

<b>REQUEST FOR COUNCIL ACTION</b> CITY OF SAN DIEGO				CERTIFICATE NUMBER (FOR COMPTROLLER'S USE ONLY)	
TO: CITY COUNCIL		FROM (ORIGINATING DEPARTMENT): Public Utilities - Water		DATE: 06/28/2013	
SUBJECT: Water Budget Based Billing					
PRIMARY CONTACT (NAME, PHONE): Luis Generoso ,(619) 533-5258 MS 904A			SECONDARY CONTACT (NAME, PHONE): Kyrsten Burr-Rosenthal, (619) 533-5380 MS 904A		
COMPLETE FOR ACCOUNTING PURPOSES					
FUND					
DEPT / FUNCTIONAL AREA					
ORG / COST CENTER					
OBJECT / GENERAL LEDGER ACCT					
JOB / WBS OR INTERNAL ORDER					
C.I.P./CAPITAL PROJECT No.					
AMOUNT	0.00	0.00	0.00	0.00	0.00
FUND					
DEPT / FUNCTIONAL AREA					
ORG / COST CENTER					
OBJECT / GENERAL LEDGER ACCT					
JOB / WBS OR INTERNAL ORDER					
C.I.P./CAPITAL PROJECT No.					
AMOUNT	0.00	0.00	0.00	0.00	0.00
COST SUMMARY (IF APPLICABLE):					
ROUTING AND APPROVALS					
CONTRIBUTORS/REVIEWERS:		APPROVING AUTHORITY	APPROVAL SIGNATURE	DATE SIGNED	
Liaison Office		ORIG DEPT.	Sasaki, Ann	7/2/2013	
		CFO			
		DEPUTY CHIEF			
		COO			
		CITY ATTORNEY			
		COUNCIL PRESIDENTS OFFICE			
PREPARATION OF:		<input type="checkbox"/> RESOLUTIONS	<input type="checkbox"/> ORDINANCE(S)	<input type="checkbox"/> AGREEMENT(S)	<input type="checkbox"/> DEED(S)
Accept the Red Oak Consultant Phase I report and authorize the Mayor to proceed with Phase II of the project to model rates for the Irrigation customer class.					
STAFF RECOMMENDATIONS: Approve the proposed action.					
SPECIAL CONDITIONS (REFER TO A.R. 3.20 FOR INFORMATION ON COMPLETING THIS SECTION)					

COUNCIL DISTRICT(S):	Citywide
COMMUNITY AREA(S):	Citywide
ENVIRONMENTAL IMPACT:	
CITY CLERK INSTRUCTIONS:	

**COUNCIL ACTION  
EXECUTIVE SUMMARY SHEET  
CITY OF SAN DIEGO**

DATE: 06/28/2013

ORIGINATING DEPARTMENT: Public Utilities - Water

SUBJECT: Water Budget Based Billing

COUNCIL DISTRICT(S): Citywide

CONTACT/PHONE NUMBER: Luis Generoso /(619) 533-5258 MS 904A

**DESCRIPTIVE SUMMARY OF ITEM:**

Accept the Red Oak Consultant Phase I report and authorize the Mayor to proceed with Phase II of the project to model rates for the Irrigation customer class.

**STAFF RECOMMENDATION:**

Approve the proposed action.

**EXECUTIVE SUMMARY OF ITEM BACKGROUND:**

In response to drought conditions in California and imported water delivery reductions from the City Council enacted mandatory (Level 2) water use restrictions in June 2009. As a possible alternative to water use restrictions, the Council expressed interest in studying the use of water budgets as a tool to achieve water reduction targets in an equitable manner. Public Utilities staff initiated a pilot study in July 2009 to examine the water budget approach. The study concluded that a model could be created to predict water budgets, supported by the finding that an average of approximately 80 percent of the properties reviewed had historical water usage that would have been within the established water budget. City staff reported results to the NR&C committee on April 20, 2011. With encouraging findings from the pilot study, Public Utilities undertook a competitive procurement process in 2011 and retained Red Oak Consulting in January 2012 to evaluate the applicability of water budgets across all water customer classes. Key findings from the Phase I report include:

1. Water budgets can be developed for the City's entire customer base. Single Family Residential (SFR) water budget methodology should be based upon the number of people per household, the area of irrigated landscape and weather conditions at the site (that impact water needs of a plant). Irrigation water budget methodology should be based upon irrigated area and weather conditions at the site. Commercial and multi-family water budget methodologies should be based upon average historical consumption at the site.
2. In order to implement water budgets, the billing system must be able to handle the proposed methodology and calculations. Enhancements and modifications would need to be made to the current billing system.
3. All customers should be billed on a monthly basis in order to provide proper and timely feedback to customers on actual consumption compared to their water budget.
4. A variance process would need to be available to customers seeking to make adjustments to the initial water budget, as well as whenever there is a change that impacts consumption, such as

an increase or decrease in the number of occupants in a dwelling, changes in irrigated landscape area, or business growth.

In addition to these consultant findings, the following are important considerations when assessing water budget based billing.

1. Perceived equity/inequity - With efficiency standards and the individual characteristics of a customer account as its basis, water budgets reward customers who use water efficiently and penalize those who do not. Customers that have an above average number of people living in the house, special needs, and/or large lots are able to meet their budget and are not penalized if they use water efficiently. The argument supporting water budgets as equitable because they accommodate larger households, special needs and larger landscape areas may also be perceived as inequitable for the same reason. A customer with minimal irrigation requirements will pay the same rate per unit of water as a customer with greater irrigation requirements.

2. Revenue stability -With a traditional inclining tier rate structure, substantially reduced water sales can result when greater than anticipated conservation levels are achieved by customers. The utility often responds with rate increases, drought surcharges or reliance on a stability fund in order to meet revenue requirements. A water budget rate structure is designed to generate sufficient revenue to recover costs through the fixed charge and tiers 1 and 2 of the rate structure. To effectively stabilize revenue, individual water budgets must be an accurate representation of each customer's efficient usage, making development of precise water budgets a critical component of the process.

3. Most customer would meet a water budget – Modeling from the pilot study and consultant review indicate that 80 to 90 percent of the SFR accounts would meet their water budget. Given this high percentage, are water budgets a worthy endeavor when just a minority of customers are likely to use water inefficiently?

4. Water Affordability – The Department is currently going through a Cost of Service Study, which may likely recommend a rate increase. The Department also anticipates possible pass-through rate increases from our two wholesalers, the Metropolitan Water District of Southern California and the San Diego County Water Authority. It is the intention of the Department to keep water rates as affordable as possible and avoid additional expenses. This includes selecting a rate structure that is simple, easy to understand and not too expensive to implement.

Based upon the findings and recommendations made by the consultant in the Phase I report staff developed two cost estimates regarding implementation of water budgets.

#### A. Implementation of Water Budgets for All Customer Classes

It is estimated that it would cost nearly \$5.7 million in one-time expenditures to implement water budgets for the entire customer base, with an ongoing annual cost of over \$3.6 million.

#### B. Implementation of Water Budgets for Irrigation Customer Class

This reduced scope is estimated to cost approximately \$871,000 in one-time expenditures to implement, with an ongoing annual cost of \$88,000.



FISCAL CONSIDERATIONS: N/A

EQUAL OPPORTUNITY CONTRACTING INFORMATION (IF APPLICABLE): N/A

PREVIOUS COUNCIL and/or COMMITTEE ACTION (describe any changes made to the item from what was presented at committee): N/A

COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS:

Results from Phase I were presented to the Independent Rates and Oversight Committee (IROC) on June 24, 2013. At that meeting IROC passed a motion to recommend that the City Council accept the Red Oak Consultant Phase I report and move forward with Phase II of the project to model rates for the Irrigation customer class. IROC passed a second motion recommending against going forward with rate modeling or implementation of water budgets for the SFR customer class.

KEY STAKEHOLDERS AND PROJECTED IMPACTS:

Key stakeholders include:

Homeowner associations, Public Utilities Department customers, Property Management Companies, Large landscape managers, and Environmental Organizations such as Coastkeeper, Surfrider

Sasaki, Ann

Originating Department

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Deputy Chief/Chief Operating Officer



THE CITY OF SAN DIEGO  
**REPORT TO THE CITY COUNCIL**

DATE ISSUED:

REPORT NO:

ATTENTION: Natural Resources and Culture Committee  
Agenda of

SUBJECT: Water Budget Based Billing

REFERENCE:

1. Memorandum dated April 20, 2011 entitled "Water Budget Based Billing"
2. Informational Report dated May 14, 2012 entitled "Consultant Review of Water Budget Based Billing Pilot Study"
3. September 8, 2010 Memo from Mayor Jerry Sanders and Council Member Donna Frye to the City Council on Water Budget Based Billing

**REQUESTED ACTION:**

Accept the Water Budget Based Billing Phase I Report prepared by Red Oak Consulting. Recommend the Mayor direct staff to complete a modified Phase II scope of work of the study to model water budget rate structures for the Irrigation customer class.

**STAFF RECOMMENDATION:**

Approve the proposed action.

**BACKGROUND:**

In response to drought conditions in California and imported water delivery reductions from the State Water Project in 2009, the San Diego County Water Authority set a regional water reduction target of eight percent for Fiscal Year 2010. In turn, the City Council enacted mandatory (Level 2) water use restrictions in June 2009 to achieve the reduction target. As a possible alternative to water use restrictions, the Council expressed interest in studying the use of water budgets as a tool to achieve water reduction targets in an equitable manner. Public Utilities staff initiated a pilot study in July 2009 to examine the water budget approach and determine the potential for implementing a similar year-round water pricing and allocation structure.

The study concluded that a model could be created to reasonably predict water budgets for the test homes included in the study, supported by the finding that an average of approximately 80 percent of the properties reviewed had historical water usage that would have been within the established water budget. City staff reported results to the NR&C committee on April 20, 2011.

With encouraging findings from the pilot study, the Public Utilities Department (Department) undertook a competitive procurement process in 2011 and retained Red Oak Consulting in January 2012. Red Oak was tasked with reviewing the pilot study, evaluating the applicability of water budgets across all customer classes, identifying the challenges associated with establishing water budgets and recommending long-term water conservation programs that could most effectively support customers that are billed based upon a water budget.

#### DISCUSSION:

In its evaluation of Water Budget Based Billing for the City of San Diego, Red Oak's Phase I report makes the following findings and recommendations:

1. Assumptions, data and methodology utilized in the 2010 pilot study to test a water budget methodology for Single Family Residential (SFR) accounts represent a valid approach, and can be used as a starting point in the development of water budgets for the entire customer class.
2. Water budgets can be developed for the City's entire customer base, including commercial, irrigation, and multi-family residential customer classes. SFR water budget methodology should be based upon the number of people per household, the area of irrigated landscape and weather conditions at the site (that impact water needs of a plant). Irrigation water budget methodology should be based upon irrigated area and weather conditions at the site. Commercial and multi-family water budget methodologies should be based upon average historical consumption at the site.
3. In order to implement water budgets, the billing system must be able to handle the proposed methodology and calculations. Enhancements and modifications would need to be made to the current billing system.
4. All customers should be billed on a monthly basis in order to provide proper and timely feedback to customers on actual consumption compared to their water budget.
5. The implementation of water budget based billing would provide the Department's customer service representatives and water conservation staff a new context for helping customers achieve water efficiency. Proper training on the new rate structure would need to be provided to these "front line" professionals, and public outreach programs developed to educate customers moving to a water budget rate structure.
6. A variance process would need to be available to customers seeking to make adjustments to the initial water budget, as well as whenever there is a change that impacts consumption, such as an increase or decrease in the number of occupants in a dwelling, changes in irrigated landscape area, or business growth. A variance process is central to the establishment of valid water budgets and is the mechanism that enables customers to work with the water utility to improve the accuracy of (and therefore confidence in) their water budget. The variance process can be viewed as a positive step toward enhancing customer understanding of water consumption patterns, however this process requires the dedication of significant resources (including additional costs and staffing) to support the effort.
7. Water budgets can provide a useful drought management tool, offering an effective way to encourage usage reductions associated with drought stages.

8. In addition to the existing water conservation programs maintained by the City, several other program enhancements and additions should be considered when implementing water budgets including: providing additional turf removal customer support, web support for irrigation scheduling, participation in the FreeSprinkler.com voucher program, and implementation of a urinal retrofit program.

In addition to these findings made by the consultant, the following are important considerations when assessing water budget based billing.

1. Perceived equity / inequity - With efficiency standards and the individual characteristics of a customer account as its basis, water budgets reward customers who use water efficiently and penalize those who do not. Customers that have an above average number of people living in the house, special needs, and/or large lots are able to meet their budget and are not penalized if they use water efficiently. The structure has been perceived as an equitable way to share limited water supplies, while preserving some flexibility for customers to decide how water is used. The argument that supports water budgets as equitable because they accommodate the water use requirements of larger households, special needs and larger landscape areas may also be perceived as inequitable for the same reason. A customer with minimal irrigation requirements will pay the same rate per unit of water as a customer with much greater irrigation requirements. Under the current SFR tiered rate structure, a customer pays a higher per unit price for water when exceeding 14 HCF, regardless of the number of people living in the house or the lot size. With a water budget structure, the larger the household, the larger the indoor budget (tier 1 rate) and the bigger the lot size, the bigger the outdoor budget (tier 2 rate).
2. Revenue stability - With a traditional inclining tier rate structure, a substantial reduction in water sales can result when greater than anticipated conservation levels are achieved by customers. The utility often responds with rate increases, drought surcharges or reliance on a stability fund in order to meet revenue requirements. In this scenario there is no reward for customers that conserve. When conservation occurs, the utility that counts on recovering all or part of its costs through volumetric rates is vulnerable to falling short of generating enough revenue. A water budget rate structure is designed to generate sufficient revenue to recover costs through the base charge and tiers 1 and 2 of the rate structure. To effectively stabilize revenue, individual water budgets must be an accurate representation of each customer's efficient usage, making the development of precise water budgets a critical component of the process. Revenue collected from customers exceeding their budget is accounted for separately, and can be used to fund programs to increase efficiency and reduce waste, or to mitigate the cost to acquire additional water supplies that meet demands caused by inefficient water use.
3. Impact on a water bill – It may be a common but false assumption that water budgets will result in lower water bills for most customers. A water budget rate structure, like any other rate structure, must generate required revenue through fixed and/or volumetric charges.
4. Sewer billing methodology - A SFR water budget typically incorporates unique characteristics of a household to determine an allotment that reflects the efficient use of indoor water. Currently, the City bases the volumetric sewer charge on water consumption during a period of time in the winter when outdoor water use is assumed to be at its lowest, thus offering the best representation of indoor water use and returns to sewer. Should the City move to water budgets, an additional method upon

which to base returns to sewer would become available. Questions may arise as to why two methods are used to estimate indoor water consumption.

5. Most customers would meet a water budget – Modeling from the pilot study and consultant review indicate that approximately 80 to 90 percent of all customers would meet their water budget. Given this high percentage, are water budgets a worthy endeavor for all customers when a minority of customers are likely to use water inefficiently?
6. Water Affordability – The Department is currently going through a Cost of Service Study, which may likely recommend a rate increase. The Department also anticipates possible pass-through rate increases from our two wholesalers, the Metropolitan Water District of Southern California and the San Diego County Water Authority. It is the intention of the Department to keep water rates as affordable as possible and avoid additional expenses. This includes selecting a rate structure that is simple, easy to understand and not too expensive to implement.

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#### COST ANALYSIS:

The following section presents two alternatives for consideration. Option A represents a continuation of the water budget based billing project's established scope of work and includes the further evaluation of water budgets for all customer classes. Option B considers moving the study forward with a focus on water budgets for the Irrigation customer class only. Cost estimates are based upon the recommended enhancements made by the consultant in the Phase I report. A summary of the next steps of the project in association with both options has also been developed.

##### *Option A: Water Budgets for All Customer Classes*

Cost Estimate: \$5.7 million in one-time expenditures, with an ongoing annual cost of over \$3.6 million. The table below categorizes the largest anticipated expenses associated with implementation of water budgets.

Next Steps: Phase II of the project includes rate modeling of water budgets for all customer classes and could be completed in nine to twelve months. At its conclusion a policy decision by the City Council on whether to implement water budgets for Irrigation customers would be required. Phase III is implementation of water budgets and is expected to take 16 to 20 months. A cost of service study and Prop 218 notification process would be required prior to implementation.

Option A Estimated Costs to Implement Water Budgets for All Customer Classes		
	One Time Costs	Annual Costs
Billing System Enhancements <i>(E.g. programming costs to reflect actual ET*, landscape size, etc. in bill)</i>	\$ 754,000	
Migration from bi-monthly billing to monthly billing for all SFR accounts <i>(Additional cost to read SFR meters monthly instead of bi-monthly).</i>		\$ 2,383,000
Internal Training and Public Outreach <i>(Frontline staff training, public outreach)</i>	\$ 563,000	
Initial development of water budgets <i>(includes building and populating database with unique variables for each site, site verification of landscape measurements, verification of data)</i>	\$ 356,500	
Variance Program - Development, Implementation and Ongoing <i>(Assumes 30% of customers request initial variance, 10% request variance annually on an ongoing basis. Includes staff costs to administer program.)</i>	\$ 3,578,100	\$ 1,023,000
Micro-Climate Geo-referencing and Data Collection <i>(To establish a micro-climate tag based on location for each account, and to purchase ET on an ongoing basis used to calculate budgets and actual bills)</i>	\$ 50,000	\$ 39,600
Enhancements to conservation programs to complement water budgets <i>(To develop and implement the consultant recommended programs, includes rebate amount, staffing resources)</i>	\$ 64,000	\$ 180,800
Shadow Billing <i>(Sample bills that show customers what the current bill would look like once water budget based billing is in place)</i>	\$ 294,000	
Total	\$ 5,659,600	\$ 3,626,400

\* ET is Evapotranspiration and represents plant watering needs.

#### Option B: Water Budgets for Irrigation Customer Class

Cost Estimate: \$871,000 in one-time expenditures to implement, with an ongoing annual cost of \$87,800. The table below categorizes the largest anticipated expenses associated with implementing water budgets for this option.

Next Steps: Phase II of the project includes rate modeling of water budgets for the Irrigation class only and could be completed in four to six months. At its conclusion a policy decision by the City Council on whether to implement water budgets for Irrigation customers would be required. Phase III is implementation of water budgets and is expected to take 16 months. A cost of service study and Prop 218 notification process would be required prior to implementation.

Option B Estimated Costs to Implement Water Budgets for Irrigation Customer Class		
	One Time Costs	Annual Costs
Billing System Enhancements <i>(E.g. programming costs to reflect actual ET* , landscape size, etc. in bill)</i>	\$ 513,000	
Migration from bi-monthly billing to monthly billing for 5,000 Irrigation accounts** <i>(Additional cost to read Irrigation meters monthly instead of bi-monthly)</i>		\$ 44,000
Internal Training and Public Outreach <i>(Frontline staff training, public outreach)</i>	\$ 19,500	
Initial development of water budgets for Irrigation customers <i>(Includes verification of landscape area by meter )</i>	\$ 256,500	
Variance Program - Development, Implementation and Ongoing <i>(Assumes 5% of customers request initial variance, 1% request variance annually on an ongoing basis. Includes staff costs to administer program.)</i>	\$ 16,650	\$ 4,200
Micro-Climate Geo-referencing and Data Collection <i>(To establish a micro-climate tag based on location for each account, and to purchase ET on an ongoing basis used to calculate budgets and actual bills)</i>	\$ 50,000	\$ 39,600
Shadow Billing <i>(Sample bills that show customers what the current bill would look like once water budget based billing is in place)</i>	\$ 15,600	
Total:	\$ 871,250	\$ 87,800

\* ET is Evapotranspiration and represents plant watering needs.

\*\* Public Utilities is implementing Automated Meter Infrastructure (AMI) for all accounts billed on a monthly basis, which includes 25% of the Irrigation accounts. An expansion of AMI to include the remaining 5,000 bi-monthly billed Irrigation accounts would eliminate the need for manual meter reading and associated expense. Information regarding the cost to convert meters to AMI is being prepared, but is not yet available.

### RECOMMENDATIONS:

It is recommended the Public Utilities Department continue working with the consultant to model potential water budget rate structures for the Irrigation customer class.

The complexity, expense and potentially limited benefit associated with the implementation of water budget based billing across all customer classes is significant. When using past water consumption to predict performance in a water budget rate structure, the consultant's preliminary research found that the Irrigation class as a whole had the greatest percentage of 'over budget' water use, suggesting the greatest potential to increase efficiency. The Irrigation class accounts for approximately two percent (7,500) of all accounts but 11% of total water consumption. Once site data is collected, the methodology used to develop a water budget for irrigation customers is fairly simple. Since the initial water budget development process requires the use of accurate site-specific details it is anticipated that few customers would request variances. Continuing the evaluation of water budgets for the Irrigation class also aligns with a recommendation from the Water Policy Implementation Task Force to focus on water use efficiency for these customers.

#### ALTERNATIVES:

1. Proceed to Phase II of the study and complete the planned scope of work with Red Oak Consulting to model water budget rate structures for all customer classes. This option will allow the development of a water budget rate structure that can be compared with the traditional rate structure, and will show how water budget based billing will recover revenue through the base charge and two rate tiers. This is not recommended due to excessive implementation costs.
2. Take no action. Do not continue efforts to research Water Budget Based Billing in any capacity. This option will terminate the contract with Red Oak Consulting for the water budget based billing study. The current Cost of Service Study provides enough options to consider.

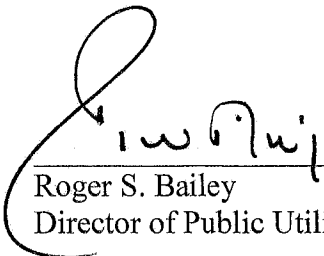
#### COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS:

Results from Phase I were presented to the Independent Rates and Oversight Committee (IROC) on June 24, 2013. At that meeting IROC passed a motion to recommend that the City Council accept the Red Oak Consultant Phase I report and move forward with Phase II of the project to model rates for the Irrigation customer class. IROC passed a second motion recommending against going forward with rate modeling or implementation of water budgets for the SFR customer class. Should the City Council decide to move forward with the study, Staff will return to IROC with the results of Phase II (rate structure modeling). Public Utilities plans to update stakeholder groups with information about Phase II. Substantial outreach and community involvement would occur during Phase III of the project.

#### KEY STAKEHOLDERS AND PROJECTED IMPACTS:

Key stakeholders include:

- Homeowner associations (HOAs)
- Public Utilities Department customers
- Property Management Companies
- Large landscape managers for parks, sports fields and golf courses
- Environmental Organizations, such as San Diego Coastkeeper and Surfrider



Roger S. Bailey  
Director of Public Utilities

KBR/kbr

Attachment A: Water Budget Based Billing Project – Phase I Report, Red Oak Consultants





**City of San Diego**  
**Public Utilities Department**

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# **Water Budget-Based Billing Project**

## **Phase I Report**

June 3, 2013

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## Appendix

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- A. Task 1 – Validation of Single-Family Residential Pilot Study, May 5, 2012
  - Mayor Sanders and Council Member Frye Memorandum to City Council, dated September 8, 2010
  - Director of Public Utilities Roger Bailey Memorandum to Natural Resources and Culture Committee, dated April 13, 2011
  - Staff Presentation to Natural Resources and Culture Committee, dated April 20, 2011
- B. Summary of Water Accounts for FY 2009, FY 2010 and FY 2011 by Customer Group

## Acronyms Used in the Report

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AF	Acre-foot
BMP	Best Management Practice
CIMIS	California Irrigation Management Information System
CSR	Customer Service Representative
CF	Cubic Feet
CLIA	Certified Landscape Irrigation Auditor
DWR	Department of Water Resources
ET	Evapotranspiration
FY	Fiscal Year
GIS	Geographic Information Systems
gpcd	Gallons per Capita per Day
gpd	Gallons per day
gpf	Gallons per flush
gpm	Gallons per minute
HCF	Hundred Cubic Feet
HECW	High-Efficiency Clothes Washer
HE toilet	High-Efficiency toilet
HET upgrade	High-Efficiency toilet upgrade
IRWD	Irvine Ranch Water District
IRWMP	Integrated Regional Watershed Management Program
LF	Landscape Factor
Method 3	Hydrologic Region Target method
MWD	Metropolitan Water District of Southern California
pphh	People or Persons per Household
ROI	Return on Investment
SB X7-7	California Water Conservation Act of 2009
SDCWA	San Diego County Water Authority
SDMC	San Diego Municipal Code
SF	Square Feet
SFR	Single-family Residential
SWP	State Water Project
ULFT	Ultra-Low-Flow Toilet
WEF	Water Efficiency Factor
WMWD	Western Municipal Water District

## Glossary of Terms

Acre-foot (AF)	Volume of water sufficient to cover an acre of land to a depth of 1 foot and equal to 43,560 cubic feet or approximately 325,851 gallons.
Best Management Practices (BMP)	Urban water conservation practices included in the California Urban Water Conservation Council Memorandum of Understanding (MOU) with water suppliers. According to the MOU, a BMP is a policy, program, practice, rule, regulation or ordinance or the use of devices, equipment or facilities which meets either of the following criteria: (a) An established and generally accepted practice among water suppliers that results in more efficient use or conservation of water; (b) A practice for which sufficient data are available from existing water conservation projects to indicate that significant conservation or conservation related benefits can be achieved; that the practice is technically and economically reasonable and not environmentally or socially unacceptable; and that the practice is not otherwise unreasonable for most water suppliers to carry out.
California Irrigation Management Information System (CIMIS)	Program of the Office of Water Use Efficiency (OWUE), California Department of Water Resources (DWR) that manages a network of over 120 automated weather stations in the state of California.
Cubic feet (CF)	Volume unit measured by City water meters and equal to approximately 7.48 gallons.
Evapotranspiration (ET)	Loss of water from the soil both by evaporation and by transpiration from the plants measured in inches.
Fiscal Year (FY)	12 month period ending June 30
Hundred Cubic Feet (HCF)	Volume unit measured by City water meters and equal to approximately 748 gallons.
Landscape Factor (LF)	Target established by State of California, with AB 1881, for landscape water use efficiency of 80 percent of the local ET. Basis for state legislation that every city and county have adopted (including San Diego).
Metropolitan Water District (MWD) of Southern California	Consortium of 26 cities and water districts that provides drinking water to nearly 19 million people in parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura counties.

Microclimate	Weather within a microzone. The ability to calculate daily ET for any microzone (or microclimate) enables an agency to establish a landscape water budget based on actual weather for any given address.
Microzone	Area equal to one square kilometer (approximately 0.40 square miles). There are about 900 microzones within the city limits.
Proposition 218	Amended the California constitution in 1996 and required water utilities, among other things, to proportionately charge their rates while managing limited resources for the overall benefit of the community.
San Diego County Water Authority (SDCWA)	Public agency serving the San Diego region as a wholesale supplier of water from the Colorado River and Northern California to its 24 member agencies serving the San Diego region.
SB X7-7	The State of California legislation, adopted in November 2009 to increase water use efficiency, sets an overall goal of reducing per capita urban water use by 20 percent by the end of 2020.
Water Budget	Calculated amount of water a single- or multi-family residential, non-residential, or dedicated irrigation customer will require based on the size of the family, number and types of fixtures, type of business, and landscape needs, or based on historically consumption.
Water Efficiency Factor (WEF)	Target established by City to adjust water budget to further encourage multi-family and non-residential water efficiency. Set at 100% in initial water budget calculation in this report.

# 1. Executive Summary

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## 1.1. Background

The City of San Diego (the City), the second largest city in California, is located at the “end of the pipeline” in terms of water supply. The City, through its Public Utilities Department (Department), imports approximately 85 percent of its water from northern California and the Colorado River.

Driven by drought, rising costs of water, concerns of residents and business about the equity and efficiency of the current rate structure during recent periods of use restrictions, the Mayor and Council directed the Department to conduct a Pilot Study of water budget-based rate structures for single-family residential (SFR) customers. Department staff completed the Pilot Study in March 2010.

The City retained Red Oak Consulting (Red Oak) in conjunction with Tom Ash & Associates, Maureen Erbeznik & Associates and Katz & Associates to undertake a two-phase study of the water budget-based billing approach to water rate structures. Phase I tasks include:

- Validation of Pilot Study findings of water budget-based billing for SFR customers
- Applicability of water budget-based billing to entire customer base
- Considerations involved with establishing water budget-based billing
- Review and evaluation of long-term water conservation programs

Phase II, if authorized by the City, develops specific water rate structures for each customer class. Upon direction from the City Council to proceed, the next step of the project would conclude with a public outreach and education process leading to implementation of the water budget-based billing structures.

This report documents Phase I findings and recommendations. Red Oak provided a separate report for the Pilot Study validation task (Appendix A). Separate sections within this report address each of the other Phase I tasks. The goal of this Phase I Report is to provide information on all aspects of water budget-based billing such that the City can make an informed decision about moving forward to Phase II.

## 1.2. Validation of Pilot Study of Water Budget-Based Billing for SFR Customers

The City completed an internal analysis of 900 SFR accounts in different climate zones within the City’s water service area. The Pilot Study sought to confirm the methodology



determining water budgets for each customer. The testing of water budgets for different customers addresses the following questions:

- Is the Pilot Study methodology sound?
- Are water budgets reasonably and accurately calculated based on individual home characteristics (number of persons per household, landscape area, and changing weather conditions)?
- Does customer water use align with water budget assumptions (i.e., how many SFR accounts would be expected to meet and/or exceed their given water budgets)?

Appendix A contains Red Oak's report on its validation of the Pilot Study. Our investigation found that the Pilot Study:

- Incorporated an approach to processes and methods similar to that used by other utilities to test water budget rate structures
- Made assumptions consistent with State legislation and industry data
- Used different geographic zones (Rancho Bernardo, Point Loma, and Central) to recognize different temperature and precipitation patterns
- Demonstrated that water budgets can identify SFR accounts that meet water budgets and accounts that exceed their budget
- Confirmed that customer equity could be accomplished with water budget-based allocations and billing
- Confirmed that the City can use water budgets to manage limited water supplies and meet State legislation (SB X7-7)

### **1.3. Applicability of Water Budget-Based Billing to Entire Customer Base**

Red Oak analyzed historical billing data for SFR, multi-family, non-residential, and dedicated irrigation customers and calculated water budgets for each customer. Red Oak used water budget methodologies in its analysis that are in accordance with industry standards, comply with State guidelines, and are in common practice by Southern California water utilities.

Table 1-1 summarizes the water budget methodologies used for each class. The SFR water budget is the sum of indoor and outdoor budgets. The indoor budget is based on the number of persons per household (pphh). The outdoor budget is based on evapotranspiration (ET) and irrigable area. ET is the loss of water from the soil both by evaporation and by transpiration from the plants. The dedicated irrigation accounts water budget methodology is identical to the SFR outdoor budget methodology.

Customers in the multi-family and non-residential classes have unique water usage characteristics. The water budget for these classes is based on the average water usage for a similar historical billing period. This recognizes unique water usage characteristics for each customer and is simple to determine.

**Table 1-1:  
Water Budget Methodologies by Customer Class**

Customer Class	Efficiency Standard	Billing Equation	Data Requirements
Single-Family Residential	Household size, Irrigable area, 80% of ET	$(pphh) \times (gpcd) + (SF) \times (ET) \times (LF)$	Household size Irrigable area by meter Billing period ET
Multi-Family	Bill period average	Average of similar bill cycles	Historical water use
Non-Residential	Bill period average	Average of similar bill cycles	Historical water use
Dedicated Irrigation	80% of ET	$(SF) \times (ET) \times (LF)$	Irrigable area by meter Billing period ET

Table 1-2 summarizes the results of our analysis of fiscal year (FY) 2010 bills for each customer class using the water budget methodologies from Table 1-1. For example, our analysis of FY 2010 single-family bimonthly bills indicates that 92 percent were within their water budget and 8 percent were in excess of their water budget.

**Table 1-2:  
Summary of Water Budget Analysis of FY 2010 Bills**

Customer Class	Portion of Total Water Bills	
	Within Water Budget	In Excess of Water Budget
Single-Family Residential	92%	8%
Multi-Family	80%	20%
Non-Residential	81%	19%
Dedicated Irrigation <sup>(a)</sup>	86%	14%
(a) Based on analysis of dedicated irrigation accounts with irrigable area.		

Table 1-3 summarizes the results of our analysis of FY 2010 usage for each customer class using the water budget methodologies from Table 1-1. Our analysis of FY 2010 single-family bimonthly usage indicates that 90 percent was within their water budget and 10 percent was in excess of their water budget. In this context, FY 2010 water sales to all customer classes exceeded their potential water budget usage by a sum of 25,200 acre-feet (AF) (overall average of 16%).

**Table 1-3:  
Summary of Water Budget Analysis of FY 2010 Usage**

Customer Class	Portion of Total Water Usage		Estimated Amount of Water Usage in Excess of Water Budget (AF)
	Within Water Budget	In Excess of Water Budget	
Single-Family Residential	90%	10%	6,600
Multi-Family	86%	14%	5,200
Non-Residential	81%	19%	6,900
Dedicated Irrigation	70%	30%	<u>6,500</u>
Total			25,200

#### 1.4. Considerations Involved with Establishing Water Budget-Based Billing

The City may encounter policy, technical, operational, and philosophical considerations during the establishment of water budget-based billing. Section 4 discusses these considerations in detail.

##### Policy Considerations

- The City Council enacted City Policy No. 400-15 (*Comprehensive Policy for a Sustainable Water Supply in San Diego*) on October 25, 2011. Section C of this policy delineates the following conservation policies, among others, to:
  - Support water conservation during wet and dry weather periods
  - Support a tiered or budget pricing structure for SFR customers that encourages conservation, discourages waste, and supports the needs of private sector businesses and agriculture
  - Consider using customer-specific data, such as geographic information systems (GIS) data, geographic zones, and ET information for SFR rates.

- The State of California adopted SB X7-7 in November 2009 to increase water use efficiency. This legislation sets an overall goal of reducing per capita urban water use by 20 percent by the end of 2020.
- Proposition 218 amended the California constitution in 1996 and required water utilities, among other things, to proportionately charge their rates while managing limited resources for the overall benefit of the community.

#### Technical Considerations

- In order to implement a water budget structure successfully, the City's billing software must be able to employ a variety of data, such as household size, irrigated area, ET values, and historical monthly water use for five years. The City's Department of IT prepared an initial cost estimate to implement a water budget-based structure in Customer Care Solutions (utility billing system). Based on information provided by the City's Department of IT, Red Oak believes the current SAP system can accommodate a change to a water budget structure.

#### Operational Considerations

- The City bills its SFR customers using a bimonthly billing cycle and all other customers on a monthly basis. The bimonthly cycle provides delayed feedback to the customer and limits achievement of a high level of consistent water use efficiency.
- The implementation of water budget-based billing provides customer service representatives and conservation staff a new context for helping customers achieve water efficiency. It is important to provide proper training on the new rate structures to these "front line" professionals.
- Public outreach programs will be essential to educate customers should the City decide to implement water budgets. Website information, bill inserts, direct communication, and other communication means will create coordinated communication.
- Water budget structures provide a useful drought management tool. It is relatively easy to change a customer's water budget to accommodate usage reductions associated with drought stages.

#### Philosophical Considerations

- The City strives to maintain a rate structure that supports City policies, equitably recovers costs, and places high value on water efficiency. A conventional fixed-tier structure carries less capability to monitor each customer's water efficiency than with the water budget structure.
- Customer service becomes an important part of education and support for customers tasked with using water efficiently. Variance programs imbed

flexibility into water budget structures and become important to public outreach and education when implementing water budget-based billing.

Our Red Oak team believes that the City can effectively address virtually every policy, technical, operational, or philosophical consideration. The major challenge is moving from traditional rate structures to water budget-based billing. This move requires a coordinated strategy of preparation, both internal and external to the City. The payback for the effort, based on the experience of utilities over the past 20 years, is a billing structure that:

- Ensures long-term water efficiency regardless of weather or economy
- Adapts quickly to changes in weather, customers, business needs, and drought conditions
- Provides a new source of local conservation and future water supply funding

### **1.5. Long-term Water Conservation Programs**

Red Oak evaluated the ability of the City's existing conservation programs to support a water budget structure and recommended additional programs that enable customers to remain within their individual water budgets successfully. We also reviewed the programs of five regional water utilities that have implemented water budget structures.

The City has a broad array of existing programs that have delivered considerable water savings in the past and will continue to do so. Should the City transition to water budget-based billing structure, there are several other program designs that have the potential to bolster the level of support and conservation options for customers. These suggested programs will fill the gap identified by the analysis of the City's existing programs, include an educational component, and provide strong implementation support. These programs include:

- Turf removal support
- Web support for irrigation scheduling
- FreeSprinklerNozzles.com voucher
- Urinal retrofit

## 2. Introduction

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### 2.1. Study Background

The City, through its Public Utilities Department (Department) currently serves about 290,000 water connections. The City has effectively managed its water resources in a dry climate located at the end of the imported water “pipeline” in populous Southern California. The City imports approximately 85 percent of its water from the Sacramento-San Joaquin Bay Delta and the Colorado River conveyed through the State Water Project (SWP) and the Metropolitan Water District of Southern California (MWD) delivery systems, respectively.

In the face of persistent statewide drought in 2009, reduced allocations of eight percent of imported water deliveries from SDCWA and economic recession, Department staff researched allocation approaches to encourage customers to reduce water consumption. One approach (based on historical consumption) could create challenges for those minimizing water uses through conservation efforts than on past water-wasters. The City ultimately adopted specific water use restrictions in 2009 to curb water consumption during the City’s period of mandatory conservation.

During 2009, Department staff also researched water-pricing alternatives including the water budget-based billing approach. This approach can be defined as:

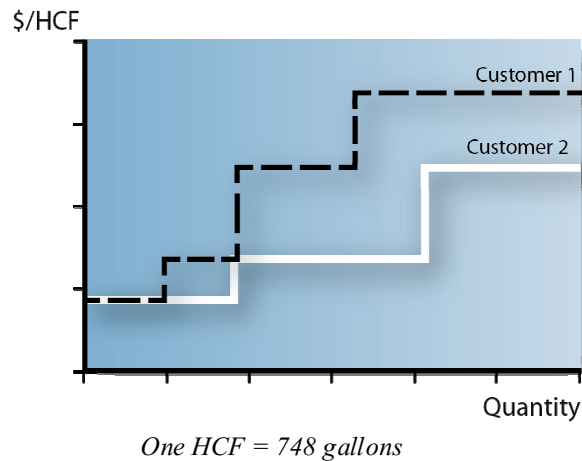
*The budget is an estimate of how much water the household needs, based on the number of people in the household, the size of landscaped area, local weather, the amount of water plants need, as well as any water use efficiency standards and/or drought factors that may be put in place.*

Figure 2-1 illustrates the water budget structure for two customers. Both customers pay the same unit price per hundred cubic feet (HCF)<sup>1</sup> of metered water use, but the water use budget is individually calculated based on determinations of efficient indoor and outdoor water use allowances. Customer 1 in Figure 2-1 has a smaller indoor budget and moves into higher-priced usage blocks sooner than Customer 2, who has a larger indoor budget as well as a larger outdoor budget.

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<sup>1</sup> One HCF is approximately 748 gallons.

**Figure 2-1: Water Budget Rate Structure**



During the last few years there has been an increasing interest in the water budget-based billing approach in San Diego. In 2009, Department staff initiated the Pilot Study to examine how this approach would work for SFR customers. The Department completed the Pilot Study in March 2010. Based on a sampling of sites in three different climate zones (coastal, central, and inland), the Pilot Study concluded that water budgets could be calculated and this billing structure could be applied across the entire SFR customer class.

The City retained Red Oak Consulting to further study the feasibility of implementing a water budget structure for all retail customers. Initially, the Department tasked Red Oak with:

- Validating results of the Pilot Study
- Determining applicability of water budget-based billing to the entire customer base
- Identifying considerations involved with establishing water budget-based billing
- Identifying long-term water conservation programs that support water budget-based billing

This Phase I report summarizes study findings and includes the following sections:

- Section 1 - Executive Summary
- Section 2 - Introduction
- Section 3 - Applicability of Water Budget-Based Billing to Entire Customer Base
- Section 4 - Considerations Involved with Establishing Water Budget Based Billing
- Section 5 – Review and Evaluation of Long-Term Water Conservation Programs
- Appendices

## **2.2. Water Budget-Based Billing Approach**

The City is evaluating whether or not a water budget-based billing structure can accomplish a wide range of goals important to the City, Department, and its citizens/customers. Achievement of these goals is intended to:

- Promote long-term management of water resources through cost-effective, sustainable conservation programs.
- Provide equity to each customer.
- Recognize efficient water users. A successful rate structure needs to identify and reward efficient water use.
- Establish accurate water efficiency standards across all types and classes of customers.
- Meet water efficiency targets and maintain savings gains.
- Meet requirements of State legislation SB X7-7, which calls for a 20 percent reduction in water consumption per capita by 2020.
- Meet customer class proportionality and public approval/voting requirements of Proposition 218 and, as appropriate, Proposition 26 (Supermajority Vote to Pass New Taxes and Fees Act).

These goals are important elements to consider when assessing the Department's Pilot Study for SFR customers and the applicability of a water budget structure to all other customers.



## 3. Applicability of Water Budget-Based Billing to Entire Customer Base

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### 3.1. Introduction

This report section discusses the applicability of water budget-based rate structures to SFR, multi-family, non-residential, and dedicated irrigation customer classes. This section describes the water budget methodology, provides examples of water budget calculations, and presents results of the initial water budget analysis for each customer class. Red Oak believes that water budget structures are applicable to all of the City's customer classes.

### 3.2. Single-Family Residential

In FY 2010, the City served approximately 228,000 SFR accounts whose water usage totaled approximately 63,000 AF. Appendix B summarizes the number of single-family accounts for FY 2009, 2010 and 2011.

#### 3.2.1. Pilot Study

In 2009, the City initiated a Pilot Study to determine the feasibility of implementing a water budget-based billing structure for SFR customers. The City conducted an internal analysis of 900 SFR accounts (about 0.4 percent of the total number of SFR accounts). The Pilot Study sought to confirm the effectiveness of the methodology to determine water budgets for each customer.

Red Oak validated the results of the City's Pilot Study in Task 1 of this study (Appendix A) and concluded the following:

- Pilot Study approach, in terms of the data used and analyzed, is valid.
- Assumptions used in the Pilot Study to determine water budgets for sample accounts are appropriate. These values include persons per household, water use per person, and landscape to lot size ratios for sampled accounts.
- The water budget-based billing approach is feasible for use in serving SFR customers.

The Pilot Study found that approximately 80 percent of SFR customers in the Pilot Study sample would already meet a typical water budget based on 60 gallons per capita per day (gpcd), four pphh, and 80 percent ET for the estimated irrigated area. This finding is generally consistent with the experience of other utilities and is useful for

assessing/identifying the potential for additional “efficiencies” that might be achieved through a budget-based billing approach.

### 3.2.2. Single-Family Residential Water Budget Methodology

Assuming the City adopts a water budget-based billing structure for SFR customers, Red Oak proposes the water budget be based on the sum of indoor and outdoor budgets. The indoor budget is based on the assumed number of persons per household and gallons per capita per day. The outdoor budget is based on ET, irrigable area, and the landscape factor. This methodology calculates the water budget for each customer for each billing period.

The proposed SFR water budget formula is as follows:

***SFR Water Budget = Indoor Budget + Outdoor Budget***

*Indoor Budget = (pphh) x (gpcd) x (days in the billing period)*

*Outdoor Budget = (SF) x (ET) x (LF) x (days in the billing period)*

*Where:*

pphh = number of persons per household

gpcd = gallons per capita per day

SF = square feet of irrigated area

ET = evapotranspiration

LF = landscape factor

The landscape factor is a measure of landscape water use efficiency. The target established by State of California, with AB 1881, is a landscape water use efficiency of 80 percent of the local ET.

### 3.2.3. Single-Family Residential Water Budget Calculation Example

Tables 3-1 and 3-2 illustrate the development of water budgets for two sample SFR customers with differing budget billing criteria. In these examples, Tier 1 captures indoor budget water use and is the same for all bimonthly billing periods; Tier 2 captures outdoor budget water use and varies each billing period according to the ET; Tier 3 captures excessive water use that is greater than the customer’s water budget.

Table 3-1 shows the development of a bimonthly water budget for sample SFR Customer No. 1. This sample customer has three residents and a landscape area of 3,000 SF. The total water budget for the bimonthly billing period is 36 HCF (27,000 gallons) consisting of an indoor budget of 14 HCF (11,000 gallons) and an outdoor budget of 22 HCF (16,000 gallons).

**Table 3-1:**  
**Sample Water Budget Calculation for SFR Customer No. 1**

Budget Billing Criteria				
No. of residents = 3		Average daily ET = 0.18 in. (0.015 ft.)		
Daily use per capita = 60 gallons		Landscape Factor = 0.80		
Billing period = 60 days		Landscape Area = 3000 SF		
Rate Structure	Budget Description	Formula	Bimonthly Tier Range (HCF)	Bimonthly Tier Range (gallons)
Tier 1	Indoor	3 people x 60 gpcd x 60 days / (748 gals per HCF)	0 to 14	0 to 11,000
Tier 2	Outdoor	3000 SF x 0.015 ft ET per day x 60 days x 0.80 LF / 100 CF	14 to 36	11,000 to 27,000
Tier 3	Excess		Greater than 36	Greater than 27,000

Table 3-2 shows the development of a bimonthly water budget for sample SFR Customer No. 2. This sample customer has six residents and a landscape area of 6,000 SF. The total water budget for the bimonthly billing period is 72 HCF (54,000 gallons) consisting of an indoor budget of 29 HCF (22,000 gallons) and an outdoor budget of 43 HCF (32,000 gallons). Numbers are rounded in both tables for simplicity.

**Table 3-2:**  
**Sample Water Budget Calculation for SFR Customer No. 2**

Budget Billing Criteria				
No. of residents = 6		Average daily ET = 0.18 in. (0.015 ft.)		
Daily use per capita = 60 gallons		Landscape Factor = 0.80		
Billing period = 60 days		Landscape Area = 6000 SF		
Rate Structure	Budget Description	Formula	Bimonthly Tier Range (HCF)	Bimonthly Tier Range (gallons)
Tier 1	Indoor	6 people x 60 gpcd x 60 days / (748 gals per HCF)	0 to 29	0 to 22,000
Tier 2	Outdoor	6000 SF x 0.015 ft ET per day x 60 days x 0.80 LF / 100 CF	29 to 72	22,000 to 54,000
Tier 3	Excess		Greater than 72	Greater than 54,000

### 3.2.4. Initial Single-Family Residential Water Budget Results

Red Oak analyzed FY 2010 billing data for 212,470 SFR accounts (approximately 93% of total SFR accounts). The methodology described above was used to determine the proportionate number of bills and usage falling within the water budget. We used the following assumptions from the Pilot Study:

Indoor budget assumptions

- 4 people per household
- 60 gallons per capita per day

Outdoor budget assumptions

- 80 percent landscape factor
- Irrigable area shown in following tabulation

SFR Property Size	Percent of SFR Property Landscaped <sup>(a)</sup>
<= 1/8 acre	28%
> 1/8 acre but <= 1/4 acre	39%
> 1/4 acre but <= 1/2 acre	59%
> 1/2 acre but <= 3/4 acre	60%
> 3/4 acre but <= 1 acre	67%
> 1 acre	72%
(a) Percentages represent portion of lot size that is irrigable for test sites included in PILOT study.	

- ET based on data from California Irrigation Management Information System (CIMIS) Station No. 184 (San Diego II) for months of July 2009 through June 2010

Table 3-3 summarizes the results of our analysis of FY 2010 bills for the SFR accounts. Ninety-two percent of the SFR bimonthly bills in our analysis were within their water budget and eight percent were in excess of their water budget.

**Table 3-3:  
Summary of Single-Family Residential  
Water Budget Analysis of FY 2010 Bills**

	Within Water Budget	In Excess of Water Budget	Total
Portion of Bills	92%	8%	100%

Table 3-4 summarizes the results of our analysis of FY 2010 usage for the SFR accounts. Ninety percent of single-family usage was within their water budget and 10 percent was in excess of their water budget. Our analysis estimates that the SFR customers exceeded their water budget amount in FY 2010 by 6,600 AF (2,870,000 HCF or 2,150 million gallons).

**Table 3-4:  
Summary of Single-Family Residential  
Water Budget Analysis of FY 2010 Usage**

	Within Water Budget	In Excess of Water Budget	Total	Usage in Excess of Water Budget (AF)
Portion of Usage	90%	10%	100%	6,600

### 3.3. Multi-Family

In FY 2010, the City served approximately 29,000 multi-family accounts whose water usage totaled approximately 36,000 AF. Appendix B summarizes the number of multi-family accounts for FY 2009, 2010 and 2011.

#### 3.3.1. Multi-Family Water Budget Methodology

Assuming the City adopts a water budget-based billing structure for multi-family customers, Red Oak proposes the water budget be based on the average water usage for a similar historical billing period. For example, the bimonthly water budget for the current May-June billing period might be based on the average water usage for the May-June billing periods of the previous two years. This historical billing average methodology for multi-family accounts provides a simplified approach to determining a budget that recognizes each account's unique water usage characteristics.

The multi-family water budget methodology includes a water efficiency factor applicable to the historical usage-based water budget. This factor provides a simple means to adjust the water budget to encourage further water efficiency. For example, a 95 percent efficiency factor reduces the water budget by five percent. The proposed multi-family water budget formula is as follows:

$$\text{Multi-Family Water Budget} = (WE) \times (Usage)$$

**Where:**

WEF= water efficiency factor

Usage = average billing period water use for previous two years

### 3.3.2. Multi-Family Water Budget Calculation Example

Table 3-5 illustrates the development of a sample water budget for a multi-family customer. The water budget is the product of the average billing period water usage for the FY 2009 and FY 2010 and a water efficiency factor of 100 percent. In this sample calculation, the customer exceeds its water budget during FY 2011 by 52 HCF (39,000 gallons).

**Table 3-5:  
Sample Multi-Family Customer  
Bimonthly Water Budget Calculation**

Bimonthly Billing Period	FY 2009 Actual Consumption	FY 2010 Actual Consumption	Average of FY 2009 and FY 2010 Actual Consumption	FY 2011		
				Actual Consumption	Water Budget	Consumption in Excess of Budget
	(HCF)	(HCF)	(HCF)	(HCF)	(HCF)	(HCF)
1	158	190	174	162	174	-
2	143	161	152	170	152	18
3	142	138	140	153	140	13
4	159	147	153	149	153	-
5	161	153	157	178	157	21
6	163	147	155	128	155	-
<b>Total</b>						52

### 3.3.3. Initial Multi-Family Water Budget Results

Red Oak determined the water budget for each multi-family account by using the average of the water usage for similar periods in FY 2009 and FY 2010. . We assumed a water efficiency factor of 100 percent in our analysis.

Table 3-6 summarizes the results of our analysis of FY 2011 bills for multi-family accounts. Eighty percent of multi-family bimonthly bills were within their water budget and 20 percent were in excess of their water budget.

**Table 3-6:  
Summary of Multi-Family  
Water Budget Analysis of FY 2011 Bills**

	Within Water Budget	In Excess of Water Budget	Total
Portion of Bills	80%	20%	100%

Table 3-7 summarizes the results of our analysis of FY 2011 usage for the multi-family accounts. Eighty-six percent of multi-family usage was within their water budget and 14 percent was in excess of their water budget. Our analysis estimates that multi-family customers exceeded their water budget amount in FY 2011 by 5,200 AF (2,270,000 HCF or 1,700 million gallons).

**Table 3-7:  
Summary of Multi-Family  
Water Budget Analysis of FY 2011 Usage**

	Within Water Budget	In Excess of Water Budget	Total	Usage in Excess of Water Budget (AF)
Portion of Usage	86%	14%	100%	5,200

### 3.4. Non-Residential

In FY 2010, The City served approximately 15,700 non-residential accounts whose water usage totaled approximately 37,000 AF. Appendix B summarizes the number of non-residential accounts for FY 2009, 2010 and 2011.

#### 3.4.1. Non-Residential Water Budget Methodology

Assuming the City adopts a water budget-based billing structure for non-residential customers, Red Oak proposes the water budget be based on the average water usage for a similar historical billing period. For example, the bimonthly water budget for the current May-June billing period might be based on the average water usage for the May-June billing periods of the previous two years. This historical billing average methodology for non-residential accounts provides a simplified approach to determining a budget that recognizes each account's unique water usage characteristics.

The non-residential water budget methodology includes a water efficiency factor applicable to the historical usage-based water budget. This factor provides a simple means to adjust the water budget to encourage further water efficiency. For example, a 95 percent efficiency factor reduces the water budget by five percent. The proposed non-residential water budget formula is as follows:

$$\text{Non-Residential Water Budget} = (WE) \times (Usage)$$

**Where:**

WEF = water efficiency factor

Usage = average billing period water use for previous two years

#### 3.4.2. Non-Residential Water Budget Calculation Example

Table 3-8 illustrates the development of a sample water budget for a non-residential customer. The water budget is the product of the average billing period water usage for the FY 2009 and FY 2010 and a water efficiency factor of 100 percent. In this sample calculation, the customer exceeds its water budget during FY 2011 by 34 HCF (25,000 gallons).



**Table 3-8:**  
**Sample Non-Residential Customer**  
**Bimonthly Water Budget Calculation**

Bimonthly Billing Period	FY 2009 Actual Consumption	FY 2010 Actual Consumption	Average of FY 2009 and FY 2010 Actual Consumption	FY 2011		
				Actual Consumption	Water Budget	Consumption in Excess of Budget
	(HCF)	(HCF)	(HCF)	(HCF)	(HCF)	(HCF)
1	348	308	328	302	328	-
2	381	341	360	329	360	-
3	254	214	234	211	234	-
4	158	140	149	164	149	15
5	189	159	174	179	174	5
6	216	230	223	237	223	14
<b>Total</b>						34

### 3.4.3. Initial Non-Residential Water Budget Results

Red Oak determined the water budget for each non-residential account during each bimonthly billing period in FY 2011 as the average of the water usage for similar periods in FY 2009 and FY 2010. We assumed a water efficiency factor of 100 percent in our analysis.

Table 3-9 summarizes the results of our analysis of FY 2011 bills for non-residential accounts. Eighty-one percent of non-residential bimonthly bills were within their water budget and 19 percent were in excess of their water budget.

**Table 3-9:**  
**Summary of Non-Residential**  
**Water Budget Analysis of FY 2011 Bills**

	Within Water Budget	In Excess of Water Budget	Total
Portion of Bills	81%	19%	100%

Table 3-10 summarizes the results of our analysis of FY 2011 usage for the non-residential accounts. Eighty-one percent of non-residential usage was within their water budget and 19 percent was in excess of their water budget. Our analysis estimates that

non-residential customers exceeded their water budget amount in FY 2011 by 6,900 AF (3,000,000 HCF or 2,300 million gallons).

**Table 3-10:  
Summary of Non-Residential  
Water Budget Analysis of FY 2011 Usage**

	Within Water Budget	In Excess of Water Budget	Total	Usage in Excess of Water Budget (AF)
Portion of Usage	81%	19%	100%	6,900

### 3.5. Dedicated Irrigation

In FY 2010, the City served approximately 7,300 direct irrigation accounts. Appendix B itemizes the number of dedicated irrigation accounts for FY 2009, 2010 and 2011.

Red Oak analyzed FY 2010 billing data for 420 direct irrigation accounts (approximately 6% of all dedicated irrigation accounts). The analyzed accounts had readily available irrigable area that corresponded directly to a specific account. Red Oak recommends further analysis when irrigable area is determined for additional dedicated irrigation accounts.

#### 3.5.1. Dedicated Irrigation Water Budget Methodology

Assuming the City adopts a water budget-based billing structure for dedicated irrigation customers, Red Oak proposes the water budget be based on ET, irrigable area, and the landscape factor. The proposed dedicated irrigation water budget formula is as follows:

***Dedicated Irrigation Water Budget = (SF) x (ET) x (LF) x (days in the billing period)***

***Where:***

SF = square feet of irrigated area

ET = evapotranspiration

LF = landscape factor

#### 3.5.2. Dedicated Irrigation Water Budget Calculation Example

Table 3-8 illustrates the development of a water budget for a dedicated irrigation customer. Tier 1 captures the water budget and may vary each billing period with differing ET. Tier 2 captures excess water use that is greater than the customer's water budget.

**Table 3-11:**  
**Dedicated Irrigation Customer**  
**Water Budget Sample Calculation**

Budget Criteria				
Average daily ET = 0.18 in. (0.015 ft.)		Billing period = 30 days		
Landscape Area = 50,000 SF		Landscape Factor = 0.80		
Rate Structure	Budget Description	Formula	Monthly Tier Range (HCF)	Monthly Tier Range (gallons)
Tier 1	Water Budget	50,000 SF x 0.015 ft ET per day x 30 days x 0.80 LF / 100 CF	0 to 180	0 to 135,000
Tier 2	Excess		Greater than 180	Greater than 135,000

### 3.5.3. Initial Dedicated Irrigation Water Budget Results

The methodology described above was used to determine the proportionate number of bills and usage falling within the budget.

Table 3-12 summarizes the results of our analysis of FY 2010 bills for a sample of the dedicated irrigation accounts. Eighty-six percent of dedicated irrigation bills were within their water budget and 14 percent were in excess of their water budget.

**Table 3-12:**  
**Summary of Water Budget Analysis of FY 2010 Bills**  
**For Sample of Dedicated Irrigation Accounts**

	Within Water Budget	In Excess of Water Budget	Total
Bills	86%	14%	100%

Table 3-13 summarizes the results of our analysis of FY 2011 usage for a sample of the dedicated irrigation accounts. Seventy percent of dedicated irrigation usage was within the water budget and 30 percent was in excess of the water budget. Our analysis estimates that this sample of 420 dedicated irrigation accounts exceeded their water budget amount in FY 2010 by 375 AF (163,000 HCF or 122 million gallons). Assuming these results are representative of the total 7,300 dedicated irrigation accounts, the usage in excess of water budget might total 6,500 AF (2,830,000 HCF or 2,118,000 gallons) for all dedicated irrigation accounts.

**Table 3-13:  
Summary of Water Budget Analysis of FY 2010 Usage  
For Dedicated Irrigation Accounts**

	Within Water Budget	In Excess of Water Budget	Total	Usage in Excess of Water Budget (AF)
Portion of Usage	70%	30%	100%	6,500 <sup>(a)</sup>
(a) Estimated amount for all dedicated irrigation accounts based on amount for sampled accounts.				

### 3.6. Water Budget Practices of California Water Utilities

Table 3-14 shows a sample list of California water utilities with water budget structures. The vast majority of these utilities use water budget structures for all of their customer classes. For comparison, the City of San Diego services about 290,000 customer accounts.

**Table 3-14:**  
**Survey of California Utilities with Water Budget Structures**  
**Applicability to Customer Classes**

Utility	Customer Classes with Water Budget Billing	No. of Accounts
Corona	All	68,000
Coachella Valley Water District	All	110,000
Eastern Municipal Water District	All	115,000
El Toro Water District	Residential only	
Irvine Ranch Water District	All	125,000
Los Angeles Dept. of Water & Power	All	676,000
Moulton Niguel Water District	All	65,000
Palmdale Water District	All	25,000
Rancho California Water District	All	35,000
San Juan Capistrano Water District	All	16,000
Santa Rosa	Irrigation only	
Western Municipal Water District	All	25,000

## 4. Considerations Involved with Establishing Water Budget-Based Billing

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### 4.1. Introduction

This report section identifies policy, technical, operational, and philosophical considerations to implementing a water budget-based structure and the ability of this structure to provide equitability, revenue stability, and water use efficiency.

### 4.2. Policy Considerations

This section discusses the significant policy considerations involved with implementing a water budget structure. These considerations include:

- City policy
- State legislation

#### 4.2.1. City Policy

City Policy No. 400-15, *Comprehensive Policy for a Sustainable Water Supply in San Diego*, is perhaps the most relevant policy related to water budget structures. This policy states, “*The City of San Diego needs to establish guiding principles through which we will ensure that our water supply remains secure*”.

This policy specifies that a water budget structure should:

- Support efficiency in wet and dry periods
- Support tiered rates or budgets that encourage conservation and discourage water waste, and support the needs of business and agriculture
- Consider using customer-specific data for [determining] customer water budget [billing]

The following discussion highlights how water budgets meet the objectives defined in City Policy 400-15.

#### **Efficiency in Wet and Dry periods**

The water budget structure provides an allocation of water use that recognizes actual weather conditions. Daily ET values are available for each billing period specific to each customer’s location. This means customers will have a lower budget when it is cool or rainy and a higher budget when it is hotter and drier. Customers learn to modify outdoor water use behavior to match actual weather conditions and avoid costs associated with

higher tier rates when budgets are exceeded. This will likely maximize water efficiency potential in any type of weather.

### **Encourage Conservation and Discourage Water Waste**

The water budget structure includes water use budgets that recognize each individual customer's characteristics and sets an efficiency standard based on State guidelines and local weather conditions. A customer using water within their specific budget would have a lower bill than if they exceed their water budget. The water bill becomes a water "audit" for efficiency, specifically rewarding water efficiency and discouraging water waste.

### **Customer-Specific Data for Water Budgets**

The water budget structure uses customer-specific data to determine water budgets for billing purposes.

## **4.2.2. State Legislation**

The following discussion highlights how water budgets meet the objectives defined in the following legislative enactments.

### **SB X7-7**

Through SB X7-7, the State has established water efficiency standards that apply to all customers. These standards enhance equity by establishing the same efficiency goals for all SFR customers (and non-SFR customers as well). Utilities implementing water budget structures have done so with a goal of increasing equity. Achievement of that goal is borne out according to the results of customer surveys in these utilities. For example, 85 percent of customers served by the Irvine Ranch Water District reported that the "water budget rate structure was fair".<sup>2</sup> In a similar vein, 83 percent of the customers in the Riverside area expect a rate structure that rewarded efficiency and penalized water waste,<sup>3</sup> and the water budget structure met this expectation.

### **Proposition 218**

Under Proposition 218, water utilities apply a proper measurement of proportionality to fees and yet seek to manage limited resources for the overall benefit to the community. The proper use of individualized water budgets can meet the requirements of Proposition 218. A budget-based billing approach identifies what a community defines as appropriate water use by parcel and assesses costs in direct proportion to the costs of purchasing extra water. The Proposition 218 process educates customers on how costs are determined and allocated to customer classes.

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<sup>2</sup> IRWD. 1997. Voice of the Customer Survey.

<sup>3</sup> WMWD and Katz & Associates. 2010. Customer Survey.

### **Assembly Bill 2882**

Assembly Bill 2882 authorizes a public entity to adopt allocation-based conservation water rates. Revenues derived from these rates cannot exceed the reasonable cost of water service, including conservation measure costs and overuse. AB 2882 requires this structure to meet the following criteria<sup>4</sup>:

1. Billing is based on metered water use.
2. A basic use allocation is established for each customer account that provides a reasonable amount of water for customer's needs and property characteristics. Factors used to determine the basic use allocation may include, but are not limited to, the number of occupants, the type or classification of use, the size of lot or irrigated area, and the local climate data for the billing period.
3. A basic charge per volumetric unit is imposed for all water used within the customer's basic use allocation, except that at the option of the public entity, a lower rate may be applied to any portion of the basic use allocation that the public entity has determined to represent superior or more than reasonable conservation efforts.
4. A conservation charge is imposed for increments of water use in excess of the basic use allocation. The conservation charge for the increments shall, in the aggregate, provide revenue not to exceed conservation measure costs and overuse costs.

Water budget-based rates satisfy these criteria.

## **4.3. Technical Considerations**

This report section discusses the significant technical considerations involved with implementing a water budget structure. These considerations include:

- SAP billing software
- Customer-related data
- Non-residential and multi-family historical water use

### **4.3.1. SAP Billing Software**

In order to implement a water budget structure successfully, the City's billing software must be able to employ a variety of data, such as household size, irrigated area, ET values, and historical monthly water use for 5 years. Red Oak believes the current SAP system can accomplish this.

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<sup>4</sup> California Legislature Assembly Bill 2882, February 22, 2008.



The City's Department of IT prepared an initial cost estimate of approximately \$754,000 to implement a water budget-based structure in the SAP-based Customer Care Solutions. The cost estimate includes \$477,000 for vendor resources and \$277,000 for internal labor. The vendor cost estimate is based on about 3,670 hours of a SAP technical analyst time. The internal labor costs estimate is based on hiring two fulltime equivalents for implementation.

#### **4.3.2. Customer-Related Data**

Water budget structures require the collection of key data components at the account level for calculating individualized water budgets. These include:

- Number of persons per household (SFR accounts)
- Irrigated area (for SFR and irrigation accounts)
- ET (for SFR and irrigation accounts)

The State has established standards through SB X7-7 for these data components to meet water efficiency goals, which are 55 gallons per person per day and a landscape factor of 0.80.

#### **Number of Persons per Household**

Calculating indoor water use needs requires knowledge of the number of persons per household. Utilities often use local census data as a starting point, or default, for a water budget structure. This number can initially populate the billing system to test water budget calculations and eventually produce the actual bill unless customers provide updated information (through a variance program).

**Considerations:**

- Utilities typically hire temporary staff for data input because it is time-consuming.
- Customers may object to providing the pphh data. If a customer does not wish to provide this data, the census default is typically used.
- Customers may update their individual data through a variance program.

**Benefits:**

- Customers are educated about water budgets and water efficiency even before the water budget-based billing commences.
- Customers provide their data and participate in building their individualized water budget. This reinforces the reality that customers are responsible for their efficiency levels.

**Irrigated Area for SFR Accounts**

Irrigated area data are perhaps the most challenging to obtain. Every parcel will have different percentages of actual irrigated area relative to the total area. Utilities may select a method to develop this value internally, calculate an estimated irrigated area based on the total lot size (as was done in the Pilot Study), or retain a vendor to determine the irrigated area for each individual parcel. Utilities with water budget-based billing typically ask customers to verify and/or provide their estimated irrigated area.

**Irrigated Area for Dedicated Irrigation Accounts**

Most utilities have used a single approach to collect irrigated area information for dedicated irrigation accounts. Customers provide or assist the utility in measuring the irrigated area. This approach is most effective in situations where a meter or multiple meters may serve a single parcel, and only the on-site landscapers know the areas irrigated by a particular meter.

**Considerations:**

- If the City selects the more accurate vendor-provided estimates, the cost is approximately \$1.00 per SFR parcel. The City has nearly 230,000 SFR parcels and 8,000 irrigation meters.
- Utilities usually participate with on-site landscapers to measure sites and assure data accuracy.

**Benefits:**

- Establishing accurate landscape water budgets can provide the highest potential water efficiency return.
- Customers and landscapers are educated about water budgets and become more aware of water efficiency, particularly outside water use.

- Customers provide their data and participate in building an individualized water budget.
- Customers become aware of high water use landscapes compared to lower water use landscapes.
- Customer awareness of outside water efficiency standards and water budget billing incentives combine to reduce outside water waste and particularly water runoff.
- Customers become aware that outside water use efficiency is their responsibility.
- If the City uses the vendor-provided individual parcel data to target water efficiency programs:
  - High-resolution aerial imagery supports the most accurate calculation of irrigated area and reduces staff and customer time for collecting data.
  - High-resolution data identifies turf areas for proactive conservation program outreach.

### **Evapotranspiration Data**

Irrigation (outdoor) water budgets are the product of ET data, multiplied by the irrigated area, multiplied by a landscape factor. Utilities have access to the following ET sources:

- Historical weather station data
- CIMIS daily ET for given weather station locations
- Private sector daily ET for one square kilometer areas (based on longitude and latitude grid)

The consideration for the utility is to determine the most appropriate source of ET data to use for calculating accurate water budgets to meet landscape water needs. However, they have found both customer issues and data reliability issues with historical and CIMIS data sources, including:

**Historical ET.** The use of historical ET is less accurate than other methods because the weather may vary for a given billing period from year to year.

**CIMIS ET.** This is a free and available source of daily ET data. A local CIMIS station is an excellent source of weather data for utilities with relatively flat terrain and similar weather across its service area. However, a single ET source is inadequate for the service area that stretches from the cooler, wetter coast to the hotter and generally drier inland valleys. There are three CIMIS stations inside the City's service area (La Jolla, Miramar and San Diego II) and two stations outside the service area (Otay Lake, and Escondido).

Figure 4-1 shows ET for July 28, 2010 and illustrates the typical daily variation of weather across the City's service area. The grid depicts square-kilometer microzones. The red circles denote the five CIMIS weather stations. There are three weather stations inside and two weather stations outside the City's service area.

### Figure 4-1: San Diego CIMIS Stations

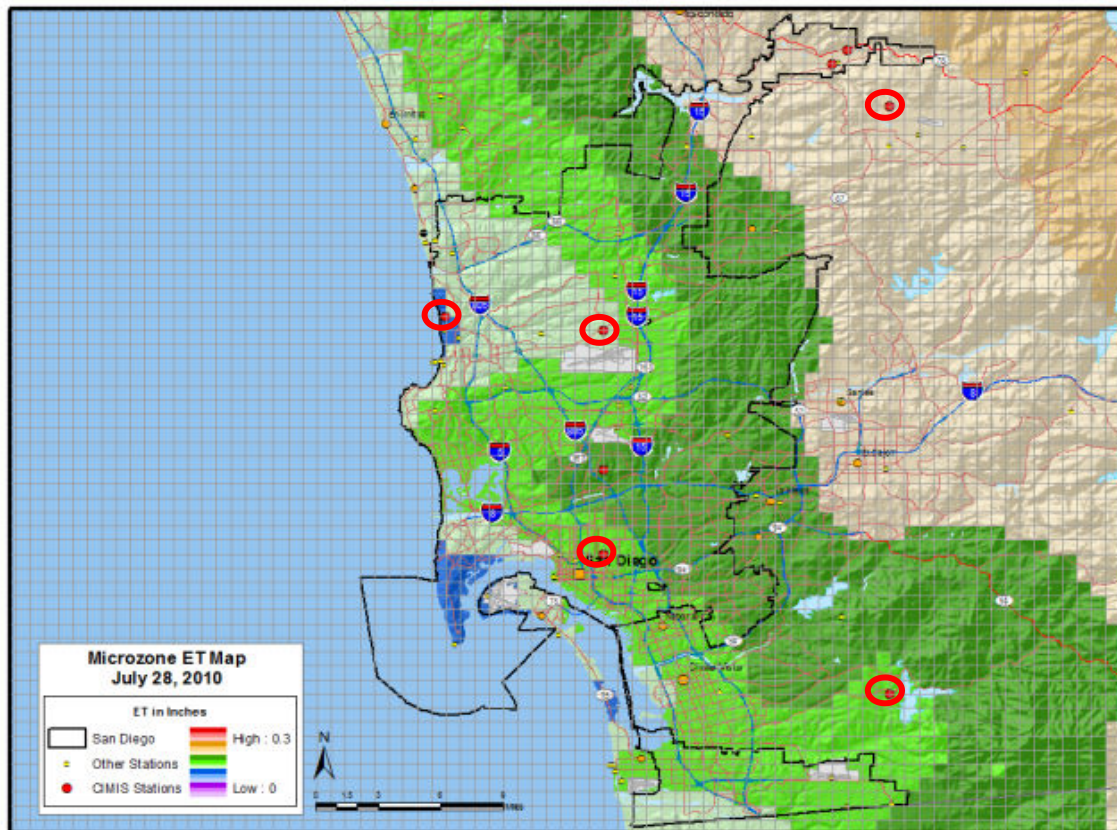
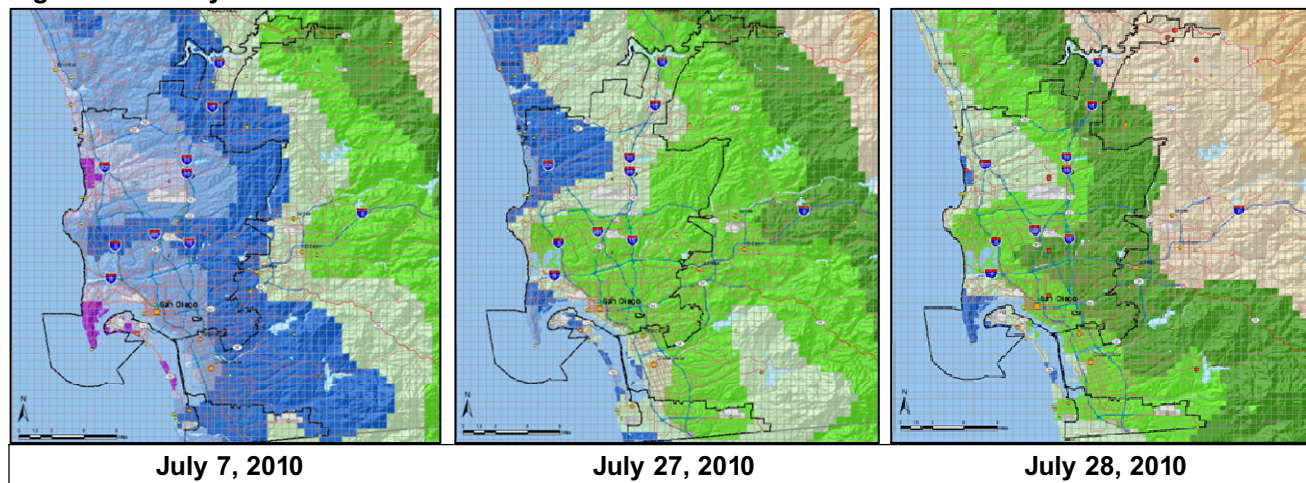




Figure 4-2 shows ET data for three days in July 2010 and illustrates how significantly the ET data can vary, potentially within a single billing period. For example, the coastal regions experienced very low ET during July 7, moderate ET during July 27 and much higher ET on July 28.

**Figure 4-2: Daily ET**



**Private Sector Daily ET.** A solution for large utilities with varied microclimates is the relatively new technological ability to calculate daily ET for each microzone within its service area. Four utilities in southern California with large and/or varied service areas are using this technology. The cost to utilities using these data is approximately \$0.12 per microzone per day or \$43.80 per year per microzone. Additionally, there is a cost for matching meter locations into microzones. This technology automates the process of attaching meter locations with a microzone number. With this accomplished, the City can use daily ET data to calculate billing period water budgets for each customer. The annual cost would be about \$40,000.

Alternatively, the cost to install one ET station is approximately \$10,000, and the cost to maintain each station is approximately \$2,500 per year. As such, it would cost the City about \$2.25 million annually to maintain 900 CIMIS stations.

#### **4.3.3. Non-Residential and Multi-Family Historical Water Use**

Non-residential customers generally include business, institutional, and other accounts not included in SFR or dedicated irrigation meter accounts. These customers have unique individual water usage characteristics that are reflected in their historical use data. For this reason, Red Oak proposes using a two-year average of historical billing data for each billing period to determine water budgets.

## 4.4. Operational Considerations

This section describes the operational considerations relating to implementation of water budget structures. The considerations include:

- |  |                                 |
|--|---------------------------------|
| ■ Bimonthly Billing                          | ■ Public Education and Outreach |
| ■ Staff Coordination and Training            | ■ Drought Management            |
| ■ Customer Service and Conservation Staffing | ■ Conservation Funding          |

### 4.4.1. Bimonthly Billing

Timely feedback to customers on their water use behavior is necessary to achieve immediate improvement of their water efficiency. The water bill is perhaps the best feedback mechanism for customers. The City bills its SFR customers using a bimonthly billing cycle. SFR accounts comprise nearly 80 percent of all water accounts. The City bills all other customers monthly. The bimonthly cycle provides delayed feedback to customers about their water efficiency. Bimonthly billing limits achievement of a high level of consistent water use efficiency. The City should consider monthly billing to provide more timely water use feedback to SFR customers.

### 4.4.2. Staff Coordination and Training

Customer service representatives (CSRs) and conservation staff represent the City's "front line". CSRs will require training to understand and maximize the use of billing software; communicate with customers about the budget structure, water efficiency, and variances; and educate customers about the benefits of water efficiency.

Implementation of the water budget structure would have impacts across the entire Department. It touches most functional areas including information technology, planning, finance, meter reading, customer service, and conservation. Based on the experience of other agencies, successful implementation of the new billing structure may take three years and requires:

- Staff training at all levels and across the Department
- Thorough testing of the billing methodology prior to implementation
- Implementation planning and development of a public outreach strategy

Utilities that have been through the process in the past few years report that:

- "There are no negatives to this from a cost and public relations standpoint if you put in the proper effort." (Moulton Niguel Water District Customer Service and Public Relations Manager)
- "Our revenues are up 7% and our water use is down 4%. The water budget structure is working as it was intended." (Western Municipal Water District Finance Manager, nine months into implementation)

#### **4.4.3. Customer Service and Conservation Staffing**

The implementation of water budget-based billing provides CSRs and conservation staff a new and clear context for identifying and helping customers achieve water efficiency. With efficiency standards established for customers, the water budget structure will identify accounts that exceed their budgets in a billing cycle. This new ability helps focus conservation efforts on those customers who need assistance.

#### **4.4.4. Public Education and Outreach**

The public education and outreach component of implementing any rate structure is a key to success. Internally, City officials and Department staff must fully understand the new structure in order to conduct successful outreach to customers. Externally, a successful public education and outreach process for water budget rate structures:

- Identifies key stakeholder groups for meetings including commercial, industrial, irrigation, multi-family residential, agriculture, and homeowner associations
- Emphasizes being water efficient and staying within individual budget
- Explains variance program to accommodate customer needs
- Considers “shadow billing” to identify potential over-allocation users before implementation and provide assistance
- Coordinates website information, billing inserts, specific news, and outreach materials to create a coordinated message
- Helps develop on-line/web-based water budget calculator tool.

#### **4.4.5. Drought Management**

Current drought responses cause operational considerations for a large utility. Drought management with a water budget structure is generally easier to administer, less costly, and more equitable for customers than the current fixed-tier structure.

In drought conditions, utilities with a traditional rate structure typically impose restrictions on water use. Those restrictions often limit water use for landscape purposes and rely on public outreach to curtail water use.

A water budget structure provides another tool for managing water use in a drought. For example, a drought may trigger the need for a 10 percent overall reduction in water use. With an individual water budget in place, the drought response is to lower the budget for all customers by 10 percent. Those who are already meeting or using less than their water budget will likely be able to meet the “drought” requirement. However, those who are already exceeding their water budget will find it even more difficult to reduce use. In effect, a drought response with a water budget structure puts most of the burden of savings on those who exceed their budgets.

#### 4.4.6. Conservation Funding

The water budget structure may create a new funding source for conservation programs. When a customer uses water in excess of their water budget, they pay higher tiered prices. By rate structure design, the City may use revenues generated from excess use tiers for efficiency-related programs.

### 4.5. Philosophical Considerations

This report section discusses the significant philosophical considerations involved with implementing a water budget structure. These considerations include:

- |                     |                                      |
|---------------------|--------------------------------------|
| ■ Rate structure    | ■ Customer service/Variance programs |
| ■ Revenue stability | ■ Conservation                       |

#### 4.5.1. Rate Structure

Utilities across the country have been wrestling with the “new normal” regarding water use reductions resulting from the effectiveness of conservation programs, water shortages, rising cost of imported water, and the economic downturn. These utilities, like the Department, are re-examining their existing water rate structure in light of this new normal.

The General Manager of the SDCWA, Maureen Stapleton, recently stated:

“We're selling a lot less water than we originally anticipated. That's what I call the new normal.”<sup>5</sup>

Water efficiency is the “new normal” in San Diego. It follows that the method to manage, allocate, and price limited water resources to incentivize water efficiency is through a rate structure that can recognize the “new normal”.

It also follows that the City needs a rate structure that supports current City policies; assigns and recovers costs in an accurate and fair manner; places a value on the need to use water efficiently; and recognizes the variation in weather, location, and customer characteristics. The “new normal” requires just this type of evaluation of the current water rate structure, options for water billing, and a determination of the most appropriate structure.

#### 4.5.2. Revenue Stability

Reduction in water use due to increased water efficiencies can lower water sales revenue. In using a water budget structure, revenue from the lower-priced water budget tiers and the fixed-meter charges will recover annual revenue requirements. Revenue from the higher-priced excessive use tiers will fund conservation programs designed to improve

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<sup>5</sup> Stapleton, M. 2012. SDCWA Press Release.



water efficiency. The design of water rates using a water budget structure that provides adequate water sales revenue is a major component of Task 5 in Phase II of this study.

#### **4.5.3. Customer Service / Variance Programs**

With a water budget structure, customer service becomes a more integrated and important part of education and support for customers who are tasked with using water efficiently. Most customer service tasks are the same or very similar for the current billing structure and the water budget structures. The main difference is the knowledge of water budgets, recognition of how that affects the customers, and ability to navigate the variance process.

A water budget is an efficiency-based billing approach and is intended to be flexible. It has features that allow for changes in water needs for customers based on local weather and water supply conditions. Being flexible means being able to quickly change or adapt overall budgets for groups, such as during a drought, or for individual budgets, as in the case of a single customer. *Variance* programs imbed flexibility into water budget structures. Utilities employ a variety of “variance” programs to:

- Educate customers on water use efficiency (what is efficient per capita water use)
- Create buy-in (each customer gets a water budget based upon their specific situation)
- Create flexibility to adjust individual budgets as customer conditions change
- Ensure that individual budgets are accurate

A variance program is one of the most important public outreach and education tools employed when implementing a water budget structure. An individualized water budget developed by the customer and the utility builds a sense of common ground or a partnership based on achieving water efficiency.

#### **4.5.4. Conservation**

Conservation staff will perform the same tasks with one major change: every customer will have a target or water budget for each billing cycle. Each customer’s utility bill compares actual with budgeted water use and the use that exceeds the budget, if applicable. This information enables the conservation staff to be more effective in helping customers to be efficient.

## 5. Review and Evaluation of Long-Term Water Conservation Programs

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### 5.1. Introduction

This report section evaluates the ability of existing conservation programs to support a water budget structure and recommends additional programs that support customers' efforts to remain within their individual water budget. This section also summarizes the experience of five Southern California utilities with water budget-based billing structures.

### 5.2. Conservation Programs for Water Budget-Based Billing Structure

Water budget-based billing structures incentivize customers to increase their water efficiency, particularly those whose usage exceeds their water budget. Although water utilities with water budget-based billing structures provide conservation programs for all customers, the preponderance of interest comes from customers who exceeded their water use allotment.

Figure 5-1 illustrates the customer service processes and conservation programs necessary to assist all types of customers to meet their water budget goals. Conservation programs in this process are described in this report section.

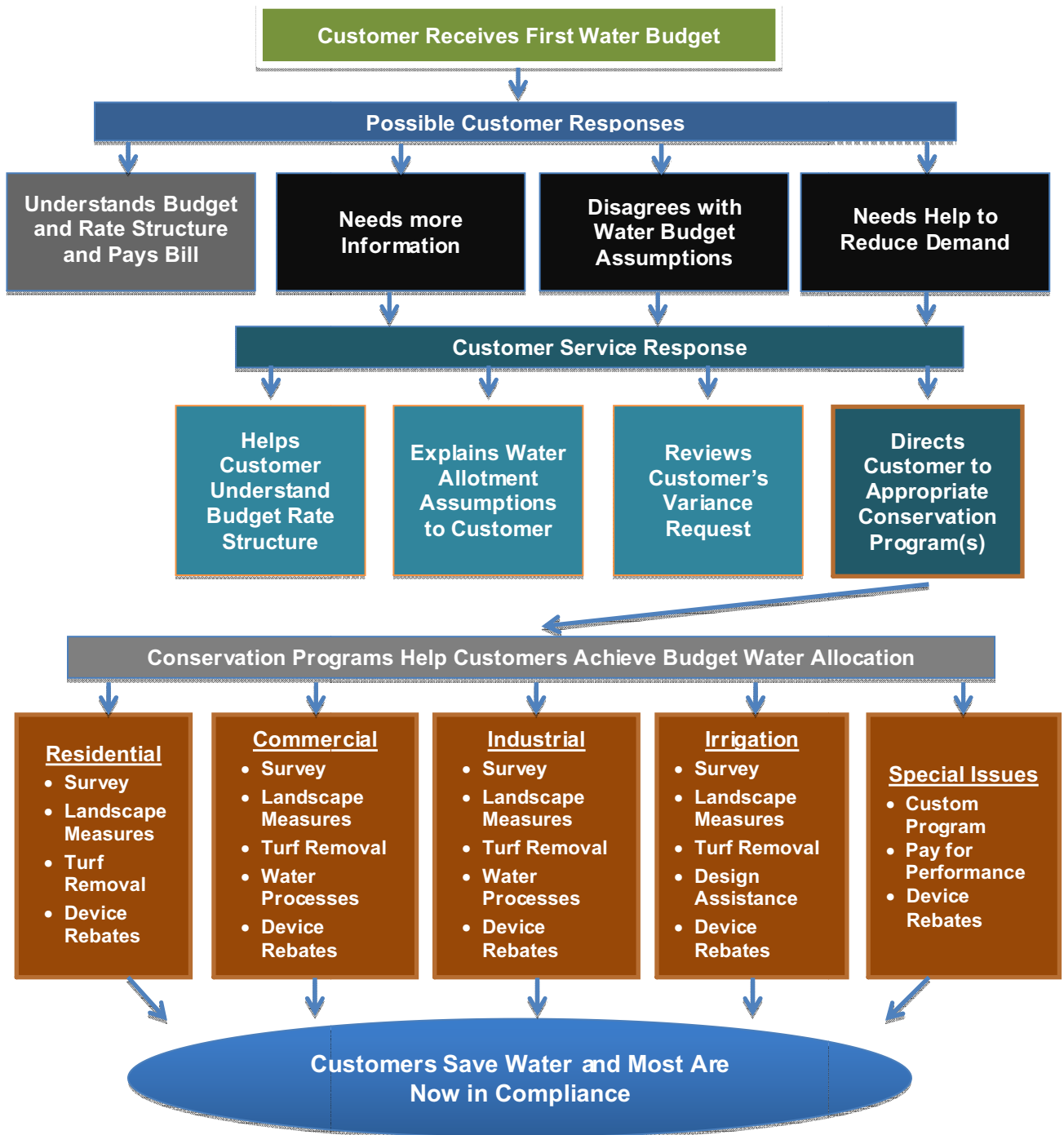
A responsive, comprehensive water conservation program will help customers find ways to remain within their water budget. To address the general needs of each customer group, the conservation program should have the following elements:

#### Surveys

Site surveys provide information about the customer's water usage specific to their site and the best ways to reduce usage and stay within their water budget. The survey will also direct the customer to the proper solutions. Survey benefits include:

- Interaction with a field surveyor
- Water budget program education - how budget is designed, value of water, and fairness of budget and rate structure
- Identification of opportunities for water reduction
- Selection of best measures or services for the customer
- Information about next steps and variance process
- Aid in learning about relevant conservation program(s)

**Figure 5-1: Commencing Water Budget-Based Billing Structure**



### **Residential Incentives**

One of the best opportunities for water savings for residential customers is through landscape and irrigation improvements. Cost-effective landscape enhancements include:

- Installing smart controllers that vary the irrigation schedule based on the needs of the landscape and site conditions
- Installing high-efficiency irrigation nozzles
- Installing micro and other low-volume and application rate irrigation systems
- Turf removal and replacement with water-wise plants

### **Commercial Incentives**

Commercial customers include a broad range of businesses and property layouts and require a flexible list of measures that provide a full array of options to meet the needs of this customer sector. The City may want to reach out to customers consuming water in the highest water budget tiers. Business-specific evaluations are necessary. Commercial measure incentives to consider are:

- Landscape enhancements
- Low-volume plumbing device changes
- Cooling tower enhancements
- Process water reuse
- Custom incentives for customers requiring tailored solutions

### **Customized Incentives**

With a water budget program, all customers should have the opportunity to implement water-saving measures at their site to meet their budget. The Department staff could assist these customers in drafting a proposal for an individual plan to implement water efficiency measures. Department staff can then review the plan, the measures, and consider proper and cost-effective incentives.

### **Turf Removal Support**

Turf removal is an effective method to reduce landscape water use and provide persistent and long-term water savings. Customers may need turf design assistance in order to create a plan with the correct technologies, regionally climate-appropriate plant selections, and landscape area design.

### 5.3. Case Studies of Water Budget Program Implementations

This section discusses the experiences of five Southern California water utilities that have implemented water budget structures. These utilities have a variety of conservation programs in place that have greatly assisted their customers in achieving individual water budgets. Please note that all five agencies are a fraction of the City's size and customer base.

Eastern Municipal Water District	
Water budget structure implementation year	2009
Number of connections	145,000
Customer classes using water budget structure	Single-family residential Multi-family Dedicated irrigation
Budget formula	Indoor = 60 gpcd x 3 pphh (single-family) or 2 pphh (multi-family) Outdoor = Irrigated Area x ET x LF (0.7 – 1.0) Four tiers Initially used parcel data based on estimated irrigated area. Currently use GIS to estimate irrigated area
Percent of customers initially exceeding budget	40%
Percent of customers currently exceeding budget	10%
Number of variances processed	75,000
Supplemental staffing	5 temporary employees
Conservation program	Surveys Turf removal rebates Smart controller direct installation and rebates FreeSprinklerNozzles.com vouchers
Biggest obstacles	Accurate irrigated area measurements Public utility irrigation accounts – no response from institutional customers
Biggest success	Limited number of customers in highest tier

<b>Elsinore Valley Municipal Water District</b>	
Water budget structure implementation year	2010
Number of connections	40,000
Customer classes using water budget structure	Single-family residential Multi-family Dedicated irrigation
Budget formula	Indoor = 60 gpcd 4 pphh Outdoor = Irrigated Area x Average Monthly ET x 0.60 LF Winter block for October - April Summer block for May - Sept Four tiers Used percent of parcel size to estimate irrigated area
Percent of customers initially exceeding budget	65%
Percent of customers currently exceeding budget	25%
Number of variances processed	3,000
Supplemental staffing	4 additional employees
Conservation program	Surveys Smart controller direct installation and rebates FreeSprinklerNozzles.com vouchers
Biggest obstacles	Implemented in summer when bills are highest
Biggest success	Low number of variances

<b>Moulton Niguel Water District</b>	
Water budget structure Implementation year	2011
Number of connections	65,000
Customer classes using water budget structure	Single-family residential Multi-family Dedicated irrigation Commercial
Budget formula	Indoor = 60 gpcd x 4 pphh (default) Outdoor = Irrigated Area x ET x 0.80 LF Five Tiers GIS images and SF measurement software to estimated irrigated area
Percent of customers initially exceeding budget	38%
Percent of customers currently exceeding budget	9%
Number of variances processed	4,500
Supplemental staffing	3 temporary staff
Conservation program	Surveys Smart controller and high-efficiency nozzle rebates Specialized rebates based on customer-designed proposals
Biggest obstacles	Board of Directors education (did not initially approve extensive outreach program)
Biggest success	Customers realizing water budget fairness Savings well over drought period water use Fully funded conservation programs

Irvine Ranch Water District	
Water budget structure implementation year	1991
Number of connections	125,000
Customer classes using water budget structure	Single-family residential Multi-family Dedication irrigation Commercial
Budget formula	Indoor = 55 gpcd x no. of people Outdoor = Irrigated Area x ET x 0.80 LF
Percent of customers initially exceeding budget	50%
Percent of customers currently exceeding budget	25%
Number of variances processed	Unknown
Supplemental staffing	No increase in staff in 1991
Conservation program	Surveys with credit for water use improvements Smart controller direct installation and rebates Turf removal rebates FreeSprinklerNozzles.com vouchers Landscape workshops
Biggest obstacles	Dedicated irrigation customers meeting budgets
Biggest success	61% landscape water use reduction 25% residential water use reduction Water runoff reduction



Section 5

Review and Evaluation of Long-Term Water Conservation Programs

Western Municipal Water District	
Water budget structure implementation year	2011
Number of connections	26,000
Customer classes using water budget structure	Single-family residential Multi-family Dedicated irrigation Commercial
Budget formula	Indoor = 60 gpcd x no. of people Outdoor = Irrigated Area x ET x 0.80 LF
Percent of customers initially exceeding budget	40%
Percent of customers currently exceeding budget	15%
Number of variances processed	8,000
Supplemental staffing	3 customer service and 2 temporary conservation employees
Conservation program	Surveys Smartyard on-bill financing for smart controllers FreeSprinklerNozzle.com vouchers Turf removal incentives
Biggest obstacles	Billing system upgrades
Biggest success	Customers self-regulated to more efficiency Stable revenue, new conservation funding (estimating \$750k in first year) New customers have awareness of the value of water efficiency

## 5.4. Existing Conservation Programs Evaluation

The City has the following programs with measurable water savings for residential and commercial customers:

- Residential Water Survey
- Commercial Landscape Survey
- Residential and Commercial Outdoor Water Conservation Rebate
- MWD SoCal WaterSmart Residential and Commercial Rebate
- Plumbing Retrofit on Resale (SDMC 147.04)
- Water-Wise Business Survey
- Prevent Water Waste Reporting
- Public Outreach and Education

This section briefly evaluates these programs using the most recent cost and unit information available. This evaluation determines the reasoning, advantages and disadvantages, savings and costs, and market potential of each program. We recognize that the City's portfolio of programs will change over time and may need re-evaluation should the City implement a water budget-based billing structure.

In many instances, references are made to 2009 data. This is the most recent year that much of the detailed data was available due to subsequent changes in information systems.

Residential Water Survey Program		
<p style="text-align: center;"><b>Overview:</b></p> <ul style="list-style-type: none"> <li>• Offered since 1992 to single-family and multi-family sites (up to seven units), transitioning to large multi-family sites</li> <li>• Indoor survey of water fixtures, outdoor survey of irrigation system and customers' existing watering schedule, identification of leaks</li> <li>• Distribution of low-flow showerheads and aerators</li> <li>• Recommendations for water efficiency improvements</li> <li>• 45,000 surveys performed to date, average of 1,400 surveys performed annually</li> <li>• \$50,000 funding annually from SDCWA contingent upon surveyor being a Certified Landscape Irrigation Auditor (CLIA)</li> </ul>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>The Program helps meet Programmatic BMP 3. Surveys provide good customer service and public education and outreach. The positive public perception of the program brings strong political support.</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Site-specific education provides best opportunity for market transformation for outdoor measures</li> <li>• High customer ratings</li> <li>• Instructs customers on how to read meter and identify leaks</li> <li>• Data captured could be used for future program planning</li> <li>• Helps meet BMP 3</li> </ul>		<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Savings cannot be assured to be sustained over time</li> <li>• Depends on customer follow-up and available incentives</li> </ul>
<p style="text-align: center;"><b>Unit Water Savings</b></p> <p style="text-align: center;">60 gpd</p>	<p style="text-align: center;"><b>Lifetime Water Savings (2009 Production)</b></p> <p style="text-align: center;">485 AF</p>	<p style="text-align: center;"><b>Annual Production (2009)</b></p> <p style="text-align: center;">1,805 Surveys</p>
<p style="text-align: center;"><b>Market Potential</b></p> <p style="text-align: center;">228,600 Single-family homes Estimated 80% with irrigation</p>		<p style="text-align: center;"><b>Cost per AF</b></p> <p style="text-align: center;">\$445 – City funding only \$1,348 – All funding including grants and outside funding</p>

Commercial Landscape Survey Program		
<p style="text-align: center;"><b>Overview:</b></p> <ul style="list-style-type: none"> <li>Offered since 2003</li> <li>Irrigated area by individual meter, pressure testing, valve operation sample per controller, multiple catch can tests, water budget creation per irrigation meter, identification of typical irrigation problems</li> <li>Site reports given to customers and target water usage shown on water bill</li> <li>Data tracking using in-house Water Resource Landscape Database and Water Smart Target from SDCWA</li> <li>Program originally outsourced but now operated by Department staff</li> <li>1,800 target water use plans prepared since program inception</li> <li>Participation recently dropped to 20 surveys per year</li> <li>\$59,000 funding annually from SDCWA contingent upon surveyor being CLIA certified</li> </ul>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>Large landscape offers huge opportunity for water savings. The program helps meet what was BMP 5. Landscape surveys provide high level of customer service and public education and outreach. As with the Residential Water Surveys, the positive customer perception of the program results in strong political support</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>Targets highest water use</li> <li>Provides best opportunity for market transformation</li> <li>Landscape contractor education applicable to other sites</li> <li>Excellent customer service opportunity</li> <li>Helps meet BMP 5</li> </ul>		<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>Savings cannot be assured to be sustained over time</li> <li>Depends on customer follow-up and available incentives</li> </ul>
<p style="text-align: center;"><b>Unit Water Savings</b></p> <p style="text-align: center;">2,154 gpd</p>	<p style="text-align: center;"><b>Lifetime Water Savings (2009 Production)</b></p> <p style="text-align: center;">618 AF</p>	<p style="text-align: center;"><b>Annual Production (2009)</b></p> <p style="text-align: center;">64 Surveys</p>
<p style="text-align: center;"><b>Market Potential</b></p> <p style="text-align: center;">7,300 Irrigation customers 10,000 – 12,000 Commercial customers with irrigation</p>		<p style="text-align: center;"><b>Cost per AF</b></p> <p style="text-align: center;">\$131</p>

Residential and Commercial Outdoor Water Conservation Rebate Program			
<p style="text-align: center;"><b>Overview:</b></p> <ul style="list-style-type: none"> <li>• Prop 50 Integrated Regional Watershed Management Program (IRWMP) grants of \$1.05 million and \$200,000 in matching funds from Storm Water Department to fund the program</li> <li>• Prop 50 grant effective August 2010 through December 2014</li> <li>• 80% of funds being used for sustainable landscape/turf removal rebates</li> <li>• Department working to secure additional grant funding to continue program</li> </ul>			
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>Program targets the highest water use and offers rebates for smart controllers, drip irrigation, and turf removal. It caters to a wide spectrum of customers. Program leverages grant funding opportunities and provides customized measures not available in MWD's regional landscape program offerings.</p>			
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Full landscape offering: turf removal – sprinklers and controllers</li> <li>• Highly cost-effective</li> <li>• Targets the highest water use</li> <li>• Helps meet BMP 5</li> </ul>		<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Labor-intensive with pre- and post-inspections</li> <li>• High levels of administration required for grant reporting</li> <li>• Subject to grant funding availability</li> </ul>	
<p style="text-align: center;"><b>Unit Water Savings</b></p> <p>Residential Smart Controllers: 37 gpd Commercial Smart Controllers: 290 gpd Turf Removal: 0.12 gpd per SF Micro Irrigation: 0.025 gpd per SF</p>	<p style="text-align: center;"><b>Lifetime Water Savings (2011 Production)</b></p> <p style="text-align: center;">243 AF</p>	<p style="text-align: center;"><b>Annual Production (2011)</b></p> <p>260 Applications processed \$215,000 rebates issued</p>	
<p style="text-align: center;"><b>Market Potential</b></p> <p>Low saturation in all markets for smart controllers, turf removal, and micro irrigation</p>		<p style="text-align: center;"><b>Cost per AF</b></p> <p>\$255 – City funding only \$1,319 - All funding including grants and outside funding</p>	

MWD SoCalWater\$mart Residential Rebate Program			
<b>Overview:</b> <ul style="list-style-type: none"><li>• Offers free residential customer incentives for indoor and outdoor devices</li><li>• Is operated by Electric &amp; Gas Industries Association (EGIA), MWD's regional vendor</li><li>• MWD will continue program through FY 2013 combining both SoCal Water\$mart and commercial Save-A-Buck incentive programs. EGIA administrates both programs.</li><li>• The City has long-standing and successful partnership with San Diego Gas &amp; Electric to co-market the high-efficiency clothes washers (HECWs).</li></ul>			
<b>Program Reasoning:</b> <p>Incentives are still necessary to motivate customers to choose most water-efficient devices. Offering customers the MWD regional program takes advantage of program funding and operations provided by MWD. Program benefits customers without further burden on City funding, staff, or resources. It also provides quantifiable water savings.</p>			
<b>Advantages:</b> <ul style="list-style-type: none"><li>• Funding from MWD</li><li>• Minimal administration time needed from Department staff</li><li>• HECW incentives provide good PR</li><li>• Additional incentives provided by energy utility for HECWs</li><li>• Helps meet BMP 3</li></ul>		<b>Disadvantages:</b> <ul style="list-style-type: none"><li>• Uncertain MWD funding levels</li><li>• Landscape products require aggressive marketing and MWD does not continually market</li><li>• Overall reliance upon MWD for the program</li></ul>	
<b>Unit Water Savings (gpd)</b>		<b>Lifetime Water Savings (2009 Production)</b>	<b>Annual Production (2009)</b>
HECW 29		3,138 AF	HECW 3,055
HE Toilet 38			HE Toilet 1,439
HET Upgrade 7			HET Upgrade 44
Rotating Nozzle 3.5			Rotating Nozzle 3,134
Smart Controller 37			Smart Controller 71
<b>Market Potential (industry averages)</b> <p>Toilets = 90% saturated</p> <p>Clothes washer market = 10-20% saturated</p> <p>Landscape measures not saturated</p>		<b>Cost per AF</b> <p>\$80 – City funding only</p> <p>\$338 - All funding including grants and outside funding</p>	

MWD SoCal WaterSmart Rebate Program																																
<b>Overview :</b> <ul style="list-style-type: none"><li>• The Save-A-Buck Program offers commercial customers incentives for a menu of indoor and outdoor devices.</li><li>• The program is operated by EGIA, MWD’s regional vendor.</li><li>• MWD will continue the program through FY 2013 combining both SoCal Water\$mart and the commercial Save-A-Buck incentive programs. EGIA will be the administrator of both programs.</li></ul>																																
<b>Program Reasoning:</b> <p>Providing incentives for the commercial customer segment is critical to help customers initiate projects as the economy begins to improve. The Program takes advantage of program funding and operations provided by MWD. This program benefits water customers without any further burden upon City funding, staff, or resources. It also provides quantifiable water savings, as well as free PR.</p>																																
<b>Advantages:</b> <ul style="list-style-type: none"><li>• Target commercial customer segment with large opportunity for water savings</li><li>• Funding from MWD</li><li>• Easy to implement</li><li>• Minimal administration time needed from Department staff</li><li>• Helps meet BMP 4</li></ul>		<b>Disadvantages:</b> <ul style="list-style-type: none"><li>• Uncertain MWD funding levels</li><li>• Trade allies do not market program equitably among all MWD utilities</li><li>• CII customers require a positive return on investment (ROI) before making a decision to participate</li><li>• Landscape products require aggressive marketing</li><li>• MWD does not continually market</li><li>• Overall reliance upon MWD for the program</li></ul>																														
<b>Unit Water Savings (gpd)</b> <table><tr><td>HETs</td><td>3</td></tr><tr><td>Ultra Low-volume Urinals</td><td>109</td></tr><tr><td>HEWs</td><td>96</td></tr><tr><td>Waterbrooms</td><td>191</td></tr><tr><td>Pre Rinse Spray Valves</td><td>136</td></tr><tr><td>Rotating Nozzles</td><td>3.5</td></tr><tr><td>WBICs</td><td>290</td></tr><tr><td>Conductivity Controllers</td><td>593</td></tr><tr><td>Food Steamers</td><td>223</td></tr></table>	HETs	3	Ultra Low-volume Urinals	109	HEWs	96	Waterbrooms	191	Pre Rinse Spray Valves	136	Rotating Nozzles	3.5	WBICs	290	Conductivity Controllers	593	Food Steamers	223	<b>Lifetime Water Savings (2009 Production)</b>  2,329 AF	<b>Annual Production (2009)</b> <table><tr><td>HETs and ULV Urinals</td><td>2,470</td></tr><tr><td>HEWs</td><td>178</td></tr><tr><td>Waterbrooms</td><td>9</td></tr><tr><td>Pre Rinse Spray Valves</td><td>3</td></tr><tr><td>Conductivity Controllers</td><td>6</td></tr><tr><td>Food Steamers</td><td>1</td></tr></table>	HETs and ULV Urinals	2,470	HEWs	178	Waterbrooms	9	Pre Rinse Spray Valves	3	Conductivity Controllers	6	Food Steamers	1
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Pre Rinse Spray Valves	3																															
Conductivity Controllers	6																															
Food Steamers	1																															
<b>Market Potential</b>  Commercial marker offers second highest water savings opportunity		<b>Cost per AF</b>  \$35 – City funding only \$260 - All funding including grants and outside funding																														

Plumbing Retrofit on Sale Ordinance		
<p style="text-align: center;"><b>Overview:</b></p> <ul style="list-style-type: none"> <li>City adopted an ordinance in 1991 that required replacement of existing toilets with a 1.6 gallons per flush (gpf) ultra-low-flow toilets (ULFTs) when remodeling a bathroom or upon change of property ownership.</li> <li>The ordinance requires high-efficiency toilets, as well as 2.5 gallons per minute (gpm) showerheads and 2.2 gpm faucets.</li> <li>Over 125,000 certificates of compliance with SDMC 147.04 have been filed since its inception, with 3,354 certificates completed in FY 2011.</li> <li>This program is financially viable because the seller retrofits the property.</li> </ul>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>Customer is responsible for cost of upgrades. All sites will eventually be upgraded.</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>Low cost to City, customer pays for upgrade</li> <li>Assures nearly 100% retrofit</li> <li>Helps meet BMP 3</li> </ul>	<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>Not enforceable, relies on self-certification, buyer awareness of requirements</li> <li>Requires significant resources to track participation</li> <li>Savings will significantly diminish when HETs become law in 2014</li> </ul>	
<p style="text-align: center;"><b>Unit Water Savings</b></p> <p style="text-align: center;">24 gpd</p>	<p style="text-align: center;"><b>L ifetime Water Savings (2009 Production)</b></p> <p style="text-align: center;">1,110 AF</p>	<p style="text-align: center;"><b>Annual Production (2009)</b></p> <p style="text-align: center;">2,066 Retrofits</p>
<p style="text-align: center;"><b>Market Potential</b></p> <p>Limited number of non-efficient residential properties remaining</p>	<p style="text-align: center;"><b>Cost per AF</b></p> <p style="text-align: center;">\$141</p>	



Water-Wise Business Survey Program		
<p style="text-align: center;"><b>Overview:</b></p> <ul style="list-style-type: none"> <li>• The Water-Wise Business Survey Program offers commercial, industrial, and institutional customers a customized review of their water usage, including an on-site visit to identify water efficiency opportunities.</li> <li>• The City has contracted with a water use efficiency consultant to administer the program and work with customers to follow through in actual achievement of water savings.</li> <li>• Survey includes review of historical water usage, meter reading and leak detection instruction, inventory of indoor water equipment and efficiency rating, and check of indoor equipment for leaks.</li> <li>• A follow-up report is sent detailing recommended equipment upgrades, water management improvements, applicable rebate opportunities, cost/benefit analysis, and payback periods.</li> <li>• There are few program participants thus far, as it is a relatively new program.</li> </ul>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>This program targets a market with significant potential for water savings. The City offers this program to provide water-saving opportunity for each type of customer.</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Target markets are not saturated</li> <li>• Potential for significant water savings</li> <li>• Surveys are designed for customers to take action</li> <li>• Helps meet BMP 4</li> </ul>	<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Customer segment is highly specialized; therefore, complex marketing required</li> <li>• Services provided but no guarantee of customer savings</li> <li>• The varying uses of commercial customers make it difficult to benchmark an average usage and savings threshold for a standardized program.</li> </ul>	
<p style="text-align: center;"><b>Unit Water Savings</b></p> <p style="text-align: center;">Unknown at this time</p>	<p style="text-align: center;"><b>Lifetime Water Savings (2009 Production)</b></p> <p style="text-align: center;">Data not Available</p>	<p style="text-align: center;"><b>Annual Production (2009)</b></p> <p style="text-align: center;">Data not Available</p>
<p style="text-align: center;"><b>Market Potential</b></p> <p style="text-align: center;">15,000 commercial accounts</p>	<p style="text-align: center;"><b>Cost per AF</b></p> <p style="text-align: center;">\$450*</p>	

\*Industry average noted due to lack of production and data.

### Prevent Water Waste Reporting Program

#### Overview:

- Water Conservation Section staff respond to water waste complaints generated by citizens throughout the service area. As part of the drought response, the Section added additional temporary staff to assist with the large volume of complaints received during the year in association with Level 2 Drought; however, these positions were eliminated at the end of FY 2011, when the drought ordinance was rescinded.
- Program flow entailed the following process:
  - Citizens report water waste
  - Department staff investigates complaint
  - Customers are notified
  - Chronic wasters can be fined
- To resolve water waste issues, Department staff contacts property owner or manager and works to eliminate water waste issues and associated hazards. Water waste complaints can vary drastically. A typical example is a broken sprinkler head, which is wasting up to 20 gpm and flooding adjacent properties and streets.
- In FY 2011, more than 2,754 water waste complaints were resolved, with a water savings of an estimated 60 gallons per day (gpd) per complaint. This translates into estimated water savings of 165,240 gpd.
- With the elimination of temporary staff positions at the end of FY 2011, the program now has one person full-time. Complaints have been reduced 10-fold upon the declaration of the end of the drought and the lifting of watering restrictions.

#### Program Reasoning:

The creation of this program was reactionary due to drought conditions. When needed, the program provided the necessary public interaction to obtain water savings through the elimination of inefficiency behaviors.

#### Advantages:

- Provides one-on-one customer education
- Provides good PR when managed correctly

#### Disadvantages:

- Requires extensive staff resources
- Can potentially provide negative public perception when managed incorrectly

Unit Water Savings	Lifetime Water Savings (2009 Production)	Annual Production (2009)
60 gpd	75 AF	1,116 water waste investigations
<b>Cost per AF</b>		
\$1,742		

Educational Programs	
Program	Description
<b>Waste No Water Campaign</b>	<p>During FY 2011, the Water Conservation Section communicated water supply issues to the public by developing the <b>San Diegans Waste No Water</b> public involvement, education, and outreach campaign.</p> <p>Tactics included trolley wraps, bus “king kong” wraps, presentations to public groups, “Water Awareness Day” activities, press releases, Facebook, Twitter references, and public service announcements.</p> <p>With local water supply conditions gradually improving, the main objectives of the campaign were to make water conservation persona and less authoritarian. The Department contracted with a public outreach consultant to conduct the campaign.</p>
<b>Kids Water Conservation Corner and Poster Contest</b>	<p>The Kids Water Conservation Corner is a website providing resources on water use and efficiency for teachers and kids including water savings tips, activity books, and a poster contest. The link to this website is shown below:</p> <p><a href="http://www.sandiego.gov/water/conservation/kids/index.shtml">http://www.sandiego.gov/water/conservation/kids/index.shtml</a></p> <p>Each year, the City invites all teachers to enter their students' artwork in an Annual Water Conservation Poster Contest. Winning posters received savings bonds and certificates and will be published in the Water Conservation Poster Calendar for the following year. For 2012, the winning posters are displayed at the following locations:</p> <ul style="list-style-type: none"> <li>- City Administration Building - Lobby: May 2012</li> <li>- San Diego Watercolor Society Gallery: June 2012</li> <li>- San Diego County Fair - Kids' Best Exhibit: June 2012</li> <li>- San Diego International Airport: June-September 2012</li> </ul>
<b>Water Conservation Film Contest</b>	<p>The City implemented the 4<sup>th</sup> annual Water Conservation Film Contest in 2012, “San Diegans Waste No Water.” This contest is open to high school juniors, seniors, and college students in San Diego, Coronado, and Imperial Beach. The film contest created an opportunity to engage students directly in the importance of conserving water, allowing the creativity of the students to inspire the community to use water more efficiently.</p> <p>The City showed the finalists' films at the “Red Carpet Premiere” at the IMAX Theater in the Rueben H. Fleet Science Center. The top three winners received prize packs donated by local businesses and attractions. Three local theaters featured the Grand Prize winning film.</p>

## **5.5. Recommended Changes to Existing Conservation Programs**

The Red Oak team recommends several changes to the existing conservation program. These improvements are independent of implementing a water budget structure and are discussed below.

### **Commercial Landscape Survey**

The City should consider implementing field automation with an on-line survey report that can be completed by either the customer or the Department staff. Customers could complete the survey on-line. Otherwise, Department staff, in collaboration with the customer, could complete an on-site survey and report their findings to the customer for review and comment. The report should include photos of any issues found at the site. The report for commercial customers may also include GIS mapping of heads, valves, and controllers to assist in long-term management.

The City may need to guide customers in the upgrade of their irrigation system and plant material after the evaluation. This guidance includes provision of on-line tools, databases, and pictorial examples; offers incentives for irrigation efficiency devices and landscape change-outs; offers education and incentives; and enrolls customers in the Outdoor Rebate Program.

### **Water-Wise Business Surveys**

The City should set goals for the number of commercial surveys and incentives they would like to provide in a given fiscal year. The City may improve its commercial survey efficiencies by targeting specific industries or customer types and creating template surveys for entities such as food service, hotel/motels, and office buildings.

As with the landscape surveys, the City could provide more follow-up and support to guide the customer through making the water use efficiency upgrades, selecting products and vendors, and implementing the project.

The City may also consider creating a public education and outreach environment around this program and recognizing facilities that fulfill recommended measures or achieve sustainability. These recognitions could happen at board, committee, or council meetings and would garner positive public recognition. Recognition could come in the form of certificates, awards, or grants.

### **Residential and Commercial Outdoor Water Conservation Rebate**

The City should combine this program with residential and commercial survey programs to improve program efficiencies. This will encourage customers to immediately survey recommendations. The logical connection of the two programs would lead to higher levels of participation in both programs.

The City could increase marketing efforts, especially on items like controller rebates. An expanded rebate could cover the entire cost of an average device, thus making it “Free” from a marketing standpoint. Another upgrade proposed to ensure water savings is to email the customer periodically after installation as a reminder to adjust their irrigation schedule seasonally.

### **MWD Rebate Programs**

The City may consider adding funding to individual measures in conjunction with marketing outreach campaigns. Leveraging MWD funds and minimal administrative effort provides an opportunity to maximize the value received at minimal funding.

## 5.6. Potential New Conservation Programs

The City has a broad array of existing programs in place that have delivered considerable water savings in the past and will continue to do so into the future. Should the City transition to a water budget-based billing structure, there are several other program designs that have the potential to bolster support and conservation options for customers and fill the gap identified by the analysis of existing programs. These new programs are outlined in this section. Additionally, these programs provide an educational component and strong implementation support.

Turf Removal Support Program		
<p style="text-align: center;"><b>Overview:</b></p> <ul style="list-style-type: none"> <li>• Target over-budget customers with difficult irrigable areas.</li> <li>• Provide on-line: <ul style="list-style-type: none"> <li>○ water-efficient solutions for difficult irrigable areas</li> <li>○ instructional videos on turf removal</li> <li>○ guidance for design and installation of water-efficient irrigation systems</li> <li>○ description of a qualified contractor</li> <li>○ irrigation product locations</li> <li>○ irrigation schedule calculator</li> </ul> </li> <li>• Offer design templates.</li> <li>• Train contractors in removing turf in difficult irrigable areas and installing new low-precipitation irrigation and low water use plant materials.</li> <li>• Generate a list of qualified contractors that understand water use efficiency, low-precipitation irrigation, and efficient irrigation scheduling.</li> </ul>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>Customers with dedicated irrigation meters serving difficult irrigable areas, such as turf strips and medians, typically have difficulty maintaining their water usage within their budget. Turf removal is a viable option.</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Addresses customer segment most challenged with meeting their budget</li> <li>• Provides educational and support services for all customers</li> </ul>	<p style="text-align: center;"><b>Disadvantages:</b></p>	
<p style="text-align: center;"><b>Unit Water Savings</b> 0.12 gpd per SF</p>	<p style="text-align: center;"><b>Service Life</b> 12 years</p>	<p style="text-align: center;"><b>Lifetime Water Savings</b> 526 gallons per SF</p>
<p style="text-align: center;"><b>Market Potential</b> Percentage of 7,300 dedicated irrigation meters</p>	<p style="text-align: center;"><b>Cost per AF</b> Not available</p>	

Pay for Performance or Custom Incentive Program		
<p style="text-align: center;"><b>Overview:</b></p> <ul style="list-style-type: none"> <li>• Offer incentives for site-specific water savings opportunities.</li> <li>• Include non-standard devices such as irrigation system replacement and water reuse.</li> <li>• Target commercial, institutional, and industrial sites and large landscape areas.</li> <li>• Identify opportunities through survey programs and customers.</li> <li>• Require customers to submit applications describing a project and detailed calculation of water savings.</li> <li>• Pay customers based on achievement of estimated savings “Pay for Performance”.</li> <li>• Offer implementation support, which could include finding vendors, generating bid requests, and evaluating bids.</li> </ul>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>This program provides implementation support and financial incentives for the customer to improve water use efficiency.</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Large water savings per site based up on real life conditions</li> <li>• Program drives market for new water use efficiency technologies</li> </ul>		<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Requires significant resources to support customers</li> <li>• Requires large incentive to drive down payback in less than two years</li> </ul>
<p style="text-align: center;"><b>Unit Water Savings</b> Site-specific</p>	<p style="text-align: center;"><b>Service Life</b> Varies depending on project</p>	<p style="text-align: center;"><b>Lifetime Water Savings</b> Varies depending on project</p>
<p style="text-align: center;"><b>Market Potential</b> 15,000 CII customers 7,300 dedicated irrigation meter customers</p>		<p style="text-align: center;"><b>Cost per AF</b> If City paid \$6.00 per 1,000 gallons, cost would range from \$166 to \$333 depending on life of product and incentive.</p>

Web Support for Irrigation Scheduling		
<p style="text-align: center;"><b>Overview:</b></p> <ul style="list-style-type: none"> <li>• Provide program website with return-on-investment calculator to determine cost-effectiveness of replacing existing controller with smart controller.</li> <li>• Provide on-line resources to aid in installing and programming smart controller through regional smart controller rebate program.</li> <li>• Provide access to manual irrigation scheduling through the web application, Sprinkler Times, that: <ul style="list-style-type: none"> <li>○ is less costly than a smart controller</li> <li>○ enables customer to create customized watering schedules</li> <li>○ sends email reminders to change their watering schedules</li> <li>○ provides web-based customer support including information about: <ul style="list-style-type: none"> <li>• plant watering needs</li> <li>• irrigation systems</li> <li>• watering schedules and adjustments of schedules based upon weather in the local area</li> </ul> </li> </ul> </li> </ul>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>Customers are generally reluctant to improve landscape irrigation scheduling and equipment. The program provides the required support and assures water savings through the ROI evaluation.</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Offers a two-pronged approach – serves all customers with automatic irrigation controller</li> <li>• Uses on-line resources with minimal staff support</li> <li>• Validates smart controller savings</li> </ul>	<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Upfront development costs and time incurred by Department</li> </ul>	
<p style="text-align: center;"><b>Unit Water Savings</b></p> <p>Smart Controllers = 37 gpd</p>	<p style="text-align: center;"><b>Service Life</b></p> <p>Smart Controllers = 10 years</p>	<p style="text-align: center;"><b>Lifetime Water Savings</b></p> <p>Smart Controllers = 0.414 AF</p>
<p style="text-align: center;"><b>Market Potential</b></p> <p>All SFR customers with automatic irrigation controller</p>		<p style="text-align: center;"><b>Estimated Cost per AF</b></p> <p>\$482 per AF</p>



FreeSprinklerNozzles.com Voucher Program		
<p style="text-align: center;"><b>Overview:</b></p> <p>This innovative design is a web-administered voucher program for free high-efficiency sprinkler nozzles.</p> <p>Customers sign on to the FreeSprinklerNozzles.com website and login using their customer information.</p> <p>Customers then watch videos explaining how nozzles work, how to identify appropriate nozzles for their irrigation system, and how to install the new nozzles properly.</p> <p>The customer takes a voucher to a participating equipment supplier and obtains the nozzles.</p> <p>The Program is a turnkey design. Utilities have the opportunity to sign a Memorandum of Understanding with Western MWD and provide customer data, sample bills, and utility logo. Western MWD will administer, on behalf of the City, all program operations including website development, updates, maintenance, and hosting.</p>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>There are pop-up spray heads in nearly all irrigated areas throughout San Diego in both residential and commercial applications.</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Cost-effective</li> <li>• Large market potential</li> <li>• Turnkey administered</li> </ul>	<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Verifying installations can be challenging</li> </ul>	
<p style="text-align: center;"><b>Unit Water Savings</b> 3.56 gpd</p>	<p style="text-align: center;"><b>Service Life</b> 5 years</p>	<p style="text-align: center;"><b>Lifetime Water Savings</b> 6,600 gallons</p>
<p style="text-align: center;"><b>Market Potential</b> Unlimited throughout San Diego</p>	<p style="text-align: center;"><b>Cost per AF</b> \$160</p>	

Urinal Retrofit Program		
<p style="text-align: center;"><b>Overview:</b></p> <p>Currently replacing an entire urinal, flush valve, and porcelain with an ultra-low volume urinal is cost-prohibitive for many customers. Many times, the physical “footprint” of the new urinals does not match that of the old urinal and requires additional construction and costs.</p> <p>Low participation in MWD’s SoCalWater\$mart Rebate Program, which offers \$200 per rebate, suggests that more direct customer outreach, as well as a turnkey program approach, is necessary in order to establish a base of interested customers and increase installations within the service area. This program offers a retrofit program vs. a full replacement.</p> <p>The retrofit is a replacement of the flush valve only. The City enlists commercial customers in the program, assesses site conditions, inventories sites, and installs the new valves. The installations may need to be done by a licensed plumbing contractor. The program would target sites with large numbers of urinals including public sector facilities (schools, cities, counties, and state facilities) as well as restaurants, bars, office buildings, sporting venues, and other high-traffic locations.</p>		
<p style="text-align: center;"><b>Program Reasoning:</b></p> <p>Full replacement is cost-prohibitive.</p>		
<p style="text-align: center;"><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• Less expensive than traditional urinal replacements</li> <li>• Urinal market has low saturation</li> <li>• Free offer increases likelihood of participation</li> <li>• Targets public sector sites in need of upgrade projects</li> </ul>	<p style="text-align: center;"><b>Disadvantages:</b></p> <ul style="list-style-type: none"> <li>• Lower water savings than full replacement</li> </ul>	
<p style="text-align: center;"><b>Unit Water Savings</b></p> <p style="text-align: center;">54 gpd</p>	<p style="text-align: center;"><b>Service Life</b></p> <p style="text-align: center;">20 years</p>	<p style="text-align: center;"><b>Lifetime Water Savings</b></p> <p style="text-align: center;">1.22 AF per urinal</p>
<p style="text-align: center;"><b>Market Potential</b></p> <p>Urinals are located within most commercial and public sector sites.</p>	<p style="text-align: center;"><b>Cost per AF</b></p> <p style="text-align: center;">\$187</p>	

## 5.7. Recommended Conservation Programs

Table 5-1 summarizes the recommended programs. These programs will provide the resources and measures necessary to help customers reach their water efficiency goals, which will then enable achievement of SB X7-7 goals.

**Table 5-1:  
Recommended Conservation Programs**

Recommended Programs	Comments
<b>Existing Programs</b>	
MWD Save A Buck Commercial Rebate Program	Takes advantage of MWD funding Is easy to administer
Commercial Landscape Survey Program	Targets highest water use Provides site-specific opportunities
MWD SoCal WaterSmart Residential Rebate Program	Takes advantage of MWD funding and is easy to administer
Plumbing Retrofit on Resale Program	Charges customer for cost of upgrades to high-efficiency fixtures
Residential and Commercial Outdoor Water Conservation Rebate Program	Targets highest water use Leverages grant funding opportunities Provides additional measures not available in MWD's regional landscape program offerings
Residential Water Survey Program	Provides site-specific opportunities
Water Wise Business Survey Program	Targets commercial market with potential for water savings Provides site-specific opportunities
Prevent Water Waste Reporting	Is ramped up during water shortages
<b>New Programs</b>	
Turf Removal Support Services	Targets customers requiring significant irrigation water reduction Is difficult to implement without support
Pay for Performance Customer Incentives	Provides customized incentives for special case situations Targets commercial and direct irrigation applications
Web Support for Irrigation Scheduling and Smart Controller Vouchers	Is applicable to multiple customer segments Uses on-line resources with minimal support Offers low-cost high-opportunity savings Screens customers for smart controller through ROI evaluation
FreeSprinklerNozzles.com	Offers prime opportunity for landscape measure Is a turnkey implementation Provides low cost/high savings
Urinal Retrofit Program	Targets commercial plumbing fixtures in non-saturated market Delivers high response through direct install format