Palos Verdes District
Conservation Master Plan: 2011 - 2015

California Water Service Company

Prepared by

M.Cubed
Gary Fiske and Associates, Inc.
A&N Technical Services, Inc.

April 2011

Table of Contents

List of Acronyms/Abbreviations vi
Executive Summary vii
ES-1 Introduction vii
ES-2 Baseline Per-Capita Demand viii
ES-3 Demand-Reduction Targets viii
ES-3.1 SBx7-7 Requirements ix
ES-3.2 MOU Requirements x
ES-3.3 SBx7-7 Per Capita Targets x
ES-3.4 Gross and Net Savings Requirements xi
ES-4 Conservation Program Analysis xii
ES-5 Portfolio Development xv
ES-6 Required Staffing and Expenditure Levels xix
ES-6.1 Administration and Research xix
ES-6.2 Public Information and School Education xx
ES-6.3 Cost Summary xx
ES-6.4 Expected Savings xx
ES-7 Plan Monitoring and Updates xxii
1 Introduction 1
1.1 Master Plan Scope and Objectives 1
1.2 Plan Development 2
1.3 Report Organization 3
2 District Profile 5
2.1 Introduction 5
2.2 Service Area Description 5
2.3 Population and Service Connections 5
2.4 Historical Water Demand 8
2.5 Unadjusted Water Demand Projection 10
2.6 Local Water Supply Issues 11
2.7 Future Water Cost 12
2.7.1 Short-Run Avoided Costs 12
2.7.2 Long-Run Avoided Costs 13

2.8 Future Water Rates 13
3 Statewide Urban Water Demand Reduction Policies 14
3.1 Introduction 14
3.2 CPUC GPCD Policy 14
3.3 State Per Capita Water Use Policies and Targets 14
3.3.1 SBx7-7 GPCD Reduction Targets 14
3.3.2 Regional Compliance 15
3.3.3 Cal Water SBx7-7 Compliance Strategy 16
3.4 Urban Water Conservation MOU 17
3.4.1 MOU Compliance Options 17
3.4.2 Cal Water MOU Compliance Strategy 18
4 SBx7-7 and MOU Savings Targets 20
4.1 Introduction 20
4.2 SBx7-7 Target Calculation 20
4.3 MOU Flex Track Target Calculation 23
4.4 Difference from Unadjusted Baseline Water Use 25
5 Water Savings Required from New Programs 26
5.1 Introduction 26
5.2 Expected Savings from Efficiency Codes 26
5.3 Expected Savings from Rates 28
5.4 Expected Savings from Current Programs 28
5.5 Adjusted Baseline Demand 29
5.6 Water Savings Needed from New Programs 29
6 Conservation Program Analysis 32
6.1 Introduction 32
6.2 Conservation Program Concepts 32
6.2.1 Concept Screening 36
6.2.2 Preliminary Quantitative Analysis 38
6.2.3 Identification of Core and Non-Core Programs 39
6.3 Benefit-Cost Analysis of Core and Non Core Programs 42
7 Portfolio Development 44
7.1 Introduction 44
7.2 SBx7-7 and MOU Savings Targets 44
7.3 2011-13 General Rate Case Decision 44

7.4 Minimum and Maximum Program Levels 45
7.5 Recommended Annual Program Activity and Staff Levels 45
7.5.1 Residential and Non-Residential Conservation Programs 45
7.5.2 Administration & Research 46
7.5.3 Public Information & School Education 47
7.6 Projected Annual Program Expenditures 48
7.7 Projected Portfolio Water Savings 49
7.8 Projected Water Demands 50
7.9 Program Cut Sheets 51
8 Plan Monitoring and Updates 53
8.1 Introduction 53
8.2 Program Tracking 53
8.3 2014-16 General Rate Case 53
8.4 2015 UWMP 53
8.5 MOU Flex Track Target 53
8.6 Water Savings Verification 54
8.7 Local Codes and Ordinances 54
8.8 2015 Plan Update 54
Appendix 1 Conservation Program Cut Sheets
Appendix 2 Conservation Program Modeling Assumptions and Results

Report Tables

Table ES-1. Cal Water Districts Sorted by Hydrologic Region x
Table ES-2. Regional SBx7-7 Targets for Cal Water Districts in South Coast HR xi
Table ES-3. Palos Verdes District Gross Savings Required for SBx7-7 and MOU Compliance xi
Table ES-4. Palos Verdes District New Program Savings Required for SBx7-7 and MOU Compliance xii
Table ES-5. Palos Verdes District Program Concepts Passing Qualitative Screen xiii
Table ES-6. Cal Water Conservation Programs xvi
Table ES-7. Palos Verdes District Core and Non-Core Program Benefit-Cost Ratios xvii
Table ES-8. Palos Verdes District GRC Conservation Program Expenditure Constraints xviii
Table ES-9. Palos Verdes District Recommended Residential and Non-Residential Program Levels xix
Table ES-10. Palos Verdes District Projected Annual Conservation Expenditures xx
Table ES-11. Palos Verdes District Projected Water Savings by Customer Class xxi
Table ES-12. Palos Verdes District Recommended Portfolio Projected 2015 Demand xxi
Table ES-13. South Coast Regional Alliance 2015 Average Per Capita Demand xxii
Table 2-1. Palos Verdes District Historical and Projected Population 7
Table 2-2. Palos Verdes District Service Connections 8
Table 2-3. Palos Verdes District Unadjusted Baseline Demand Projection 11
Table 2-4. Palos Verdes District Avoided Cost Forecast 13
Table 2-5. Palos Verdes District Nominal Change in Service Rates 13
Table 3-1. Cal Water Districts Sorted by Hydrologic Region 16
Table 3-2. MOU Best Management Practices 19
Table 4-1. Palos Verdes District SBx7-7 GPCD Targets 21
Table 4-2. Regional SBx7-7 Targets for Cal Water Districts in South Coast HR 22
Table 4-3. Programmatic BMPs Used to Calculate Flex Track Target 24
Table 4-4. Palos Verdes District 2015 MOU Flex Track Target 25
Table 4-5. Palos Verdes District Gross Savings Required for SBx7-7 and MOU Compliances 25
Table 5-1. Palos Verdes District 2011-2015 Code-Driven Water Savings 27
Table 5-2. Palos Verdes District 2011-2015 Water Savings from Proposed Rate Adjustment 28
Table 5-3. Palos Verdes District Water Savings from 2009-10 Conservation Programs 29
Table 5-4. Palos Verdes District Adjusted Baseline Demand Projection 29
Table 5-5. Palos Verdes District New Program Savings Required for SBx7-7 and MOU Compliance 30
Table 5-6. Palos Verdes District 2015 GPCD Required for SBx7-7 and MOU Compliance 31

Table 6-1. Palos Verdes District Indoor Conservation Program Concepts..... 34
Table 6-2. Palos Verdes District Outdoor Conservation Program Concepts..... 35
Table 6-3. Palos Verdes District General Conservation Program Concepts..... 36
Table 6-4. Palos Verdes District Program Concepts Passing Qualitative Screen 37
Table 6-5. Cal Water Conservation Programs..... 41
Table 6-6. Palos Verdes District Core and Non-Core Program Benefit-Cost Ratios... 43
Table 7-1. Palos Verdes District GRC Conservation Program Expenditure Constraints 45
Table 7-2. Palos Verdes District Recommended Residential and Non-Residential Program Levels 46
Table 7-3. Palos Verdes District Projected Annual Conservation Expenditures..... 49
Table 7-4. Palos Verdes District Projected Water Savings by Program..... 50
Table 7-5. Palos Verdes District Projected Water Savings by Customer Class 50
Table 7-6. Palos Verdes District Recommended Portfolio Projected 2015 Demand. 51
Table 7-7. South Coast Regional Alliance 2015 Average Per Capita Demand 51

Report Figures

Figure ES-1. Palos Verdes District Historical Per Capita Demand viii
Figure 2-1. General Location of Palos Verdes District 6
Figure 2-2. Palos Verdes District Distribution of Services by Customer Type..... 7
Figure 2-3. Palos Verdes District Historical Demand..... 9
Figure 2-4. Palos Verdes District Percent of Total Demand by Type of Use 9
Figure 2-5. Palos Verdes District Historical Per Capita Demand..... 10
Figure 2-6. Palos Verdes District Unadjusted Baseline Demand Projection..... 11
Figure 4-1. Palos Verdes District SBx7-7 Per Capita Target Demand 22
Figure 7-1. Cal Water Conservation Program Management Regions 48
Figure 7-2. Palos Verdes District 2011-15 Conservation Expenditure Shares 49

List of Acronyms/Abbreviations

AF	Acre-Feet
AFY	Acre-feet Per Year
BCR	Benefit-Cost Ratio
BMP	Best Management Practice, as in MOU Conservation BMPs
Cal Water	California Water Service Company
CII	Commercial, Industrial, Institutional
Comm	Commercial
Cont	Contractor
CPUC	California Public Utilities Commission
Cust	Customer
CUWCC	California Urban Water Conservation Council
CW	Clothes Washer
Dist	Distributor
DWR	California Department of Water Resources
ETo	Reference Evapotranspiration
GPCD	Gallons Per Capita Per Day
GPM	Gallons Per Minute
GRC	General Rate Case
HE	High-Efficiency, as in HE Toilets
HECW	High-Efficiency Clothes Washer
HET	High-Efficiency Toilet
HR	Hydrologic Region
Inc	Incentive
Irrig or Irr	Irrigation
Lg	Large, as in Large Landscape Survey
Lndscp	Landscape
MCL	Maximum Contaminant Level
MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
NAICS	North American Industrial Classification System
Reb	Rebate
SBx7-7	Senate Bill 7 (Steinberg), The Water Conservation Act of 2009
SWP	State Water Project
ULFT	Ultra Low Flush Toilet
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WBIC	Weather-Based Irrigation Controller (also called “Smart Controllers”)
WSS	WaterSense Specification

Executive Summary

ES-1 Introduction

California Water Service Company (Cal Water) is in the process of expanding current conservation programs and developing new programs for its 24 service districts. Over the next five years, Cal Water conservation program expenditures are likely to increase significantly due in large measure to recently adopted state policies requiring significant future reductions in per capita urban water use. These include the passage of Senate Bill No. 7 (SBx7-7) in November 2009, which mandated a statewide 20% reduction in per capita urban water use by 2020, as well as recent decisions by the California Public Utilities Commission (CPUC) directing Class A and B water utilities to adopt conservation programs and rate structures designed to achieve reductions in per capita water use, and the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU), of which Cal Water has been a signatory since 1991.

Aside from these mandates, conservation will also help the Palos Verdes District address reduce its purchases of imported water, the cost of which has increased significantly in recent years while its reliability has diminished.

In preparing for this program expansion, Cal Water has spent the past year developing five-year conservation program plans for each of its service districts. Each district plan was developed with the following questions in mind:

- How much water conservation will each district need to implement in order to comply with state urban per capita water use targets?
- How much of this conservation requirement can be met by existing water efficiency codes and ordinances, scheduled increases in water rates, and past investment in conservation programs?
- How much of this conservation requirement will need to be met through new investments in conservation?
- Which water conservation programs at what levels of activity result in the most benefit to Cal Water ratepayers?
- Should existing programs be expanded, new programs developed, or both?
- How can conservation be used to help address local water supply constraints?

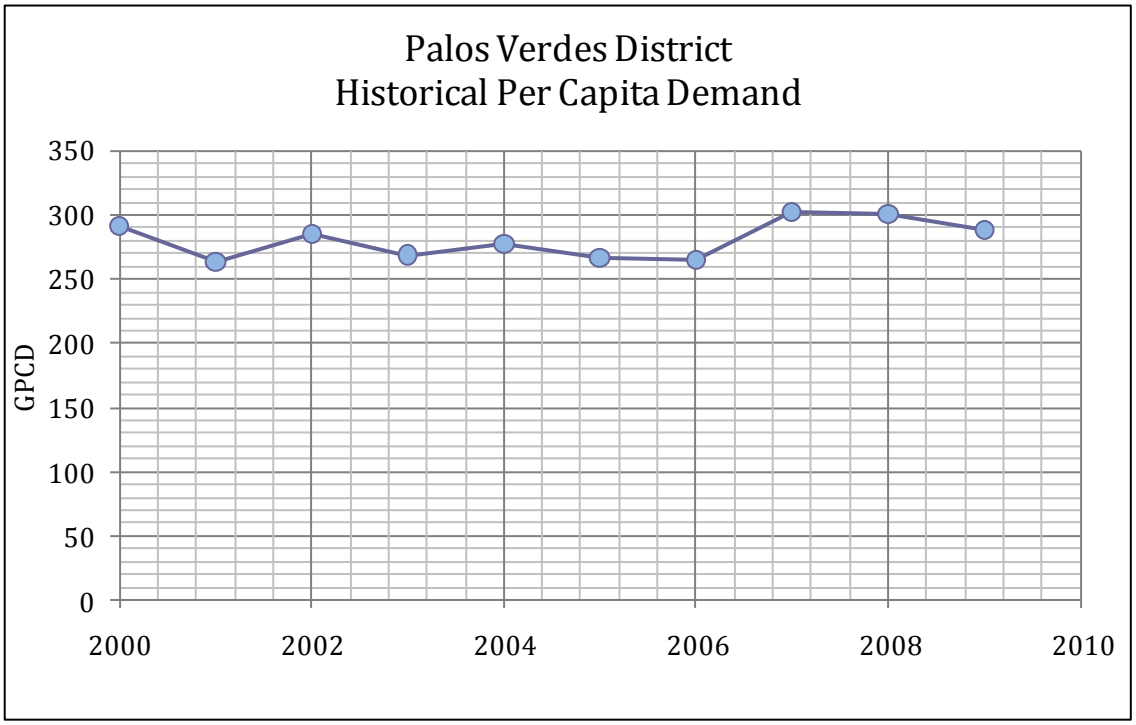
- How many conservation programs can Cal Water reasonably expect to operate given the geographic dispersion of its districts, and staffing and budgetary constraints?

- How can regional partnerships be leveraged to more efficiently achieve a district's water conservation targets?

ES-2 Baseline Per-Capita Demand

The determination of the required future demand reductions must begin with a clear understanding of past and current per-capita demands. In the last five years, per capita demand (Figure ES-1) has averaged 284 gallons per day. Per capita water use in the district is very high relative to state norms, exceeding by 48% statewide average urban per capita water use. High per capita water use in the district will make it more difficult for the district to comply with state legislation passed in 2009 requiring it to reduce per capita water use by 20% by 2020.

Figure ES-1. Palos Verdes District Historical Per Capita Demand



ES-3 Demand-Reduction Targets

The two statewide policies that result in quantified future demand reduction targets are those of SBx7-7 and the MOU. Following are brief discussions of each of these requirements.

ES-3.1 SBx7-7 Requirements

Senate Bill 7 (SBx7-7), which was signed into law in November 2009, amended the State Water Code to require a 20% reduction in urban per capita water use, net of recycled water use, by 2020. Commonly known as the 20x2020 policy, the new requirements apply to every retail urban water supplier subject to the Urban Water Management Planning Act (UWMPA).

SBx7-7 requires the state to achieve a 20% reduction in urban per capita water use by December 31, 2020. The state is required to make incremental progress toward this goal by reducing per capita water use by at least 10% on or before December 31, 2015. SBx7-7 requires each urban retail water supplier to develop interim and 2020 urban water use targets in accordance with specific requirements. They will not be eligible for state water grants or loans unless they comply with those requirements.

The law provides each water utility several ways to calculate its interim 2015 and ultimate 2020 water reduction targets. In addition, water suppliers are permitted to form regional alliances and set regional targets for purposes of compliance. Under the regional compliance approach, water suppliers within the same hydrologic region can comply with SBx7-7 by either meeting their individual target or being part of a regional alliance that meets its regional target. Cal Water districts sorted by hydrologic region are shown in Table ES-1.

Cal Water's SBx7-7 compliance strategy involves:

1. Identifying for each district the largest allowable interim and 2020 GPCD targets under the relevant compliance methods allowed by the statute;

2. Grouping districts by hydrologic region and calculating population-weighted regional targets where applicable; and

3. Developing conservation programs aimed at achieving the regional and/or district-specific targets.

As shown in Table ES-1, the Palos Verdes District is part of the South Coast hydrologic region, along with Dominguez, East Los Angeles, Hermosa-Redondo and Westlake districts. Under SBx7-7, these five districts, in addition to developing their district-specific per capita demand targets, can form a regional alliance and define regional 2015 and 2020 compliance targets. While the demand modeling done for this plan indicates that Palos Verdes District is unlikely to meet its district-specific target by 2015, it does show it will be able to comply with SBx7-7 via the regional compliance option.

Table ES-1. Cal Water Districts Sorted by Hydrologic Region

Hydrologic Region	Cal Water Districts in Region
North Coast	Redwood Valley
San Francisco Bay Area	Bear Gulch, Livermore, Los Altos, Mid-Peninsula, South San Francisco
Central Coast	King City, Salinas
South Coast	Dominguez, East LA, Hermosa-Redondo, **Palos Verdes**, Westlake
Sacramento River	Chico, Dixon, Marysville, Oroville, Willows
San Joaquin	Stockton
Tulare Lake	Bakersfield, Kern River Valley, Selma, Visalia
North Lahontan	None
South Lahontan	Antelope Valley
Colorado River	None

ES-3.2 MOU Requirements

Administered by the California Urban Water Conservation Council (CUWCC), the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU) has guided urban water conservation programs in California since it was first adopted in 1991. There are three ways in which a water supplier can comply with the MOU. The first way is to implement a set of water conservation best management practices (BMPs) according to the requirements and schedules set forth in Exhibit 1 of the MOU. The second way, called Flex Track compliance, is to implement conservation programs expected to save an equivalent or greater volume of water than the BMPs. The third way, similar to SBx7-7, is to reduce per capita water use. Because the Flex Track compliance option affords the most flexibility in selecting conservation programs suited to each Cal Water district and allows for more streamlined reporting, Cal Water plans to use Flex Track to comply with the MOU. Because CUWCC tools for calculating a district's Flex Track savings target are not yet available, Cal Water developed its own target estimates for planning purposes.

ES-3.3 SBx7-7 Per Capita Targets

District-specific and regional targets for Cal Water districts within the South Coast hydrologic region are shown in Table ES-2.[1] The 2015 and 2020 district-specific targets for Palos Verdes District are 253 and 225 gpcd, respectively. Over the last five years district demand has averaged 285 gpcd. Thus, per capita demand would need to fall by 11% by 2015 and by 21% by 2020 in order to meet these targets. Alternatively, if average per capita water use for the five districts listed in Table ES-

[1] District-specific targets are based either on Method 1 or Method 3, as defined in SBx7-7, whichever yielded the highest per capita target for the district.

2 does not exceed 176 gpcd in 2015 and 160 gpcd in 2020, then all five districts will be in compliance with SBx7-7 requirements.

Table ES-2. Regional SBx7-7 Targets for Cal Water Districts in South Coast HR

District	Population	2015 Target (GPCD)	2020 Target (GPCD)
Dominguez	144,190	193	171
East Los Angeles	148,740	121	115
Hermosa-Redondo	94,070	134	126
Palos Verdes	67,620	253	225
Westlake	16,740	442	393
Regional Targets[1]		**176**	**160**

[1] Regional targets are the population-weighted average of the district targets.

ES-3.4 Gross and Net Savings Requirements

Table ES-3 shows the gross savings required under SBx7-7 and MOU Flex Track compliance. These, however, do not reflect the savings that are required to be achieved from new conservation programming, which are net of the expected savings from water efficiency codes, expected future rate adjustments, and 2009-10 conservation program investment. The impacts of these savings components are shown in Table ES-4. Palos Verdes District's net savings targets for SBx7-7 and MOU compliance in 2015 are 2,538 AF and 361 AF, respectively.

Table ES-3. Palos Verdes District Gross Savings Required for SBx7-7 and MOU Compliance

Gross Water Savings Required by 2015	SBx7-7	MOU Flex Track
2015 Unadjusted Baseline Demand	22,070 AF	22,070 AF
2015 Target Demand	19,640 AF	21,701 AF
Gross Savings Requirement	**2,430 AF**	**369 AF**

Table ES-4. Palos Verdes District New Program Savings Required for SBx7-7 and MOU Compliance

2015 Net Savings Requirement (AF)	SBx7-7	MOU Flex Track
Gross Savings Requirement	**2,430**	**369**
Less		
Savings from codes	122	NA
Savings from rates	-238	NA
Savings from existing programs	8	8
Subtotal Expected Savings	*-108*	*8*
Savings Required from New Programs	**2,538**	**361**

ES-4 Conservation Program Analysis

As a result of an exhaustive search of the literature, consultation with experts in the field, knowledge of conservation programming by other water suppliers, and the experience of the project team, a universe of more than 75 conservation program concepts was defined. At this point in the process, the goal was to be as inclusive as possible. The list was therefore intentionally large to ensure that all possible program concepts were considered. Cal Water did not want to risk inadvertently excluding a program from consideration.

For the purposes of this plan, a conservation program concept is comprised of two components:

- Targeted technologies or changes in customer behavior; and
- A delivery mechanism by which customers will be encouraged (or required) to adopt the technology(ies) or change their behavior.

Each program may apply to multiple customer classes (Single Family, Multi-Family, Commercial/ Industrial/Institutional, and Large Landscape).

Once the universe of program concepts was defined, the next step was to subject each program concept to a careful district-specific qualitative screen, the objective of which was to eliminate those program concepts that were clearly inappropriate. For this purpose, six screening criteria were developed. For each program concept, Cal Water staff answered “yes” or “no” for each of these criteria. A “yes” answer on all of these criteria was considered to be essential for program success. Thus, a negative response to any one of the criteria for a particular program concept

eliminated that concept from further consideration. Once Cal Water had completed the initial qualitative screen, it met with local community leaders to share the results and solicit feedback on conservation program concepts for the district.

The final set of programs passing the qualitative screen for Palos Verdes District is shown in Table ES-5.

Table ES-5. Palos Verdes District Program Concepts Passing Qualitative Screen

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
INDOOR					
HE Toilets	Customer rebates or vouchers	x	x	x	
	Vendor, distributor & contractor incentives	x	x	x	
	Distribution (by utility, community group, vendor)	x	x	x	
	Direct install	x	x	x	
Urinals	Customer rebates or vouchers			x	
	Vendor, distributor & contractor incentives			x	
	Distribution (by utility or vendor)			x	
	Valve replacement			x	
Clotheswashers: in-unit, common area, & coin-op	Customer rebates & vouchers	x	x	x	
	Vendor, distributor & contractor incentives	x	x	x	
Showerhead (2.0, 1.5 gpm)/ flapper/aerators	Kit distribution or install	x	x	x	
Shower timers, Reminder cards	Distribution	x	x	x	
Cooling Towers	Customer rebates, customized incentives			x	
Food Steamers	Customer rebates			x	
Steam Sterilizers	Customer rebates			x	
Vacuum Pumps	Customer rebates			x	
Spray valves	Customer rebates			x	
	Audits			x	
OUTDOOR					
Large Landscape Surveys					x
WBIC	Direct Install	x	x	x	x
	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Distribution	x	x	x	x
Irrigation System (including, but	Customer rebate	x	x	x	x

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
not limited to, high efficiency nozzles for pop-up heads, drip, soil moisture sensors, rain shut off, pressure control)	Vendor, distributor & contractor incentives	x	x	x	x
Landscape design	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
Turf buy back (Cash for Grass)	Customer rebate	x	x	x	x
Large Landscape Water Use Reports					x
Pool, hot tub covers & other upgrades	Customer rebate or voucher	x	x	x	
GENERAL					
Audits & Surveys (incl high bill contacts)		x	x	x	x
Meter installation	Direct Install	x	x	x	x
Water use meter alerting device		x	x	x	
Water recycling, grey water use, rainwater harvesting	Customized incentives	x	x	x	
Education/outreach		x	x	x	x

The savings and cost parameters associated with each of these program concepts were then identified and each program concept was subjected to a preliminary quantitative analysis to help Cal Water distinguish between core and non-core programs. A key challenge facing Cal Water is finding a way to efficiently scale up conservation programming across its 24 districts with the limited staffing it has to implement and manage these programs. The current General Rate Case (GRC) decision authorizes 4 full-time conservation program staff for 2011-13. These staff will be responsible for implementing and managing programs in 24 geographically dispersed districts serving a combined population of over 1.7 million.[2]

Even with the added staffing beginning in 2014 that Cal Water intends to propose to the CPUC, the most efficient way for Cal Water to manage programs across its geographically dispersed districts is to standardize programs and centralize their implementation and oversight. Using the results of the qualitative screening and the preliminary quantitative analysis, Cal Water identified five core programs that it would run in every district over the next five years.

In addition to the core programs, an additional set of non-core programs was selected. Unlike core programs, Cal Water may not offer non-core programs in every district or in every year. Implementation of non-core programs will depend

[2] By way of comparison, the East Bay Municipal Utility District has a conservation program staff of 21 full-time positions serving a population of 1.3 million within a geographically contiguous and compact service area.

on whether additional water savings are required for SBx7-7 or MOU compliance, or to help address local supply constraints.

The set of core and non-core programs that Cal Water will offer over the next five years is shown in Table ES-6.

A detailed benefit-cost analysis was then performed for all of the core and non-core programs, the results of which are shown in Table ES-7. This analysis showed that all but six of the programs proposed for the district have benefit-cost ratios (BCR) greater than one.

ES-5 Portfolio Development

The program analysis results described above provided the starting point for portfolio development. The next step was to determine the annual levels of program activity needed for SBx7-7 and MOU compliance. Several considerations informed these decisions, including budgetary constraints included in the current GRC decision, Cal Water conservation program administrative capacity, program market and water savings potential, and the program benefit-cost results shown in Table ES-7.

Cal Water's current GRC decision established conservation budgets for each district for the years 2011-2013. These budgets specify the total annual expenditure on conservation programs, as well as the maximum amount that can be allocated to (1) program administration and research, (2) public information and school education programs, (3) residential conservation programs, and (4) non-residential conservation programs. Table ES-8 shows these budgetary restrictions for Palos Verdes District.

Table ES-6. Cal Water Conservation Programs

Program Name	Description	Target Market
CORE PROGRAMS		
Rebate/Vouchers for toilets, urinals, and clothes washers	Provide customer rebates for high-efficiency toilets, urinals, and clothes washers	All customer segments
Residential Surveys	Provide residential surveys to low-income customers, high-bill customers, and upon customer request or as pre-screen for participation in direct install programs	All residential market segments
Residential Showerhead/Water Conservation Kit Distribution	Provide residential showerhead/water conservation kits to customers upon request, as part of residential surveys, and as part of school education curriculum	All residential market segments
Pop-Up Nozzle Irrigation System Distribution	Offer high-efficiency pop-up irrigation nozzles through customer vouchers or direct install.	All customer segments
Public Information/Education	Provide conservation messaging via radio, bill inserts, direct mail, and other appropriate methods. Provide schools with age appropriate educational materials and activities. Continue sponsorship of Disney Planet Challenge program.	All customer segments
NON-CORE PROGRAMS		
Toilet/Urinal Direct Install Program	Offer direct installation programs for replacement of non-HE toilets and urinals	All customer segments
Smart Irrigation Controller Contractor Incentives	Offer contractor incentives for installation of smart irrigation controllers	All customer segments
Large Landscape Water Use Reports	Expand existing Cal Water Large Landscape Water Use Report Program providing large landscape customers with monthly water use reports and budgets	Non residential customers with significant landscape water use and potential savings
Large Landscape Surveys & Irrigation System Incentives	Provide surveys and irrigation system upgrade financial incentives to large landscape customers participating in the Large Landscape Water Use Reports programs and other targeted customers	Non residential customers with significant landscape water use and potential savings
Food Industry Rebates/Vouchers	Offer customer/dealer/distributor rebates/vouchers for high-efficiency dishwashers, food steamers, ice machines, and pre-rinse spray valves	Food and drink establishments, institutional food service providers
Cooling Tower Retrofits	Offer customer/dealer/distributor rebates/vouchers of cooling tower retrofits	Non-residential market segments with significant HVAC water use
Industrial Process Audits and Retrofit Incentives	Offer engineering audits/surveys and financial incentives for process water efficiency improvement	Non-residential market segments with significant industrial process water uses

Table ES-7. Palos Verdes District Core and Non-Core Program Benefit-Cost Ratios

Program ID	Program Name	Customer Class	BCR
1	HE Toilets: Cust Rebates or Vouchers	Single Family	3.04
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	5.97
3	HE Toilets: Cust Rebates or Vouchers	Commercial	1.92
4	Clotheswasher: Cust Reb or Voucher	Single Family	1.07
5	CW common: Cust Reb or Voucher	Multi Family	1.30
6	CW in-unit: Cust Reb or Voucher	Multi Family	0.81
7	CW coin-op: Cust Reb or Voucher	Commercial	1.57
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	1.33
9	HE Toilets: Direct Install	Single Family	1.34
10	HE Toilets: Direct Install	Multi Family	3.50
11	HE Toilets: Direct Install	Commercial	1.18
12	Urinals: Direct Install	Commercial	1.38
13	Audits & Surveys (incl high bill contacts)	Single Family	0.82
14	Audits & Surveys (incl high bill contacts)	Multi Family	0.93
15	Audits & Surveys (incl high bill contacts)	Commercial	2.26
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	6.26
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	6.26
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	6.26
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	2.13
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	2.13
21	WBIC Vendor, Dist, & Cont Inc	Single Family	0.53
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	0.95
23	WBIC Vendor, Dist, & Cont Inc	Commercial	0.95
24	Large Landscape Water Use Reports	Irrigation	1.29
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	1.03
26	Comm Irrigation System: Rebates	Commercial	2.74
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	11.73
28	Food Steamers: Cust Rebates	Commercial	1.17
29	Pre-Rinse Spray Valves: Cust rebates	Commercial	4.55
30	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	5.46
31	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	5.60

Table ES-8. Palos Verdes District GRC Conservation Program Expenditure Constraints

Budget Constraint ($000)	2011	2012	2013
Overall Budget	$675.0	$675.0	$675.0
Admin & Research	$83.6	$83.8	$83.8
Public Info & School Educ.	$72.5	$72.5	$72.5
Programmatic Activity	$518.9	$518.7	$518.7
Expenditure Caps			
Residential Programs	$550.5	$555.5	$555.5
Non Residential Programs	$442.5	$442.5	$442.5

For each district, Cal Water then specified minimum and maximum program activity levels to guide portfolio development. The minimum levels were those below which it would not be administratively feasible or cost-effective to offer the program in the district, while the maximum levels were those that could reasonably be achieved given district customer characteristics, current market demand, and past experience marketing similar programs/technologies to district customers. The constraints placed on annual program activity levels are presented in Appendix 3.

Based on the foregoing, Table ES-9 shows the recommended annual program levels for residential and non-residential programs. The program levels were derived from the following decision rules:

- For 2011-13, set annual program activity to maximize water savings subject to the GRC conservation program budget constraints and the min/max annual activity constraints. This ensured that the portfolio would reflect the least-cost mix of core and non-core conservation programs consistent with the GRC budget constraints.

- For 2014-15, set annual activity to minimum program levels. For programs with BCRs greater than one, increase activity to its maximum level. This ensured that the portfolio would benefit ratepayers by helping to lower average water supply costs.

- For 2014-15, if needed to satisfy the 2015 district-specific SBx7-7 and MOU Flex Track water savings targets, increase program activity of programs with BCRs less than one in order of cost-effectiveness. This ensured the least-cost set of activity levels needed to achieve the water savings targets.

In the case of Palos Verdes District, program activity in each year was maximized subject to the GRC program budget constraints in an effort to meet the 2015 SBx7-7 target. The significant increase in the customer survey/audit, toilet/urinal direct installation, and smart irrigation controller incentive programs starting in 2014 shows the impact of the GRC budget constraints on 2011-13 program production.

Table ES-9. Palos Verdes District Recommended Residential and Non-Residential Program Levels

Program	Recommended Annual Activity Levels[1]				
	2011	2012	2013	2014	2015
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	630	630	630	950	950
Clothes Washers	480	480	480	500	500
Urinals	0	0	0	0	0
Customer Surveys/Audits	370	370	370	550	550
Conservation Kit Distribution	780	780	780	780	780
Pop-Up Nozzle Distribution	9,300	9,300	9,300	9,300	9,300
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	550	560	560	1,190	1,190
Smart Irr. Controller Vendor Incentives	20	20	20	530	530
Large Landscape Water Use Reports	50	50	50	100	100
Large Landscape Surveys/Incentives	30	30	30	30	30
Commercial Kitchen Rebates/Vouchers	0	0	0	20	20
Cooling Tower/Process Water Retrofit Incentives	10	10	10	0	0

[1]Annual activity levels are aggregated across customer classes and rounded up to the nearest 10 units of activity. Appendix 3 contains the detail modeling results broken down by customer class and program measure.

ES-6 Required Staffing and Expenditure Levels

ES-6.1 Administration and Research

District staff levels and expenditure for administration and research for 2011-13 are set by the current GRC. At present, Cal Water divides its 24 districts into two program management regions which are administered by its two conservation program coordinators. Program reporting and analysis will be conducted by its conservation program analyst. Proposed expenditures for 2014 and 2015 assume two additional conservation program coordinator positions and one additional conservation analyst position for a total of seven full-time positions. Given the scale and diversity of programs proposed in this plan and the geographic dispersion of Cal Water's districts, this is the minimum staffing level recommended for program implementation, and assumes Cal Water will divide its 24 districts into four program management regions. Program administration costs for 2014-15 are prorated to the districts based on their share of company-wide conservation program expenditures.

ES-6.2 Public Information and School Education

District expenditure for public information and school education programs in 2011-13 is set by the current GRC. Recommended expenditures in 2014 and 2015 were set to allow some expansion in these programs to support proposed increases in residential and non-residential program levels.

ES-6.3 Cost Summary

Annual program expenditures for conservation programming, administration and research, and public information and education, based on the recommended program levels and GRC budget allocations are shown in Table ES-10. The plan allocates approximately 80% of projected expenditure to programmatic activity, and splits the remaining 20% evenly between public information/education functions and administration and research functions. Within the programmatic expenditure category, approximately 80% of planned expenditure is for residential conservation programs and 20% is for non-residential programs. The allocation of program expenditures between residential and non-residential program categories reflects the small amount of commercial and industrial water use in the district.

Proposed expenditures in 2014 and 2015 are roughly double the annual program expenditure allowed under the current GRC. Even with this proposed increase in program expenditure, the district is not expected to meet its district-specific SBx7-7 target, but the extra savings from 2014 and 2015 will enable the five South Coast districts to meet their regional target. Moreover, the proposed program is justified by Palos Verdes District's high water costs. The avoided costs of imported water more than offset the proposed conservation program expenditures, resulting in a net benefit to ratepayers.

Table ES-10. Palos Verdes District Projected Annual Conservation Expenditures

Expenditure Category	Projected Annual Expenditures ($000)				
	2011	**2012**	**2013**	**2014**	**2015**
Program Costs:					
Residential	$392.0	$398.5	$398.5	$902.8	$902.8
Non-Residential	$126.9	$120.2	$120.2	$196.6	$195.5
Program Subtotal	***$518.9***	***$518.7***	***$518.7***	***$1,099.3***	***$1,098.3***
Admin/Research	$83.6	$83.8	$83.8	$107.1	$106.7
Public Info/Education	$72.5	$72.5	$72.5	$109.9	$109.8
TOTAL ANNUAL	**$675.0**	**$675.0**	**$675.0**	**$1,316.4**	**$1,314.8**

ES-6.4 Expected Savings

Table ES-11 summarizes projected annual water savings by customer class. By 2015 projected water savings are approximately 666 AF. Roughly 79% of the savings come out of the residential sector and 21% come out of the non-residential sector.

Projected water savings in 2015 are almost twice the MOU Flex Track Target, but well under the savings needed to achieve the district-specific SBx7-7 target.

Table ES-12 shows the adjusted 2015 baseline demand, the demand targets required to comply with SBx7-7 and the MOU, and the projected 2015 demand based on the recommended conservation portfolio.[3] Under the recommended portfolio, projected demand in 2015 is 277 gpcd, which is below the MOU Flex Track target by about 4 gpcd, but over the district-specific SBx7-7 by about 24 gpcd. This means that 2015 per capita demand for the five Cal Water districts in the South Coast hydrologic region can average no more than 176 gpcd in order for Palos Verdes District to comply with SBx7-7.

Table ES-13 shows projected 2015 per capita demands for each of the five Cal Water districts in the South Coast hydrologic region based on the proposed conservation plan for each district. Assuming each district's 2015 per capita demand is no greater than shown in the table, average per capita demand for the five districts would be under the regional target, thereby ensuring SBx7-7 compliance for all five districts.

Table ES-11. Palos Verdes District Projected Water Savings by Customer Class

	Annual Water Savings (AF)				
Customer Class	**2011**	**2012**	**2013**	**2014**	**2015**
Single Family	77.8	152.4	223.8	329.2	430.5
Multi Family	17.7	34.7	51.1	73.1	94.4
Commercial/Industrial	31.3	55.0	78.0	103.5	127.9
Irrigation	5.1	6.4	7.7	12.8	14.1
Total Water Savings	**131.8**	**248.5**	**360.6**	**518.7**	**666.9**

Table ES-12. Palos Verdes District Recommended Portfolio Projected 2015 Demand

Demand Projection	**Demand (GPCD)**	**Difference from Adjusted Baseline (GPCD)**
Adjusted Baseline	286	
SBx7-7 Target	253	-33
MOU Flex Track Target	281	-5
Recommended Portfolio	**277**	**-9**

[3] The adjusted baseline demand forecast deducts expected reductions in demand due to codes/ordinances, scheduled adjustments to water rates, and 2009-10 conservation program investment.

Table ES-13. South Coast Regional Alliance 2015 Average Per Capita Demand

District	2015 Projected Population	2015 Projected Demand (GPCD)
Dominguez	146,550	194
East Los Angeles	151,510	111
Hermosa-Redondo	99,050	120
Palos Verdes	69,300	277
Westlake	16,960	488
Average GPCD[1]		**175**
Regional Target		**176**
[1]Population-weighted average per capita demand.		

ES-7 Plan Monitoring and Updates

Cal Water will need to regularly review the plan and make adjustments to it as appropriate. Key monitoring and updating activities Cal Water anticipates undertaking following plan implementation include:

- Cal Water will assess and adopt conservation program tracking software to be used to track and manage its core and non-core programs.
- Cal Water will submit its initial filing for the 2014-16 GRC in July 2012. Prior to that filing, Cal Water may elect to update this plan to reflect new information and changed circumstances affecting the baseline water demands, calculated water savings targets, recommended conservation programs, projected water savings, and proposed conservation program budgets.
- Cal Water may, in conjunction with preparation of its 2015 Urban Water Management Plans, elect to update its baseline demand estimates and gpcd targets, if new information warrants doing so. Depending on the final methodology adopted by DWR for the as-yet unspecified fourth target calculation option, Cal Water may decide to update the SBx7-7 targets included in the plan using this alternative methodology.
- Cal Water may elect to update this plan to reflect a revised Flex Track target based on a CUWCC-sanctioned Flex Track target calculator, expected to be available in the first half of 2011.
- Results from studies, such as the one Cal Water and San Jose State University Research Foundation are jointly undertaking to better estimate realized water savings from converting customers from flat rate to metered billing, will be used by Cal Water to update water savings projections.

- Cal Water will work with local planning and enforcement departments to ensure that its conservation programs are consistent with and complementary to local water use codes and ordinances, and may elect to modify the design or level of implementation of programs included in the plan in order to do so.
- Cal Water plans to update these plans no less frequently than every five years, in conjunction with the update and reporting cycle for the district-specific UWMPs. Plan updates may entail adjustment of existing programs and addition of new programs based on performance history, community input, and changes to state and local conservation requirements.

1 Introduction

1.1 Master Plan Scope and Objectives

California Water Service Company (Cal Water) is in the process of expanding current conservation programs and developing new programs for its 24 service districts. Over the next five years, Cal Water conservation program expenditures are likely to increase significantly. Recently adopted state policies requiring future reductions in per capita urban water use are providing much of the impetus for this effort. Primarily the passage of Senate Bill No. 7 (SBx7-7) in November 2009, which mandated a statewide 20% reduction in per capita urban water use by 2020, but also recent decisions by the California Public Utilities Commission (CPUC) directing Class A and B water utilities to adopt conservation programs and rate structures designed to achieve reductions in per capita water use, and the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU), of which Cal Water has been a signatory since 1991. In addition, conservation will help to address local water supply constraints in some districts.

In preparing for this program expansion, Cal Water has spent the past year developing five-year conservation program plans for each of its service districts. Each district plan was developed with the following questions in mind:

- How much water conservation will each district need to implement in order to comply with state urban per capita water use targets?
- How much of this conservation requirement can be met by existing water efficiency codes and ordinances, scheduled increases in water rates, and past investment in conservation programs?
- How much of this conservation requirement will need to be met through new investments in conservation?
- Which water conservation programs at what levels of activity result in the most benefit to Cal Water ratepayers?
- Should existing programs be expanded, new programs developed, or both?
- How can conservation be used to help address local water supply constraints?
- How many conservation programs can Cal Water reasonably expect to operate given the geographic dispersion of its districts, available staffing and budgetary resources?

- How can regional partnerships be leveraged to more efficiently achieve a district's water conservation targets?

The primary objective of this planning process was the development of a set of comprehensive, service-area-specific conservation plans to guide Cal Water conservation program development and investment over the next five years. This report describes the five-year plan developed for the Palos Verdes District.

1.2 Plan Development

Plan development proceeded in phases. The first phase focused on compiling data needed for projecting future district water demand, developing per capita water use targets, and analyzing conservation programs. The data collected during this phase is used extensively throughout this report and provides the foundation for the quantitative analyses used to develop the plan's per capita water use targets and conservation program recommendations.

The next phase of plan development centered on estimating the volume of water savings the district would need to achieve over the next five years in order to satisfy SBx7-7 and MOU interim compliance requirements. Once these volumes were determined, expected water savings from existing codes and ordinances, scheduled increases in water rates, and past conservation program activity were deducted in order to determine the amount of water savings that would need to come from new conservation programs.

Using the results of the second phase as a starting point, the third phase of plan development entailed a comprehensive assessment of conservation program concepts to identify the best mix of programs to achieve the required water savings. This included soliciting input on program concepts from community stakeholders, and passing a broad universe of conservation program concepts through qualitative and quantitative screens designed to eliminate program concepts that were not good matches for Cal Water districts. Program concepts making it through the screening process were further refined and used to develop a set of core and non-core conservation programs, where core programs are those that Cal Water will offer in every district over the next five years and non-core programs are those that Cal Water will offer in some districts as needed.

To complete the plan, the recommended annual levels of activity for core and non-core programs were developed for each district. Proposed district program activity levels were informed by several considerations, as follows:

- First, minimum and maximum levels of activity for each district were established, where the minimum level sets the point below which it would not be administratively feasible or cost-effective to offer the program in the district, and the maximum level sets the point above which additional program participation would be highly uncertain given current market

penetration and district experience.

- Second, the current CPUC General Rate Case (GRC) decision for Cal Water establishes each district's conservation budget for 2011-13 as well as the maximum amount of budget each district can allocate to residential and non-residential conservation programs. Thus, the proposed program activity levels are designed so as not to violate these budgetary constraints.

- Third, the proposed program activity levels seek to achieve each district's water use targets at lowest possible cost, subject to the activity level and budgetary constraints described above.

- Lastly, any program with a benefit-cost ratio greater than one was set to its maximum activity level in 2014 and 2015, since doing so would benefit ratepayers by lowering the average cost of water service.[4]

1.3 Report Organization

The organization of this plan closely follows the analytical process described above, and, in addition to this introduction, includes the following sections:

- *Section 2, District Profile*, provides a general overview of the Palos Verdes District, including service area description, historical and projected population and service connections, historical water demand, projected water demand (without additional conservation), future water supply constraints and costs, projected water rates affecting future water use in the district.

- *Section 3, Statewide Urban Water Demand Reduction Policies*, describes the inter-related state-level policies and agreements aimed at reducing urban water use. These include: (1) recent decisions by the CPUC directing Class A and B water utilities to reduce per capita urban water demand; (2) state legislation mandating urban water suppliers to reduce per capita demand 20% by 2020; and (3) the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU).

- *Section 4, Per Capita and MOU Savings Targets,* derives the reduction in demand required by 2015 in order for Palos Verdes District to achieve interim compliance with SBx7-7 and the MOU.

- *Section 5, Water Savings Required from New Programs*, calculates the volume of water savings expected from existing water efficiency codes and

[4] This could not be done for 2011-13 because of the annual budget constraints resulting from the current General Rate Case (GRC).

ordinances, scheduled increases in water rates, and past investment in conservation programs in order to derive the amount of water savings that will be needed from new conservation program investment.

- *Section 6, Conservation Program Analysis*, describes the conservation program screening and quantitative analysis used to identify, evaluate and select conservation programs for Palos Verdes District.

- *Section 7, Portfolio Development*, describes the process used to develop the recommended conservation program portfolio for Palos Verdes District.

- *Section 8, Plan Monitoring and Updates*, describes how plan implementation will be monitored, discusses key uncertainties related to plan implementation, realization of projected water savings, and achieving the stated water savings targets, and how the plan will be updated as conditions change and new information on the effectiveness and cost of programs becomes available.

2 District Profile

2.1 Introduction

This part of the plan provides a general overview of the Palos Verdes District, including service area description, historical and projected population and service connections, historical water demand, projected water demand (without additional conservation), future water supply constraints and costs, projected water rates affecting future water use in the district.

2.2 Service Area Description

The Palos Verdes District is located at the southwest corner of the Los Angeles coastal plain, approximately 20 miles from downtown Los Angeles. The district covers approximately 26 square miles, encompassing all the area incorporated by the cities of Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills Estates, and Rolling Hills. The district is bordered on the north by the cities of Torrance and Lomita, on the east by San Pedro, and on the west and south by the Pacific Ocean. A map of the district is shown in Figure 2-1.

2.3 Population and Service Connections[5]

The Palos Verdes District currently serves a population of about 69,000. Over the previous ten years, the district's population has been stable. The area served by the district is largely built-out and district population is not projected to change much over the next decade, increasing by less than 1%. Historical and projected population for the district is shown in Table 2-1.

Palos Verdes District primarily serves single-family households, which account for about 96% of total service connections. The distribution of services by customer type for 2009 is shown in Figure 2-2. Projected services through 2020 are shown in Table 2-2. Total services are projected to increase by less than 2% over the next 10 years.

[5] The population and service connection projections in this section are based on the draft final projections for the district's 2011 UWMP. Because the final UWMP projections were not available during the development of this plan, the data in this section may differ slightly from the final projections contained in the 2011 UWMP update.

Figure 2-1. General Location of Palos Verdes District

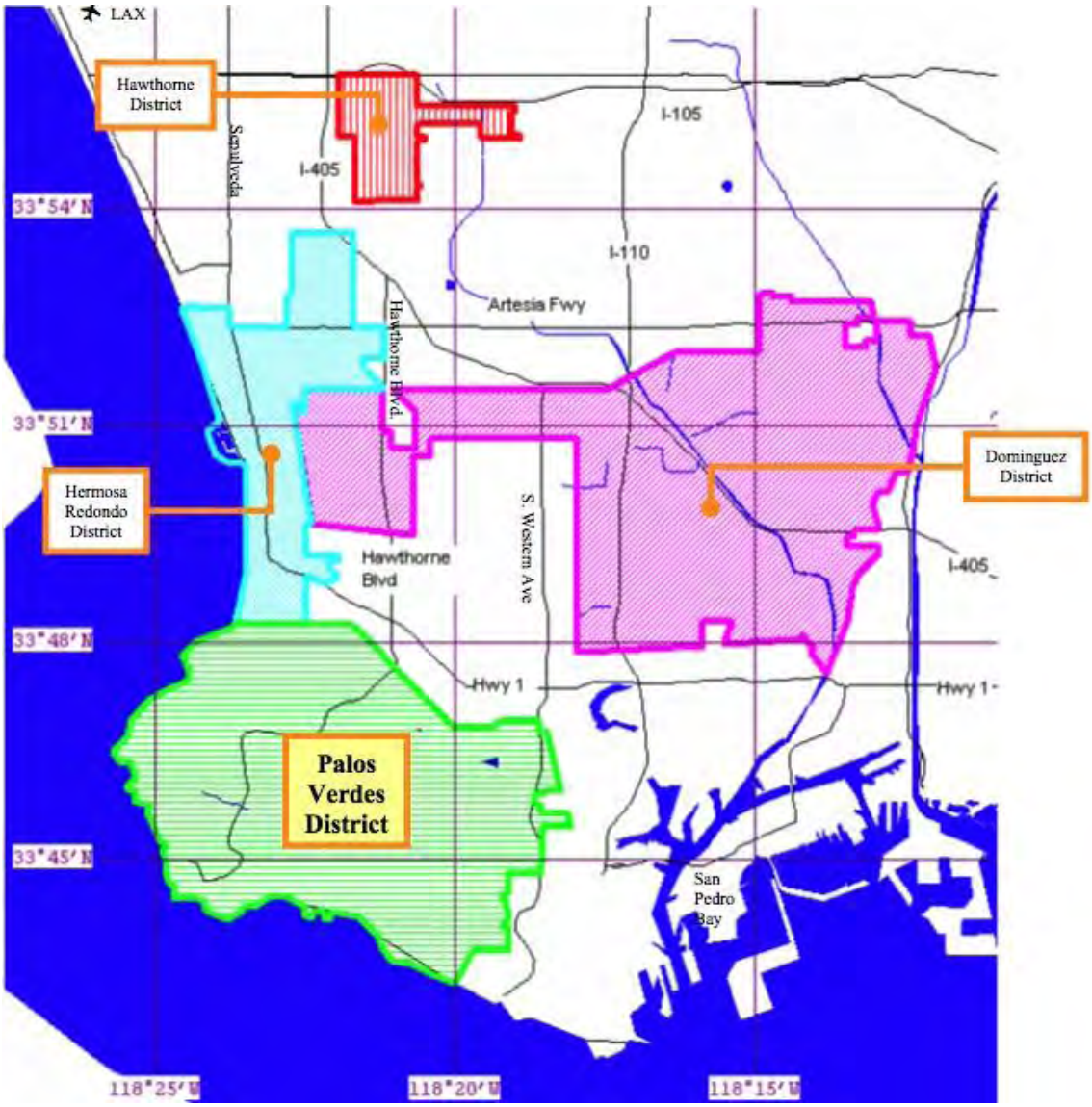


Table 2-1. Palos Verdes District Historical and Projected Population

Historical		Projected	
Year	Population	Year	Population
1999	68,020	2010	69,020
2000	68,110	2011	69,070
2001	68,110	2012	69,130
2002	68,550	2013	69,190
2003	68,580	2014	69,250
2004	68,620	2015	69,300
2005	68,790	2016	69,360
2006	68,840	2017	69,420
2007	68,420	2018	69,480
2008	68,030	2019	69,540
2009	67,620	2020	69,590
Av. Ann. Growth Rate	-0.1%	Av. Ann. Growth Rate	0.1%

Figure 2-2. Palos Verdes District Distribution of Services by Customer Type

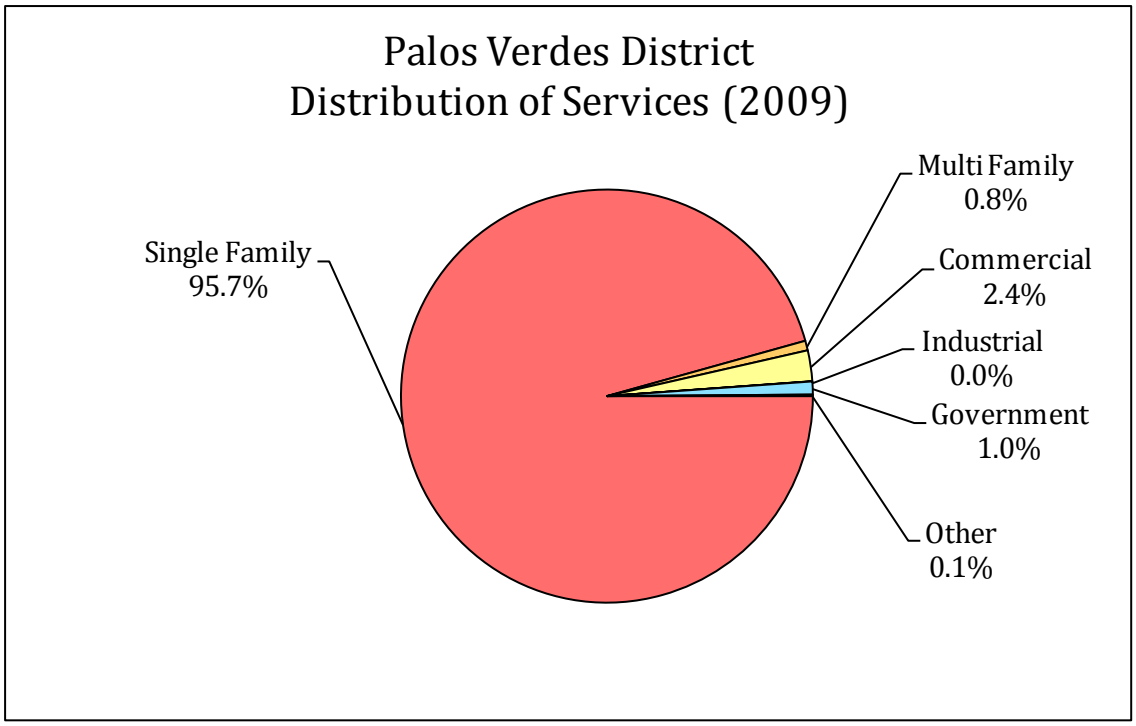


Table 2-2. Palos Verdes District Service Connections

Customer Type	Projected Services 2010	Projected Services 2015	Projected Services 2020
Single Family Residential	23,155	23,369	23,584
Multi Family Residential	144	146	147
Commercial	500	504	509
Industrial	10	10	10
Government	214	216	218
Other	24	24	25
Total	**24,047**	**24,269**	**24,493**

2.4 Historical Water Demand

Since 2005, annual demand in the district has averaged about 22,000 AF. Historical demands by category are shown in Figure 2-3. The percent of total demand in 2009 by type of use is shown in Figure 2-4. As shown by the figure, residential customers accounted for approximately 80% of demand. Commercial and governmental customers accounted for approximately 16%, and system water losses accounted for the remaining 4%. The district does not have significant industrial water uses.

Historical per capita demand is shown in Figure 2-5.[6] Over the last decade, per capita demand has fluctuated between 250 and 350 gallons per day. In the last five years, it has averaged 284 gallons per day. Per capita water use in the district is very high relative to state norms, exceeding by 48% statewide average urban per capita water use. As discussed in Section 4, the district's high per capita water use is expected to make compliance with state legislation passed in 2009 requiring urban water suppliers to reduce per capita water use by 20% by 2020 more difficult.

[6] Per capita demand is the quotient of total demand across all customer classes and the district population.

Figure 2-3. Palos Verdes District Historical Demand

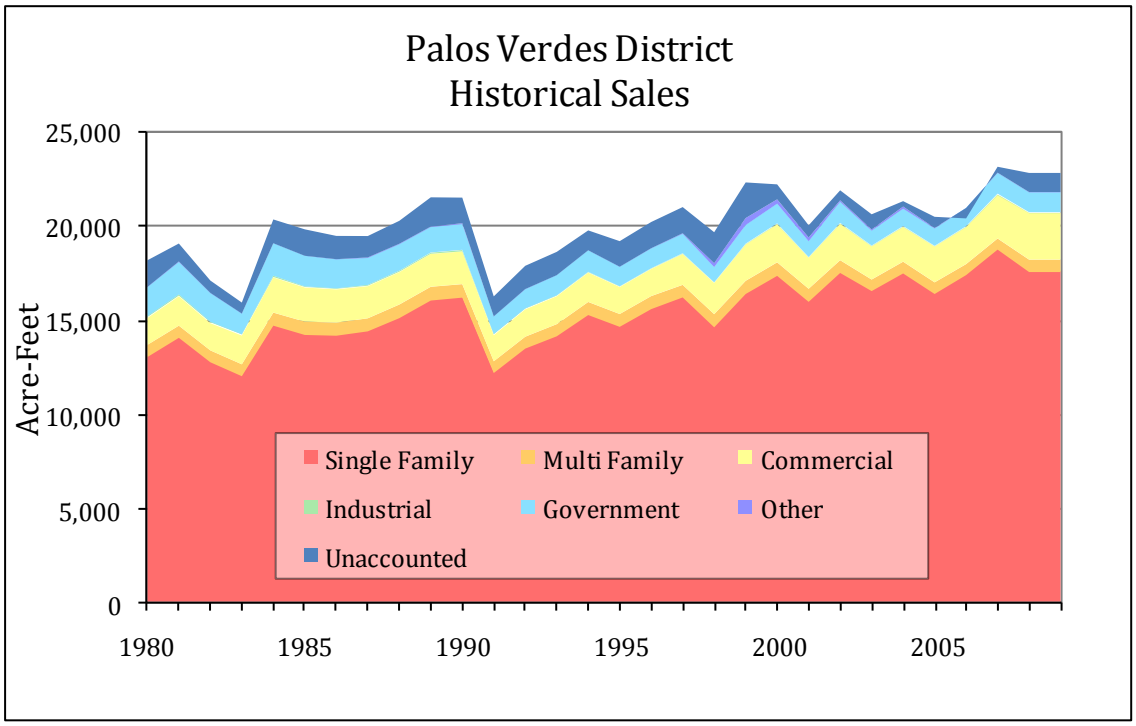


Figure 2-4. Palos Verdes District Percent of Total Demand by Type of Use

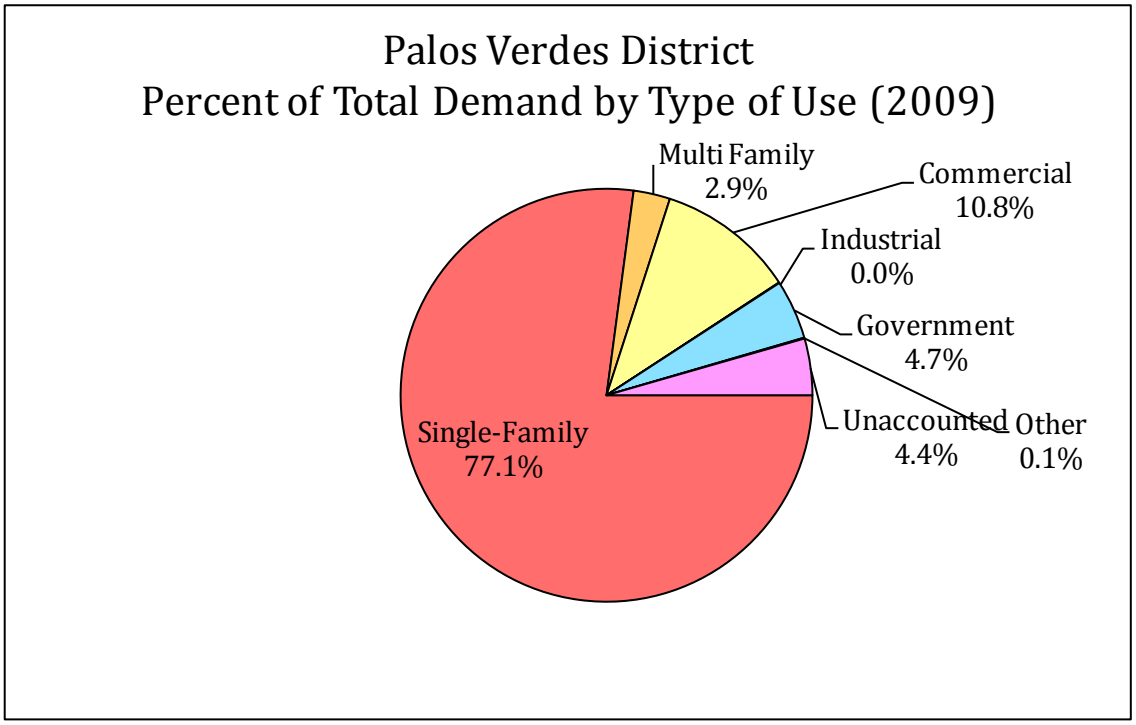
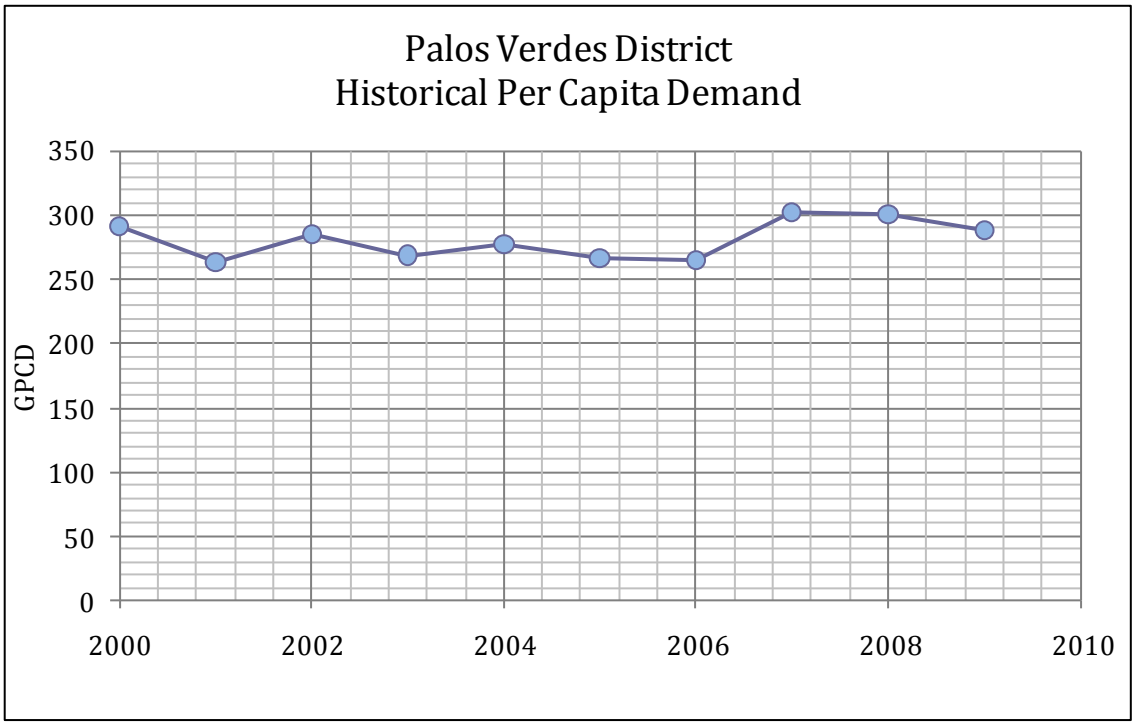


Figure 2-5. Palos Verdes District Historical Per Capita Demand



2.5 Unadjusted Water Demand Projection

The unadjusted baseline water demand projection equals the forecasted district population multiplied by 2005-09 average per capita water use. This shows expected future demand given current patterns of consumption and water use efficiency and expected population growth. Baseline projections are shown in Figure 2-6 and Table 2-3.

Historical demand excluding recycled water use is used to calculate the district's 2015 and 2020 per capita water use targets required under state law. These targets are then compared to the baseline demand projection to determine how much potable water demands will need to adjust in order to achieve the targets. The derivation of these per capita targets and savings requirements are presented in Section 4.

Some of the required water saving are expected to come from plumbing fixture efficiency codes, changes in water rates, and past conservation program investment. These expected changes in demand need to be addressed in order to calculate the amount of savings that will need to come from new conservation investment. Expected changes in demand due to codes, rates, and past conservation investment are calculated in Section 5.

Figure 2-6. Palos Verdes District Unadjusted Baseline Demand Projection

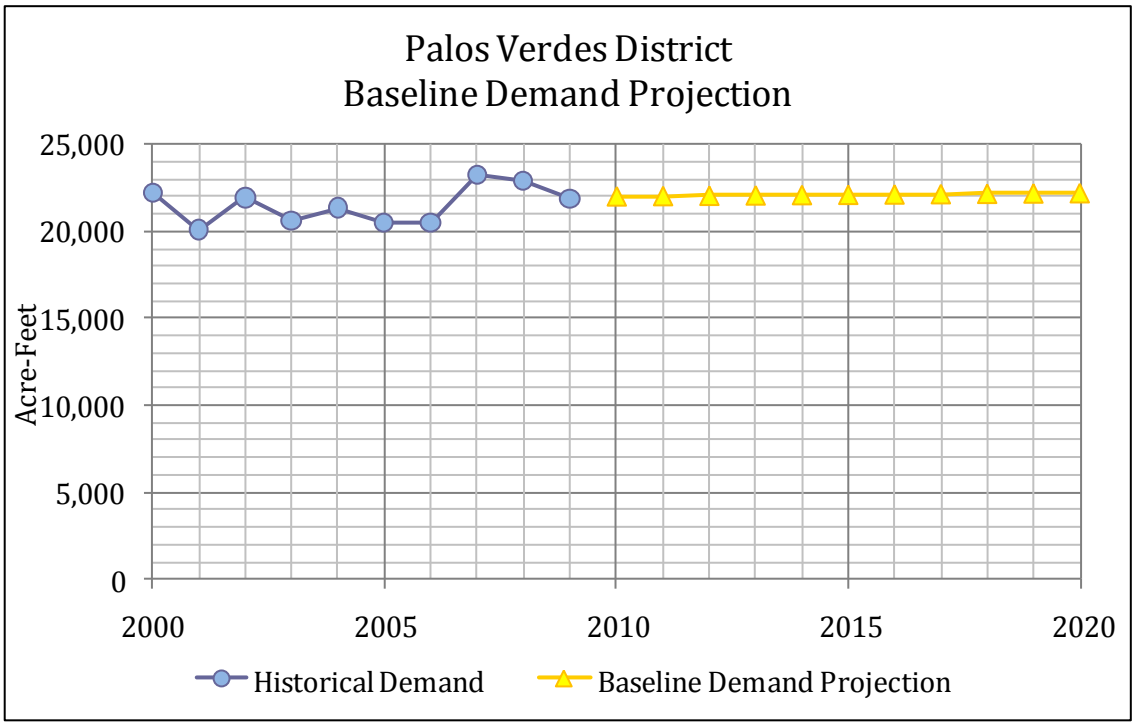


Table 2-3. Palos Verdes District Unadjusted Baseline Demand Projection

Year	2010	2015	2020
Unadjusted Baseline Demand (AF)	21,981	22,070	22,162
Increase from 2010 (AF)	NA	89	182
Increase from 2010 (%)	NA	0.4%	0.8%

2.6 Local Water Supply Issues

All water furnished to customers in the Palos Verdes District is purchased water, no groundwater wells are used as a source of supply. The purchases are made through West Basin Municipal Water District (WBMWD), the regional wholesaler. The Metropolitan Water District of Southern California (MWDSC) imports the water used in the Palos Verdes District into Southern California. This importation occurs either through the Colorado River Aqueduct, which is owned by MWDSC, or through the California Aqueduct, a facility of the State Water Project, which is owned and operated by the California Department of Water Resources. Cal Water does not have any groundwater wells within the Palos Verdes District. The District is located in an area of the basin where ground water is unconfined and wells have not been found to be practical. The Palos Verdes service area does not currently receive recycled water from WBMWD, which is the regional wholesale water supply agency. However, WBMWD plans to extend service into the Palos Verdes service area as it becomes cost effective. WBMWD acquires, controls, distributes, and sells recycled

water to several Cal Water districts as well as other cities and agencies in the greater Los Angeles area.

The reliability of MWD's imported water supply from both the SWP and CVP has been seriously impacted by the recent Wanger Decision that limits pumping in the Delta. Pumping restrictions have been implemented, at least temporarily, because of the negative impact of pumping on Delta Smelt populations, which are protected under the California Endangered Species Act. The restrictions will be in place from late December through June and could reduce available supply from this source by up to 30 percent. This level of reduction will limit CBMWD's ability to deliver normal allocation amounts to each of its retail customers, especially in dry or consecutive dry years. Delta pumping restrictions due to Delta Smelt and other emerging species of concern are expected to last for at least several years.

2.7 Future Water Cost[7]

As will be discussed below in Section 6, a key component of the analysis of potential water conservation programs for each district is a forecast of the district's future avoided costs of water supplies and infrastructure. Each unit of water conservation provides an economic benefit to the water utility by allowing the agency to avoid certain supply and/or infrastructure costs.

The avoided cost for each Cal Water district was estimated using the CUWCC/Water Research Foundation Avoided Cost Model. The model estimates the costs that the water utility will avoid as a result of each acre foot of water conserved. The model estimates both short run and long run avoided costs, and differentiates between water saved in the peak and off-peak seasons.[8] Following is a description of how the avoided costs were estimated for Palos Verdes District.

2.7.1 Short-Run Avoided Costs

As water conservation programs reduce demand, less water must be purchased, produced, pumped, and/or treated. These reduced variable operating costs constitute the short-run avoided costs. To estimate the short-run avoided costs per acre-foot of reduced demand, the supplies and/or facilities that will be cut back in response to conservation-induced demand reductions (the so-called "marginal" supplies and facilities) must be identified. In the case of Palos Verdes District, the marginal supply is purchased water.

The avoidable cost components for this purchased supply include the purchase price, as well as power costs for pumping.

[7] The district's 2010 Urban Water Management Plan provides a detailed discussion of district water supply sources and water supply management issues.
[8] The peak season is separately specified for each district depending on district supply and demand characteristics. For Palos Verdes, the peak season includes the months of May-September.

2.7.2 Long-Run Avoided Costs

In addition to the immediate reduction in variable operating costs, peak-season demand reductions may, in the long run, also enable a water supplier to defer or downsize planned future capital investments in supply and/or infrastructure capacity. For Palos Verdes District, no such projects were identified. Thus, Palos Verdes District's avoided costs does not include a long-run component.

Table 2-4 summarizes the Palos Verdes District avoided cost forecast.

Table 2-4. Palos Verdes District Avoided Cost Forecast

Avoided Cost ($/AF)	2010	2020	2030	2040
Short-Run	$999	$1,454	$1,892	$2,476
Long-Run[1]	$0	$0	$0	$0
TOTAL	$999	$1,454	$1,892	$2,476

[1] Long-Run costs are avoided only as a result of reductions in peak-season demand.

2.8 Future Water Rates

Water service rates in the district are regulated by the California Public Utilities Commission (CPUC). The district files a General Rate Case with the CPUC every three years. The CPUC uses the information provided in the rate case to set rates so that the district can recover the cost of service and earn a reasonable return on its investments in the water system. The last rate case was concluded in 2010 and established rates for 2011, 2012, and 2013. The percentage increase in service rates over the prior year is shown in Table 2-5.[9] These rate changes are incorporated into the analysis of future demand and net water saving requirements, as described in Section 5 of the plan.

Table 2-5. Palos Verdes District Nominal Change in Service Rates

Year	2011	2012	2013
Change from Prior Year	-0.2%	0.9%	0.9%

[9]More precisely, the increases for 2012 and 2013 show the percentage change in district revenue requirement, which may be slightly different than the percentage change in the average rate, but provide a close proxy for the expected change in volumetric rates.

3 Statewide Urban Water Demand Reduction Policies

3.1 Introduction

Inter-related state-level policies and agreements aimed at reducing urban water use have provided much of the impetus for this plan. These include: (1) recent decisions by the California Public Utilities Commission (CPUC) directing Class A and B water utilities to reduce per capita urban water demand; (2) state legislation mandating urban water suppliers to reduce per capita demand 20% by 2020; and (3) the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). This section of the plan discusses these requirements, their relationship to one another, and their relationship to Cal Water's overall conservation strategy.

3.2 CPUC GPCD Policy

The CPUC's Decision 07-05-062 directed Class A and B water utilities to submit a plan to achieve a 5% reduction in average customer water use over each three-year rate cycle. This policy was refined under Decision 08-02-036, which established a water use reduction goal of 3% to 6% in per customer or service connection consumption every three years once a full conservation program, with price and non-price components, is in place. These decisions anticipated enactment of policies by the State legislature to reduce urban water use in California 20% by 2020.

3.3 State Per Capita Water Use Policies and Targets

Senate Bill 7 (SBx7-7), which was signed into law in November 2009, amended the State Water Code to require a 20% reduction in urban per capita water use by 2020. Commonly known as the 20x2020 policy, the new requirements apply to every retail urban water supplier subject to the Urban Water Management Planning Act (UWMPA).

3.3.1 SBx7-7 GPCD Reduction Targets

SBx7-7 requires the state to achieve a 20% reduction in urban per capita water use by December 31, 2020. The state is required to make incremental progress toward this goal by reducing per capita water use by at least 10% on or before December 31, 2015. SBx7-7 requires each urban retail water supplier to develop interim and 2020 urban water use targets in accordance with specific requirements described below. Urban retail water suppliers will not be eligible for state water grants or loans unless they comply with SBx7-7's requirements.

Under SBx7-7, an urban retail water supplier may adopt one of four different methods for determining the 2020 gpcd target:

1. Set the 2020 target to 80% of average GPCD, net of recycled water use, for any continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.[10]

2. Set the 2020 target as the sum of the following:

    a. 55 GPCD for indoor residential water use

    b. 90% of baseline CII water uses, net of recycled water use, where baseline CII GPCD equals the average for any contiguous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

    c. Estimated per capita landscape water use for landscape irrigated through residential and dedicated irrigation meters assuming water use efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Section 2.7 of Division 2 of Title 23 of the California Code of Regulations.[11]

3. Set the 2020 target to 95% of the applicable state hydrologic region[12] target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009).

4. A method as yet unspecified, to be determined by DWR no later than December 31, 2010.

Additionally, if baseline GPCD is greater than 100 gallons, the 2020 GPCD target can be no greater than 95% of average GPCD, net of recycled water use, calculated over a continuous 5-year period ending no earlier than December 31, 2007 and no later than December 31, 2010, irrespective of the target method adopted.

Compliance with the targets is measured in terms of per capita potable water demand in 2015 and 2020. This means that water suppliers can fully or partially meet their targets by replacing potable water use with recycled water use.

3.3.2 Regional Compliance

SBx7-7 allows water suppliers to form regional alliances and set regional targets for purposes of compliance. Under the regional compliance approach, water suppliers within the same hydrologic region can comply with SBx7-7 by either meeting their

[10] If the supplier meets at least 10% of its retail demand with recycled water, it may extend the period for calculating average baseline GPCD by up to an additional five years.
[11] This method requires the use of satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas served by residential and dedicated irrigation meters.
[12] California is divided into 10 hydrologic regions. A map of these regions can be viewed at: www.water.ca.gov/floodmgmt/hafoo/csc/.

individual target or being part of a regional alliance that meets its regional target.[13] The regional target is calculated as the population-weighted average target for the water suppliers comprising the regional alliance.

Importantly, being part of a regional alliance does not preclude a water supplier from complying with SBx7-7 by meeting its individual target. A water supplier that is part of a regional alliance will not comply with SBx7-7 only if the regional alliance fails to meet the regional target and the water supplier fails to meet its individual target. This provision of SBx7-7 effectively gives a water supplier that is part of a regional alliance two ways to comply. Cal Water districts sorted by hydrologic region are shown in Table 3-1. Palos Verdes District is one of five Cal Water districts within the South Coast hydrologic region. For these districts, Cal Water has calculated both district-specific targets and a regional target. As will be shown in Section 7, Palos Verdes District is not expected to be able to meet its district-specific target by 2015, but will still be able to comply with SBx7-7 via the regional compliance option.

Table 3-1. Cal Water Districts Sorted by Hydrologic Region

Hydrologic Region	**Cal Water Districts in Region**
North Coast	Redwood Valley
San Francisco Bay Area	Bear Gulch, Livermore, Los Altos, Mid-Peninsula, South San Francisco
Central Coast	King City, Salinas
South Coast	Dominguez, East LA, Hermosa-Redondo, **Palos Verdes**, West Lake
Sacramento River	Chico, Dixon, Marysville, Oroville, Willows
San Joaquin	Stockton
Tulare Lake	Bakersfield, Kern River Valley, Selma, Visalia
North Lahontan	None
South Lahontan	Antelope Valley
Colorado River	None

3.3.3 Cal Water SBx7-7 Compliance Strategy

Cal Water's SBx7-7 compliance strategy involves:

1. Identifying for each district the largest allowable interim and 2020 GPCD targets under methods 1 and 3;[14]

[13] Water suppliers may also form regional alliances if they are served by the same wholesale water supplier, they are members of a regional agency authorized to plan and implement water conservation, or they are part of an integrated regional water management funding area.
[14] Targets based on method 2 were not considered because the data necessary to accurately estimate landscape areas served by residential and dedicated irrigation meters was not available. Method 4 had not been defined at the time this plan was developed.

2. Grouping districts by hydrologic region and calculating population-weighted regional targets where applicable; and

3. Developing conservation programs aimed at achieving the regional and/or district-specific targets.

The resulting SBx7-7 targets and required water demand reductions for Palos Verdes District are presented in Section 4 of the plan. It is important to emphasize that SBx7-7 is just one of several factors used to determine the recommended level of water savings. Other factors included MOU compliance, cost-effectiveness, and district water supply and quality considerations.

3.4 Urban Water Conservation MOU

The MOU has guided urban water conservation programs in California since it was first adopted in 1991. More than 230 California urban water suppliers have signed the MOU and pledged good faith efforts to comply with its terms. Most urban water conservation programs operated by California water utilities have been shaped to some extent by MOU requirements. While compliance with the MOU is voluntary, access to some types of state funding for water resources management is conditioned on MOU compliance.[15] These eligibility requirements will end July 1, 2016. After that date, access to state funding for water resources management will be conditioned on compliance with SBx7-7 requirements.

3.4.1 MOU Compliance Options

There are three ways in which a water supplier can comply with the MOU. The first way is to implement a set of water conservation best management practices (BMPs) according to the requirements and schedules set forth in Exhibit 1 of the MOU. The second way, called Flex Track compliance, is to implement conservation programs expected to save an equivalent or greater volume of water than the BMPs. The third way, similar to SBx7-7, is to reduce per capita water use. Each of these compliance options is briefly described below.

BMP Implementation Compliance

Originally, the MOU established a set of BMPs that signatories agreed to implement in good faith. For each BMP, the MOU established the actions required by the water supplier (e.g. site surveys, fixture and appliance rebates, water use budgets, volumetric pricing and conservation rate designs), the implementation schedule, and the required level of effort (in the MOU this is referred to as the coverage requirement). Additionally, the MOU established the terms by which a water supplier could opt out of implementing a BMP.

BMPs are grouped into five categories. Two categories, Utility Operations and Education, are "Foundational BMPs" because they are considered to be essential water conservation activities by any utility and are adopted for implementation by

[15] Section 10631.5 of the California Water Code.

all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories. Table 3-2 shows the BMPs by category. The requirements and coverage levels of each BMP are set forth in Exhibit 1 of the MOU.

Flex Track Compliance

Under Flex Track, a water supplier can estimate the expected water savings over the 10-year period 2009-2018 if it were to implement the programmatic BMPs in accordance with the MOU's schedule, coverage, and exemption requirements, and then achieve these water savings through any combination of programs it desires.[16] Thus, through the Flex Track compliance option, a water supplier agrees to save a certain volume of water using whatever it determines to be the best combination of programs. Because the savings target depends on the programmatic BMP coverage requirements, which in turn are functions of service area size and composition of demand, the volume of water to be saved under this compliance option must be calculated separately for each supplier. The methodologies and tools for water suppliers to implement these calculations are still being developed by the CUWCC.

GPCD Compliance

Under the GPCD option, a water supplier can comply with the MOU by reducing its baseline GPCD by 18% by 2018. The baseline is the ten-year period 1997-2006. The MOU also establishes interim GPCD targets and the highest acceptable levels of water use deemed to be in compliance with this option. The MOU's GPCD option is similar to using Method 1 to set the SBx7-7 target, except that it uses a fixed baseline period and only runs through 2018. This compliance option may be difficult to achieve for Cal Water districts that are part of a regional alliance for purposes of SBx7-7 compliance because savings as a percent of demand will vary considerably among the districts in the alliance. It may also conflict with district-specific SBx7-7 targets set using method 3 (hydrologic region-based target). Because of these potential conflicts, this is not considered a viable MOU compliance option for Cal Water districts.

3.4.2 Cal Water MOU Compliance Strategy

Cal Water plans to use Flex Track to comply with the MOU. This compliance option affords the most flexibility in selecting conservation programs suited to each Cal Water district and allows for more streamlined reporting. Because CUWCC tools for calculating a district's Flex Track savings target are not yet available, Cal Water developed its own target estimates for planning purposes, as described in Section 4. Cal Water will update these estimates as necessary following the release of the CUWCC Flex Track target calculator.

[16] The supplier is required to implement the foundational BMPs regardless of which compliance option it selects.

Table 3-2. MOU Best Management Practices

BMP Group	BMP Name
1. Utility Operations Programs (F)	Conservation Coordinator
	Water Waste Prevention
	Wholesale Agency Assistance Programs
	Water Loss Control
	Metering & Volumetric Rates
	Retail Conservation Pricing
2. Education Programs (F)	Public Information Programs
	School Education Programs
3. Residential (P)	Residential Assistance Program
	Landscape Water Surveys
	High Efficiency Clothes Washer Program
	Watersense Toilet Program
	Watersense Specifications for Residential Development
4. Commercial, Industrial, Institutional (P)	Reduce baseline CII water use by 10% in 10 years
5. Landscape (P)	Large Landscape Water Budget Programs
	Large Landscape Water Surveys

F = Foundational BMP, P = Programmatic BMP
BMP definitions, coverage requirements, and schedule of implementation are contained in the MOU (www.cuwcc.org).

4 SBx7-7 and MOU Savings Targets

4.1 Introduction

This section of the plan presents the SBx7-7 and MOU compliance targets for Palos Verdes District. For district-specific SBx7-7 compliance, targets were set to either 80% of baseline GPCD or 95% of the district's hydrologic region target, whichever was greater. For MOU compliance, the Flex Track target was calculated as the volume of expected water savings from cost-effective programmatic BMPs over the 10-year period 2009 - 2018.

4.2 SBx7-7 Target Calculation

Table 4-1 shows the SBx7-7 target calculation for Palos Verdes District. This table shows: (1) the maximum allowable target under SBx7-7, (2) the target based on Method 1 – 80% of baseline water use, (3) the target based on Method 3 – 95% of the hydrologic region target, and (4) the selected target for the district.

Maximum Allowable Target

As described in Section 3, the SBx7-7 target for 2020 cannot exceed 95% of the district's five-year baseline water use, where the baseline period ends no earlier than December 31, 2007 and no later than December 31, 2010. The district's 2020 target cannot exceed this level, regardless of which method is used to calculate it. In the case of Palos Verdes District, neither target calculation method results in a target exceeding the maximum allowable target, so no adjustment is necessary.

Method 1 Target

Under Method 1, the 2015 and 2020 targets are set to 90% and 80% of baseline water use, respectively. Baseline water use is the average water use, excluding recycled water, for any continuous 10-year period ending between 2004 and 2010. For Palos Verdes District, the 10-year base period 1999-2008 yielded the maximum target under this method. The 2015 target is 253 gpcd and a 2020 target is 225 gpcd.

Method 3 Target

Under Method 3, the 2015 and 2020 targets are set to 95% of the 2015 and 2020 targets for the hydrologic region in which the district is located. Palos Verdes District is located in the South Coast hydrologic region. The 2015 target is 157 gpcd and the 2020 target is 142 gpcd.

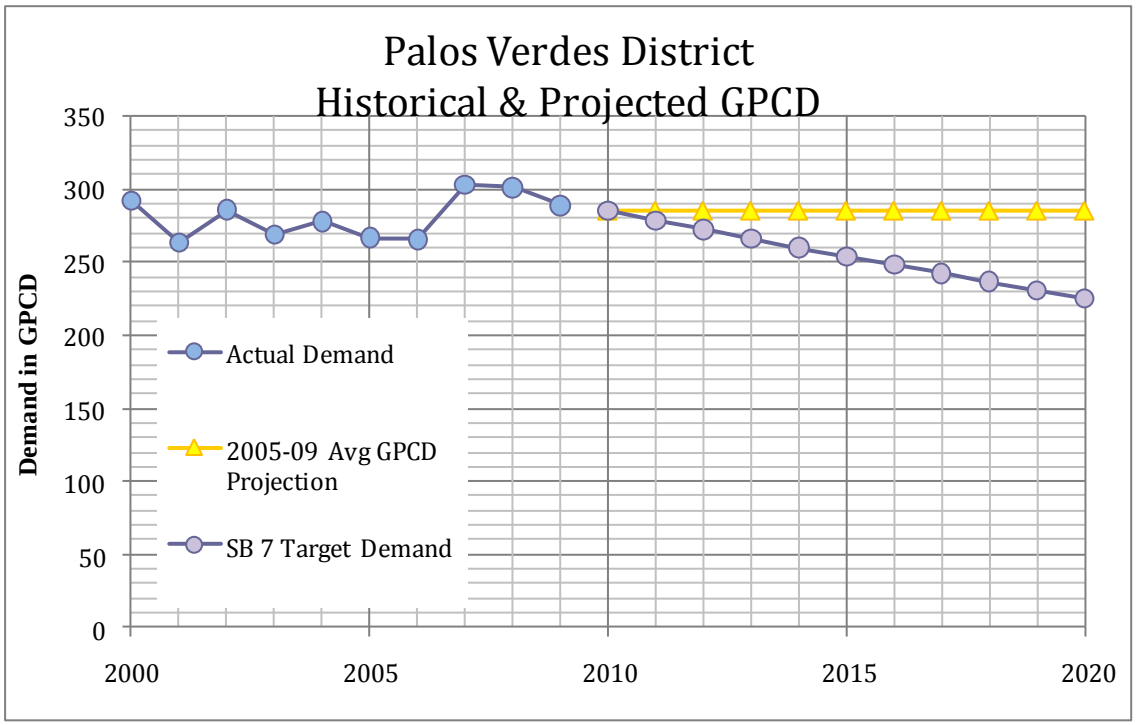
Selected District Target

For Palos Verdes District, SBx7-7 non-compliance risk is minimized by selecting the Method 1 targets. Figure 4-1 shows projected per capita demand based on the last five-years of district sales data and how it would need to change in order to meet the SBx7-7 targets. In order to achieve the district-specific targets, per capita demand will need to decrease by approximately 11% by 2015 and 21% by 2020.

Table 4-1. Palos Verdes District SBx7-7 GPCD Targets

Maximum Allowable Target	
Base Period:	2005-2009
Per Capita Water Use:	285
Maximum Allowable 2020 Target:	271
Method 1: 80% of Baseline Per Capita Daily Water Use	
Base Period:	1999-2008
Per Capita Water Use:	282
2015 Target:	253
2020 Target:	225
Method 3: 95% of Hydrologic Region Target	
Hydrologic Region:	South Coast
2015 Target:	157
2020 Target:	142
Selected District Target	
2015 Target:	253
2020 Target:	225

Figure 4-1. Palos Verdes District SBx7-7 Per Capita Target Demand



Regional Alliance Target

As discussed in Section 3, water suppliers within the same hydrologic region can form a regional alliance for purposes of SBx7-7 compliance. This gives them two ways to comply with SBx7-7 – they will be in compliance as long as their per capita demand is less than or equal to the district-specific target or the weighted average per capita demand of the regional alliance is less than or equal to the regional target. As shown in Table 4-2, this means that Palos Verdes District will be in compliance in 2015 if its per capita demand is less than or equal to 253 gpcd, or average per capita demand for the regional alliance is less than or equal to 179 gpcd.

Table 4-2. Regional SBx7-7 Targets for Cal Water Districts in South Coast HR

District	Population	2015 Target (GPCD)	2020 Target (GPCD)
Dominguez	144,190	193	171
East Los Angeles	148,740	121	115
Hermosa-Redondo	94,070	134	126
Palos Verdes	67,620	253	225
Westlake	16,740	442	393
Regional Targets[1]		**176**	**160**

[1] Regional targets are the population-weighted average of the district targets.

4.3 MOU Flex Track Target Calculation

As discussed in Section 3, because CUWCC tools for calculating a district's Flex Track savings target are not yet available, Cal Water developed its own target estimates for planning purposes. The targets are based on the expected water savings from cost-effective programmatic BMPs over the ten-year period 2009-2018. The coverage requirements for the programmatic BMPs listed in Table 4-3 were used to calculate the Flex Track targets. Expected water savings and cost-effectiveness were based on the conservation program specifications presented in Section 6 and avoided water supply costs presented in Section 2. The resulting 2015 Flex Track target for Palos Verdes District is shown in Table 4-4. The estimated Flex Track target is approximately 369 AF of annual water savings from residential and non-residential conservation programs by 2015.

Table 4-3. Programmatic BMPs Used to Calculate Flex Track Target

BMP No.	Coverage Requirement Used to Calculate Water Savings
3.1 *Residential Assistance*	Provide leak detection assistance to an average of 1.5 percent per year of current single-family accounts and 1.5 percent per year of current multi-family units during the first ten years after signing the MOU. After completing the ten-year 15 percent target, agencies will maintain a program at the level of high-bill complaints or not less than 0.75 percent per year of current single-family accounts and 0.75 percent per year of current multi-family units. Showerhead distribution will be considered complete when 75 percent market saturation is achieved.
3.2 *Landscape Water Surveys*	Provide landscape water surveys to an average of 1.5 percent per year of current single-family accounts during the first ten years after signing the MOU. After completing the ten-year 15 percent target, agencies will maintain a program at the level of high-bill complaints or no less than 0.75 percent per year of current single-family accounts.
3.3 *High Efficiency Clothes Washer Incentives*	Provide financial incentives for the purchase of HECWs that meet an average water factor value of 5.0. If the WaterSense Specification is less than 5.0, then the water factor value will decrease to that amount. Incentives shall be provided to 0.9 percent of current single-family accounts during the first reporting period following BMP implementation, rising to 1.0 percent per year of current single-family accounts for the remainder of ten year period following signing of the MOU. An alternative method is to demonstrate 1.4 percent per year of the market penetration during the first ten years after signing the MOU.
3.4 *WSS Toilet Incentives*	A financial incentive shall continue to be offered for toilets meeting the current WSS and updated standard whenever a more efficient toilet is identified by WSS. Compliance will entail demonstrating a number of toilet replacements of 3.5 gpf or greater, toilets at or above the level achieved through a retrofit on resale ordinance until 2014, or a market saturation of 75% is demonstrated, whichever is sooner.
4.0 *CII Water Use Reduction*	Implement measures to achieve the water savings goal for CII accounts of 10% of the baseline water use over a 10-year period. Baseline water use is defined as the water consumed by CII accounts in the agency's service area in 2008. Credit for prior activities, as reported through the BMP database, will be given for up to 50% of the goal; in this case, coverage will consist of reducing annual water use by CII accounts by an amount equal to the adjusted percentage goal within 10 years.
5.1 *Dedicated Irrigation Account Budgets*	ETo-based water use budgets developed for 90% of CII accounts with dedicated irrigation meters at an average rate of 9% per year over 10 years.
5.2 *Non Residential Landscape Surveys*	Complete irrigation water use surveys for not less than 15% of CII accounts with mixed-use meters and un-metered accounts within 10 years of the date implementation is to commence. (Note: CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII BMPs.)

Table 4-4. Palos Verdes District 2015 MOU Flex Track Target

BMP	2015 Savings at Full Coverage	Cost-Effective[1]	2015 Target Contribution
BMP 3.1 Residential Assistance Savings - Single Family	21.4 AF	FALSE	0.0 AF
BMP 3.1Residential Assistance Savings - Multi Family	2.0 AF	FALSE	0.0 AF
BMP 3.2 Landscape Surveys - Single Family	26.3 AF	FALSE	0.0 AF
BMP 3.3 High Efficiency Clothes Washers	34.3 AF	TRUE	34.3 AF
BMP 3.4 WSS Toilets - Single Family	163.6 AF	TRUE	163.6 AF
BMP 3.4 WSS Toilets - Multi Family	35.2 AF	TRUE	35.2 AF
BMP 4.0 CII Reduction	248.0 AF	126.6 AF	126.6 AF
BMP 5.1 Dedicated Irrigation Account Budgets[2]	0.0 AF	NA	NA
BMP 5.2 Non Residential Landscape Surveys	9.0 AF	TRUE	9.0 AF
2015 Flex Track Target			368.7 AF

[1]True or false, except BMP 4.0 CII Reduction, which shows the calculated volume of cost-effective CII water savings based on the conservation program analysis presented in Section 6. Cost-effectiveness based on avoided water supply costs presented in Section 2 and the conservation program savings and cost assumptions presented in Section 6.
[2]District does not have dedicated irrigation accounts.

4.4 Difference from Unadjusted Baseline Water Use

The differences between the unadjusted baseline demand, district-specific SBx7-7 target, and MOU Flex Track target are shown in Table 4-5. This shows the maximum amount of water savings needed for SBx7-7 compliance, as well as the savings required for MOU compliance. Under SBx7-7, target demand in 2015 is 2,435 AF less than the unadjusted baseline demand. Because the savings requirement for SBx7-7compliance is so much greater than what is required for MOU Flex Track compliance, any plan designed to achieve SBx7-7 compliance will also provide sufficient water savings for MOU compliance. As will be discussed in the next section, some of reduction in baseline demand needed to achieve SBx7-7 compliance will come from savings from efficiency codes and 2009-10 conservation program investment. The residual will need to come from new conservation program activity, which will be the focus of Sections 6 and 7 of the plan.

Table 4-5. Palos Verdes District Gross Savings Required for SBx7-7 and MOU Compliances

Gross Water Savings Required by 2015	SBx7-7	MOU Flex Track
2015 Unadjusted Baseline Demand	22,070 AF	22,070 AF
2015 Target Demand	19,640 AF	21,701 AF
Gross Savings Requirement	**2,430 AF**	**369 AF**

5 Water Savings Required from New Programs

5.1 Introduction

In Section 4 the gross water savings Palos Verdes District needs to realize by 2015 in order to satisfy MOU compliance requirements were presented. In this section, the volume of water savings that can reasonably be expected from existing efficiency codes, conversion of flat rate customers to metered billing, water rate adjustments, and past conservation program implementation is considered. The results are used to adjust baseline demand so that the volume of water savings that will need to come from new conservation programs can be determined.

5.2 Expected Savings from Efficiency Codes

Two recent California laws are expected to accelerate the replacement of low efficiency plumbing fixtures – primarily toilets and showerheads – with higher efficiency alternatives. [17]

- AB 715, passed in 2007, amended the California Building and Safety Code to require by January 1, 2014, that toilets sold or installed in California use no more than 1.28 gallons per flush.[18] It also requires that urinals sold or installed use no more than 0.5 gallons per flush.[19]

- SB 407, passed in 2009, amended the California Civil Code to require replacement of low efficiency plumbing fixtures with higher efficiency alternatives when a property undergoes alterations, improvements, or transfer.[20] In the case of single-family residential properties, issuance of a certificate of final completion and occupancy or final permit approval by the local building department for building alterations or improvements will be conditional on the replacement of low efficiency plumbing fixtures beginning in 2014. Single-family property owners are required by law to replace any remaining non-compliant plumbing fixtures by no later than January 1, 2017.

[17] Cities and counties also are required, under AB 1881, to adopt water efficient landscape design ordinances at least as effective as the state's model landscape ordinance. The extent and variability of landscape water use in the service area, as well as uncertain enforcement of ordinance requirements by the relevant city or county, make projections of potential water savings highly uncertain and therefore they are not incorporated into the forecast of potential water savings from efficiency codes.

[18] State law currently prohibits the sale and installation of toilets using more than 1.6 gallons per flush.

[19] State law currently prohibits the sale and installation of urinals using more than 1.0 gallon per flush.

[20] Non compliant plumbing fixtures include any toilet manufactured to use more than 1.6 gallons per flush, any showerhead manufactured to have a flow capacity more than 2.5 gallons per minute, and any interior faucet that emits more than 2.2 gallons per minute. Compliant water conserving plumbing fixtures means any fixture that is in compliance with current building standards applicable to a newly constructed real property of the same type.

> After this date, a seller or transferor of single-family residential real property must disclose in writing to the prospective purchaser or transferee whether the property includes any noncompliant plumbing fixtures. For multi-family and commercial properties non-compliant fixtures must be replaced by January 1, 2019. As with single-family properties, final permits or approvals for alterations or improvements are conditional on the replacement of low efficiency fixtures beginning in 2014.[21]

The phase-in dates for AB 715 and SB 407 mean they will not greatly contribute to meeting the 2015 interim GPCD target under SBx7-7. But they will support meeting the 2020 target. Moreover, since the early 1990's, the sale and installation of toilets manufactured to flush more than 1.6 gallons, showerheads manufactured to have a flow capacity more than 2.5 gallons per minute, and interior faucets manufactured to emit more than 2.2 gallons per minute has been prohibited. These requirements will continue to improve the efficiency of plumbing fixtures in older residential and commercial buildings.

Expected code-driven water savings for the period 2011-2015 are shown in Table 5-1. These estimates incorporate existing plumbing code requirements, as well as the full phase-in of AB 715 requirements starting in 2014.

Table 5-1. Palos Verdes District 2011-2015 Code-Driven Water Savings

Code-Driven Water Savings (AF)	2011	2012	2013	2014	2015
Toilets					
Single Family	16.2	31.7	46.6	60.9	79.8
Multi Family	1.5	3.0	4.3	5.7	7.4
Non Residential	2.8	5.5	8.0	10.5	13.6
Subtotal Toilets	*20.5*	*40.1*	*59.0*	*77.1*	*100.8*
Showerheads					
Single Family	4.7	8.9	12.7	16.1	19.2
Multi Family	0.4	0.9	1.2	1.5	1.8
Subtotal Showerheads	*5.1*	*9.8*	*13.9*	*17.7*	*21.0*
Total Savings	**25.6**	**49.8**	**72.9**	**94.7**	**121.8**

[21] In the case of multi-family and commercial property, the permit approval requirements apply only if (a) the improvements would increase building floor area by more than 10%, or (b) the value of the improvements exceed $150,000, or (c) the improvements are in a room containing non-compliance plumbing fixtures.

5.3 Expected Savings from Rates

Changes in water demand from expected rate adjustments in Palos Verdes District were also calculated. The estimates are based on inflation-adjusted changes in rates for 2011, 2012, and 2013, as contained in CPUC's proposed GRC decision. Short-run price elasticity estimates used to calculate potential changes in demand were drawn from the CUWCC's conservation rate guidebook.[22] Expected savings from the proposed rate adjustments are shown in Table 5-2.[23] Because the proposed rate adjustments will result in a decrease in the real cost of water to Palos Verdes District customers, demand is projected to increase by about 238 AF by 2015, thereby more than offsetting expected water savings from plumbing efficiency codes.[24]

Table 5-2. Palos Verdes District 2011-2015 Water Savings from Proposed Rate Adjustment

Rate-Driven Water Savings (AF)	2011	2012	2013	2014	2015
% Change in Inflation-Adjusted Water Rate[1]	-3%	-2%	-2%	NA	NA
Expected Savings	**-22.8**	**-62.1**	**-121.4**	**-157.9**	**-238.1**

[1]Percent change does not include adjustments to the future costs of purchased water, assessments charged for pumping groundwater, electricity, and other costs generally beyond Cal Water's control. Additionally, some water system improvements approved by the CPUC will not be included in rates until they are completed and are in service.

5.4 Expected Savings from Current Programs

In addition to changes in demand due to codes and rates, expected on-going water savings from conservation program activity occurring in 2009 and 2010 were also taken into account. These savings are not estimated to be large, as shown in Table 5-3.[25]

[22] California Urban Water Conservation Council, "Designing, Evaluating, and Implementing Conservation Rate Structures," July 1997, p. 8-18. Price elasticity measures the expected percentage change in demand given a one percent change in price. For example, an elasticity of -0.25 indicates that a one percent increase in price would be expected to result in a 0.25 percent decrease in demand.
[23] The savings estimates in the table were derived using the methodology and assumptions contained in *Rebuttal to DRA's Report on the Conservation Expenditures of California Water Service Company (California Water Service Company Application 09-07-001), prepared by David Mitchell and Gary Fiske, March 29, 2010.*
[24] Negative savings indicates that demand would increase relative to the baseline condition.
[25] Estimated savings from 2009 and 2010 meter conversion and conservation program activity are taken from the report *Achieving Conservation Targets: Conservation Program Recommendations and Budgets for California Water Service Company Districts: Test Years 2011 through 2013, prepared by M.Cubed, Gary Fiske and Associates, and A&N Technical Services, June 2009.*

Table 5-3. Palos Verdes District Water Savings from 2009-10 Conservation Programs

Existing Programs (AF)	2011	2012	2013	2014	2015
Existing Programs: 2009-10	14.1	13.7	13.3	10.7	8.1
Total Existing Programs	**14.1**	**13.7**	**13.3**	**10.7**	**8.1**

5.5 Adjusted Baseline Demand

The adjusted baseline demand is calculated by deducting expected changes in demand due to codes, rates, meter conversion, and past programs from the unadjusted demand projection presented in Section 2. The adjusted baseline demand is shown in Table 5-4.

Table 5-4. Palos Verdes District Adjusted Baseline Demand Projection

Adjusted Baseline (AF)	2011	2012	2013	2014	2015
Unadjusted Baseline	21,997	22,016	22,035	22,054	22,070
Less Savings from					
Codes	26	50	73	95	122
Schedule Rate Adjustments	-23	-62	-121	-158	-238
Existing Programs	14	14	13	11	8
Adjusted Baseline Demand (net of recycled water)	**21,980**	**22,014**	**22,070**	**22,107**	**22,178**
Per Capita (GPCD)	284	284	285	285	286

5.6 Water Savings Needed from New Programs

The amount of water savings required from new conservation programs is different for SBx7-7 and MOU Flex Track compliance. In the case of SBx7-7, the objective is to reduce 2015 per capita water use at least to the target in Table 4-1, and any expected savings from codes, rates, and existing conservation programs can be credited toward meeting this goal. This is not the case for MOU Flex Track compliance, where the objective is to implement conservation programs that would save at least as much as the Flex Track target. Unlike SBx7-7, water savings from codes and rates cannot be credited against the Flex Track target. Only savings from conservation programs implemented in 2009 or 2010 can be deducted.

Savings required from new conservation programs to meet SBx7-7 and MOU Flex Track compliance requirements are summarized in Table 5-5. In the case of SBx7-7, 2015 potable demand, after accounting for codes, scheduled changes in rates, and 2009-10 conservation program activity, is projected to exceed the SBx7-7 compliance target by 2,538 AF. While this sets the upper-bound water savings target for the district, as will be shown in Section 7, the district can save less than this amount and still comply with SBx7-7 via the regional compliance option.

In the case of MOU Flex Track Compliance, water savings from conservation programs implemented in 2009 and 2010 are expected to generate about 8 AF of savings in 2015. Thus conservation programs implemented over the period 2011-2015 will need to save an additional 361 AF by 2015 for Palos Verdes District to be in compliance with the MOU.

Table 5-5. Palos Verdes District New Program Savings Required for SBx7-7 and MOU Compliance

2015 Net Savings Requirement (AF)	**SBx7-7**	**MOU Flex Track**
Gross Savings Requirement (Tbl 4-4)	**2,430**	**369**
Less		
Savings from codes (Tbl 5-1)	122	NA
Savings from rates (Tbl 5-2)	-238	NA
Savings from existing programs (Tbl 5-3)	8	8
Subtotal Expected Savings	*-108*	*8*
Savings Required from New Programs	**2,538**	**361**

Table 5-6 compares the adjusted baseline demand in gpcd to the 2015 SBx7-7 and MOU Flex Track Targets. The district's adjusted baseline demand exceeds its 2015 SBx7-7 and MOU Flex Track targets by 33 and 5 gpcd, respectively. Thus, adjusted baseline demand would need to decrease 12% to meet the district-specific SBx7-7 target and somewhat more than 1% to satisfy the MOU Flex Track target.

Table 5-6. Palos Verdes District 2015 GPCD Required for SBx7-7 and MOU Compliance

Demand Projection	Demand (GPCD)	Difference from Adjusted Baseline (GPCD)
Adjusted Baseline	286	
SBx7-7 Target	253	-33
MOU Flex Track Target	281	-5

The next two sections of the plan describe the analyses undertaken to identify the best mix of new conservation programs to help Palos Verdes District achieve the required savings for MOU Flex Track compliance and SBx7-7 compliance.

6 Conservation Program Analysis

6.1 Introduction

Cal Water engaged in a detailed, multi-step process to identify the best mix of programs to achieve the required savings. The process began with an inclusive universe of potential program concepts. These concepts were qualitatively analyzed to eliminate those that were clearly inappropriate for each district and thereby narrow the analytical focus to those remaining programs that were potentially appropriate. Those programs were then subjected to detailed quantitative analysis. This Section describes the steps of the analytical process for Palos Verdes District, and the programs that emerged as potential components of a portfolio of programs for the district. Section 7 will then describe the process of creating this portfolio.

6.2 Conservation Program Concepts

As a result of an exhaustive search of the literature, consultation with experts in the field, knowledge of conservation programming by other water suppliers, and the experience of the project team, a universe of more than 75 conservation program concepts was defined. At this point in the process, the goal was to be as inclusive as possible. The list was therefore intentionally large to ensure that all possible program concepts were considered. Cal Water did not want to risk inadvertently excluding a program from consideration.

For the purposes of this plan, a conservation program concept is comprised of two components:

- Targeted technologies or changes in customer behavior; and
- A delivery mechanism by which customers will be encouraged (or required) to adopt the technology(ies) or change their behavior. Key delivery mechanisms that apply to one or more measures/technologies include:
    - **Customer rebates or vouchers**. Customers who choose to participate in the program receive either cash rebates upon suitable evidence of purchase and/or installation or vouchers that can be used to purchase the water efficient device or fixture.
    - **Vendor, distributor and contractor incentives**. Instead of providing incentives to customers, they are provided to 'upstream' entities such as vendors, distributors, or contractors to encourage them to promote water-efficiency devices or fixtures.
    - **Retrofit/conversion on resale ordinance**. Prior to sale of a property, the seller must retrofit or convert to the designated water-efficient technology.

- **Direct distribution**. Devices or fixtures are directly provided to eligible customers at designated sites, either by the utility or by vendors or distributors.
- **Direct install**. Devices or fixtures are delivered and installed at the customer premises.
- **New construction ordinance**. All specified categories of new construction are required to include the designated technology(ies).
- **Audits/Surveys**. These are customer-specific assessments, focused on a particular technology, to determine whether and how that technology is applicable to the customer and the volume of water that might be saved. These audits are to be distinguished from the more general audits and surveys, which are designed to identify a variety of water savings opportunities.
- **Customized incentives**. Unlike the rebate and voucher incentives described above, these incentives are tailored to each customer based on the results of an audit.
- **Mandatory operating standards**. Designated types of equipment are required to be operated in particular ways to reduce water usage.
- **Demonstration**. For new technologies, demonstration projects can be implemented to gather information about their more general applicability.
- **Utility system maintenance**. Water savings from these measures come from enhancements to the utility's own delivery system. Unlike the other mechanisms, this one is not associated with individual customers and occurs on the utility's side of the meter.

Each program may apply to multiple customer classes (Single Family, Multi-Family, Commercial/ Industrial/Institutional, and Large Landscape).

The universe of program concepts, shown in Table 6-1, Table 6-2, and Table 6-3, includes programs targeting indoor, outdoor, and general end-uses. It includes programs that have been successfully implemented by many other utilities as well as programs that do not have such a history. It includes some programs for which there is a considerable amount of available savings and cost data, and others for which little or no such data exists.

Table 6-1. Palos Verdes District Indoor Conservation Program Concepts

Technology/Intervention	Delivery Mechanism	Single Family	Multi-Family	CII
HE Toilets	Customer rebates or vouchers	x	x	x
	Vendor, distributor & contractor incentives	x	x	x
	Retrofit on resale ordinance	x	x	x
	Direct distribution (by utility, community group, vendor)	x	x	x
	Direct install	x	x	x
Urinals	Customer rebates or vouchers			x
	Vendor, distributor & contractor incentives			x
	Retrofit on resale ordinance			x
	Direct distribution (by utility or vendor)			x
	Valve replacement			x
Clotheswashers: in-unit, common area, & coin-op	Customer rebates & vouchers	x	x	x
	Vendor, distributor & contractor incentives	x	x	x
	New construction ordinance		x	x
Industrial laundries	Audits			x
	Customized incentives			x
Showerhead (2.0, 1.5 gpm)/ flapper/aerators	Kit distribution or install	x	x	x
Showerhead (1.5 gpm)	Customer rebates or vouchers	x	x	x
Shower timers, Reminder cards	Direct distribution	x	x	x
Faucets (reduced flow, auto shut-off)	Customer rebates or vouchers	x	x	x
Hot Water recirculation, point-of-use, or demand Systems	Customer rebates or vouchers	x	x	x
	Retrofit on resale ordinance	x	x	x
	New construction ordinance	x	x	x
Hot water pipe insulation	Retrofit on resale ordinance	x	x	x
	New construction ordinance	x	x	x
Cooling Towers	Customer rebates, customized incentives			x
Food Steamers	Customer rebates			x
Ice Machines	Customer rebates			x
Steam Sterilizers	Customer rebates			x
Vacuum Pumps	Customer rebates			x
Car Washes	Mandatory operating standards			x
	Customer rebates			x
	Audits			x
Dishwashers	Customer rebates or vouchers	x	x	x
	New construction ordinance		x	x
	Vendor, distributor & contractor incentives	x	x	x
Spray valves	Direct install			x
	Customer rebates			x

Technology/Intervention	Delivery Mechanism	Single Family	Multi-Family	CII
	Audits			x
Sensor-operated faucets	Customer rebates or vouchers			x
Plan requirement (indoor & outdoor)	New construction ordinance	x	x	x
Self-generating water softener replacement	Customer rebates	x	x	x
	Operating restrictions	x	x	x
X Ray film & photo processors	Customer rebates			x
Industrial process	Audits & incentives			x
Wet cleaning systems	Customer rebates			x
Evaporative Coolers	Customer rebates	x	x	X
An "x" indicates the program could be offered to the indicated customer class.				

Table 6-2. Palos Verdes District Outdoor Conservation Program Concepts

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
Large Landscape Surveys					x
WBIC	Direct Install	x	x	x	x
	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Direct distribution	x	x	x	x
Irrigation System (including, but not limited to, high efficiency nozzles for pop-up heads, drip, soil moisture sensors, rain shut off, pressure control)	New construction ordinance	x	x	x	x
	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Retrofit on resale ordinance	x	x	x	x
Landscape design	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Conversion on resale ordinance	x	x	x	x
	New construction ordinance	x	x	x	x
Turf buy back (Cash for Grass)	Customer rebate	x	x	x	x
Artificial Turf	Customer rebate	x	x	x	x
Water Budgets	(Potentially rate-linked)	x	x	x	x
Large Landscape Water Use Reports					x
Pool, hot tub covers & other upgrades	Customer rebate or voucher	x	x	x	
Water Brooms	Customer rebate or voucher			x	
	Direct distribution			x	
Dedicated Irrigation Meters	Customer rebate	x	x	x	
	New construction ordinance	x	x	x	
An "x" indicates the program could be offered to the indicated customer class.					

Table 6-3. Palos Verdes District General Conservation Program Concepts

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
Audits & Surveys (incl high bill contacts)*		x	x	x	x
Meter installation	Direct Install	x	x	x	x
Water use meter alerting device		x	x	x	x
"Smart Meters"	Demonstration	x	x	x	x
Increased billing frequency		x	x	x	x
Water waste ordinance		x	x	x	x
Water recycling, grey water use, rainwater harvesting	Customized incentives	x	x	x	x
New construction guidelines		x	x	x	x
New const conservation offsets		x	x	x	x
System loss prevention, leak detection & repair	Utility system maintenance				
An "x" indicates the program could be offered to the indicated customer class.					

6.2.1 Concept Screening

Once the universe of program concepts was defined, the next step was to subject each program concept to a careful district-specific qualitative screen, the objective of which was to eliminate those program concepts that were clearly inappropriate. For this purpose, six screening criteria were developed:

1. **Implementation feasibility**. Are the administrative, staffing, billing, institutional, legal, and/or political difficulties associated with implementing the program acceptable?
2. **Customer/stakeholder acceptability**. Will the program likely be deemed acceptable by customers and/or other key program stakeholders?
3. **District match**. Is the technology well matched to the customers, appliance stocks, climate, building stock, and/or other characteristics of the service area? Are there enough target sites in the district to warrant developing and operating the program?
4. **Relationship to other programs**. Does the program reinforce rather than duplicate or conflict with other existing or proposed conservation programs?
5. **Program costs**. Are the expected costs of the program acceptable?
6. **Certainty of savings**. Are we able to forecast future program savings with a sufficient degree of certainty? Is our savings forecast sufficiently reliable?

For each program concept, Cal Water staff answered "yes" or "no" for each of these criteria. A "yes" answer on each of these criteria was considered to be essential for program success. Thus, a negative response to any one of the criteria for a particular program concept eliminated that concept from further consideration. Once Cal

Water had completed the initial qualitative screen, it met with local community leaders to share the results and solicit feedback on conservation program concepts for the district.

The final set of programs passing the qualitative screen for Palos Verdes District is shown in Table 6-4.

Table 6-4. Palos Verdes District Program Concepts Passing Qualitative Screen

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
INDOOR					
HE Toilets	Customer rebates or vouchers	x	x	x	
	Vendor, distributor & contractor incentives	x	x	x	
	Distribution (by utility, community group, vendor)	x	x	x	
	Direct install	x	x	x	
Urinals	Customer rebates or vouchers			x	
	Vendor, distributor & contractor incentives			x	
	Distribution (by utility or vendor)			x	
	Valve replacement			x	
Clotheswashers: in-unit, common area, & coin-op	Customer rebates & vouchers	x	x	x	
	Vendor, distributor & contractor incentives	x	x	x	
Showerhead (2.0, 1.5 gpm)/ flapper/aerators	Kit distribution or install	x	x	x	
Shower timers, Reminder cards	Distribution	x	x	x	
Cooling Towers	Customer rebates, customized incentives			x	
Food Steamers	Customer rebates			x	
Steam Sterilizers	Customer rebates			x	
Vacuum Pumps	Customer rebates			x	
Spray valves	Customer rebates			x	
	Audits			x	
OUTDOOR					
Large Landscape Surveys					x
WBIC	Direct Install	x	x	x	x
	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
	Distribution	x	x	x	x
Irrigation System (including, but	Customer rebate	x	x	x	x

		CUSTOMER CLASS			
Technology/Intervention	**Delivery Mechanism**	**Single Family**	**Multi-Family**	**CII**	**Lg Lndscp**
not limited to, high efficiency nozzles for pop-up heads, drip, soil moisture sensors, rain shut off, pressure control)	Vendor, distributor & contractor incentives	x	x	x	x
Landscape design	Customer rebate	x	x	x	x
	Vendor, distributor & contractor incentives	x	x	x	x
Turf buy back (Cash for Grass)	Customer rebate	x	x	x	x
Large Landscape Water Use Reports					x
Pool, hot tub covers & other upgrades	Customer rebate or voucher	x	x	x	
GENERAL					
Audits & Surveys (incl high bill contacts)		x	x	x	x
Meter installation	Direct Install	x	x	x	x
Water use meter alerting device		x	x	x	
Water recycling, grey water use, rainwater harvesting	Customized incentives	x	x	x	
Education/outreach		x	x	x	x

6.2.2 Preliminary Quantitative Analysis

A preliminary quantitative analysis was conducted on the programs that passed the qualitative screen. To do that, estimates were made of key savings and cost parameters for each of the programs in Table 6-4. Where applicable, these estimates were based on prior Cal Water experience with similar programs. In the absence of such experience, the experience of other water suppliers, the expertise of the project team, consultation with national experts, and published figures, where available, were relied upon. In particular, estimates developed by the California Urban Water Conservation Council and the Alliance for Water Efficiency were utilized where such estimates were available. While in most cases, the savings assumptions for a program do not vary across districts, for several programs, they do due to district-specific characteristics of household size, climate, etc. Other than meter installation, program cost assumptions are uniform across districts, although in some cases, cost sharing with other water utilities reduce Cal Water's share.

The specific savings and cost variables that were estimated for each program are as follows.

Savings Parameters

Unit savings. The savings in gallons per year that can be expected per device or intervention.

Savings decay. The annual rate at which the unit savings will decay due to behavioral attrition or physical device limitations.

Seasonal distribution. The percentage of the annual savings that will occur during the peak season. Generally, this parameter will differ between indoor and outdoor programs.

Useful life. The expected life of the device or intervention over which the savings will persist.

Free riders. The percentage of program participants who would be expected to have acted in the absence of the program and for whom, therefore, there is assumed to be no incremental savings.

Natural replacement. The annual rate at which customers would be expected to replace their inefficient fixtures in the absence of utility intervention, due either to code requirements or market forces.

Cost Parameters

Initial variable cost. The cost the utility must pay per device or intervention at the time that the device is installed or the intervention occurs. This cost could include such things as the cost of a fixture, a survey, a customer rebate, a voucher, plus the cost for program administration and marketing.

Follow-up variable cost. Subsequent annual per-device or intervention costs the utility must pay to maintain the program savings.

Follow-up years. The number of years the follow up costs will persist.

6.2.3 Identification of Core and Non-Core Programs

A key challenge facing Cal Water is finding a way to efficiently scale up conservation programming across its 24 districts with the limited staffing it has to implement and manage these programs. The current GRC decision authorizes 4 full-time conservation program staff for 2011-13. These staff will be responsible for implementing and managing programs in 24 geographically dispersed districts serving a combined population of over 1.7 million.[26] As will be discussed in Section 7, Cal Water intends to propose to the CPUC adding three more conservation positions beginning in 2014 so that it can divide its districts into four program management regions. Even with the added staffing, the most efficient way for Cal Water to manage programs across its geographically dispersed districts is to standardize programs and centralize their implementation and oversight. Using the results of the qualitative screening and preliminary quantitative analysis, Cal Water

[26] By way of comparison, the East Bay Municipal Utility District has a conservation program staff of 21 full-time positions serving a population of 1.3 million within a geographically contiguous and compact service area.

identified five core programs that it would run in every district over the next five years. The following criteria were used for selecting core programs:

- Scalable – programs were more likely to be selected if they could simultaneously be run at low volumes in smaller districts and at much higher volumes in larger districts.
- Vendor Operation – programs were more likely to be selected if they could be operated by third-parties specializing in water conservation program implementation.
- Scale Economies – programs were more likely to be selected if aggregation of material purchases could lower unit costs of implementation.
- Synergy with Regional Programs – programs were more likely to be selected if they complemented or could leverage regional conservation programs that may be available to the district.
- Program Diversity –programs were selected to ensure a mix of programs for residential, commercial, industrial, and landscape customer segments.
- Proven Track Record – programs were more likely to be selected if they had demonstrated water savings and a proven track record of implementation by other water providers.
- Low Unit Cost – programs were more likely to be selected if they had low unit costs of implementation relative to other program options.[27]

In addition to the core programs, an additional set of non-core programs was selected. Unlike core programs, Cal Water may not offer non-core programs in every district or in every year. Implementation of non-core programs will depend on whether additional water savings are required for SBx7-7 compliance, MOU compliance, or to help address local supply constraints.

The set of core and non-core programs that Cal Water will offer over the next five years is shown in Table 6-5.

[27] A program's unit cost was only one factor taken into account, which had to be balanced against other competing criteria, such as scalability, program diversity, and synergy with regional programs.

Table 6-5. Cal Water Conservation Programs

Program Name	Description	Target Market
CORE PROGRAMS		
Rebate/Vouchers for toilets, urinals, and clothes washers	Provide customer rebates for high-efficiency toilets, urinals, and clothes washers	All customer segments
Residential Surveys	Provide residential surveys to low-income customers, high-bill customers, and upon customer request or as pre-screen for participation in direct install programs	All residential market segments
Residential Showerhead/Water Conservation Kit Distribution	Provide residential showerhead/water conservation kits to customers upon request, as part of residential surveys, and as part of school education curriculum	All residential market segments
Pop-Up Nozzle Irrigation System Distribution	Offer high-efficiency pop-up irrigation nozzles through customer vouchers or direct install.	All customer segments
Public Information/Education	Provide conservation messaging via radio, bill inserts, direct mail, and other appropriate methods. Provide schools with age appropriate educational materials and activities. Continue sponsorship of Disney Planet Challenge program.	All customer segments
NON-CORE PROGRAMS		
Toilet/Urinal Direct Install Program	Offer direct installation programs for replacement of non-HE toilets and urinals	All customer segments
Smart Irrigation Controller Contractor Incentives	Offer contractor incentives for installation of smart irrigation controllers	All customer segments
Large Landscape Water Use Reports	Expand existing Cal Water Large Landscape Water Use Report Program providing large landscape customers with monthly water use reports and budgets	Non residential customers with significant landscape water use and potential savings
Large Landscape Surveys & Irrigation System Incentives	Provide surveys and irrigation system upgrade financial incentives to large landscape customers participating in the Large Landscape Water Use Reports programs and other targeted customers	Non residential customers with significant landscape water use and potential savings
Food Industry Rebates/Vouchers	Offer customer/dealer/distributor rebates/vouchers for high-efficiency dishwashers, food steamers, ice machines, and pre-rinse spray valves	Food and drink establishments, institutional food service providers
Cooling Tower Retrofits	Offer customer/dealer/distributor rebates/vouchers of cooling tower retrofits	Non-residential market segments with significant HVAC water use
Industrial Process Audits and Retrofit Incentives	Offer engineering audits/surveys and financial incentives for process water efficiency improvement	Non-residential market segments with significant industrial process water uses

6.3 Benefit-Cost Analysis of Core and Non Core Programs

Core and non-core programs were then subjected to a detailed benefit cost analysis, the results of which were used to inform program portfolio development discussed in the next section. The first step in this process was to refine and finalize the savings and cost specifications of each program. The final assumptions for the Palos Verdes District programs are provided in Appendix 3.

The program savings and cost assumptions enable the calculation of program benefits and costs to the utility and its ratepayers, and comparisons of these costs in the form of benefit-cost ratios. The tool used to do this comparison was a simplified version of the Alliance for Water Efficiency Tracking Tool. Following are descriptions of how the model calculates and compares conservation program benefits and costs.

Program Benefits

For each acre-foot of water saved by a conservation program in a particular year – and in a particular season – the benefit to the utility is given by that year's/season's avoided cost, as described in Section 2.7. The model calculates the programmatic savings (that is, the savings that can be attributed to the utility program) for each year/season based on the program water savings parameters shown in Appendix 3. Each year's/season's programmatic savings is then multiplied by that year's real-dollar avoided costs to compute the annual program benefits. The model then computes the present value of these benefits.[28]

Program Costs

For each device/intervention, the model uses the program cost parameters shown in Appendix 3 to compute the annual costs the utility will incur. It then computes the present value of these costs.

Benefit-Cost Ratios

For each program, the benefit-cost ratio (BCR) is the quotient of the present value of the program benefits and the present value of the program costs. A BCR greater than 1 indicates that, over time, the program provides a positive net benefit to the utility and its ratepayers. Table 6-6 shows the BCRs for the Palos Verdes District programs. All but six of the thirty-one programs listed in the table have BCRs greater than 1, meaning the district can make ratepayers better off by investing in these programs in order to avoid future purchases of imported water. As described in Section 7, these BCRs were a key input to the development of the recommended district conservation portfolio.

[28] Present values are computed using a 3.4% real discount rate, which is based on a 6% nominal discount rate and a 2.5% annual inflation rate.

Table 6-6. Palos Verdes District Core and Non-Core Program Benefit-Cost Ratios

Program ID	Program Name	Customer Class	BCR
1	HE Toilets: Cust Rebates or Vouchers	Single Family	3.04
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	5.97
3	HE Toilets: Cust Rebates or Vouchers	Commercial	1.92
4	Clotheswasher: Cust Reb or Voucher	Single Family	1.07
5	CW common: Cust Reb or Voucher	Multi Family	1.30
6	CW in-unit: Cust Reb or Voucher	Multi Family	0.81
7	CW coin-op: Cust Reb or Voucher	Commercial	1.57
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	1.33
9	HE Toilets: Direct Install	Single Family	1.34
10	HE Toilets: Direct Install	Multi Family	3.50
11	HE Toilets: Direct Install	Commercial	1.18
12	Urinals: Direct Install	Commercial	1.38
13	Audits & Surveys (incl high bill contacts)	Single Family	0.82
14	Audits & Surveys (incl high bill contacts)	Multi Family	0.93
15	Audits & Surveys (incl high bill contacts)	Commercial	2.26
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	6.26
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	6.26
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	6.26
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	2.13
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	2.13
21	WBIC Vendor, Dist, & Cont Inc	Single Family	0.53
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	0.95
23	WBIC Vendor, Dist, & Cont Inc	Commercial	0.95
24	Large Landscape Water Use Reports	Irrigation	1.29
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	1.03
26	Comm Irrigation System: Rebates	Commercial	2.74
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	11.73
28	Food Steamers: Cust Rebates	Commercial	1.17
29	Pre-Rinse Spray Valves: Cust rebates	Commercial	4.55
30	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	5.46
31	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	5.60

7 Portfolio Development

7.1 Introduction

This section of the plan presents the recommended conservation program portfolio for Palos Verdes District. The program analysis results described in Section 6 provided the starting point for portfolio development. The next step was to determine the annual levels of program activity needed to, at minimum, meet Palos Verdes District's water savings targets and local demand management goals. Several considerations informed these decisions, including budgetary constraints included in the current GRC decision, Cal Water conservation program administrative capacity, program market and water savings potential, and the program benefit-cost results presented in Section 6.

7.2 SBx7-7 and MOU Savings Targets

Section 5 showed that, after accounting for water savings from existing water efficiency codes and ordinances, scheduled adjustments to water rates, and past investment in conservation programs, projected 2015 baseline demand (excluding recycled water use) in Palos Verdes District is projected to exceed the SBx7-7 target by 2,543 AF and the MOU Flex Track target by 361 AF. The analysis done for this plan suggests the district will not be able to meet its district-specific SBx7-7 target by 2015 and instead will need to rely on the regional compliance option. The reason for this is three-fold. First, the district's very high per capita water use results in a large water savings target. Second, the small amount of non-residential demand in the district will limit the reach of commercial and industrial conservation programs. And third, the amount of conservation investment the district can undertake in 2011 through 2013 is capped by Cal Water's current GRC decision, which will prevent the district from scaling up programs rapidly enough to reach the target.

7.3 2011-13 General Rate Case Decision

Cal Water's current GRC decision established conservation budgets for each district for the years 2011-2013. These budgets specify the total annual expenditure on conservation programs allowed under the GRC decision, as well as the maximum amount that can be allocated to (1) program administration and research, (2) public information and school education programs, (3) residential conservation programs, and (4) non-residential conservation programs. Table 7-1 shows these budgetary restrictions for Palos Verdes District. These expenditure caps effectively limit how much water savings the district can generate by 2015. As will be shown in Section 7.6, recommended conservation program expenditures in 2014 and 2015 are approximately double the amounts allowed under the current GRC.

Table 7-1. Palos Verdes District GRC Conservation Program Expenditure Constraints

Budget Constraint ($000)	2011	2012	2013
Overall Budget	$675.0	$675.0	$675.0
Admin & Research	$83.6	$83.8	$83.8
Public Info & School Educ.	$72.5	$72.5	$72.5
Programmatic Activity	$518.9	$518.7	$518.7
Expenditure Caps			
Residential Programs	$550.5	$555.5	$555.5
Non Residential Programs	$442.5	$442.5	$442.5

7.4 Minimum and Maximum Program Levels

For each district, Cal Water specified minimum and maximum program activity levels to guide portfolio development. The minimum levels were those below which it would not be administratively feasible or cost-effective to offer the program in the district, while the maximum levels were those that could reasonably be achieved given district customer characteristics, current market demand, and past experience marketing similar programs/technologies to district customers. As part of development of this plan, Cal Water matched its non-residential customer accounts to North American Industrial Classification (NAICS) 4-digit codes, which enabled it to estimate the number of businesses in the Palos Verdes District that would potentially participate in the non-residential programs. It also identified, using a review and analysis of prior consumption, the number of large landscape customers in the district so that it could accurately assess potential participation levels and savings potential for large landscape conservation programs. The constraints placed on annual program activity levels are presented in Appendix 3.

7.5 Recommended Annual Program Activity and Staff Levels

7.5.1 Residential and Non-Residential Conservation Programs

Recommended annual program levels for residential and non-residential programs are shown in Table 7-2. The program levels were derived from the following decision rules:[29]

- For 2011-13, set annual program activity to maximize water savings subject to the GRC conservation program budget constraints and the min/max annual activity constraints. This ensured that the portfolio would reflect the least-cost mix of core and non-core conservation programs consistent with the GRC budget constraints.

- For 2014-15, set annual activity to minimum program levels. For programs with BCRs greater than one, increase activity to its maximum level. This

[29] Linear programming models were used to implement the decision rules.

ensured that the portfolio would benefit ratepayers by helping to lower average water supply costs.

- For 2014-15, if needed to satisfy the 2015 SBx7-7 and MOU Flex Track water savings targets, increase program activity of programs with BCRs less than one in order of cost-effectiveness. This ensured the least-cost set of activity levels needed to achieve the water savings targets.

In the case of Palos Verdes District, program activity in each year was maximized subject to the GRC program budget constraints in an effort to meet the 2015 SBx7-7 target. The significant increase in the customer survey/audit, toilet/urinal direct installation, and smart irrigation controller incentive programs starting in 2014 shows the impact of the GRC budget constraints on 2011-13 program production.

Table 7-2. Palos Verdes District Recommended Residential and Non-Residential Program Levels

Program	Recommended Annual Activity Levels[1]				
	2011	2012	2013	2014	2015
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	630	630	630	950	950
Clothes Washers	480	480	480	500	500
Urinals	0	0	0	0	0
Customer Surveys/Audits	370	370	370	550	550
Conservation Kit Distribution	780	780	780	780	780
Pop-Up Nozzle Distribution	9,300	9,300	9,300	9,300	9,300
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	550	560	560	1,190	1,190
Smart Irr. Controller Vendor Incentives	20	20	20	530	530
Large Landscape Water Use Reports	50	50	50	100	100
Large Landscape Surveys/Incentives	30	30	30	30	30
Commercial Kitchen Rebates/Vouchers	0	0	0	20	20
Cooling Tower/Process Water Retrofit Incentives	10	10	10	0	0

[1]Annual activity levels are aggregated across customer classes and rounded up to the nearest 10 units of activity. Appendix 3 contains the detail modeling results broken down by customer class and program measure.

7.5.2 Administration & Research

District staff levels and expenditure for administration and research for 2011-13 are set by the current GRC. At present, Cal Water divides its 24 districts into two program management regions which are administered by its two conservation program coordinators. Program reporting and analysis will be conducted by its

conservation program analyst. Proposed expenditures for 2014 and 2015 assume two additional conservation program coordinator positions and one additional conservation analyst position for a total of seven full-time positions. Given the scale and diversity of programs proposed in this plan and the geographic dispersion of Cal Water's districts, this is the minimum staffing level recommended for program implementation, and assumes Cal Water will divide its 24 districts into four program management regions, as shown in Figure 7-1, with one program coordinator assigned to each region. Palos Verdes District would be within program management region 4. Program administration costs for 2014-15 are prorated to the districts based on their share of company-wide conservation program expenditures.[30] Proposed annual expenditures for administration and research for Palos Verdes District are shown in Table 7-3.

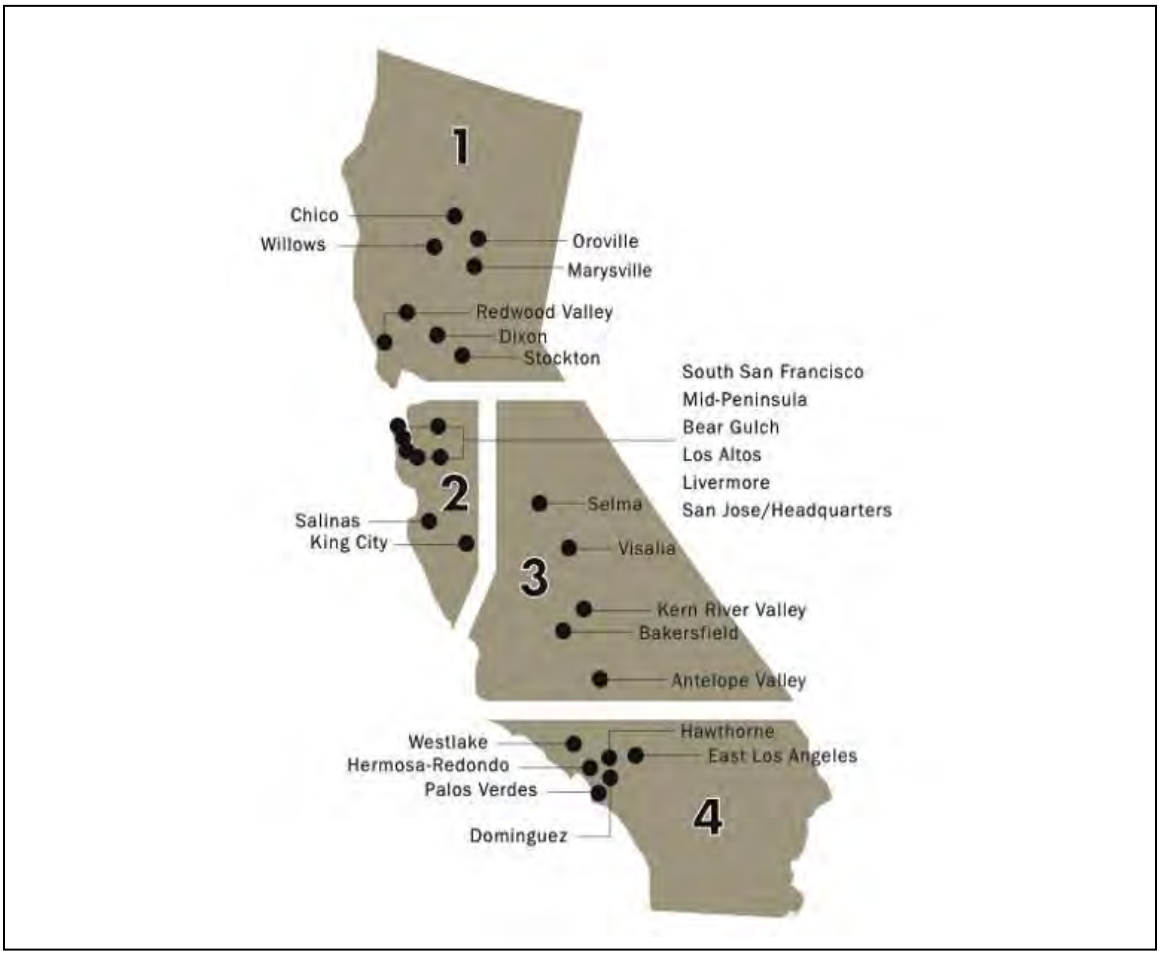
7.5.3 Public Information & School Education

District expenditure for public information and school education programs in 2011-13 is set by the current GRC. Recommended expenditures in 2014 and 2015 are set to allow some expansion in these programs to support proposed increases in residential and non-residential program levels.[31] Recommended annual expenditures for public information and school education programs are shown in Table 7-3.

[30] Projected expenditure in 2014 and 2015 and the allocation of these expenditures to each Cal Water district are shown in Appendix 3.

[31] Specifically, the recommended level of expenditure in 2014 and 2015 was set to either 110% of the 2013 public information/school education budget or 10% of recommended expenditures for residential and non-residential programs, whichever was greater. This decision rule ensured continuity with 2011-13 public information/school education program levels while allowing for an expansion of this programming in districts with significant increases in residential and non-residential program activity.

Figure 7-1. Cal Water Conservation Program Management Regions



7.6 Projected Annual Program Expenditures

Annual program expenditures based on the recommended program levels and GRC budget allocations are shown in Table 7-3. Appendix 3 provides a detailed breakdown of these expenditures by year and individual program activity. Figure 7-2 shows the recommended expenditure shares by expenditure category over the entirety of the five-year planning period. The plan allocates approximately 80% of projected expenditure to programmatic activity, and splits the remaining 20% evenly between public information/education functions and administration and research functions. Within the programmatic expenditure category, approximately 80% of planned expenditure is for residential conservation programs and 20% is for non-residential programs. The allocation of program expenditures between residential and non-residential program categories reflects the small amount of commercial and industrial water use in the district.

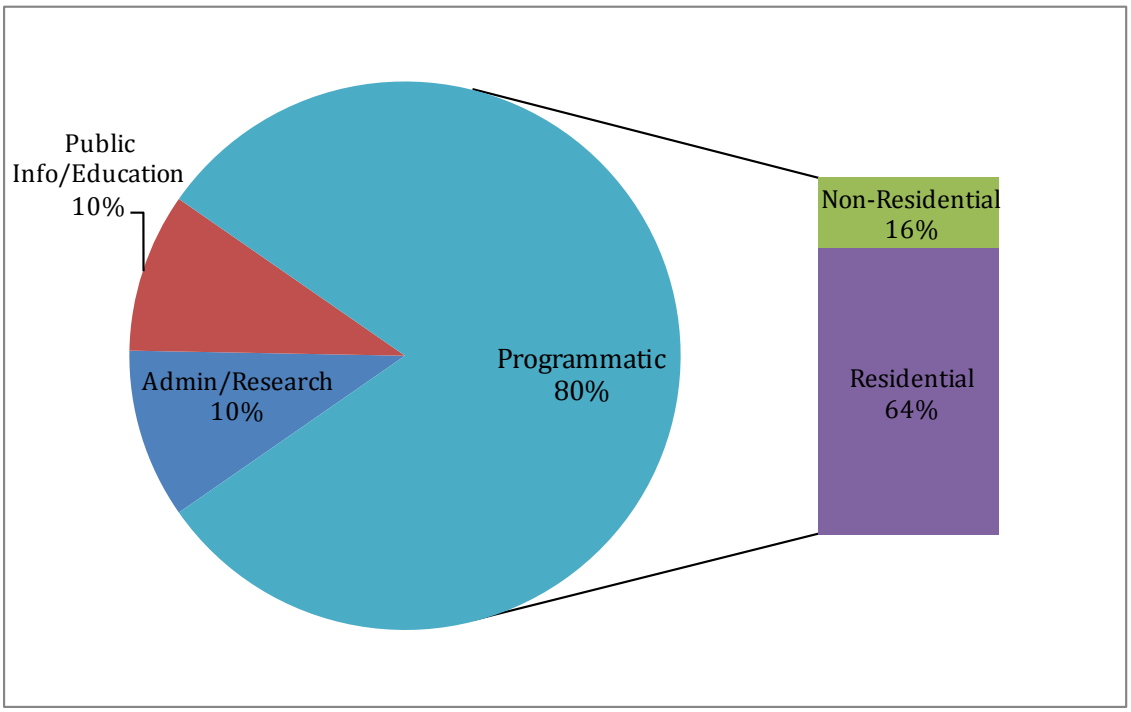
Proposed expenditures in 2014 and 2015 are roughly double the annual program expenditure allowed under the current GRC. Even with this proposed increase in program expenditure, the district is unable to meet its district-specific target.

However, as will be shown next, it does allow the region to meet its regional target. Moreover, the proposed program is justified by the district's high water costs. The avoided costs of imported water more than offset conservation program expenditures, resulting in a net benefit to ratepayers.

Table 7-3. Palos Verdes District Projected Annual Conservation Expenditures

Expenditure Category	Projected Annual Expenditures ($000)				
	2011	2012	2013	2014	2015
Program Costs:					
Residential	$392.0	$398.5	$398.5	$902.8	$902.8
Non-Residential	$126.9	$120.2	$120.2	$196.6	$195.5
Program Subtotal	***$518.9***	***$518.7***	***$518.7***	***$1,099.3***	***$1,098.3***
Admin/Research	$83.6	$83.8	$83.8	$107.1	$106.7
Public Info/Education	$72.5	$72.5	$72.5	$109.9	$109.8
TOTAL ANNUAL	**$675.0**	**$675.0**	**$675.0**	**$1,316.4**	**$1,314.8**

Figure 7-2. Palos Verdes District 2011-15 Conservation Expenditure Shares



7.7 Projected Portfolio Water Savings

Table 7-4 and Table 7-5 show projected annual water savings broken down by program category and customer class, respectively. By 2015 projected water savings are approximately 666 AF. Roughly 79% of the savings come out of the

residential sector and 21% come out of the non-residential sector. Projected savings are well below the amount needed to meet the district-specific SBx7-7 target, but are about 184% of the MOU Flex Track target.

Table 7-4. Palos Verdes District Projected Water Savings by Program

Program	Annual Water Savings (AF)				
	2011	**2012**	**2013**	**2014**	**2015**
CORE PROGRAMS					
Rebates/Vouchers					
Toilets	18.4	36.1	53.0	78.7	103.4
Clothes Washers	8.7	17.0	25.0	33.0	40.7
Urinals	0.0	0.0	0.0	0.0	0.0
Customer Surveys/Audits	17.8	33.8	48.2	70.0	89.7
Conservation Kit Distribution	12.2	22.9	32.3	40.6	47.9
Pop-Up Nozzle Distribution	37.2	74.4	111.6	148.7	185.9
Subtotal Core Programs	***94.2***	***184.1***	***270.1***	***371.1***	***467.6***
NON-CORE PROGRAMS					
Direct Install Toilets/Urinals	16.9	33.6	49.6	85.8	120.5
Smart Irr. Controller Vendor Incentives	0.5	1.0	1.4	13.1	24.8
Large Landscape Water Use Reports	3.8	3.8	3.8	7.6	7.6
Large Landscape Surveys/Incentives	3.6	7.1	10.7	14.2	17.8
Commercial Kitchen Rebates/Vouchers	0.0	0.0	0.0	1.8	3.6
Cooling Tower/Process Water Retrofit Incentives	12.9	19.0	25.0	25.0	25.0
Subtotal Non-Core Programs	***37.6***	***64.4***	***90.5***	***147.6***	***199.3***
Total Core and Non-Core Program Savings	**131.8**	**248.5**	**360.6**	**518.7**	**666.9**

Table 7-5. Palos Verdes District Projected Water Savings by Customer Class

	Annual Water Savings (AF)				
Customer Class	**2011**	**2012**	**2013**	**2014**	**2015**
Single Family	77.8	152.4	223.8	329.2	430.5
Multi Family	17.7	34.7	51.1	73.1	94.4
Commercial/Industrial	31.3	55.0	78.0	103.5	127.9
Irrigation	5.1	6.4	7.7	12.8	14.1
Total Water Savings	**131.8**	**248.5**	**360.6**	**518.7**	**666.9**

7.8 Projected Water Demands

Table 7-6 shows the adjusted 2015 baseline demand, the demand targets required to comply with SBx7-7 and the MOU, and the projected 2015 demand based on the

recommended conservation portfolio.[32] Under the recommended portfolio, projected demand in 2015 is 277 gpcd, which is below the MOU Flex Track target by about 5 gpcd, but over the district-specific SBx7-7 by about 24 gpcd. This means that 2015 per capita demand for the five Cal Water districts in the South Coast hydrologic region can average no more than 176 gpcd in order for Palos Verdes District to comply with SBx7-7. Table 7-7 shows projected 2015 per capita demands for each of the five districts based on the proposed conservation plan for each district. Assuming each district's 2015 per capita demand is no greater than shown in the table, average per capita demand for the five districts would be under the regional target, thereby ensuring SBx7-7 compliance for all five districts.

Table 7-6. Palos Verdes District Recommended Portfolio Projected 2015 Demand

Demand Projection	Demand (GPCD)	Difference from Adjusted Baseline (GPCD)
Adjusted Baseline	286	
SBx7-7 Target	253	-33
MOU Flex Track Target	281	-5
Recommended Portfolio	**277**	**-9**

Table 7-7. South Coast Regional Alliance 2015 Average Per Capita Demand

District	2015 Projected Population	2015 Projected Demand (GPCD)
Dominguez	146,550	194
East Los Angeles	151,510	111
Hermosa-Redondo	99,050	120
Palos Verdes	69,300	277
West Lake	16,960	488
Average GPCD[1]		**175**
Regional Target		**176**
[1]Population-weighted average per capita demand.		

7.9 Program Cut Sheets

As part of plan development, one page program summaries, or "cut sheets," were developed for each recommended program. These cut sheets provide a quick reference summarizing program design and marketing, expected level of customer participation, projected water savings, and proposed program expenditure for the

[32] The adjusted baseline demand forecast deducts expected reductions in demand due to codes/ordinances, scheduled adjustments to water rates, and 2009-10 conservation program investment.

period 2011 – 2015. Appendix 1 includes a copy of each program cut sheet for Palos Verdes District.

8 Plan Monitoring and Updates

8.1 Introduction

This conservation master plan is a working document and, as such, will need to be modified and updated as new information becomes available. Cal Water will need to regularly review the plan and make adjustments to it as appropriate. This section of the plan describes key monitoring and updating activities Cal Water anticipates undertaking following plan implementation

8.2 Program Tracking

Cal Water intends to adopt conservation program tracking software that it can use to track and manage its core and non-core programs. Such software will help Cal Water track customer participation in its programs, manage program materials, track program costs, and estimate program water savings. Cal Water will conduct a review of tracking software options in early 2011 with the goal of selecting the deploying the software in spring 2011.

8.3 2014-16 General Rate Case

Implementation of the recommended programs in 2014 and 2015 is contingent upon the outcome of Cal Water's 2014-16 GRC. Cal Water will not know until late 2013 whether the CPUC will approve the 2014-15 conservation program budgets proposed in this plan. Cal Water will submit its initial filing for the 2014-16 GRC in July 2012. Prior to that filing, Cal Water may elect to update this plan to reflect new information and changed circumstances affecting the baseline water demands, calculated water savings targets, recommended conservation programs, projected water savings, and proposed conservation program budgets.

8.4 2015 UWMP

Under SBx7-7 water suppliers may update their baseline demands and per capita water use targets in their 2015 UWMP. As part of its 2015 UWMP preparation, Cal Water may elect to update its baseline demand estimates and gpcd targets, if new information warrants doing so. Depending on the final methodology adopted by DWR for the fourth target calculation method, Cal Water may decide to update the SBx7-7 targets included in the plan using this alternative methodology.

8.5 MOU Flex Track Target

The CUWCC-sanctioned tools for calculating the Flex Track target for MOU compliance were not available during this plans development. Therefore, Cal Water used its own Flex Track calculator to calculate the required volume of water savings. CUWCC tools for calculating the Flex Track target are expected to be available sometime in early 2011. Cal Water may elect to update this plan to reflect a revised Flex Track target based on a CUWCC-sanctioned Flex Track target calculator.

8.6 Water Savings Verification

Cal Water intends to undertake various research projects to verify water savings projections included in these plans. For example, Cal Water and San Jose State University Research Foundation are jointly undertaking a study of realized water savings from converting customers from flat rate to metered billing. This study is expected to commence in early 2011. Results from studies such as this one will be used by Cal Water to update water savings projections.

8.7 Local Codes and Ordinances

Water waste prohibitions and codes and ordinances affecting new construction and landscape design and irrigation enacted by cities and counties in the communities served by Cal Water may alter demands in ways not anticipated by this plan.[33] Cal Water will work with local planning and enforcement departments to ensure that its conservation programs are consistent with and complementary to local water use codes and ordinances, and may elect to modify the design or level of implementation of programs included in the plan in order to do so.

8.8 2015 Plan Update

Cal Water plans to update these plans no less frequently than every five years. These plan updates will correspond to the update and reporting cycle for the UWMPs Cal Water prepares for each district every five years. Plan updates may entail adjustment of existing programs and addition of new programs based on performance history, community input, and changes to state and local conservation requirements.

[33] For example, AB 1881, passed in 2006, gave cities and counties until January 2010 to update an existing or adopt a new landscape water use ordinance to comply with the state's updated model landscape ordinance.

Appendix 1
Conservation Program Cut Sheets

The program cut sheets in this appendix provide a quick reference summarizing program design and marketing, expected level of customer participation, projected water savings, and proposed program expenditure for the period 2011 – 2015.

High Efficiency Toilet Rebate Program

Palos Verdes District

Program Description

High-efficiency toilets use approximately 70% less water than non-efficient toilets and 20% less water than ultra-low flush toilets. This program will provide customer incentives for residential and non-residential high-efficiency toilets. Cal Water will centrally administer the program as part of a company-wide toilet rebate program.

Program Marketing

This program will be available to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Rebate Goal
2011	630
2012	630
2013	630
2014	950
2015	950

*Combined goal for single family, multi family, and commercial toilet rebates.

IMPLEMENTATION COST

Costs Per Rebate and Per AF of Water Savings: Program costs vary by fixture type and customer class. Expected program costs per fixture (including marketing and administration) and per AF of water savings are shown below.

Customer Class	Program Cost ($/Rebate)	Water Savings ($/AF)
Single Family	$150	$470
Multi Family	$130	$240
Non-Residential	$250	$750

*Costs rounded to nearest $10.

Year	Annual Program Cost
2011	$97,800
2012	$97,800
2013	$97,800
2014	$147,900
2015	$147,900
Five-Year Cost	$589,200

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected water savings per fixture vary by customer class. Projected savings per fixture, and annual and lifetime program water savings are shown below.

Customer Class	Unit Savings (gal/yr)	Lifetime Savings (AF/Rebate)
Single Family	8,400	0.5
Multi Family	14,800	0.9
Non-Residential	9,100	0.6

*Unit savings rounded to nearest 100 gal.

Year	Water Savings (AF)
2011	18.4
2012	36.1
2013	53.0
2014	78.7
2015	103.4
5-Year Total Savings	289.6

High Efficiency Clothes Washer Rebate Program

Palos Verdes District

Program Description

Washing clothes is the second biggest use of water inside most homes, accounting for approximately 20% of indoor water use for a typical family. High-efficiency clothes washers can cut this water use by up to 60%, and save a significant amount of energy too. Unfortunately, many households and businesses are still purchasing low-efficiency washers because of their lower up-front purchase cost. Rebates are an effective way to level the playing field.

This program will provide customer incentives for residential and non-residential high-efficiency clothes washers. The program will target single-family households, multi-family units, multi-family common laundry areas, and commercial coin-op laundries.

Cal Water will centrally administer the program as part of a company-wide toilet rebate program.

Program Marketing

This program will be available to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table below.

Year	Rebate Goal
2011	480
2012	480
2013	480
2014	500
2015	500

*Combined rebates for single family, multi family, and commercial customers.

IMPLEMENTATION COST

Costs per Rebate and per AF of Water Savings: Program costs vary by fixture type and customer class. Expected program costs per rebate (including marketing and administration) and per AF of water savings are shown below.

Washer Location	Program Cost ($/Rebate)	Water Savings ($/AF)
Single Family	$170	$1,200
Multi Family - In Unit	$170	$1,630
Multi Family - Common	$460	$950
Commercial Coin-op	NA	NA

Year	Annual Program Cost
2011	$84,400
2012	$84,400
2013	$84,400
2014	$88,700
2015	$88,700
Five-Year Cost	**$430,600**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected water savings per fixture vary by customer class. Projected savings per fixture, and annual and lifetime program water savings are shown below.

Customer Class	Unit Savings (gal/yr)	Lifetime Savings (AF/Rebate)
Single Family	7,100	0.3
Multi Family - In Unit	5,200	0.2
Multi Family - Common	25,300	1.1
Commercial Coin-op	31,400	1.3

Year	Water Savings (AF)
2011	8.7
2012	17.0
2013	25.0
2014	33.0
2015	40.7
Total Five-Year Savings	**124.4**

Toilet/Urinal Direct Install Program

Palos Verdes District

Program Description

High-efficiency toilets and urinals use significantly less water than non-efficient models. This program will offer direct installation of high-efficiency toilets and urinals to Cal Water residential and commercial customers. The program will primarily target multi-family and commercial properties with older plumbing fixtures, where water savings potential is greatest.

Residential direct installations will include high-efficiency showerhead replacement and bathroom faucet aerators, in addition to toilet replacement. On the commercial side, the program will replace non-efficient toilets and flush valves for both toilets and urinals.

Cal Water will centrally administer the program as part of a company-wide program.

Program Marketing

Cal Water will market this program primarily to multi-family and commercial properties with older plumbing fixtures using direct mail. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Program Production Goal
2011	550
2012	560
2013	560
2014	1,190
2015	1,190

*Combined goal for single family, multi family, and commercial direct installations.

IMPLEMENTATION COST

Costs Per Rebate and Per AF of Water Savings: Program costs vary by fixture type and customer class. Expected program costs per fixture (including marketing and administration) and per AF of water savings are shown below.

Customer Class/ Fixture	Program Cost ($/Install)	Water Savings ($/AF)
Single Family	$400	$1,090
Multi Family	$270	$410
Comm. Toilet	$500	$1,250
Comm. Urinal	$240	$1,030

*Rounded to nearest $10.

Year	Annual Program Cost
2011	$173,600
2012	$180,400
2013	$180,400
2014	$436,900
2015	$436,900
Five-Year Cost	**$1,408,200**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected annual and lifetime water savings per fixture and for the five-year program are shown below.

Customer Class/ Fixture	Unit Savings (gal/yr)	Lifetime Savings (AF/Installation)
Single Family	10,100	0.6
Multi Family	17,600	1.1
Comm. Toilet	10,900	0.7
Comm. Urinal	6,200	0.4

*Unit savings rounded to nearest 100 gal.

Year	Program Water Savings (AF)
2011	16.9
2012	33.6
2013	49.6
2014	85.8
2015	120.5
Five-Year Total Savings	**306.4**

Residential & Commercial Survey Program

Palos Verdes District

Program Description

This program will provide residential and non-residential water use surveys to Cal Water customers. Residential surveys will evaluate a customer's indoor and outdoor water use and provide information on how to reduce household water use. Customers will receive a report with specific water saving recommendations as well as information on available Cal Water conservation rebate programs that may benefit them. Multi family and commercial surveys will be used to assist high-bill customers, as well as to screen potential properties for the bathroom fixture direct installation program (if available in the district).

Surveys will be conducted by trained professionals. Cal Water will centrally administer the program as part of a company-wide program.

Program Marketing

This program will be available to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Survey Goal
2011	370
2012	370
2013	370
2014	550
2015	550

*Combined surveys for single family, multi family, and commercial customers.

IMPLEMENTATION COST

Costs Per Rebate and Per AF of Water Savings: Program costs vary by fixture type and customer class. Expected program costs per fixture (including marketing and administration) and per AF of water savings are shown below.

Customer Class	Program Cost ($/Survey)	Water Savings ($/AF)
Single Family	$210	$1,470
Multi Family	$930	$1,300
Non-Residential	$1,070	$560

*Cost rounded to nearest dollar. Water savings cost rounded to nearest $10. Multi family program cost is per property complex.

Year	Annual Program Cost
2011	$92,100
2012	$92,100
2013	$92,100
2014	$138,000
2015	$138,000
Five-Year Cost	**$552,300**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected water savings per fixture vary by customer class. Projected savings per fixture, and annual and lifetime program water savings are shown below.

Customer Class	Unit Savings (gal/yr)	Lifetime Savings (AF/Survey)
Single Family	12,300	0.2
Multi Family	61,700	0.8
Non-Residential	109,700	1.4

*Unit savings rounded to nearest 100 gal/yr.

Year	Water Savings (AF)
2011	17.8
2012	33.8
2013	48.2
2014	70.0
2015	89.7
Five-Year Savings	**259.5**

Residential Conservation Kit Distribution Program

Palos Verdes District

Program Description

This program will offer Cal Water residential customers conservation kits featuring a range of water-saving plumbing retrofit fixtures. Kits will be available at no charge to customers, who can request them via Cal Water's website, via mail, or by contacting or visiting their district.

Each kit can include up to two of each of the following items: high-efficiency showerhead, kitchen faucet aerator, bathroom faucet aerator, full-stop hose nozzle, and toilet leak detection tablets. Customers may customize items and quantities included in their kit.

Cal Water will centrally administer this program as part of a company-wide program operated in each of its 24 service districts.

Year	Kits Distributed
2011	780
2012	780
2013	780
2014	780
2015	780

Program Marketing

This program will be available to all residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and through its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

IMPLEMENTATION COST

Costs Per Nozzle and Per AF of Water Savings: Bulk purchasing will help keep program costs low. Kit distribution costs about $29/kit, including the costs for the kit, marketing, and administration.

Fixture	Program Cost ($/Kit)	Water Savings ($/AF)
Residential Conservation Kit	$29	$550

*Water savings cost rounded to nearest $10.

Year	Annual Program Cost
2011	$23,700
2012	$23,700
2013	$23,700
2014	$23,700
2015	$23,700
Five-Year Cost	**$118,500**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Kit and Program Savings: Projected savings per kit are based on prior program experience and assume a 50% to 60% installation rate for each device included in the kit. Annual and lifetime savings per kit and for the five-year program are shown below.

Fixture	Unit Savings (gal/yr)	Lifetime Savings (gal/Kit)
Residential Conservation Kit	5,100	25,500

*Unit savings rounded to nearest 100 gal/yr. Savings assumed to last five years.

Year	Water Savings (AF)
2011	12.2
2012	22.9
2013	32.3
2014	40.6
2015	47.9
Five-Year Total Savings	**155.9**

Sprinkler Nozzle Distribution Program

Palos Verdes District

Program Description

Water efficient sprinkler nozzles use up to 20% less water than a standard sprinkler head by distributing water more slowly and uniformly to the landscape. In addition to reducing water use, water directed from these nozzles reduces run-off onto streets and sidewalks with a more directed flow.

Customers will be able to obtain the nozzles either directly through Cal Water or via a web-voucher program. Restrictions on the number of nozzles individual customers may receive will vary by customer class and/or landscape size.

Cal Water will centrally administer this program as part of a company-wide program operated in each of its 24 service districts.

Program Marketing

This program will be available to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Nozzles Distributed
2011	9,300
2012	9,300
2013	9,300
2014	9,300
2015	9,300

IMPLEMENTATION COST

Costs Per Nozzle and Per AF of Water Savings: Bulk purchasing will help keep program costs low. Nozzles are expected to cost about $3/nozzle. Program marketing and administration is estimated at under $1/nozzle.

Fixture	Program Cost ($/Nozzle)	Water Savings ($/AF)
Sprinkler Nozzle	$4	$190

*Fixture cost rounded to nearest dollar. Water savings cost rounded to nearest $10.

Year	Annual Program Cost
2011	$34,500
2012	$34,500
2013	$34,500
2014	$34,500
2015	$34,500
Five-Year Cost	**$172,500**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Nozzle and Program Savings: Projected savings per nozzle, and annual and lifetime program water savings are shown below. These estimates are based on Metropolitan Water District's Save Water-Save A Buck program estimates.

Fixture	Unit Savings (gal/yr)	Lifetime Savings (gal)
Sprinkler Nozzle	1,300	6,500

*Unit savings rounded to nearest 100 gal/yr. Nozzles assumed to have a five-year useful life.

Year	Water Savings (AF)
2011	37.2
2012	74.4
2013	111.6
2014	148.7
2015	185.9
Five-Year Total Savings	**557.8**

Smart Irrigation Controller Distribution Program

Palos Verdes District

Program Description

Weather-based "smart" irrigation controllers allow for more accurate, customized irrigation by automatically adjusting the schedule and amount of water in response to changing weather conditions. Empirical studies have shown savings of 15% to 25% of irrigation water use.

This program will target residential and non-residential customers with high landscape water use. The program will offer incentives to either the customer or contractor for proper installation of the Smart Controller at customer sites.

The landscape contractor has the direct relationship with customers and is typically the entity customers listen to when making landscape and irrigation decisions. The program will educate contractors about the customer benefits of Smart Controllers along with proper installation of the devices.

Program Marketing

This program will be offered to all residential and non-residential customers. Cal Water will market the program through direct mail, print media, bill stuffers, and its website. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Distribution Goal
2011	20
2012	20
2013	20
2014	530
2015	530

IMPLEMENTATION COST

Costs Per Rebate and Per AF of Water Savings: Program costs vary by rebate and customer class. Expected program costs per rebate (including marketing and administration) and per AF of water savings are shown below.

Customer Class	Program Cost ($/Rebate)	Water Savings ($/AF)
Single Family	$480	$2,510
Multi Family	$480	$1,350
Non-Residential	$480	$1,350

*Rebate cost rounded to nearest dollar. Water savings cost rounded to nearest $10.

Year	Annual Program Cost
2011	$5,800
2012	$5,800
2013	$5,800
2014	$255,400
2015	$255,400
Five-Year Cost	**$528,200**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Rebate and Program Savings: Projected water savings per rebate vary by customer class. Projected savings per rebate, and annual and lifetime program water savings are shown below.

Customer Class	Unit Savings (gal/yr)	Lifetime Savings (AF/Rebate)
Single Family	7,000	0.2
Multi Family	13,000	0.4
Non-Residential	13,000	0.4

*Unit savings rounded to nearest 100 gal/yr.

Year	Water Savings (AF)
2011	0.5
2012	1.0
2013	1.4
2014	13.1
2015	24.8
Five-Year Total Savings	**40.8**

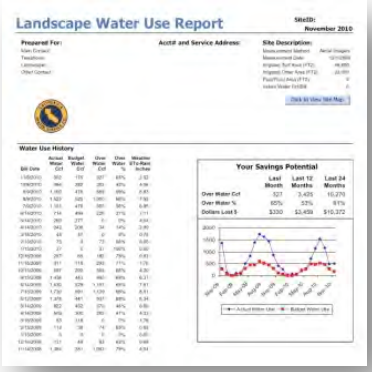
Large Landscape Water Use Report Program

Palos Verdes District

Program Description

A landscape water budget calculates the recommended amount of water for irrigation based on landscape size, plant mix, weather, and season. Empirical studies have shown that providing customers with landscape budgets can reduce irrigation water use by 10% to 20%.

This program will provide participating large landscape customers monthly reports comparing actual landscape water use to their budget. The reports will show whether irrigation is excessive and how much the customer's water costs could fall by irrigating more efficiently. Customers having trouble staying within budget may request a large landscape site evaluation and may be eligible for landscape equipment incentives.



Program Marketing

Cal Water is already implementing this program in several districts. The program will be expanded to more customers in these districts and extended to other districts. Satellite imagery and billing data are used to identify good candidates for the program. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Participating Large Landscapes
2011	50
2012	50
2013	50
2014	100
2015	100

IMPLEMENTATION COST

Costs per Property and per AF of Water Savings: Expected program costs per property (including marketing and administration) and per AF of water savings are shown below. Costs per property include the amortized one-time cost to measure the property's landscape area and set up the budget.

Customer Type	Program Cost ($/Yr/Property)	Water Savings ($/AF)
Customers with Significant Landscape Area	$60	$900

*rounded to nearest $10.

Year	Annual Program Cost
2011	$3,400
2012	$3,400
2013	$3,400
2014	$6,800
2015	$6,800
Five-Year Cost	**$23,800**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Program Savings: Projected average annual and lifetime water savings per property are shown below. Cumulative program water savings over five-years are also shown.

Customer Type	Unit Savings (gal/yr)	Lifetime Savings (AF)
Customers with Significant Landscape Area	24,700	1.9

*Unit savings rounded to nearest 100 gallons. Lifetime savings calculated

Year	Water Savings (AF)
2011	3.8
2012	3.8
2013	3.8
2014	7.6
2015	7.6
Five-Year Total Savings	**26.6**

Large Landscape Surveys

Palos Verdes District

Program Description

This program will provide landscape water use evaluations, recommendations, and education to commercial and industrial customers with significant landscaped area.

Participating customers will receive a detailed assessment of the water use efficiency of their current landscape and irrigation system. Participants will receive a report summarizing the results of the assessment and recommended changes to irrigation systems and practices.

Program Marketing

Cal Water is already implementing this program in several districts. The program will be expanded to more customers in these districts and extended to other districts. This program will target HOA, apartment complex, commercial, and industrial properties with significant landscape water use. Customers participating in Cal Water's Landscape Water Use Report program will be the primary targets for program participation. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Participating Large Landscapes
2011	10
2012	10
2013	10
2014	10
2015	10

IMPLEMENTATION COST

Costs per Property and per AF of Water Savings: Expected program costs per survey (including marketing and administration) and per AF of water savings are shown below.

Target Participant	Program Cost ($/Survey)	Water Savings ($/AF)
Customers with Significant Landscape Area	$1,400	$1,170

*rounded to nearest $10.

Year	Annual Program Cost
2011	$7,400
2012	$7,400
2013	$7,400
2014	$7,400
2015	$7,400
Five-Year Cost	**$37,000**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Program Savings: Projected average annual and lifetime water savings per survey are shown below. Cumulative program water savings over five-years are also shown.

Target Participant	Unit Savings (gal/yr)	Lifetime Savings (AF/Survey)
Customers with Significant Landscape Area	84,800	1.3

*Unit savings rounded to nearest 100 gallons.

Year	Water Savings (AF)
2011	1.3
2012	2.6
2013	3.9
2014	5.2
2015	6.5
Five-Year Total Savings	**19.5**

Irrigation System Rebates

Palos Verdes District

Program Description

This program will provide customized irrigation system rebates to commercial and industrial customers with significant landscaped area.

Participating customers can receive rebates on a variety of irrigation system equipment and changes to landscape, including commercial-grade weather-based controllers, rotating sprinkler nozzles, and replacement of turf or other high-water use landscape with climate-appropriate low-water use landscape. Eligibility and rebate amounts will be determined on a customer-by-customer basis.

Program Marketing

This program will target HOA, apartment complex, commercial, and industrial properties with significant landscape water use. The program will be marketed primarily through direct mail and via landscape contractor networks. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Participating Customers
2011	20
2012	20
2013	20
2014	20
2015	20

IMPLEMENTATION COST

Costs per Rebate and per AF of Water Savings: Expected program costs per rebate (including marketing and administration) and per AF of water savings are shown below. Individual rebate amounts will vary by participant. The amount shown below is the average rebate amount across all expected participants.

Target Participant	Program Cost ($/Rebate)	Water Savings ($/AF)
Customers with Significant Landscape Area	$520	$470

*rounded to nearest $10.

Year	Annual Program Cost
2011	$9,400
2012	$9,400
2013	$9,400
2014	$9,400
2015	$9,400
Five-Year Cost	**$47,000**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Program Savings: Projected average annual and lifetime water savings per rebate are shown below. Cumulative program water savings over five-years are also shown.

Target Participant	Unit Savings (gal/yr)	Lifetime Savings (AF/Rebate)
Customers with Significant Landscape Area	42,400	1.3

*Unit savings rounded to nearest 100 gallons.

Year	Water Savings (AF)
2011	2.3
2012	4.5
2013	6.8
2014	9.0
2015	11.3
Five-Year Total Savings	**33.9**

Commercial Kitchen Rebate Program

Palos Verdes District

Program Description

Potential water savings in commercial kitchens are significant. However, financial barriers often prevent these facilities from taking simple steps to improve water use efficiency.

This program will provide financial incentives for high-efficiency commercial dishwashers, food steamers, ice machines, and pre-rinse spray valves. The program will target commercial and institutional customers with significant kitchen water use.

Cal Water will centrally administer the program. The program will be offered in all Cal Water Districts starting in 2014.

Program Marketing

Cal Water will market this program through direct mail campaigns and its website. Commercial customers with significant kitchen water use participating in Cal Water's commercial survey program will be directed to the program as well. Expected program participation levels (rounded up to nearest 10 units) are shown in the table to the right.

Year	Rebate Goal
2011	0
2012	0
2013	0
2014	20
2015	20

IMPLEMENTATION COST

Costs per Rebate and per AF of Water Savings: Expected program costs per rebate (including marketing and administration) and per AF of water savings are shown below.

Customer Target	Program Cost ($/Rebate)*	Water Savings ($/AF)*
Commercial Kitchens	$470	$380

*Rounded to nearest $10. Average cost per rebate or AF based on expected mix of devices rebated.

Year	Annual Program Cost
2011	$ 0
2012	$ 0
2013	$ 0
2014	$6,200
2015	$5,100
Five-Year Cost	**$11,300**

*Annual cost rounded to nearest $100.

WATER SAVINGS

Fixture and Program Savings: Projected annual and lifetime water savings per fixture and from program implementation are shown below.

Customer Target	Unit Savings (gal/yr)*	Lifetime Savings (AF/Rebate)
Commercial Kitchens	48,500	1.5

*Rounded to nearest 100 gallons. Average for expected mix of devices rebated.

Year	Water Savings (AF)
2011	0.0
2012	0.0
2013	0.0
2014	1.8
2015	3.6
Five-Year Total Savings	**5.4**

Appendix 2
Conservation Program Modeling Results

Table A- 1. Palos Verdes District Minimum Activity Level Constraints

Activity ID	Activity Name	Customer Class	2011	2012	2013	2014	2015
1	HE Toilets: Cust Rebates or Vouchers	Single Family	113	113	113	113	113
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	15	15	15	15	15
3	HE Toilets: Cust Rebates or Vouchers	Commercial	10	10	10	10	10
4	Clotheswasher: Cust Reb or Voucher	Single Family	114	114	114	114	114
5	CW common: Cust Reb or Voucher	Multi Family	1	1	1	1	1
6	CW in-unit: Cust Reb or Voucher	Multi Family	8	8	8	8	8
7	CW coin-op: Cust Reb or Voucher	Commercial	0	0	0	0	0
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	0	0	0	0	0
9	HE Toilets: Direct Install	Single Family	70	70	70	70	70
10	HE Toilets: Direct Install	Multi Family	25	25	25	25	25
11	HE Toilets: Direct Install	Commercial	25	25	25	25	25
12	Urinals: Direct Install	Commercial	25	25	25	25	25
13	Audits & Surveys (incl high bill contacts)	Single Family	125	125	125	125	125
14	Audits & Surveys (incl high bill contacts)	Multi Family	1	1	1	1	1
15	Audits & Surveys (incl high bill contacts)	Commercial	2	2	2	2	2
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	2,325	2,325	2,325	2,325	2,325
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	388	388	388	388	388
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	388	388	388	388	388
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	180	180	180	180	180
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	20	20	20	20	20
21	WBIC Vendor, Dist, & Cont Inc	Single Family	0	0	0	0	0
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	0	0	0	0	0
23	WBIC Vendor, Dist, & Cont Inc	Commercial	0	0	0	0	0
24	Large Landscape Water Use Reports	Irrigation	50	50	50	100	100
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	2	2	2	2	2
26	Comm Irrigation System: Rebates	Commercial	4	4	4	4	4
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	0	0	0	1	1
28	Food Steamers: Cust Rebates	Commercial	0	0	0	1	1
29	Pre-Rinse Spray Valves: Cust rebates	Commercial	0	0	0	1	1
30	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	2	2	2	0	0
31	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	1	1	1	0	0

Table A- 2. Palos Verdes District Maximum Activity Level Constraints

Activity ID	Activity Name	Customer Class	2011	2012	2013	2014	2015
1	HE Toilets: Cust Rebates or Vouchers	Single Family	452	452	452	683	683
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	104	104	104	158	158
3	HE Toilets: Cust Rebates or Vouchers	Commercial	70	70	70	106	106
4	Clotheswasher: Cust Reb or Voucher	Single Family	456	456	456	456	456
5	CW common: Cust Reb or Voucher	Multi Family	8	8	8	8	8
6	CW in-unit: Cust Reb or Voucher	Multi Family	34	34	34	34	34
7	CW coin-op: Cust Reb or Voucher	Commercial	0	0	0	0	0
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	0	0	0	0	0
9	HE Toilets: Direct Install	Single Family	452	452	452	683	683
10	HE Toilets: Direct Install	Multi Family	104	104	104	158	158
11	HE Toilets: Direct Install	Commercial	94	94	94	142	142
12	Urinals: Direct Install	Commercial	200	200	200	200	200
13	Audits & Surveys (incl high bill contacts)	Single Family	342	342	342	513	513
14	Audits & Surveys (incl high bill contacts)	Multi Family	5	5	5	7	7
15	Audits & Surveys (incl high bill contacts)	Commercial	14	14	14	22	22
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	6,975	6,975	6,975	6,975	6,975
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	1,162	1,162	1,162	1,162	1,162
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	1,162	1,162	1,162	1,162	1,162
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	727	727	727	727	727
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	52	52	52	52	52
21	WBIC Vendor, Dist, & Cont Inc	Single Family	342	342	342	512	512
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	6	6	6	8	8
23	WBIC Vendor, Dist, & Cont Inc	Commercial	6	6	6	8	8
24	Large Landscape Water Use Reports	Irrigation	100	100	100	100	100
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	5	5	5	5	5
26	Comm Irrigation System: Rebates	Commercial	17	17	17	17	17
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	0	0	0	6	6
28	Food Steamers: Cust Rebates	Commercial	0	0	0	1	1
29	Pre-Rinse Spray Valves: Cust rebates	Commercial	0	0	0	5	5
30	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	7	2	2	0	0
31	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	1	1	1	0	0

Table A- 3. Palos Verdes District Program Savings and Cost Assumptions

Activity ID	Activity Name	Customer Class	Unit Savings (gal/yr)	Useful Life (yrs)	Free Riders (%)	Unit Costs ($)	Annual Natural Replacement Rate (%)
1	HE Toilets: Cust Rebates or Vouchers	Single Family	8,437 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household Assumes that replaced toilets are 25% ULFTs, 75% non ULFTS.	25		$140.00 ---------- $100 rebate + $40 administration	4.00%
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	14,803 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household Assumes that replaced toilets are 25% ULFTs, 75% non ULFTS.	25		$125.00 ---------- $100 rebate + $25 administration	4.00%
3	HE Toilets: Cust Rebates or Vouchers	Commercial	9,134 ---------- CUWCC CII Toilet Savings Study and Zip Code Toilet Inventory. Assumes 25% of replaced toilets are ULFTs and 75% are not ULFTs.	25		$240.00 ---------- $200 rebate + $40 administration	4.00%
4	Clotheswasher: Cust Reb or Voucher	Single Family	7,079 ---------- CUWCC Cost and Savings Study, revised 2005.	12	20%	$165.00 ---------- $125 rebate + $40 administration	4.00%
5	CW common: Cust Reb or Voucher	Multi Family	25,310 ---------- Alliance for Water Efficiency Guide, p. 136.	8		$440.00 ---------- $400 rebate + $40 administration	4.17%
6	CW in-unit: Cust Reb or Voucher	Multi Family	5,244 ---------- CUWCC Cost and Savings Study, revised 2005.	12	20%	$165.00 ---------- $125 rebate + $40 administration	4.17%
7	CW coin-op: Cust Reb or Voucher	Commercial	31,435 ---------- Alliance for Water Efficiency Guide, p. 159.	8		$440.00 ---------- $400 rebate + $40 administration	4.17%
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	9,310 ---------- Savings estimate for 0.5 gpf urinal from Alliance for Water Efficiency Library. Savings for 0.25 gpf urinal is 1.5 x the AWE figure.	25		$340.00 ---------- $300 rebate + $40 administration	4.00%
9	HE Toilets: Direct Install	Single Family	10,054 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household. Based on Cal Water's existing direct install program, assumes that replaced toilets are 10% ULFTs, 50% 5 gpf and 40% 3.5 gpf.	25		$384.50 ---------- Based on Cal Water program experience.	4.00%
10	HE Toilets: Direct Install	Multi Family	17,640 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household. Based on Cal Water's existing direct install program, assumes that replaced toilets are 10% ULFTs, 50% 5 gpf and 40% 3.5 gpf.	25		$254.50 ---------- Based on Cal Water program experience.	4.00%
11	HE Toilets: Direct Install	Commercial	10,884 ---------- Based on toilet savings formula in CUWCC Costs & Savings Study. Varies with persons per household. Based on Cal Water's existing direct install program, assumes that replaced toilets are 10% ULFTs, 50% 5 gpf and 40% 3.5 gpf.	25		$479.50 ---------- Based on Cal Water program experience.	4.00%
12	Urinals: Direct Install	Commercial	6,207 ---------- Alliance for Water Efficiency Library.	25		$224.50 Based on experience of other water utilities.	4.00%

13	Audits & Surveys	Single Family	11,753 ---------- Chesnutt, T.W., C. N. McSpadden, and D. M. Pekelney, "What is the Reliable Yield from Residential Home Water Survey Programs? The Experience of the Los Angeles Department of Water and Power", Proceedings of the American Water Works Association Conference in Anaheim, June 1995.	5		$201.50 ---------- Whitcomb, J. Residential Water Survey Evaluation, Contra Costa Water District, May 2000	
14	Audits & Surveys	Multi Family	58,721 ---------- Assumes 5% of per-acct usage	5		$886.82 ---------- Based on $56 per AF of annual per-acct usage.	
15	Audits & Surveys	Commercial	104,455 ---------- Based on AWWARF, *Water Use Efficiency in IRP*, pg 155-58, CII typical survey savings potential is around 15%. Assuming half of recommended conservation activiies are complfeted, this results in 7.5% savings per audit.	10		$1,016.50 ---------- Based on AWWARF, Water Use Efficiency in IRP, pg 155-58,	
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	1,303 ---------- Source: MWDSC Save Water - Save A Buck program assumptions.	5		$3.53 ---------- $3 per nozzle material cost + $0.5 per nozzle marketing cost + $0.03 per nozzle to cover fixed setup costs.	
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	1,303 ---------- Source: MWDSC Save Water - Save A Buck program assumptions.	5		$3.53 ---------- $3 per nozzle material cost + $0.5 per nozzle marketing cost + $0.03 per nozzle to cover fixed setup costs.	
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	1,303 ---------- Source: MWDSC Save Water - Save A Buck program assumptions.	5		$3.53 ---------- $3 per nozzle material cost + $0.5 per nozzle marketing cost + $0.03 per nozzle to cover fixed setup costs.	
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	5,091 ---------- Based on Cal Water program experience: 2,628 gpy showerhead 821 gpy kitchen aerator 1,642 gpy bathroom aerator	5		$29.00 ---------- Based on Cal Water program experience: $26 for kit + $3 for marketing	12.00%
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	5,091 ---------- Based on Cal Water program experience: 2,628 gpy showerhead 821 gpy kitchen aerator 1,642 gpy bathroom aerator	5		$29.00 ---------- Based on Cal Water program experience: $26 for kit + $3 for marketing	12.00%
21	WBIC Vendor, Dist, & Cont Inc	Single Family	7,036 ---------- Based on district-specific landscape savings model.	10		$460.00 ---------- Required vendor incentive assumed to be less than estimated $530 customer rebate.	
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	13,011 ---------- Based on district-specific landscape savings model.	10		$460.00 ---------- Required vendor incentive assumed to be less than estimated $530 customer rebate.	

23	WBIC Vendor, Dist, & Cont Inc	Commercial	13,011 ---------- Based on district-specific landscape savings model.	10		$460.00 ---------- Required vendor incentive assumed to be less than estimated $530 customer rebate.	
24	Large Landscape Water Use Reports	Irrigation	24,680 ---------- Based on district-specific landscape savings model.	1		$64.99 ---------- Set up cost of $142 amortized over 10 years, plus $48/year report cost.	
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	84,817 ---------- Based on district-specific landscape savings model.	5		$1,400.00	
26	Comm Irrigation System: Rebates	Commercial	42,409 ---------- Based on district-specific landscape savings model.	10		$515.00	
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	57,757 ---------- Source: Alliance for Water Efficiency Library	20		$330.00 ---------- Source: Alliance for Water Efficiency Library. Incentive is half the cost difference between conventional and water-efficient machines.	
28	Food Steamers: Cust Rebates	Commercial	81,407 ---------- Source: MOU pp. 45-46.	10		$2,411.00 ---------- Half of average fixture cost from industry sources + marketing + admin cost	
29	Pre-Rinse Spray Valves: Cust rebates	Commercial	28,285 Industry sources	5		$110.00 Half of estimated fixture cost + admin	
30	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	336,129 ---------- Source: MOU pp. 45-46.	5		$1,000.00 ---------- Based on Cal Water program experience.	
31	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	1,296,502 ---------- Source: MOU pp. 45-46.	5		$3,810.00 Industry data + admin costs	

Table A- 4. Palos Verdes District Program Activity Levels

Activity ID	Program	Class	Annual Activity Levels				
			2011	2012	2013	2014	2015
1	HE Toilets: Cust Rebates or Vouchers	Single Family	452	452	452	683	683
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	104	104	104	158	158
3	HE Toilets: Cust Rebates or Vouchers	Commercial	70	70	70	106	106
4	Clotheswasher: Cust Reb or Voucher	Single Family	456	456	456	456	456
5	CW common: Cust Reb or Voucher	Multi Family	8	8	8	8	8
6	CW in-unit: Cust Reb or Voucher	Multi Family	8	8	8	34	34
7	CW coin-op: Cust Reb or Voucher	Commercial	0	0	0	0	0
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	0	0	0	0	0
9	HE Toilets: Direct Install	Single Family	213	230	230	683	683
10	HE Toilets: Direct Install	Multi Family	104	104	104	158	158
11	HE Toilets: Direct Install	Commercial	25	25	25	142	142
12	Urinals: Direct Install	Commercial	200	200	200	200	200
13	Audits & Surveys (incl high bill contacts)	Single Family	342	342	342	513	513
14	Audits & Surveys (incl high bill contacts)	Multi Family	5	5	5	7	7
15	Audits & Surveys (incl high bill contacts)	Commercial	14	14	14	22	22
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	6,975	6,975	6,975	6,975	6,975
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	1,162	1,162	1,162	1,162	1,162
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	1,162	1,162	1,162	1,162	1,162
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	727	727	727	727	727
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	52	52	52	52	52
21	WBIC Vendor, Dist, & Cont Inc	Single Family	0	0	0	512	512
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	6	6	6	8	8
23	WBIC Vendor, Dist, & Cont Inc	Commercial	6	6	6	8	8
24	Large Landscape Water Use Reports	Irrigation	50	50	50	100	100
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	5	5	5	5	5
26	Comm Irrigation System: Rebates	Commercial	17	17	17	17	17
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	0	0	0	6	6
28	Food Steamers: Cust Rebates	Commercial	0	0	0	1	1
29	Pre-Rinse Spray Valves: Cust rebates	Commercial	0	0	0	5	5
30	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	7	2	2	0	0
31	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	1	1	1	0	0

Table A- 5. Palos Verdes District Program Costs

Activity ID	Program	Class	Annual Cost				
			2011	2012	2013	2014	2015
1	HE Toilets: Cust Rebates or Vouchers	Single Family	$63,263	$63,263	$63,263	$95,674	$95,674
2	HE Toilets: Cust Rebates or Vouchers	Multi Family	$13,029	$13,029	$13,029	$19,703	$19,703
3	HE Toilets: Cust Rebates or Vouchers	Commercial	$16,800	$16,800	$16,800	$25,440	$25,440
4	Clotheswasher: Cust Reb or Voucher	Single Family	$75,265	$75,265	$75,265	$75,265	$75,265
5	CW common: Cust Reb or Voucher	Multi Family	$3,638	$3,638	$3,638	$3,638	$3,638
6	CW in-unit: Cust Reb or Voucher	Multi Family	$1,385	$1,385	$1,385	$5,565	$5,565
7	CW coin-op: Cust Reb or Voucher	Commercial	$0	$0	$0	$0	$0
8	Urinals (0.25 gpf): Cust Rebates or Vouchers	Commercial	$0	$0	$0	$0	$0
9	HE Toilets: Direct Install	Single Family	$81,866	$88,337	$88,337	$262,761	$262,761
10	HE Toilets: Direct Install	Multi Family	$26,526	$26,526	$26,526	$40,116	$40,116
11	HE Toilets: Direct Install	Commercial	$11,988	$11,988	$11,988	$68,085	$68,085
12	Urinals: Direct Install	Commercial	$44,900	$44,900	$44,900	$44,900	$44,900
13	Audits & Surveys (incl high bill contacts)	Single Family	$68,915	$68,915	$68,915	$103,276	$103,276
14	Audits & Surveys (incl high bill contacts)	Multi Family	$4,033	$4,033	$4,033	$6,044	$6,044
15	Audits & Surveys (incl high bill contacts)	Commercial	$14,682	$14,682	$14,682	$22,003	$22,003
16	High Efficiency Pop-Up Nozzle Web Voucher	Single Family	$24,622	$24,622	$24,622	$24,622	$24,622
17	High Efficiency Pop-Up Nozzle Web Voucher	Multi Family	$4,102	$4,102	$4,102	$4,102	$4,102
18	High Efficiency Pop-Up Nozzle Web Voucher	Commercial	$4,102	$4,102	$4,102	$4,102	$4,102
19	Showerhead/Aerator,Tablet Kit Dist	Single Family	$21,083	$21,083	$21,083	$21,083	$21,083
20	Showerhead/Aerator,Tablet Kit Dist	Multi Family	$1,522	$1,522	$1,522	$1,522	$1,522
21	WBIC Vendor, Dist, & Cont Inc	Single Family	$0	$0	$0	$235,713	$235,713
22	WBIC Vendor, Dist, & Cont Inc	Multi Family	$2,760	$2,760	$2,760	$3,680	$3,680
23	WBIC Vendor, Dist, & Cont Inc	Commercial	$2,760	$2,760	$2,760	$3,680	$3,680
24	Large Landscape Water Use Reports	Irrigation	$3,249	$3,249	$3,249	$6,499	$6,499

Activity ID	Program	Class	Annual Cost				
			2011	**2012**	**2013**	**2014**	**2015**
25	Lg Lndscp Surveys & Irrig Sys: Rebates	Irrigation	$7,000	$7,000	$7,000	$7,000	$7,000
26	Comm Irrigation System: Rebates	Commercial	$8,929	$8,929	$8,929	$8,929	$8,929
27	Dishwashers: Vendor, Dist & Cont Inc	Commercial	$0	$0	$0	$1,932	$1,932
28	Food Steamers: Cust Rebates	Commercial	$0	$0	$0	$3,452	$2,411
29	Pre-Rinse Spray Valves: Cust rebates	Commercial	$0	$0	$0	$554	$554
30	Cooling Tower Cond Cont: Cust Reb, Inc	Industrial	$7,083	$2,000	$2,000	$0	$0
31	Cooling Tower pH Cont: Cust Reb, Inc	Industrial	$5,397	$3,810	$3,810	$0	$0