California Water Service

2015 Urban Water Management Plan

Livermore District

June 2016

Table of Contents

List of Tables

List of Figures

List of Acronyms

AB	Assembly Bill
AF	Acre-Foot
AMI	Advanced Metering Infrastructure
AMR	Automatic Meter Reading
BCR	Benefit-Cost Ratio
BMP	Best Management Practice
CEHTP	California Environmental Health Tracking Program
CASGEM	California Statewide Groundwater Elevation Monitoring Program
CII	Commercial, Industrial, Institutional, water use sectors
CIMIS	California Irrigation Management Information System
CPUC	California Public Utilities Commission
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CWC	California Water Code
DMMs	Demand Management Measures
DOF	Department of Finance
DWR	Department of Water Resources
eARDWP	Electronic Annual Reports to the Drinking Water Program (SWRCB)
ETo	Reference Evapotranspiration
GIS	Geographic Information System
GPCD	Gallons per Capita per Day
IOU	Investor-Owned Utility
IRWM	Integrated Regional Water Management
LAFCO	Local Agency Formation Commission
MGD	Million Gallons Per Day
MOU	Memorandum of Understanding Regarding Urban Water Conservation
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
PWS	Public Water System
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SB X7-7	Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
SWRCB	State Water Resources Control Board
RUWMP	Regional Urban Water Management Plan
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
WARN	Water/Wastewater Agency Response Network
WDR	Waste Discharge Requirement
WRR	Water Recycling Requirement
WSCP	Water Shortage Contingency Plan

Chapter 1
Introduction and Overview

This chapter discusses the importance and uses of this Urban Water Management Plan (UWMP), the relationship of this plan to the California Water Code (CWC), the relationship of this plan to other local and regional planning efforts, and how this plan is organized.

This chapter contains the following sections:

1.1 Background and Purpose

California Water Service Company (Cal Water) is an investor-owned public utility supplying water service to 1.7 million Californians through 435,000 connections. Its 24 separate water systems serve 63 communities from Chico in the North to the Palos Verdes Peninsula in Southern California. California Water Service Group, Cal Water's parent company, is also serving water to communities in Washington, New Mexico and Hawaii. Rates and operations for districts located in California are regulated by the California Public Utilities Commission (CPUC). Rates are set separately for each of the systems.

The Livermore District was formed in 1927 with Cal Water's purchase of the water system from Pacific Gas and Electric Company. Water served by the District comes from local groundwater and local surface and imported water purchased from the Zone 7 Water District. The District delivers up to 20 million gallons of water per day to more than 18,000 service connections.

The UWMP is a foundational document and source of information about Livermore District's historical and projected water demands, water supplies, supply reliability and vulnerabilities, water shortage contingency planning, and demand management programs. Among other things, it is used as:

- A long-range planning document by Cal Water for water supply and system planning
- Source data on population, housing, water demands, water supplies, and capital improvement projects used in

- Regional water resource management plans prepared by wholesale water suppliers and other regional planning authorities,
- General Plans prepared by cities and counties,
- Statewide and broad regional water resource plans prepared by the California Department of Water Resources (DWR), State Water Resources Control Board (State Board or Board), or other state agencies.

UWMPs are updated every five years. The last update was completed in 2010. This document is an update to the 2010 UWMP and carries forward information from that plan that remains current and is relevant to this plan. Although this plan is an update to the 2010 UWMP, it was developed to be a self-contained, stand-alone document and does not require readers to reference information contained in previous updates.

1.2 Urban Water Management Planning and the California Water Code

The UWMP Act requires urban water suppliers to prepare an UWMP every five years and to file this plan with the DWR, the California State Library, and any city or county within which the supplier provides water supplies. All urban water suppliers, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet annually are required to prepare an UWMP (CWC §10617).

The UWMP Act was enacted in 1983. Over the years it has been amended in response to water resource challenges and planning imperatives confronting California. A significant amendment was made in 2009 as a result of the governor's call for a statewide 20 percent reduction in urban water use by 2020. Colloquially known as 20x2020, the Water Conservation Act of 2009 (also referred to as SB X7-7) required urban retail water suppliers to establish water use targets for 2015 and 2020 that would result in statewide water savings of 20 percent by 2020. Beginning in 2016, urban retail water suppliers are required to comply with the water conservation requirements in SB X7-7 in order to be eligible for state water grants or loans. Chapter 5 of this plan contains the data and calculations used to determine compliance with these requirements.

The UWMP Act contains numerous other requirements that an UWMP must satisfy. Appendix A to this plan lists each of these requirements and where in the plan they are addressed.

1.3 Relation to Other Planning Efforts

This plan provides information specific to water management and planning by the Livermore District. However, water management does not happen in isolation; there are other planning processes that integrate with the UWMP to accomplish urban planning.

Some of these plans include city and county General Plans, Water Master Plans, Recycled Water Master Plans, Integrated Regional Water Management Plans, Groundwater Management Plans, and others.

This plan is informed by and helps to inform these other planning efforts. In particular, this plan utilizes information contained in city and county General Plans and local and regional water resource plans to the extent data from these plans is applicable and available.

1.4 Plan Organization

The organization of this Plan follows the same sequence as outlined in 2015 UWMP Guidebook.

Chapter 1 - Introduction and Overview

Chapter 2- Plan Preparation

Chapter 3 - System Description

Chapter 4 - System Water Use

Chapter 5- Baselines and Targets

Chapter 6 - System Supplies

Chapter 7— Water Supply Reliability

Chapter 8 – Water Shortage Contingency Planning

Chapter 9 — Demand Management Measures

Chapter 10 — Plan Adoption, Submittal, and Implementation

In addition to these ten chapters, this plan includes a number of appendices providing supporting documentation and supplemental information. Pursuant to CWC §10644(a)(2), this plan utilizes the standardized forms, tables, and displays developed by DWR for the reporting of water use and supply information required by the UWMP Act. This plan also includes other tables, figures, and maps, to augment the set developed by DWR. The plan notes if a table, figure, or map is part of DWR's standardized set or supplemental to it.

Chapter 2
Plan Preparation

This chapter discusses the type of UWMP Livermore District is preparing and includes information that will apply throughout the plan. Coordination and outreach during the development of the plan is also discussed.

This chapter includes the following sections:

2.1 Basis for Preparing a Plan

2.2 Regional Planning and Reporting

2.3 Units of Measure

2.4 Coordination and Outreach

2.1 Basis for Preparing a Plan

Per CWC §10617, Livermore District is an urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. It is therefore obligated under CWC §10621(d) to update and submit its 2015 UWMP to DWR by July 1, 2016.

Livermore District is an urban retail water supplier, as defined by CWC §10608.12. Livermore District does not provide water at wholesale.

Livermore District operates the Public Water Systems (PWS) listed in Table 2-1. Public Water Systems are the systems that provide drinking water for human consumption and these systems are regulated by the State Water Resources Control Board (Board), Division of Drinking Water. The Board requires that water agencies report water usage and other information via the electronic Annual Reports to the Drinking Water Program (eARDWP). The information provided in this UWMP is consistent with the data reported in the eARDWP. PWS data reported to the Board is used by the state to determine whether or not a retail supplier has reached the threshold (3,000 or more connections or 3,000 acre-feet of water supplied) for submitting an UWMP.

Table 2-1: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015 (AF)
110003	Livermore	18,123	7,255
	Total	**18,123**	**7,255**

2.2 Regional Planning

Regional planning can deliver mutually beneficial solutions to all agencies involved by reducing costs for the individual agency, assessing water resources at the appropriate geographic scale, and allowing for solutions that cross jurisdictional boundaries. Cal Water participates in regional water resources planning initiatives throughout California in the regions in which its 25 water districts are located. Groundwater in the region is managed by the Zone 7 Water Agency. As part of a regional groundwater management plan, Cal Water has agreed to a Groundwater Pumping Quota of just over 3,000 acre-feet annually. More broadly, as a retail water supplier in the San Francisco Bay Area, Cal Water participated in the development of the San Francisco Bay Area Integrated Regional Water Management Plan.

2.3 Individual or Regional Planning and Compliance

Urban water suppliers may elect to prepare individual or regional UWMPs (CWC §10620(d)(1)). Livermore District is preparing an individual UWMP.

Urban retail water suppliers may report on the requirements of SB X7-7 (2009 California Conservation Act) individually or as a member of a "Regional Alliance." As described in Chapter 5, Livermore District is a member of a Regional Alliance and this UWMP provides information on the District's progress towards meeting its SB X7-7 water conservation targets both as an individual urban retail water supplier and as a member of a Regional Alliance.

Table 2-2: Plan Identification	
☑	Individual UWMP
☐	Regional UWMP
Notes: Livermore District is a member of a Regional Alliance. Chapter 5 provides information on the District's progress towards meeting its water conservation targets under SB X7-7 both as an individual urban retail water supplier and as a member of its Regional Alliance.	

2.4 Fiscal or Calendar Year and Units of Measure

Annual volumes of water reported in this UWMP are measured in acre-feet (AF) and are reported on a calendar year basis. Water use and planning data reported in this UWMP for calendar year 2015 cover the full twelve months of the year, as required by the UWMP Guidelines. Table 2-3 summarizes the units of measure used throughout this UWMP.

Table 2-3: Agency Identification	
Name of Agency	California Water Service: Livermore District
Select one or both	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year	
☑	UWMP Tables Are in Calendar Years
☐	UWMP Tables Are in Fiscal Years
Units of Measure	
☑	Acre Feet (AF)
☐	Million Gallons (MG)
☐	Hundred Cubic Feet (CCF)

2.5 Coordination and Outreach

Coordination with other water suppliers, cities, counties, and other community organizations in the region is an important part of preparing an UWMP (CWC §10620; CWC §10642). This section identifies the agencies and organizations Livermore District sought to coordinate with during preparation of this plan.

2.5.1 Wholesale and Retail Coordination

Urban retail water suppliers relying on one or more wholesalers for water supply are required to provide these wholesalers with information regarding projected water supply and demand. Livermore District provided information regarding projected water supply and demand to the wholesale water suppliers listed in Table 2-4.

Table 2-4: Retail: Water Supplier Information Exchange
Livermore District has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name
Zone 7 Water Agency

2.5.2 Coordination with Other Agencies and the Community

Livermore District coordinated with cities, counties, and other community organizations during preparation of this UWMP. Cal Water provided notice to these entities and the communities it serves 60 days prior to the public hearing it held on May 25, 2016, to present the draft of the UWMP, address questions, and receive comments. Cities and counties receiving the public hearing notification from Livermore District as required per CWC §10621 (b) are listed in Table 10-1 in Chapter 10 of this plan.

Chapter 3
System Description

This chapter provides a description of Livermore District's water system and the service area, including climate, population, and demographics, to help in understanding various elements of water supply and demand.

This chapter includes the following sections:

3.1 Service Area General Description

3.2 Service Area Map(s)

3.3 Service Area Climate

3.4 Service Area Population and Demographics

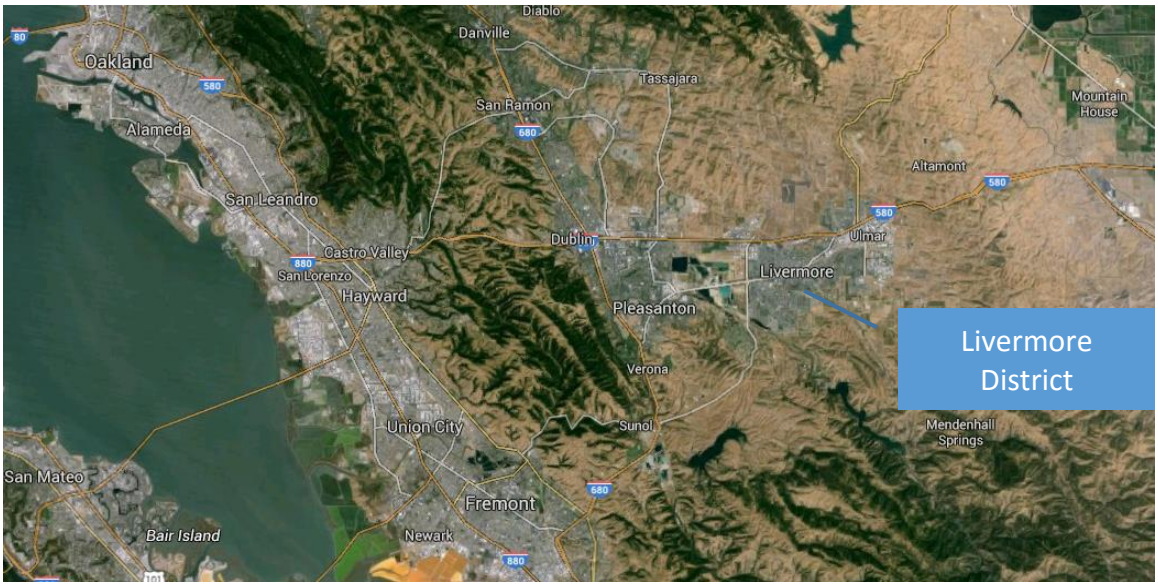
3.1 Service Area General Description

The Livermore District is located in eastern Alameda County, approximately thirty miles from downtown Oakland. The District is in the Livermore-Amador Valley, which is part of the Livermore sub-area of the San Francisco Bay Hydrologic Region. The service area encompasses approximately 48 percent of the area incorporated by the City of Livermore and accounts for approximately 69 percent of its population. The City of Livermore provides retail water service to the remainder of the city. The City of Pleasanton is located to the west and is served by that city's water department. The City of Dublin lies north of Pleasanton and is served by the Dublin San Ramon Services District (DSRSD). Figure 3-1 shows a general location map of the District.

Major geologic features of the region include the Calaveras Fault Zone, the Hayward Fault, Williams Fault, and Clayton-Marsh Creek-Greenville Fault. The San Andreas Fault system lies forty miles to the west of the District. This fault system can produce an earthquake of magnitude 8.0 on the Richter Scale, the Hayward Fault, which is located just fifteen miles to the west of Livermore presents one of the greatest earthquake hazards in California. A major earthquake on this fault could disrupt imported water deliveries leaving the Livermore District to rely on groundwater pumping.

The Livermore District was formed in 1927 with the purchase of the water system from Pacific Gas and Electric Company. Water served by the District comes from local groundwater and local surface and imported water purchased from the Zone 7 Water District. Over the last five years, the District delivered an average of 10 million gallons of water per day to more than 18,000 service connections.

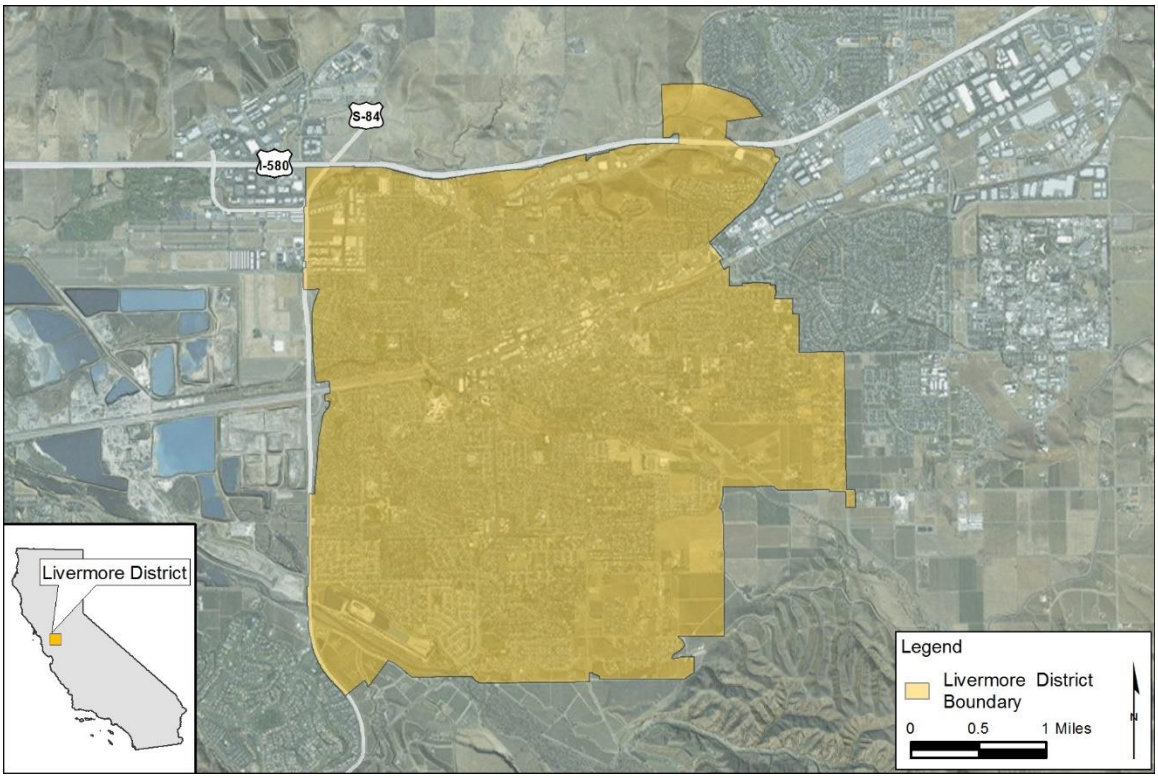
Figure 3-1. General Location of Livermore District



3.2 Service Area Maps

A detailed service area map is provided in Appendix E. Figure 3-2 shows the District's service area boundaries.

Figure 3-2. Livermore District Service Area Boundaries



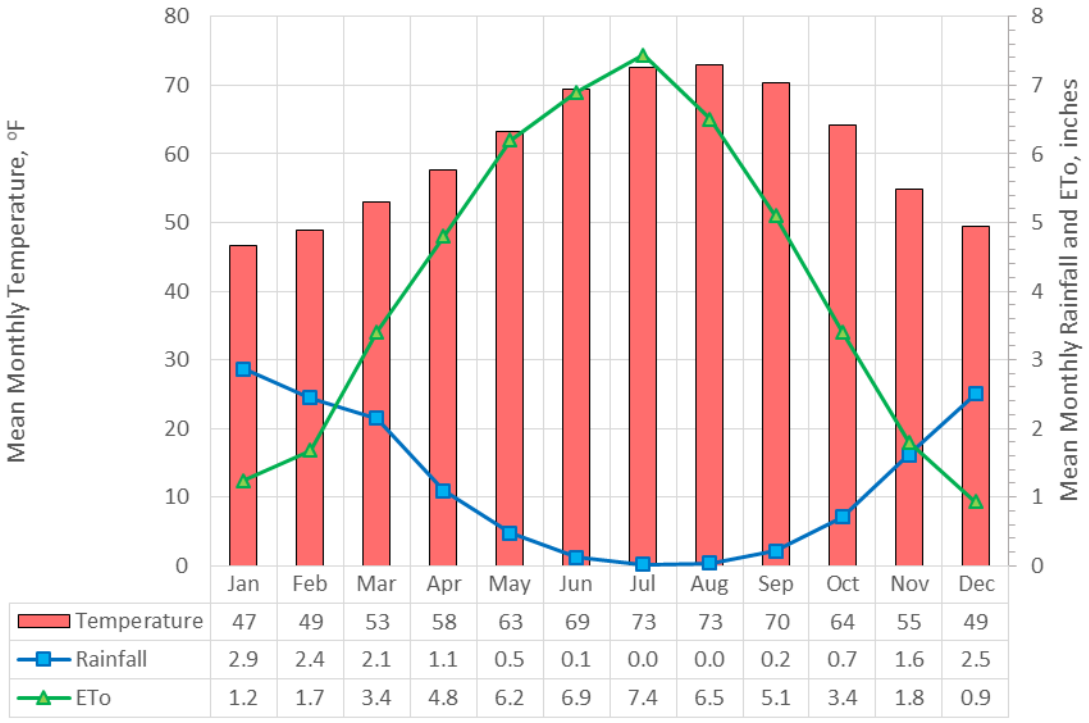
3.3 Service Area Climate

The climate for the Livermore District is moderate with hot dry summers and cool winters. The majority of precipitation falls during late autumn, winter, and spring. Figure 3-3 displays monthly averages for rainfall, reference evapotranspiration (ETo), and daily air temperature. Additional climate data is provided in Appendix F, worksheet 13. Rainfall and temperature data are obtained from the PRISM Climate Group.[1] ETo values are from the California Irrigation Management Information System (CIMIS).[2]

On average, the District receives 14 inches of rainfall, annually. ETo averages 49 inches, annually. Annual rainfall is 29 percent of ETo, on average. Nearly all irrigation requirements are met with District water sources due to the lack of rainfall in the region. Annual rainfall in Livermore District is highly variable, as shown in Figure 3-4, and has been below average in six of the last ten years. Calendar year 2013 was the driest year on record, receiving just 30 percent of average rainfall.

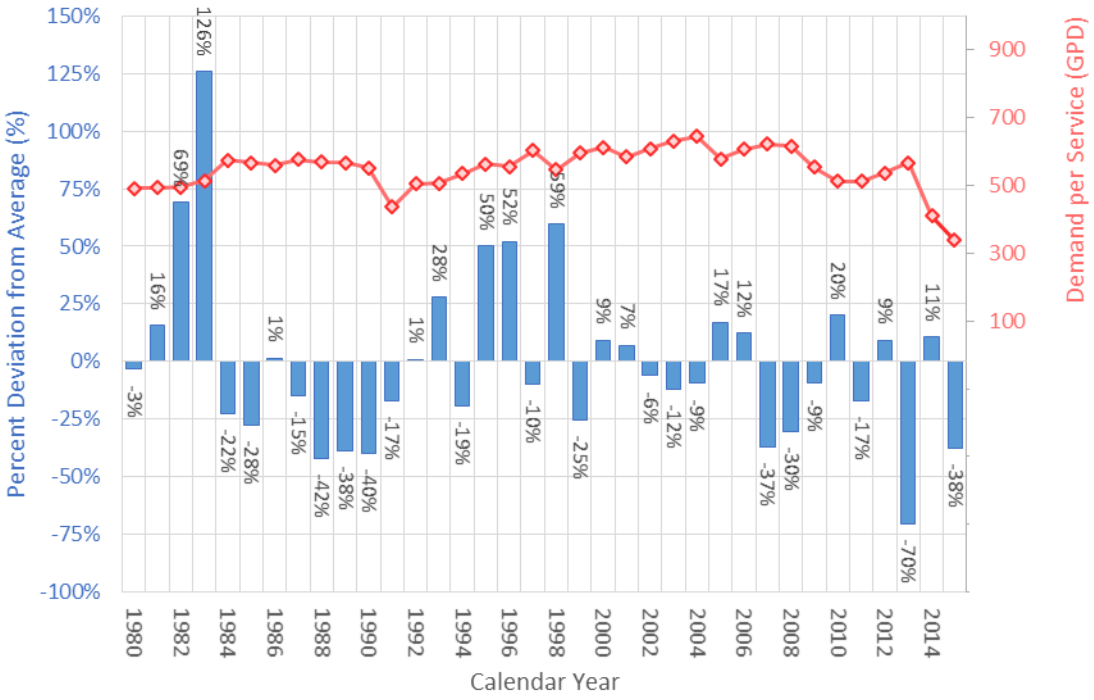
[1] www.prism.oregonstate.edu.
[2] CIMIS Zones Map, Zone 8.

Figure 3-3. Average Monthly Temperature, Rainfall, and ETo



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature	47	49	53	58	63	69	73	73	70	64	55	49
Rainfall	2.9	2.4	2.1	1.1	0.5	0.1	0.0	0.0	0.2	0.7	1.6	2.5
ETo	1.2	1.7	3.4	4.8	6.2	6.9	7.4	6.5	5.1	3.4	1.8	0.9

Figure 3-4. Annual Rainfall Deviation from Average



3.3.1 Climate Change

Potential impacts of climate change on District water demands and supplies are discussed in Chapters 4 (System Water Use), 6 (System Supplies), and 7 (Water Supply Reliability Assessment). Here it is noted that climate change is expected to bring higher average temperatures and greater variability in weather, with the potential for more frequent and deeper droughts.

The National Climatic Data Center (NCDC) has established 11 climate regions within California. Each region is defined by unique characteristics, and is shown in Figure 3-5. The Livermore District is located in the Sacramento-Delta Region (region E on the map). The Sacramento-Delta Region has experienced a general warming trend in the last several decades, as shown in Figure 3-6. Since 1895, maximum and minimum temperatures have increased at a rate of 1.64 °F and 2.64 °F per 100 years, respectively. More recently, since 1975, maximum and minimum temperatures have increased at a rate of 3.99 °F and 4.17 °F per 100 years, respectively.

Figure 3-5. Climate Regions of California

A. North Coast Region
B. North Central Region
C. Northeast Region
D. Sierra Region
E. Sacramento-Delta Region
F. Central Coast Region
G. San Joaquin Valley Region
H. South Coast Region
I. South Interior Region
J. Mojave Desert Region
K. Sonoran Desert Region

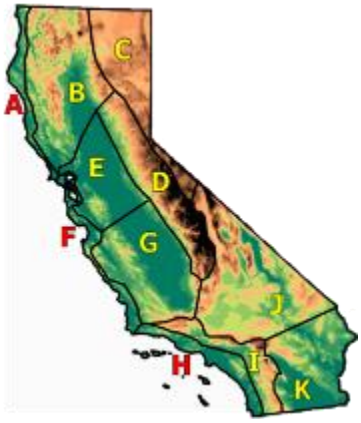
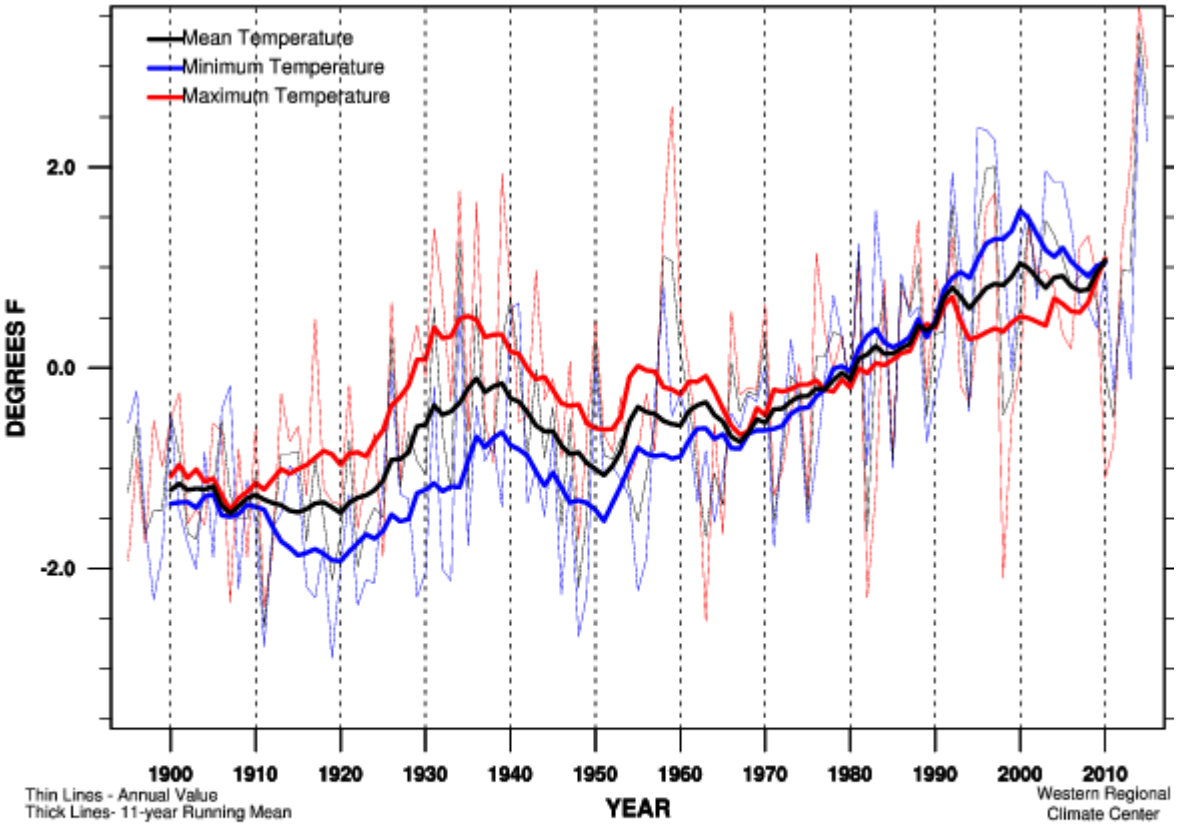


Figure 3-6. Temperature Departure, Sacramento-Delta Region



	Maximum Temperature	Minimum Temperature
Linear Trend 1895-present	+ 1.64 (± 0.52) °F/100yr	+ 2.64 (± 0.48) °F/100yr
Linear Trend 1949-present	+ 2.59 (± 1.38) °F/100yr	+ 4.41 (± 1.10) °F/100yr
Linear Trend 1975-present	+ 3.99 (± 2.96) °F/100yr	+ 4.17 (± 2.58) °F/100yr

3.4 Service Area Population and Demographics

Cal Water estimates the service area population was 58,095 in 2015. Service area population has been growing at an annual rate of 0.92 percent for the past 15 years. Between the 2000 and 2010 Censuses, it grew at an average annual rate of 0.89 percent. Between 2010 and 2015, population increased slightly to an average annual rate of 1.0 percent per year. Going forward, service area population is projected to increase at a rate of 1.1 percent annually until 2030 after which little to no growth is projected. The Livermore District is bounded on the northeast and northwest by the City of Livermore and on the southwest by the City of Pleasanton. Growth to the south is restricted by the recently voter approved Measure D, which preserves much of this area as open space. Therefore, future growth will be limited to the southeast portion of the service district

and to infill areas. It is expected that the population will reach buildout by 2030, as per the 2009 Water Supply and Facilities Master Plan.

To estimate current service area population, Cal Water uses MARPLOT and LandView 5 software to intersect District service area boundaries with Census Blocks from the 2000 and 2010 Censuses. This yields estimates of the number of housing units and population within each Census Block in the District for 2000 and 2010. From these data, Cal Water estimates the total population and the average number of persons per housing unit in the District. Cal Water applies the average number of persons per housing unit to the number of housing units served to calculate service area population in non-Census years.

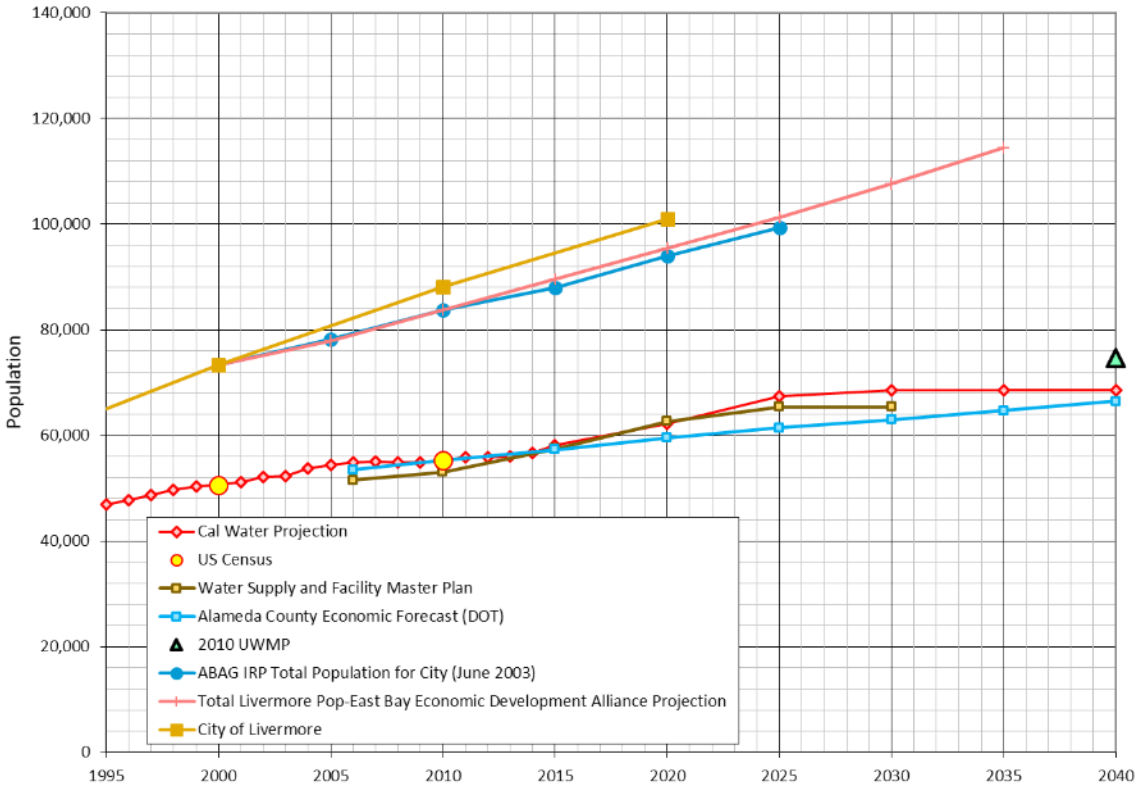
Between the 2000 and 2010 Censuses, the average number of persons per household decreased slightly from 2.73 to 2.64. The projection of future population is based on the lower housing unit density. Projected service area population is given in Table 3-1.

Table 3-1: Population - Current and Projected

	2015	2020	2025	2030	2035	2040
Population Served	58,095	62,212	67,382	68,566	68,566	68,566

Cal Water's current population projection for Livermore District is compared in Figure 3-7 to the projections made in its 2009 Water Supply and Facility Master Plan and 2010 UWMP, as well as a projection based on California Department of Transportation's (DOT) countywide population growth rate forecast. The District serves approximately 48 percent of the City of Livermore. Figure 3-7 also shows population forecasts prepared by the Association of Bay Area Governments (ABAG), the East Bay Economic Development Alliance, and the City of Livermore for all of the city.

Figure 3-7. Population Projection Comparison



Chapter 4
System Water Use

This chapter provides a description and quantifies the Livermore District's current water use and the projected uses through the year 2040. For purposes of the UWMP, the terms "water use" and "water demand" are used interchangeably.

This chapter is divided into the following subsections:

4.1 Recycled vs Potable and Raw Water Demand

4.2 Water Uses by Sector

4.3 Distribution System Water Losses

4.4 Estimating Future Water Savings

4.5 Water Use for Lower Income Households

4.6 Climate Change

4.1 Recycled versus Potable and Raw Water Demand

This plan maintains a clear distinction between recycled, potable, and raw water uses and supplies. Recycled water is addressed comprehensively in Chapter 6, but a summary of recycled water demand is included in Table 4-3 of this chapter. The primary focus of this chapter is historical and projected potable and raw water uses in the district.

4.2 Water Uses by Sector

4.2.1 Historical Potable and Raw Water Uses

Actual water use in 2015 by customer category is shown in Table 4-1. Total system demand in 2015 was 6,824 AF. District water use in 2015 was strongly affected by the Drought Emergency Regulation adopted by the State Water Resources Control Board in May of 2015 (SWRCB Resolution No. 2015-0032). Among other things, the Drought Emergency Regulation mandated urban retail water suppliers reduce potable water use between June of 2015 and February of 2016 by percentage amounts specified by the State Water Resources Control Board. The Livermore District was ordered to reduce potable water use by 24 percent over this period relative to use over the same period in 2013. Between June and December 2015, water use in Livermore was 41.4 percent less than water use over the same period in 2013.

The negative water loss shown in Table 4-1 is caused by a meter calibration or data record error that Cal Water is addressing. Over the five-year period 2010-2014, total water loss in the District, which includes both real and apparent losses, averaged 385 AF -- about 4 percent of total production.

Table 4-1: Retail: Demands for Potable and Raw Water- Actual		
Use Type	2015 Actual	
	Level of Treatment When Delivered	Volume (AF)
Single Family	Drinking Water	4,803
Multi-Family	Drinking Water	404
Commercial	Drinking Water	1,050
Industrial	Drinking Water	0
Institutional/Governmental	Drinking Water	599
Other	Drinking Water	8
Landscape	Drinking Water	6
Losses	Drinking Water	385
	Total	**7,255**

Residential customers account for approximately 93 percent of services and 74 percent of water use in the District, most of which is associated with single-family water use. Figure 4-1 shows the distribution of services in 2015. Figure 4-2 shows historical water sales by customer category.

Figure 4-1. Distribution of Services in 2015

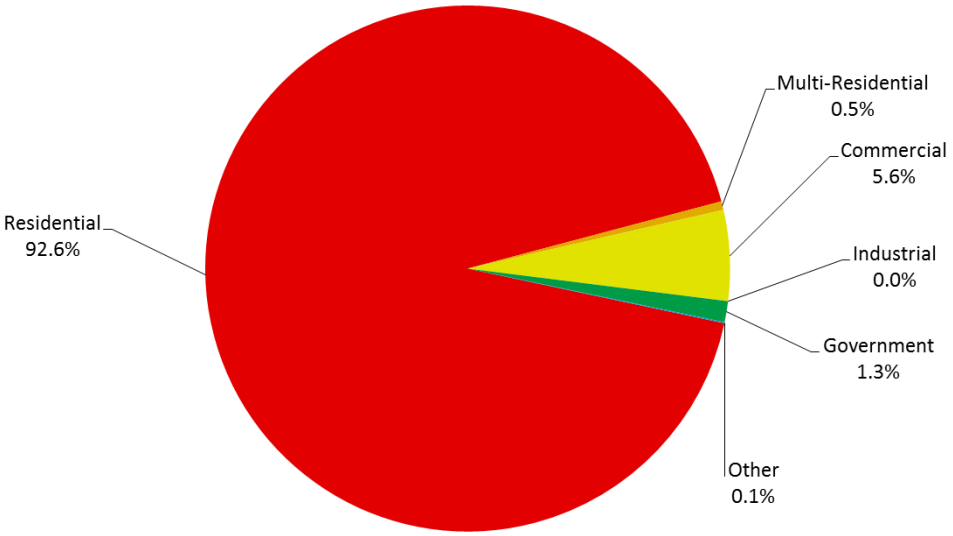
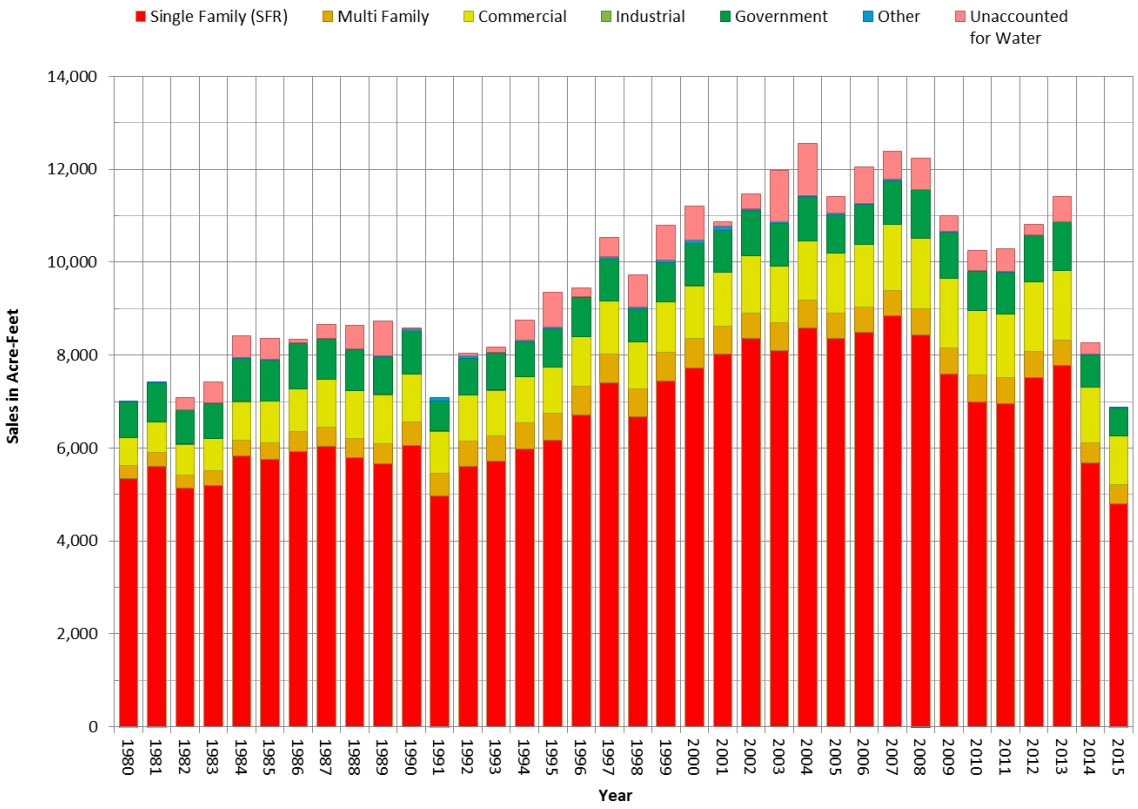


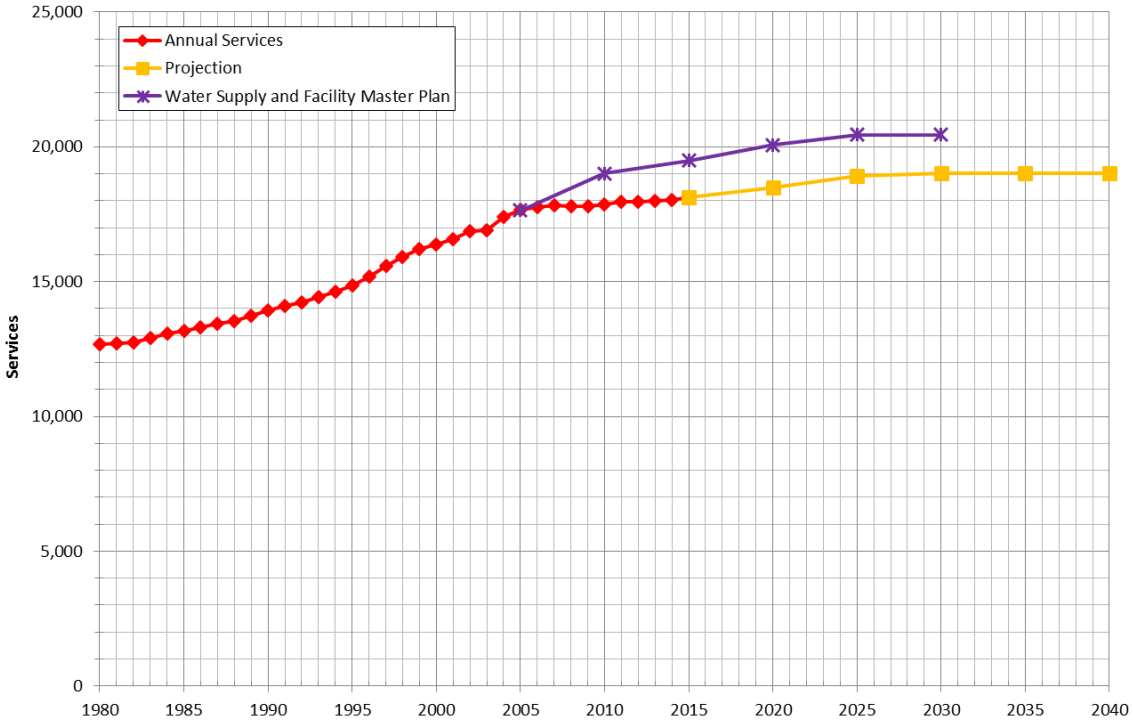
Figure 4-2. Historical Sales by Customer Category



4.2.2 Projected Potable and Raw Water Uses

Projected water demands by customer category through 2040 are shown in Tables 4-2. Future demands are estimated as the product of future services and expected water use per service. Future services are based on historical growth rates in the District. Residential and non-residential services are projected forward using the service growth rates from the 2009 Water Supply and Facility Master Plan. The forecast assumes no change in the number of industrial services. The projected average annual growth rate in services across all customer categories is approximately 0.2 percent. Historical and projected services are shown in Figure 4-3. Also shown in the figure is the services projection from Cal Water's Water Supply and Facility Master Plan.

Figure 4-3. Historical and Projected Services



Expected water use per service, shown in Figure 4-4, is based on weather-normalized historical use, adjusted for future expected water savings from plumbing codes and District conservation programs. Weather normalization of historical use was done econometrically using the California Urban Water Conservation Council GPCD Weather Normalization Methodology. Expected water savings from plumbing codes are presented in Section 4.4. Expected water savings from District conservation programs and projected compliance with the District's SB X7-7 2020 per capita water use target are discussed in Chapter 9. The projected trend in average use per service shown in Figure 4-4 does not

account for possible effects of climate change on future demand. The potential effects of climate change on demand are discussed in Section 4.6.

Projected water uses in Table 4-2 and Figure 4-4 are predicated on unrestricted demands under normal weather conditions. Demands are assumed to partially rebound by 2020 from 2015 levels on the assumption that the State Water Resources Control Board's mandatory water use reductions end by October 2016, as currently scheduled. The difference between actual and projected demands in 2020 will critically depend on the accuracy of this assumption. If the Emergency Drought Regulations are continued beyond October 2016, then the likelihood of actual demands being less than projected demands in 2020 would be significantly increased.

Figure 4-4. Historical and Projected Average Use per Service in Gallons per Day

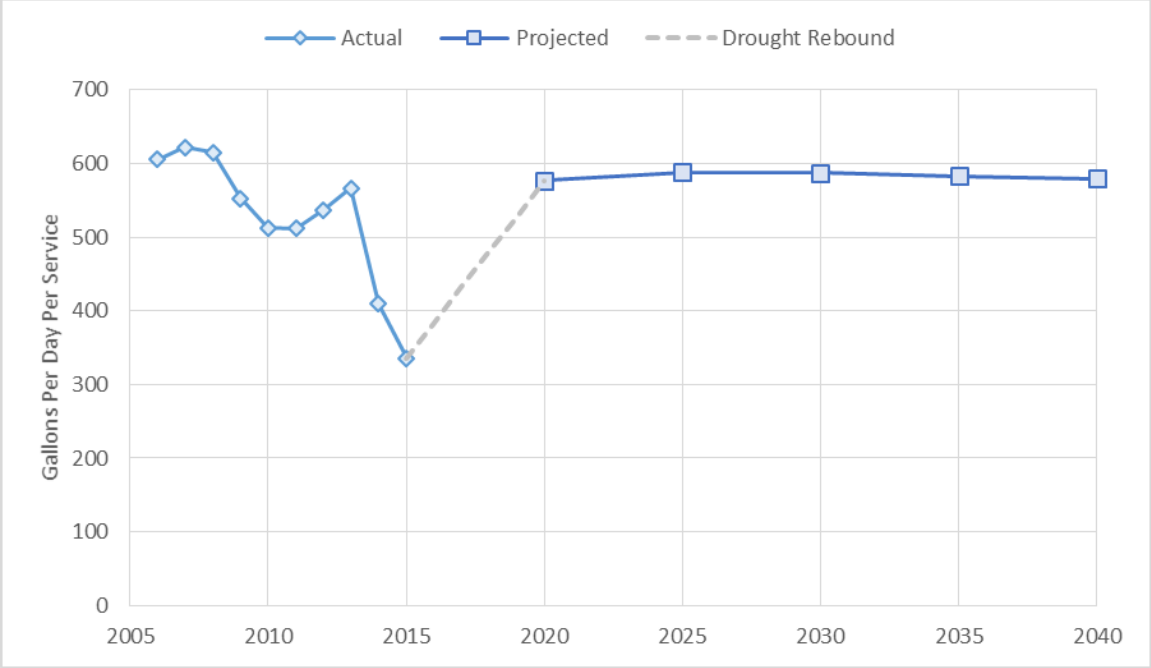


Table 4-2: Retail: Demands for Potable and Raw Water - Projected					
Use Type	Projected Water Use (AF)				
	2020	2025	2030	2035	2040
Single Family	7,804	7,731	7,668	7,613	7,569
Multi-Family	833	1,046	1,082	1,066	1,052
Commercial	1,691	2,038	2,112	2,097	2,084
Industrial	0	0	0	0	0
Institutional/Governmental	1,068	1,076	1,076	1,073	1,071
Other	10	13	14	14	14
Losses	539	553	556	556	556
Total	**11,946**	**12,457**	**12,507**	**12,418**	**12,346**

4.2.3 Total Water Demand Including Recycled Water

Total water demands, including recycled water uses, are shown in Table 4-3. Current and projected recycled water use is discussed in Chapter 6, Section 6.5.

Table 4-3: Retail: Total Water Demands						
	2015	2020	2025	2030	2035	2040
Potable and Raw Water *From Tables 4-1 and 4-2*	7,255	11,946	12,457	12,507	12,418	12,346
Recycled Water Demand *From Table 6-4*	0	0	0	0	0	0
Total Water Demand	**7,255**	**11,946**	**12,457**	**12,507**	**12,418**	**12,346**

4.3 Distribution System Water Losses

For the 2015 UWMP, urban retail water suppliers are required to quantify distribution system water losses for the most recent 12-month period available. For the Livermore District, this period is January 1 to December 31 2014. System water loss was calculated using the DWR Water Audit Method, as described in Appendix L of the UWMP Guidelines. Distribution system water loss is reported in Table 4-4. The DWR Water Audit Method calculates two types of water losses: (1) apparent losses and (2) real losses. Apparent losses include unauthorized consumption, metering errors, and data errors. Apparent losses represent unauthorized or unrecorded water delivered to customers. Real losses include distribution system discharges, spills, and leaks of water. Real losses represent a physical loss of water to the system. Table 4-4 reports combined apparent and real

distribution system water loss. A copy of the completed water balance worksheet for the Livermore District is provided in Appendix M. Actions the Livermore District is taking to reduce real and apparent distribution system water losses are discussed in Chapter 9.

Table 4-4: Retail: Water Loss Summary Most Recent 12 Month Period Available	
Reporting Period Start Date	Volume of Water Loss*
01/2014	144
*Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.	

4.4 Estimating Future Water Savings

The projections of future water use in Table 4-2 incorporate expected water savings from plumbing codes and appliance standards for residential and commercial toilets, urinals, clothes washers, dishwashers, and showerheads. These savings are commonly referred to as *passive water savings* to differentiate them from water savings resulting from water supplier conservation programs, which are termed *active water savings*. Active water savings resulting from the Livermore District's implementation of demand management measures are discussed in Chapter 9 of this plan. The estimates of passive water savings presented in this chapter were developed with the Alliance for Water Efficiency's *Water Conservation Tracking Tool* using data on the vintage, number, and water using characteristics of residences and businesses within Livermore District's service area.

Confirmation that the water use projections contained in this plan incorporate projected future water savings from plumbing codes and appliance standards is provided in Table 4-5. The estimated volume of future water savings from plumbing codes and standards is summarized in Table 4-6.

Table 4-5: Retail Only: Inclusion in Water Use Projections	
Future Water Savings Included Y/N	Yes
If "Yes" to above, state the section or page number where citations of the codes, ordinances, etc… utilized in demand projections are found.	Location in UWMP: Section 4.4 of Chapter 4
Lower Income Residential Demands Included	Yes

Table 4-6: Retail Only: Future Passive Savings						
	2015	2020	2025	2030	2035	2040
Passive	11	151	262	347	412	463

Savings (AF)						

The following codes and standards form the basis for the estimated volume of future passive water savings:

- AB 715, enacted in 2007, requires that any toilet or urinal sold or installed in California on or after January 1, 2014 cannot have a flush rating exceeding 1.28 and 0.5 gallons per flush, respectively. AB 715 superseded the state's previous standards for toilet and urinal water use set in 1991 of 1.6 and 1.0 gallons per flush, respectively. On April 8, 2015, in response to the Governor's Emergency Drought Response Executive Order (EO B-29-15), the California Energy Commission approved new standards for urinals requiring that they not consume more than 0.125 gallons per flush, 75% less than the standard set by AB 715.

- Water use standards for residential and commercial clothes washers and dishwashers are established by the U.S. Department of Energy through its authority under the federal Energy Policy and Conservation Act. Water use efficiency is summarized by the water factor for the appliance which measures the gallons of water used per cycle per cubic foot of capacity. A typical top-loading residential clothes washer manufactured in the 1990s had a water factor of around 12. In 2015, the allowable water factor for top- and front-loading residential clothes was reduced to 8.4 and 4.7, respectively. In 2018, water factor standard for top-loading residential clothes washers will be reduced to 6.5. In 2010 the allowable water factor for top- and front-loading commercial clothes washers was reduced to 8.5 and 5.5, respectively. The maximum water factor for Energy Star compliant top- and front-loading washers is 3.7 and 4.3, respectively. EPA estimates that Energy Star washers comprised at least 60 percent of the residential market and 30 percent of the commercial market in 2011.[3] An Energy Star compliant washer uses about two-thirds less water per cycle than washers manufactured in the 1990s. Federal dishwasher water use efficiency standards were last updated in 2013. The maximum water use for standard and compact sized dishwashers is 5.0 and 3.5 gallons per cycle, respectively.

- New construction and renovations in California are now subject to CalGreen Code requirements. CalGreen includes prescriptive indoor provisions for maximum water consumption of plumbing fixtures and fittings in new and renovated properties. CalGreen also allows for an optional performance path to compliance, which requires an overall aggregate 20% reduction in indoor water use from a calculated baseline using a set of worksheets provided with the CalGreen guidelines.

[3] EPA Energy Star Unit Shipment and Market Penetration Report Calendar Year 2011 Summary.

- SB 407, enacted in 2009, mandates that all buildings in California come up to current State plumbing fixture standards within this decade. This law establishes requirements that residential and commercial property built and available for use on or before January 1, 1994 replace plumbing fixtures that are not water conserving, defined as "noncompliant plumbing fixtures" as follows:
    - any toilet manufactured to use more than 1.6 gallons of water per flush;
    - any urinal manufactured to use more than one gallon of water per flush;
    - any showerhead manufactured to have a flow capacity of more than 2.5 gallons of water per minute; and
    - any interior faucet that emits more than 2.2 gallons of water per minute.

  For single-family residential property, the compliance date is January 1, 2017. For multi-family and commercial property, it is January 1, 2019. In advance of these dates, the law requires effective January 1, 2014 for building alterations and improvements to all residential and commercial property that water-conserving plumbing fixtures replace all noncompliant plumbing fixtures as a condition for issuance of a certificate of final completion and occupancy or final permit approval by the local building department.

  SB 407 also requires effective January 1, 2017 that a seller or transferor of single-family residential property disclose to the purchaser or transferee, in writing, the specified requirements for replacing plumbing fixtures and whether the real property includes noncompliant plumbing. Similar disclosure requirements go into effect for multi-family and commercial transactions January 1, 2019. SB 837, passed in 2011, reinforces the disclosure requirement by amending the statutorily required transfer disclosure statement to include disclosure about whether the property is in compliance with SB 407 requirements. If enforced, these two laws will require retrofit of non-compliant plumbing fixtures upon resale or major remodeling for single-family residential properties effective January 1, 2017 and for multi-family and commercial properties effective January 1, 2019.

California has also adopted regulations governing the future use of landscape water use.

- The California Water Commission approved the State's updated Model Water Efficient Landscape Ordinance (MWELO) on July 15, 2015. The updated MWELO supersedes the State's MWELO developed pursuant to AB 1881. Local agencies have until December 1, 2015 to adopt the MWELO or to adopt a Local Ordinance which must be at least as effective in conserving water as MWELO. Local agencies working together to develop a Regional Ordinance have until February 1, 2016 to adopt. The size of landscapes subject to MWELO has been lowered from 2500 sq. ft. to 500 sq. ft. The size threshold applies to residential, commercial, industrial and institutional projects that require a permit, plan check or design review. Additionally, the

maximum applied water allowance (MAWA) has been lowered from 70% of the reference evapotranspiration (ETo) to 55% for residential landscape projects, and to 45% of ETo for non-residential projects. This water allowance reduces the landscape area that can be planted with high water use plants such as cool season turf. For typical residential projects, the reduction in the MAWA reduces the percentage of landscape area that can be planted to high water use plants from 33% to 25%. In typical non-residential landscapes, the reduction in MAWA limits the planting of high water use plants to special landscape areas. The revised MWELO allows the irrigation efficiency to be entered for each area of the landscape. The site-wide irrigation efficiency of the previous ordinance (2010) was 0.71; for the purposes of estimating total water use, the revised MWELO defines the irrigation efficiency (IE) of drip irrigation as 0.81 and overhead irrigation and other technologies must meet a minimum IE of 0.75.

- CalGreen requires that automatic irrigation system controllers for new landscaping provided by a builder and installed at the time of final inspection must be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plant water needs as weather or soil conditions change.

The estimates of future water savings in Table 4-6 do not include potential landscape water savings from implementation of MWELO or CalGreen because estimating these savings required data that was not available to the District at the time this plan was prepared, including data on existing and future landscape areas, plant materials, irrigation equipment, and probable enforcement of and compliance with the landscape design and irrigation equipment requirements.

4.5 Water Use for Lower Income Households

California Senate Bill No. 1087 (SB 1087), Chapter 727, was passed in 2005 and amended Government Code Section 65589.7 and Water Code Section 10631.1. SB 1087 requires local governments to provide a copy of their adopted housing element to water and sewer providers. In addition, it requires water providers to grant priority for service allocations to proposed developments that include housing units for lower income families and workers. Subsequent revisions to the UWMP Act require water providers to develop water demand projections for lower income single and multi-family households.

Cal Water does not maintain records of the income level of its customers and does not discriminate in terms of supplying water to any development. Cal Water is required to serve any development that occurs within its service area, regardless of the income level of the future residents. It is ultimately the City's or County's responsibility to approve or not approve developments within the service area.

As a benefit to its customers, Cal Water offers a Low Income Rate Assistance Program (LIRA) in all of its service districts. Under the LIRA Program lower income customers that qualify are able to receive a discount on their monthly bills.

For the purposes of estimating projected demand of lower income households, Cal Water used the Housing Element from the City of Livermore's General Plan to estimate the percentage of households in the service area that qualify as lower income.[4] Based on these data, 26 percent of total households are classified as lower income. Lower income households are defined as households with income that is less than or equal to 80 percent of the median income for the area. Projected residential water demand for lower income households is shown in Table 4-7. These demands are incorporated into the service area demand projection given in Table 4-2.

Table 4-7. Residential Demand of Lower Income Households

	2015 (actual)	2020	2025	2030	2035	2040
Demand (AF)	2,069	2,211	2,247	2,240	2,222	2,207

4.6 Climate Change

A hotter and dryer climate is expected to increase demand for outdoor water use. Cal Water has econometrically estimated the sensitivity of class-level water demand to deviations in precipitation and temperature from their long-term averages using historical data on monthly water sales and weather for the District.[5] The weather effect is measured as predicted sales conditional on observed weather versus predicted sales conditional on long-term average weather. The predicted weather effect is then summed on an annual basis and expressed as a percentage of annual weather-normalized sales. An estimate of the variance in annual water sales caused by departures in precipitation and temperature from their long term averages was developed for each customer class. The variance estimates of class-level water sales were weighted and summed across classes for an aggregate district-level estimate of the standard deviation of water demand induced by variation in precipitation and temperature. The standard deviation in District demand due to weather variability is 3.4 percent. The maximum deviation, based on historical weather data, is 5.5 percent.

A selection of climate change scenarios for 2040 for the Southwest United States contained in the Regional Climate Trends and Scenarios for the U.S. National Climate

[4] City of Livermore 2015 Housing Element, Table 2-15. Accessed from http://www.cityoflivermore.net/civicax/filebank/documents/14139/

[5] A&N Technical Services, Inc., Cal Water Long Term Water Demand Forecast Model, December 2014.

Assessment, Part 5, is shown in Table 4-8, along with the expected effect on District water demand.[6] Based on the scenarios in the table, temperature increases by 2040 associated with climate change imply a 2 to 3 percent increase in demand relative to weather-normalized demand. This expected effect is solely due to predicted changes in temperature. While the climate change scenarios also include predicted changes in the pattern and amount of precipitation, this has not been included in Cal Water's demand modeling at this time due to the large uncertainty associated with these estimates.[7]

The predicted effect of climate change on demand is based on current patterns of outdoor water use. It does not account for changes households and businesses may make in the way they use water in the future given a warming climate. For example, social norms and economic incentives regarding the type and extent of residential and non-residential landscaping may change over time which could lead to outdoor water use having a lower share of total demand compared to what is currently observed. In this case, the predicted effect of climate change would be offset to some extent by changes in the way households and businesses use water.

Table 4-8. Climate Change Effect on Demand

Climate Scenario	Year 2040 degree C	Year 2040 degree F	% Change from mean Temperature	Effect on Demand
B1	1.4	2.5	3.4%	2.0%
A1B	1.6	2.9	3.9%	2.3%
A2	1.5	2.7	3.7%	2.1%
80%ile	2.0	3.6	4.9%	2.8%

[6] Kunkel, K.E, L.E. Stevens, S.E. Stevens, L. Sun, E. Janssen, D. Wuebbles, K.T. Redmond, and J.G. Dobson, 2013: Regional Climate Trends and Scenarios for the U.S. National Climate Assessment. Part 5. Climate of the Southwest U.S., NOAA Technical Report NESDIS 142-5.

[7] Ibid. A discussion and depiction of the uncertainty around the precipitation forecasts is found on pages 55-56, Table 7, and Figure 27 of the cited report.

Chapter 5
Baselines and Targets

With the adoption of the Water Conservation Act of 2009, also known as SB X7-7, the state is required to reduce urban water use by 20 percent by the year 2020. Each urban retail water supplier must determine baseline per capita water use during their baseline period and also target water use for the years 2015 and 2020 in order to help the state achieve the 20 percent reduction.

SB X7-7 defines an urban retail water supplier as "a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes." (CWC 10608.12) As shown in Chapter 2, the Livermore District meets both of these thresholds.

In this Chapter, the Livermore District demonstrates compliance with its per capita water use target for the year 2015. This will also demonstrate whether or not the District is currently on track to achieve its 2020 target. Compliance will be verified by DWR's review of the SB X7-7 Verification Tables submitted with this plan. These tables are included with this plan in Appendix I.

This chapter includes the following sections:

5.1 Wholesale Agencies

5.2 Updating Calculations from 2010 UWMP

5.3 Baseline Periods

5.4 Service Area Population

5.5 Gross Water Use

5.6 Baseline Daily per Capita Water Use

5.7 2015 and 2020 Targets

5.8 2015 Compliance Daily per Capita Water Use

5.9 Regional Alliance

5.1 Wholesale Agencies

Wholesale water suppliers are not required to establish and meet baseline and targets for daily per capita water use. However, they can provide important support to their retail water suppliers through adopted policies and programs to encourage demand reduction in their service area. Wholesale water suppliers can also participate in a Regional Alliance established to meet the region's daily per capita water use targets.

The Livermore District coordinated its demand reduction policies and programs with the wholesale water suppliers listed in Table 2-4.

5.2 Updating Calculations from 2010 UWMP

The District reported base period population and water use, selected the 2020 target method, and calculated its 2020 water use target in its 2010 UWMP. SB X7-7 allows the District to update these estimates, change the target methodology, and revise its 2020 urban water use target in its 2015 UWMP (CWC 10608.20).

Per the UWMP Guideline requirements, Cal Water has updated District population estimates to incorporate information from the 2010 Census that was not available at the time the 2010 UWMP was prepared. It has not changed the base period or methodology upon which the District's 2020 urban water use target is based. The updated population estimates are slightly higher than the estimates in the 2010 plan for most years. A comparison between the two sets of population estimates is provided in Appendix I. The revised population estimates did not result in a change to the District's 2020 water use target (when rounded to nearest whole GPCD).

5.3 Baseline Periods

Under SB X7-7 urban retail water suppliers must establish two baseline periods for historical water use and population in the District. The first of these is either a 10- or 15-year continuous period ending between 2004 and 2010. The second is a 5-year continuous period ending between 2007 and 2010. The 10-15 year period is used to establish the 2020 water use target under Method 1 (CWC 10608.20). The 5-year period is used to confirm that the selected 2020 target meets SB X7-7's minimum water use reduction requirements (CWC 10608.22). The baseline periods the District is using are summarized in SB X7-7 Table 1.

SB X7-7 Table 1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	12,260	Acre Feet
	2008 total volume of delivered recycled water	0	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	percent
	Number of years in baseline period[1]	10	years
	Year beginning baseline period range	1999	
	Year ending baseline period range[2]	2008	
5-year baseline period	Number of years in baseline period	5	years
	Year beginning baseline period range	2003	
	Year ending baseline period range[3]	2007	
[1]If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.			
[2]The ending year must be between December 31, 2004 and December 31, 2010.			
[3]The ending year must be between December 31, 2007 and December 31, 2010.			

5.3.1 Determination of the 10-15 Year Baseline Period

The 10-15 year baseline period must be a continuous period ending between 2004 and 2010. It can be up to 15 years in length if recycled water comprised 10 percent or more of the retail urban water supplier's 2008 deliveries. Otherwise, the baseline period is set to 10 years.

The Livermore District did not have recycled water deliveries in 2008. Therefore it is using a 10-year baseline period commencing January 1, 1999 and running through December 31, 2008. The 10-year baseline period is unchanged from the 2010 UWMP.

5.3.2 Determination of the 5-Year Baseline

The 5-year baseline period must be a continuous period ending between 2007 and 2010. The Livermore District's 5-year baseline period commences January 1, 2003 and runs through December 31, 2007. The 5-year baseline period is unchanged from the 2010 UWMP.

5.4 Service Area Population

As noted above, Cal Water has updated the baseline period population estimates to incorporate information from the 2010 Census that was not available at the time the 2010

UWMP was prepared. Updating resulted in a small change in the original population estimates.

Urban retail water suppliers must estimate their service area population in a manner that is consistent with DWR requirements. For water suppliers whose boundaries correspond by 95 percent or more with a city or census designated place, population estimates prepared by the Department of Finance may be used. Where this is not the case, water suppliers may use the DWR Population Tool or estimate their population using other methods, provided these methods comply with Methodology 2 – Service Area Population – of DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*.

Cal Water uses a population estimation methodology based on overlaying Census Block data from the 2000 and 2010 Censuses with the District's service area. LandView 5 and MARPLOT software are used with these data to estimate population per dwelling unit for 2000 and 2010. The per dwelling unit population estimates are then combined with Cal Water data on number of dwelling units served to estimate service area population for non-Census years.

Cal Water also estimated service area population using DWR's Population Tool. The estimates prepared using Cal Water's methodology and DWR's Population Tool differed by less than one percent. A comparison of the estimates generated by the two approaches is provided in Appendix I. Cal Water is electing to use the population estimates produced by its methodology in order to maintain consistency with population projections it has prepared in other planning documents and reports.

The population methodology and estimates used to calculate baseline and 2015 daily per capita water use are summarized in SB X7-7 Tables 2 and 3.

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. DWR Population Tool**
☑	**3. Other** DWR recommends pre-review

SB X7-7 Table 3: Service Area Population		
Year		**Population**
10 to 15 Year Baseline Population		
Year 1	1999	50,349
Year 2	2000	50,622
Year 3	2001	51,214
Year 4	2002	52,060
Year 5	2003	52,307
Year 6	2004	53,693
Year 7	2005	54,475
Year 8	2006	54,883
Year 9	2007	55,110
Year 10	2008	54,971
5 Year Baseline Population		
Year 1	2003	52,307
Year 2	2004	53,693
Year 3	2005	54,475
Year 4	2006	54,883
Year 5	2007	55,110
2015 Compliance Year Population		
2015		58,095

5.5 Gross Water Use

Annual gross water use is defined as the amount of water entering the District's distribution system over a 12-month period, excluding:

- Recycled water delivered within the service area
- Indirect recycled water
- Water placed in long-term storage
- Water conveyed to another urban supplier
- Water delivered for agricultural use

Gross water use must be reported for each year in the baseline periods as well as 2015. The Livermore District's annual gross water use is summarized in SB X7-7 Table 4. Volumes are in acre-feet. No water delivery exclusions are taken.

SB X7-7 Table 4: Annual Gross Water Use									
	Baseline Year	**Volume Into Distrib. System**	**Deductions**						**Annual Gross Water Use**
			Recycled Water	Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water	Water Delivered for Agricultural Use	Process Water	
10 to 15 Year Baseline - Gross Water Use									
Year 1	1999	10,791	0	0	0	0	0	0	10,791
Year 2	2000	11,207	0	0	0	0	0	0	11,207
Year 3	2001	10,861	0	0	0	0	0	0	10,861
Year 4	2002	11,474	0	0	0	0	0	0	11,474
Year 5	2003	11,967	0	0	0	0	0	0	11,967
Year 6	2004	12,556	0	0	0	0	0	0	12,556
Year 7	2005	11,416	0	0	0	0	0	0	11,416
Year 8	2006	12,055	0	0	0	0	0	0	12,055
Year 9	2007	12,417	0	0	0	0	0	0	12,417
Year 10	2008	12,260	0	0	0	0	0	0	12,260
10 - 15 year baseline average gross water use									**11,700**
5 Year Baseline - Gross Water Use									
Year 1	2003	11,967	0	0	0	0	0	0	11,967
Year 2	2004	12,556	0	0	0	0	0	0	12,556
Year 3	2005	11,416	0	0	0	0	0	0	11,416
Year 4	2006	12,055	0	0	0	0	0	0	12,055
Year 5	2007	12,417	0	0	0	0	0	0	12,417
5 year baseline average gross water use									**12,082**
2015 Compliance Year - Gross Water Use									
2015		6,824	0	0	0	0	0		**6,824**

5.6 Baseline Daily Per Capita Water Use

Baseline daily per capita water use is calculated by converting annual gross water use to gallons per day and dividing by service area population. Daily per capita water use for each baseline year and 2015 are summarized in SB X7-7 Table 5.

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year		Service Area Population	Annual Gross Water Use (AF)	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1999	50,349	10,791	191
Year 2	2000	50,622	11,207	198
Year 3	2001	51,214	10,861	189
Year 4	2002	52,060	11,474	197
Year 5	2003	52,307	11,967	204
Year 6	2004	53,693	12,556	209
Year 7	2005	54,475	11,416	187
Year 8	2006	54,883	12,055	196
Year 9	2007	55,110	12,417	201
Year 10	2008	54,971	12,260	199
10-15 Year Average Baseline GPCD				**197**
5 Year Baseline GPCD				
Baseline Year		Service Area Population	Annual Gross Water Use (AF)	Daily Per Capita Water Use (GPCD)
Year 1	2003	52,307	11,967	204
Year 2	2004	53,693	12,556	209
Year 3	2005	54,475	11,416	187
Year 4	2006	54,883	12,055	196
Year 5	2007	55,110	12,417	201
5 Year Average Baseline GPCD				**199**
2015 Compliance Year GPCD				
2015		58,095	6,824	**105**

5.7 2015 and 2020 Targets

Urban retail water suppliers may select from four GPCD target methods (CWC 10608.20).

- Target Method 1: 20% reduction from 10-year baseline GPCD
- Target Method 2: Water use efficiency performance standards
- Target Method 3: 95% of Hydrologic Region Target
- Target Method 4: Savings by water sector, DWR Method 4

Regardless of target method selected, the final target cannot exceed 95 percent of the 5-year baseline period average GPCD (CWC 10608.22).

The Livermore District has selected Target Method 1, which sets the 2020 target to either 80 percent of the 10-year baseline or 95 percent of the 5-year baseline average GPCD, whichever is less. This results in a 2020 target of 158 GPCD. The 2015 interim target of 177 GPCD is the midpoint between the 10-year baseline average GPCD and the 2020 target.

The District's GPCD baselines and targets are summarized in Table 5-1.

Table 5-1: Baselines and Targets Summary

Baseline Period	Start Years	End Years	Average GPCD	2015 Interim Target	Confirmed 2020 Target
10-15 year	1999	2008	197	177	158
5 Year	2003	2007	199		

5.8 2015 Compliance Daily per Capita Water Use

Compliance daily per capita water use in 2015 is summarized in Table 5-2. In reporting their compliance daily per capita water use, urban retail water suppliers may elect to consider the following factors and adjust the estimate accordingly (CWC 10608.24):

- Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.
- Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.
- Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

Cal Water is not electing to make any adjustments to the District's compliance daily per capita water use in 2015. The Livermore District's 2015 compliance daily per capita water use is 105 gallons compared to its 2015 interim target of 177 gallons. The Livermore District is in compliance with its 2015 interim target.

The low per capita water use in 2015 partially reflects the impacts of the Drought Emergency Regulation adopted by the State Water Resources Control Board in May of 2015 (SWRCB Resolution No. 2015-0032). Among other things, the Drought Emergency Regulation mandated urban retail water suppliers reduce potable water use between

June of 2015 and February of 2016 by percentage amounts specified by the State Water Resources Control Board. The Livermore District was ordered to reduce potable water use by 24 percent over this period relative to use over the same period in 2013.

However, the Drought Emergency Regulation does not explain all of the decline in per capita water use, which has been trending downward since 2004 when it reached its zenith of 209 gallons per person per day. By 2014 this had fallen by 38 percent, to 130 GPCD. Between 2014 and the end of 2015, per capita water use had fallen a further 19 percent, to 105 GPCD.

Table 5-2: 2015 SB X7-7 Compliance

2015 Actual GPCD	2015 Interim Target	Optional Adjustments to 2015 GPCD *From Methodology 8*				Actual as Percent of Target	In Compliance? Y/N
		Extraordinary Events	Economic Adjust	Weather Adjust	Adjusted Actual 2015 GPCD		
105	177	0	0	0	105	59%	YES

5.9 Regional Alliance

Urban retail water suppliers may report on the requirements of SB X7-7 individually or as a member of a "Regional Alliance." The Livermore District is a member of a Regional Alliance and this UWMP provides information on the District's progress towards meeting its SB X7-7 water conservation targets as both an individual urban retail water supplier and a member of a Regional Alliance.

The Livermore District has formed a Regional Alliance with other Cal Water urban retail water districts located in the San Francisco Bay Area Hydrologic Region. Compliance with the Regional Alliance's 2015 interim target is demonstrated in Appendix I and summarized in Table SB X7-7 RA Table 1 – Compliance Verification on the following page.

The Regional Alliance's 2015 compliance daily per capita water use is 110 gallons compared to its 2015 interim target of 164 gallons. The Regional Alliance is in compliance with its 2015 interim target.

SB X7-7 RA Table 1: Compliance Verification				
2015 GPCD (Actual)	2015 Interim Target GPCD	Economic Adjustment[1] *Enter "0" if no adjustment*	Adjusted 2015 GPCD *(if economic adjustment used)*	Did Alliance Achieve Targeted Reduction for 2015?
110	164	0	110	YES

[1]Adjustments for economic growth can be applied to either the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods.

Chapter 6
System Supplies

Water furnished to customers in the Livermore District is a combination of purchased water and groundwater. Total groundwater supplies are limited to Cal Water's Groundwater Pumping Quota (GPQ), which is discussed in section 6.2.2. Cal Water will attempt to maximize use of this source in all years. The District's remaining demand will be supplied by purchased water from Zone 7 in accordance with Cal Water's Purchase Agreement.

6.1 Purchased Water

Purchased water currently serves approximately 70 percent of the District's water requirements. Zone 7 imports purchased water from the State Water Project (SWP) and Byron Bethany Irrigation District. Water is delivered through the South Bay Aqueduct, a facility of the State Water Project, which is owned and operated by the California Department of Water Resources.

Zone 7 provides regional water treatment and distribution of the wholesale water, along with management of the local groundwater supplies. The delivery of purchased water is made through nine service connections to the Zone 7 distribution feeder network.

A portion of Cal Water's purchased water deliveries come from Zone 7 local surface water supplies. These local supplies are also treated in Zone 7's treatment facilities before being delivered to Cal Water.

Zone 7 and Cal Water have entered into a thirty-year contract for a municipal and industrial water supply. The current contract entered into on November 16, 1994 is the second contract of its nature with Zone 7. The contract sets forth the terms and conditions that govern the delivery and use of both purchased water and groundwater. Cal Water agreed to accept a GPQ and to purchase imported water from Zone 7 in order to meet all remaining demand in its Livermore District. In return, Zone 7 agrees to maintain an adequate water supply to meet Cal Water's demands. The purchase agreement between Cal Water and Zone 7 is provided as a reference in Appendix G.

Zone 7's draft 2015 UWMP bases the projected SWP portion of the Zone 7 supply on the EC-ELT scenario in DWR's 2015 Delivery Capability Report and on the assumed development of the California WaterFix. Zone 7 also assumes approximately 10,000 AFY from other new supplies, including desalination and/or potable reuse. With these assumptions, the draft UWMP estimates that Zone 7 will be able to meet all projected demands under all hydrologic conditions.

6.2 Groundwater

Groundwater currently supplies approximately 30 percent of the District's supply requirements. This percentage is expected to decrease over time as the District grows, and that demand growth is served by purchases from Zone 7. In most years the District uses all of its 3,069 AFY groundwater pumping quota.

6.2.1 Basin Description

As described in DWR Bulletin 118, the Livermore Valley Groundwater Basin extends from the Pleasanton Ridge east to the Altamont Hills and from the Livermore Upland north to the Orinda Upland. Surface drainage features include Arroyo Del Valle, Arroyo Mocho, and Arroyo Las Positas (collectively referred to as the Arroyos) as principal streams, with Alamo Creek, South San Ramon Creek and Tassajara Creek as minor streams. All streams converge on the west side of the basin forming Arroyo de la Laguna, which flows south and joins Alameda Creek in Sunol Valley. Some geologic structures restrict the lateral movement of groundwater, but the general groundwater gradient is to the west, then south towards Arroyo de la Laguna.

Additional details of the basin are given in the DWR's Groundwater Bulletin 118[8].

6.2.2 Groundwater Management

The groundwater basin that Cal Water pumps from is an un-adjudicated basin. Recharge efforts are managed by the Zone 7 Water Agency. The Agency's management plan can be found at Zone 7's website.[9]

By approving the contract mentioned in Section 6.1, Cal Water agreed to accept a Groundwater Pumping Quota (GPQ). Cal Water's annual GPQ is 3,069 acre-feet. The contract authorizes:

- The carryover of unused GPQ in an amount up to 20 percent of the annual GPQ
- The production of groundwater in excess of the GPQ provided Cal Water pays a recharge fee for this additional water.
- The implementation, as supply conditions permit, of a conjunctive use storage program.

[8] California's Ground Water Bulletin 118, 2003; San Francisco Hydrologic Region; Livermore Valley Groundwater Basin; Groundwater Basin Number: 2-10
http://www.water.ca.gov/pubs/groundwater/bulletin_118/california's_groundwater__bulletin_118_-_update_2003_/bulletin118_entire.pdf

[9] http://www.zone7water.com/index.php/36-public/content/79-groundwater-management-plan

- The transfer of GPQ between Cal Water and other water purveyors that contract with Zone 7

The GPQ as established through the contract is based on the annual safe yield of the Main Basin of the Livermore-Amador Valley. The annual safe yield for the Main Basin is 13,200 acre-feet. Zone 7 recharges the Main Basin using storm runoff and imported supplies. When surplus imported supplies are available Zone 7 can authorize the sale of in-lieu treated water. Through this program, Cal Water purchases the surplus imported water in-lieu of pumping groundwater. This enables storage of groundwater supplies for future use and delivery of water at a cost comparable to pumping the groundwater.

Sustainable Groundwater Management Act

Background – On September 16, 2014, Governor Brown signed into law Assembly Bill 1739, Senate Bill 1168, and Senate Bill 1319 (AB-1739, SB-1168, and SB-1319). This three-bill legislative package is known collectively as the Sustainable Groundwater Management Act (SGMA). SGMA was amended in the later part of 2015 by Senate Bill 13, Senate Bill 226 and Assembly Bill 1390 to provide clarity to the original law and guidance on groundwater adjudications. This new legislation defines sustainable groundwater management as the "management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results" [Water Code § 10721(u)]. The legislation defines "undesirable results" to be any of the following effects caused by groundwater conditions occurring throughout the basin [Water Code § 10721(w) (1-6)]:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply;
- Significant and unreasonable reduction of groundwater storage;
- Significant and unreasonable seawater intrusion;
- Significant and unreasonable degraded water quality;
- Significant and unreasonable land subsidence;
- Surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

The legislation provides for financial and enforcement tools to carry out effective local sustainable groundwater management through formation of Groundwater Sustainability Agencies (GSA's) consisting of local public agencies, water companies regulated by the CPUC and mutual water companies. The legislation requires that GSA's within High and

Medium Priority basins under the California Statewide Groundwater Elevation Monitoring (CASGEM) program subject to critical conditions of overdraft prepare and submit a Groundwater Sustainability Plan (GSP) for the basin by January 31, 2020 [Water Code § 10720.7(a) (1)], and requires GSA's in all other groundwater basins designated as High or Medium Priority basins to prepare and submit a GSP by January 31, 2022 [Water Code § 10720.7 (a) (2)]. Following State approval, the basin would thereafter be managed under the GSP. The legislation does not require adjudicated basins to develop GSPs, but they are required to report their water use.

Intended Outcomes and Benefits – The key intended outcomes and benefits of SGMA are numerous, and include:

- Advancement in understanding and knowledge of the State's groundwater basins and their issues and challenges;
- Establishment of effective local governance to protect and manage groundwater basins;
- Management of regional water resources for regional self-sufficiency and drought resilience;
- Sustainable management of groundwater basins through the actions of GSA's, utilizing State assistance and intervention only when necessary;
- All groundwater basins in California are operated to maintain adequate protection to support the beneficial uses for the resource;
- Surface water and groundwater are managed as "a Single Resource" to sustain their interconnectivity, provide dry season base flow to interconnected streams, and support and promote long-term aquatic ecosystem health and vitality;
- A statewide framework for local groundwater management planning, including development of sustainable groundwater management best management practices and plans;
- Development of comprehensive and uniform water budgets, groundwater models, and engineering tools for effective management of groundwater basins;
- Improved coordination between land use and groundwater planning;
- Enforcement actions as needed by the SWRCB to achieve region-by-region sustainable groundwater management in accordance with the 2014 legislation.

To assist in attaining the above outcomes, the California Department of Water Resources (DWR) will provide GSA's with the technical and financial assistance necessary to sustainably manage their water resources. The benefits of these outcomes include:

- A reliable, safe and sustainable water supply to protect communities, farms, and the environment, and support a stable and growing economy;

- Elimination of long-term groundwater overdraft, an increase in groundwater storage, avoidance or minimization of subsidence, enhancement of water flows in stream systems, and prevention of future groundwater quality degradation.

Cal Water Position – Cal Water's groundwater basin philosophy continues to be to work collaboratively with all stakeholders in the basins where we operate and to do what is best for the groundwater basin including the sharing of burden(s) and benefits on an equitable basis with said stakeholders. Cal Water recognizes and deeply supports the goals, objectives, and intended outcomes of the SGMA. Moreover, the company recognizes the numerous challenges of the legislation along a variety of technical, legal, political, and financial/economic dimensions, particularly when the geographical diversity of the Company's service territory is considered. None-the-less, Cal Water intends to take an active role in the local and state-wide management of groundwater resources over the next 5-25+ years by fully supporting and participating in the principal edicts of SGMA. A number of specific steps that the Company intends to take with respect to this position and role include (among others):

- Outreach to public agencies to ensure that the Company's presence, rights and interests, as well as historical and current resource management concerns are honored/incorporated within the GSA and GSP formulation process(es);

- Outreach to applicable local and regulatory agencies to ensure that the Company is at full participation, while also meeting the requirements and expectations set forth by SGMA;

- The enhanced use of digital/electronic groundwater monitoring equipment and other new technology aimed at measuring withdrawal rates, pumping water levels, and key water quality parameters within the context of day-to-day operations;

- Full participation in the development of GSP's and formulation of groundwater models being constructed in basins where the Company has an operating presence;

- Full participation in individual and/or joint projects aimed at mitigating seawater intrusion and other "undesirable results";

- Inclusion of sound groundwater management principles and data in all applicable technical reports, studies, facility master plans, and urban water management plans (including this 2015 update), particularly as these undertakings relate or pertain to water resource adequacy and reliability;

- Inclusion of sound groundwater management principles and data in all general rate case (GRC) filings and grant applications to ensure that resource management objectives remain visible and central to Cal Water's long-term planning/budgeting efforts;

SGMA related information in the 2015 UWMP – The Urban Water Management Plans prepared by Cal Water over the past decade, including the 2015 update, already contain many of the elements required by SGMA and thus already serve as a road map toward the implementation of SGMA and the basin GSP. The UWMP addresses all water supply sources including groundwater. SGMA's specific concerns with groundwater are addressed as follows:

- Chapter 4 addresses Cal Water's historic and future customer growth and water demand in the basin.

- Chapter 6 addresses Cal Water's historic and future water supplies in the basin.

- Chapter 6 addresses the potential actions Cal Water will need to take to develop additional water supplies to maintain supply reliability.

- Chapter 6 discusses water quality and necessary actions to protect and decontaminate water supplies.

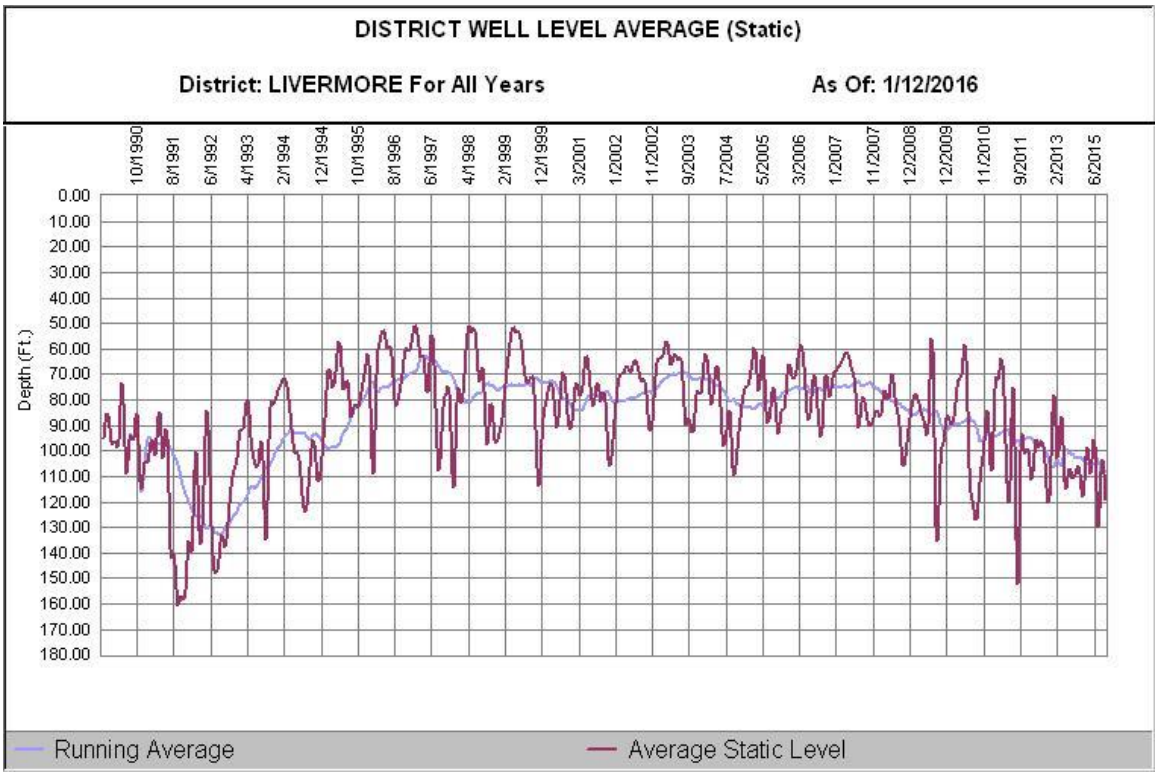
- Chapter 6 addresses supplementing water supplies with recycled water.

- Chapter 7 addresses the projected ability of the combined supply, including groundwater, to reliable serve customer demands under normal, single-dry-year and multiple-dry-year conditions.

6.2.3 Overdraft Conditions

As shown in Figure 6-1, due to artificial recharge, the average static groundwater elevations in the District remained relatively consistent over the decade between 2000 and 2010. Short periods of groundwater elevation decline and recovery occurred during this period. The drought conditions and the reduced SWP supply since thenhave resulted in declining elevations. Once recharge resumes and wholesale water is delivered, water level will start to increase.

Figure 6-1: District Well Level Average



6.2.4 Historical Pumping

The historical volume of the groundwater pumped is shown in Table 6-1.

Table 6-1 Retail: Groundwater Volume Pumped (AF)						
Groundwater Type	Location or Basin Name	2011	2012	2013	2014	2015
Alluvial Basin	Livermore Valley Groundwater Basin	2,987	3,250	2,667	2,821	2,361
Total		**2,987**	**3,250**	**2,667**	**2,821**	**2,361**

6.3 Surface Water

The Livermore District does not impound or divert surface water as a means to meet supply requirements. However, Zone 7's supply mix includes some surface water runoff from local watersheds.

6.4 Stormwater

Currently, the storm drains in the District carry water from streets and yards to local creeks then on to the Bay. While some groundwater recharge occurs from the creeks and wetland, there are no plans to divert stormwater for beneficial uses in the Livermore District.

6.5 Wastewater and Recycled Water

The recycling of wastewater offers several potential benefits to Cal Water and its customers. Perhaps the greatest of these benefits is to help maintain a sustainable groundwater supply either through direct recharge, or by reducing potable supply needs by utilizing recycled water for appropriate uses (e.g., landscape, irrigation) now being served by potable water. Currently, no wastewater is recycled for direct reuse in the District. The potential amount of recycled water that can be produced is proportional to the amount of wastewater that is generated by the District, and is discussed in the following sections.

6.5.1 Recycled Water Coordination

The relevant wastewater collection, treatment, and discharge agencies are as follows:

- The City of Livermore
- The East Bay Dischargers Authority
- Livermore Amador Valley Water Management Agency

6.5.2 Wastewater Collection, Treatment, and Disposal

The City of Livermore owns and operates the sewer system that consists of gravity sewers and pumping stations to collect wastewater from residential, commercial, and industrial customers. The collected wastewater is conveyed to the Livermore Water Reclamation Plant for treatment where it undergoes secondary or tertiary treatment with chlorination. The tertiary treatment consists of microfiltration and reverse osmosis and produces disinfected tertiary recycled water. The Water Reclamation Plant was last upgraded in 1993 and has a capacity to treat 8.5 MGD. It is currently treating flows of 4 to 7 MGD of wastewater. Up to 6 MGD of recycled water is provided to customers for such applications as firefighting and irrigation of landscaping at golf courses, airports, and wineries. None of this recycled water use occurs in Cal Water's Livermore service area.

The water not used for recycling is pumped to the transport system of the Livermore Amador Valley Water Management Agency (LAVWMA) for ultimate discharge into the San Francisco Bay. LAVWMA owns and operates the facilities that convey treated wastewater

from its member agencies' treatment plants west over the Dublin grade, through Castro Valley and the City of San Leandro, to a pipeline operated by the East Bay Discharger's Authority (EBDA). EBDA de-chlorinates the effluent and discharges it through a deepwater outfall into the San Francisco Bay. Along this route, a portion of the effluent water from the LAVWMA line is extracted, filtered and then recycled by Caltrans for irrigation of landscaping along Interstates 580 and 80.

Table 6-2 estimates the volume of wastewater collected from District customers in 2015. The estimate is calculated by annualizing 90% of January water use in the service area.

Table 6-2 Retail: Wastewater Collected Within Service Area in 2015							
Percentage of 2015 service area covered by wastewater collection system *(optional)*							
Percentage of 2015 service area population covered by wastewater collection system *(optional)*				Receiving Wastewater Treatment			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2015 (AF)		Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party?
City of Livermore	Estimated	4,182		City of Livermore	Livermore Water Reclamation Plant	No	
Total Wastewater Collected from Service Area in 2015:		**4,182**					

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015

✓	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.									
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2015 Volumes			
							Waste water Treated	Discharged Treated Waste water	Recycled Within Service Area	Recycled Outside of Service Area
						Total				

6.5.3 Recycled Water System

As stated above, there is no recycled water use in Cal Water's Livermore service area.

6.5.4 Recycled Water Beneficial Uses

There are no current or planned uses of recycled water in the District.

Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area

✓	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.										
	Name of Agency Producing (Treating) the Recycled Water:										
	Name of Agency Operating the Recycled Water Distribution System:										
	Supplemental Water Added in 2015										
	Source of 2015 Supplemental Water										
	Beneficial Use Type	General Description of 2015 Uses	Level of Treatment	2015	2020	2025	2030	2035	2040 (opt)
	Agricultural irrigation									
	Landscape irrigation (exc golf courses)									
	Golf course irrigation									
	Commercial use									
	Industrial use									
	Geothermal and other energy production									
	Seawater intrusion barrier									
	Recreational impoundment									
	Wetlands or wildlife habitat									
	Groundwater recharge (IPR)									
	Surface water augmentation (IPR)									
	Direct potable reuse									
			Total:	0	0	0	0	0	0
	IPR - Indirect Potable Reuse									

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual		
✓	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.	
Use Type	2010 Projection for 2015	2015 Actual Use
Agricultural irrigation		
Landscape irrigation (exc golf courses)		
Golf course irrigation		
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Surface water augmentation (IPR)		
Direct potable reuse		
Total		

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

Because Cal Water's service area is mostly built out, increasing the use of recycled water would require the installation of new piping systems throughout the District. Retrofitting the existing system to bring recycled water to existing customers would be very costly. Cal Water's Water Supply and Facilities Master Plan for the Livermore District included an analysis of potential recycled water customers and their projected demand. The analysis found that there is a potential demand of 780 AFY of recycled water in the Livermore service area. Based on the capital cost of the required infrastructure to develop a recycled water supply, the unit cost of recycled water would be about $3,350 per acre-foot, which is almost three times the cost of imported water from Zone 7. In addition, customers not receiving recycled water would be forced to bear the burden of increased rates to help fund these capital projects.

Cal Water supports the use of recycled water as a means to offset potable water use and has become one of the largest retail providers of recycled water in California. Cal Water is participating in the process of developing the City of Livermore's Recycled Water Master Plan and will offer recycled water to its customers if it is found to be cost effective. As a regulated utility Cal Water must receive approval from the CPUC prior to implementing a recycled water program.

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
✓	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
No planned actions	NA	NA	NA

6.6 Desalinated Water Opportunities

There are no opportunities for the development of desalinated water in the District by Cal Water. Zone 7 has updated its Water Supply Evaluation which identified participation in the Bay Area Regional Desalination Project as the only potentially-viable desalination option.

6.7 Exchanges or Transfers

Cal Water is not currently pursuing any direct transfer or exchange opportunities in its Livermore District.

6.7.1 Exchanges

No water exchanges are planned for the Livermore Districts.

6.7.2 Transfers

No water transfers are planned for the Livermore Districts.

6.7.3 Emergency Interties

Aside from the Zone 7 interties, Cal Water has interties with the City of Livermore.

6.8 Future Water Projects

The provisions of the thirty year contract with Zone 7 are such that Cal Water may not purchase or receive with or without compensation either directly or indirectly, any water for use in its service area from any source other than extraction of its Groundwater Pumping Quota or from purchase from Zone 7. Any financial incentive to seek other sources of supply are removed by a contract provision that obligates Cal Water to pay

Zone 7 for all its fixed costs that are associated with any quantity of water purchased from another source.

These provisions are in the contract to protect Zone 7's financial base. This base is necessary because as a State Water Project contractor Zone 7 is obligated to cover its portion of the project cost. In addition, Zone 7 must have the ability to finance facility construction. However, these provisions also obligate Zone 7 to take all prudent actions to maintain and enhance the reliability of the imported supply.

Cal Water will work with Zone 7, as it is able to improve the water supply reliability for the Valley. The contract has been structured to permit greater flexibility in the management of the Valley's water resources. The In-lieu pumping program and the emergency over-extraction provisions of the contract will be used to balance the annual fluctuations in supply availability.

In addition, Cal Water developed a Water Supply and Facilities Master Plan for the District in 2007. Water quality, supply reliability, and supply redundancy issues are addressed, along with the resulting capital improvement projects over a 20 year planning period. Cal Water will be studying the possibility of updating this document.

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
✓	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format. LOCATION OF THE NARRATIVE_____					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency
		If Yes, Agency Name				*This may be a range*

6.9 Summary of Existing and Planned Sources of Water

Table 6-8 shows the actual volumes of purchased water for calendar year 2015. Table 6-9 shows the projected supply volumes through 2040.

Consistent with the Zone 7 Agreement and with Zone 7's draft 2015 UWMP, Cal Water is assuming that purchased water will serve all demand that exceeds the groundwater supply. Therefore, the purchased supply volumes shown in Table 6-9 equal the difference between projected demand in each year and the GPQ.

Table 6-8 Retail: Water Supplies — Actual (AF)

Water Supply	Additional Detail on Water Supply	2015		
		Actual Volume	Water Quality	Total Right or Safe Yield *(optional)*
Purchased or Imported Water		4,463	Drinking Water	
Groundwater		2,361	Drinking Water	
Total		**6,824**		**0**

Table 6-9 Retail: Water Supplies — Projected (AF)

Water Supply	Projected Water Supply *Report To the Extent Practicable*									
	2020		2025		2030		2035		2040 *(opt)*	
	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Purchased	8,877		9,388		9,438		9,349		9,277	
Groundwater	3,069		3,069		3,069		3,069		3,069	
Total	**11,946**		**12,457**		**12,507**		**12,418**		**12,346**	

6.10 Climate Change Impacts to Supply

Cal Water recently completed an initial study of climate change impacts for a sample of its districts.[10] The sample districts account for 85% of Cal Water's total 2014 production and reflect the diversity of all Cal Water districts, including geographic, hydrologic, and climatic conditions and primary and secondary supply sources. Livermore was not included in this study. The study was undertaken because it is critical for Cal Water to gain a better understanding of the potential impacts of climate change on the availability of its diverse supplies. The impacts are inherently uncertain, but Cal Water believes that the only responsible course is to carefully incorporate climate change into its ongoing water supply planning.

The initial study represents a first step in that path. In order for Cal Water to determine how its long-term water supply planning should reflect climate change impacts, it must first have an understanding of what the impacts of climate change on its supply sources might be. That was the purpose of the study.

Changes in climate can affect the availability of local groundwater and surface water supplies, as well as purchased imported supplies. This study separately addressed the impacts on each of these for each sample district. It relied on the best available projections of changes in climate (temperature and precipitation) through the end of the century, and then used the climate projections to examine how surface water flows and groundwater recharge rates may change. The study generally relied on studies done by or data provided by wholesale suppliers.

The study results provide an integrated view of how projected climate changes may affect water supply availability for Cal Water's service districts, and represent a first step in integrating potential future climate change impacts into Cal Water's ongoing supply planning.

6.10.1 Estimating Changes in Climate

Climate change is primarily driven by increased concentrations of greenhouse gases (GHGs) in the atmosphere. The trajectory of future climate change is a function of the rate at which those concentrations are projected to increase and the manner in which the atmosphere and oceans respond to increased concentrations. Both are difficult to model. Thus, while the scientific community overwhelmingly agrees that climate change will occur (and indeed may already have begun), the trajectory of those changes is very uncertain.

[10] California Water Service Company, *Potential Climate Change Impacts on the Water Supplies of California Water Service*. January 2016.

The projections of temperature and precipitation that underlie this study are based on 40 of the latest Global Circulation Models (GCMs) run as part of the Coupled Model Intercomparison Project Phase 5 (CMIP5). Generally speaking, this type of approach is termed an ensemble analysis, for which the downscaled climate projections for any particular Cal Water Service District were based on the median of the 40 downscaled GCM datasets. The GCMs used by the analysis are driven by two GHG emission pathways that bound the possible trajectories of GHG concentrations.

6.10.2 Impacts of Climate Change on Water Supplies

Since the supplies for each district consist of a mix of local surface water, local groundwater, and/or purchased imports, climate change impacts were estimated for each of these components. Based on the breakdown of district production among the supply sources, Table 6-10 shows the ranges of projected overall climate change impacts on available supply, relative to the historic average.

Table 6-10 Projected Changes in Average Available Supply Due to Climate Change

District	Percentage Change in Supply			
		2020	2050	2100
BK	Minimum	-10%	-10%	-12%
	Maximum	-12%	-16%	-20%
VIS	Minimum	-7%	-8%	-8%
	Maximum	-9%	-10%	-14%
KRV	Minimum	-13%	-16%	-19%
	Maximum	-16%	-21%	-31%
MPS/SSF/BG	Minimum	0%	-2%	-6%
	Maximum	0%	-7%	-15%
LAS	Minimum	-3%	-3%	-10%
	Maximum	-4%	-18%	-28%
CH	Minimum	2%	2%	0%
	Maximum	3%	1%	-3%
ORO	Minimum	0%	8%	5%
	Maximum	0%	-8%	-7%
DOM/HR/PV	Minimum	0%	0%	-1%
	Maximum	0%	-2%	-3%
STK	Minimum	0%	0%	-8%
	Maximum	0%	-14%	-17%
SLN	Minimum	-6%	-6%	-6%
	Maximum	-7%	-7%	-7%

6.10.3 Next Steps and Key Conclusions

Possible next steps for Cal Water's study of climate change include:

- Methodological enhancements to reduce some of the uncertainties in the results;
- Development and acquisition of better and more complete data;
- Extending the study to other Cal Water districts;
- Developing a plan to mitigate anticipated climate change impacts on supply; and
- Integrating climate change into the Company's ongoing water supply planning.

Three critical messages emerged from the study:

- Cal Water supplies in the 21st century are likely to be adversely affected by climate change.
- These impacts will vary considerably across districts, depending on geography and source mix. For some districts, the impacts can be significant; for others, little or no impacts are projected.
- The impacts will generally increase over time. Anticipated late-century impacts are forecast to be significantly higher in some districts than impacts at mid-century. Moreover, during the period that climate change is forecast to increasingly constrain supplies, demands are also generally forecast to increase, further exacerbating the adverse impacts on water supply reliability.

Chapter 7
Water Supply Reliability Assessment

This chapter addresses the reliability of the Livermore District's water supplies. Assessment of water supply reliability is complex and dependent upon a number of factors, such as the number of water sources, regulatory and legal constraints, hydrological and environmental conditions, climate change, and expected growth, among others. Based on available historical information and projections of future water uses, regulatory and legal constraints, and hydrological and environmental conditions, including climate change, Cal Water has made its best determination of the future reliability of Livermore District's water supplies.

7.1 Constraints on Water Sources

The combined purchased water and groundwater supply of the District is projected to be able to serve all demands under all hydrologic conditions. This is consistent with Zone 7's draft 2015 UWMP, as discussed in Chapter 6.

Although unlikely, any change to current agreements with Zone 7 or the SWP could negatively affect the future availability of supply. Cal Water's current 30-year contract with Zone 7 ensures adequate supply through 2024.

Although the historical climatic record shows that the demand can be met by the supply, other factors which may threaten the reliability of supply include legal, environmental, water quality, and climatic issues for imported water and legal, water quality, and climatic issues for groundwater.

Another potential limitation on water supply reliability is water quality. Water delivered to customers in the Livermore District meets or surpasses all federal and state regulations. The U.S. Environmental Protection Agency as authorized by the Federal Safe Drinking Water Act of 1974 sets drinking water standards. A state can either adopt the USEPA standard or set state standards that are more stringent than those set by the federal government.

There are two general types of drinking water standards, Primary and Secondary. Primary Standards are designed to protect public health by establishing MCL for substances in water that may be harmful to humans. MCLs are established very conservatively for each contaminant and are generally based on health effects which may occur if a person were to drink two liters of the water per day for 70 years. Secondary Standards are based on the aesthetic qualities of the water such as taste, odor, color, and certain mineral content.

These standards, established by the State of California, specify limits for substances that may affect consumer acceptance of the water.

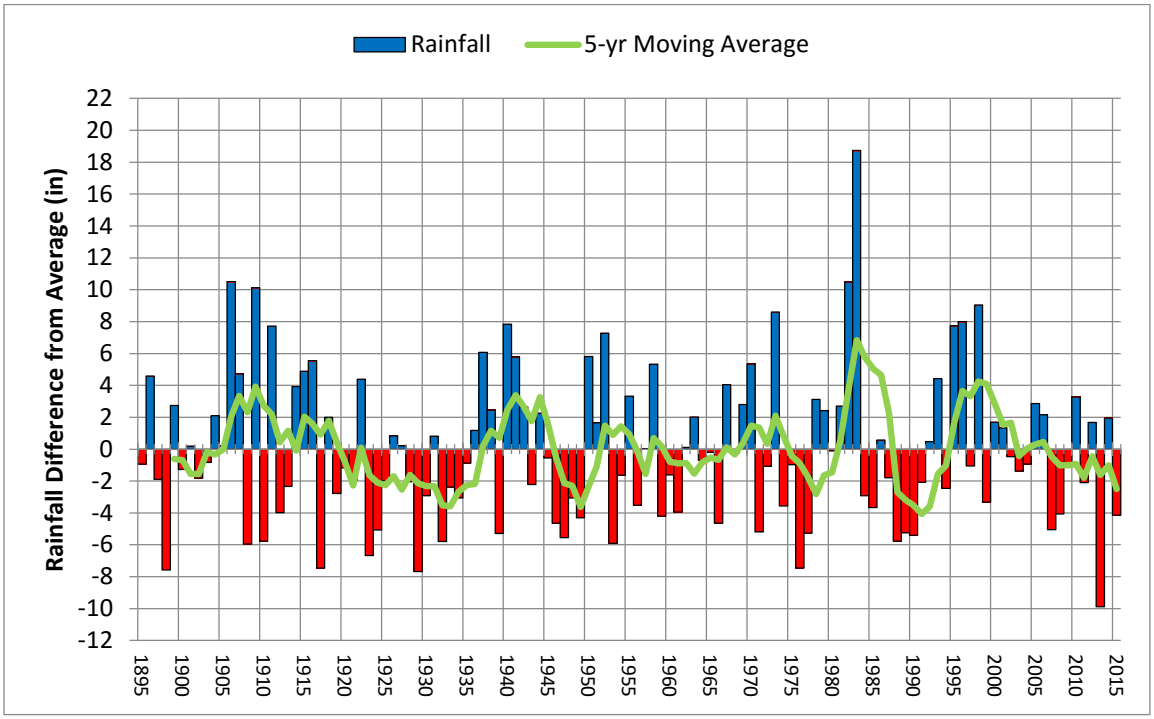
Nitrate and organic compounds are the primary contaminants of concern in the district. Arsenic, boron, and chromium are all found below current MCLs for these compounds. Nitrate contamination is believed to be from septic systems in areas not served by the City of Livermore's sewer system. Nitrate is generally found in the northeastern portion of the Livermore District. Wells that are affected by the presence of nitrate are blended with Zone 7 supply to manage high concentrations. Wells contaminated with organic compounds are retrofitted with granulated activated carbon (GAC) wellhead treatment or blending to ensure that concentrations remain below MCLs for these compounds.

7.2 Reliability by Type of Year

Figure 7-1 compares annual rainfall to the historic average (14.24 inches). The designation of Base Years for drought planning shown in Table 7-1 below comes from the data underlying this chart.

A normal hydrologic year occurred in 1957 when precipitation was approximately 0.1 percent below the historic average for the period from 1903 to 2015. The driest year occurred in 2013 when the rainfall was approximately 69% percent below average (4.34 inches). This is taken as the single dry year shown in Table 7-1. The multiple dry-water years used are 1988 through 1990.

Figure 7-1. Deviation of Annual Rainfall from Long-Term Average



Source: PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu

Table 7-1 Retail: Basis of Water Year Data			
Year Type	Base Year	Available supplies if year type repeats Agency may complete these columns for volume only, percent only, or both	
		Volume available (AF)	% of avg supply
Average Year	1957	12,507	100%
Single-Dry Year	2013	13,190	
Multiple-Dry Years 1st Year	1988	13,024	
Multiple-Dry Years 2nd Year	1989	12,979	
Multiple-Dry Years 3rd Year	1990	12,993	
NOTES: Available volumes are the maximum volumes across all forecast years in Tables 7-2, 7-3, and 7-4.			

7.3 Supply and Demand Assessment

As noted earlier, Cal Water's share of the local sustainable groundwater supply is 3,069 AFY. Cal Water plans to maximize this source each year. Also as noted earlier, Zone 7 will have adequate purchased supplies to provide the remaining demand to the Livermore system under all hydrologic conditions. (This excludes usage reductions that are not directly a function of Cal Water supplies, but are externally-imposed by other entities, such as the 2015 state-mandated cutbacks.)

Table 7-2 shows the projected supply and demand totals for a normal year. The supply totals match those in Table 6-9; the demand totals match Table 4-3.

Table 7-2 Retail: Normal Year Supply and Demand Comparison (AF)					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill fm Table 6-9)*	11,946	12,457	12,507	12,418	12,346
Demand totals *(autofill fm Table 4-3)*	11,946	12,457	12,507	12,418	12,346
Difference	**0**	**0**	**0**	**0**	**0**

Table 7-3 shows the projected supply and demand totals for the single dry year.

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison (AF)					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	12,597	13,137	13,190	13,096	13,019
Demand totals	12,597	13,137	13,190	13,096	13,019
Difference	**0**	**0**	**0**	**0**	**0**

Table 7-4 shows the projected supply and demand totals for the multiple dry years.

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison (AF)						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	12,439	12,972	13,024	12,931	12,856
	Demand totals	12,439	12,972	13,024	12,931	12,856
	Difference	**0**	**0**	**0**	**0**	**0**
Second year	Supply totals	12,396	12,926	12,979	12,886	12,811
	Demand totals	12,396	12,926	12,979	12,886	12,811
	Difference	**0**	**0**	**0**	**0**	**0**
Third year	Supply totals	12,409	12,941	12,993	12,900	12,825
	Demand totals	12,409	12,941	12,993	12,900	12,825
	Difference	**0**	**0**	**0**	**0**	**0**

7.4 Regional Supply Reliability

Cal Water coordinates on an ongoing basis with all relevant agencies in the region to optimize the use of regional water supplies. This includes Zone 7, the City of Livermore, and other public and private entities with which Cal Water can collaborate to protect and enhance local groundwater and surface water resources.

Cal Water also has its own aggressive conservation program that has and will continue to reduce per-capita usage and therefore demands on critical water sources. Cal Water is committed to helping its customers use water efficiently and has developed a range of water conservation programs to support this goal. To ensure that it is providing the right mix of programs in the most cost-effective manner possible, Cal Water routinely conducts comprehensive conservation program analysis and planning. This is done on a five-year cycle in tandem with the UWMP. Cal Water's current Conservation Master Plan provides the basis for the information on the implementation of and expected water savings from Demand Management Measures (DMMs) presented in Chapter 9. A copy of the Conservation Master Plan is provided in Appendix L.

Cal Water also monitors and supports the goals of the Bay Area IWRMP. These goals include:

- Promoting environmental, economic and social sustainability
- Improving water supply reliability and quality
- Protecting and improving watershed health and function and Bay water quality
- Improving regional flood management

- Creating, protecting, enhancing, and maintaining environmental resources and habitats

Chapter 8
Water Shortage Contingency Planning

This chapter describes the water shortage contingency plan for the Livermore District. The water shortage contingency plan includes the stages of response to a water shortage, such as a drought, that occur over a period of time, as well as catastrophic supply interruptions which occur suddenly. The primary objective of the water shortage contingency plan is to ensure that the District has in place the necessary resources and management responses needed to protect health and human safety, minimize economic disruption, and preserve environmental and community assets during water supply shortages and interruptions.

Rule 14.1, as filed with the California Public Utilities Commission (CPUC), serves as Cal Water's Water Shortage Contingency Plan (WSCP) and includes Mandatory Staged Restrictions of Water Use. In the event that more stringent measures are required, Cal Water may request the addition of Schedule 14.1 which includes Staged Mandatory Water Use Reductions.

On April 1, 2016, Cal Water filed its current Schedule 14.1 with the California Public Utilities Commission (CPUC).[11] The Schedule lays out the staged mandatory reductions and drought surcharges associated with Cal Water's Water Shortage Contingency Plan. This filing is consistent with Resolution W-5034, adopted by the Commission on April 9, 2015, ordering compliance with requirements of the State Water Resources Control Board (SWRCB).

Schedule 14.1 is an extension of the Water Shortage Contingency Plan provided in Rule 14.1. The information presented in this chapter, is based on the current versions of both Rule 14.1 and Schedule 14.1 which are based, in part, on the specific SWRCB requirements associated with the Governor's Executive Order requiring statewide cutbacks to address the unprecedented drought.

8.1 Stages of Action

Table 8-1 defines the four stages of action in Cal Water's WSCP.

[11] Schedule 14.1, along with the underlying Cal Water Rule 14.1 are included as Appendix J.

Table 8-1 Retail: Stages of WSCP		
Stage	Complete One or Both	
	Percent Supply Reduction[1]	Water Supply Condition
	numerical value as percent	*narrative description*
1	Up to 10%	Minimal shortage
2	Up to 20%	Moderate shortage
3	Up to 35%	Severe shortage
4	Greater than 35%	Critical shortage
[1] One stage in the WSCP must address a water shortage of 50%.		

8.2 Prohibitions on End Uses

Except where necessary, to address an immediate health or safety need, or to comply with a term or condition in a permit issued by a state or federal agency, customers are prohibited, at all times, from using potable water for the following actions, as each is declared a non-essential, wasteful use of water:

1. Use of potable water through a broken or defective plumbing fixture or irrigation system when Cal Water has notified the customer in writing to repair the broken or defective plumbing fixture or irrigation system, and the customer has failed to effect such repairs within seven (7) business days of receipt of such notice;

2. The application of potable water to landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures; and,

3. The use of a hose that dispenses potable water to wash vehicles, including cars, trucks, buses, boats, aircraft, and trailers, whether motorized or not, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use.

Restrictions of water use by Stage of the Water Shortage Contingency Plan are included in Table 8-2.

Table 8-2 Retail: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
1	Landscape - Limit landscape irrigation to specific days	Limited to no more than 3 days per week	Yes
1	Landscape - Limit landscape irrigation to specific times	Limited to 8 am and 6pm	Yes
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Must be repaired within 5 business days	Yes
1	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
1	Landscape - Other landscape restriction or prohibition	Prohibit application of potable water to outdoor landscapes within 48 hours of measurable rainfall.	Yes
1	Other - Require automatic shut off hoses		Yes
1	Other - Prohibit use of potable water for washing hard surfaces		Yes
1	Other	Limits filling ornamental lakes or ponds; prohibit use of potable water in a water feature except where the water is recirculated	Yes
2	Landscape - Limit landscape irrigation to specific days	Limited to no more than 3 days per week	Yes
2	Landscape - Limit landscape irrigation to specific times	Limited to 8 am and 6pm	Yes
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Must be repaired within 3 business days	Yes
2	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
2	Landscape - Other landscape restriction or prohibition	Prohibits irrigation of ornamental turf on public street medians with potable water; prohibit application of potable	Yes

Table 8-2 Retail: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
		water to outdoor landscapes within 48 hours of measurable rainfall.	
2	CII - Lodging establishment must offer opt out of linen service		Yes
2	CII - Restaurants may only serve water upon request		Yes
2	Other - Require automatic shut off hoses		Yes
2	Other - Prohibit use of potable water for washing hard surfaces		Yes
2	Other	Limits filling ornamental lakes or ponds; prohibit use of potable water in a water feature except where the water is recirculated	Yes
3	Landscape - Limit landscape irrigation to specific days	Limited to no more than 2 days per week	Yes
3	Landscape - Limit landscape irrigation to specific times	Limited to 8 am and 6pm	Yes
3	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Must be repaired within 2 business days	Yes
3	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
3	Landscape - Other landscape restriction or prohibition	Prohibits irrigation of ornamental turf on public street medians with potable water; prohibit application of potable water to outdoor landscapes within 48 hours of measurable rainfall.	Yes
3	CII - Lodging establishment must offer opt out of linen service		Yes

Table 8-2 Retail: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
3	CII - Restaurants may only serve water upon request		Yes
3	Other - Require automatic shut off hoses		Yes
3	Other - Prohibit use of potable water for washing hard surfaces	Prohibits use of potable water for street cleaning with trucks except for initial wash-down for construction purposes if street sweeping is not feasible	Yes
3	Other	Limits filling ornamental lakes or ponds; prohibit use of potable water in a water feature except where the water is recirculated	Yes
3	Other - Prohibit use of potable water for construction and dust control	Prohibited unless no other method or source of water can be used	Yes
4	Landscape - Prohibit all landscape irrigation	Prohibited except with hand-held bucket nozzle to maintain trees and shrubs.	Yes
4	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Must be repaired within 1 business day	Yes
4	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
4	CII - Lodging establishment must offer opt out of linen service		Yes
4	CII - Restaurants may only serve water upon request		Yes
4	Other - Require automatic shut off hoses		Yes
4	Other - Prohibit use of potable water for washing hard surfaces	Prohibits use of potable water for street cleaning with trucks	Yes

Table 8-2 Retail: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
4	Other	Limits filling ornamental lakes or ponds; prohibit use of potable water in a water feature except where the water is recirculated	Yes
4	Other - Prohibit use of potable water for construction and dust control	No exceptions	Yes

8.3 Penalties, Charges, Other Enforcement of Prohibitions

In accordance with Rule 14.1, Cal Water is authorized to take the following actions to enforce restrictions of water use that are in effect:

FIRST VIOLATION: Cal Water shall provide the customer with a written notice of violation.

SECOND VIOLATION: If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the first violation, Cal Water shall provide the customer with a second written notice of violation and is authorized to install a flow-restricting device on the customer's service line.

If Schedule 14.1 is implemented, Cal Water is authorized to take the following actions when its personnel verify a customer is using potable water for non-essential, wasteful uses.

First Violation: Cal Water shall provide the customer with a written notice of violation. In addition, Cal Water is authorized to take the following actions:

A. If the customer currently receives service through a metered connection, install a real-time water measurement device on the customer's service line and provide the customer with access to information from the device. The cost of the device, including installation and ongoing operating costs, may be billed to the customer, and nonpayment may result in discontinuance of service.

B. If the customer does not currently receive service through a metered connection, install a water meter on the customer's service line, charge the customer for water

use pursuant to Cal Water's metered service tariffs and rules, and install a real-time water measurement device on the customer's service line and provide the customer with access to information from the device. The cost of the device, including installation and ongoing operating costs, may be billed to the customer, and nonpayment may result in discontinuance of service.

Second Violation: If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the first violation, Cal Water shall provide the customer with a second written notice of violation. In addition to the actions prescribed under the first violation above, Cal Water is authorized to take the following actions:

A. Apply the following waste of water penalties, which are in addition to any other charges authorized by this Schedule or other Cal Water tariffs.

   i. If Stage 1 is in effect, $25
   ii. If Stage 2 is in effect, $50
   iii. If Stage 3 is in effect, $100
   iv. If Stage 4 is in effect, $200

B. At its sole discretion, waive the waste of water penalty if the customer participates in a water use evaluation provided by Cal Water and/or provides documentation to Cal Water proving that a drip irrigation system, micro spray irrigation system, high-efficiency sprinkler system, or properly programmed smart irrigation controller has been installed, after a notice of violation was delivered, and is in use at the customer's service address.

Third Violation: If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the second violation, Cal Water shall provide the first and second violations above, Cal Water is authorized to take the following actions:

A. Apply the following waste of water penalties, which are in addition to any other charges authorized by this Schedule or other Cal Water tariffs.

   i. If Stage 1 is in effect, $50
   ii. If Stage 2 is in effect, $100
   iii. If Stage 3 is in effect, $200
   iv. If Stage 4 is in effect, $400

B. At its sole discretion, waive the waste of water surcharge if the customer participates in a water use evaluation provided by Cal Water and/or provides documentation to

Cal Water proving that a drip irrigation system, micro spray irrigation system, high-efficiency sprinkler system, or properly programmed smart irrigation controller has been installed, after notice of violations have been delivered, and is in use at the customer's service address.

Fourth Violation: If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the third violation, Cal Water shall provide the customer with a fourth written notice of violation. In addition to actions set forth in previous violations prescribed above, Cal Water is authorized to install a flow-restricting device on the customer's service line.

Egregious Violations: Notwithstanding the foregoing framework for penalties, customers who Cal Water has verified are egregiously using potable water for non-essential, wasteful uses are subject to having a flow- restricting device installed on their service line. After providing the customer with one notice of egregious violation, either by direct mail or door hanger, which documents the egregious use of potable water for non-essential, wasteful uses and explains that failure to correct the violation may result in the installation of a flow-restricting device on the customer's service line, Cal Water is authorized to install a flow-restricting device on the customer's service line.

DROUGHT SURCHARGES

Cal Water may elect to implement actions such as water budgets with associated surcharges through the implementation of Schedule 14.1. An example of such a program is included in Appendix J.

8.4 Consumption Reduction Methods by Agencies

Table 8-3 Retail: Stages of WSCP - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference *(optional)*
2	Expand Public Information Campaign	
2	Offer Water Use Surveys	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.
2	Provide Rebates or Giveaways of Plumbing Fixtures and Devices	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.
2	Provide Rebates for Landscape Irrigation Efficiency	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.

Table 8-3 Retail: Stages of WSCP - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference *(optional)*
2	Decrease Line Flushing	
2	Reduce System Water Loss	
2	Increase Water Waste Patrols	
2	Other	Mandatory water budgets and banking--Water budgets will be based on a customer's consumption during a historical base period and will include a percentage reduction designed to meet necessary water-use reductions.
2	Implement or Modify Drought Rate Structure or Surcharge	Drought surcharges charged to customers for each unit of water used over the established water budget for the billing period. For Stage 2 surcharges are two times the highest residential tier rate, with exceptions discussed in Section 8.3
3	Expand Public Information Campaign	
3	Offer Water Use Surveys	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.
3	Provide Rebates or Giveaways of Plumbing Fixtures and Devices	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.
3	Provide Rebates for Landscape Irrigation Efficiency	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.
3	Decrease Line Flushing	
3	Reduce System Water Loss	
3	Increase Water Waste Patrols	
3	Other	Mandatory water budgets and banking
3	Implement or Modify Drought Rate Structure or Surcharge	Drought surcharges charged to customers for each unit of water used over the established water budget for the billing period.
4	Expand Public Information Campaign	

Table 8-3 Retail: Stages of WSCP - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference *(optional)*
4	Offer Water Use Surveys	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.
4	Provide Rebates or Giveaways of Plumbing Fixtures and Devices	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.
4	Provide Rebates for Landscape Irrigation Efficiency	Offered as part of standard conservation program. Will expand as needed to achieve additional savings.
4	Decrease Line Flushing	
4	Reduce System Water Loss	
4	Increase Water Waste Patrols	
4	Other	Mandatory water budgets and banking
4	Other	Mandatory water budgets and banking
4	Implement or Modify Drought Rate Structure or Surcharge	Drought surcharges charged to customers for each unit of water used over the established water budget for the billing period.
NOTES: The actions included may be implemented through a combination of Rule 14.1 and Schedule 14.1 and would be evaluated based on specific need.		

8.5 Determining Water Shortage Reductions

All customers in the District are metered. The metered demands will be used to monitor reductions that result from actions taken by Cal Water when implementing its WSCP.

8.6 Revenue and Expenditure Impacts

In 2008 the CPUC allowed for the creation of a Water Revenue Adjustment Mechanism (WRAM) and Modified Cost Balancing Accounts (MCBA). The goals of the WRAM and MCBA are to sever the relationship between sales and revenue to remove the disincentive to reduce water use. The WRAM and MCBA are designed to be revenue neutral in order to ensure that both the utility and ratepayers are neither harmed nor benefitted.

During the current drought, the CPUC authorized a memorandum account through Resolution W-4976 to track incremental drought-related costs and waste of water

penalties which may be recovered through rates if deemed appropriate by the Commission.

8.7 Resolution or Ordinance

Cal Water is an investor-owned water utility that is regulated by the California Public Utilities Commission (CPUC). As such, it does not have the authority to adopt resolutions or ordinances. As described above, Rule 14.1, as filed with the California Public Utilities Commission (CPUC), serves as Cal Water's Water Shortage Contingency Plan and includes Mandatory Staged Restrictions of Water Use. In the event that more stringent measures are required, Cal Water may request the addition of Schedule 14.1 which includes Staged Mandatory Water Use Reductions. Cal Water will work with local planning and enforcement departments to ensure consistency with local resolutions and ordinances.

8.8 Catastrophic Supply Interruption

Cal Water has an Emergency Response Plan (ERP) in place that coordinates the overall company response to a disaster in any or all of its districts. In addition, the ERP requires each District to have a local disaster plan that coordinates emergency responses with other agencies in the area.

Cal Water also inspects its facilities annually for earthquake safety. To prevent loss of these facilities during an earthquake, auxiliary generators and improvements to the water storage facilities have been installed as part of Cal Water's annual budgeting and improvement process.

During an emergency, the Livermore District can transfer water through an interconnection to or from the neighboring water system owned by the City of Livermore Water Department. This interconnection can be used to help offset the impact of interrupted service to district customers or, being two way connections, these facilities can be used to supply either imported water or pumped groundwater from the District to the City of Livermore water system. Also, if Zone 7 experiences a period of supply deficiency, Cal Water may extract groundwater from the Main Basin in excess of the normal contract amount.

Cal Water has generators installed at key facilities throughout the system in order to maintain water distribution throughout the system. These include backup generators at well sites and booster sites to maintain supply throughout the system. These generators are routinely tested, maintained, and replaced when needed.

8.9 Minimum Supply Next Three Years

Table 8-4 provides estimates of total supply volumes that would be produced if the hydrology of the multi-year drought period discussed in Chapter 7 were to occur in the immediate future. These volumes are equal to the projected 2020 supplies in Table 7-4. Since District near-term supplies over a multi-year dry period are projected to be at least sufficient to serve demands, it is likely that current supply sources could produce more water. Cal Water does not have sufficient information to estimate how much more.

Table 8-4 Retail: Minimum Supply Next Three Years (AF)

	2016	2017	2018
Available Water Supply	12,439	12,396	12,409

Chapter 9
Demand Management Measures

This chapter provides a summary of past and planned demand management measure (DMM) implementation in the Livermore District, as well as an overview of the expected water savings and projected compliance with the Water Conservation Act of 2009 (SB X7-7).

This chapter contains the following sections:

9.1 Demand Management Measures for Wholesale Agencies

9.2 Demand Management Measures for Retail Agencies

9.3 Implementation over the Past Five Years

9.4 Planned Implementation to Achieve Water Use Targets

9.5 Members of the California Urban Water Conservation Council

9.1 Demand Management Measures for Wholesale Agencies

Because the Livermore District is a retail water supplier, this section does not apply.

9.2 Demand Management Measures for Retail Agencies

Cal Water centrally administers its conservation programs for its 24 districts. For purposes of this section, these programs have been grouped in accordance with the DMM categories in Section 10631(f) of the UWMP Act. These categories are:

(i) Water waste prevention ordinances
(ii) Metering
(iii) Conservation pricing
(iv) Public education and outreach
(v) Distribution system water loss management
(vi) Water conservation program coordination and staffing support, and
(vii) Other demand management measures

Following are descriptions of the conservation programs Cal Water operates within each of these DMM categories.

9.2.1 Water Waste Prevention Ordinances

Because of its investor owned status Cal Water enforcement of water use restrictions is authorized by the CPUC through Rule 14.1 or Schedule 14.1. Restrictions may also be regulated by ordinances passed by the local governments in each community served. Cal Water has worked with municipalities to pass ordinances and coordinate activities. Cal Water will continue this effort on an ongoing basis. In the Livermore District the City of Livermore has passed a water conservation ordinance and mandatory drought water use restrictions as well as a water efficient landscape ordinance consistent with state requirements. Copies of these are included in Appendix J.

Due to worsening drought conditions, Cal Water filed Schedule 14.1 with the CPUC in the spring of 2015 which went into effect on June 1, 2015. Cal Water's Schedule 14.1 filing, which applies to both residential and non-residential customers, is responsive to Governor Brown's emergency drought declaration and executive order requiring a statewide 25% reduction in urban potable water use. It also complies with regulations adopted by the State Water Resources Control Board (State Board) and the CPUC to achieve that reduction by the end of February 2016. Schedule 14.1 puts measures in place to enable Cal Water to enforce the water-use prohibitions set by the State Board, including:

- Applying water to outdoor landscapes that causes runoff onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots, or structures
- Using a hose to wash motor vehicles unless the hose is fitted with a shut-off nozzle or device that causes it to cease dispensing water immediately when not in use
- Applying water to driveways and sidewalks
- Using water in a fountain or other decorative water feature, except where the water is part of a recirculating system
- Applying water to outdoor landscapes during and within 48 hours after measurable rainfall
- Using potable water to irrigate outside of new construction without drip or microspray systems
- Using potable water on street medians
- Filling or refilling ornamental lakes or ponds except to sustain existing aquatic life

Additionally, Schedule 14.1 requires that:

- Customers must fix leaks within their control within five business days of notification

- Hotel/motel operators must provide option to not have towels or linens laundered daily during a guest's stay, and must provide clear notice of this option in easy-to-understand language
- Restaurants and other eating and drinking establishments may only serve drinking water upon request

With the approval of the Schedule 14.1 filing, beginning June 1, 2015, individual customers in each Cal Water district were provided water budgets based upon their water use each month in 2013 minus the state-mandated reduction for the Livermore District of 24%. If a customer used less than his or her water budget, the unused water was carried forward, similar to rollover minutes on a cell phone plan. Water used in excess of the monthly budget was subject to a drought surcharge. The surcharge was discounted for customers on Cal Water's Low-Income Rate Assistance (LIRA) program. To help with compliance, the customer's monthly bill showed his or her water budget for the following month. Customers' water use history back to 2011 and their water budgets were also available online beginning in June of 2015.

Cal Water's Schedule 14.1 filing is included as Appendix J of this UWMP.

9.2.2 Metering

All service connections within the Livermore District are metered. Meters are read monthly and routinely maintained and calibrated. Customers are billed monthly based on their metered water use.

Cal Water is also piloting automatic meter reading (AMR) and advanced metering infrastructure (AMI) in several of its districts. AMI may be used by Cal Water in the future to detect and alert households of leaks and other possible problems as well as to provide customers with tailored water use information to help them use water more efficiently.

9.2.3 Conservation Pricing

As an investor owned utility, Cal Water rates and charges are reviewed and authorized by the CPUC every three years. Starting in 2008 Cal Water adopted tiered rate designs for single family residential service. Uniform volumetric rate designs are employed by Cal Water for other water service classes. Current volumetric rates by class of service within Livermore District are provided in Table 9-1.

Table 9-1: Volumetric Water Rates by Class of Service ($/CCF)				
Class of Service	Tier 1 (1-9 ccf)	Tier 2 (10-23 ccf)	Tier 3 (24+ ccf)	All units of water
Single Family	$3.08	$3.27	$3.93	
Non Residential				$3.40

Per the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU), conservation pricing provides economic incentives to customers to use water efficiently via a volumetric water rate. The MOU considers uniform, seasonal, tiered (block), and allocation-based rate designs as each being potentially consistent with conservation pricing, provided that either (1) 70% or more of total annual revenue is derived from the volumetric component of the rate design or (2) the proportion of total revenue from the volumetric component of the rate design equals or exceeds the long-run incremental cost of providing water service, or (3) the utility's metering technology, rate structure, and customer communication programs satisfy various requirements specified by the MOU.

The Livermore District's rate structure, metering, and customer communication programs comply with Option 3 of the Urban MOU's definition of conservation pricing. Urban MOU BMP compliance reports are provided in Appendix L.

9.2.4 Public Education and Outreach

Cal Water's public outreach program is divided into four components, as follows:

Residential Customer Assistance – This category provides tailored assistance to residential customers through home water surveys and monthly water use reports. It provides assistance to residential customers wanting to reduce their indoor and outdoor water uses. While available to all residential customers, marketing of home water surveys is generally focused on high use residential customers.

Non-Residential Customer Assistance – This category provides tailored assistance to commercial customers through commercial water surveys, monthly landscape reports to large landscape customers, and large landscape water use surveys. It provides assistance to commercial customers wanting to reduce their use of water for sanitation, hygiene, process, and landscape purposes.

Public Information and School Education – Cal Water's public information program provides general information on the need for and value and methods of water conservation through multiple media outlets, including its website, direct mail, external print media, and radio. Cal Water's school education program includes the Cal Water

H2O Challenge, a project-based learning competition for grades 4-6, Cal Water Town, an interactive online learning tool, and general information and learning materials for students and teachers.

Rebate Program Information and Marketing – Through its website, bill inserts, newsletters, and radio and print media, Cal Water advertises and markets a variety of conservation rebate programs, including rebate programs for high-efficiency toilets, urinals, and clothes washers, and irrigation equipment and landscape efficiency improvements.

9.2.5 Programs to Assess and Manage Distribution System Real Loss

Per the MOU, Cal Water annually quantifies the District's volume of apparent and real water loss. Cal Water's conservation staff have received training in the AWWA water audit method and component analysis process and have completed water balances for each Cal Water district using AWWA's water audit software. For the five-year period 2010-2014, apparent and real water loss in the Livermore District averaged 385 AF, or approximately 4 percent of total production.

In addition to its routine and planned system maintenance and water loss reporting, Cal Water is planning to implement a lift-and-shift sonic data logger leak detection program in the District starting in 2017. The lift-and-shift program will survey up to one-third of main miles annually in three shifts. Each leak detection shift will last approximately 80 days. Lift-and-shift sonic data logging technology will enable Cal Water to quickly and efficiently locate leaks in one part of the water distribution network and then redeploy the equipment to another part of the network. Staff will review sound files from the loggers for potential leak warnings and discuss this information with District management, who can then assign work orders for repair crews to investigate and repair leaks. Cal Water conservatively estimates the lift-and-shift program will reduce real water loss in the District by up to 44 AFY – enough water for about 140 households. Additional potential benefits of the program include reduced excavation of streets, less staff overtime spent responding to and repairing catastrophic main breaks, and improvement to the best management practices of the valve maintenance program. This program was submitted as part of Cal Water's 2015 General Rate Case with the CPUC and is subject to CPUC approval prior to implementing.

9.2.6 Water Conservation Program Coordination and Staffing Support

Because of its status as an investor owned utility, conservation program staffing positions must be approved by the CPUC through its General Rate Case every three years. Currently authorized conservation program staffing consists of five full-time positions, which include:

- One Conservation Program Manager
- One Conservation Program Analyst
- One Landscape Program Analyst
- Two Conservation Program Coordinators

These five staff positions manage all aspects of Cal Water's conservation programs deployed across 24 separate districts serving a combined population of about 2 million through 470,000 service connections. Staffing constraints have been one of the primary challenges Cal Water has faced in expanding the scope and reach of its conservation programs throughout its service districts. To ensure adequate management and oversight of the expansion and utilization of its conservation programs, Cal Water is proposing in its current General Rate Case to add three additional Conservation Program Coordinator positions. Proposed staffing is summarized in Table 9-2. If approved, total staffing level would increase from 5 to 8 FTE positions. While this would still be below the average for conservation programs of similar size and scope operated by other water utilities, it would be a substantial improvement over Cal Water's current conservation program staffing levels.

Table 9-2: Planned Conservation Program Staffing		
Staff Position	Responsibilities	Position Status
Conservation Program Manager	Long-term program planning and implementation; program budgeting and oversight; staff oversight and management; contracting and oversight of outside services	Existing
Conservation Program Coordinator	Management and oversight of conservation programs in Cal Water districts	2 Existing 3 Proposed
Conservation Program Analyst	Program analysis and reporting, including but not limited to preparation of reports related to CPUC requirements, urban water management plans, BMP compliance reports, and SB X7-7 compliance reports	Existing
Landscape Program Analyst	Analysis and tracking of landscape program implementation and performance; coordination of landscape program rollouts; GIS/GPS management; assist regional conservation program coordinators with management/oversight of landscape programs	Existing

9.2.7 Other Demand Management Measures

In addition to the DMM programs described above, Cal Water operates rebate, give-away, and direct installation programs aimed at plumbing fixture replacement and irrigation equipment and landscape efficiency improvements. Following are brief descriptions of each of these DMMs.

MaP Premium and Non-Premium Toilet Replacement – This program replaces old toilets with MaP certified high-efficiency toilets. Financial rebates, direct installation, and direct distribution are used to deliver toilets to customers. For residential customers, MaP premium certified toilets which have greater water savings potential are eligible for a $100 rebate while the rebate for MaP non-premium toilets is $50. For commercial customers, a rebate of $100 is available for valve-type toilets flushing 1.28 gallons or less and EPA WaterSense labeled tank-type toilets. Cal Water centrally administers the program. This program is available to all residential and non-residential customers. Cal Water markets the program through direct mail, print media, bill stuffers, and its website.

Where advantageous, Cal Water partners with local or regional agencies and community organizations to offer the program.

Urinal Valve and Bowl Replacement – This program replaces old urinals with high-efficiency urinals meeting the new 0.125 gallon per flush water use standard adopted by the California Energy Commission in April 2015. Financial rebates of up to $150 are available to customers. The program targets offices and public buildings receiving significant foot traffic. Cal Water centrally administers the program. While this program is available to all non-residential customers, marketing focuses on prime targets, such as restaurants and high-density office buildings. Cal Water markets the program through direct mail, print media, bill stuffers, and its website.

Clothes Washer Replacement – This program provides customer rebates up to $150 for residential and up to $200 for non-residential high-efficiency clothes washers. The program targets single-family households, multi-family units, multi-family common laundry areas, and commercial coin-op laundries. Cal Water centrally administers the program, and markets the program through direct mail, print media, bill stuffers, and its website. This program is available to all residential and non-residential customers. Where advantageous, Cal Water partners with local or regional agencies to offer the program.

Residential Conservation Kit Distribution – This program offers Cal Water residential customers conservation kits featuring a range of water-saving plumbing retrofit fixtures. Kits are 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 includes the following items: high-efficiency showerheads, kitchen faucet aerator, bathroom faucet aerators, full-stop hose nozzle, and toilet leak detection tablets. Cal Water centrally administers this program as part of a company-wide program operated in each of its districts. This program is available to all residential customers. Cal Water markets the program through direct mail, print media, bill stuffers, and through its website.

Smart Controllers Rebates/Vouchers – This program targets residential and non-residential customers with high landscape water use. The program offers financial incentives up to $125 for residential controllers and up to $25 per station for commercial-grade controllers 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 educates contractors about the customer benefits of Smart Controllers along with proper installation of the devices. This program is offered to all residential and non-residential customers. Cal Water markets the program through direct mail, print media, bill stuffers, and its website.

High Efficiency Irrigation Nozzle Web Vouchers/Rebates – Water efficient sprinkler nozzles (popup and rotating) and integrated pressure-regulated spray bodies use significantly 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 are able to obtain the nozzles and spray bodies either directly through Cal Water or via a web-voucher program. Restrictions on the number of nozzles individual customers may receive vary by customer class and/or landscape size. Cal Water centrally administers this program as part of a company-wide program operated in most of its districts.

Turf Buy-Back – This program offers customers a $1 per square foot rebate to replace turf with qualified drought-tolerant landscaping. Customer applications are screened to ensure program requirements are met, including before and after photos of the retrofitted landscape area. Turf replacement rebates were offered in a subset of Cal Water districts starting in 2014 and offered across all districts starting in 2015 as a drought response measure. Governor Brown's Executive Order B-29-15 calls on the Department of Water Resources to lead a statewide initiative, in partnership with local agencies, to replace 50 million square feet of lawns and ornamental turf with drought tolerant landscapes.

Table 9-3 summarizes the DMMs currently available to Livermore district customers.

Table 9-3: Cal Water DMMs Available to Livermore District Customers			
1. Plumbing Fixture Replacement	Customer Class Eligibility		
Rebates	SFR	MFR	COM
MaP Premium Toilet	✓	✓	✓
MaP Non-Premium Toilet	✓	✓	✓
Urinal Bowl & Valve (< 0.125 gal)			✓
Clothes Washer (In Unit)	✓	✓	
Clothes Washer (Commercial)		✓	✓
Direct Install			
MaP Premium Toilet	✓	✓	
MaP Non-Premium Toilet			
Urinal Valve (< 0.125 gal)			
Direct Distribution			
MaP Premium Toilet	✓	✓	
Conservation Kits (showerheads, aerators)	✓		✓
2. Irrigation Equipment/Landscape Upgrades			
Rebates/Vouchers			
Smart Irrigation Controller	✓	✓	✓
High Efficiency Irrigation Popup Nozzle	✓	✓	✓
High Efficiency Irrigation Rotating Nozzle	✓	✓	✓
High Efficiency Irrigation Spray Body		✓	✓
Turf Buy-Back	✓	✓	✓
Direct Distribution			
Smart Irrigation Controller		✓	✓
3. Residential Customer Assistance			
Residential Water Survey	✓	✓	
4. Non-Residential Customer Assistance			
Commercial Water Use Surveys			✓
Monthly Water Use Report			✓
Large Landscape Water Use Survey			✓
Note: MaP Premium toilets: flush vol <= 1.1 gallons; MaP Non-Premium: flush vol <= 1.28 gallons.			

9.3 Implementation over the Past Five Years

Implementation of customer DMMs over the past five years is summarized in Table 9-4. Estimated annual and cumulative water savings from customer DMM implementation is shown in the last row of the table. The water savings estimates are only for the customer DMMs listed in Table 9-3. They do not include water savings from water waste prevention ordinances, conservation pricing, general public information, or distribution system water loss management DMMs. Estimated water savings shown in Table 9-4 were calculated with the Alliance for Water Efficiency's Water Conservation Tracking Model.

Significant additional reductions in water demand were achieved in 2015 in response to the district's drought response measures, including its public information campaigns to save water and its Schedule 14.1 water use restrictions, water budgets, and drought surcharges that went into effect June 1, 2015. Relative to its 2013 reference year under the State Board's Emergency Regulation for Statewide Urban Water Conservation, water demand between June and December 2015 decreased by 41.4 percent. Per capita potable water use in 2015 was 105 GPCD compared to the District's SB X7-7 2015 interim water use target of 177 GPCD. As discussed in Chapter 5 and the next section, for purposes of SB X7-7 compliance, the District has formed a regional alliance with Cal Water's four other Bay Area water districts. Per capita potable water use in 2015 for the regional alliance was 110 GPCD compared to the regional alliance's 2015 interim water use target of 164 GPCD.

Table 9-4: Implementation of Customer DMMs: 2011-2015		
1. Plumbing Fixture Replacement	2011 – 2015 Total	Average Annual
Toilets & Urinals (number distributed)	3,080	616
Clothes Washers (number distributed)	1,910	382
Conservation Kits (number distributed)	2,143	429
2. Irrigation Equipment/Landscape Upgrades		
Smart Controllers (number distributed)	72	14
Nozzles & Spray Bodies (number distributed)	11,301	2,260
Turf Buy-Back (sq ft removed)	83,844	16,769
3. Residential Customer Assistance		
Surveys/Audits (homes receiving)	256	51
4. Non-Residential Customer Assistance		
Surveys/Audits (sites receiving)	19	4
Large Landscape Reports (sites receiving)	572	114
Estimated Water Savings (AF)	**659**	**132**
Note: Estimated water savings shown in the table are only for the 2011-2015 period. Water savings from customer DMMs implemented between 2011 and 2015 will continue after 2015 and last for the useful life of each DMM.		

Annual expenditure for implementation of customer DMMs over the past five years is summarized in Table 9-5. The table highlights expenditures from 2011 through 2015 for administrative, research, planning, program, and public information and school education.

Table 9-5: Annual DMM Expenditure: 2011-2015		
Expenditure Category	2011 – 2015 Total	Average Annual
Admin, R&D, planning	$316,058	$63,212
Program expenditures & incentives	$1,252,120	$250,424
Public information & school education	$163,711	$32,742
Total	**$1,731,889**	**$346,378**

9.4 Planned Implementation to Achieve Water Use Targets

Planned implementation of customer and water loss management DMMs for the period 2016 to 2020 are summarized in Table 9-6. Estimated annual and cumulative water

savings from customer and water loss management DMM implementation is shown in the last two rows of the table. The water savings estimates are only for the customer DMMs listed in Table 9-3 plus the leak detection program Cal Water has proposed to start in 2017. They do not include potential water savings from water waste prevention ordinances, conservation pricing, or general public information and school education DMMs. Estimated water savings shown in Table 9-6 were calculated with the Alliance for Water Efficiency's Water Conservation Tracking Model.

In addition to the DMMs shown in Table 9-6, Cal Water will continue to fully implement the water loss ordinance, metering, conservation pricing, public outreach, and conservation program coordination and staffing support DMMs described previously.

Annual expenditure for DMM implementation in the Livermore District, including pro-rated staffing costs, is expected to average $0.49 million. Cumulative expenditure for DMM implementation for the period 2016-2020 is expected to total $2.47 million. Of this total, approximately 51% is earmarked for plumbing fixture, irrigation equipment, and landscape efficiency upgrades; 16% is earmarked for public information and school education programs; 4% is earmarked for distribution system water loss management; 9% is earmarked for site surveys/audits and customer water use reports; and 19% is earmarked for administrative and labor costs.

Because Cal Water is an investor-owned utility, the planned programs and corresponding expenditures for the next five years are subject to CPUC review and approval. The amount of program implementation for 2016 shown in Table 9-6 is what was approved in Cal Water's last General Rate Case. The amounts of program implementation for 2017-2019 are what Cal Water has proposed in its current General Rate Case. Conservation programs and budgets for 2020 will be determined by the subsequent General Rate Case. However, the amounts shown for 2020 in Table 9-6 are consistent with the amounts recommended in Cal Water's current Conservation Master Plan (see Appendix L).

Table 9-6: Planned Implementation of Customer and Water Loss Management DMMs: 2016-2020					
1. Plumbing Fixture Replacement	2016	2017	2018	2019	2020
Toilets & Urinals (number distributed)	518	352	352	352	352
Clothes Washers (number distributed)	210	300	300	300	300
Conservation Kits (number distributed)	101	150	150	150	150
2. Irrigation Equipment/Landscape Upgrades					
Smart Controllers (number distributed)	127	31	31	31	31
Nozzles & Spray Bodies (number distributed)	10,676	4,950	4,950	4,950	4,950
Turf Buy-Back (sq ft removed)	65,000	65,000	65,000	65,000	65,000
3. Residential Customer Assistance					
Monthly home water reports (homes receiving)	5,008	5,008	5,008	5,008	5,008
Surveys/Audits (homes receiving)	125	75	75	75	75
4. Non-Residential Customer Assistance					
Surveys/Audits (sites receiving)	0	5	5	5	5
Large Landscape Reports (sites receiving)	113	113	113	113	113
5. Water Loss Management					
Leak Detection (miles of main)	0	22	33	45	45
Estimated Annual Water Savings (AFY)	**166**	**217**	**256**	**295**	**322**
Cumulative Water Savings (AF)	**166**	**383**	**639**	**934**	**1,256**

Cal Water puts all proposed conservation programs through a rigorous benefit-cost analysis as part of a comprehensive program review and assessment process. The benefit-cost analysis yields information on expected water savings over the useful life of each DMM, cost of water savings, and avoided water supply cost of water savings. Results are used to rank programs in terms of cost-effectiveness, calculate the overall program unit cost of saved water and program benefit-cost ratio for each district, and develop district conservation budgets. The proposed DMMs for the Livermore District have an overall program unit cost of saved water of $729/AF (in 2015 dollars) and a benefit-cost ratio of 1.9. The unit cost of saved water includes all direct program costs associated with implementation of the proposed conservation programs.

Projected SB X7-7 compliance water use for Livermore District in 2020 under planned levels of DMM implementation is 171 GPCD compared to its target water use of 158 GPCD.

SB X7-7 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 SB X7-7 by either meeting their individual target or being part of a regional alliance that meets its regional target. The regional target is calculated as the population-weighted average target for the water suppliers comprising the regional alliance.

For purposes of SB X7-7 compliance, the Livermore District has formed a regional alliance with Cal Water's four other Bay Area water districts. Projected 2020 potable water demand for the regional alliance under planned levels of DMM implementation is 149 GPCD compared to a regional alliance target of 150 GPCD.

Livermore District is projected to be in compliance with SB X7-7 in 2020 as a member of its regional alliance.

9.5 Members of the California Urban Water Conservation Council

Cal Water is a member of the California Urban Water Conservation Council (CUWCC). CUWCC members have the option of submitting their 2013–2014 Best Management Practice (BMP) annual reports in lieu of, or in addition to, describing the DMMs in their UWMP (CWC 10631). The BMP annual reports for the Livermore District are provided in Appendix L.

Chapter 10
Plan Adoption, Submittal, and Implementation

This Chapter provides information on a public hearing, the adoption process for the UWMP, the adopted UWMP submittal process, plan implementation, and the process for amending the adopted UWMP.

This chapter includes the following sections:

10.1 Inclusion of All 2015 Data

10.2 Notice of Public Hearing

10.3 Public Hearing and Adoption

10.4 Plan Submittal

10.5 Public Availability

10.6 Amending an Adopted UWMP

10.1 Inclusion of All 2015 Data

This UWMP includes the water use and planning data for the entire calendar year of 2015, per DWR UWMP Guidelines (pg. 2-11).

10.2 Notice of Public Hearing

Prior to adopting the Plan, Cal Water held a formal public hearing to present information on its Livermore District UWMP on May 25, 2016, 12:00 noon at the following location:

Livermore District Field Yard
1493 Olivina Avenue
Livermore, CA 94551

Two audiences were notified of the UWMP review at least 60 days prior to the public hearing: cities and counties, and the public. These audiences were noticed again with the specific date, time and location of the hearing at least two weeks prior to the public hearing. The notice to the public, as specified in Government Code 6066, can be found in Appendix D. Table 10-1 lists the cities and counties notified.

10.2.1 Notice to Cities and Counties

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
City of Livermore	✓	✓
County Name	60 Day Notice	Notice of Public Hearing
Alameda County	✓	✓

10.2.2 Notice to the Public

Notification to the public and to cities and counties also provided instructions on how to view the 2015 UWMP prior to the hearing, the revision schedule, and contact information of the UWMP preparer. A copy of this notice is included in Appendix D.

10.3 Public Hearing and Adoption

The deadline for public comments was June 1, 2016, one week after the public hearing. The final plan was formally adopted by Cal Water's Vice President of Engineering on June 20, 2016, and was submitted to California Department of Water Resources within 30 days of approval. Appendix B presents a copy of the signed Resolution of Plan Adoption. Appendix C contains the following:

- Letters sent to and received from various agencies regarding this plan
- Correspondence between Cal Water and participating agencies

10.4 Plan Submittal

This UWMP was submitted to DWR within 30 days of adoption and by the July 1, 2016 deadline. The submittal was done electronically through WUEdata, an online submittal tool. The adopted Plan was also sent to the California State Library and to the cities and counties listed in Table 10-1.

10.5 Public Availability

On or about May 9, 2016, a printed hard-copy of the Draft 2015 Urban Water Management Plan and the Conservation Master Plan was made available for review during normal business hours at the Livermore District's Customer Center, located at 195 South N Street, Livermore, CA 94550. An electronic version was also made available by visiting Cal Water's website: https://www.calwater.com/conservation/uwmp.

10.6 Amending an Adopted UWMP

If the Plan is amended, each of the steps for notification, public hearing, adoption and submittal will also be followed for the amended plan.

Appendix A: UWMP Act Checklist

Appendix B: Resolution to Adopt UWMP

Appendix C: Correspondences

Appendix D: Public Meeting Notice

Appendix E: Service Area Map

Appendix F: Projection Analysis Worksheets (PAWS)

Appendix G: Supplemental Water Supply Information

Appendix H: DWR UWMP Tables Worksheets

Appendix I: DWR SB X7-7 Verification Forms

Appendix J: Schedule 14.1 and Local Conservation Ordinances

Appendix K: Water Efficient Landscape Guidelines

Appendix L: Conservation Master Plan

Appendix M: DWR/AWWA Water Balance Worksheet