City of Sacramento

Water Efficiency & Conservation Plan

PUBLISHED APRIL 2026

MADDAUS WATER MANAGEMENT
Making a Difference in the World of Water™

2026

Table of Contents

List of Figures

List of Tables

Abbreviations and Acronyms

AB	Assembly Bill
AF	acre-feet
AFY	acre-feet per year
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
BCR	Benefit Cost Ratio
BMP	Best Management Practice
CALGreen	California's Green Building Standards Code
CalWEP	California Water Efficiency Partnership
CCF	centum cubic feet
CEC	California Energy Commission
CI	Commercial/Industrial
CII	commercial, industrial, and institutional
CIMIS	California Irrigation Management Information System
City	City of Sacramento
COVID-19	Coronavirus Disease 2019
DAC	Disadvantaged Community
DEI	Diversity, Equity, and Inclusion
DIM	dedicated irrigation meter
DOU	Sacramento Department of Utilities
DSS Model	Least Cost Planning Decision Support System Model
DWR	California Department of Water Resources
ETo	evapotranspiration
FTE	full-time equivalent
FY	fiscal year (July 1-June 30 for City of Sacramento)
GPCD	gallons per capita per day
gph	gallons per hour
FY	fiscal year (July 1-June 30 for City of Sacramento)
GPCD	gallons per capita per day
gph	gallons per hour
HET	high efficiency toilet
HOA	homeowners association
KBAI	Key Business Activity Indicator
LAM	landscape area measurement
MF	multifamily
MGD	million gallons per day
MGY	million gallons per year
MUM	mixed use meter
MWM	Maddaus Water Management Inc.
NFT	non-functional turf
Plan	2026 Water Efficiency and Conservation Plan
PV	Present Value
Regulation	*"Making Water Conservation a California Way of Life"* Regulation
RWA	Regional Water Authority
SB	Senate Bill
SB X7-7	Water Conservation Act of 2009
SF	single family
SLA	special landscape area
SMUD	Sacramento Municipal Utility District
SURA	Sacramento Utility Rate Assistance program
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
UWUO	Urban Water Use Objective
UWMP	Urban Water Management Plan
Water Forum	Sacramento Water Forum
WCP	City of Sacramento's 2013 Water Conservation Plan
WSMP	Water Supply Master Plan

Executive Summary

Introduction

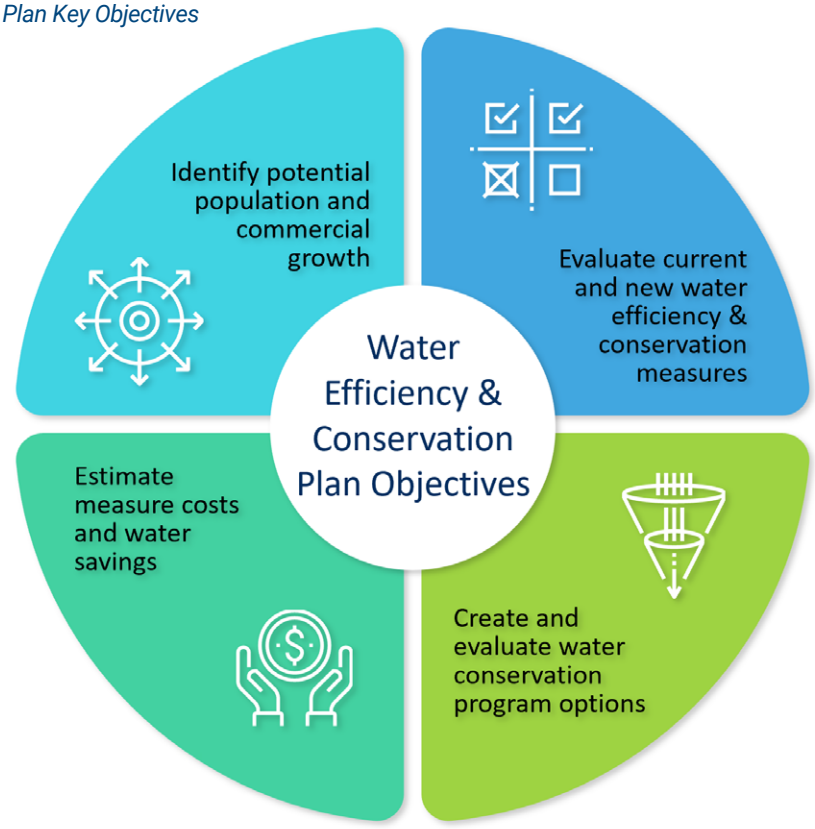
The purpose of this Executive Summary is to provide an overview of the City of Sacramento's (City) 2026 Water Efficiency and Conservation Plan (Plan). The Plan will present the full conservation evaluation process, the assumptions used to conduct the analysis, and the recommended implementation steps.

The City of Sacramento has long been a leader in water conservation, demonstrating a strong commitment to reducing the demand for potable water through its conservation program and work towards maximizing existing water sources to maintain reliability during changing conditions.

Expanding existing efforts as cost effectively as possible will help the City meet future water use objectives and ensure ongoing compliance with the "*Making Water Conservation a California Way of Life*" Regulation (Regulation) effective as of January 1, 2025. The cost effectiveness of the programs included in the Regulation is further described in Section 4 of this Plan.

To develop this Plan, the City engaged Maddaus Water Management Inc. (MWM) to conduct a thorough technical conservation analysis, focusing on four key objectives.

Figure ES-1. *Conservation Plan Key Objectives*



Program Overview

Through the identification and prioritization of water efficiency and conservation measures, this Plan enables the City to project long-range water demands, identify attainable conservation goals, develop conservation strategies, raise awareness of water-efficient practices throughout the community, and outline a strategy to comply with the Regulation.

The planning process included analyzing measures and programs using the Least Cost Planning Decision Support System (DSS Model), developed by MWM, and following the methodology presented in the American Water Works Association (AWWA) Manual of Practice, *M52 Water Conservation Programs – A Planning Manual* (AWWA, 2017). Following a thorough process of engagement with City and Regional Water Authority (RWA) staff, 19 measures were selected for evaluation from a pool of over 130 measures. An additional seven "enhanced" measures were later developed for evaluation, representing current measures that the project team anticipated would be good candidates for future enhancement. This suite of 26 measures includes residential, commercial, indoor, and outdoor measures and spans all customer service sectors.

After incorporating feedback from the Sacramento Water Forum, (Water Forum), and insights derived from the project team's analysis efforts, three conservation program scenarios were developed. The best ("optimized") conservation program for implementation was selected for its alignment with the City's conservation goals as well as its compliance with the Regulation. By combining new initiatives with existing programs and plumbing code savings, the City's optimized program scenario ("Program B") is expected to save an average of 2.58 million gallons (of water) per day (MGD) through 2055, depending on program participation, funding availability, and implementation schedule. An approximate 28% increase in average annual utility costs is estimated to be needed to implement Program B as compared to the current modeled program. The increase in overall water savings and cost-efficiency improvement for the increased conservation activity in Program B is noteworthy and offers a more proactive response to reducing water demand compared with the current program. All 26 measures evaluated as part of this Plan are listed in Figure ES-2. Descriptions of measures as well as a detailed breakdown of the measure composition of Programs A, B, and C can be found in Chapter 4.

The analysis efforts undertaken to prepare this Plan revealed that activity level has reached saturation for a few of the long-standing programs. As such, the project team identified the following recommended revisions to the City's current conservation program:

1. **Sunset Existing Toilet Rebate Program** – The program started in 2009, and activity has been low for the past two years following the end of the drought in 2022, when rebates were doubled for ultra-High Efficiency Toilets. MWM recommends removing this program and instead implementing the toilet retrofit program in the newly designed Program B to capture the remaining water savings from toilets. The City is aware of potential free ridership for this, which has been included in the savings analysis considerations.
2. **Sunset Existing Clothes Washer Rebate Program** – The program started in 2009, and activity has been low for the past two years following the end of the drought in 2022 when rebates were doubled. The City recognizes that significant free-ridership already exists for this program, and it is expected to increase once the 2028 federal regulations on clothes washers take effect, which will restrict the sale of high-water-use clothes washers nationally. A 25% free-ridership factor was included in the savings analysis considerations for this reason.
3. **Examine Smart Water Controller Exception for Two Day a Week Watering Ordinance** – The original ordinance was modified more than eight years ago to encourage the installation of this newer technology. Now that smart controllers are industry standard and have features including programming in "black out days" or "allowable watering days" to adhere to the original ordinance, this exception might be further analyzed with an adjustment.
4. **Review and Adjust Rebate Values** – Annually review and regularly adjust individual rebate values (as appropriate) to create a flexible program that can adapt to technological changes, variable weather patterns, customer behavior and changes in regulation compliance status. Factors to consider include:
   - Recent program activity.
   - Price of the product (increase or decrease in cost).
   - The stage of market saturation for the product (i.e., whether it is a new or established product).
   - The dollar value needed to motivate customers towards change.
   - Whether water shortage conditions are present and the City needs to increase conservation efforts.
5. **Annually Review Water Demands and Projections** – This Plan was developed using information provided by the City. As service area dynamics shift and new planning efforts are completed, annual water demand should be reviewed to assess projected versus realized demands for the year and how changes can affect future demand and compliance with the new Regulation. Current recommendations for near-term implementation of Program B and future consideration of Program C:
   - The City must comply with the new statewide water efficiency Regulation that took effect on January 1, 2024. The new Program B aims to keep the City in compliance with the Urban Water Use Objective (UWUO) based on the available information and the 2024 reporting information shared in Section 6.1 and Appendix A.
   - As soon as possible, the City should hire a Water Conservation Supervisor to best track the day-to-day operations of the program but would also strongly benefit by hiring a Data Analyst to handle the increased program needs, support Regulation compliance, analyze data from the new Program B measures, and efficiently analyze the Advanced Metering Infrastructure (AMI) water data similar to Section 5. Tracking water use utilizing AMI data will be significant for identifying participation and effectiveness of the City's conservation programs.
   - The new Statewide UWUO Regulation still has many unknowns, including some data that has not yet been released to the City. The Regulation will continue to be defined, and the City will continue to grow and change over the coming years. If the City's water use increases5-10% in per capita water use, then the City should seek additional staffing and apply resources to implement Program C.
   - It is important to recognize that implementing water efficiency and conservation measures will also advance other City goals and initiatives. These measures should be reviewed annually to identify opportunities for alignment and resource sharing. For example, the Climate Action Adaptation Plan includes reduction targets that closely align with the water conservation goals outlined in this Plan.

In addition, to support the transition to the new Regulation, it is envisioned that MWM will help the City in the following ways over the next 12 months:

1. Track the near-term program changes and support the transition of the sunsetting of clothes washer and toilet incentive measures.
2. Analyze another year of AMI data, and track and review the water use of individual accounts, particularly those participating in the City's conservation program.
3. Support the City in the January 1, 2026, and the January 1, 2027, Urban Water Use Objective reporting requirements.
4. Review the upcoming 2026 Water System Audit Software Workbook and assess if the gallons per connection aligns with Water Loss Performance Standard targets and recent trends.
5. Review the demand forecast from the 2025 Urban Water Management Plan.

It is also recommended that the City continue to team with RWA, Sacramento Municipal Utility District, Sacramento Area Sewer District, and other local partners as appropriate to assist with funding, outreach and implementation of the measures. Grant funding opportunities are typically more successful when implemented on a regional basis.

Figure ES-2. *Selected Measures for Evaluation**

Residential

- Residential Leak Repair Assistance Rebate
- Leak Free Sacramento
- Indoor Water Surveys
- Residential Plumber Initiated High Efficiency Toilet Retrofit Program[B]
- Residential Clothes Washer Rebate
- Enhanced - Residential Leak Repair Assistance[B]
- Enhanced - AMI Targeted Leak Free Sacramento[B]
- Enhanced - Residential Water Surveys[B]

Commercial

- CII Customized Top Users Incentives
- CII Water Savings Performance Program[B]
- CII Rebates to Replace Inefficient Equipment[B]
- Install High Efficiency Fixtures in MF & CII Buildings

Landscape & Irrigation

- Single and Multifamily Residential Financial Incentives for Irrigation and Landscape Upgrades
- Landscape Irrigation Restricted to Designated Days and Times[B]
- Commercial and Large Landscape Financial Incentives for Irrigation and Landscape Upgrades
- Outdoor Water Use Evaluations
- Large Landscape Water Surveys[B]
- Enhanced - Water Budgeting/Monitoring for Dedicated Irrigation Meters[B]
- Enhanced - Residential Smart Landscape Rebates[B]
- Commercial and Large Landscape Non-Functional Turf Outreach[B]
- Enhanced - Commercial and Large Landscape Non-Functional Turf Incentive

Education, Partnership, Other

- Partnership with Energy Utilities – Incentive
- Water Loss Tracking[B]
- Public Outreach & Education[B]
- Enhanced - Water & Energy Partnership Rebates[B]
- Enhanced Water Loss Control Program

***B** - Measure is included in the Optimized Program B.*

1. Introduction

The focus of this Plan's analysis is the City of Sacramento's retail service area, a 101 square mile area in the Central Valley of California. The oldest incorporated city in California and the state's capital, the City of Sacramento currently serves a population of approximately 530,000 people. In addition to producing water from its groundwater wells, the City treats surface water diverted from the Sacramento and American Rivers with two water treatment facilities: the Sacramento River Water Treatment Plant and the E.A. Fairbairn Water Treatment Plant. Though not described in detail in this Plan, additional information on the existing supply and distribution system infrastructure, including pipelines, treatment facilities, and other components, is provided in the 2020 Urban Water Management Plan.

As a retailer with approximately 145,000 service connections, the City is required to implement the new framework established under the "*Making Water Conservation a California Way of Life*" Regulation (Regulation) effective January 1, 2025. This recent Regulation requires urban retail water suppliers to meet individualized annual efficiency goals that are established based on the unique characteristics of the supplier's service area, summed up as the Urban Water Use Objective (UWUO). Suppliers can implement various measures to meet their water use objective. In collaboration with City staff, RWA, and the Water Forum, MWM prepared this Plan to help the City outline a strategy to comply with the new Regulation while advancing the water efficiency and conservation initiatives already implemented by the City in its pursuit of sustainable resource management.

1.1 Plan Background

The intention of this Plan is to systematically evaluate and quantify a long-term water efficiency and conservation strategy for the City's service area while also meeting the requirements under the Regulation. In this Plan the terms water efficiency and water conservation are essentially used interchangeably; the City is focused on responsible management of water supplies and implementing the most cost effective of water efficiency and conservation programs. Through the identification and prioritization of water efficiency measures, the Plan enables the City to project long-range demands, identify attainable efficiency goals, develop strategies, and raise awareness. By combining new initiatives with existing programs, this comprehensive strategy and slate of activities will contribute to a more sustainable management of water supplies for the City's community that aligns with new regulatory requirements.

MWM's goal with this effort was to provide the City with an analysis of its current conservation program and recommendations to help achieve its water efficiency goals in the most cost-effective manner possible. This Plan and the DSS Model support the City in maneuvering water efficiency requirements as part of Senate Bill (SB) 606 and Assembly Bill (AB) 1668 "*Making Water Conservation a California Way of Life*" legislation. Additionally, this Plan supports the City in planning a long-term approach to managing water resources sustainably through water conservation. Implementing strategic water-saving measures is becoming increasingly important for strengthening water system resiliency in the face of drought, population growth, and economic pressures.

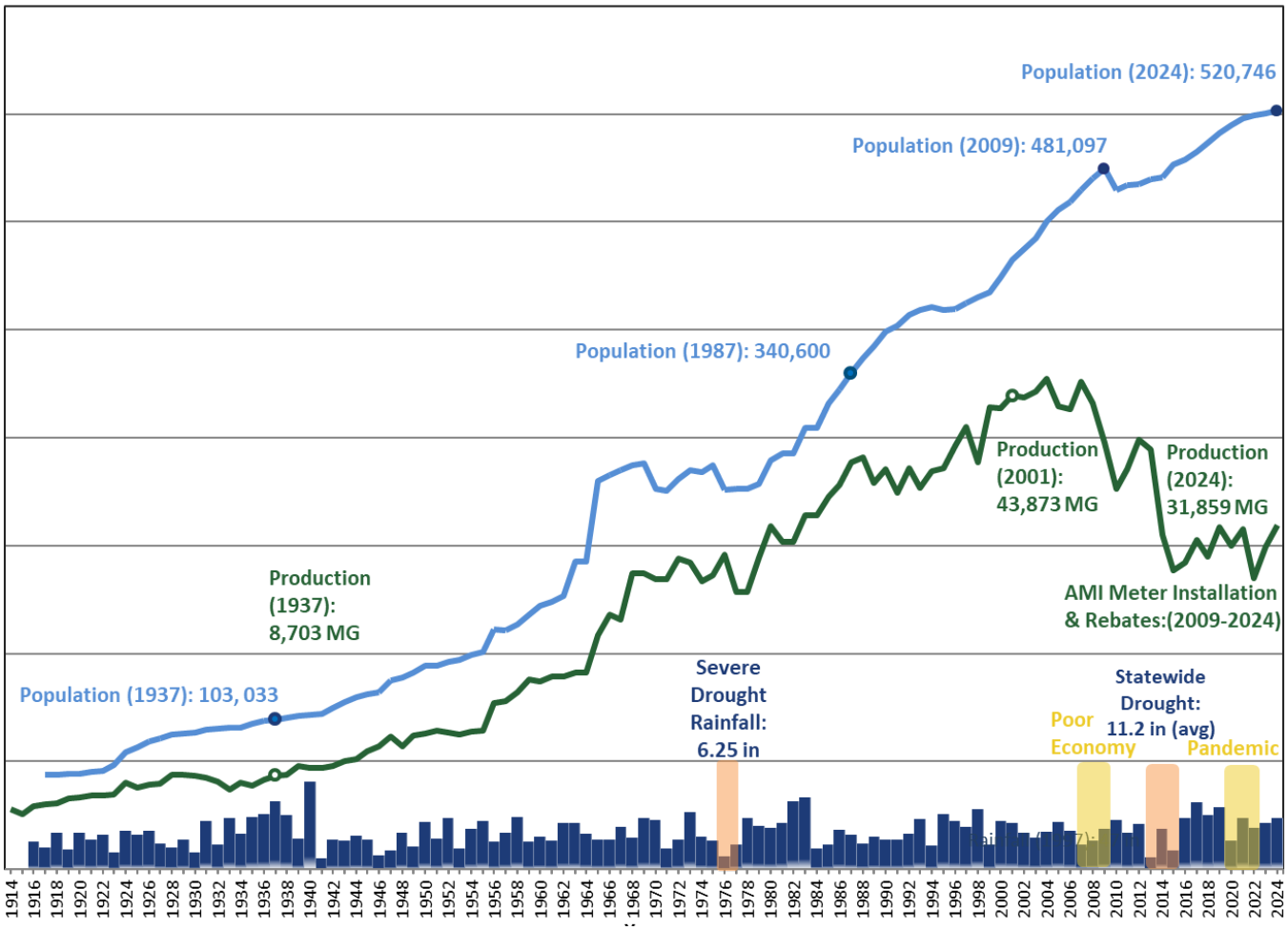
MWM previously worked on the City of Sacramento's 2013 Water Conservation Plan (WCP), the first conservation plan for the City and established a long-term framework for improving water use efficiency. The WCP recommended rebate programs and provided an approach to stay current with the State of California's Green Building Standards Code (CalGREEN) water efficiency plumbing requirements and the Water Conservation Act of 2009's (SB X7-7) gallons per capita per day (GPCD) targets. From 2014-2024 the City's conservation staff worked with regional partners and was successful at implementing the WCP, improving overall water efficiency for the City. Additional details and accomplishments are described in Section 4.

Starting in July 2009, the City worked diligently to install 144,000 meters, completing the Advanced Metering Infrastructure (AMI) installation recommendation from the WCP. This significant accomplishment has allowed the City to implement a wide range of new measures that leverage data analytics and make data-driven conservation investment decisions.

The City has experienced many external events in the past 20 years, including two droughts in 2014-2016 and 2021-2022, a poor economy from 2008-2011, and the global Coronavirus Disease of 2019 (COVID-19) pandemic from 2019-2022, all of which temporarily impacted residential and non-residential water use.

Figure 1-1 demonstrates the City's water use and trends over the last 110 years for population, rainfall, and water production. Although the City's population has increased significantly, overall water production greatly declined 10 years ago then stayed relatively steady amidst the combined factors of active conservation, passive conservation, AMI metering, and external events.

Figure 1-1. *History of City Population, Water Production, and Rainfall – 1914-2024*



1.2 Plan Purpose

This Plan reflects the City's mission and goals to protect water resources and ensure a reliable, sustainable supply through efficiency and conservation, while also meeting new regulatory requirements. The City will accomplish this by:

- Fostering a strong community water conservation ethic through:
  - Public education and outreach that highlight the value of water, promote conservation practices, and encourage participation in City initiatives.
  - Equitable distribution of resources and incentives across all customer classes.
- Securing adequate water supplies for current and future demands, including drought response and emergency situations by:
  - Applying data-driven decision-making to guide planning and operations.
  - Establishing systems to track current demand patterns, forecast future needs, and evaluate and adapt program elements as necessary to support long-term resiliency.

This Plan will serve as a guide for the City regarding future water use efficiency and conservation investments and activities. It includes a functional implementation plan to establish and administer cost-effective measures. Based on a preliminary analysis of 26 individual measures, three programs (Programs A, B, and C) were designed in collaboration with the City and RWA, then reviewed by members of the Water Forum. Each of the three programs were evaluated to determine the net effect of running multiple measures together over the 30-year period of analysis (2025–2055) and the resulting effects on water demand.

This model estimates water conservation savings through the year 2055. Despite the inevitable uncertainty involved in long-term planning like this, its value lies in the consequential economic, social, and environmental benefits that are more effectively generated with a longer lookout. Ensuring reliable water access across an extended period more reliably reduces operational costs and protects ecosystems. Longer term planning for efficient water use is more effective in helping communities maintain water resilience by extending the life of existing facilities and postponing the need for expensive new infrastructure which typically needs a decade of planning if not more. This timeline is also consistent with California's Urban Water Management Plan (UWMP) projection timeline.

1.3 Plan Objectives

The objectives of this Plan are summarized below and driven by the purpose presented earlier:

- Expand water efficiency efforts through targeted conservation strategies.
- Increase customer awareness and participation in water-saving programs.
- Identify and prioritize cost-effective water efficiency measures.
- Collaborate with local entities such as RWA and the Water Forum.
- Integrate conservation goals into broader water supply and demand planning efforts.
- Monitor and adapt programs based on performance metrics and emerging technologies.
- Provide the City with a roadmap and tool (DSS Model) needed to comply with the state of California's new regulatory requirements, in the short- and long-term.

1.4 California Legislation and the Water Use Objective

The recurring droughts in California, combined with expected increases in stress events for the water supply system due to climatic swings (in conjunction with other economic and demographic factors), have continued to exacerbate the need to implement diverse strategies to increase the resilience of water supplies. In 2024, aligned with the long history of passing legislation to address water supply system concerns and increase resilience, the California State Water Resources Control Board (SWRCB) adopted the "*Making Water Conservation a California Way of Life*" Regulation[1] (Regulation). This new regulation sets a unique Urban Water Use Objective (UWUO), which is essentially a water budget, for each urban retail water supplier, along with performance measures for the Commercial, Industrial, and Institutional (CII) sectors. Agencies, including the City, must begin reporting on the Regulation starting January 1, 2025, and compliance with the UWUOs is required by 2027. Chapter 6 of this Plan outlines MWM's vision for the City's conservation program strategy to achieve compliance with the Regulation through the next few decades, as more stringent water efficiency standards take effect.

1 Final Regulation text can be found on the SWRCB website: https://www.waterboards.ca.gov/conservation/regs/water_efficiency_legislation.html#reg-docs.

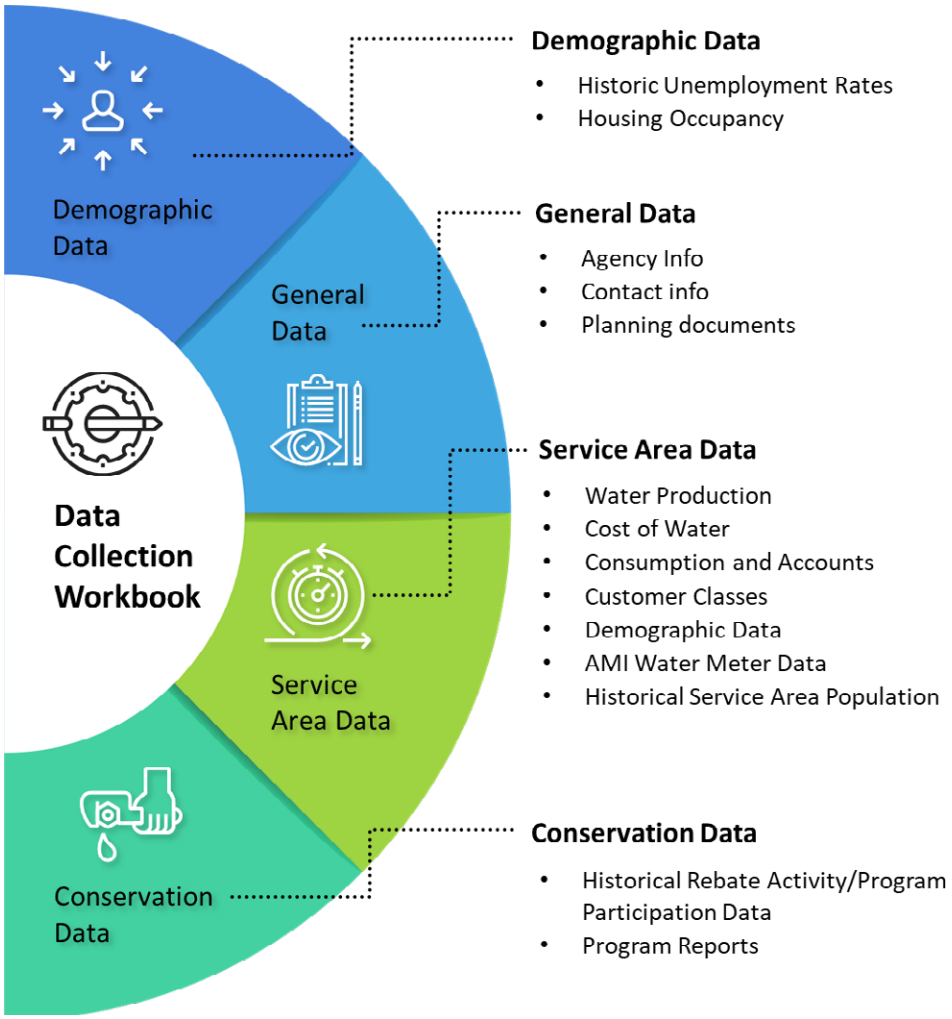
1.5 Plan Development and Data Collection

The development of the Plan included coordination between MWM and the City to manage all aspects of the project and document preparation, including review of past documentation and data analyses. The City provided data in response to a list of specific requirements requested by MWM to support the technical analysis necessary for modeling water demand and the impact of conservation activities. Collection and review of available information relevant to this effort were conducted, entered, and tracked in a robust workbook kept by MWM and the City known as the Data Collection Workbook. The information requested and received is presented in Figure 1-2.

A brief overview of the few of the items requested is provided below:

- **Demographic Data:** Historical and projected water system service area population, housing development projections through 2055, along with maps of the water system and political jurisdiction boundaries.
- **Service Area Data:** Customer characteristics and data needed to characterize water efficiency measures, such as the number of facilities or businesses of a particular type. Consumption and accounts: Prior year(s) monthly water use data for the different classes of water users.
- **Conservation Data:** Complete descriptions of past, present, and proposed future conservation programs, including historical annual participation (for programs where data was available).

Figure 1-2. *Data Collection Workbook Topics and Requested Items*



1.5.1 Plan Process and Timeline

During the data collection process, MWM created a list of over 130 potential efficiency and conservation measures derived from analyzing existing water usage patterns and took into account the specific characteristics of the service area. Additionally, MWM examined pertinent literature and the practices of other agencies to identify potential measures for adoption by the City.

A preliminary screening process was conducted in collaboration with City staff to filter the 130-plus measures to 40 of the most viable ones. Then, a formal measure screening process was conducted with City staff and regional partners to further reduce the 40 measures to 19 selected for further evaluation. This process followed the methodology presented in the American Water Works Association Manual of Practice, *M52 Water Conservation Programs – A Planning Manual* (AWWA, 2017).

The evaluation primarily included measures aimed at making existing residential and business customers more water efficient. In collaboration with the City, the 19 measures were refined and integrated with seven additional "enhanced" measures identified as strong candidates for potential future enhancement. Finally, a detailed economic analysis for all measures was performed in the DSS Model.[2]

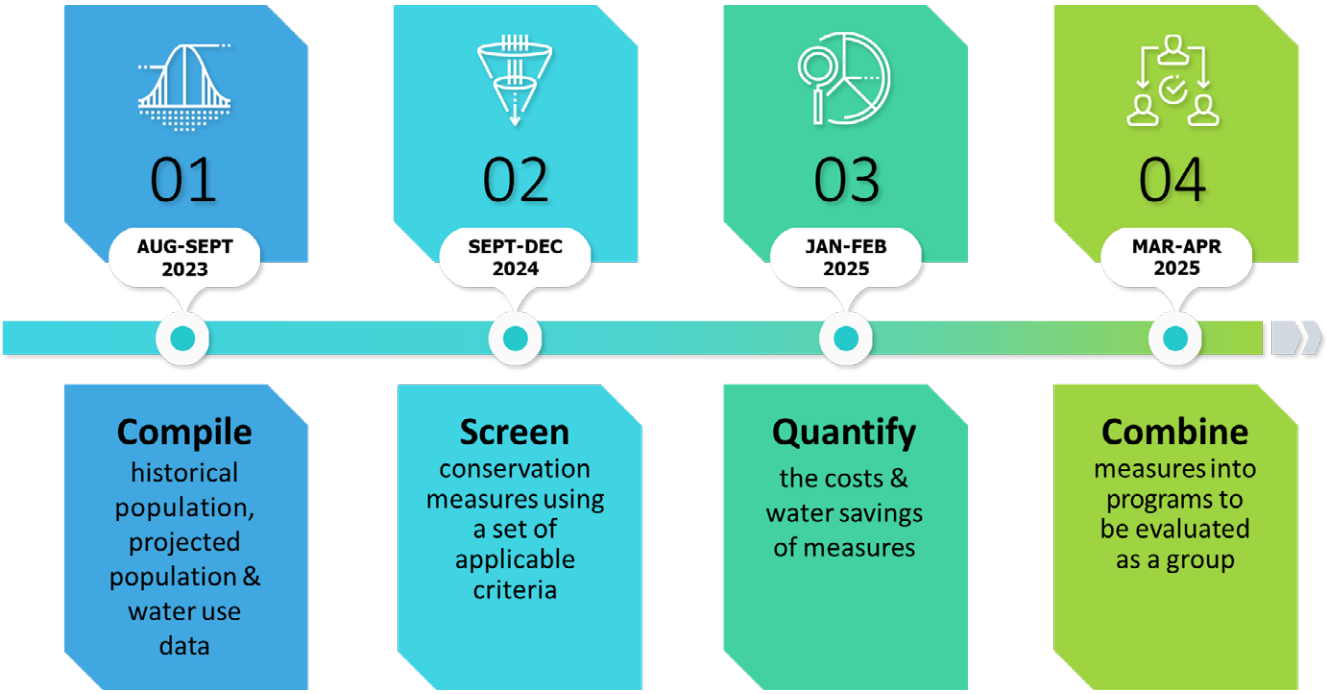
Following analysis, the measures were grouped into three programs representing the current conservation program and two alternatives. These programs were developed in collaboration with the City and are outlined below:

- **Program A** – Current water efficiency and conservation measures.
- **Program B** – Optimized program of the most cost-effective measures.
- **Program C** – Expanded program where all enhanced and new measures were analyzed to gauge the maximum estimated potential savings.

Assumptions and results for each of the 26 individual measures and three programs (A, B, and C) are described in detail in Chapter 4 of this Plan.

Throughout the measure evaluation and analysis process, the City and MWM conducted multiple meetings, primarily to complete the DSS Model. In the DSS Model, measures are designed with identified fixture costs, applicable customer classes, length of implementation, measure life, administrative costs, end uses, end-use savings per replacement, and a target number or percentage of accounts per measure year. The figure below illustrates the data collection, measure evaluation, and analysis process.

Figure 1-3. *Evaluation Process*



Note: *Measures were combined into programs, which were then reviewed by the Water Forum from May through June 2025; feedback was added to the draft Plan in July 2025.*

This Plan was prepared following completion of the DSS Model and selection of Program B for implementation. The analysis is intended to guide the City's conservation program budgeting and staffing, and to provide a strategy for complying with state legislation (described in more detail in Chapters 3, 4, and 5).

2 The DSS Model is an "end-use" model that breaks down total water production (water demand in the service area) to specific water end uses, such as plumbing fixtures and appliance uses. It uses a bottom-up approach that allows for multiple criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. It also may use a top-down approach with a utility prepared water demand forecast. More information on the DSS Model can be found in the Plan appendices.

2. Overview of City's Water Demand

This section summarizes the production and consumption data used to evaluate demand trends within the service area to assess the impact of conservation efforts. For this analysis, total retail water production and consumption (metered use) data was analyzed for the period from January 2020 through December 2024 to evaluate historical water demand trends. Monthly water production data, measured at their respective sources, was available from July 2016 through December 2024 and represented the total volume of water produced by the City. Production figures include all retail water deliveries, real and apparent losses, and authorized non-revenue uses (e.g., system flushing).

2.1 Historical and Projected Water Demand

As part of the DSS Model development, the MWM team reviewed and validated data to ensure consistency with historical records and logical alignment with known trends. This included verifying consumption and account data provided by the City, as well as confirming the number and types of customer accounts across the service area. This quality assurance process helped ensure that the Model reflected an accurate picture of historical and current water use. Figure 2-1 shows an estimate of residential water consumption in gallons-per-capita-per-day (GPCD) from 2020 to 2024 as well as total estimated population and total consumption (in million gallons) for the same time frame. While population has remained relatively constant and had periods of slow growth in the last few years, residential consumption and total consumption have experienced decreases, likely in response to drought conditions (2022) followed by a wet year (2023). The increase in 2024's residential consumption is likely due to a statewide declaration that the drought was over, a resultant drop in statewide messaging, and a decrease in enforcement that was tied to a declared drought stage. In addition, 2024 appeared to have been a hotter summer with higher summer peak temperatures as compared to 2023. Overall, the trends depicted in this chart are aligned with what is expected given the varied weather conditions over the past few years and the general trends that are identifiable for the City (as shown previously in Figure 1-1).

Figure 2-2 illustrates total retail production using the data from this analysis. Seasonal demand patterns are evident, with peak summer use more than twice that of winter volumes.

Figure 2-1. *Population and Residential Consumption, 2020-2024*

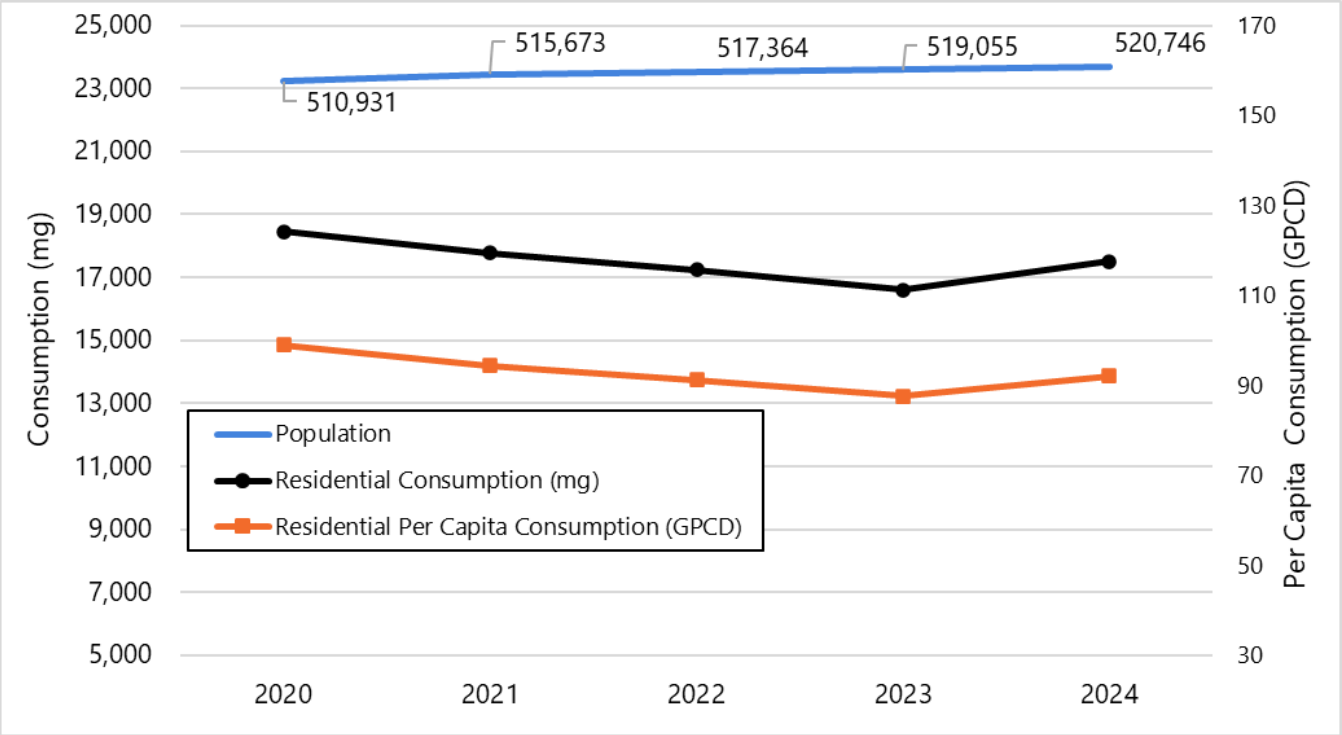
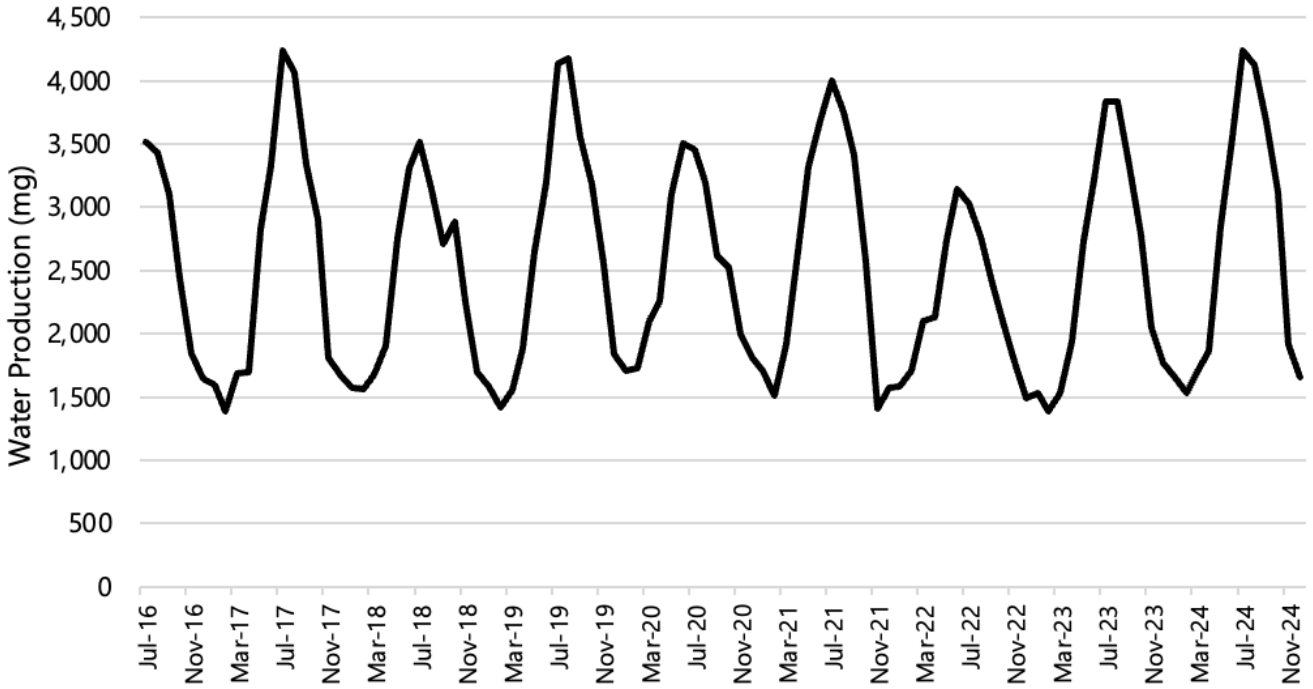


Figure 2-2. *Total Retail Production (2016-2024)*



It should be noted that demand projections were not produced as part of the peaking analysis completed for this Plan. At the direction of the City, the water demand projections developed in the 2023 Water Supply Master Plan (WSMP) were matched to ensure consistency across modeling and reporting efforts.

The City has a variety of customer categories utilized in their billing system. This Plan organizes users into the following six categories: Single Family Residential, Multifamily Residential, Commercial/ Industrial, Institutional, Landscape Irrigation and Other. Figure 2-3 illustrates the breakdowns of water use within the City's retail service area based on water use data from 2020-2024. About half of total annual water use occurs in single family homes followed in magnitude by commercial and industrial connections, and multifamily housing.

Figure 2-3. *Consumption by Retail Customer Category*

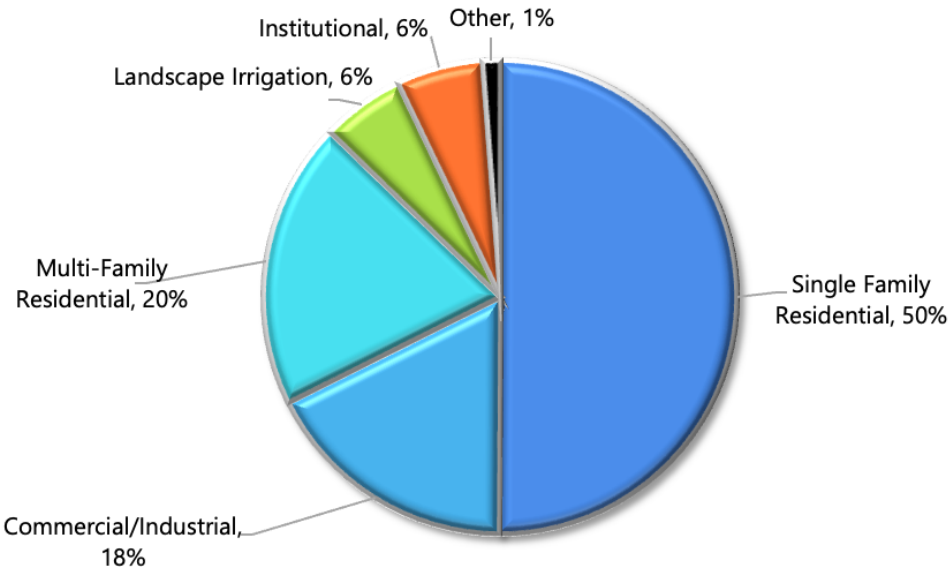
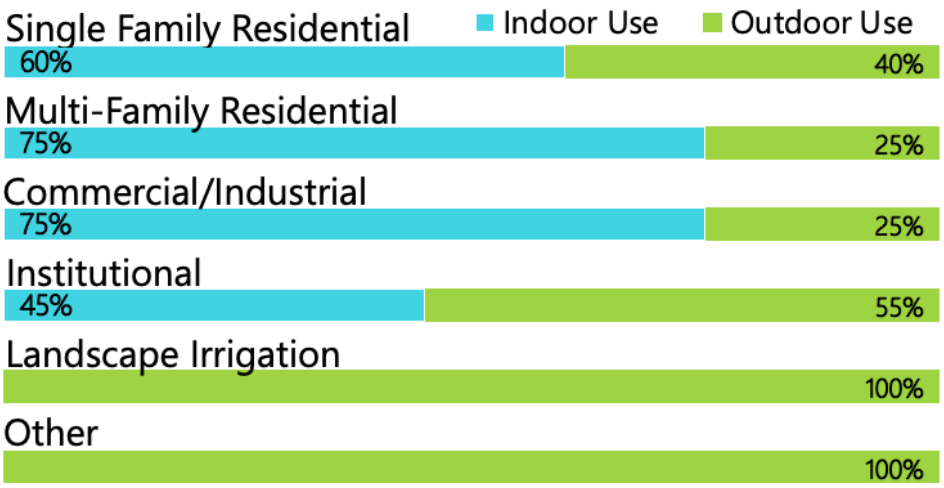


Figure 2-4 presents the breakdown of retail water use into indoor and outdoor components, based on the assumption that indoor water use is approximately equal to the lower outdoor consumption observed during winter months when irrigation is typically off. While some outdoor use may still occur in winter from limited watering or irrigation system leaks, this is assumed to be minor, accounting for less than 5-10% of average winter demand. The lowest winter month's consumption was therefore used to represent indoor water use in customer categories that reflect both indoor and outdoor demands (Single Family, Multifamily, Commercial/Industrial, and Institutional). The Landscape Irrigation and Other categories were assumed to represent outdoor use only. This analysis provided insight into historical water use patterns to guide water conservation planning by identifying end uses with the highest overall consumption.

Figure 2-4. *Indoor vs. Outdoor by Customer Category*



Note: *Indoor and outdoor water use percentage values have been rounded to the nearest 5%.*

3. California Urban Water Use Objective

This section presents background information about the requirements put forth in the California *"Making Water Conservation a California Way of Life"* Regulation (Regulation) which was one of the primary drivers for developing this Plan. As stated in the introduction, one of the principal purposes of this Plan is to assess if the City is on track to meet the Urban Water Use Objective (UWUO) standard in future compliance years with its current estimated demand, growth projections, and conservation program. The results of the Plan analysis and proposed roadmap for compliance moving forward are presented in Chapters 4 and 6.

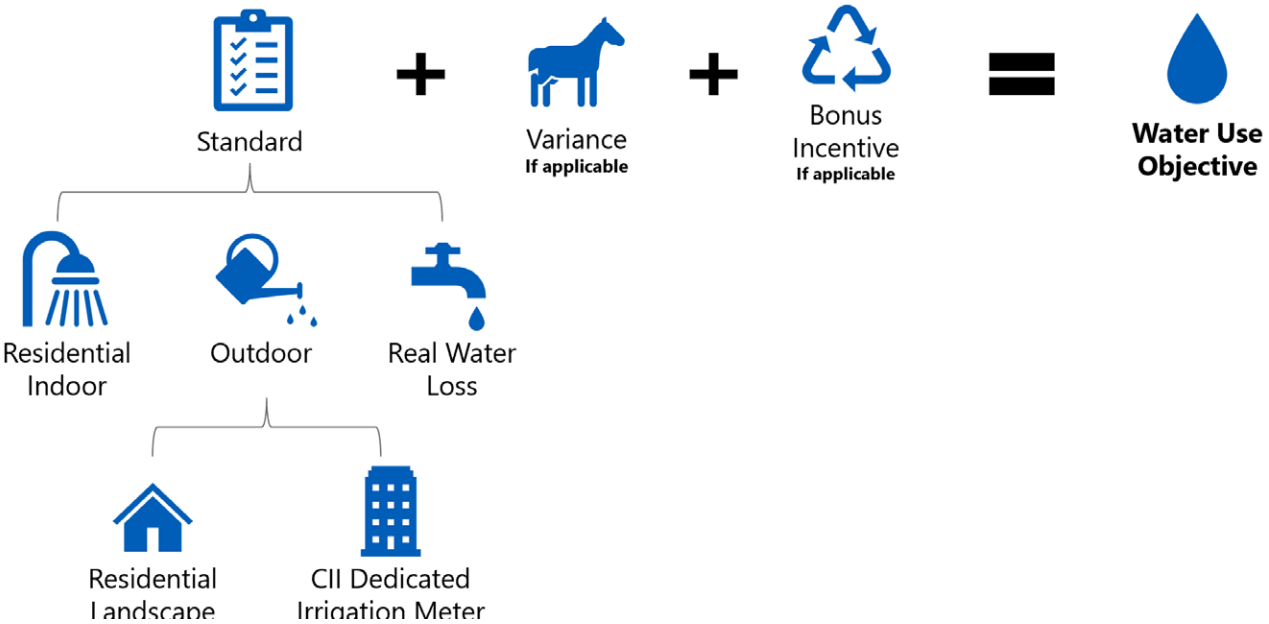
3.1 Regulation Background

In 2018, the California Legislature passed AB 1668 and SB 606. This legislation directed the State Water Resources Control Board (SWRCB) to adopt standards to encourage efficient urban water use. After six years of development, the *"Making Water Conservation a California Way of Life"* Regulation was adopted in 2024 and responds to the direction received in AB 1668 and SB 606. The Regulation establishes a quantitative volumetric target for residential and landscape water use referred to as the UWUO, in addition to performance measures required for the commercial, industrial, and institutional (CII) sectors. Annual reporting on the Regulation was required beginning January 1, 2025. Compliance is required beginning January 1, 2027, and is measured based on the various standards and CII performance measures in effect for the reporting period. The standards and performance measures have various effective dates over the course of the next fifteen years.

3.2 Urban Water Use Objective

The Regulation requires urban water suppliers to comply with a UWUO that is calculated annually. The calculation is based on local characteristics and standards for residential indoor and outdoor use, outdoor use from dedicated irrigation meters (DIM), water loss, a bonus incentive for potable reuse, and variances. The standards for indoor and outdoor use have become more restrictive over the 2025-2040 implementation period, requiring urban water suppliers to meet stricter water use budgets as time progresses. All the targets change for UWUO reporting on July 1st of the fiscal year (FY) except for the indoor Regulation which changes on January 1.

Figure 3-1. *Breakdown of Urban Water Use Objective Components*



3.2.1 Residential Indoor Water Use Standard

The Residential Indoor Water Use budget component of the UWUO is calculated by multiplying the applicable gallons-per-capita-per-day (GPCD) consumption standard by the supplier's service area population and by the number of days in the year. The GPCD standards are utilized to calculate the Residential Indoor Water Use budget and decrease over time, starting at 47 GPCD between Jan 2025 and Dec 2029 and decreasing to 42 GPCD by Jan 2030 and beyond.

3.2.2 Residential Outdoor Water Use Standard

Each supplier's efficient Residential Outdoor Water Use budget is calculated by multiplying the standard, also known as a landscape efficiency factor (LEF), by net evapotranspiration (Net Eto), by the square footage of residential irrigable irrigated landscape area, and by a conversion factor of 0.62.

Landscape Efficiency Factor: The LEF is used to indicate the amount of water a supplier may need to deliver to maintain healthy and efficient landscapes across the supplier's service area. A higher LEF value corresponds to higher water-using, less efficiently irrigated landscapes; a lower LEF value corresponds to lower water-using, more efficiently irrigated landscapes. The lower the standard, the less supplier-delivered water would be budgeted for outdoor use. The LEF values used to calculate the Residential Outdoor Water Use budget will be lowered over time and are summarized in Table 3-1. Ultimately, landscapes will need to transform to those that need less water over time. For new construction landscape areas, the applicable LEF factor will be 0.55. Residential special landscape areas (SLAs) will be granted an LEF of 1.0. Residential SLAs include pools, spas, water features, areas of solely edible plants, and areas irrigated with recycled water. Areas planted with non-functional turf (NFT) are not considered SLAs.

Figure 3-2. *Formula for Residential Indoor Use Budget*

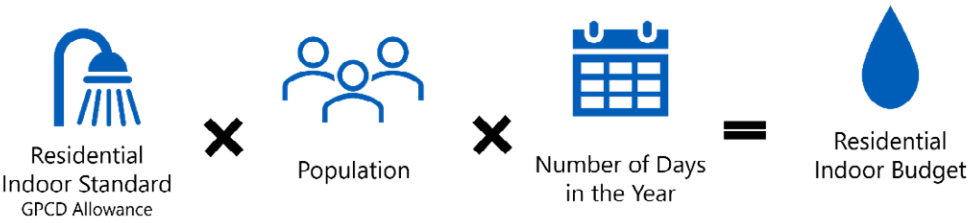


Figure 3-3. *Formula for Residential Outdoor Use Budget*

Table 3-1. *Landscape Efficiency Factors*

Year*	Landscape Efficiency Factor (LEF) for Existing Landscapes	Landscape Efficiency Factor (LEF) for New Development	Landscape Efficiency Factor (LEF) for Special Landscape Areas
2025-2034	0.8	0.55	1.0
2035-2039	0.63	0.55	1.0
2040-onward	0.55	0.55	1.0

*Targets change for UWUO reporting on July 1st of the listed years.

Net Evapotranspiration and Landscape Areas: The square footage of residential irrigable irrigated landscape area, reference evapotranspiration, and effective precipitation values were provided by the California Department of Water Resources (DWR) unless a supplier had produced alternative data that was, in terms of quality and accuracy, demonstrably equal or superior to what had been provided by DWR. If a supplier wishes to submit alternative data, they must do so by October 1st to be considered for inclusion in the following year's compliance report.

Additionally, a supplier can include budgets for temporary provisions for residential outdoor use (thereby increasing the Residential Outdoor Water Use Standard for the year) for the planting of new, climate-ready trees and the establishment of qualifying landscapes. Supporting information will need to be submitted and approved by DWR to receive temporary provisions.

3.2.3 Commercial Outdoor Water Use Standard

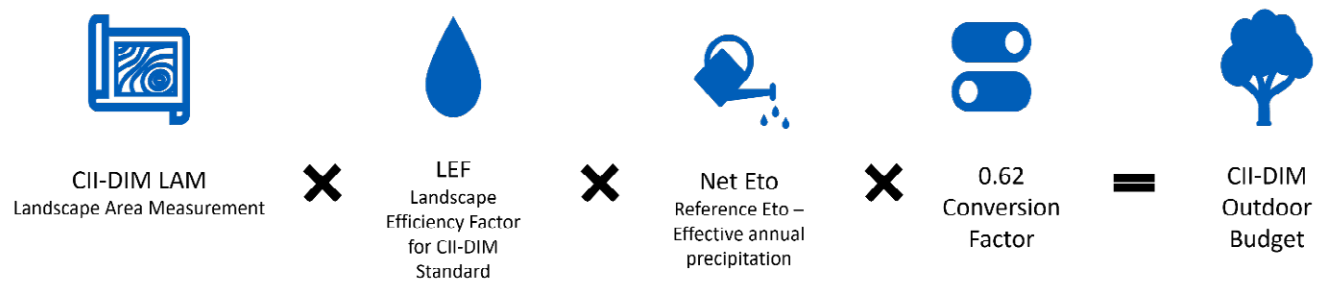
Like the Residential Outdoor Water Use Standard, the Commercial Outdoor Water Use Standard is also calculated by multiplying landscape area measurements (LAM) by the LEF, Net Eto, and Conversion Factor of 0.62.

Starting in July 2028, suppliers will calculate their Commercial Outdoor Water Use Standard for accounts with dedicated irrigation meters (DIMs). The DWR is partnering with NV5 Geospatial to develop landscape measurement datasets for CII parcels. These datasets are yet to be delivered to suppliers. Suppliers must still measure the total square footage of the irrigated area of CII landscapes with DIMs and SLAs. Suppliers must describe and substantiate how the area was quantified no later than July 1, 2028, and annually thereafter.

Prior to June 30, 2028, a supplier's Commercial, Industrial, and Institutional Dedicated Irrigation Meters (CII-DIM) water budget will be equal to actual deliveries reported to SWRCB. From July 1, 2028, to June 30, 2040, the LEF will be lowered from actual deliveries to 0.63. From July 1, 2040 onward, the LEF will be lowered to 0.45. For CII landscapes with DIMs that are special landscape areas, the applicable LEF will be 1.0.

It is important to note that the pending delivery of CII-DIM landscape area measurements insert significant uncertainty in estimating future UWUOs for the City, as a substantial component of the UWUO remains unknown until the CII-DIM LAM data becomes available.

Figure 3-4. *Formula for Commercial Outdoor Use Budget*



3.2.3.1 CII Mixed Use Meter Large Landscape Compliance

In addition to the Commercial Outdoor Water Use Standard which establishes a water use budget for commercial landscapes, the Regulation includes a requirement for conversion of large landscapes with mixed use meters (MUMs). MUMs are commercial, institutional or industrial meters that record both indoor and outdoor water usage. Suppliers are required to 1) identify all existing CII water users associated with large landscapes by June 30, 2027, or 2) identify all existing CII water users with large landscapes that exceed their water budget by June 30, 2029. Water budgets for large landscapes are to be calculated by multiplying the area of the landscape by net evapotranspiration by 0.63 (or for SLAs, by 1.0), and by a unit conversion factor of 0.62

By June 30, 2039, suppliers will have to implement one of the following compliance options and maintain the process for compliance at a rate of 95% of all CII-MUM (mixed use meter) large landscapes.

- **Compliance Option 1** – Conversion to Dedication Irrigation Meters: Suppliers must install DIMs in large CII landscapes. For suppliers selecting this compliance option, all CII large landscapes with MUMs must be measured and reported by June 30th, 2027.
- **Compliance Option 2** – Use In-Lieu Technologies: Instead of installing DIMs, suppliers must implement at least one of the following methods: 1) water budget-based management programs without a rate structure, 2) water budget-based rate structure, or 3) installation of technologies that enable the supplier to identify, estimate, and analyze outdoor water use (such as AMI or remote sensing). In addition, suppliers must offer, at a minimum, one Best Management Practice (BMP) from the Outreach, Technical Assistance, and Education category and at least two BMPs from the Landscape category (see Appendix A for a breakdown of the activities that comply with these BMP categories).

The options above have different data requirements that will be due on June 30, 2039, when full compliance is required.

3.2.4 Water Loss Standard

In 2022, a separate SWRCB regulation established system-specific standards for water losses (Cal. Code Regs., tit. 23, §§ 980-986). Suppliers will calculate their annual water loss budget by multiplying their system-specific standard by the number of days in the year and, depending on the units associated with the standard, by either the number of total service connections or the length of the distribution system in miles. Suppliers that own and operate multiple systems will calculate an annual water loss budget by summing the estimated efficient water loss budgets associated with each system. Suppliers must meet their Water Loss Standard starting January 1, 2028 (for data submitted for 2025-2027).

3.2.5 Bonus Incentive

When calculating a supplier's UWUO, a Bonus Incentive is available for those that deliver potable reuse water. This incentive increases the UWUO for that year by up to 15% for suppliers delivering potable reuse water produced at an existing facility. Alternatively, the Bonus Incentive may be up to 10% of the objective for suppliers delivering potable reuse water that was produced at all other facilities. This is referred to as the bonus incentive "cap." The Bonus Incentive is calculated as the total volume of potable water delivered to residential accounts and CII landscapes with DIMs as a percentage of all potable water deliveries multiplied by the supplier's individual potable reuse. If the City were to expand its current recycled water system to irrigate more landscapes and/or provide recycled water to commercial customers, this could count toward the Bonus Incentive. Should the City decide to move in this direction, it will discuss this option with the SWRCB to confirm the eligibility of future capital expansion projects.

3.2.6 Variances

Under the Regulation, a variance is an additional volume of water that an urban retail water supplier may request to add to its UWUO for a unique use that materially affects its UWUO. To qualify, the water use for an individual variance must account for at least 5% of the budget for the relevant UWUO standard. Examples of qualifying uses include:

- **Residential Indoor Water Use Standard:** Water use from 1) significant use of evaporative coolers, 2) significant fluctuations in seasonal population.
- **Residential Outdoor Water Use Standard:** Water used for 1) populations of horses and other livestock, 2) controlling dust on horse corrals or other animal exercise arenas, 3) irrigating agricultural landscapes that are within residential areas but have not been classified as irrigable irrigated by DWR, 4) responding to emergency events not including drought, 5) landscapes irrigated with recycled water containing high levels of total dissolved solids (TDS), 6) supplementing ponds and lakes to sustain wildlife as required by existing regulations or local ordinances, 7) irrigating existing residential trees.
- **Commercial Outdoor Water Use Standard:** Water use from 1) responding to emergency events not including drought, 2) irrigating landscapes with recycled water containing high levels of TDS, 3) supplementing ponds and lakes to sustain wildlife as required by existing regulations or local ordinances, 4) irrigating existing trees on CII landscapes with DIMs (beginning July 1, 2040).

A supplier must request a variance or temporary provision by October 1st preceding the reporting year. For example, to include a variance in the January 2026 report, a supplier must submit the variance request on or before October 1, 2025. Approved variances and temporary provisions may be included in the associated budget for up to five years. Variance and temporary provision approval constitutes approval of both methodology and data. To request approval to include additional area beyond that calculated by DWR, SLAs, and variances, the supplier would be required to provide information quantifying and substantiating each request (such as demonstrating that the amount of water requested was delivered by the supplier for the requested use) and a description of efforts to prioritize water for existing trees.

3.3 CII Performance Measures

In addition to compliance with the calculated UWUO, the City must implement CII performance measures. The performance measures were developed by SWRCB to address water use associated with the business community but are not a quantifiable standard since CII water use efficiency consists of many diverse industries, production rates, equipment, and other unique factors. The performance measures primarily focus on identification of the types of CII customers and implementation of BMPs which consist of offering various types of resources and programs to the CII customer sector.

The four performance measures are:

- **Identify Disclosable Buildings** – As defined by the California Energy Commission (CEC), Disclosable Buildings are buildings with 1) more than 50,000 square feet of gross floor area (all square footage within the exterior walls of the building), and 2) zero or more than 17 residential units. The owners of Disclosable Buildings are required to submit monthly energy use data annually to the California Energy Commission (CEC) via the Energy Star Portfolio Manager web portal. This performance measure requires all urban water suppliers to identify the number of Disclosable Buildings in their service area and to provide monthly water use data for at least the previous 12 months when requested by owners or owner agents of the buildings. The number of Disclosable Buildings identified was required to be reported no later than January 1, 2025. Water suppliers are required to report the number of Disclosable Buildings within their service area and the number of customers for which water use data has been provided annually by January 1st of each year.
- **CII Account Classification** – Water suppliers are required to classify CII customers according to the broad classification categories used by the United States Environmental Protection Agency's Energy Star Portfolio Manager tool. All CII customers must be classified into the 22 designated categories by July 1, 2027. The California Water Efficiency Partnership (CalWEP) CII Classification Guidebook is a valuable resource that the City can refer to when reviewing classification method(s) and producing the required output for compliance with the Regulation.
- **Identify High Volume Users** – The Regulation requires identification of high-volume CII water users into one of three compliance options, each with an associated deadline. Option 1 requires identifying existing CII users who fall at or above the 97.5th percentile for CII water use, as well as those at or above the 80th percentile for CII water use, with a compliance deadline of June 30, 2025. Option 2 expands this analysis by requiring classification of CII customers and identifying those at or above the 97.5th percentile and the 80th percentile within each classification category (from the CII Classification measure described). This option allows for a later compliance date of June 30, 2027. Option 3 extends the deadline further to June 30, 2029, and requires the development and application of Key Business Activity Indicators (KBAIs) to assess inefficiency within CII classification categories. While Options 2 and 3 provide additional time and analytical detail, it is recommended that the City proceed with Option 1, as it is the most straightforward to implement and the least resource intensive.
- **Implement Best Management Practices for High Volume Users** – Water suppliers are required to design resources and implement water efficiency programs from five CII-BMP categories:
  1. Outreach, Technical Assistance, and Education
  2. Incentives
  3. Landscape
  4. Collaboration and Coordination
  5. Operational

Two BMPs from each category must be offered to the top 97.5th percentile of CII users and one BMP from each category must be offered to the top 80th percentile of CII users. Singular BMPs can address multiple categories. Suppliers must have a conservation program that meets the BMP requirements in place by 2039, and progress towards compliance must be reported annually.

Table 3-2. *CII Categories for Classification*

Energy Star Portfolio Manager Categories			SWRCB Categories
Banking/Financial Services	Lodging/Residential	Retail	CII Laundries
Education	Manufacturing/Industrial	Services	Landscapes with Dedicated Irrigation Meters (DIM)
Entertainment/Public Assembly	Mixed Use	Technology/Science	
Food Sales and Service	Office	Utility	Water Recreation
Healthcare	Parking	Warehouse/Storage	Car Wash
Public Services	Religious Worship	Other	

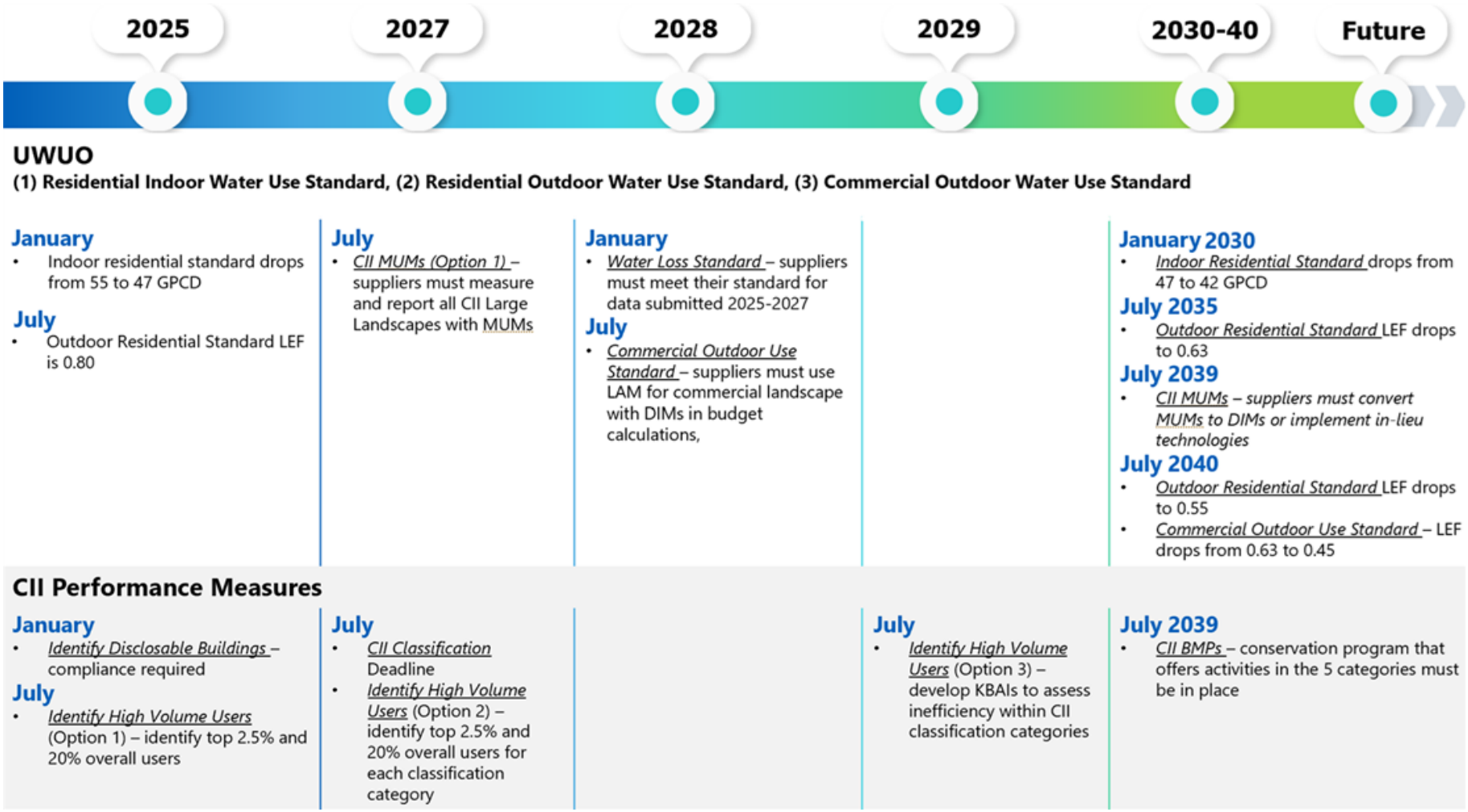
Source: *Energy Star website: https://www.energystar.gov/buildings/benchmark/understand-metrics/property-types*

3.4 Reporting and Compliance Schedule

Reporting on the Regulation started in 2025, and supplier water use is expected to be in compliance with the UWUO starting January 1, 2026. The City submitted its first report in December 2024, the results of which are provided in Appendix A. Beginning in 2026, SWRCB may issue conservation orders to suppliers that are not in compliance and beginning in 2027, SWRCB may impose administrative civil liabilities for non-compliance with the UWUO. The Regulation also includes a "no-back-sliding" provision requiring that each supplier's UWUO remain at or below its 20 x 2020 water efficiency target (SB X7-7). This earlier mandate required urban water suppliers to reduce water use by 20% from a 2010 baseline by 2020. The UWUO required by the Regulation must be below the urban water supplier's SB X7-7 target. If the UWUO is higher than the SB X7-7 target, it is capped at the SB X7-7 target. The City is currently well below its SB X7-7 target as reported in its UWMPs (see the City's 2020 and 2025 UWMPs).

Since the various standards decrease over time, compliance is based on the applicable standards that are in effect for each reporting year and is assessed based on the total UWUO, not on each individual component. The timeline in Figure 3-5 shows the reporting and compliance schedule for the various requirements and highlights the differing effective dates for the CII performance measures and BMP implementation depending on the selected options. The results of a detailed analysis of the City's current practices and additional actions required to comply with the Regulation components are presented in Section 4. The City submitted its first report on January 1, 2025, and is compliant with the first-year reporting requirements.

Figure 3-5. *Making Water Conservation a California Way of Life Compliance Timeline*



Source: *Adapted from California Water Efficiency Partnership, CII Performance Measures Cut Sheet (2025)*

4. Conservation Program Analysis

This chapter describes the City's historical and current conservation program and the analysis of measures that were evaluated as part of developing this Plan.

4.1 Historical and Current Conservation Program

Since the 1990s, the City has offered a variety of indoor and outdoor water efficiency services, ranging from showerhead swap outs to commercial spray valve distribution. Its long-standing partnerships with Sacramento Municipal Utility District (SMUD), RWA, and Sacramento Area Sewer District have brought immense value to its programs through collaboration and funding support. The City currently maintains a robust program including the rebates and services listed in Figures 4-1 and 4-2. The City's ongoing measures and rebate programs can be found on the City's website (https://www.cityofsacramento.gov/utilities/water-conservation) and are included in the modeled measures list in the next section.

Figure 4-1. *Current City of Sacramento Indoor Rebates and Services*

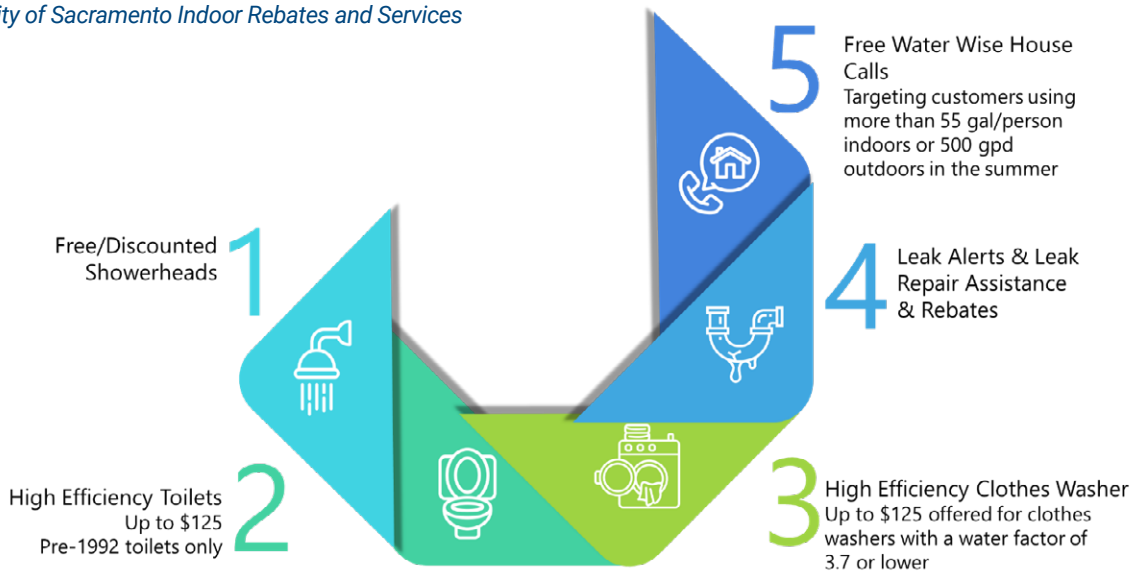
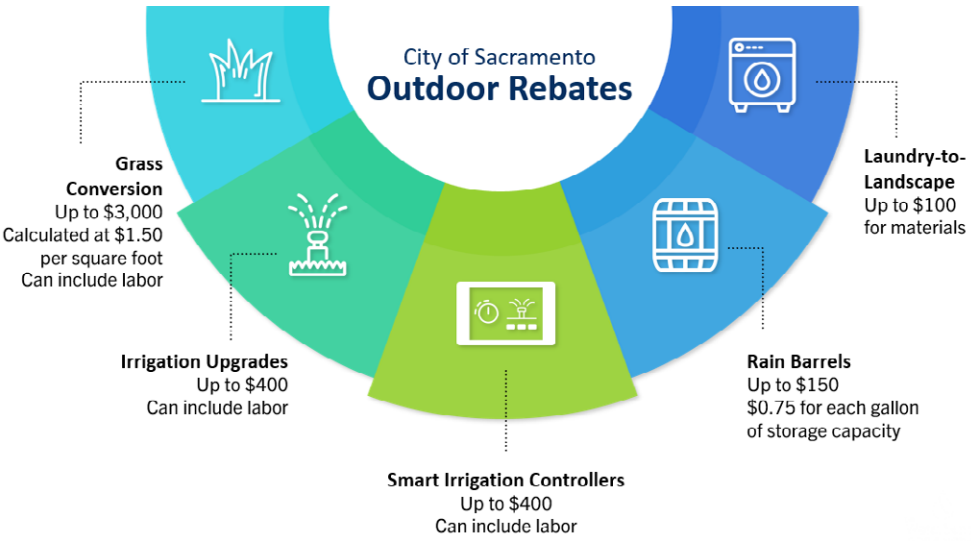


Figure 4-2. *Current City of Sacramento Outdoor Rebates*

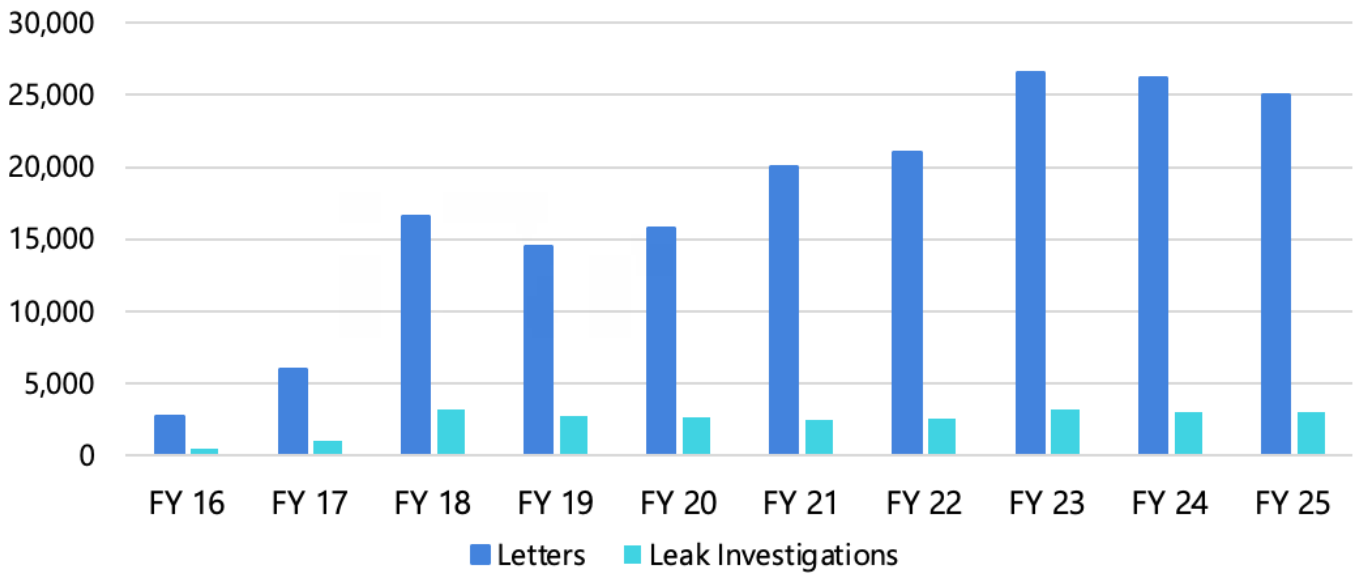


AMI Leak Alerts

For over 10 years, the City has sent out AMI Leak Letters to alert customers of potential leaks. Figure 4-3 shows the number of leak letters and leak investigations conducted in recent years since AMI was implemented. The process was automated in late 2017, and the City now sends out an average of 25,000 leak letters per fiscal year. Each letter includes a prompt to sign up for the City's online portal, estimates the amount of water lost, and offers a free site visit for a leak inspection. Customers can also opt in to receive the leak alert notification via text or email by signing up through the City's website (https://mywater.cityofsacramento.org/login). About 10% of customers call the conservation department after receiving a leak letter to request staff assistance in finding the source of their leak.

The threshold for receiving a leak alert via a notification letter varies from winter to summer. In the winter, the letter is often for a leak lasting 3 days at a rate of 150 gallons per day, or just over 6 gallons per hour (6.25 gph). In the summer, the leak threshold is often set at four continuous days at a rate of 250 gallons per day (just over 10 gph). The thresholds are set based on typical household water use patterns, professional judgment about what constitutes a likely leak, and the capacity of City staff to respond to follow-up calls and site visits. The thresholds are intentionally conservative in minimizing false positives while ensuring that if roughly 10% of notified customers call in for assistance, adequate staff time is available to provide support. Data was collected on the savings achieved from leak notifications at the City, through the Alliance for Water Efficiency study on AMI-enabled Proactive Leak Notification Programs.[3] This study found that the City's single-family and small multifamily leak notification program resulted in about 50% reductions in water volume per meter on average.

Figure 4-3. *City of Sacramento AMI Leak Alerts, FY 2016–2025*



3 https://allianceforwaterefficiency.org/resource/smart-practices-save-water-evaluation-ami-enabled-proactive-leak-notification/

Leak Free Sacramento

The Leak Free Sacramento Program depicted in Figure 4-4 began in 2018 as the first of three groundwater sales transfers (2018, 2020 and 2022) that specifically was to fund water efficiency within the City's disadvantaged communities (DAC). This program is available to homeowner occupied single family customers with leaks that are 25 gph or larger who live within the City's Disadvantaged Communities or are signed up for the Sacramento Utility Rate Assistance (SURA) program. Most of the projects involve a customer main replacement, but some involve hot water line repairs. The goal is to fund 40-50 projects per year utilizing grant funding, and the maximum repair amount is $7000 per customer.

Leak Repair Assistance Rebate

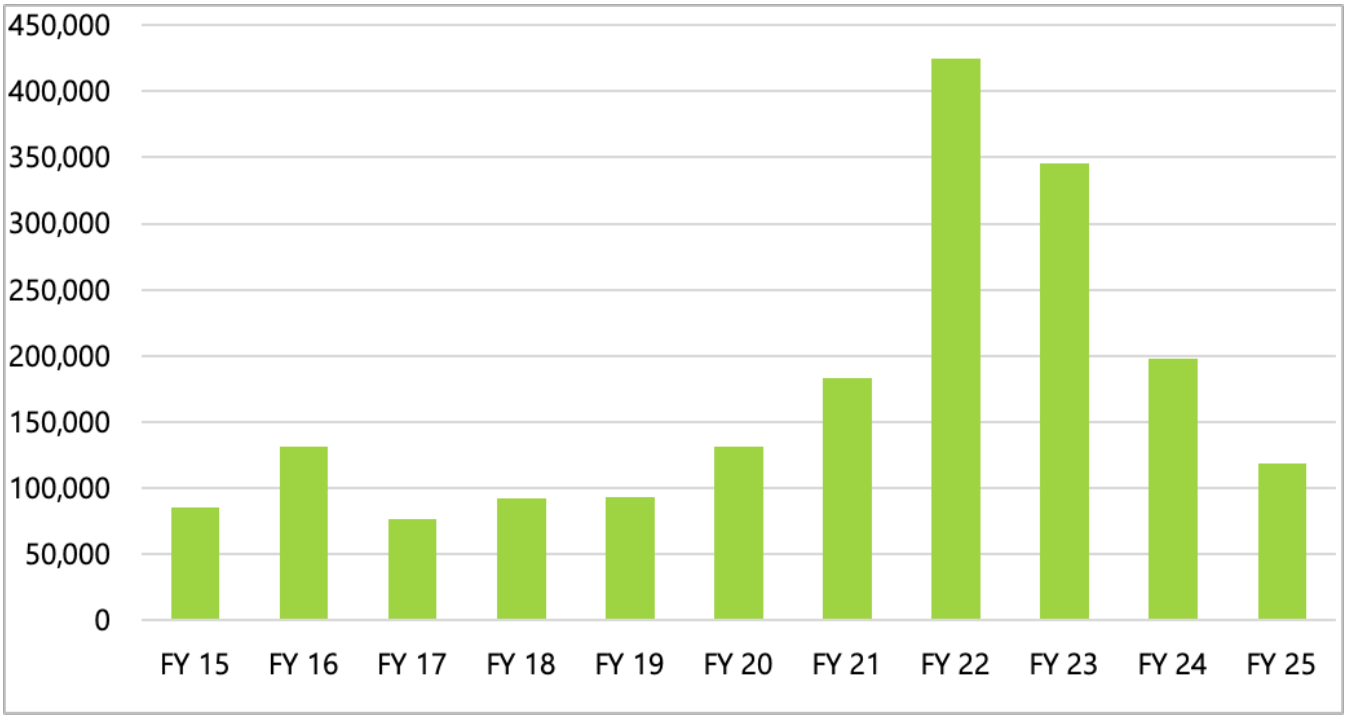
The Leak Repair Assistance Rebate program started through a grant in FY 2021 and has been internally funded for the last two years. Rebates are available to repair single family and small multi-family leaks and vary depending upon the leak size. Leaks of less than 25 gph are eligible to receive a rebate of up to $250 and licensed leak detection may be included. Leaks of 25 gph or more are eligible to receive up to $500 for leak detection and repair. In FY 25, there were 55 completed projects, compared to 48 in FY 24 and 32 in FY 23.

Turfgrass Conversion Rebates

The City's Turfgrass Conversion Rebate program provides customers with $1.50 per square foot of grass converted to low water use plants. Since the program began in fiscal year (FY) 2015, 1,438 turfgrass conversion projects have been completed, involving just under 1.9 million square feet of turfgrass. When the rebate was doubled between June and December 2021 from $1.50/square foot to $3.00/square foot, participation dramatically increased, as displayed in Figure 4-5.

Figure 4-4. *Leak Free Sacramento Program*

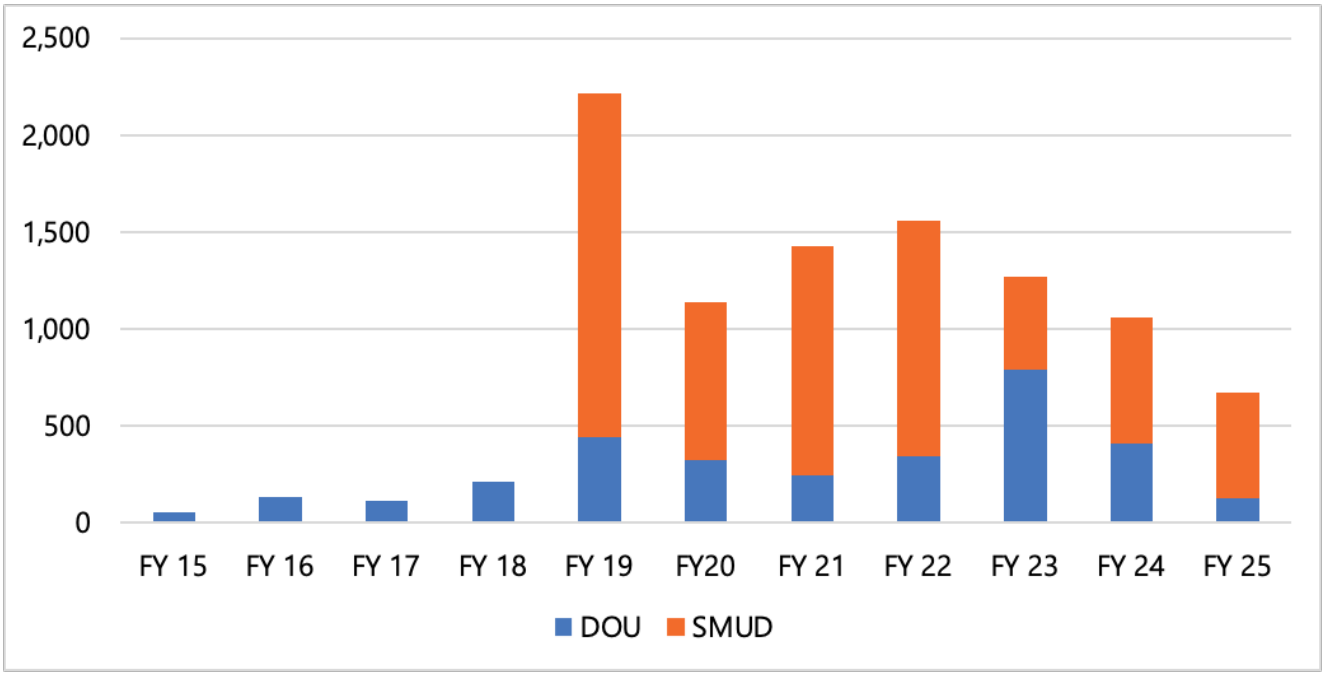
Figure 4-5. *City of Sacramento Turfgrass Transformations, FY 2015–2025*



Smart Controller Rebates

The City began providing Smart Controller Rebates in FY 2015 and has since partnered with SMUD to increase participation by providing instant rebates. More than 3,000 have been provided over the past 10 years by Sacramento Department of Utilities (DOU) separate from the SMUD instant rebates, with an additional 6,725 instant rebates to date since the partnership with SMUD launched in October 2018 (Figure 4-6).

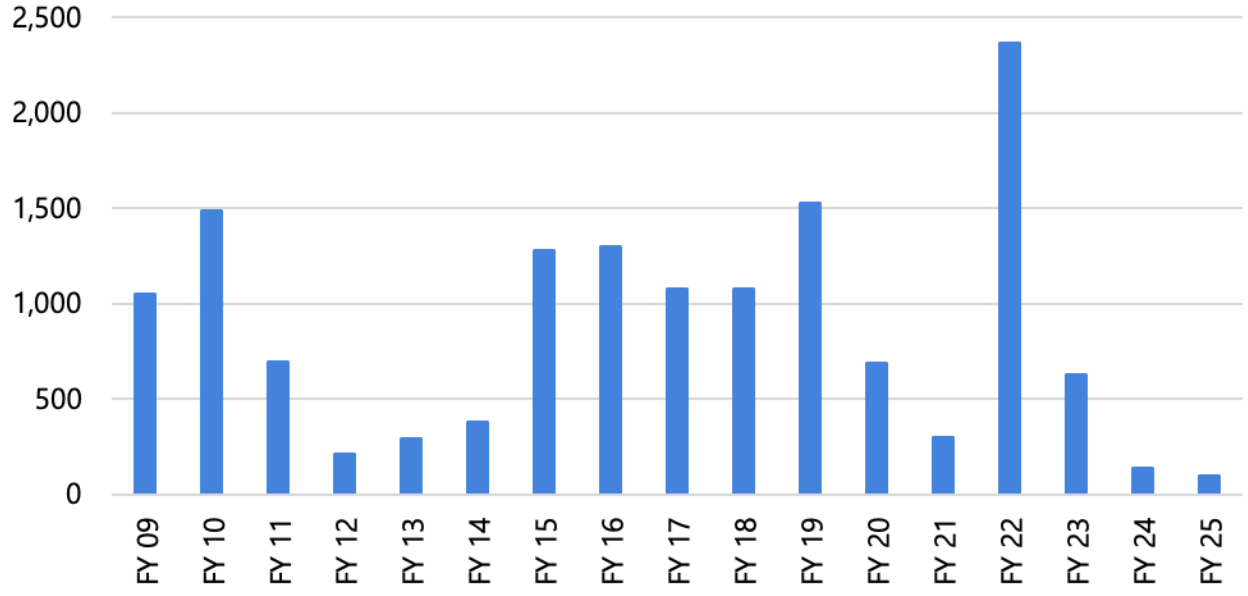
Figure 4-6. *City of Sacramento Smart Controller Rebates, FY 2014–2025*



High Efficiency Toilet Rebates

In partnership with RWA and Sacramento Area Sewer District, the City has offered High Efficiency Toilet Rebates to both residential and nonresidential customers since 2009. Shifts in participation have been seen over the years, with a more recent drop in the past two fiscal years (Figure 4-7).

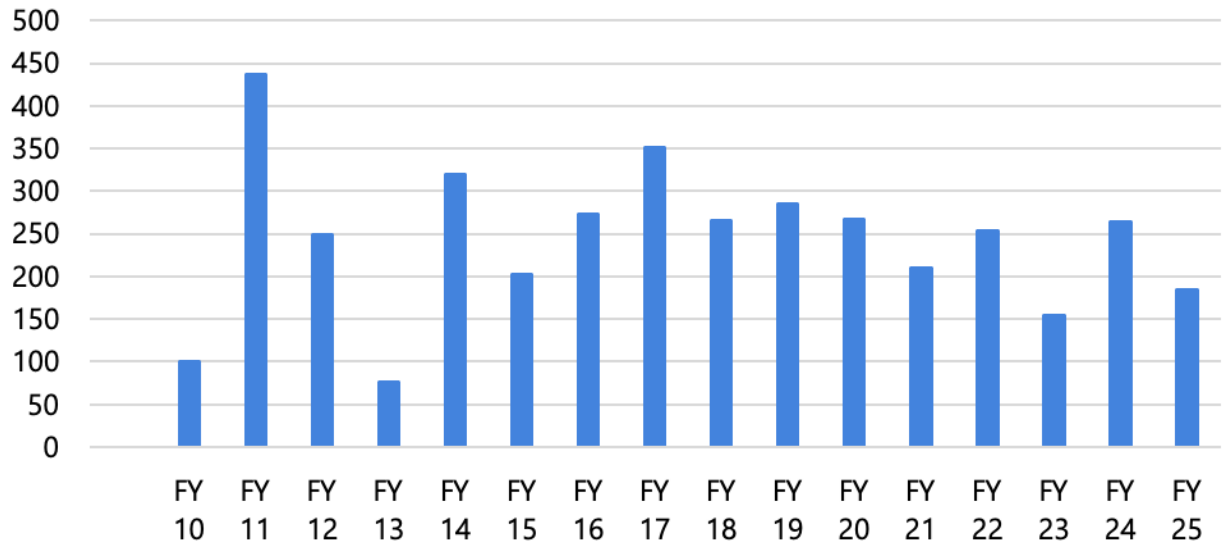
Figure 4-7. *City of Sacramento High Efficiency Toilet Rebates, FY 2009–2025*



High Efficiency Clothes Washer Rebates

The City has also offered High Efficiency Clothes Washer Rebates since 2009, though participation has been historically smaller compared with toilets. On average, the City rebates about 240 clothes washers annually, with some variance based on the year (Figure 4-8).

Figure 4-8. *City of Sacramento High Efficiency Clothes Washer Rebates, FY 2010–2025*



Rainbarrel and Graywater Rebates

The City has offered both a rainbarrel rebate and a simple laundry-to-landscape graywater rebate since 2018. The rainbarrel rebate is up to $.75 per gallon stored, up to 200 gallons captured ($150) while the graywater rebate is up to $100. While only 183 rainbarrel rebates have been issued since 2015, nearly eighteen hundred were distributed through annual events. Between 2017 and 2023, a total of 1,761 rainbarrels were distributed to Sacramento residents through a series of annual events that shifted in 2020 to a drop-ship program where the vendor mailed the rain barrel(s) to qualified customers. To date, there have only been three graywater rebates, but none since 2021.

4.2 Conservation Measure Evaluation

This section presents the City's conservation measure evaluation process to support its goal of developing a Plan that would result in the greatest ease and efficiency of program administration, the lowest cost of implementation, the greatest water savings, and the best alignment with the new Regulation.

Experience across many utilities has shown that there is a reasonable limit to the number of measures that can be effectively implemented within a service area at any given time. Historically, programs that consist of too many measures are difficult to implement successfully. Therefore, prioritization of measures is important both as an outcome of this planning effort and as the program is implemented.

The approach to program implementation is viewed as a "dynamic and evolving" process where opportunities may arise and be adopted as new technologies become available. Measure timelines can also be adjusted, with the recognition that doing so may impact the savings objectives.

An important step in updating the City's water conservation program included identification of new measures that may be appropriate and the screening of these measures to a short-list for detailed evaluation (benefit-cost analysis). A thorough measure screening process was necessary to scale to a reasonable short-list of measures for evaluation in the DSS Model. This evaluation was specific to the factors unique to the City's service area, such as water use objectives, characteristics, and demographics.

Certain terms that will be used when describing aspects of the measure evaluation include:

Utility Costs – costs that the City as a water utility will incur to operate the measure, including administrative costs.

Utility Benefits – the avoided cost of producing water at the identified rate.

Customer (Community) Costs – those costs customers will incur to implement a measure in the City's conservation program and maintain its effectiveness over the life of the measure.

Customer (Community) Benefits – the additional savings, such as energy savings, resulting from reduced use of hot water. These savings are additional as customers would also have reduced water bills (since the utility costs and benefits transfer to the customers).

Community Costs – includes Utility Costs plus Customer Costs.

Community Benefits – includes Utility Benefits plus Customer Benefits.

Present Value (PV) of Utility and Community Costs and Benefits ($) – the present value of the program period time stream of annual costs or benefits, discounted to the base year.

Utility Benefit to Cost Ratio (BCR) – PV of Utility Benefits divided by PV of Utility Costs, over the program period.

Community Benefit to Cost Ratio – (PV of Utility Benefits plus PV of customer energy savings) divided by (PV of Utility Costs plus PV of Customer Costs), over the program period.

Water Utility Costs ($) – the sum of the annual Utility Costs for the Program years. Utility costs include administrative costs and staff labor.

Cost of Savings per Unit Volume ($/AF) – PV of Utility Costs over program period divided by the program period of water savings. This value is compared to the utility's avoided cost of water as one indicator of the cost-effectiveness of conservation efforts. Note that this value somewhat minimizes the cost of savings because program costs are discounted to present value, but water benefits are not.

4.2.1 Conservation Measure Screening and Selection

To support the development of a data-driven and regulation-compliant Water Efficiency and Conservation Plan, MWM and City staff undertook a structured process to screen and select individual measures for modeling. Using MWM's proprietary library of over 130 measures as a starting point, MWM created a tailored subset of measures to review with the City. Given that the major objective of the Plan was to meet requirements of the State of California's *"Making Water Conservation a California Way of Life"* Regulation, MWM included regulatory alignment information for applicable measures in the custom library to provide the City with context in determining which measures had the potential to contribute toward compliance.

During the pre-screening process, City staff provided input on current water efficiency and conservation activities and the practical feasibility of various measures. Based on this input, the initial measure list was refined to a shortlist of 40 measures that would be evaluated further through a structured voting process. To support the voting effort, MWM and City staff collaboratively developed five screening criteria that captured the most relevant decision-making considerations. These criteria were designed to reflect both regulatory and operational priorities. Following this, MWM convened a meeting with a broader group of key City staff and regional partners to introduce the measure screening voting and scoring process that follows the methodology presented in the American Water Works Association Manual of Practice, *M52 Water Conservation Programs – A Planning Manual* (AWWA, 2017). The screening criteria included the following (in no particular order or priority):

1. **Technology Market Maturity** – Refers to whether the technology needed to implement a water use efficiency measure, such as an irrigation control device, is commercially available and supported by the local service industry. A measure would be more likely to be included if the technology is widely available in the service area, and less likely to be included if the technology was not commercially available or not supported by the local service industry.

   Technology Market Maturity – Refers to whether the technology is commercially available.
   - **0 = Not available** (i.e., New product or innovation that is not mass produced at this time, or has not been widely tested for product quality or water savings).
   - **3 = Can be obtained with effort** (i.e., Special order from a local store, online ordering).
   - **5 = Readily available** (i.e., Can be purchased at multiple local stores).

2. **Diversity, Equity, and Inclusion (DEI)** – Considers customer equity and inclusion as well as whether one group or category of customers receives a benefit while another pays the costs (without receiving benefits). Consider commercial versus residential, income levels, renter versus owner, non-English speaking population outreach, convenience (rural, urban), economics, perceived fairness and/or aesthetics.

   Diversity, Equity, and Inclusion: Equitable impacts on diverse populations.
   - **0 = No DEI benefit** (i.e., Swimming Pool covers – typically a higher income amenity).
   - **3 = Minor DEI benefit** (i.e., Toilet rebates – everyone has toilets, however full replacement cost not covered).
   - **5 = Significant DEI benefit** (i.e., Low-income direct install program, multi-family programs targeted to renters).

3. **Reduces Peak Water Use** – Systems must be built for peak demand, increasing utility costs. This criterion evaluates whether the measure drives down maximum demand on the system, reducing peak water use. This is often applicable to outdoor irrigation in the summer.

   Reduces Peak Water Use: Reduces usage during peak summer irrigation.
   - **0 = No reduction to peak demands** (i.e., Indoor plumbing retrofit – inside only).
   - **3 = Minor reduction in system peak demands** (i.e. Public information – helps educate the public on reducing summer water use).
   - **5 = Significant reduction in system peak demands** (i.e., Cooling Towers, Turf replacement – very high water use during warm weather).

4. **Environmental Impact** – Whether the measure may have (usually) unintended, environmental impacts. For example, depending upon the required design elements, turf replacement programs may contribute to the heat island effect where areas with little to no landscaping suffer from increased temperatures. Some landscape renovations may involve an increase in artificial turf that contributes to microplastics in the soil and reduces habitat for insects and microorganisms that improve soil health. Increased driving has a carbon impact.

   Environmental Impact: Program has environmental co-benefits.
   - **0 = Neutral environmental impact** (i.e., allowing artificial turf to qualify for a landscape turf replacement program).
   - **3 = Minor positive environmental impact** (i.e., low impact new development including rainwater harvesting, etc.).
   - **5 = Significant positive environmental impact** (i.e., requiring native landscape transformation with pollinator habitat benefits).

5. **Water Savings Potential** – Refers to the water savings potential a measure has on an account-by-account basis as well as the anticipated adoption by the public. This is a qualitative assessment of expected water savings potential, understanding that actual savings will be quantitatively measured using the DSS Model.

   Water Savings Potential: Expected volume of water saved.
   - **1 = Low savings potential** (i.e., Residential dishwashers – small gallons/load).
   - **3 = Medium savings potential** (i.e., Toilet retrofits – high level of saturation).
   - **5 = High savings potential** (i.e., Water Loss – large volume of water).

MWM compiled and analyzed the screening results and presented the findings during a follow-up meeting. Measures with overlapping features, such as those targeting similar end-uses or involving similar implementation strategies, were consolidated into unified measure descriptions. Based on City feedback, a final meeting was held to confirm the finalized list of 19 measures selected for modeling. These measures were then carried forward to the next stage of evaluation, where detailed analysis was conducted to estimate water savings and costs. An additional seven "enhanced" measures were included after discussion with City staff on potential improvements to current measures, creating a total of 26 measures for evaluation.

Table 4-1 presents the list of measures selected for evaluation/modeling. Information about the DSS Model analysis approach to measure unit costs, water savings, and market penetrations is in Appendix B. Actual measure inputs and assumptions used in the DSS Model to evaluate the water conservation measures selected by the City, and their results, can be found in individual measure screenshots provided in Appendix C.

Table 4-1. *Final Measure List (Abbreviated Descriptions)*

Measure[a]	Description
Single and Multi-Family Residential Financial Incentives for Irrigation and Landscape Upgrades	Currently offered by the City through the River Friendly Landscape Program, this measure provides rebates for residential customers who retrofit their landscapes with water efficient plants and/or upgrade to water efficient irrigation equipment.
Landscape Irrigation Restricted to Designated Days and Times[b]	The City maintains a two day per week watering schedule from March through October, and a one day per week schedule between November and March. This is enforced by investigating reports that come into 311 and sending letters to customers watering on the wrong day and times. Wrong day and time watering is identified using AMI data and, in some cases, in-person patrolling for verification.
Commercial and Large Landscape Financial Incentives for Irrigation and Landscape Upgrades	Currently offered by the City through the River Friendly Landscape Program, this measure provides rebates for commercial and large landscape customers who retrofit their landscapes with water efficient plants and/or upgrade to water efficient irrigation equipment.
Outdoor Water Use Evaluations	The City currently offers outdoor water surveys for existing residential customers. All single family and multi-family residential customers are eligible for free landscape water surveys upon request. Surveys include a mix of in-person visits and remote calls.
Large Landscape Water Surveys[b]	The City currently offers outdoor water surveys for existing multi-family and CII DIM customers with a minimum of ½ acre of irrigated area. All large multi-family residential, CII, and public irrigators of large landscapes are eligible for free landscape water audits upon request. The City currently conducts outreach for this measure through Waterfluence and performs surveys using in-house staff.
Enhanced - Water Budgeting/ Monitoring for Dedicated Irrigation Meters[b]	In 2024, the City of Sacramento began a multi-year agreement with Waterfluence to track and provide feedback on irrigation water use (budget vs. actual) to site managers, property owners, and landscapers. This measure aims to help the City with increasing customer engagement for larger sites and increasing participation in water efficiency programs through sharing irrigation water use data and monitoring water use at these sites.
Partnership with Energy Utilities – Incentive	Current partnership in place with SMUD, the electric utility for City of Sacramento residents, offers incentives to customers to save both water and energy.
Residential Leak Repair Assistance Rebate	Currently offered by the City this measure provides a rebate to subsidize part of a leak repair for qualified single and small multi-family customers.
Leak Free Sacramento	Customer leaks can go uncorrected at properties where owners are least able to pay the costs of repair. This measure is funded through a groundwater substitution transfer and provides free leak repairs and water-efficient upgrades to eligible low-income single-family homeowners.
Water Loss Tracking[b]	This measure models City utilities department time used for tracking and reporting water loss information as it relates to the California water loss standard and ties to the Urban Water Use Objective.
Public Outreach & Education[b]	Public outreach efforts currently include direct advertisement buys as well as educational materials, community events, social media content, and City Express articles that are sent out to 250,000 email accounts. The public outreach efforts also include providing letters of suspected leaks to customers based on their AMI water meter data and outreach to increase engagement with the Badger customer engagement portal. This measure would continue indefinitely and evolve based on public participation and evaluation of long-term conservation targets.
Indoor Water Surveys	Indoor water surveys are currently offered for existing single family and multi-family residential customers, often virtually/remotely in response to a spike in water use.

Measure[a]	Description
Residential Plumber Initiated High Efficiency Toilet Retrofit Program[b]	Licensed plumbers, pre-qualified by the Utility, would solicit customers directly. Qualified low-income customers would get new high-efficiency toilets (HETs) and other indoor fixtures installed for free by a pre-approved plumber under contract with the City. This program is designed for disadvantaged-qualified customers. This measure focuses on lowering indoor GPCD for compliance with the Urban Water Use Objective from the "*Making Water Conservation a California Way of Life*" Regulation.
Residential Clothes Washer Rebate	Currently offered by the City, this measure provides rebates for efficient clothes washing machines for residential properties, primarily single-family homes. This measure is currently administered by CalWEP and rebates are cost-shared with RWA. This measure is designed to sunset by 2028 when the new federal regulations begin.
CII Customized Top Users Incentives	This measure would provide a free water use assessment (otherwise known as water audit) to commercial, industrial, and institutional customers, followed by a free report where the Utility will present recommendations for efficiency upgrades. Financial incentives will also be provided after analyzing the benefit-cost ratio of the proposed project(s). Incentives are tailored to each individual site as each site has varying water savings potential. This measure aligns with CII BMPs for compliance with the Urban Water Use Objective from the "*Making Water Conservation a California Way of Life*" Regulation.
CII Water Savings Performance Program[b]	The City of Sacramento provides a rebate of $0.50/CCF (centum cubic feet) saved to CII sites within the service area. Water savings are estimated using the number of days operated per year and the expected life of the equipment (capped at 10 years). This measure aligns with CII BMPs for compliance with the Urban Water Use Objective from the "Making Water Conservation a California Way of Life" Regulation.
CII Rebates to Replace Inefficient Equipment[b]	Currently offered by the City, this measure provides rebates to CII customers for a standard list of water efficient equipment. Incentives offered include x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, high efficiency toilets, high efficiency urinals, replacing once through cooling, and adding conductivity meters on cooling towers. This measure aligns with CII BMPs for compliance with the Urban Water Use Objective from the "*Making Water Conservation a California Way of Life*" Regulation.
Install High Efficiency Fixtures in Multi-Family (MF) & CII Buildings	This measure would install high efficiency fixtures in select multi-family, commercial, and institutional buildings. Replacements would include high efficiency toilets, showerheads, urinals, and faucet aerators. A water survey would be conducted as a pre-requisite to qualify for direct installation of fixtures. This measure aligns with CII BMPs for compliance with the Urban Water Use Objective from the "*Making Water Conservation a California Way of Life*" Regulation.
Enhanced - Residential Smart Landscape Rebates[b]	For single Family (SF) and multi-Family (MF) customers with landscape, provide rebates for substantive landscape retrofits and/or installation of water efficient irrigation equipment upgrades through the River Friendly Landscape Program. Rebates contribute towards the purchase and installation of water-wise plants, compost, mulch, stormwater features like permeable hardscape and swales, and selected types of irrigation equipment upgrades. The City would offer a higher incentive rate due to partnerships and cost and resource sharing. This measure is an enhanced version of the Residential Financial Incentives for Irrigation and Landscape Upgrades measure above.
Commercial and Large Landscape Non-Functional Turf Outreach[b]	In October 2023, the California State Legislature passed Assembly Bill 1572, which phases in a permanent ban on watering decorative grass or non-functional turf with potable water in commercial, industrial, and institutional settings. This includes areas within homeowners' associations (HOAs). This measure reflects the City conducting outreach about the ban to increase awareness and track compliance with the regulation which occurs in phases, completing in January 2029.
Enhanced - Residential Leak Repair Assistance[b]	Provides a rebate to subsidize part of a leak repair at qualified single and small multi-family customers. This enhanced measure would utilize grant funding to increase the number of rebates provided and include Spanish translation efforts to reach additional customers. This measure is an enhanced version of the Residential Leak Repair Assistance measure above.
Enhanced - AMI Targeted Leak Free Sacramento[b]	This enhanced measure targets accounts with leak alerts identified via AMI, especially large MF customers, and provides free leak repairs to eligible low-income single family and multi-family homeowners. This measure is an enhanced version of the Leak Free Sacramento measure above, using grant funding to fully cover customer leak repair costs and targets more sites annually. It will also expand the threshold for AMI to increase participation.

Measure[a]	Description
Enhanced - Water & Energy Partnership Rebates[b]	This measure would continue partnership with SMUD to offer incentives to customers to save both water and energy. The focus of this measure is peak demand reduction and involves considering a partnership with SMUD on their shade-tree program to cross-market with the landscape transformation program. This measure is an enhanced version of the Partnership with Energy Utilities measure.
Enhanced - Residential Water Surveys[b]	This measure would provide comprehensive water surveys for existing single family and multi-family residential customers, targeting those with high water use. The enhancement involves an expansion to multi-family, and the development of a customized report would be provided to the owner. A full survey may be a pre-requisite for receiving rebates. The survey would include inspection of indoor and outdoor water use. This measure is an enhanced version of the Indoor Water Surveys measure above.
Enhanced Water Loss Control Program	This measure includes enhanced water loss efforts to find and repair leaks in the distribution system to reduce real water loss. This is funded by the DOU water distribution team budget. In this enhanced measure, the operating budget would be increased by approximately 2% to support another water loss crew that would be in the field conducting proactive leak detection and repair.
Enhanced - Commercial and Large Landscape Non-Functional Turf Incentive	This measure would target CII & Large Landscape accounts with non-functional turf (NFT) and provide an incentive and resources to assist with landscape retrofits, including water efficient landscape design and plant palette resources, smart irrigation practices guidance, and a rebate for replacing NFT with appropriate landscaping. This measure represents an enhancement to activities described in the Commercial and Large Landscape Non-Functional Turf Outreach measure above.

a. Full measure descriptions are provided in Appendix C and can be found in the DSS Model.

b. Measure is included in the Optimized Program B, as detailed in the following sections.

4.2.2 Conservation Measure Analysis Results

Following the confirmation of the final measures for modeling, MWM conducted detailed analyses to evaluate the potential water savings and cost effectiveness of measures. For each measure, a set of key inputs was developed to support benefit-cost analysis. Measure design inputs were tailored to the specific characteristics of each measure and included inputs such as:

- Affected customer categories (e.g., Single Family, Multi-Family, CII, or other sectors).
- The end uses that would be influenced by implementation (clothes washer, faucets, landscape irrigation, commercial process, etc.).
- Participation targets, which were estimated using historical conservation activity data, where available.
- Estimated measure life (i.e., the number of years the measure would provide benefits) and measure implementation length (i.e., the duration over which the measure would be offered).
- Utility and customer costs were developed on a per-customer-type basis for each measure, along with administrative costs, which were estimated using current City employee rates and informed by City feedback.

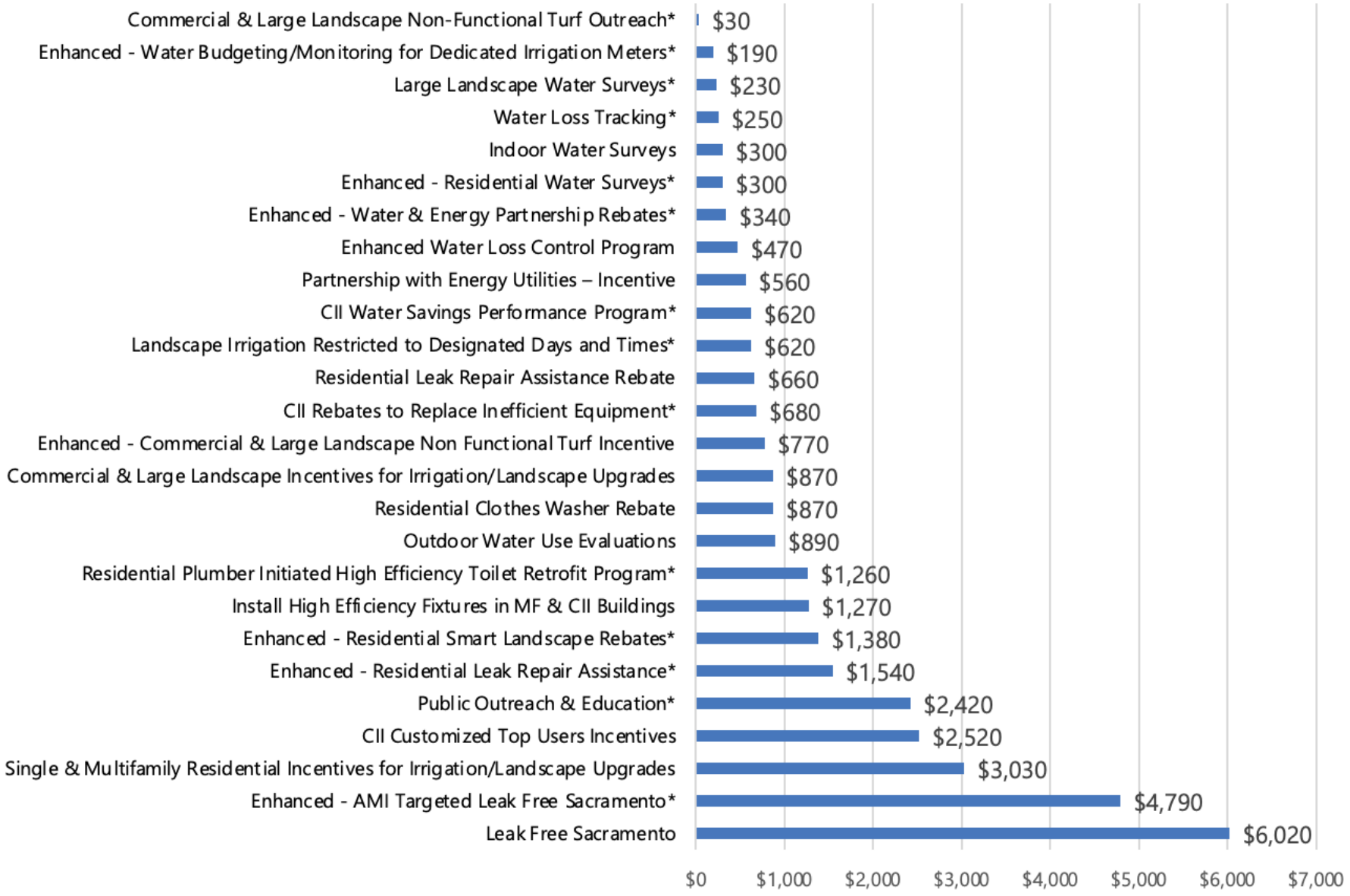
Using these inputs, MWM performed calculations to estimate key performance indicators for each measure, including the benefit-cost ratio, lifetime implementation costs, and lifetime water savings both in volumetric terms (millions of gallons saved per day) and monetary terms (dollar value of avoided costs). Estimated avoided costs, which account for the value of water not supplied due to conservation, played a central role in determining the economic viability of each measure. The results of this analysis informed the subsequent step of the planning process, which involved grouping measures into comprehensive conservation programs aligned with the City's goals and a compliance strategy for the "*Making Water Conservation a California Way of Life*" Regulation.

The following figures illustrate the results of the analyses completed for each measure evaluated. Figure 4-9 shows the cost of savings per unit volume in dollars-per-acre-foot. This metric is informative about which measures cost the most to implement. Figure 4-10 presents cumulative projected water savings by the year 2055. While costs of savings per unit volume provides information on which measures are the most cost effective, the cumulative projected savings metric provides information on which measures are the most impactful (are estimated to achieve the most water savings by 2055). It is important to note that this metric is affected by the timeline over which a measure is implemented (measures with long savings lives that are implemented in earlier years will accumulate savings for longer periods).

Figure 4-11 presents a comparison of the cumulative savings and costs of savings per unit volume information presented in Figures 4-9 and 4-10. The most cost-effective measures that also achieve higher water savings are plotted closer to the bottom right quadrant, while measures that are the least impactful and less cost-effective are plotted closer to the upper left quadrant.

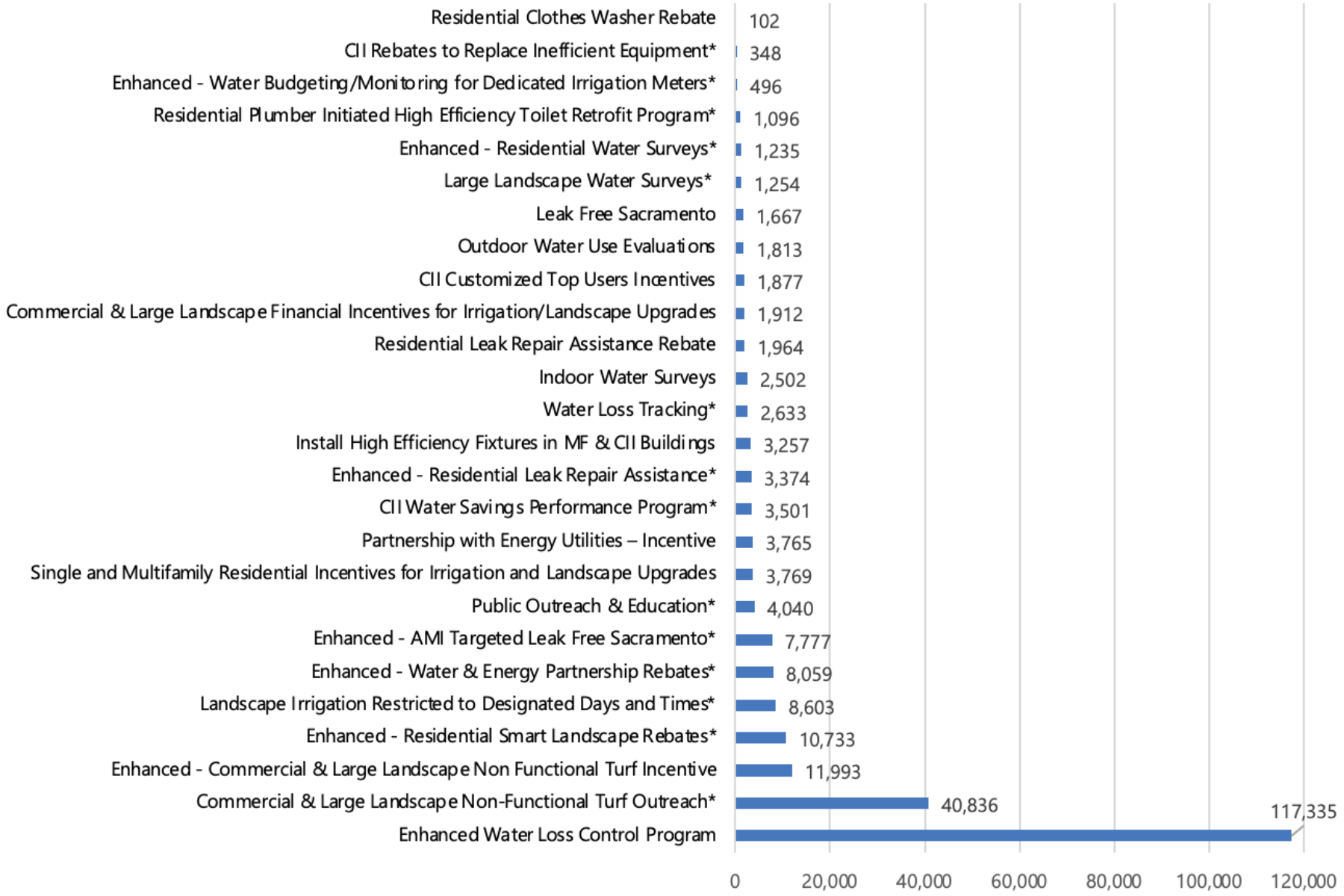
Metrics of cost-effectiveness and water savings are critical in the design of a viable conservation program. However, because a key objective of this Plan is to address new regulatory requirements, performance metrics were used to identify individual measures that could be incorporated into program alternatives in the most cost-effective way while also achieving compliance.

Figure 4-9. *Cost of Savings per Unit Volume ($/AF) Based on Cumulative Water Savings in 2055*



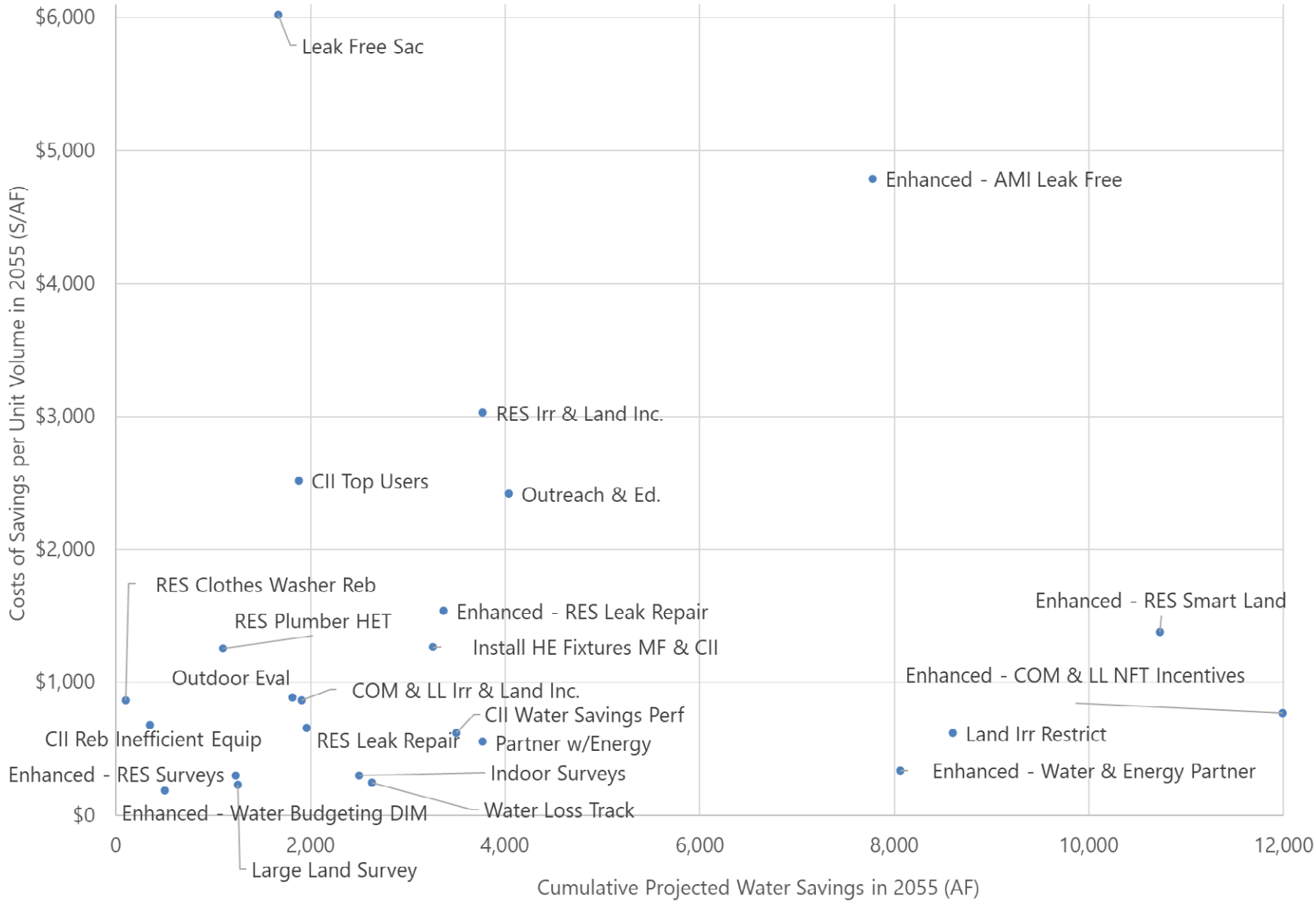
Note: *Cost of Savings per Unit Volume ($/AF) values have been rounded to the nearest ten $/AF. Measures marked with an asterisk (*) are included in the optimized Program B.*

Figure 4-10. *Cumulative Projected Water Savings (AF) in 2055*



Note: *Cumulative projected water savings values have been rounded to the nearest ten AF. Measures marked with an asterisk (*) are included in the optimized Program B.*

Figure 4-11. *Cumulative Projected Water Savings vs. Cost of Savings per Unit Volume (2055)*



Note: *Measures with the highest savings, such as Enhanced Water Loss with estimated cumulative savings of 117,340 acre-feet (AF) and $470/AF in 2055, as well as the Commercial and Large Landscape NFT Outreach measure with estimated cumulative savings of 40,840 AF and $30/AF in 2055, are excluded from the figure to better zoom in on the majority of the measures' cost of savings relationships.*

4.3 Conservation Program Evaluation

The design of conservation programs and the program evaluation process was focused on producing a suite of program alternatives to offer the City strategic flexibility in meeting both current and anticipated future regulatory requirements under the *"Making Water Conservation a California Way of Life"* Regulation and to refresh the current program to cost-effectively and strategically achieve water efficiency. The programs designed and evaluated will also help the City meet its objectives of strengthening the conservation ethic in the service area and responsibly managing water resources. Program design and evaluation emphasized combining measures with strong BCRs and substantial water savings, then refining them to account for reasonable escalation of projected implementation costs and to ensure alignment with the City's priorities.

4.3.1 Conservation Program Alternatives

To ensure adaptability in the City's water conservation strategy, MWM and City staff developed three conservation program alternatives. Each alternative was built from modeled measures and tailored to a different level of anticipated water use, with the goal of providing flexible implementation pathways as future demands arise. The programs were designed to support both near-term compliance and long-term resilience by incorporating the ability to scale conservation efforts as needed. They also draw on insights from historical conservation and water system data, along with input from City staff. In addition, the programs were reviewed by members of the Water Forum, whose comments are included in Appendix D. The programs range from maintaining current practices to adopting more aggressive conservation efforts, as outlined below:

- Program A, referred to as the "Current" Program, includes only those measures that are part of City's existing conservation activities. This program reflects a continuation of the City's ongoing efforts and serves as a baseline scenario for comparison.
- Program B, or the "Optimized" Program, includes some of the Current Program measures as well as new and enhanced measures with favorable BCRs and/or high savings potential as identified through the measure analysis. This program represents a modification of the City's existing conservation activities to optimize resources and expand conservation potential.
- Program C, or the "Expanded" program, builds on Program B by incorporating all enhanced and new measures in lieu of some current measures to achieve maximum savings potential. This program gives the City the option to proactively expand conservation efforts, creating a larger buffer between projected water use and the compliance threshold. This added margin helps mitigate risk should demand exceed current projections or if additional conservation is required to achieve UWUO compliance. Note that Program C is significantly more expensive. Program C has more individual conservation measures than Program B. Also, Program C is running at a different implementation schedule. Even with all these factors, the savings per unit are very close between Program B and Program C. The programs are run independently in the DSS Model, and they have very different budgets. Variance in Program B and C water savings and BCRs are a direct result of the variance in measures included, differing budgets, and differing schedules (measure start year and end year). Many of the measures that are in Program C have a later start date than those in Program B.

Metrics of cost effectiveness and water savings are critical in the design of a viable conservation program. However, because a key objective of this Plan is to address new regulatory requirements, performance metrics were used to identify individual measures that could be incorporated into program alternatives in the most cost-effective way while also achieving compliance.

Table 4-2 presents the measures that comprise the programs discussed above. Table 4-3 presents a summary of the estimated water demand in million gallons per year (MGY) and acre feet per year (AFY) as well as lifetime present value of water savings and utility costs for all three programs analyzed.

Table 4-2. *Measure Composition of Programs A, B, and C*

Measure	Program		
	A	B	C
Single and Multi-Family Residential Financial Incentives for Irrigation and Landscape Upgrades	✔		
Landscape Irrigation Restricted to Designated Days and Times	✔	✔	✔
Commercial and Large Landscape Financial Incentives for Irrigation and Landscape Upgrades	✔		
Outdoor Water Use Evaluations	✔		
Large Landscape Water Surveys	✔	✔	✔
Enhanced - Water Budgeting/Monitoring for Dedicated Irrigation Meters		✔	✔
Partnership with Energy Utilities – Incentive	✔		
Residential Leak Repair Assistance Rebate	✔		
Leak Free Sacramento	✔		
Water Loss Tracking	✔	✔	✔
Public Outreach & Education	✔	✔	✔
Indoor Water Surveys	✔		
Residential Plumber Initiated High Efficiency Toilet Retrofit Program		✔	✔
Residential Clothes Washer Rebate	✔		✔
CII Customized Top Users Incentives			✔
CII Water Savings Performance Program	✔	✔	✔
CII Rebates to Replace Inefficient Equipment	✔	✔	✔
Install High Efficiency Fixtures in MF & CII Buildings			✔
Enhanced - Residential Smart Landscape Rebates		✔	✔
Commercial and Large Landscape Non-Functional Turf Outreach		✔	
Enhanced - Residential Leak Repair Assistance		✔	✔
Enhanced - AMI Targeted Leak Free Sacramento		✔	✔
Enhanced - Water & Energy Partnership Rebates		✔	✔
Enhanced - Residential Water Surveys		✔	✔
Enhanced Water Loss Control Program			✔
Enhanced - Commercial and Large Landscape Non-Functional Turf Incentive			✔

Table 4-3. *Water Savings and Costs of Evaluated Water Conservation Programs*

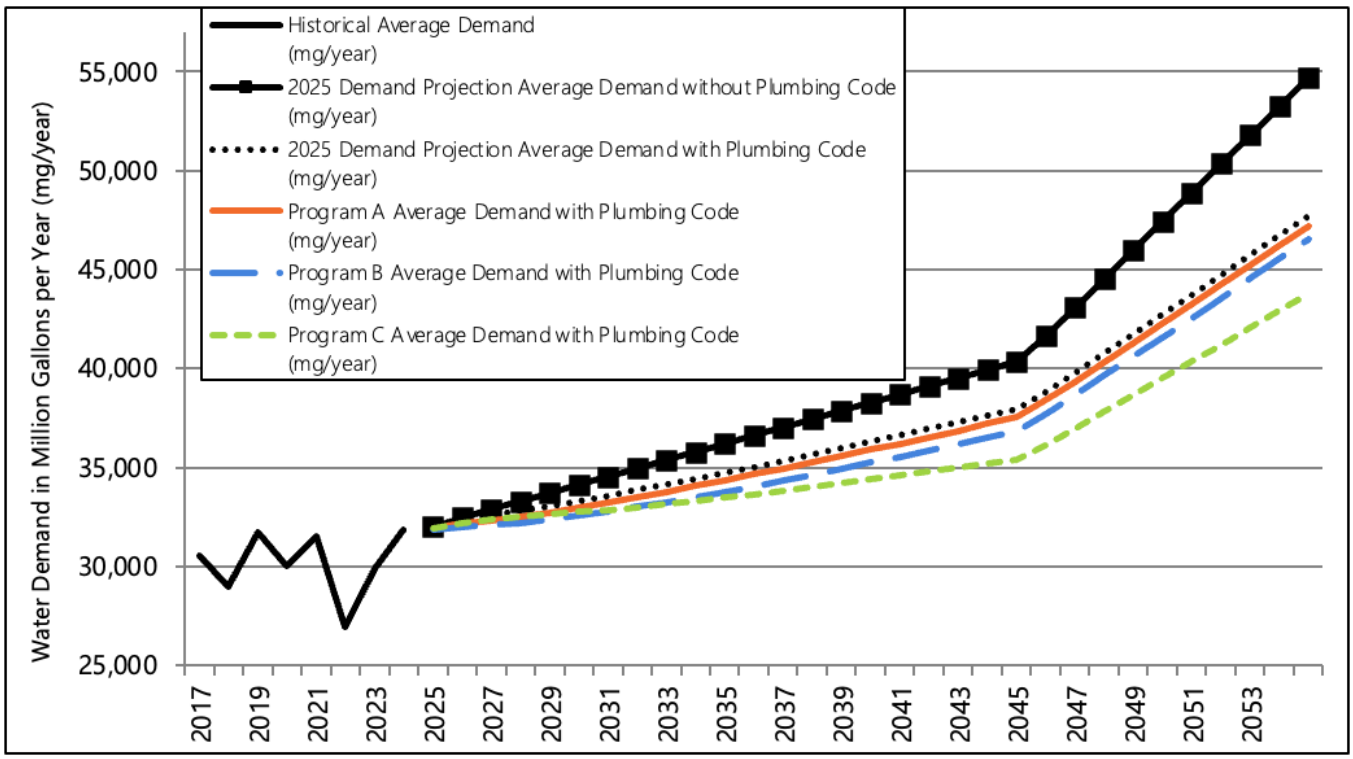
Water Savings	Program A Current Measures (Baseline)		Program B		Program C	
			Optimized Program		Expanded Program	
Year	MGY	AFY	MGY	AFY	MGY	AFY
2025	80	287	148	529	71	253
2030	364	1,300	717	2,562	567	2,026
2035	345	1,232	944	3,371	1,251	4,467
2040	394	1,407	1,040	3,714	1,891	6,752
2045	423	1,509	1,107	3,955	2,563	9,154
Lifetime Present Value of Water Savings (2025-2055)	$10,019,000		$24,593,000		$47,943,000	
Lifetime Present Value of Utility Costs (2025-2055)	$47,442,000		$81,430,000		$153,329,000	
Water Utility Avg. Cost of Water Saved (2025-2055)	$4,000/MG	$1,120/AF	$2,790/MG	$780/AF	$2,580/MG	$720/AF
Avg. Annual Utility Cost (2025-2030)	$1,662,000		$2,122,000		$4,479,000	

Notes:

1. Water savings are relative to the Plan baseline period, directed by the City to align with the 2023 Water Supply Master Plan (WSMP). Program savings do not include savings from plumbing codes.
2. Present value costs and savings are rounded to the nearest $1,000. Water utility cost of water saved is rounded to the nearest $10. 2025-2030 average annual utility cost is rounded to the nearest $1,000.
3. 2025-2030 average annual utility cost for all four programs includes all direct City costs as well as costs supported by grants for all modeled measures.
4. The average annual utility cost represents what was modeled for this analysis, which differs from the City's current total program cost.
5. Program A's utility cost of water saved is higher than that of the other programs because it contains two measures not included in the other programs (Leak Free Sac and RES Incentives for Irrigation) that have very high cost of water values, $6,000/AF (acre-feet) and $3,000/AF, respectively. The other programs have more measures than Program A and most with much lower cost of water values.

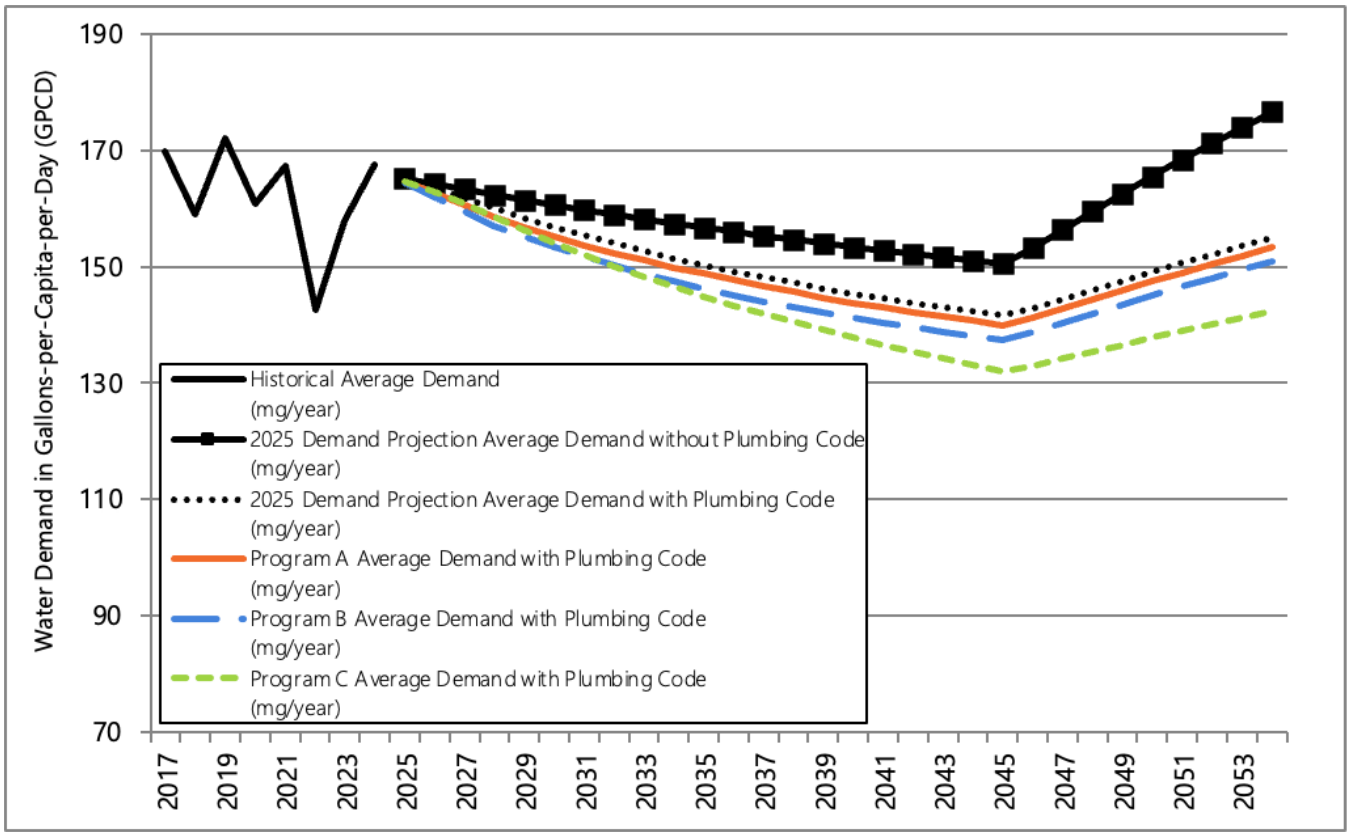
The following figures present total estimated water demand and demand as GPCD for the three different programs for comparison. Projected demands with and without the effect of passive conservation (plumbing codes) have also been included to illustrate the effect of passive conservation. The increase in demand in 2045 is due to baseline demands aligning with the 2023 WSMP and 2020 UWMP demands per the City's direction for consistency between planning efforts. In these plans, individual customer category demands' rate growth increases in 2045. The 2020 UWMP demands were developed as part of the peaking analysis completed for the 2023 WSMP. Please refer to the 2020 UWMP and 2023 WSMP for details on this growth projection.

Figure 4-12. *Projected Water Demand (MG) for Different Program Options*



Note: *This graph has been scaled to more clearly show the estimated water savings from the program. The year 2017 was selected as a start for the graph as it was the first year that was not declared a water shortage.*

Figure 4-13. *Projected GPCD Demand for Different Program Options*



Note: *This graph has been scaled to more clearly show the estimated water savings from the program. The year 2017 was selected as a start for the graph as it was the first year that was not declared a water shortage.*

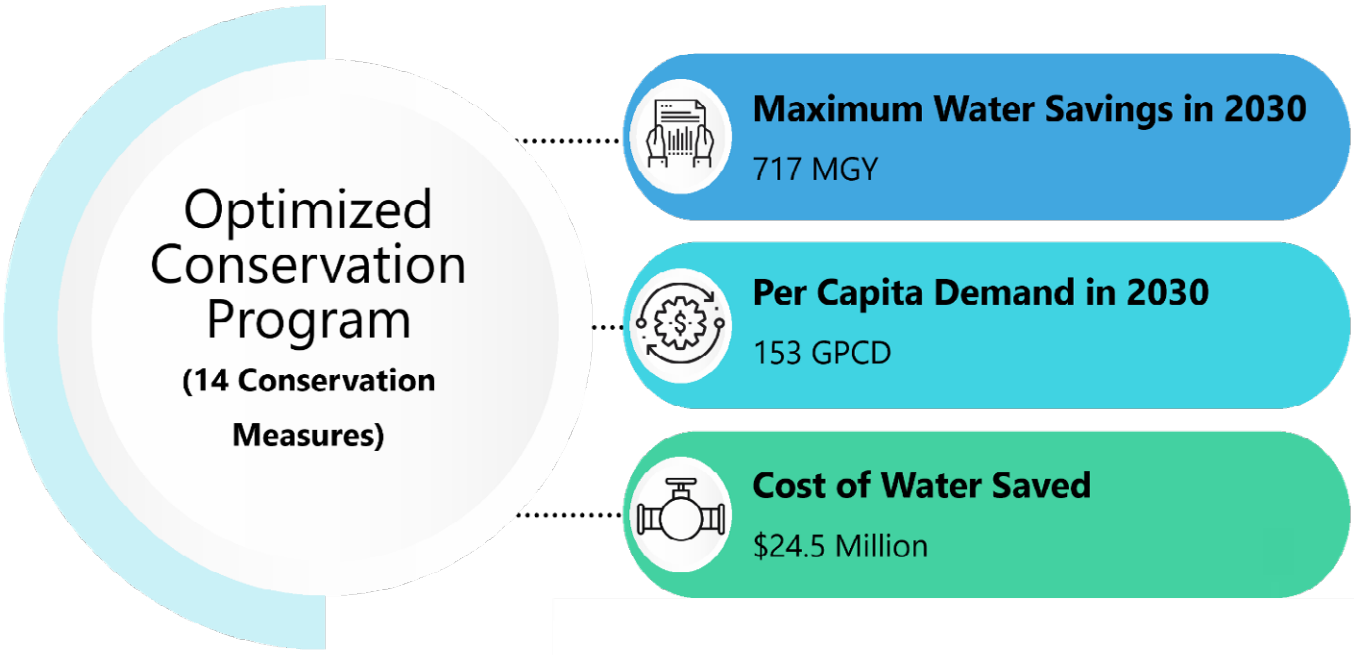
As can be observed from the graphs presented above, Programs B and C are estimated to achieve more water savings than the Current Program (Program A). This is expected as these programs incorporate additional measures and cost more to implement.

4.3.2 Selected Program Strategy

Based on the analysis presented above, Program B "Optimized Program" was selected as the preferred program to meet the City's conservation program objectives based on its ability to increase conservation activity in a strategic and optimized cost-effective manner while positioning the City to meet future regulatory requirements.

As displayed in Table 4-3 above, Program B doubles the present value of water savings over the forecast period compared with the current program and decreases the cost per unit of water saved, while Program C quadruples the present value of water savings compared with the current program and further decreases the cost per unit of water saved. While it is estimated that approximately a 28% increase in average annual utility costs compared to the current program will be needed to implement Program B, the increase in overall water savings and cost-efficiency improvement for the increased conservation activity are noteworthy and offer a more proactive response to reducing water demand compared with the current program. Program C is approximately 47% more expensive than Program B over the 30-year forecast period, making it the most expensive program. As shown in Table 4-2, Program C is different from Program B with several different measures (running at different times). Again, Program C is more expensive than Program B, with a higher program cost of $4M dollars; Program C's measures also occur later in time. While Program C has more measures and the highest water savings, its additional activities would incur considerable costs and require substantial additional resources and staff than the significantly less expense Program B. For this reason, it is recommended to implement Program B but keep Program C in mind for future investment should additional demand mitigation be needed in the future. Overall, implementing Program B would enable the City to maintain water resilience as cost-effectively as possible and address the regulatory requirements. A summary of Program B's water savings, project demand, and cost of water saved is presented in Figure 4-14.

Figure 4-14. *Program B (Optimized) Results Summary*



5. AMI Data Analysis

In parallel with the conservation program analysis, MWM conducted an analysis of AMI meter data to:

1. Further evaluate and validate savings estimates for benefit-cost analyses of current measures (where data were available).
2. Understand customer water use patterns to assess opportunities for water savings across the service area more effectively.
3. Identify additional opportunities for targeted program implementation.

This analysis identified data-related challenges and opportunities in AMI data management. Addressing these issues will help the City better leverage available data for future program implementation. The following sections summarize the methodology, key findings, and implications for measures based on the AMI data analyses conducted for this Plan.

5.1 Data Quality

The City provided MWM with hourly consumption data from 2021 to 2023 for all service address meters in the service area. The data was categorized into four customer classes: single-family residential, multi-family residential, commercial, and irrigation.

During the analysis, several items were identified for the City that warrant further investigation:

- **Negative Meter Reads:** Approximately 13% of service addresses had more than one negative read from 2021 to 2023. In December 2023, the last month of data provided, about 4% of service addresses had at least one negative read. Known causes for negative reads include meter malfunction, improper installation/calibration, backflow (including thermal expansion-related backflow), tampering, etc.
- **Missing Data:** Multiple meters had no assigned customer class or lacked data completely.

A professional with expertise in data is recommended to develop a standard operating procedure for data cleaning and efficient data downloads, ensuring accuracy, consistency, and accessibility. This will improve the reliability of future analyses, support more accurate decision-making, and maximize the value of the City's AMI investment.

5.2 Outdoor Watering Schedule Analysis

An outdoor watering schedule analysis was performed to identify single-family residential service addresses that are potentially irrigating more frequently than permitted under current watering restrictions. The term potential irrigation is used for this analysis because some activities (e.g., automatic pool filling) can mimic irrigation patterns. "More frequent" was defined as four or more irrigation days per week, providing a small buffer beyond the two-day maximum permitted by the City's ordinance. Exceptions to the two-day limit include customers using drip irrigation, experiencing two consecutive days above 100°F, or operating a validated irrigation controller.

Hourly AMI data was reviewed for single-family residential accounts during the week of July 17-23, 2023, a period with the highest cumulative reference evapotranspiration (ETo) recorded at the Fair Oaks California Irrigation Management Information System (CIMIS) station (the closest station to the service area). A week with the highest ETo is chosen because it is a time when people are most likely to irrigate and potentially over-irrigate. This particular week was also chosen for analysis because a similar ETo occurred during the same period in 2022, allowing for a year-over-year comparison.

In 2023, approximately 9,154 single-family residential customers (~8% of all single-family residential service addresses) appeared to irrigate four or more days that week. In 2022, when fines increased for the two day per week watering ordinance, 7,741 customers (~7%) met that same threshold. These results suggest that a notable portion of single-family residential customers may be irrigating above the allowed limit, even with restrictions in place. These findings highlight a potential water savings opportunity. Customers who irrigate four or more days per week are strong candidates for the City's water efficiency programs and services. Targeted outreach to this group could help reduce excess outdoor use while supporting compliance with the ordinance or even greater initiatives.

Figures 5-1 and 5-2 illustrate service addresses with potential irrigation four or more days per week. Visualizing the AMI data for individual accounts can help confirm whether observed patterns represent irrigation; additional verification steps may be needed before determining compliance violations.

Figure 5-1. *Service Address with Potential Irrigation 4 Days per Week*

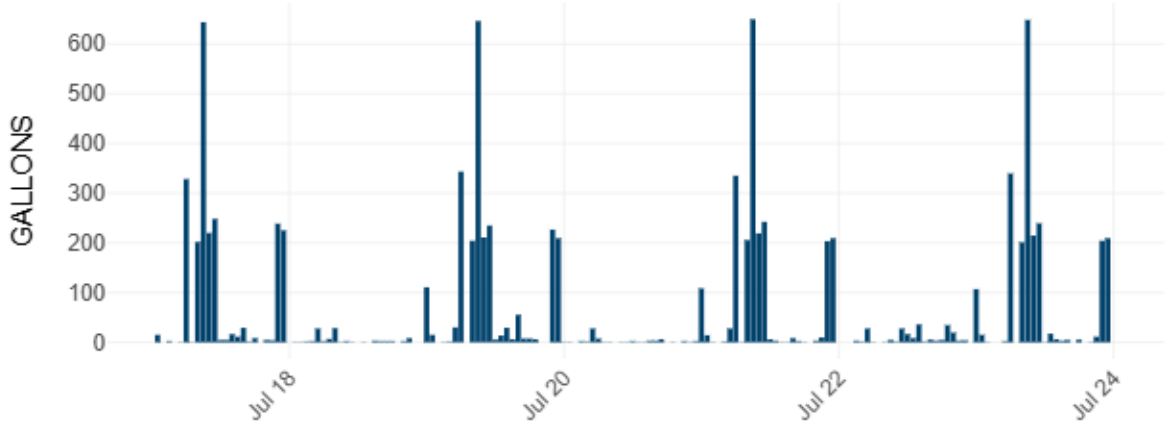
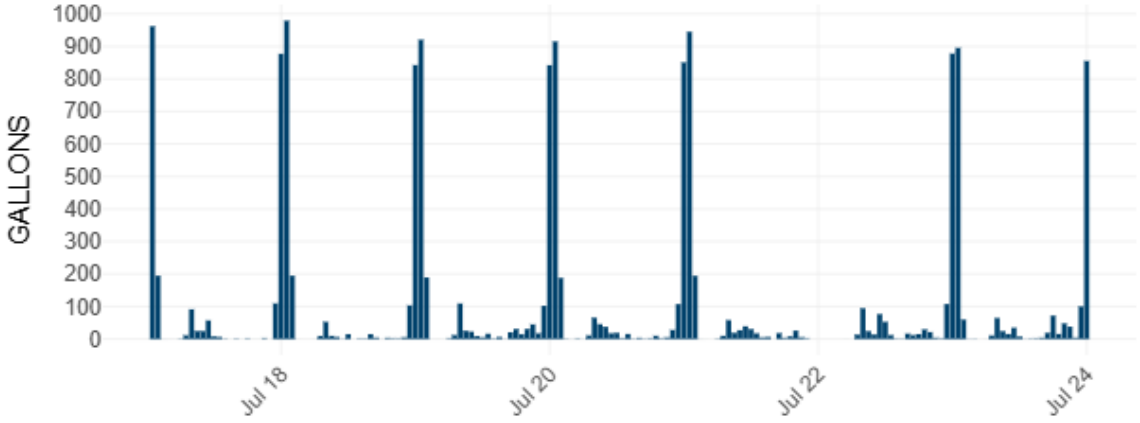


Figure 5-2. *Service Address with Potential Irrigation 6 Days per Week*



5.3 Peak Production Analysis

The peak production analysis assessed whether the City's designated watering days of Tuesday, Wednesday, Saturday, and Sunday produce significantly higher hourly peaks than non-watering days.

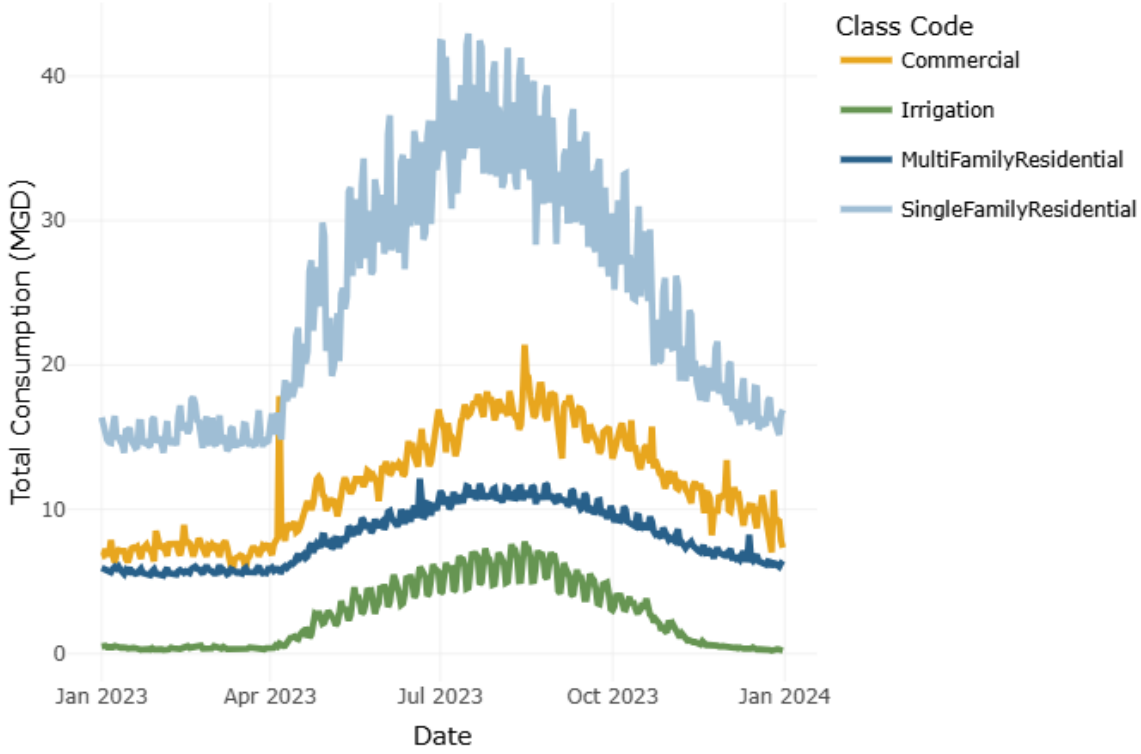
City Watering Schedule Ordinance (March 1–October 31, in place since 2014)

This ordinance allows watering times in the early morning (before 10 a.m.) and later in the evening (after 7 p.m.). The following exceptions are in place:

- Drip irrigation or soaker hoses.
- Hose watering with a spray nozzle.
- Validated smart controllers.
- Potted plants.
- Edible gardens
- New landscaping, up to 30 days after installation.
- Periods with two or more consecutive days above 100°F (degrees Fahrenheit).

This analysis focused on calendar year 2023, a period after the most recent drought and with reduced impacts from the COVID-19 pandemic.

Figure 5-3. *Daily Water Consumption by Service Point Class*



Findings

After data cleaning to ensure data validity, the analysis found no statistically significant difference in the peak factor between watering and non-watering days. This suggests the following possibilities:

- Customers are not concentrating their irrigation on the allowed watering days (i.e., not causing noticeable peaks on those days).
- Customers are watering more than two days per week, spreading irrigation demands evenly across the week and reducing any contrast.

To better understand irrigation behaviors, customers who watered three or more days per week were identified. While this level of activity does not necessarily indicate a violation of the watering schedules, it may signal potential overwatering. To minimize the impact of the weather exception, the analysis focused on the week with the highest 7-day cumulative ETo that did not include days over 100°F.

- The peak ETo week occurred from July 24th through July 30th, 2023, with a total ETo of 1.92 inches, and daily high temperatures remained below 100°F.
- There were 18,554 single-family residential customers (~20% of all single-family residential service addresses) that may have been irrigating three or more days per week from July 24th through July 30th, 2023.

The figures below provide examples of AMI data visualizations showing service addresses with irrigation patterns on four or more days within the week.

Figure 5-4. *Service Address with 5 Days of Irrigation Using Up to ~750 gallons/hour*

Figure 5-5. *Service Address with 6 Days of Irrigation Using Up to ~500 gallons/hour*

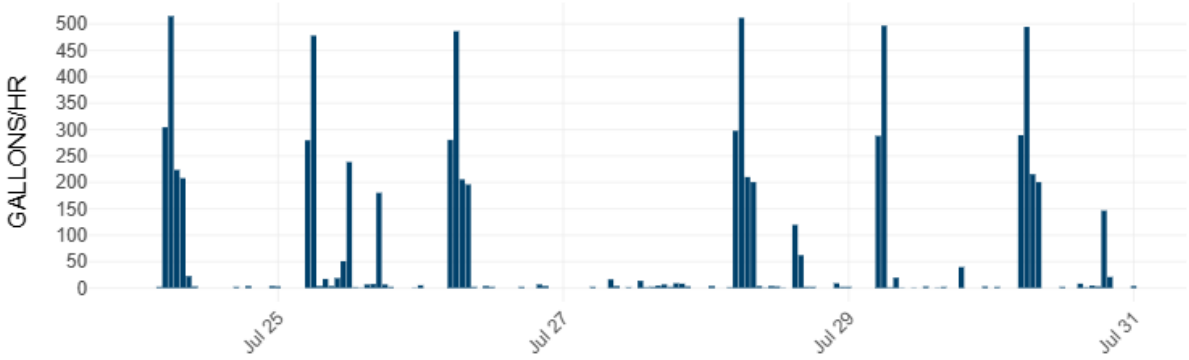
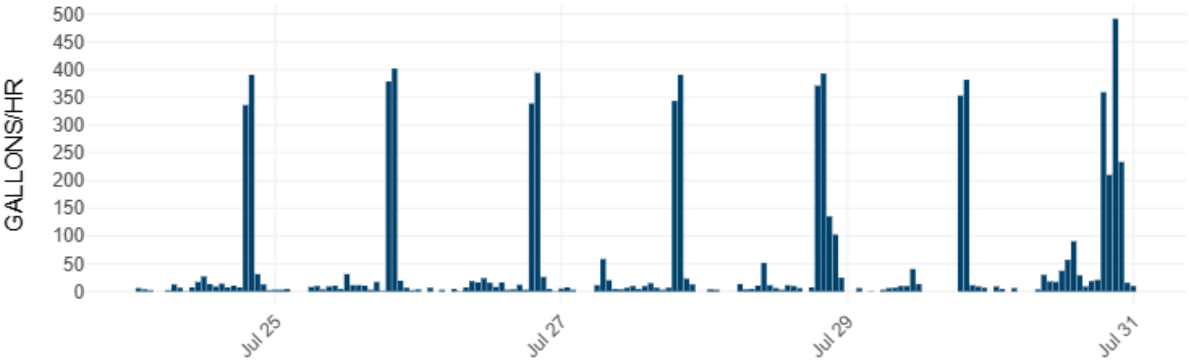


Figure 5-6. *Service Address with 7 Days of Irrigation Using Up to ~400 gallons/hour*



5.4 Program Water Savings Analysis Using AMI Data

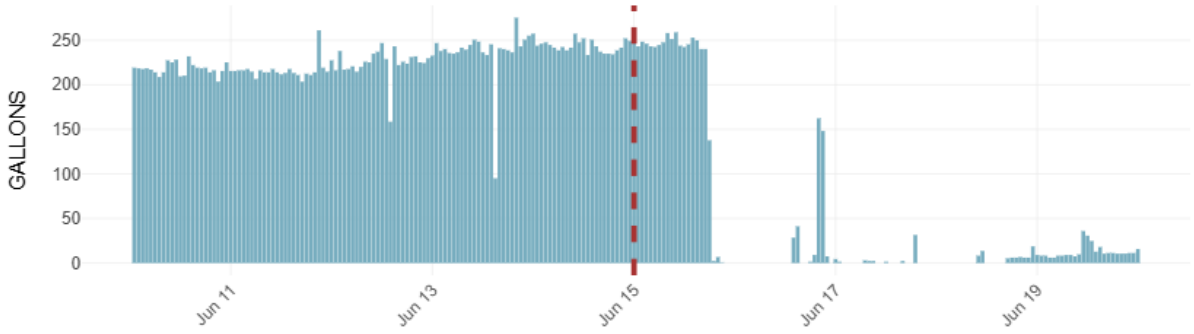
After data cleaning to ensure validity, 201 rebates were analyzed across six rebate types: Irrigation Upgrade, Leak Free Sac, Leak Repair Assistance, Rain Barrel, Smart Controller, and Turf Conversion. For each rebate, the "Packet_Completed_Date" was used as the reference point for analysis. Ideally, a date such as the installation or completion date would provide greater accuracy. One year of data was analyzed before and after the date provided, and the total consumption from the pre- and post-periods was compared to determine the presence and magnitude of water savings. A supplemental test examined whether normalizing consumption against evapotranspiration (ET) data would significantly change results; no substantial differences were found. This analysis was used to inform the DSS model, and additional details can be found in Appendix B.

The analysis of AMI data was found to be a useful analytical tool for reviewing individual programs and activities based on participant water use. Further analysis is planned for 2026 with additional AMI data through 2025. The example below shows one program that was analyzed for this effort in addition to those listed above.

5.4.1 Leak Repair Assistance Rebates

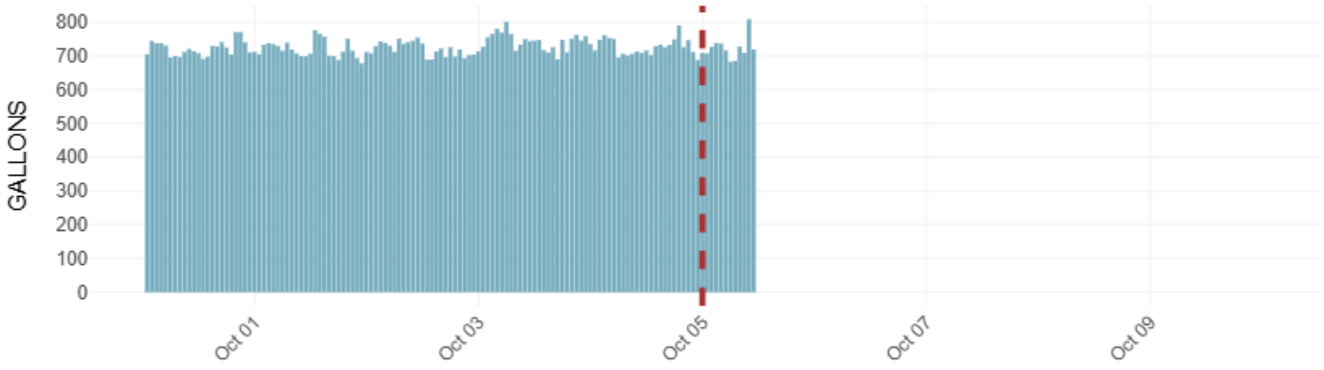
The following figures are examples of meters with leaks that participated in a leak rebate. The graph zooms into the final days of the leak, during which the rebate was provided. The red vertical line represents the packet completion date provided for the rebate.

Figure 5-7. *AMI Meter Leak, ~16 months*



Note: *Visual representation of an AMI meter that experienced a leak that lasted ~16 months, starting on January 28th, 2021, and ending on June 15th, 2022, with a total volume of 2,826,930 gallons.*

Figure 5-8. *AMI Meter Leak, ~2 months*



Note: *Visual representation of an AMI meter that experienced a leak that lasted ~2 months, starting on August 6th, 2022, and ending on October 5th, 2022, with a total volume of 923,578 gallons.*

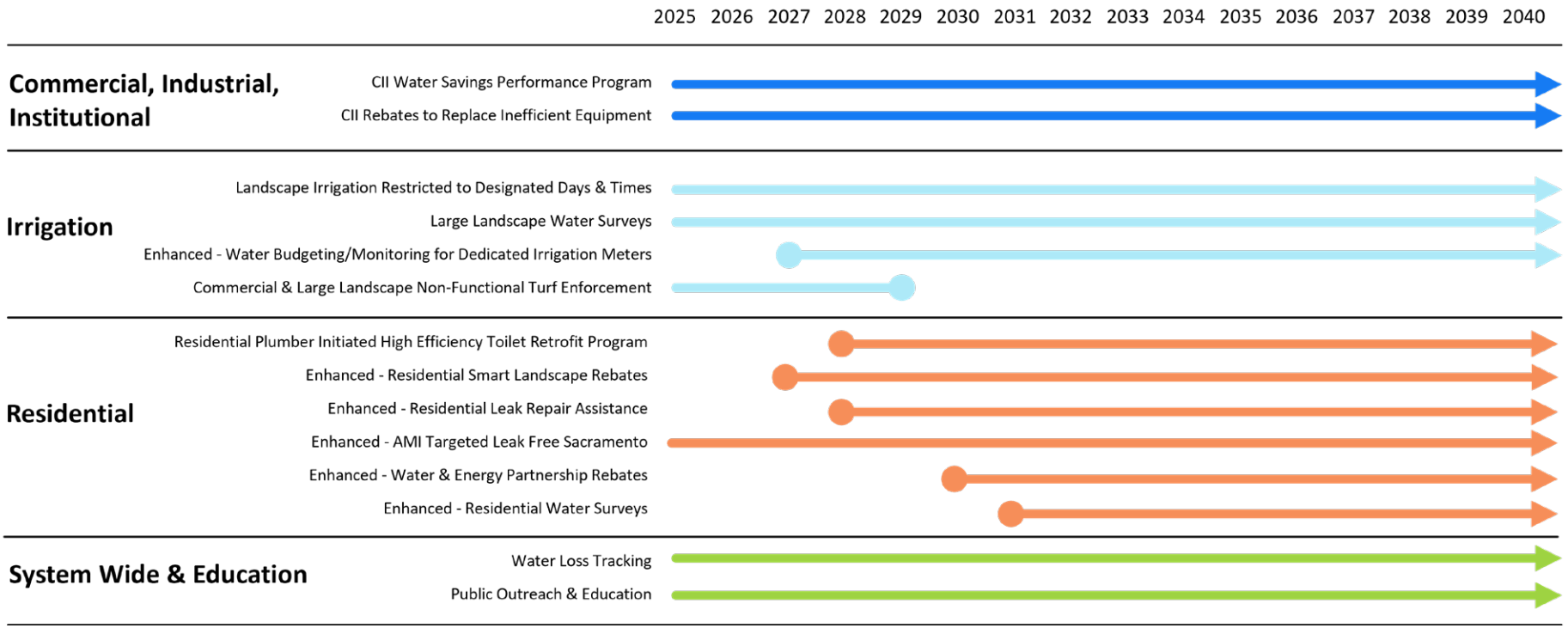
6. Program Implementation

Chapter 3 outlined the requirements for the new "*Making Water Conservation a California Way of Life*" Regulation, while Chapter 4 evaluated individual measures and their grouping into program alternatives, as well as the selected program strategy. This chapter presents the implementation of the selected conservation program strategy to meet the objectives for this Plan.

6.1 Urban Water Use Objective Roadmap

To address the additional activities required for compliance with the Regulation (described in more detail in Chapter 3), a compliance strategy is proposed for Program B. The goal of Program B's strategy is to maintain or enhance current measures and supplement additional high-savings activities that would help the City achieve compliance with regulatory requirements. As such, Program B's measures were structured to be in line with these regulatory timelines. Figure 6-1 presents the modeled implementation schedule for each measure over the planning horizon. Measures recommended as a high priority have an earlier starting year. Descriptions of each measure can be found in Chapter 4; each measure's comments (see measure screenshots in Appendix C) contain further detail on how the measure would be structured.

Figure 6-1. *Implementation Schedule for Recommended Program B*



6.2 Recommended Staffing

The selected program, Program B, requires a Water Conservation Supervisor and total of 12 full-time equivalent (FTE) staff to implement for FY 2027-2028. The existing City program has 11 FTE staff and has a vacant Water Conservation Supervisor role. With the incoming Regulation and the staff needs, the program and reporting process would benefit from having a Water Conservation Supervisor to manage and streamline the program to ensure future success. MWM recommends also adding 1 more FTE as a Data Analyst. This new Data Analyst would use the daily AMI water meter data to do regular program analysis for water savings similar to what was shown and discussed in Chapter 5.

The City can only seek budget increases on a bi-annual budget cycle. The next opportunity to consider staffing is in FY 2027. The City of Sacramento's water rates are typically adjusted in a multi-year cycle, and adjustments on or shortly after FY 27 are anticipated. The recommended increased staff should be included as part of the new Water Conservation budget request, especially if the City is not on track to meet future the UWUO requirements.

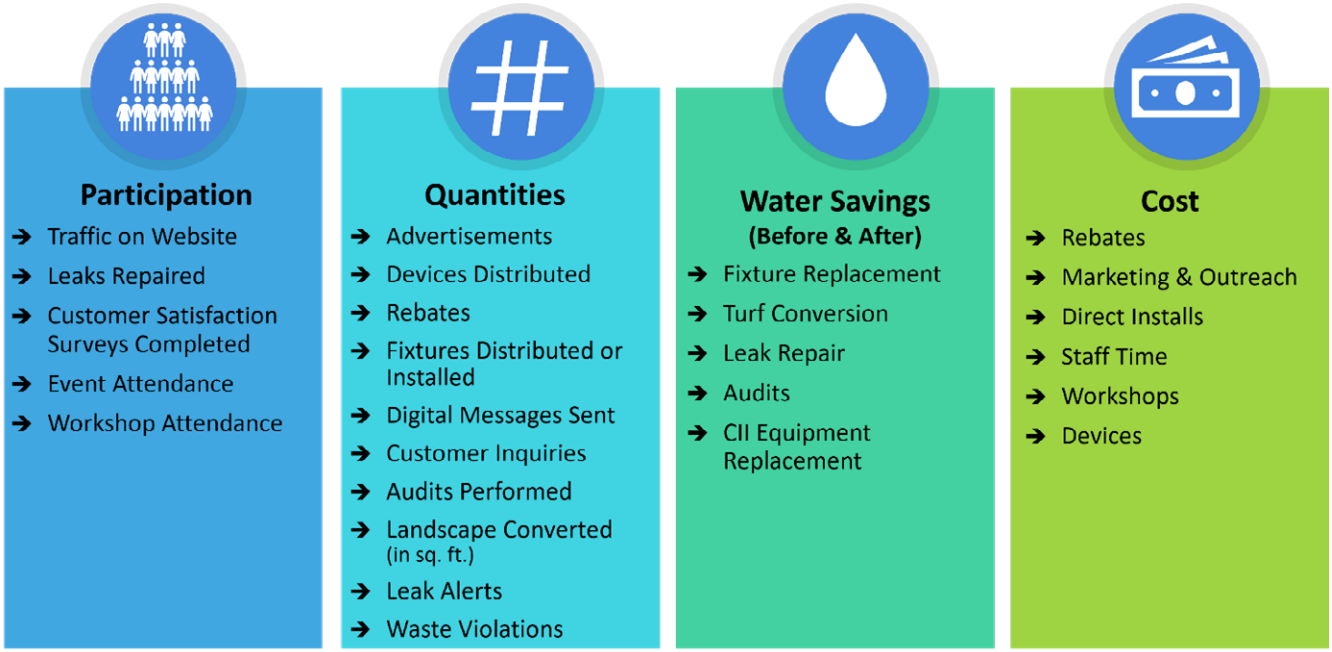
It is recommended that between now and when the budget request is due, that the program activity and UWUO be tracked carefully. MWM is planning to support this effort of tracking and monitoring as the program recommendations are implemented. Additional suggestions and tips are provided in Section 6.3.

6.3 Monitoring Suggestions for Tracking Progress

Regularly tracking conservation program progress is key to maintaining a robust and effective program and to keeping the City on target to meet its water conservation goals. Additionally, monitoring changes in water use and demand will help the City right-size any future measures and programs to meet both customer and system needs. A summary is provided in Figure 6-2. The following presents industry-based suggestions for tracking ongoing progress:

- Develop an annual work plan for each planned year as soon as the budget is adopted (or in connection with the budget planning process) and note current participation rates and per capita water demand, as well as the targets for the upcoming year.
- The conservation measure worksheets in the DSS Model can be used to track actual activities against those planned during model development. Updating this information is recommended as part of the annual work plan and budget process and should occur at least once every 3-5 years.
- Track water use each month by customer class and overall per capita water use. Use the MWM Data Collection Workbook or an online tool (e.g., WaterView™ by Eagle Aerial) to enter data.
- Consider soliciting and tracking community input and feedback via online or phone surveys or at outreach and education events.
- Identify specific metrics to track within each measure, using an Excel spreadsheet to keep records monthly, quarterly, or annually. The City currently tracks the following metrics and should continue to prioritize program monitoring and refine the metrics used:
  - Number of rebates provided or fixtures installed.
  - Number and size of leaks repaired.
  - Square feet of landscape converted.
  - Workshop attendance.
  - Number of water waste violations.
  - Water savings before and after fixture replacement or leak repair.
  - Cost of devices provided/installed.
  - Staff time spent per measure per customer and/or site.

Figure 6-2. *Examples of Program Tracking and Monitoring Metrics*



6.4 Future Recommendations and Considerations

Considering the City's ongoing commitment to improving water demand resilience and to be in good standing for future UWUO compliance, the following additional points should be considered. Many of the programs described in Section 4.2 show that the activity level has reached saturation for a few of the long-standing programs.

Existing City conservation program recommended revisions:

1. **Sunset Existing Toilet Rebate Program** – The program started in 2009, and activity has been low for the past two years following the end of the drought in 2022 when toilet rebates were temporarily doubled for more efficient models. MWM recommends removing this program and instead implementing the toilet retrofit program in the newly designed Program B to capture the remaining water savings from toilets. The City is aware of potential free-ridership for this, which has been included in the savings analysis considerations, but believes it can be minimized by requiring that Ultra High Efficiency Toilets (HETs) of (1 gallon per flush or less) be installed in most instances.
2. **Sunset Existing Clothes Washer Rebate Program** – The program started in 2009, and activity has been low for the past two years following the end of the drought in 2022. Even when the City doubled the rebate in 2021, activity did not increase. The City recognizes that significant free-ridership already exists for this program, and it is expected to increase once the 2028 federal regulations on clothes washers take effect, which will restrict the sale of high-water-use clothes washers nationally. A 25% free-ridership factor was included in the savings analysis considerations for this reason.
3. **Examine the effectiveness of the Smart Water Controller Exception to the Two Day a Week Watering Ordinance** – The original ordinance was modified more than eight years ago to encourage the installation of this newer technology. Now that smart controllers are industry standard and have features including programming in "black out days" or "allowable watering days" to adhere to the original ordinance, this exception might be further analyzed with an adjustment to the Outdoor Watering Code considered.
4. **Review and Adjust Rebate Values** – Annually review and regularly adjust individual rebate values (as appropriate) to create a flexible program that can adapt to technological changes, variable weather patterns, customer behavior, and changes in regulation compliance status. Factors to consider include:
   - Recent program activity.
   - Price of the product (increase or decrease in cost).
   - The stage of market saturation for the product (i.e., if it is a new or established product).
   - The dollar value needed to motivate customers to make a change.
   - Whether water shortage conditions are present and the City needs to increase conservation efforts.
5. **Annually Review Water Demands and Projections** – This Plan was developed using information provided by the City. As service area dynamics shift and new planning efforts are completed, annual water demand should be reviewed to assess projected versus realized demands for the year and how changes can affect future demand and compliance with the new Regulation.

Recommendations for near-term implementation of Program B and future consideration of Program C:

- The City has to comply with the new statewide water efficiency Regulation that took effect on January 1, 2024. The new Program B aims to keep the City in compliance with the UWUO based on the available information and the 2024 reporting information shared in Section 6.1 and Appendix A.
- As soon as possible, the City should hire a Water Conservation Supervisor as well as a Data Analyst to handle the increased program needs, support regulation compliance, analyze data from the new Program B measures, and efficiently analyze the AMI water data similar to Section 5. Tracking water use utilizing AMI data will be significant for identifying participation and effectiveness of the City's conservation programs. The City currently has 1 FTE Water Conservation staff per 13,000 connections, which is relatively low ratio, compared to proactive water agencies throughout the State of California and in Southern Nevada.
- The new statewide Urban Water Use Objective Regulation still has many unknowns, including some data that has not yet been released to the City. The Regulation will continue to be defined, and the City will continue to grow and change over the coming years. If the City's water use increases for any reason, then the City should seek additional staffing and apply resources to implement Program C. It is planned to run program B starting in FY 2028. If the City's per capita water use increases more than 5-10% for more than one or two years, the City should seek additional staffing and apply resources to implement Program C.
- It is important to recognize that implementing water efficiency and conservation measures will also advance other City goals and initiatives. These measures should be reviewed annually to identify opportunities for alignment and resource sharing. For example, the Climate Action Adaptation Plan includes reduction targets that closely align with the water conservation goals outlined in this Plan.

6.4.1 Water Loss Enhancement

The Water Loss Performance Standard is already set for the City, and enforcement takes effect on January 1, 2028. The City of Sacramento's Real Water Loss Standard is 41 gallons per connection per day. The City is currently meeting this standard. However, water loss is a dynamic value that changes on an annual basis, and the City's infrastructure is aging. It is recommended that the water loss be tracked carefully. If it appears to be rising, more resources should be allocated to keep water loss at or below the City's standard to stay in compliance. As part of this monitoring, the City should review the upcoming 2026 Water System Audit Software Workbook and assess if the gallons per connection aligns with the City's goals and recent trends. In addition, the City is required to submit a registry of breaks, repairs, and estimated water losses to the SWRCB every three years. The first registry contains three years of data between calendar years 2025 and 2027 and is due by January 1, 2029.

To help the City with its funding and planning efforts, two different measures were developed and analyzed as part of this Plan. The first measure is simply to complete the Water System Audit Software and staff level planning to track trends, which is done on an annual basis. The "enhanced" measure allocates more resources and more proactively addresses leakage levels while investing further in repairs, such that water loss levels stay in the appropriate range for compliance. A second leak detection crew was temporarily added during the 2014-17 drought that found mostly customer side leaks. However, as the overall City water system continues to age there may be an increase in water loss and a second crew may be needed to meet the Real Water Loss Standard of 41 gallons per connection per day.

6.4.2 Funding Sources and Partnerships

The City has a long-standing relationship with regional partners including RWA, SMUD (the local energy provider), and other local partners. These partnerships have helped the City successfully implement its conservation program since the 2013 Water Conservation Plan was developed. It is recommended to continue partnering with these and other entities, as such collaborations support funding, outreach, and program implementation. Recent experience shows that grant applications are more successful when pursued on a regional basis rather than individually.

7. Conclusion

This Water Efficiency and Conservation Plan was developed to support the City of Sacramento in meeting both near- and long-term regulatory compliance requirements while working to build on its water conservation program, jointly achieved with RWA. This Plan selects the most cost-effective path forward and provides a data-driven roadmap that builds on the City's existing efficiency and conservation efforts while addressing new standards and requirements established under SB 606, AB 1668, and the "*Making Water Conservation a California Way of Life*" Regulation.

The City has a robust conservation program in place which, combined with its operations efforts, has positioned the City to adapt strategically to meet the Regulation requirements and continue to build an ethic of water conservation in its service area.

This Plan seeks to address all the identified gaps for compliance with the Regulation and gives the City flexibility in increasing conservation activity if projections materialize higher than anticipated. Through the integration of historical conservation data, service area demographics, and demand data, collaboration with City staff, and the use of the DSS Model, the Plan evaluated 26 individual measures and designed three program alternatives tailored to the City's unique service area characteristics and anticipated development. Program B ("Optimized") was selected as the preferred program for implementation. It reflects a moderate yet strategic expansion of conservation efforts, including the ability to mitigate future uncertainties related to the Commercial Outdoor Water Use Standard, future water costs, and potential climate impacts.

To implement Program B effectively and ensure ongoing compliance with changing UWUO standards, this Plan recommends annual tracking of participation, water savings, and program costs, along with regular updates to the DSS Model. As new data becomes available, the UWUO will shift annually, underscoring the need for adaptive management. Program B provides a structured yet flexible platform for the City to meet its water use objectives, expand its conservation ethic, and maintain long-term water supply resiliency in an increasingly complex regulatory and environmental landscape.

8. References

All links were accessed in August 2025 unless otherwise indicated.

Alliance for Water Efficiency. (2016). *The Status of Legislation, Regulation, Codes & Standards on Indoor Plumbing Water Efficiency*. https://allianceforwaterefficiency.org/resource/status-legislation-regulation-codes-standards/p://www.allianceforwaterefficiency.org/Codes-Standards-White-Paper.aspx

American Water Works Association (AWWA). G480 Standard and AWE Leaderboard web page. https://www.allianceforwaterefficiency.org/resources/topic/g480-standard-and-awe-leaderboard

Ibid. *M52 Water Conservation Programs – A Planning Manual*, 2nd Edition. (2017). https://store.awwa.org/M52-Water-Conservation-Programs-A-Planning-Manual-Second-Edition

California Department of Water Resources. (2015). *Model Water Efficient Landscape Ordinance*. https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=I55B69DB0D45A11DEA95CA4428EC25FA0&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)

California Department of Water Resources et al. (2018). Making Water Conservation a California Way of Life: Primer of 2018 Legislation on Water Conservation and Drought Planning Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman). https://water.ca.gov/-/media/DWR-Website/Web-Pges/Programs/Water-Use-And-Efficiency/Make-Water-Conservation-A-California-Way-of-Life/Files/PDFs/Final-WCL-Primer.pdf

California Code of Regulations, tit. 23, §§ 980-986

California Department of Water Resources. Water Use Efficiency. https://water.ca.gov/Programs/Water-Use-And-Efficiency

California Energy Commission. (2022). Appliance Efficiency Regulations, California Code of Regulations, Title 20, Sections 1601-1609, Toilet, Urinal, Faucet, and Showerhead Regulations. https://efiling.energy.ca.gov/GetDocument.aspx?tn=206010

Ibid. *Analysis of Standards Proposal for Residential Faucets and Faucet Accessories*, Docket #12-AAER-2C, prepared by Energy Solutions and Natural Resources Defense Council. (2013) https://efiling.energy.ca.gov/GetDocument.aspx?tn=71714&DocumentContentId=8058

Ibid. *Staff Analysis of Toilets, Urinals and Faucets*, Report # CEC-400-2014-007-SD. (2014) https://efiling.energy.ca.gov/GetDocument.aspx?tn=203718&DocumentContentId=11538

California Green (CALGreen) Building Standards 2022 Code, effective January 1, 2023. https://www.dgs.ca.gov/BSC/CALGreen

California Urban Water Conservation Council (CUWCC, now California Water Efficiency Partnership). (2005). Best Management Practices (BMP) Cost and Savings Study. https://owl.cwp.org/mdocs-posts/an-technical-services-2005/

California Water Efficiency Partnership. (2025). CII Performance Measures Cut Sheet.

California Water Efficiency Partnership (formerly CUWCC) web page. https://calwep.org/

California Water Efficiency Partnership (2025). "Making Conservation a Way of Life Cut Sheet, Commercial, Industrial, and Institutional (CII) Performance Measures". https://calwep.org/wp-content/plugins/s2member-files/CII-Performance-Cut-Sheet-022025.pdf

California State Legislature. Assembly Bill 715 (Laird), October 11, 2007. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200720080AB715

Ibid. Assembly Bill 1668 (Friedman), May 31, 2018. http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB1668

Ibid. Senate Bill 1157 (Hertzberg), September 28, 2022.

https://leginfo.legislature.ca.gov/faces/billHistoryClient.xhtml?bill_id=202120220SB1157

Ibid. Senate Bill 407 (Padilla), October 11, 2009. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100SB407

Ibid. Senate Bill 555 (Wolk), October 9, 2015. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB555

Ibid. Senate Bill 606 (Hertzberg), May 31, 2018. http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB606

Ibid. Senate Bill 837 (Blakeslee), July 1, 2011. http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120SB837

City of Sacramento. (2013). Water Conservation Plan. https://www.cityofsacramento.gov/content/dam/portal/dou/utilities/reports/Water_Conservation-Plan-City_of_Sac-Final.pdf

Ibid. 2020 Urban Water Management Plan. Consortium for Efficient Energy website. https://www.cee1.org/

DeOreo, W.B. (2016). *Residential End Uses of Water, Version 2 – 4309*. Denver, Colorado: AWWA Research Foundation. https://www.waterrf.org/research/projects/residential-end-uses-water-version-2

DeOreo, W.B., P.W. Mayer, Leslie Martien, Matthew Hayden, Andrew Funk, Michael Kramer-Duffield, Renee Davis, James Henderson, Bob Raucher, Peter Gleick, and Matt Heberger. (2011). *California Single-Family Water Use Efficiency Study*. Sacramento, California: Department of Water Resources. https://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/byron_bethany/docs/exhibits/pt/wr71.pdf

Dziegielewski, B., J. C. Kiefer, W. DeOreo, P. Mayer, E. M. Opitz, G. A. Porter, G. L. Lantz, and J. O. Nelson. (2000). *Commercial and Institutional End Uses of Water*. Denver, Colorado: AWWA, Research Foundation and American Water Works Association with Cooperation of the U.S. Bureau of Reclamation. Catalog No.90806. 264 pp. ISBN 1-58321-035-0. http://ufdc.ufl.edu/WC13511002/00001

Energy Star. (2011). *Unit Shipment and Market Penetration Report Calendar Year 2011 Summary*. http://www.energystar.gov/ia/partners/downloads/unit_shipment_data/2011_USD_Summary_Report.pdf

Energy Star web page. https://www.energystar.gov/buildings/benchmark/understand-metrics/property-types

Federal Regulations. (2022). Subpart O – Commercial Prerinse Spray Valves, 87 FR 13910, as amended Mar. 11, 2022. https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-431/subpart-O

GMP Research, Inc. (2019). 2019 U.S. WaterSense4 Market Penetration Industry Report, commissioned by Plumbing Manufacturers International. https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

Oak Ridge National Laboratory, Energy Division. (1998). "Bern Clothes Washer Study, Final Report," prepared for U.S. Department of Energy. https://digital.library.unt.edu/ark:/67531/metadc691712/

State Water Resources Control Board (SWRCB). (2016). California Executive Order B-37-16. https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/5_9_16_eo_b37_16.pdf

Ibid. California Statutes web page (defining "Making Conservation a California Way of Life"). https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/california_statutes.html

U.S. Census Bureau. Explore Census Data web page. https://data.census.gov/cedsci/

U.S. Congress. Energy Policy Act of 1992; amended in 2005. https://www.congress.gov/bill/102nd-congress/house-bill/776/text/enr; https://www.epa.gov/laws-regulations/summary-energy-policy-act; https://www.gpo.gov/fdsys/pkg/BILLS-109hr6enr/pdf/BILLS-109hr6enr.pdf

U.S. Department of Energy. EnergyStar Calculators. Online: https://www.energystar.gov/

U.S. Environmental Protection Agency. WaterSense Products. Online: https://www.epa.gov/watersense/watersense-products

WaterSense Partners. https://www.epa.gov/watersense/join-watersense#utilities

West Yost. (2023). *City of Sacramento Water Supply Master Plan Update*.

Appendix A
UWUO Assessment & Status Summary

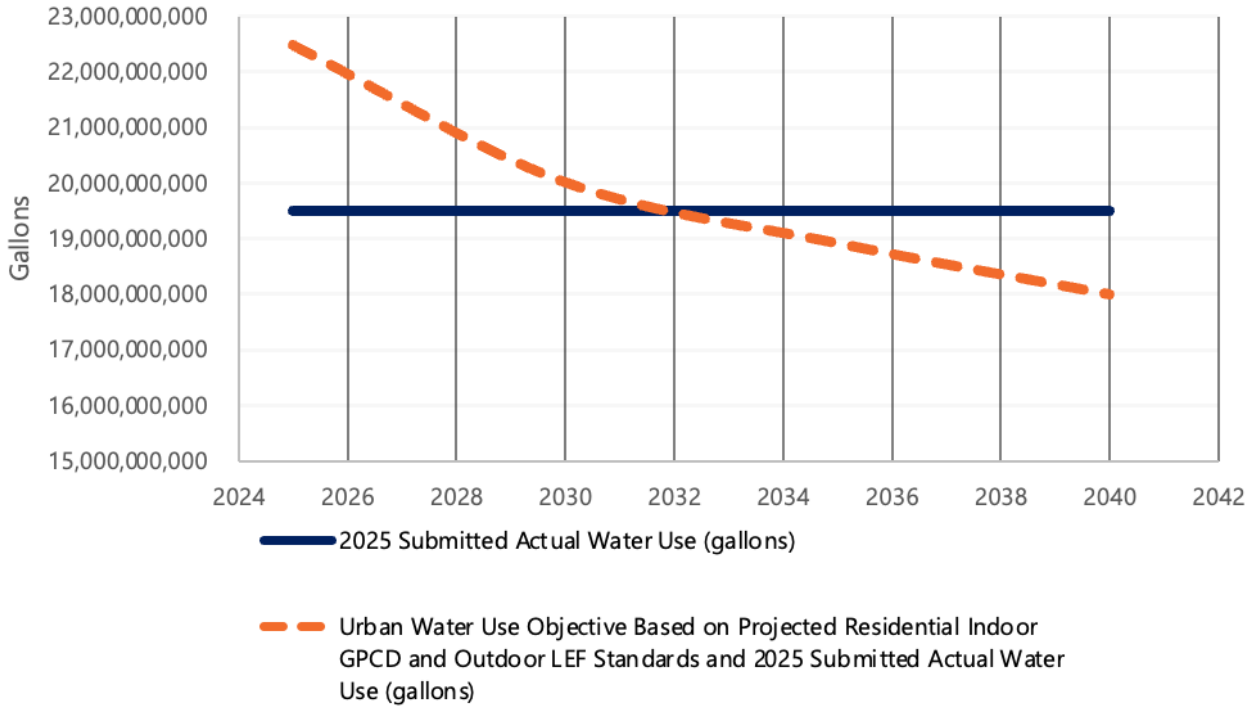
A.1 City of Sacramento UWUO Assessment

The City's reported water use for 2024 (shown below in the UWUO report) was compared to UWUO standards for 2025, 2030, 2035, and 2040 to assess whether the City is on course to meet the Regulation water use standards and to inform measure and program design decisions. Note that *only the Residential Indoor and Residential Outdoor UWUO Standards were considered, as the Commercial Outdoor Water Use Standard is still unknown pending Land Area Measurement data*. The results of this analysis are presented in Figure A-0-1.

Based on estimated projected residential indoor and outdoor requirements compared to current water use, the City will need to achieve significant water savings to meet its UWUOs through 2040. It is important to note that the City's Commercial Outdoor Water Use Standard will change in 2028, but the impact on the UWUO cannot be estimated until the pending data is available.

It is recommended that the City continue to monitor water use closely and implement more aggressive water conservation efforts—such as increasing measure participation—if actual use exceeds projections or to proactively widen the gap between demand and the UWUO (see Section 3 for a detailed discussion of the UWUO and its components). The program recommended in this Plan (Program B) positions the City toward compliance; however, outcomes will be influenced by future climate conditions, development patterns, and actual implementation of conservation activities. If additional water savings are required, the City may consider transitioning to Program C.

City of Sacramento Submitted Data versus Project Standards



A.2 CII BMP Requirements

The following tables present the compliance status and notes on the City's current and planned activities to meet each of the CII BMP category requirements. Only the CII regulations and actions are detailed below, as they are not included in the quantitative UWUO like the other use category. Tables one through five below present all the options available to meet CII BMP requirements per the Regulation text. The tables indicate the activities the City is planning to pursue for compliance, only two activities per category are required for compliance.

Table A-1. *Compliance Status of CII BMP Categories*

CII BMP Categories	Status (Meet Requirements with Current/Planned Activities)
1 - Outreach, Technical Assistance, and Education	Current
2 - Incentive	Planned
3 - Landscape	Current
4 - Collaboration and Coordination	Planned
5 - Operational	Current

1 – *Outreach, Technical Assistance, and Education*

List of Activities that Meet Requirements	City's Active Activities that Meet Requirements	City's Planned Activities that Meet Requirements
Direct contact via site visits or phone calls	Large Landscape Water Surveys	
Informative or educational bill inserts		
Conducting workshops or developing training videos		
Webpage portals to access information, tools, and rebates		
Cost-effectiveness analysis tools		
Commercials and advertisements	Public Outreach and Education	
Community-based social marketing		
Other CII-best management practices derived from additional innovation and technology advancement that can be taken by suppliers, subject to Board approval		Commercial and Large Landscape Non-Functional Turf Outreach

2 – Incentive

List of Activities that Meet Requirements	City's Active Activities that Meet Requirements	City's Planned Activities that Meet Requirements
Rebates and cost-sharing for replacing inefficient fixtures, equipment, irrigation systems or landscapes with water efficient ones	CII Water Savings Performance Program, CII Rebates to Replace Inefficient Equipment	
Certification or branding programs that recognize customers as water efficient		
Incentives for technologies that enable customers to identify, measure, and analyze indoor and outdoor water use		
Other CII-best management practices derived from additional innovation and technology advancement that can be taken by suppliers, subject to Board approval		

3 – Landscape

List of Activities that Meet Requirements	City's Active Activities that Meet Requirements	City's Planned Activities that Meet Requirements
Landscape and irrigation management practices to promote improved water use efficiency	Landscape Irrigation Restricted to Designated Days and Times, Commercial and Large Landscape Financial Incentives for Irrigation and Landscape	
Irrigation system inspections, audits, or surveys	Large Landscape Water Surveys	
Training or guidance on irrigation scheduling and maintenance		
New development landscape inspection, workshops, and training		
Programs to remove turf and replace it with climate-ready vegetation	Commercial and Large Landscape Financial Incentives for Irrigation and Landscape Upgrades	
Programs to decrease urban heat and reduce turf water use by planting trees		
Programs to install green infrastructure such as swales or rain gardens that offset irrigation needs		
Other CII-best management practices derived from additional innovation and technology advancement that can be used by suppliers, subject to State Board approval		Enhanced – Water Budgeting/Monitoring for Dedicated Irrigation Meters

4 – Collaboration and Coordination

List of Activities that Meet Requirements	City's Active Activities that Meet Requirements	City's Planned Activities that Meet Requirements
Infrastructure changes (for example, smart meter replacement programs)	AMI deployment and maintenance	
Billing or data collection procedures (for example, data tracking, analysis, and reporting improvements)	Enhanced – Water Budgeting/Monitoring for Dedicated Irrigation Meters	
Other operational best management practices to facilitate CII best management practices program implementation and evaluation	AMI data analysis to identify potential targets for participation	
Other CII Best Management Practices derived from additional innovation and technology advancements that can be taken by suppliers, subject to SWRCB approval		

5 – Operational

List of Activities that Meet Requirements	City's Active Activities that Meet Requirements	City's Planned Activities that Meet Requirements
Infrastructure changes (for example, smart meter replacement programs)	AMI deployment and maintenance	
Billing or data collection procedures (for example, data tracking, analysis, and reporting improvements)	Enhanced – Water Budgeting/Monitoring for Dedicated Irrigation Meters	
Other operational best management practices to facilitate CII best management practices program implementation and evaluation	AMI data analysis to identify potential targets for participation	
Other CII Best Management Practices derived from additional innovation and technology advancements that can be taken by suppliers, subject to SWRCB approval		

A.3 2024 UWUO Compliance Report

Figure A-1. *2024 UWUO Compliance Report Submission for the City of Sacramento*

Actual Use Compared to Urban Water Use Objective

In Gallons/Year

Water Use Component	Actual Water Use (Gallons)	Urban Water Use Objective (Gallons)
Total Residential Water Use, Indoor + Outdoor	16,603,200,000.00	18,864,698,997.91
Outdoor Irrigation of CII landscapes associated with DIMs	1,440,800,000.00	1,440,800,000.00
System Water Loss	1,446,314,610.40	2,175,848,401.13
Variances, Provisions, and 20% INI buffer, if applicable	N/A	0.00
Bonus Incentive	N/A	0.00
Sum of Water Use Components (Specific to Objective)	19,490,314,610.40	22,481,347,399.04
Excluded Demands	6,730,600,000.00	6,730,600,000.00
Sum of Water Use Components (Objective + Excluded)	26,220,914,610.40	29,211,947,399.04
SB X7-7 Target Volume Plus Previously Excluded Process and Recycled Water	N/A	42,670,558,350.00
"Capped" Objective	N/A	22,481,347,399.04
Regional Alliance Met Regional Target? (If Applicable)	N/A	Not Applicable
Final Comparison of Actual Water Use to Objective	19,490,314,610.40	22,481,347,399.04

In Acre-Feet/Year

Water Use Component	Actual Water Use (Acre-Feet)	Urban Water Use Objective (Acre-Feet)
Total Residential Water Use, Indoor + Outdoor	50,953.28	57,893.56
Outdoor Irrigation of CII landscapes associated with DIMs	4,421.65	4,421.65
System Water Loss	4,438.57	6,677.42
Variances, Provisions, and 20% INI buffer, if applicable	N/A	0.00
Bonus Incentive	N/A	0.00
Sum of Water Use Components (Specific to Objective)	59,813.50	68,992.63
Excluded Demands	20,655.45	20,655.45
Sum of Water Use Components (Objective + Excluded)	80,469.03	89,648.17
SB X7-7 Target Volume Plus Previously Excluded Process and Recycled Water	N/A	130,951.14
"Capped" Objective	N/A	68,992.72
Regional Alliance Met Regional Target?	N/A	Not Applicable
Final Comparison of Actual Water Use to Objective	59,813.58	68,992.72

List of Supplier Public Water Systems

PWSID	Water System Name	County	Residential Population	Number of months with non-zero potable deliveries in Clearinghouse	Annual Potable Municipal Deliveries (Acre-Feet)	Annual Nonpotable Municipal Deliveries (Acre-Feet)	Reported Real Water Loss (per Open Data table) (Acre-Feet)	Water System Included in Objective Calculations?
CA3410020	CITY OF SACRAMENTO MAIN	SACRAMENTO	518,161	12	76,030.46	0.00	4,438.57	Yes

Note: *This summary sheet was taken from the revised 2023-2024 Fiscal Year UWUO Submittal file uploaded to the Water Use Efficiency Data Portal on the California Department of Water Resources webpage.*

Appendix B
DSS Model Description and Assumptions

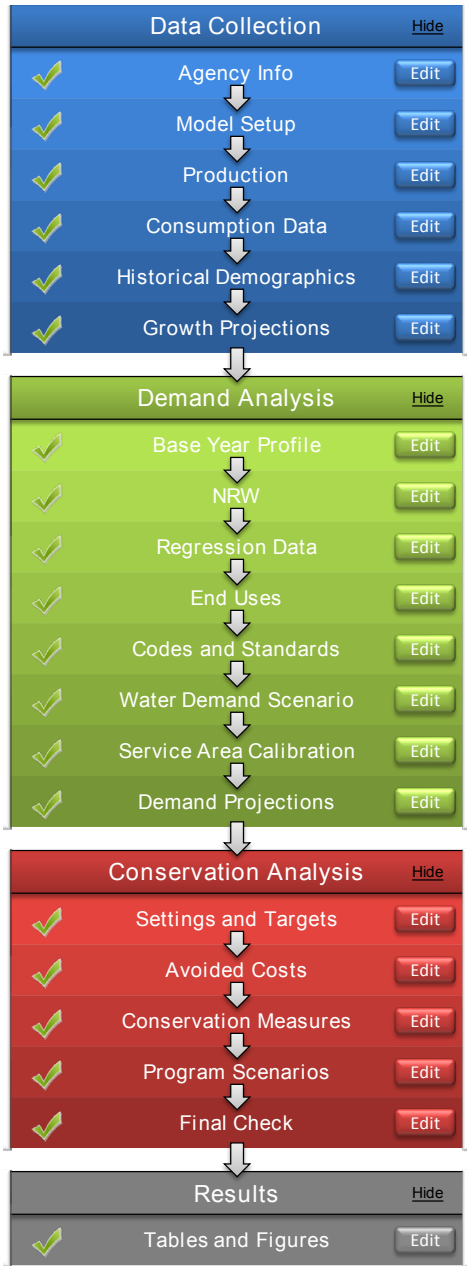
DSS Model Overview: The Demand Side Management Least Cost Planning Decision Support System (DSS Model) as shown in Figure B-1 is used to prepare long-range, detailed demand projections. The purpose of the extra detail is to enable a more accurate assessment of the impact of water efficiency programs on demand and to provide a rigorous and defensible modeling approach necessary for projects subject to regulatory or environmental review.

Originally developed in 1999 and continuously updated, the DSS Model is an "end-use" model that breaks down total water production (water demand in the service area) to specific water end uses, such as plumbing fixtures and appliance uses. The model uses a bottom-up approach that allows for multiple criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The DSS Model may also use a top-down approach with a utility-prepared water demand forecast.

Demand Forecast Development and Model Calibration: To forecast urban water demands using the DSS Model, customer demand data are obtained from the water agency being modeled. Demand data are reconciled with available demographic data to characterize water usage for each customer category in terms of number of users per account and per capita water use. Data is further analyzed to approximate the split of indoor and outdoor water usage in each customer category. The indoor/outdoor water usage is further divided into typical end uses for each customer category. Published data on average per capita indoor water use and average per capita end use is combined with the number of water users to calibrate the volume of water allocated to specific end uses in each customer category. In other words, the DSS Model checks that social norms from end studies on water use behavior (e.g., flushes per person per day) are not exceeded or drop below reasonable use limits.

Passive Water Savings Calculations: The DSS Model is used to forecast service area water fixture use. Specific end-use type, average water use, and lifetime are compiled for each fixture. Additionally, state and national plumbing codes, and appliance standards are modeled by customer category. These fixtures and plumbing codes can be added to, edited, or deleted by the user. This process yields two demand forecasts, one with plumbing codes and one without plumbing codes.

Figure B-1. *DSS Model Main Page*



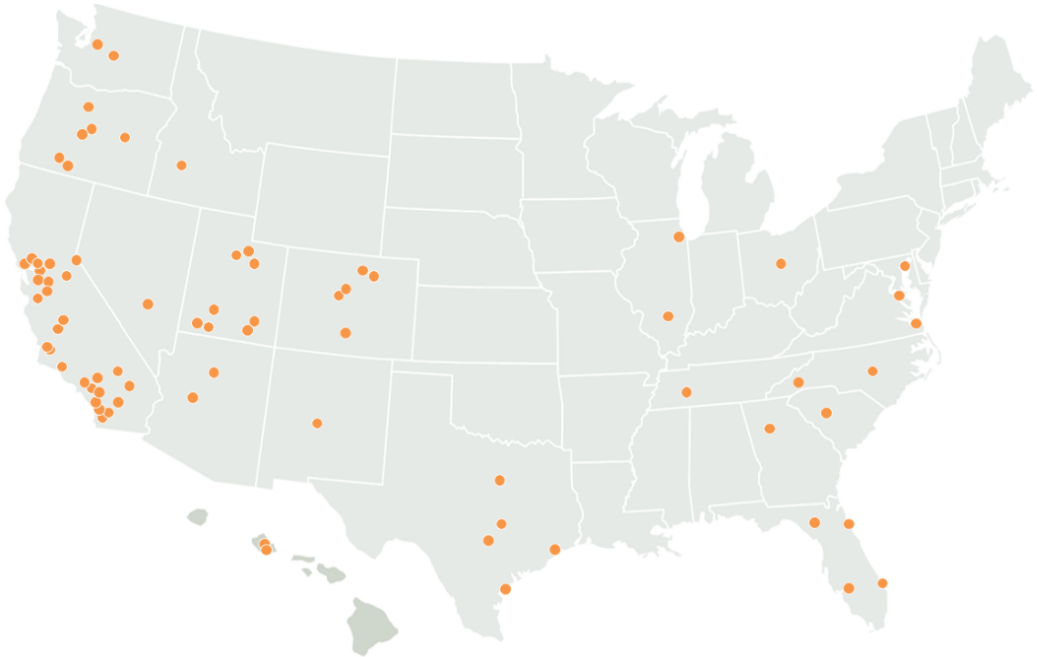
Active Conservation Measure Analysis Using Benefit-Cost Analysis: The DSS Model evaluates active measures using benefit-cost analysis with the present value of the cost of water saved ($/Million Gallons or $/Acre-Feet). Benefits are based on savings in water and wastewater facility operations and maintenance (O&M) and any deferred capital expenditures. The figures on the previous page illustrate the processes for forecasting conservation water savings, including the impacts of fixture replacement due to existing plumbing codes and standards. A Benefit Cost Ratio at or above 1 indicates a measure or program is cost effective, as indicated in the figure below.

Figure B-2. *Benefit-Cost Analysis Summary Example*

Util Cost Five Year Start Year: 2025	Water Savings Year: 2040	Units: AF								
	Measure	Present Value of Water Utility Benefits	Present Value of Community Benefits	Present Value of Water Utility Costs	Present Value of Community Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Five Years of Water Utility Costs 2025-2030	Water Savings in 2040 (afy)	Cost of Savings per Unit Volume ($/af)
1	Single and Multifamily Residential Financial Incentives for Irrigation and Landscape Upgrades	$1,022,377	$1,022,377	$11,418,312	$99,592,186	0.09	0.01	$1,827,604	134.754240	$3,030
2	Landscape Irrigation Restricted to Designated Days and Times	$2,336,169	$2,336,169	$5,367,144	$5,883,694	0.44	0.40	$871,427	309.060204	$624
3	Commercial and Large Landscape Financial Incentives for Irrigation and Landscape Upgrades	$520,311	$520,311	$1,657,086	$2,410,307	0.31	0.22	$288,086	69.303054	$867
4	Outdoor Water Use Evaluations	$497,440	$497,440	$1,605,025	$2,039,285	0.31	0.24	$259,202	59.501940	$885

Model Use and Validation: The DSS Model has been used for over 20 years for practical applications of conservation planning in over 300 service areas representing 60 million people, including extensive efforts nationally and internationally in Australia, New Zealand, and Canada.

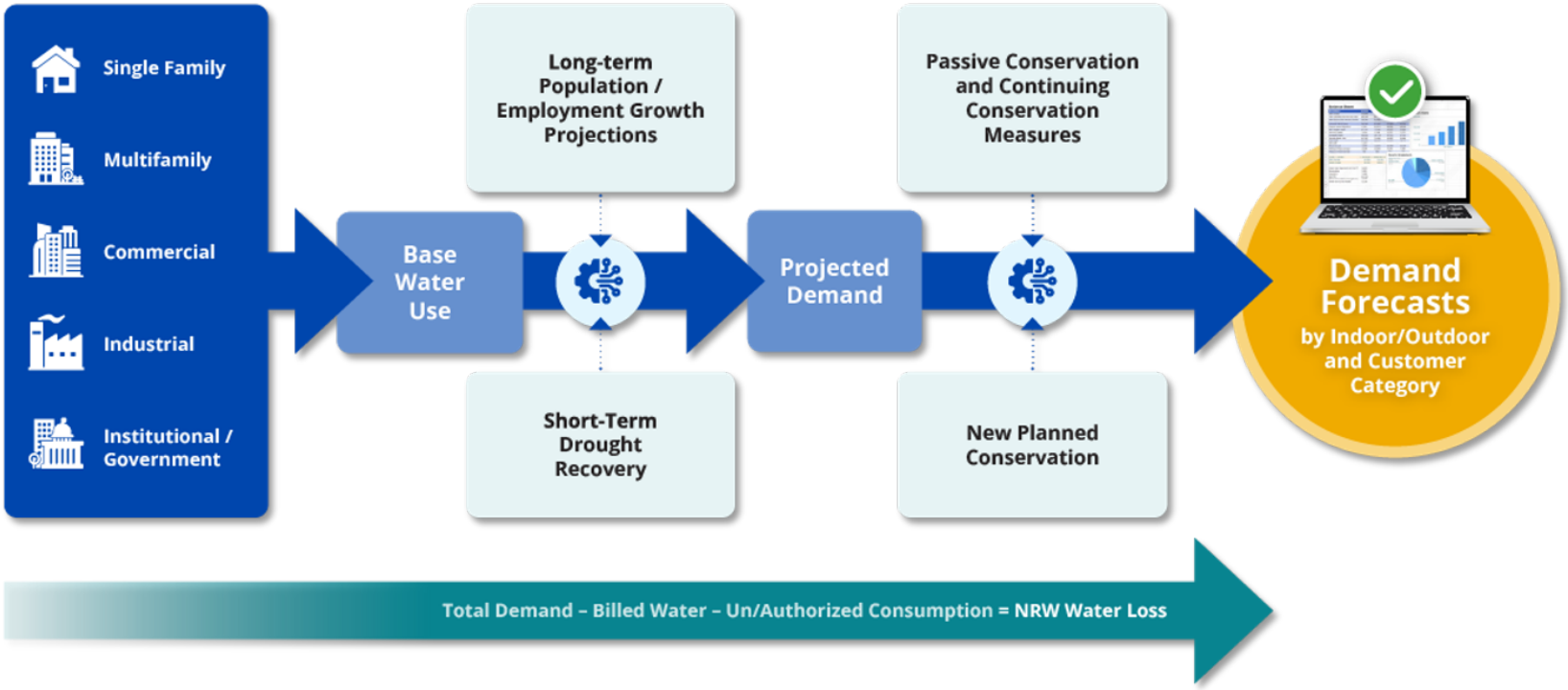
Figure B-3. *DSS Model Analysis Locations in the U.S.*



The DSS Model can use one of the following: 1) a statistical approach to forecast demands (e.g., an econometric model); 2) a forecasted increase in population and employment; 3) predicted future demands; or 4) a demand projection entered into the model from an outside source.

The following figure presents the flow of information in the DSS Model Analysis.

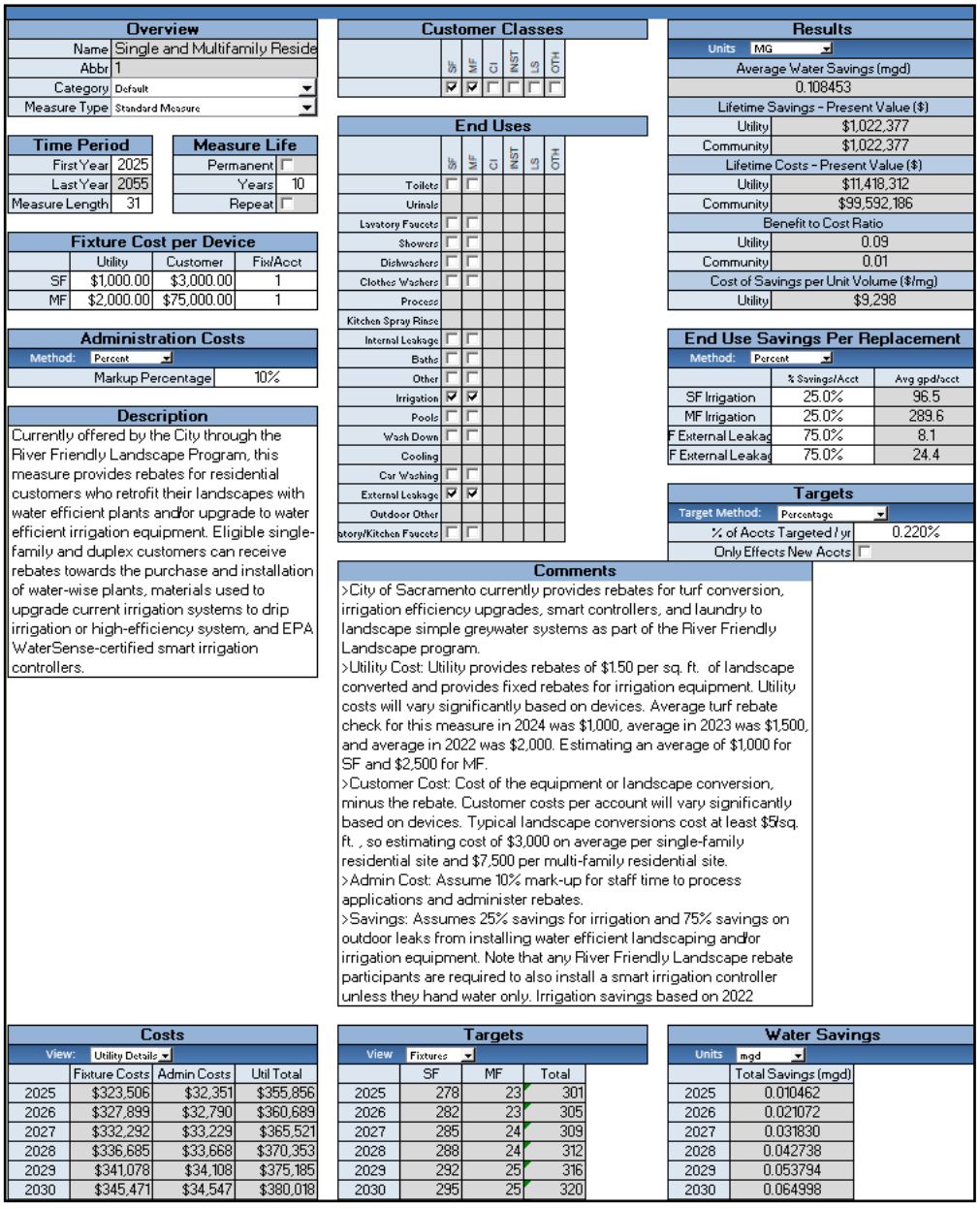
Figure B-4. *DSS Model Analysis Flow*



Appendix C
Conservation Measure Design Inputs & Results

The following figures present the DSS Model starting values for the measures that were analyzed for the City's conservation program. Each figure depicts a single measure and there are 26 measures total.

Measure #1 *Single and Multifamily Residential Financial Incentives for Irrigation and Landscape Upgrades*



Overview

Name	Single and Multifamily Reside
Abbr	1
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	10
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$1,000.00	$3,000.00	1
MF	$2,000.00	$75,000.00	1

Administration Costs

Method:	Percent
Markup Percentage	10%

Description

Currently offered by the City through the River Friendly Landscape Program, this measure provides rebates for residential customers who retrofit their landscapes with water efficient plants and/or upgrade to water efficient irrigation equipment. Eligible single-family and duplex customers can receive rebates towards the purchase and installation of water-wise plants, materials used to upgrade current irrigation systems to drip irrigation or high-efficiency system, and EPA WaterSense-certified smart irrigation controllers.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☐	☐				
Showers	☐	☐				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☐	☐				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☑	☑				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☑	☑				
Outdoor Other						
tory/Kitchen Faucets	☐	☐				

Comments

>City of Sacramento currently provides rebates for turf conversion, irrigation efficiency upgrades, smart controllers, and laundry to landscape simple greywater systems as part of the River Friendly Landscape program.
>Utility Cost: Utility provides rebates of $1.50 per sq. ft. of landscape converted and provides fixed rebates for irrigation equipment. Utility costs will vary significantly based on devices. Average turf rebate check for this measure in 2024 was $1,000, average in 2023 was $1,500, and average in 2022 was $2,000. Estimating an average of $1,000 for SF and $2,500 for MF.
>Customer Cost: Cost of the equipment or landscape conversion, minus the rebate. Customer costs per account will vary significantly based on devices. Typical landscape conversions cost at least $5/sq. ft. , so estimating cost of $3,000 on average per single-family residential site and $7,500 per multi-family residential site.
>Admin Cost: Assume 10% mark-up for staff time to process applications and administer rebates.
>Savings: Assumes 25% savings for irrigation and 75% savings on outdoor leaks from installing water efficient landscaping and/or irrigation equipment. Note that any River Friendly Landscape rebate participants are required to also install a smart irrigation controller unless they hand water only. Irrigation savings based on 2022

Results

Units: MG

Average Water Savings (mgd)	
	0.108453
Lifetime Savings - Present Value ($)	
Utility	$1,022,377
Community	$1,022,377
Lifetime Costs - Present Value ($)	
Utility	$11,418,312
Community	$99,592,186
Benefit to Cost Ratio	
Utility	0.09
Community	0.01
Cost of Savings per Unit Volume ($/mg)	
Utility	$9,298

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Irrigation	25.0%	96.5
MF Irrigation	25.0%	289.6
F External Leakag	75.0%	8.1
F External Leakag	75.0%	24.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.220%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$323,506	$32,351	$355,856
2026	$327,899	$32,790	$360,689
2027	$332,292	$33,229	$365,521
2028	$336,685	$33,668	$370,353
2029	$341,078	$34,108	$375,185
2030	$345,471	$34,547	$380,018

Targets

View: Fixtures

	SF	MF	Total
2025	278	23	301
2026	282	23	305
2027	285	24	309
2028	288	24	312
2029	292	25	316
2030	295	25	320

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.010462
2026	0.021072
2027	0.031830
2028	0.042738
2029	0.053794
2030	0.064998

Measure #2 *– Landscape Irrigation Restricted to Designated Days and Times*

Overview

Name	Landscape Irrigation Restricted to Designated Days and Times
Abbr	2
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	10
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$93.00	$10.00	1
MF	$93.00	$10.00	1
CI	$93.00	$30.00	1
INST	$93.00	$30.00	1
LS	$93.00	$30.00	1

Administration Costs

Method:	Percent
Markup Percentage	25%

Description

The City maintains a two day per week watering schedule from March through October, enforced by investigating reports that come into 311 and sending letters to customers watering on the wrong day. Wrong day watering is identified using AMI data and, in some cases, in-person patrolling for verification.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☑	☑	☑	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐	☐	☐		
Urinals			☐	☐		
Lavatory Faucets	☐	☐	☐	☐		
Showers	☐	☐	☐	☐		
Dishwashers	☐	☐	☐	☐		
Clothes Washers	☐	☐	☐	☐		
Process			☐			
Kitchen Spray Rinse			☐	☐		
Internal Leakage	☐	☐	☐	☐		
Baths	☐	☐				
Other	☐	☐	☐	☐		
Irrigation	☑	☑	☑	☑	☑	
Pools	☐	☐				
Wash Down	☐	☐				
Cooling			☐	☐		
Car Washing	☐	☐				
External Leakage	☐	☐	☐	☐	☐	
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets	☐	☐	☐	☐		

Comments

>Leverage AMI data to identify customers in violation, send out water waste notifications, then perform patrolling to verify compliance in person.
>Utility Cost: Represents staff time to identify and process violations. Includes field time to visit customers. Estimating Approximately 2 hours per account, at the FTE WC Representative rate of $46.50/hr.
>Customer Cost: Represents average cost per customer to address notifications. In some cases, customers reprogram their irrigation to water on a different day but sometimes incur a fee from the landscaper to make the adjustment.
>Admin Cost: Estimating 25% markup to cover administration costs from phone, email and/or mail communications.
>End use savings: From AWE study "The Use and Effectiveness of Municipal Irrigation Restrictions During Drought", January 2020, utilities can achieve annual savings of 18-20% when operating at Stage 2 and 3 of WSCPs. SFPUC's Irrigation Study is an additional resource to consider. Anticipated irrigation water use savings per account is 10% to be conservative, based on limited current enforcement. If irrigation violations are tracked and followed up on until compliance is achieved, this value could be increased.
>Targets: Assumes about 1% of customers will adjust their irrigation schedules due to this measure, annually.

Results

Units: MG

Average Water Savings (mgd)	
	0.247568
Lifetime Savings - Present Value ($)	
Utility	$2,336,169
Community	$2,336,169
Lifetime Costs - Present Value ($)	
Utility	$5,367,144
Community	$5,883,694
Benefit to Cost Ratio	
Utility	0.44
Community	0.40
Cost of Savings per Unit Volume ($/mg)	
Utility	$1,915

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Irrigation	10.0%	96.5
MF Irrigation	10.0%	289.6
CI Irrigation	10.0%	426.8
INST Irrigation	10.0%	2,119.6
LS Irrigation	10.0%	2,669.9

Targets

Target Method:	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$170,056	$16,537	$186,593
2026	$172,171	$16,731	$188,902
2027	$174,285	$16,925	$191,210
2028	$176,400	$17,119	$193,519
2029	$178,515	$17,313	$195,827
2030	$180,629	$17,507	$198,136
2031	$182,744	$17,701	$200,445
2032	$184,859	$17,895	$202,754
2033	$186,975	$18,089	$205,063
2034	$189,090	$18,283	$207,372
2035	$191,205	$18,477	$209,681
2036	$193,320	$18,671	$211,990
2037	$195,435	$18,865	$214,299
2038	$197,550	$19,059	$216,608
2039	$199,665	$19,252	$218,917
2040	$201,780	$19,446	$221,226
2041	$203,894	$19,640	$223,535
2042	$206,009	$19,834	$225,843
2043	$208,124	$20,028	$228,152
2044	$210,238	$20,222	$230,461
2045	$212,353	$20,416	$232,769
2046	$219,740	$21,094	$240,834
2047	$227,128	$21,771	$248,899
2048	$234,515	$22,449	$256,964
2049	$241,902	$23,126	$265,029
2050	$249,289	$23,804	$273,093
2051	$256,677	$24,482	$281,158
2052	$264,064	$25,159	$289,223
2053	$271,451	$25,837	$297,288
2054	$278,839	$26,514	$305,353
2055	$286,226	$27,192	$313,418

Targets

View: Accounts

	SF	MF	CI	INST	LS	Total
2025	1,264	103	71	9	16	1,463
2026	1,280	105	71	9	16	1,481
2027	1,295	108	71	9	16	1,499
2028	1,310	110	71	9	17	1,517
2029	1,325	113	72	9	17	1,536
2030	1,340	115	72	9	17	1,554
2031	1,356	117	72	9	17	1,572
2032	1,371	120	73	9	18	1,590
2033	1,386	122	73	9	18	1,608
2034	1,401	124	73	9	18	1,627
2035	1,416	127	74	9	19	1,645
2036	1,432	129	74	9	19	1,663
2037	1,447	132	74	9	19	1,681
2038	1,462	134	74	9	19	1,699
2039	1,477	136	75	9	20	1,718
2040	1,493	139	75	9	20	1,736
2041	1,508	141	75	9	20	1,754
2042	1,523	144	76	9	21	1,772
2043	1,538	146	76	9	21	1,790
2044	1,553	148	76	9	21	1,809
2045	1,569	151	76	10	22	1,827
2046	1,622	159	77	10	23	1,890
2047	1,675	167	78	10	24	1,954
2048	1,728	176	79	10	25	2,017
2049	1,781	184	80	10	26	2,081
2050	1,834	192	81	10	27	2,144
2051	1,887	201	83	10	28	2,208
2052	1,940	209	84	10	29	2,272
2053	1,994	217	85	10	30	2,335
2054	2,047	225	86	10	31	2,399
2055	2,100	234	87	10	32	2,462

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.024315
2026	0.048940
2027	0.073875
2028	0.099120
2029	0.124676
2030	0.150541
2031	0.176717
2032	0.203204
2033	0.230000
2034	0.257107
2035	0.260210
2036	0.263312
2037	0.266415
2038	0.269517
2039	0.272620
2040	0.275723
2041	0.278825
2042	0.281928
2043	0.285031
2044	0.288133
2045	0.291236
2046	0.295111
2047	0.299761
2048	0.305184
2049	0.311380
2050	0.318349
2051	0.326093
2052	0.334609
2053	0.343899
2054	0.353963
2055	0.364800

Measure #3 *– Commercial and Large Landscape Financial Incentives for Irrigation and Landscape Upgrades*

Overview

Name	Commercial and Large Landscape Financial Incentives for Irrigation and Landscape Upgrades
Abbr	3
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	10
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	$2,000.00	$1,000.00	1
INST	$2,000.00	$1,000.00	1
LS	$3,000.00	$1,500.00	1

Administration Costs

Method:	Percent
Markup Percentage	10%

Description

Currently offered by the City through the River Friendly Landscape Program, this measure provides rebates for commercial and large landscape customers who retrofit their landscapes with water efficient plants and/or upgrade to water efficient irrigation equipment. Multi-family properties of three or more units, commercial, and institutional customers can receive a maximum rebate of $50,000 for eligible expenses and can be used for grass conversion (currently at $1.50/sq. ft.), irrigation upgrades, or a combination of both. Labor can also be included, if done by a licensed landscape contractor.

Customer Classes

SF	MF	CI	INST	LS	OTH
☐	☐	☑	☑	☑	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets			☐	☐		
Urinals			☐	☐		
Lavatory Faucets			☐	☐		
Showers			☐	☐		
Dishwashers			☐	☐		
Clothes Washers			☐	☐		
Process			☐			
Kitchen Spray Rinse			☐	☐		
Internal Leakage			☐	☐		
Baths						
Other			☐	☐		
Irrigation			☑	☑	☑	
Pools						
Wash Down						
Cooling			☐	☐		
Car Washing						
External Leakage			☑	☑	☑	
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets			☐	☐		

Comments

>Utility Cost: Utility provides rebates per of landscape converted and provides fixed rebates for irrigation equipment. Utility costs will vary significantly based on devices and landscape size. Estimating $2000 on average per commercial and institutional sites and $3000 per landscape irrigation site.
>Customer Cost: Cost of the equipment or landscape conversion, minus the rebate. Customer costs per account will vary significantly based on devices and landscape size.
>Admin Cost: Assume 10% mark-up for staff time to process applications and administer rebates.
>Savings: Assume 20% savings for irrigation and 75% savings on outdoor leaks from installing water efficient landscaping and/or irrigation equipment. Sources for this value include: 2018 Landscape Rebate Water Savings Study from Valley Water and Southern Nevada Water Authority, 2024 Valley Water participation data.
>Targets: Assumes approximately 25 customers participate annually, or ~0.25% of CII & IRR accounts.

Results

Units: MG

Average Water Savings (mgd)	
	0.055035
Lifetime Savings - Present Value ($)	
Utility	$520,311
Community	$520,311
Lifetime Costs - Present Value ($)	
Utility	$1,657,086
Community	$2,410,307
Benefit to Cost Ratio	
Utility	0.31
Community	0.22
Cost of Savings per Unit Volume ($/mg)	
Utility	$2,659

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
CI Irrigation	20.0%	426.8
INST Irrigation	20.0%	2,119.6
LS Irrigation	20.0%	2,669.9
CI External Leakage	75.0%	28.5
INST External Leakage	75.0%	132.5
LS External Leakage	75.0%	140.5

Targets

Target Method:	Percentage
% of Accts Targeted / yr	0.250%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$56,794	$25,815	$82,609
2026	$57,205	$26,002	$83,208
2027	$57,617	$26,190	$83,807
2028	$58,029	$26,377	$84,406
2029	$58,441	$26,564	$85,004
2030	$58,852	$26,751	$85,603
2031	$59,264	$26,938	$86,202
2032	$59,676	$27,125	$86,801
2033	$60,087	$27,312	$87,400
2034	$60,499	$27,500	$87,999
2035	$60,911	$27,687	$88,598

Targets

View: Accounts

	CI	INST	LS	Total
2025	18	2	4	24
2026	18	2	4	24
2027	18	2	4	24
2028	18	2	4	24
2029	18	2	4	24
2030	18	2	4	25
2031	18	2	4	25
2032	18	2	4	25
2033	18	2	5	25
2034	18	2	5	25
2035	18	2	5	25

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.005584
2026	0.011225
2027	0.016922
2028	0.022677
2029	0.028489
2030	0.034358
2031	0.040284
2032	0.046267
2033	0.052307
2034	0.058404
2035	0.058975

Measure #4 – Outdoor Water Use Evaluations

Overview

Name	Outdoor Water Use Evaluations
Abbr	4
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	5
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$120.00	$50.00	1
MF	$120.00	$50.00	1

Administration Costs

Method:	Percent
Markup Percentage	54%

Description

The City currently offers outdoor water surveys for existing residential customers. All single family and multifamily residential are eligible for free landscape water surveys upon request. Surveys include a mix of in-person visits and remote calls.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☐	☐				
Showers	☐	☐				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☐	☐				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☑	☑				
Pools	☑	☑				
Wash Down	☑	☑				
Cooling						
Car Washing	☑	☑				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☐	☐				

Comments

>This measure is currently run in-house but they do not provide customized reports. Assumes future of this measure would include reports.
> Utility Cost: Staff costs for field time, drive time, data entry, and report creation. Assumes fully burdened rate of WC Specialist is $52.23/hr. and each survey takes 2 hours of time. Additionally, utility fixture costs assume all surveyed accounts receive a kit with ~$12 of supplies including a rain gauge, an auto shut-off hose nozzle, and a soil moisture sensor.
> Admin Costs: Assumes 75 min/survey for administration (scheduling site visits, handling calls and email communications), ~54% markup.
> Customer Costs: Assumes average of $50 for addressing recommendations from the survey.
> End Use Water Savings: Savings based off of California Urban Water Agencies water Savings Study (4/13/15); Outdoor Residential Water Surveys saved on average 21 gpd per single family residential audit. Assumed 10% savings on outdoor end uses and 5% selected on pools to be conservative which total up to an approximate average savings of 21 gpd per single family residential audit. Assume similar savings for multi-family residential.
> Target: Assume about 275 customers participate annually, ~0.2% of residential accounts.

Results

Units	MG
Average Water Savings (mgd)	0.052169
Lifetime Savings - Present Value ($)	
Utility	$497,440
Community	$497,440
Lifetime Costs - Present Value ($)	
Utility	$1,605,025
Community	$2,039,285
Benefit to Cost Ratio	
Utility	0.31
Community	0.24
Cost of Savings per Unit Volume ($/mg)	
Utility	$2,717

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Irrigation	20.0%	96.5
MF Irrigation	20.0%	289.6
SF Pools	5.0%	2.3
MF Pools	5.0%	7.0
SF Wash Down	10.0%	4.6
MF Wash Down	10.0%	14.0
SF Car Washing	10.0%	4.6
MF Car Washing	10.0%	14.0
SF External Leakage	100.0%	8.1
MF External Leakage	100.0%	24.4

Targets

Target Method:	Percentage
% of Accts Targeted / yr	0.200%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$50,540	$13,674	$64,215
2026	$51,190	$13,850	$65,040
2027	$51,840	$14,026	$65,866
2028	$52,490	$14,202	$66,692
2029	$53,140	$14,378	$67,518
2030	$53,791	$14,554	$68,344
2031	$54,441	$14,730	$69,170
2032	$55,091	$14,906	$69,996
2033	$55,741	$15,081	$70,823
2034	$56,391	$15,257	$71,649
2035	$57,041	$15,433	$72,475

Targets

View: Accounts

	SF	MF	Total
2025	253	21	273
2026	256	21	277
2027	259	22	281
2028	262	22	284
2029	265	23	288
2030	268	23	291
2031	271	23	295
2032	274	24	298
2033	277	24	302
2034	280	25	305
2035	283	25	309

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.008962
2026	0.018051
2027	0.027267
2028	0.036611
2029	0.046082
2030	0.046718
2031	0.047355
2032	0.047991
2033	0.048628
2034	0.049264
2035	0.049901

Measure #5 – Large Landscape Water Surveys

Overview

Name	Large Landscape Water Surveys
Abbr	5
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	5
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
MF	$157.00	$100.00	1
CI	$157.00	$100.00	1
INST	$157.00	$100.00	1
LS	$157.00	$100.00	1

Administration Costs

Method: Percent

Markup Percentage	15%

Description

The City currently offers outdoor water surveys for existing large landscape customers with a minimum of ½ acre of irrigated area. All large multifamily residential, CII, and public irrigators of large landscapes would be eligible for free landscape water audits upon request. The City currently conducts outreach for this measure through Waterfluence and performs surveys using in-house staff.

Customer Classes

SF	MF	CI	INST	LS	OTH
☐	☑	☑	☑	☑	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets		☐	☐	☐		
Urinals			☐	☐		
Lavatory Faucets		☐	☐	☐		
Showers		☐	☐	☐		
Dishwashers		☐	☐	☐		
Clothes Washers		☐	☐	☐		
Process			☐			
Kitchen Spray Rinse			☐	☐		
Internal Leakage		☐	☐	☐		
Baths		☐				
Other		☐	☐	☐		
Irrigation		☑	☑	☑	☑	
Pools		☐				
Wash Down		☐				
Cooling			☐	☐		
Car Washing		☐				
External Leakage		☑	☑	☑	☑	
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets		☐	☐	☐		

Comments

> Utility Cost: Assumes all large landscape accounts can apply. Surveys are conducted in house, estimating 3 hours of staff time per survey at specialist rate of $52.23

> Customer Cost: Assumes small cost to review/update controller programming or fix minor leaks to align water use to an appropriate level for the amount and type of landscaping at the site.

>Admin Cost: Assumes 15% markup for administering this measure.

> End Use Water Savings: Savings based off of California Urban Water Agencies water savings study (4/13/15) of 326 gpda, average of 15% for CII landscape accounts; distributed between irrigation and external leakage. The actual water savings of 20% of irrigation and 10% of leakage is conservative but yields representative end use water savings for this measure.

> Targets: Assume target approximately 50 large landscapes annually, or ~0.25%.

Results

Units: MG

Average Water Savings (mgd)	
	0.036076
Lifetime Savings - Present Value ($)	
Utility	$344,206
Community	$344,206
Lifetime Costs - Present Value ($)	
Utility	$293,399
Community	$455,901
Benefit to Cost Ratio	
Utility	1.17
Community	0.76
Cost of Savings per Unit Volume ($/mg)	
Utility	$718

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
MF Irrigation	20.0%	289.6
CI Irrigation	20.0%	426.8
INST Irrigation	20.0%	2,119.6
LS Irrigation	20.0%	2,669.9
MF External Leakage	10.0%	24.4
CI External Leakage	10.0%	28.5
INST External Leakage	10.0%	132.5
LS External Leakage	10.0%	140.5

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.250%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$8,958	$4,962	$13,920
2026	$9,093	$5,036	$14,129
2027	$9,228	$5,111	$14,338
2028	$9,362	$5,185	$14,548
2029	$9,497	$5,260	$14,757
2030	$9,631	$5,334	$14,966
2031	$9,766	$5,409	$15,175
2032	$9,901	$5,484	$15,384
2033	$10,035	$5,558	$15,593
2034	$10,170	$5,633	$15,803
2035	$10,304	$5,707	$16,012

Targets

View: Accounts

	MF	CI	INST	LS	Total
2025	26	18	2	4	50
2026	26	18	2	4	50
2027	27	18	2	4	51
2028	28	18	2	4	52
2029	28	18	2	4	53
2030	29	18	2	4	53
2031	29	18	2	4	54
2032	30	18	2	4	55
2033	31	18	2	5	56
2034	31	18	2	5	56
2035	32	18	2	5	57

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.006258
2026	0.012600
2027	0.019027
2028	0.025538
2029	0.032134
2030	0.032557
2031	0.032979
2032	0.033402
2033	0.033825
2034	0.034247
2035	0.034670

Measure #6 – Enhanced – Water Budgeting/Monitoring for Dedicated Irrigation Meters

Overview

Name	Enhanced - Water Budgeting/Monitoring for Dedicated Irrigation Meters
Abbr	6
Category	Default
Measure Type	Standard Measure

Time Period	
First Year	2027
Last Year	2046
Measure Length	20

Measure Life	
Permanent	☐
Years	2
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
MF	$80.00	$50.00	1
CI	$80.00	$50.00	1
INST	$80.00	$50.00	1
LS	$80.00	$50.00	1

Administration Costs

Method: Percent

Markup Percentage	15%

Description

In 2024, the City of Sacramento began a multi-year agreement with Waterfluence to track and provide feedback on irrigation water use (budget vs. actual) to site managers, property owners, and landscapers. This measure aims to help the City with increasing customer engagement for larger sites and increasing participation in water efficiency programs through sharing irrigation water use data and monitoring water use at these sites.

Customer Classes

SF	MF	CI	INST	LS	OTH
☐	☑	☑	☑	☑	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets		☐	☐	☐		
Urinals			☐	☐		
Lavatory Faucets		☐	☐	☐		
Showers		☐	☐	☐		
Dishwashers		☐	☐	☐		
Clothes Washers		☐	☐	☐		
Process			☐			
Kitchen Spray Rinse			☐	☐		
Internal Leakage		☐	☐	☐		
Baths		☐				
Other		☐	☐	☐		
Irrigation		☑	☑	☑	☑	
Pools		☐				
Wash Down		☐				
Cooling			☐	☐		
Car Washing		☐				
External Leakage		☑	☑	☑	☑	
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets		☐	☐	☐		

Comments

>City of Sacramento maintains a contract with Waterfluence to track water budgets for 963 sites. This measure would be to incentivize property owners to sign up for the customer facing portal so that they can track their budgets themselves.
>Utility Cost: The City pays an average of $78/site currently, but that does increase 3% each year. Estimating an average of $80/site.
>Customer Cost: Assumes minimal cost to the customer to maintain their budget.
>Admin Cost: Estimating a 15% markup for staff to administer this program.
>End Use Savings: Waterfluence's 2024 report for the City of Sacramento, analyzing 940 sites, estimates on average customers are 31% over budget or "expected" water use. Customers on average will become more efficient overtime per the study's analysis and 12 year downward trend of overwater. Assumes approximately 25% savings outdoor and 100% on leaks.
>Targets: Per client, target about 50 participants annually. Per 2024 report, target sites that are commercial, have less than 1 acre of landscaping, and do not have online stakeholders.

Results

Units: MG

Average Water Savings (mgd)	
	0.014280
Lifetime Savings - Present Value ($)	
Utility	$144,133
Community	$144,133
Lifetime Costs - Present Value ($)	
Utility	$92,568
Community	$142,876
Benefit to Cost Ratio	
Utility	1.56
Community	1.01
Cost of Savings per Unit Volume ($/mg)	
Utility	$573

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
MF Irrigation	25.0%	289.6
CI Irrigation	25.0%	426.8
INST Irrigation	25.0%	2,119.6
LS Irrigation	25.0%	2,669.9
MF External Leakage	100.0%	24.4
CI External Leakage	100.0%	28.5
INST External Leakage	100.0%	132.5
LS External Leakage	100.0%	140.5

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.250%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$0	$0	$0
2026	$0	$0	$0
2027	$4,702	$2,555	$7,257
2028	$4,771	$2,593	$7,363
2029	$4,839	$2,630	$7,469
2030	$4,908	$2,667	$7,575
2031	$4,976	$2,705	$7,681
2032	$5,045	$2,742	$7,787
2033	$5,113	$2,779	$7,893
2034	$5,182	$2,816	$7,998
2035	$5,251	$2,854	$8,104

Targets

View: Accounts

	MF	CI	INST	LS	Total
2025	0	0	0	0	0
2026	0	0	0	0	0
2027	27	18	2	4	51
2028	28	18	2	4	52
2029	28	18	2	4	53
2030	29	18	2	4	53
2031	29	18	2	4	54
2032	30	18	2	4	55
2033	31	18	2	5	56
2034	31	18	2	5	56
2035	32	18	2	5	57

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000000
2026	0.000000
2027	0.009818
2028	0.019766
2029	0.020026
2030	0.020285
2031	0.020544
2032	0.020804
2033	0.021063
2034	0.021323
2035	0.021582

Measure #7 – Partnership with Energy Utililties – Incentive

Overview

Name	Partnership with Energy Utilities – Incentive
Abbr	7
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	15
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$126.00	$76.00	1
MF	$126.00	$76.00	1

Administration Costs

Method: Percent

Markup Percentage	10%

Description

Current partnership in place with SMUD, the electric utility for City of Sacramento residents, offers incentives to customers to save both water and energy.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☑	☑				
Showers	☑	☑				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☐	☐				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☑	☑				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☑	☑				

Comments

>City of Sacramento provides an instant rebate for smart controllers from the SMUD energy store. Additional items customers can get rebates for include showerheads, aerators, and drip kits.
>Utility cost: Cost of rebates and giveaways: controllers - $125, showerhead & aerator kits-$10 . Per past participation, most participants only apply for controllers so assuming 1/10 cost per showerhead & aerator kit per account (1 out of every 10 applicants).
>Customer cost: Remaining cost of smart controller (Rachio) & showerhead/aerator kit- $75 + $6/10 = ~ $76.
>Admin cost: Assumes 10% admin markup to coordinate this measure with SMUD.
>End use savings: Savings assume the following fixtures are replaced: 2.5 gpm showerhead with a 1.5 gpm showerhead and 2.2 gpm lavatory and non-lavatory faucet aerators with 1.5 gpm kitchen faucet aerators and 1.2 gpm lav faucet aerators. (divided by 10 to align with participation)
-Assumes smart controllers save approximately 10% of outdoor water when installed, per an analysis of City of Sacramento's 2022 smart controller rebate participants.
>Targets: Per recent past participation (July 2023-July 2024), about 650 smart controller rebates are distributed annually. Assumes this rate will continue.

Results

Units: MG

Average Water Savings (mgd)	
	0.108360
Lifetime Savings - Present Value ($)	
Utility	$1,012,049
Community	$2,817,022
Lifetime Costs - Present Value ($)	
Utility	$2,106,595
Community	$3,261,726
Benefit to Cost Ratio	
Utility	0.48
Community	0.86
Cost of Savings per Unit Volume ($/mg)	
Utility	$1,717

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Lavatory Faucets	4.5%	7.2
MF Lavatory Faucets	4.5%	37.1
SF Showers	4.0%	39.7
MF Showers	4.0%	185.6
SF Irrigation	10.0%	96.5
MF Irrigation	10.0%	289.6
SF External Leakage	25.0%	8.1
MF External Leakage	25.0%	24.4
SF Non-Lavatory/Kitchen Faucets	3.0%	25.3
MF Non-Lavatory/Kitchen Faucets	3.0%	111.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.350%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$60,304	$6,030	$66,334
2026	$61,079	$6,108	$67,187
2027	$61,855	$6,185	$68,040
2028	$62,631	$6,263	$68,894
2029	$63,406	$6,341	$69,747
2030	$64,182	$6,418	$70,600
2031	$64,958	$6,496	$71,453
2032	$65,733	$6,573	$72,307
2033	$66,509	$6,651	$73,160
2034	$67,285	$6,728	$74,013
2035	$68,061	$6,806	$74,867

Targets

View: Accounts

	SF	MF	Total
2025	443	36	479
2026	448	37	485
2027	453	38	491
2028	459	39	497
2029	464	39	503
2030	469	40	509
2031	474	41	516
2032	480	42	522
2033	485	43	528
2034	490	44	534
2035	496	44	540

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.008065
2026	0.016214
2027	0.024450
2028	0.032775
2029	0.041192
2030	0.049703
2031	0.058310
2032	0.067015
2033	0.075820
2034	0.084727
2035	0.093736

Measure #8 *– Residential Leak Repair Assistance Rebate*

Overview

Name	Residential Leak Repair Assistance Rebate
Abbr	8
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	5
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$350.00	$5,500.00	1
MF	$350.00	$5,500.00	1

Administration Costs

Method: Percent

Markup Percentage	70%

Description

Currently offered by the City, this measure provides a rebate to subsidize part of a leak repair for qualified single and small multi family customers.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☐	☐				
Showers	☐	☐				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☑	☑				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☐	☐				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☐	☐				

Comments

>This measure is offered for customers that do not qualify for Leak Free Sacramento (Measure 9). Most leaks are main line leaks (customer side), according to City staff.
>Utility Cost: Assumes average of $350 to cover partial leak repairs. The maximum rebate value is $500.
>Customer Cost: Repairs are typically costly, assuming up to $10,000 total and average of $6,000.
>Admin Cost: .25 of 1 Specialist's time is spent administering this measure, or ~$27,160 annually. This equates to ~$250/participant.
>End Use Savings: Savings might be over 200% if based on a targeted account's using 2-4 times the amount of the previous year's water use. Assume 1 leak per SF, 2 leaks per MF (typically duplex owners), as these programs typically are for owner-occupied residences. source: AWE 2023 Leak Alert Study https://www.allianceforwaterefficiency.org/resources/topic/evaluation-ami-enabled-proactive-leak-notification-programs
Savings updated to 330% based on City of Sacramento participation data.
>Targets: Considering the $40,000 budget for this measure, assumes target about 75 customers annually.

Results

Units: MG

Average Water Savings (mgd)	
	0.056524
Lifetime Savings - Present Value ($)	
Utility	$538,575
Community	$2,297,045
Lifetime Costs - Present Value ($)	
Utility	$1,291,923
Community	$13,234,071
Benefit to Cost Ratio	
Utility	0.42
Community	0.17
Cost of Savings per Unit Volume ($/mg)	
Utility	$2,019

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Internal Leakage	330.0%	25.3
MF Internal Leakage	330.0%	129.9
SF External Leakage	330.0%	8.1
MF External Leakage	330.0%	24.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.050%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$40,681	$376,043	$416,724
2026	$41,204	$380,880	$422,084
2027	$41,728	$385,717	$427,444
2028	$42,251	$390,554	$432,804
2029	$42,774	$395,390	$438,165
2030	$43,297	$400,227	$443,525
2031	$43,821	$405,065	$448,886
2032	$44,344	$409,902	$454,246
2033	$44,867	$414,740	$459,607
2034	$45,391	$419,578	$464,968
2035	$45,914	$424,415	$470,329

Targets

View: Accounts

	SF	MF	Total
2025	63	5	68
2026	64	5	69
2027	65	5	70
2028	66	6	71
2029	66	6	72
2030	67	6	73
2031	68	6	74
2032	69	6	75
2033	69	6	75
2034	70	6	76
2035	71	6	77

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.009597
2026	0.019339
2027	0.029225
2028	0.039255
2029	0.049430
2030	0.050152
2031	0.050875
2032	0.051597
2033	0.052320
2034	0.053042
2035	0.053765

Measure #9 – Leak Free Sacramento

Overview

Name	Leak Free Sacramento
Abbr	9
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	5
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$5,000.00	$0.00	1
MF	$5,000.00	$0.00	1

Administration Costs

Method: Percent

Markup Percentage	32%

Description

Customer leaks can go uncorrected at properties where owners are least able to pay costs of repair. This measure provides free leak repairs and water-efficient upgrades to eligible low-income single-family homeowners. This measure is currently funded by groundwater sales transfer as well as a grant.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☐	☐				
Showers	☐	☐				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☑	☑				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☐	☐				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☐	☐				

Comments

>This is a grant funded program.
>Utility Cost: Assume average of $5,000 to pay a plumber to fix a main line leak (City of Sacramento provides plumber - discounted rate).
>Customer Cost: no cost to customer. This is an income-qualified measure with a minimum leak size of 25 gph.
>Admin Cost: Assumes .75 FTE at Specialist rate to administer this measure (approx. $81,500 burdened). This equates to approx. $1,600 per customer if targeting 50 customers.
>End Use Savings: Per City of Sacramento analyzed data, participants saved 100 gpd/account on average on indoor leaks, which equates to 400% (assumes the participating leaking customers are using more water than the average household).
>Targets: Staff's goal is 40-50 annually.

Results

Units: MG

Average Water Savings (mgd)	
	0.047960
Lifetime Savings - Present Value ($)	
Utility	$456,972
Community	$1,949,008
Lifetime Costs - Present Value ($)	
Utility	$10,031,404
Community	$10,031,404
Benefit to Cost Ratio	
Utility	0.05
Community	0.19
Cost of Savings per Unit Volume ($/mg)	
Utility	$18,473

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Internal Leakage	400.0%	25.3
MF Internal Leakage	400.0%	129.9
SF External Leakage	400.0%	8.1
MF External Leakage	400.0%	24.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.035%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$239,300	$76,576	$315,876
2026	$242,378	$77,561	$319,939
2027	$245,456	$78,546	$324,002
2028	$248,534	$79,531	$328,065
2029	$251,612	$80,516	$332,128
2030	$254,690	$81,501	$336,191
2031	$257,769	$82,486	$340,255
2032	$260,847	$83,471	$344,318
2033	$263,925	$84,456	$348,382
2034	$267,004	$85,441	$352,445
2035	$270,082	$86,426	$356,509

Targets

View: Accounts

	SF	MF	Total
2025	44	4	48
2026	45	4	48
2027	45	4	49
2028	46	4	50
2029	46	4	50
2030	47	4	51
2031	47	4	52
2032	48	4	52
2033	49	4	53
2034	49	4	53
2035	50	4	54

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.008143
2026	0.016409
2027	0.024797
2028	0.033307
2029	0.041941
2030	0.042554
2031	0.043166
2032	0.043779
2033	0.044392
2034	0.045005
2035	0.045618

Measure #10 *– Water Loss Tracking*

Overview	
Name	Water Loss Tracking
Abbr	10
Category	Default
Measure Type	Water Loss Measure

Time Period	
First Year	2025

Backlog Costs	
Total Backlog Work Costs	$775,000
Years to Complete Backlog	31

Maintenance Costs	
Annual Maintenance Costs	$25,000

Target	
Total GPCD Reduction	0.2

Description

> This measure models conservation department time used for tracking and reporting water loss information as it relates to the California water loss standard and ties to the Urban Water Use Objective.
> Water loss efforts to find and repair leaks in the distribution system to reduce real water loss are currently funded by the City of Sacramento operations team and budget, which is not modeled here.
>This measure assumes system water loss actions such as proactive leak detection and leak repairs would be handled by existing crews at no extra cost.

Results

Units: MG

Average Water Savings (mgd)	
	0.075784
Lifetime Savings - Present Value ($)	
Utility	$689,818
Community	$689,818
Lifetime Costs - Present Value ($)	
Utility	$646,137
Community	$646,137
Benefit to Cost Ratio	
Utility	1.07
Community	1.07
Cost of Savings per Unit Volume ($/mg)	
Utility	$753

Comments

> Backlog Costs: Annual maintenance costs x the number of years in forecast.
> Maintenance Costs: Assume costs for a conservation representative to analyze data and flag potential issues (approximately 40 hours of staff time per month, or a total of three weeks per year, at the fully burdened WC specialist rate of $56/hour).
> Target: Assume minimal reductions - this is for tracking only. Reductions would be from further utilizing newly available technologies and AMI water meter data to identify and locate leaks in the system.

Costs

	Utility
2025	$25,000
2026	$25,000
2027	$25,000
2028	$25,000
2029	$25,000
2030	$25,000
2031	$25,000
2032	$25,000
2033	$25,000
2034	$25,000
2035	$25,000

Targets

	Projected NRW Percent
2025	14.5%
2026	14.5%
2027	14.5%
2028	14.5%
2029	14.5%
2030	14.5%
2031	14.5%
2032	14.5%
2033	14.5%
2034	14.4%
2035	14.4%

Water Savings (MG/d)

	Total Savings
2025	0.003425
2026	0.006982
2027	0.010669
2028	0.014488
2029	0.018437
2030	0.022518
2031	0.026730
2032	0.031073
2033	0.035547
2034	0.040153
2035	0.044889

Measure #11 *– Public Outreach & Education*

Overview

Name	Public Outreach & Education
Abbr	11
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	2
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$1.40	$1.00	1
MF	$1.40	$1.00	8

Administration Costs

Method: Percent

Markup Percentage	100%

Description

Public outreach efforts currently include direct ad buys as well as educational materials, community events, social media content, and City Express articles that are sent out to 250,000 email accounts. This measure would continue indefinitely and evolve based on public participation and evaluation of long term conservation targets. Near-term public outreach programs should focus on the importance of replacing Non-Functional Turf with local native plants and the irrigation requirements of trees.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☑	☑				
Urinals						
Lavatory Faucets	☑	☑				
Showers	☑	☑				
Dishwashers	☑	☑				
Clothes Washers	☑	☑				
Process						
Kitchen Spray Rinse						
Internal Leakage	☑	☑				
Baths	☑	☑				
Other	☑	☑				
Irrigation	☑	☑				
Pools	☑	☑				
Wash Down	☑	☑				
Cooling						
Car Washing	☑	☑				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☑	☑				

Comments

>Utility Cost: $300k spent annually, including the 1 FTE staff member (salary for staff is $150k), so $150k on non-staff costs. Includes advertisement buys, typically three per year. This measure is currently funded in-house.
>Admin Cost: 1 FTE - Public Information Coordinator - ~150k annually.
>Customer Cost: Assumes minimal cost to the customer to make small improvements.
>End Use Savings: Assumes savings lasts 2 year, assume minimal savings on all end uses due to behavioral changes.
>Targets: 50% of accounts per year.

Results

Units: MG

Average Water Savings (mgd)	
	0.116260
Lifetime Savings - Present Value ($)	
Utility	$1,122,285
Community	$5,884,059
Lifetime Costs - Present Value ($)	
Utility	$9,761,613
Community	$13,247,903
Benefit to Cost Ratio	
Utility	0.11
Community	0.44
Cost of Savings per Unit Volume ($/mg)	
Utility	$7,416

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Toilets	0.2%	30.3
MF Toilets	0.2%	155.9
SF Lavatory Faucets	0.2%	7.2
MF Lavatory Faucets	0.2%	37.1
SF Showers	0.2%	39.7
MF Showers	0.2%	185.6
SF Dishwashers	0.2%	2.2
MF Dishwashers	0.2%	11.1
SF Clothes Washers	0.2%	28.9
MF Clothes Washers	0.2%	185.6
SF Internal Leakage	0.2%	25.3
MF Internal Leakage	0.2%	129.9
SF Baths	0.2%	7.2
MF Baths	0.2%	37.1
SF Other	0.2%	14.5
MF Other	0.2%	74.2
SF Irrigation	0.2%	96.5
MF Irrigation	0.2%	289.6
SF Pools	0.2%	2.3
MF Pools	0.2%	7.0
SF Wash Down	0.2%	4.6
MF Wash Down	0.2%	14.0
SF Car Washing	0.2%	4.6
MF Car Washing	0.2%	14.0
SF External Leakage	0.2%	8.1
MF External Leakage	0.2%	24.4
SF Non-Lavatory/Kitchen Faucets	0.2%	25.3
MF Non-Lavatory/Kitchen Faucets	0.2%	111.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	50.000%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$146,215	$146,215	$292,430
2026	$148,612	$148,612	$297,224
2027	$151,009	$151,009	$302,019
2028	$153,407	$153,407	$306,813
2029	$155,804	$155,804	$311,607
2030	$158,201	$158,201	$316,402
2031	$160,598	$160,598	$321,197
2032	$162,996	$162,996	$325,992
2033	$165,394	$165,394	$330,787
2034	$167,791	$167,791	$335,582
2035	$170,189	$170,189	$340,377

Targets

View: Accounts

	SF	MF	Total
2025	63,219	5,153	68,371
2026	63,979	5,272	69,251
2027	64,740	5,390	70,130
2028	65,500	5,509	71,010
2029	66,261	5,628	71,889
2030	67,021	5,747	72,769
2031	67,782	5,866	73,648
2032	68,542	5,985	74,528
2033	69,303	6,104	75,407
2034	70,063	6,223	76,287
2035	70,824	6,342	77,166

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.050690
2026	0.101365
2027	0.102113
2028	0.102866
2029	0.103621
2030	0.104420
2031	0.105259
2032	0.106138
2033	0.107053
2034	0.108002
2035	0.108981

Measure #12 – Indoor Water Surveys

Overview

Name	Indoor Water Surveys
Abbr	12
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2030
Measure Length	6

Measure Life

Permanent	☐
Years	5
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$52.00	$20.00	1
MF	$52.00	$20.00	8

Administration Costs

Method: Percent

Markup Percentage	15%

Description

Indoor water surveys are currently offered for existing single family and multifamily residential customers, often virtually/remotely in response to a spike in water use.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☑	☑				
Urinals						
Lavatory Faucets	☑	☑				
Showers	☑	☑				
Dishwashers	☑	☑				
Clothes Washers	☑	☑				
Process						
Kitchen Spray Rinse						
Internal Leakage	☑	☑				
Baths	☑	☑				
Other	☑	☑				
Irrigation	☐	☐				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☐	☐				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☑	☑				

Comments

>Utility Cost: Cost to conduct surveys in house. Estimating 1 hour per SF & MF account for sending out letters (once/mo. during irrigation season) and conducting on-site surveys. Assumes fully burdened rate of WC Specialist is ~$52/hr.
>Admin Cost: Estimated mark-up cost for administering measure. Administration includes intern's time to fold letters and go to the post office (hoping to make this more automated in the future).
>Customer Cost: Cost to implement recommended water efficiency improvements. This will vary greatly, but estimating $20 per customer on average considering some folks will make very minor adjustments.
>End Use Savings: Savings are conservative since end uses will vary based on what was identified during the survey, and so not to overlap with savings from other indoor measures.
>Targets: The City sends targeted letters to residential customers that have high summer time water use. Approximately 2% response rate received. Assumes half of those make improvements to indoor water use - targeting 1%.

Results

Units: MG

Average Water Savings (mgd)	
0.072008	
Lifetime Savings - Present Value ($)	
Utility	$800,541
Community	$5,151,594
Lifetime Costs - Present Value ($)	
Utility	$755,829
Community	$1,008,614
Benefit to Cost Ratio	
Utility	1.06
Community	5.11
Cost of Savings per Unit Volume ($/mg)	
Utility	$927

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Toilets	10.0%	30.3
MF Toilets	10.0%	155.9
SF Lavatory Faucets	10.0%	7.2
MF Lavatory Faucets	10.0%	37.1
SF Showers	10.0%	39.7
MF Showers	10.0%	185.6
SF Dishwashers	10.0%	2.2
MF Dishwashers	10.0%	11.1
SF Clothes Washers	10.0%	28.9
MF Clothes Washers	10.0%	185.6
SF Internal Leakage	100.0%	25.3
MF Internal Leakage	100.0%	129.9
SF Baths	10.0%	7.2
MF Baths	10.0%	37.1
SF Other	10.0%	14.5
MF Other	10.0%	74.2
SF Non-Lavatory/Kitchen Faucets	10.0%	25.3
MF Non-Lavatory/Kitchen Faucets	10.0%	111.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	1.000%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$124,909	$41,776	$166,685
2026	$126,957	$42,461	$169,418
2027	$129,005	$43,146	$172,151
2028	$131,053	$43,830	$174,883
2029	$133,101	$44,515	$177,616
2030	$135,149	$45,200	$180,349
2031	$0	$0	$0
2032	$0	$0	$0
2033	$0	$0	$0
2034	$0	$0	$0
2035	$0	$0	$0

Targets

View: Accounts

	SF	MF	Total
2025	1,264	103	1,367
2026	1,280	105	1,385
2027	1,295	108	1,403
2028	1,310	110	1,420
2029	1,325	113	1,438
2030	1,340	115	1,455
2031	0	0	0
2032	0	0	0
2033	0	0	0
2034	0	0	0
2035	0	0	0

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.073226
2026	0.146802
2027	0.220756
2028	0.295110
2029	0.369883
2030	0.373740
2031	0.299977
2032	0.225792
2033	0.151110
2034	0.075865
2035	0.000000

Measure #13 *– Residential Plumber Initiated High Efficiency Toilet Retrofit Program*

Overview

Name	Residential Plumber Initiated High Efficiency Toilet Retrofit Program
Abbr	13
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2028
Last Year	2055
Measure Length	28

Measure Life

Permanent ☑

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$600.00	$0.00	2
MF	$600.00	$0.00	10

Administration Costs

Method: Percent

Markup Percentage	10%

Description

Licensed plumbers, pre-qualified by the Utility would solicit customers directly. Qualified low-income customers would get new HETs and other indoor fixtures installed for free by a pre-approved plumber under contract with the City. This program is designed for disadvantaged-qualified customers. This measure focuses on lowering indoor GPCD for compliance with the Urban Water Use Objective from the "Making Conservation a California Way of Life" regulation.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☑	☑				
Urinals						
Lavatory Faucets	☑	☑				
Showers	☑	☑				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☑	☑				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☐	☐				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☐	☐				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☑	☑				

Comments

>This measure should be grant funded or funded by a groundwater sales transfer to meet Prop 218 requirements.
>This measure is an expansion of the City's pilot program - limited to low income customers, the City would provide direct installation of toilets and other indoor devices to those that qualify, and retain a plumber to conduct the outreach.
>Utility Cost: Assumes it costs $600 per account for the City to pay for fixtures & installation.
>Customer Cost: Assumes customer receives toilet, showerhead and faucet aerator installation for free via a City-provided plumber. Assumes MF residential accounts have 1.2 toilets per unit (and 8 units per account) and SF residential accounts have 2.2 toilets per residence, on average.
>Admin Cost: Small mark-up cost since the plumbers are doing most of the administration.
>End Use Savings: Estimating savings based on savings to replace a 1.6 gpf toilet with a 0.8 gpf toilet (UHET), a 2.5 gpm showerhead with a 1.5 gpm showerhead, a 2.2 gpm lavatory faucet with a 1.2 faucet, and a 2.2 gpm kitchen faucet with a 1.5 faucet. Assumes indoor leaks would be fixed from upgrading fixtures.
>Targets: Assumes target 80 accounts retrofitted annually.

Results

Units: MG

Average Water Savings (mgd)	0.031528
Lifetime Savings - Present Value ($)	
Utility	$285,976
Community	$1,869,061
Lifetime Costs - Present Value ($)	
Utility	$1,383,709
Community	$1,383,709
Benefit to Cost Ratio	
Utility	0.21
Community	1.35
Cost of Savings per Unit Volume ($/mg)	
Utility	$3,876

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Toilets	50.0%	30.3
MF Toilets	50.0%	155.9
SF Lavatory Faucets	45.0%	7.2
MF Lavatory Faucets	45.0%	37.1
SF Showers	40.0%	39.7
MF Showers	40.0%	185.6
SF Internal Leakage	90.0%	25.3
MF Internal Leakage	90.0%	129.9
SF Non-Lavatory/Kitchen Faucets	32.0%	25.3
MF Non-Lavatory/Kitchen Faucets	32.0%	111.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.020%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$0	$0	$0
2026	$0	$0	$0
2027	$0	$0	$0
2028	$44,134	$4,413	$48,547
2029	$44,773	$4,477	$49,250
2030	$45,412	$4,541	$49,953
2031	$46,051	$4,605	$50,657
2032	$46,691	$4,669	$51,360
2033	$47,330	$4,733	$52,063
2034	$47,969	$4,797	$52,766
2035	$48,608	$4,861	$53,469

Targets

View: Fixtures

	SF	MF	Total
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	52	21	74
2029	53	22	75
2030	54	22	76
2031	54	23	77
2032	55	23	78
2033	55	23	79
2034	56	24	80
2035	57	24	81

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000000
2026	0.000000
2027	0.000000
2028	0.002354
2029	0.004709
2030	0.007067
2031	0.009432
2032	0.011808
2033	0.014197
2034	0.016602
2035	0.019025

Measure #14 *– Residential Clothes Washer Rebate*

Overview

Name	Residential Clothes Washer Rebate
Abbr	14
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2027
Measure Length	3

Measure Life

Permanent	☐
Years	13
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$125.00	$875.00	1

Administration Costs

Method:	Percent
Markup Percentage	25%

Description

Currently offered by the City, this measure provides rebates for efficient clothes washing machines to residential properties, primarily single family homes. This measure is administered by CalWEP.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☐	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐					
Urinals						
Lavatory Faucets	☐					
Showers	☐					
Dishwashers	☐					
Clothes Washers	☑					
Process						
Kitchen Spray Rinse						
Internal Leakage	☐					
Baths	☐					
Other	☐					
Irrigation	☐					
Pools	☐					
Wash Down	☐					
Cooling						
Car Washing	☐					
External Leakage	☐					
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☐					

Comments

>Current rebate is only for single family residential customers.
>Utility Cost: Rebate cost of $125 per device.
>Customer Cost: Remaining cost of device. Per approved devices list, average device cost is ~$1,000.
>Admin Cost: This measure is administered by CalWEP, including a $25 fee per washer and also a small mark-up for the City's time for any communications and follow up related to the measure.
>End Use Savings: Estimating approximately 50% water savings for switching from a low or medium efficiency washer to an ultra high efficiency washer, based on the difference in integrated water factors (IWF) .
>Target: The City distributes approximately 200 clothes washer rebates annually, or ~ 0.1% of SFR accounts.

Results

Units: MG

Average Water Savings (mgd)	
	0.002945
Lifetime Savings - Present Value ($)	
Utility	$31,894
Community	$421,004
Lifetime Costs - Present Value ($)	
Utility	$88,845
Community	$586,380
Benefit to Cost Ratio	
Utility	0.36
Community	0.72
Cost of Savings per Unit Volume ($/mg)	
Utility	$2,664

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Clothes Washers	50.0%	28.9

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.150%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$29,634	$165,950	$195,584
2026	$29,990	$167,946	$197,936
2027	$30,347	$169,942	$200,289
2028	$0	$0	$0
2029	$0	$0	$0
2030	$0	$0	$0
2031	$0	$0	$0
2032	$0	$0	$0
2033	$0	$0	$0
2034	$0	$0	$0
2035	$0	$0	$0

Targets

View: Accounts

	SF	Total
2025	190	190
2026	192	192
2027	194	194
2028	0	0
2029	0	0
2030	0	0
2031	0	0
2032	0	0
2033	0	0
2034	0	0
2035	0	0

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.002741
2026	0.005384
2027	0.007919
2028	0.007705
2029	0.007482
2030	0.007279
2031	0.007094
2032	0.006924
2033	0.006770
2034	0.006629
2035	0.006501

Measure #15 *– CII Customized Top Users Incentives*

Overview

Name	CII Customized Top Users Incentives
Abbr	15
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2028
Last Year	2048
Measure Length	21

Measure Life

Permanent	☐
Years	15
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	$50,000.00	$25,000.00	1
INST	$50,000.00	$25,000.00	1

Administration Costs

Method: Percent

Markup Percentage	5%

Description

This measure would provide a free water use assessment (otherwise known as water audit) to commercial, industrial, and institutional customers, followed by a free report where the Utility will present recommendations for efficiency upgrades. Financial incentives will also be provided after analyzing the cost benefit ratio of the proposed project(s). Incentives are tailored to each individual site as each site has varying water savings potentials. Incentives will be granted at the sole discretion of the Utility while funding lasts. This measure aligns with CII BMPs for compliance with the Urban Water Use Objective from the "Making Conservation a California Way of Life" regulation.

Customer Classes

SF	MF	CI	INST	LS	OTH
☐	☐	☑	☑	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets			☑	☑		
Urinals			☑	☑		
Lavatory Faucets			☑	☑		
Showers			☑	☑		
Dishwashers			☑	☑		
Clothes Washers			☑	☑		
Process			☑			
Kitchen Spray Rinse			☑	☑		
Internal Leakage			☑	☑		
Baths						
Other			☑	☑		
Irrigation			☐	☐		
Pools						
Wash Down						
Cooling			☐	☐		
Car Washing						
External Leakage			☐	☐		
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets			☑	☑		

Comments

>This measure targets top users for indoor water uses only (outdoor incentives provided in alternate measures).
>Utility Cost: Cost to do a preliminary onsite assessment and report, cost of rebate, and cost for follow-up inspection. The City currently provides rebates of up to $50,000 per site but has received very little interest to date. Assumes average applicant requests full rebate cap. If the city were to outsource the surveys + report, would likely cost around $8,000 per site (not including incentives), dependent on site size and equipment.
>Customer Cost: Assumes business has to cover some costs - will vary but assuming they will pay for on average half of what they are getting via rebate.
>Admin Cost: Assumes 5% markup to administer this measure, representing staff time to process rebates.
>End Use Savings: Savings will vary greatly depending on the project, but should be significant considering this targets high users.
>Targets: Target top users. Due to limited budget, assumes approximately 5 participants in this measure annually.

Results

Units: MG

Average Water Savings (mgd)	
	0.054013
Lifetime Savings - Present Value ($)	
Utility	$503,352
Community	$2,967,317
Lifetime Costs - Present Value ($)	
Utility	$4,723,841
Community	$6,973,290
Benefit to Cost Ratio	
Utility	0.11
Community	0.43
Cost of Savings per Unit Volume ($/mg)	
Utility	$7,724

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
CI Toilets	75.0%	152.7
INST Toilets	75.0%	302.3
CI Urinals	75.0%	30.2
INST Urinals	75.0%	60.5
CI Lavatory Faucets	75.0%	33.3
INST Lavatory Faucets	75.0%	60.5
CI Showers	75.0%	136.1
INST Showers	75.0%	362.7
CI Dishwashers	75.0%	90.7
INST Dishwashers	75.0%	120.9
CI Clothes Washers	75.0%	226.8
INST Clothes Washers	75.0%	362.7
CI Process	75.0%	378.0
CI Kitchen Spray Rinse	75.0%	75.6
INST Kitchen Spray Rinse	75.0%	120.9
CI Internal Leakage	75.0%	151.2
INST Internal Leakage	75.0%	201.5
CI Other	75.0%	140.6
INST Other	75.0%	262.0
CI Non-Lavatory/Kitchen Faucets	75.0%	96.8
INST Non-Lavatory/Kitchen Faucets	75.0%	161.2

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.060%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$0	$0	$0
2026	$0	$0	$0
2027	$0	$0	$0
2028	$241,984	$12,099	$254,084
2029	$242,914	$12,146	$255,060
2030	$243,845	$12,192	$256,037
2031	$244,775	$12,239	$257,014
2032	$245,705	$12,285	$257,991
2033	$246,636	$12,332	$258,967
2034	$247,566	$12,378	$259,944
2035	$248,496	$12,425	$260,921

Targets

View: Accounts

	CI	INST	Total
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	4	1	5
2029	4	1	5
2030	4	1	5
2031	4	1	5
2032	4	1	5
2033	4	1	5
2034	4	1	5
2035	4	1	5

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000000
2026	0.000000
2027	0.000000
2028	0.005682
2029	0.011376
2030	0.017084
2031	0.022805
2032	0.028541
2033	0.034292
2034	0.040057
2035	0.045838

Measure #16 – CII Water Savings Performance Program

Overview

Name	CII Water Savings Performance Program
Abbr	16
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	15
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	$15,000.00	$5,000.00	1
INST	$15,000.00	$5,000.00	1

Administration Costs

Method:	Percent
Markup Percentage	10%

Description

The City of Sacramento provides a rebate of $0.50/CCF saved to CII sites within the service area. Water savings are estimated using the number of days operated per year and the expected life of the equipment (capped at 10 years). Participants are eligible for one rebate per site per program year for up to $50,000. Equipment and projects must remain in use for 10 years or the life of the equipment whichever is less. This measure aligns with CII BMPs for compliance with the Urban Water Use Objective from the "Making Conservation a California Way of Life" regulation.

Customer Classes

SF	MF	CI	INST	LS	OTH
☐	☐	☑	☑	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets			☐	☐		
Urinals			☐	☐		
Lavatory Faucets			☐	☐		
Showers			☐	☐		
Dishwashers			☑	☑		
Clothes Washers			☐	☐		
Process			☑			
Kitchen Spray Rinse			☐	☐		
Internal Leakage			☐	☐		
Baths						
Other			☑	☑		
Irrigation			☐	☐		
Pools						
Wash Down						
Cooling			☑	☑		
Car Washing						
External Leakage			☐	☐		
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets			☐	☐		

Comments

>Utility Cost: Assuming an average rebate offered is $15k per account. This measure is capped at $50k per account.
>Customer Cost: Assumes many of these large projects will need some additional investment from the customer.
>Admin Cost: Assumes 10% markup for staff time to process applications and administer the rebates.
>End Use Savings: Approved projects will be for high savings proposals only. Estimating high savings since targeting high users compared to an average account's usage. Upgrades would be for cooling, flushing and bottling equipment, sterilization equipment, and high efficiency ware washers.
>Targets: Targeting 5 users annually.

Results

Units: MG

Average Water Savings (mgd)	
	0.100754
Lifetime Savings - Present Value ($)	
Utility	$945,745
Community	$3,220,737
Lifetime Costs - Present Value ($)	
Utility	$2,181,171
Community	$2,842,132
Benefit to Cost Ratio	
Utility	0.43
Community	1.13
Cost of Savings per Unit Volume ($/mg)	
Utility	$1,912

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
CI Dishwashers	250.0%	90.7
INST Dishwashers	250.0%	120.9
CI Process	250.0%	378.0
CI Other	250.0%	140.6
INST Other	250.0%	262.0
CI Cooling	250.0%	85.4
INST Cooling	250.0%	265.0

Targets

Target Method:	Percentage
% of Accts Targeted / yr	0.060%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$71,758	$7,176	$78,934
2026	$72,037	$7,204	$79,241
2027	$72,316	$7,232	$79,548
2028	$72,595	$7,260	$79,855
2029	$72,874	$7,287	$80,162
2030	$73,153	$7,315	$80,469
2031	$73,432	$7,343	$80,776
2032	$73,712	$7,371	$81,083
2033	$73,991	$7,399	$81,390
2034	$74,270	$7,427	$81,697
2035	$74,549	$7,455	$82,004

Targets

View: Accounts

	CI	INST	Total
2025	4	1	5
2026	4	1	5
2027	4	1	5
2028	4	1	5
2029	4	1	5
2030	4	1	5
2031	4	1	5
2032	4	1	5
2033	4	1	5
2034	4	1	5
2035	4	1	5

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.008245
2026	0.016521
2027	0.024830
2028	0.033171
2029	0.041544
2030	0.049950
2031	0.058387
2032	0.066857
2033	0.075359
2034	0.083893
2035	0.092459

Measure #17 – CII Rebates to Replace Inefficient Equipment

Overview

Name	CII Rebates to Replace Inefficient Equipment
Abbr	17
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	15
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	$750.00	$250.00	1
INST	$750.00	$250.00	1

Administration Costs

Method: Percent

Markup Percentage	15%

Description

Currently offered by the City, this measure provides rebates to CII customers for a standard list of water efficient equipment. Incentives offered include x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, high efficiency toilets, high efficiency urinals, replace once through cooling, and add conductivity meters on cooling towers. This measure aligns with CII BMPs for compliance with the Urban Water Use Objective from the "Making Conservation a California Way of Life" regulation.

Customer Classes

SF	MF	CI	INST	LS	OTH
☐	☐	☑	☑	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets			☑	☑		
Urinals			☑	☑		
Lavatory Faucets			☑	☑		
Showers			☐	☐		
Dishwashers			☐	☐		
Clothes Washers			☐	☐		
Process			☐			
Kitchen Spray Rinse			☑	☑		
Internal Leakage			☑	☑		
Baths						
Other			☑	☑		
Irrigation			☐	☐		
Pools						
Wash Down						
Cooling			☑	☑		
Car Washing						
External Leakage			☐	☐		
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets			☑	☑		

Comments

>Utility Cost: Assumes average of $750 per account for eligible rebates.
>Customer Cost: Remaining cost of devices not covered by rebate, assuming $250 per account on average.
>Admin Cost: Assumes 15% markup for staff time to process rebates.
>End Use Savings: Since fixture upgrades will vary by account, conservatively estimating 10% savings on all end uses on average. Assumes savings are on applicable fixtures only - additional CII end uses are targeted in measures 15 and 16.
>Targets: approximately 10-20 customers annually.

Results

Units: MG

Average Water Savings (mgd)	
	0.010012
Lifetime Savings - Present Value ($)	
Utility	$94,069
Community	$355,039
Lifetime Costs - Present Value ($)	
Utility	$237,533
Community	$306,383
Benefit to Cost Ratio	
Utility	0.40
Community	1.16
Cost of Savings per Unit Volume ($/mg)	
Utility	$2,095

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
CI Toilets	10.0%	152.7
INST Toilets	10.0%	302.3
CI Urinals	10.0%	30.2
INST Urinals	10.0%	60.5
CI Lavatory Faucets	10.0%	33.3
INST Lavatory Faucets	10.0%	60.5
CI Kitchen Spray Rinse	10.0%	75.6
INST Kitchen Spray Rinse	10.0%	120.9
CI Internal Leakage	10.0%	151.2
INST Internal Leakage	10.0%	201.5
CI Other	10.0%	140.6
INST Other	10.0%	262.0
CI Cooling	10.0%	85.4
INST Cooling	10.0%	265.0
CI Non-Lavatory/Kitchen Faucets	10.0%	96.8
INST Non-Lavatory/Kitchen Faucets	10.0%	161.2

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.125%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$8,596	$2,492	$11,088
2026	$8,629	$2,501	$11,131
2027	$8,663	$2,511	$11,174
2028	$8,696	$2,521	$11,217
2029	$8,730	$2,530	$11,260
2030	$8,763	$2,540	$11,303
2031	$8,797	$2,550	$11,346
2032	$8,830	$2,559	$11,389
2033	$8,863	$2,569	$11,433
2034	$8,897	$2,579	$11,476
2035	$8,930	$2,589	$11,519

Targets

View: Accounts

	CI	INST	Total
2025	9	1	10
2026	9	1	10
2027	9	1	10
2028	9	1	10
2029	9	1	10
2030	9	1	10
2031	9	1	10
2032	9	1	10
2033	9	1	10
2034	9	1	10
2035	9	1	10

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000839
2026	0.001679
2027	0.002519
2028	0.003360
2029	0.004202
2030	0.005045
2031	0.005889
2032	0.006734
2033	0.007580
2034	0.008428
2035	0.009278

Measure #18 *– Install High Efficency Fixtures in MF & CII Buildings*

Overview

Name	Install High Efficiency Fixtures in MF & CII Buildings
Abbr	18
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2035
Last Year	2055
Measure Length	21

Measure Life

Permanent	☐
Years	12
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
MF	$4,765.00	$0.00	1
CI	$3,672.00	$2,448.00	1
INST	$3,672.00	$2,448.00	1

Administration Costs

Method: Percent

Markup Percentage	10%

Description

This measure would install high efficiency fixtures in select multifamily, commercial, and institutional buildings. Replacements would include high efficiency toilets, showerheads, urinals, and faucet aerators. A water survey would be conducted as a pre-requisite to qualifying for direct installation of fixtures. This measure aligns with CII BMPs for compliance with the Urban Water Use Objective from the "Making Conservation a California Way of Life" regulation.

Customer Classes

	SF	MF	CI	INST	LS	OTH
	☐	☑	☑	☑	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets		☑	☑	☑		
Urinals			☑	☑		
Lavatory Faucets		☑	☑	☑		
Showers		☑	☐	☐		
Dishwashers		☐	☐	☐		
Clothes Washers		☐	☐	☐		
Process			☐			
Kitchen Spray Rinse			☐	☐		
Internal Leakage		☑	☑	☑		
Baths		☐				
Other		☐	☐	☐		
Irrigation		☐	☐	☐		
Pools		☐				
Wash Down		☐				
Cooling			☐	☐		
Car Washing		☐				
External Leakage		☐	☐	☐		
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets		☑	☑	☑		

Comments

> Target the remaining low efficiency fixtures where possible.
>Utility Cost: Cost assumes to following fixtures are purchased and installed, on average:
-MF buildings: 9 toilets, 9 showerheads, 9 lavatory faucets and 8 kitchen faucets.
-CI & INST buildings: 10 toilets, 3 urinals, 10 lavatory faucets, and 4 kitchen faucets.
-Assumed avg cost per fixture (Incl. installation): toilets - $500, urinals - $350, showerheads- $20, aerators- $5.
-assumes 40% of cost is for installation (removed for CI & INST)
>Customer Cost: Assumes no cost to MF customers as modeling this as a direct install program for low-income MF customers. However, for CI and government buildings the installation would be the building owner's responsibility, so assuming 40% of the cost.
>Admin Cost: Assumes a 10% markup for staff time to administer the program.
>End Use Savings: Assumes the following upgrades:
Toilets - from 2.5 to 0.8 gpf (68%) - avg of 3.5 and 1.6 gpf toilets
Urinals - from 2.0 to 1.0 gpf (50%)
Showerheads - from 2.5 to 1.5 gpm (50%)
Lav faucets - from 2.2 to 1.2 gpm (45%)
Kitchen faucets - from 2.2 to 1.5 gpm (32%)
Leaks - assumes leaks would be addressed from replacement with upgraded fixtures.
>Target: Targeting the remaining high use fixture sites, approx. 50 customers annually, targeting majority of MF accounts to help meet the indoor residential UWUO.

Results

Units: MG

Average Water Savings (mgd)	
0.093740	
Lifetime Savings - Present Value ($)	
Utility	$837,909
Community	$4,901,022
Lifetime Costs - Present Value ($)	
Utility	$4,151,922
Community	$4,429,674
Benefit to Cost Ratio	
Utility	0.20
Community	1.11
Cost of Savings per Unit Volume ($/mg)	
Utility	$3,912

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
MF Toilets	68.0%	155.9
CI Toilets	68.0%	152.7
INST Toilets	68.0%	302.3
CI Urinals	50.0%	30.2
INST Urinals	50.0%	60.5
MF Lavatory Faucets	45.0%	37.1
CI Lavatory Faucets	45.0%	33.3
INST Lavatory Faucets	45.0%	60.5
MF Showers	50.0%	185.6
MF Internal Leakage	90.0%	129.9
CI Internal Leakage	90.0%	151.2
INST Internal Leakage	90.0%	201.5
MF Non-Lavatory/Kitchen Faucets	32.0%	111.4
CI Non-Lavatory/Kitchen Faucets	32.0%	96.8
INST Non-Lavatory/Kitchen Faucets	32.0%	161.2

Targets

Target Method: Detailed

Enter Annual Targets Below

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$0	$0	$0
2026	$0	$0	$0
2027	$0	$0	$0
2028	$0	$0	$0
2029	$0	$0	$0
2030	$0	$0	$0
2031	$0	$0	$0
2032	$0	$0	$0
2033	$0	$0	$0
2034	$0	$0	$0
2035	$230,094	$23,009	$253,103

Targets

View: Accounts

	MF	CI	INST	Total
2025	0	0	0	0
2026	0	0	0	0
2027	0	0	0	0
2028	0	0	0	0
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	43	5	2	50

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000000
2026	0.000000
2027	0.000000
2028	0.000000
2029	0.000000
2030	0.000000
2031	0.000000
2032	0.000000
2033	0.000000
2034	0.000000
2035	0.017124

Measure #19 *– Enahanced – Residential Smart Landscape Rebates*

Overview

Name	Enhanced - Residential Smart Landscape Rebates
Abbr	19
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2027
Last Year	2055
Measure Length	29

Measure Life

Permanent	☐
Years	10
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$600.00	$500.00	1
MF	$1,600.00	$1,500.00	1

Administration Costs

Method: Percent

Markup Percentage	20%

Description

For SF and MF customers with landscape, provide rebates for substantive landscape retrofits and/or installation of water efficient irrigation equipment upgrades through the River Friendly Landscape Program. Rebates contribute towards the purchase and installation of water-wise plants, compost, mulch, stormwater features like permeable hardscape and swales, and selected types of irrigation equipment upgrades. Rebates would be "stacked incentives," provided in partnership with other agencies and organizations such as Master Gardeners, Green Gardeners, Sac State, UC Davis, and Sacramento County's Department of Water Resources who would share in costs, labor, and/or producing educational materials. The City would also continue their partnership with the Sacramento Valley Chapter of the California Native Plant Society to provide education and resources on local native plants.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☐	☐				
Showers	☐	☐				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☐	☐				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☑	☑				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☐	☐				

Comments

>City of Sacramento currently provides rebates for turf conversion, irrigation efficiency upgrades, smart controllers, rain barrels, and laundry to landscape simple greywater systems as part of the River Friendly Landscape program. This program would focus rebates on landscape retrofits only (no rain barrels nor greywater), and be in partnership with neighboring organizations to be able to fund more projects and have more outreach power.
>Utility Cost: Utility currently provides rebates of $1.50 per sq. ft. of landscape converted and provides fixed rebates for irrigation equipment. Assumes a higher rebate will be offered overall (Recommend $4-$5/sq. ft.) to incentive customers, but the city will cost-share and only pay ~$1.00/sq. ft. for this measure. Estimating an average of $600 and $1,600 for the City's portion of SF and MF rebates, respectively.
>Customer Cost: Cost of the equipment or landscape conversion, minus the rebate. Customer costs per account will vary significantly based on devices. Estimating $500 on average per single-family residential site and $1500 per multi-family residential site.
>Admin Cost: Assume 20% mark-up for staff time to process applications and administer rebates - increased from current program since more applicants and to coordinate with partners.
>Savings: Assumes 40% savings for irrigation and 90% savings on outdoor leaks from this measures, assuming that participants receive extra equipment and support from the various partners involved.
>Targets: Assumes more partners on the ground = more participation, so increasing target from 300 to 600 rebates annually.

Results

Units: MG

Average Water Savings (mgd)	
	0.308876
Lifetime Savings - Present Value ($)	
Utility	$2,878,162
Community	$2,878,162
Lifetime Costs - Present Value ($)	
Utility	$14,765,221
Community	$25,279,176
Benefit to Cost Ratio	
Utility	0.19
Community	0.11
Cost of Savings per Unit Volume ($/mg)	
Utility	$4,222

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Irrigation	40.0%	96.5
MF Irrigation	40.0%	289.6
SF External Leakage	90.0%	8.1
MF External Leakage	90.0%	24.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.440%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$0	$0	$0
2026	$0	$0	$0
2027	$501,269	$356,010	$857,279
2028	$508,098	$360,926	$869,024
2029	$514,926	$365,843	$880,769
2030	$521,755	$370,759	$892,514
2031	$528,584	$375,677	$904,261
2032	$535,414	$380,594	$916,008
2033	$542,243	$385,511	$927,754
2034	$549,073	$390,428	$939,501
2035	$555,902	$395,345	$951,248

Targets

View: Accounts

	SF	MF	Total
2025	0	0	0
2026	0	0	0
2027	570	47	617
2028	576	48	625
2029	583	50	633
2030	590	51	640
2031	596	52	648
2032	603	53	656
2033	610	54	664
2034	617	55	671
2035	623	56	679

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000000
2026	0.000000
2027	0.032690
2028	0.065831
2029	0.099424
2030	0.133469
2031	0.167965
2032	0.202912
2033	0.238311
2034	0.274162
2035	0.310464

Measure #20 *– Commercial and Large Landscape Non-Functional Turf Outreach*

Overview

Name	Commercial and Large Landscape Non Functional Turf Outreach
Abbr	20
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2028
Measure Length	4

Measure Life

Permanent ☑

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	$250.00	$10,000.00	1
INST	$250.00	$10,000.00	1
LS	$250.00	$20,000.00	1

Administration Costs

Method: Percent

Markup Percentage	20%

Description

In October 2023, the California State Legislature passed Assembly Bill 1572, which phases in a permanent ban on watering decorative grass or non-functional turf with potable water in commercial, industrial, and institutional settings. This includes areas within homeowners associations (HOAs). The ban does not apply to residential lawns, school fields, sports fields, or areas that are regularly used for civic or community events.
This measure reflects the City conducting enforcement according to the implementation timeline required per the regulation which occurs in phases, completing in January 2029. The City would also partner with the Environmental Council of Sacramento to improve outreach and communication with landscape contractors and maintenance personnel to increase awareness of the regulation and providethem with resources and training.
> Note: MF irrigation assumed to be captured in COM (as part of HOAs).

Customer Classes

SF	MF	CI	INST	LS	OTH
☐	☐	☑	☑	☑	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets			☐	☐		
Urinals			☐	☐		
Lavatory Faucets			☐	☐		
Showers			☐	☐		
Dishwashers			☐	☐		
Clothes Washers			☐	☐		
Process			☐			
Kitchen Spray Rinse			☐	☐		
Internal Leakage			☐	☐		
Baths						
Other			☐	☐		
Irrigation			☑	☑	☑	
Pools						
Wash Down						
Cooling			☐	☐		
Car Washing						
External Leakage			☑	☑	☑	
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets			☐	☐		

Comments

>Utility Cost: This measure does NOT include an incentive, as it is a requirement for all CII and large landscape accounts with NFT. Assume costs incurred are for inspections for compliance and other material requirements to ensure compliance. Assumes approximately five hour of staff time is required to identify customers who are not in compliance and inspect for compliance (per customer) at the fully burdened WC Representatives rate of $46.50/hr.
>Customer Cost: Assuming that customers incur the total cost for turf conversions, the average cost per account is estimated to be $10,000. This average takes into account that some customers might participate in the City's program or in regional rebate programs, which may lower the average customer's cost slightly. Assume costs for LS customers are slightly higher since it is assumed that landscapes for these customers are larger.
>Admin Cost: Assume 20% mark-up for administration of this measure.
>Savings: Savings conservatively assumes 33% savings (1/3 of entire irrigated area) - 1/3 of a 5000 square foot landscape that would save 77,000 gallons annually based on 35% turf grass remaining. Could increase to assume 50% irrigation water savings with turf removal only. Assumes not all landscape is turf, therefore not all landscape is removed.
Conservatively assumes 5% external leakage savings for assumption that irrigation equipment is updated/corrected during the landscape transformation.
>Targets: Assumes 10% of CII & LS accounts are targeted annually over the next four years (until NFT compliance dates). Compliance must be in effect on the following dates: State buildings & local government agency properties - January 2027. CII properties - January 2028. HOA common areas - January 2029. The City could verify the target by analyzing the LAM data for an estimate on

Results

Units: MG

Average Water Savings (mgd)	
1.175192	
Lifetime Savings - Present Value ($)	
Utility	$11,411,771
Community	$11,411,771
Lifetime Costs - Present Value ($)	
Utility	$1,134,316
Community	$45,273,541
Benefit to Cost Ratio	
Utility	10.06
Community	0.25
Cost of Savings per Unit Volume ($/mg)	
Utility	$85

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
CI Irrigation	33.0%	426.8
INST Irrigation	33.0%	2,119.6
LS Irrigation	33.0%	2,669.9
CI External Leakage	5.0%	28.5
INST External Leakage	5.0%	132.5
LS External Leakage	5.0%	140.5

Targets

Target Method: Percentage

% of Accts Targeted / yr	10.000%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$286,254	$11,110,469	$11,396,723
2026	$288,061	$11,199,938	$11,487,999
2027	$289,868	$11,289,407	$11,579,275
2028	$291,675	$11,378,876	$11,670,551
2029	$0	$0	$0
2030	$0	$0	$0
2031	$0	$0	$0
2032	$0	$0	$0
2033	$0	$0	$0
2034	$0	$0	$0
2035	$0	$0	$0

Targets

View: Accounts

	CI	INST	LS	Total
2025	706	91	157	954
2026	709	91	160	960
2027	712	92	163	966
2028	715	92	166	972
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	0	0	0	0

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.304148
2026	0.611444
2027	0.921889
2028	1.235481
2029	1.235481
2030	1.235481
2031	1.235481
2032	1.235481
2033	1.235481
2034	1.235481
2035	1.235481

Measure #21 *– Enhanced – Residential Leak Repair Assistance*

Overview

Name	Enhanced - Residential Leak Repair Assistance
Abbr	21
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2028
Last Year	2052
Measure Length	25

Measure Life

Permanent	☐
Years	5
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$1,000.00	$5,000.00	1
MF	$1,000.00	$5,000.00	2

Administration Costs

Method:	Percent
Markup Percentage	38%

Description

Provides a rebate to subsidize part of a leak repair at qualified single and small multi family customers. This optimized measure would utilize grant funding to increase the number of rebates provided. Include Spanish translation to reach additional customers.

Customer Classes

	SF	MF	CI	INST	LS	OTH
	☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☐	☐				
Showers	☐	☐				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☑	☑				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☐	☐				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☐	☐				

Comments

>This measure is offered for customers that do not qualify for Leak Free Sacramento.
>Utility Cost: Assumes the City provides $1,000 rebates on average to subsidize repairs.
>Customer Cost: Repairs are typically costly, assuming up to $10,000 total and average of $6,000.
>Admin Cost: Assumes 50% of 1 Specialist's time is spent administering this measure, or ~$54,320 annually. This equates to ~$380/participant.
>End Use Savings: Savings might be over 200% if based on a targeted account's using 2-4 times the amount of the previous year's water use. Assume targeting high leak accounts. Assume 1 leak per SF, 2 leaks per MF (typically duplex owners), as these programs typically are for owner-occupied residences. source: AWE 2023 Leak Alert Study https://www.allianceforwaterefficiency.org/resources/topic/evaluation-ami-enabled-proactive-leak-notification-programs
Savings updated to 330% based on City of Sacramento participation data.
>Targets: Assumes grant funding increases the budget, so can target approx. 150 annually.

Results

Units: MG

Average Water Savings (mgd)	
	0.097093
Lifetime Savings - Present Value ($)	
Utility	$917,224
Community	$3,912,336
Lifetime Costs - Present Value ($)	
Utility	$5,183,344
Community	$23,963,578
Benefit to Cost Ratio	
Utility	0.18
Community	0.16
Cost of Savings per Unit Volume ($/mg)	
Utility	$4,715

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Internal Leakage	330.0%	25.3
MF Internal Leakage	330.0%	129.9
SF External Leakage	330.0%	8.1
MF External Leakage	330.0%	24.4

Targets

Target Method:	Percentage
% of Accts Targeted / yr	0.100%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$0	$0	$0
2026	$0	$0	$0
2027	$0	$0	$0
2028	$153,038	$58,155	$211,193
2029	$155,035	$58,913	$213,949
2030	$157,032	$59,672	$216,704
2031	$159,029	$60,431	$219,460
2032	$161,026	$61,190	$222,216
2033	$163,023	$61,949	$224,972
2034	$165,021	$62,708	$227,728
2035	$167,018	$63,467	$230,484

Targets

View: Accounts

	SF	MF	Total
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	131	11	142
2029	133	11	144
2030	134	11	146
2031	136	12	147
2032	137	12	149
2033	139	12	151
2034	140	12	153
2035	142	13	154

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000000
2026	0.000000
2027	0.000000
2028	0.020061
2029	0.040411
2030	0.061050
2031	0.081978
2032	0.103194
2033	0.104639
2034	0.106084
2035	0.107529

Measure #22 *– Enhanced – AMI Targeted Leak Free Sacramento*

Overview

Name	Enhanced - AMI Targeted Leak Free Sacramento
Abbr	22
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2055
Measure Length	31

Measure Life

Permanent	☐
Years	5
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$5,000.00	$0.00	1
MF	$5,000.00	$0.00	1

Administration Costs

Method: Fixed

Annual Admin Costs	$81,500

Description

Customer leaks can go uncorrected at properties where owners are least able to pay costs of repair. This measure provides free leak repairs to eligible low-income single family and multi-family homeowners. Accounts with leak alerts identified via AMI would be targeted, especially large MF customers. This measure aligns with the Water Loss Performance Standards for compliance with the Urban Water Use Objective from the "Making Conservation a California Way of Life" regulation.

Customer Classes

	SF	MF	CI	INST	LS	OTH
	☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☐	☐				
Showers	☐	☐				
Dishwashers	☐	☐				
Clothes Washers	☐	☐				
Process						
Kitchen Spray Rinse						
Internal Leakage	☑	☑				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☐	☐				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☐	☐				

Comments

>Assumes that this is a grant funded program.
>Eligibility for multi-family homeowners could be determined by those that live in a duplex/triplex/fourplex or multi-plex within a DAC area.
>Utility Cost: Assume average of $5,000 to pay a plumber to fix a main line leak (City of Sacramento provides plumber - discounted rate).
>Customer Cost: No cost to customer. This is an income-qualified measure.
>Admin Cost: Assumes .75 FTE at Specialist rate to administer this measure (approx. $81,500 burdened).
>End Use Savings: Savings would be above 100% of the average account's use on indoor leaks since providing direct support to high using customers. Per City of Sacramento analyzed data, participants saved 100 gpd/account on average on indoor leaks, so increased savings to 400%.
>Targets: Assume non-enhanced targets till end of 2027 when budget can be adjusted. Then target 250 leaks per year.

Results

Units: MG

Average Water Savings (mgd)	
	0.223800
Lifetime Savings - Present Value ($)	
Utility	$2,103,636
Community	$8,973,781
Lifetime Costs - Present Value ($)	
Utility	$37,232,018
Community	$37,232,018
Benefit to Cost Ratio	
Utility	0.06
Community	0.24
Cost of Savings per Unit Volume ($/mg)	
Utility	$14,693

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Internal Leakage	400.0%	25.3
MF Internal Leakage	400.0%	129.9
SF External Leakage	400.0%	8.1
MF External Leakage	400.0%	24.4

Targets

Target Method: Detailed

Enter Annual Targets Below

Costs

View: Summary

	Utility	Customer	Total
2025	$320,800	$0	$320,800
2026	$323,878	$0	$323,878
2027	$326,956	$0	$326,956
2028	$1,324,171	$0	$1,324,171
2029	$1,339,561	$0	$1,339,561
2030	$1,354,951	$0	$1,354,951
2031	$1,370,343	$0	$1,370,343
2032	$1,385,735	$0	$1,385,735
2033	$1,401,127	$0	$1,401,127
2034	$1,416,520	$0	$1,416,520
2035	$1,431,912	$0	$1,431,912

Targets

View: Accounts

	SF	MF	Total
2025	44	4	48
2026	45	4	48
2027	45	4	49
2028	229	19	249
2029	232	20	252
2030	235	20	255
2031	237	21	258
2032	240	21	261
2033	243	21	264
2034	245	22	267
2035	248	22	270

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.008143
2026	0.016409
2027	0.024797
2028	0.067350
2029	0.110517
2030	0.146153
2031	0.182280
2032	0.218897
2033	0.221962
2034	0.225027
2035	0.228092

Measure #23 *– Enhanced – Water & Energy Partnership Rebates*

Overview

Name	Enhanced - Water & Energy Partnership Rebates
Abbr	23
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2030
Last Year	2054
Measure Length	25

Measure Life

Permanent	☐
Years	15
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$190.00	$260.00	1
MF	$190.00	$260.00	1

Administration Costs

Method:	Percent
Markup Percentage	10%

Description

Continue partnership with SMUD to offer incentives to customers to save both water and energy. The focus of this measure is peak demand reduction. Consider partnering with SMUD on their shade-tree program to cross-market with the landscape transformation program.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☐	☐				
Urinals						
Lavatory Faucets	☑	☑				
Showers	☑	☑				
Dishwashers	☐	☐				
Clothes Washers	☑	☑				
Process						
Kitchen Spray Rinse						
Internal Leakage	☐	☐				
Baths	☐	☐				
Other	☐	☐				
Irrigation	☑	☑				
Pools	☐	☐				
Wash Down	☐	☐				
Cooling						
Car Washing	☐	☐				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☑	☑				

Comments

>City of Sacramento provides an instant rebate for smart controllers from the SMUD energy store, along with rebates for include showerheads, aerators, and drip kits. Expand the offerings provided to include clothes washers, and include a required online water audit to receive a rebate.
>Utility cost: Cost of rebates and giveaways: controllers - $125, showerhead & aerator kits-$10, $250 - clothes washers. Assumes most participants apply for one of either a controller or clothes washer, thus average rebate is ~$190.
>Customer cost: Remaining cost of smart controller (Rachio), showerhead/aerator kit, and clothes washer. Assumes controllers are $200, showerhead/aerator kits are $15, and clothes washers are $700.
>Admin cost: Assumes 10% admin markup to coordinate this measure with SMUD - website already exists.
>End use savings: Savings assume the following fixtures are replaced: 2.5 gpm showerhead with a 1.5 gpm showerhead and 2.2 gpm lavatory and non-lavatory faucet aerators with 1.5 gpm kitchen faucet aerators and 1.2 gpm lavatory faucet aerators. (divided by 10 assuming 1 out of 10 applicants applies).
-Estimating approximately 50% water savings for switching from a low or medium efficiency washer to an ultra high efficiency washer, based on the difference in integrated water factors. Assumes 1 out of 2 applicants applies for a controller - average of 25% savings per account.
-Per EPA, savings can range from 20-50% for installation of smart controllers; assumes 1 out of 2 applicants applies for a controller- average of 25% savings per account.
>Targets: Per recent past participation (FY 23 - FY 24), about 560 smart controller rebates are distributed

Results

Units: MG

Average Water Savings (mgd)	
0.231934	
Lifetime Savings - Present Value ($)	
Utility	$2,108,085
Community	$7,953,212
Lifetime Costs - Present Value ($)	
Utility	$2,778,581
Community	$6,235,189
Benefit to Cost Ratio	
Utility	0.76
Community	1.28
Cost of Savings per Unit Volume ($/mg)	
Utility	$1,058

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Lavatory Faucets	4.5%	7.2
MF Lavatory Faucets	4.5%	37.1
SF Showers	4.0%	39.7
MF Showers	4.0%	185.6
SF Clothes Washers	25.0%	28.9
MF Clothes Washers	25.0%	185.6
SF Irrigation	25.0%	96.5
MF Irrigation	25.0%	289.6
SF External Leakage	25.0%	8.1
MF External Leakage	25.0%	24.4
SF Non-Lavatory/Kitchen Faucets	3.0%	25.3
MF Non-Lavatory/Kitchen Faucets	3.0%	111.4

Targets

Target Method:	Percentage
% of Accts Targeted / yr	0.380%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$0	$0	$0
2026	$0	$0	$0
2027	$0	$0	$0
2028	$0	$0	$0
2029	$0	$0	$0
2030	$115,586	$143,791	$259,376
2031	$116,983	$145,529	$262,512
2032	$118,380	$147,267	$265,647
2033	$119,777	$149,005	$268,782
2034	$121,174	$150,743	$271,917
2035	$122,571	$152,481	$275,052

Targets

View: Accounts

	SF	MF	Total
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	509	44	553
2031	515	45	560
2032	521	45	566
2033	527	46	573
2034	532	47	580
2035	538	48	586

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000000
2026	0.000000
2027	0.000000
2028	0.000000
2029	0.000000
2030	0.023535
2031	0.047102
2032	0.070733
2033	0.094458
2034	0.118303
2035	0.142291

Measure #24 – Enhanced – Residential Water Surveys

Overview

Name	Enhanced - Residential Water Surveys
Abbr	24
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2031
Last Year	2055
Measure Length	25

Measure Life

Permanent	☐
Years	5
Repeat	☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	$115.00	$50.00	1
MF	$62.00	$25.00	8

Administration Costs

Method: Percent

Markup Percentage	15%

Description

Provide comprehensive water surveys for existing single family and multifamily residential customers. Target those with high water use and provided a customized report to owner. Require a full survey as a pre-requisite for receiving rebates. Includes indoor and outdoor.

Customer Classes

SF	MF	CI	INST	LS	OTH
☑	☑	☐	☐	☐	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets	☑	☑				
Urinals						
Lavatory Faucets	☑	☑				
Showers	☑	☑				
Dishwashers	☑	☑				
Clothes Washers	☑	☑				
Process						
Kitchen Spray Rinse						
Internal Leakage	☑	☑				
Baths	☑	☑				
Other	☑	☑				
Irrigation	☑	☑				
Pools	☑	☑				
Wash Down	☑	☑				
Cooling						
Car Washing	☑	☑				
External Leakage	☑	☑				
Outdoor Other						
Non-Lavatory/Kitchen Faucets	☑	☑				

Comments

>Utility Cost: Cost to conduct surveys in house and cost for giveaway items (showerheads, faucet aerators, and hose nozzles). Estimating 2 hours per customer to conduct SF survey and produce report; half the time per MF unit. Assumes fully burdened rate of WC Specialist is ~$52/hr. Assumes survey kit materials cost $10 per customer due to bulk orders.
>Admin Cost: Estimated mark-up cost for administering measure, including follow up with customers.
>Customer Cost: Cost to implement recommended water efficiency improvements. This will vary greatly, but estimating $50 per SF customer and $25 per MF customer on average.
>End Use Savings: Savings are generalized as end uses will vary based on what was identified during the survey, but assumes high users are targeted and therefore significant recommendations will be identified. However, as measure implementation is not guaranteed, savings are still relatively low. Assumes leaks will be discovered and addressed.
>Targets: Target residential customers that have high use via online notifications connected to AMI customer portal and analysis of both summer and wintertime use. Goal would be to reach approximately 100 customers per year. Consider conducting a raffle or providing e-gift cards to participants to increase engagement.

Results

Units: MG

Average Water Savings (mgd)	
0.035535	
Lifetime Savings - Present Value ($)	
Utility	$327,727
Community	$1,568,673
Lifetime Costs - Present Value ($)	
Utility	$373,649
Community	$511,884
Benefit to Cost Ratio	
Utility	0.88
Community	3.06
Cost of Savings per Unit Volume ($/mg)	
Utility	$929

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
SF Toilets	15.0%	30.3
MF Toilets	15.0%	155.9
SF Lavatory Faucets	15.0%	7.2
MF Lavatory Faucets	15.0%	37.1
SF Showers	15.0%	39.7
MF Showers	15.0%	185.6
SF Dishwashers	15.0%	2.2
MF Dishwashers	15.0%	11.1
SF Clothes Washers	15.0%	28.9
MF Clothes Washers	15.0%	185.6
SF Internal Leakage	100.0%	25.3
MF Internal Leakage	100.0%	129.9
SF Baths	15.0%	7.2
MF Baths	15.0%	37.1
SF Other	15.0%	14.5
MF Other	15.0%	74.2
SF Irrigation	15.0%	96.5
MF Irrigation	15.0%	289.6
SF Pools	15.0%	2.3
MF Pools	15.0%	7.0
SF Wash Down	15.0%	4.6
MF Wash Down	15.0%	14.0
SF Car Washing	15.0%	4.6
MF Car Washing	15.0%	14.0
SF External Leakage	100.0%	8.1
MF External Leakage	100.0%	24.4
SF Non-Lavatory/Kitchen Faucets	15.0%	25.3
MF Non-Lavatory/Kitchen Faucets	15.0%	111.4

Targets

Target Method: Percentage

% of Accts Targeted / yr	0.062%
Only Effects New Accts	☐

Costs

View: Summary

	Utility	Customer	Total
2025	$0	$0	$0
2026	$0	$0	$0
2027	$0	$0	$0
2028	$0	$0	$0
2029	$0	$0	$0
2030	$0	$0	$0
2031	$15,265	$5,657	$20,922
2032	$15,474	$5,734	$21,208
2033	$15,683	$5,811	$21,493
2034	$15,892	$5,887	$21,779
2035	$16,100	$5,964	$22,064

Targets

View: Accounts

	SF	MF	Total
2025	0	0	0
2026	0	0	0
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	0	0	0
2031	84	7	91
2032	85	7	92
2033	86	8	94
2034	87	8	95
2035	88	8	96

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.000000
2026	0.000000
2027	0.000000
2028	0.000000
2029	0.000000
2030	0.000000
2031	0.008270
2032	0.016601
2033	0.024999
2034	0.033469
2035	0.042015

Measure #25 *– Enhanced Water Loss Control Program*

Overview	
Name	Enhanced Water Loss Control Program
Abbr	25
Category	Default
Measure Type	Water Loss Measure

Time Period	
First Year	2029

Backlog Costs	
Total Backlog Work Costs	$67,500,000
Years to Complete Backlog	27

Maintenance Costs	
Annual Maintenance Costs	$2,500,000

Target	
Total GPCD Reduction	10.0

Description

> Enhanced water loss efforts to find and repair leaks in the distribution system to reduce real water loss. This is currently funded by the City of Sacramento operations team and budget.
> In addition, the City's water loss efforts include maintaining a thorough annual accounting of water production, sales by customer class and quantity of water produced but not sold (non-revenue water) as required by California SB-555. This provides a picture of the City's system, including water usage patterns and trends needed to identify appropriate conservation activities.
> Operating budget per the 2023 validated water loss audit workbook was approx. $121M. In this enhanced measure, adding approximately 2% to the budget to support another water loss crew that would be in the field conducting proactive leak detection and repair.

Results

Units: MG

Average Water Savings (mgd)	
3.376729	
Lifetime Savings - Present Value ($)	
Utility	$30,270,890
Community	$30,270,890
Lifetime Costs - Present Value ($)	
Utility	$54,799,138
Community	$54,799,138
Benefit to Cost Ratio	
Utility	0.55
Community	0.55
Cost of Savings per Unit Volume ($/mg)	
Utility	$1,433

Comments

> Backlog Costs: Assume covered by operations. Assume $2.5M per year through modeling period to achieve GPCD reduction target.
> Maintenance Costs: Funding an additional 2% to the current operating budget to support another water loss crew that would be in the field conducting proactive leak detection and repair. (approx. $2.5M annually)
> Target: Assume significantly higher savings than original measure due to additional water loss mgmt. field crews.

Costs

	Utility
2025	$0
2026	$0
2027	$0
2028	$0
2029	$2,500,000
2030	$2,500,000
2031	$2,500,000
2032	$2,500,000
2033	$2,500,000
2034	$2,500,000
2035	$2,500,000

Targets

	Projected NRW Percent
2025	14.5%
2026	14.5%
2027	14.5%
2028	14.5%
2029	14.3%
2030	14.0%
2031	13.8%
2032	13.5%
2033	13.3%
2034	13.0%
2035	12.8%

Water Savings (MG/d)

	Total Savings
2025	0.000000
2026	0.000000
2027	0.000000
2028	0.000000
2029	0.211688
2030	0.430904
2031	0.657647
2032	0.891918
2033	1.133716
2034	1.383043
2035	1.639896

Measure #26 *– Enhanced – Commercial and Large Landscape Non-Functional Turf Incentive*

Overview

Name	Enhanced - Commercial and Large Landscape Non Functional Turf Incentive
Abbr	26
Category	Default
Measure Type	Standard Measure

Time Period

First Year	2025
Last Year	2028
Measure Length	4

Measure Life

Permanent	☑

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	$10,000.00	$20,000.00	1
INST	$10,000.00	$20,000.00	1
LS	$20,000.00	$40,000.00	1

Administration Costs

Method:	Percent
Markup Percentage	5%

Description

Target CII & Large Landscape accounts with non-functional turf (NFT) and provide an incentive and resources to assist with landscape retrofits, including water efficient landscape design and plant palette resources, smart irrigation practices guidance, and a rebate for replacing NFT with appropriate landscaping.

Customer Classes

SF	MF	CI	INST	LS	OTH
☐	☐	☑	☑	☑	☐

End Uses

	SF	MF	CI	INST	LS	OTH
Toilets			☐	☐		
Urinals			☐	☐		
Lavatory Faucets			☐	☐		
Showers			☐	☐		
Dishwashers			☐	☐		
Clothes Washers			☐	☐		
Process			☐			
Kitchen Spray Rinse			☐	☐		
Internal Leakage			☐	☐		
Baths						
Other			☐	☐		
Irrigation			☑	☑	☑	
Pools						
Wash Down						
Cooling			☐	☐		
Car Washing						
External Leakage			☑	☑	☑	
Outdoor Other			☐	☐		
Non-Lavatory/Kitchen Faucets			☐	☐		

Comments

>Utility Cost: Cost for a rebate of $2/sq. ft.. Estimating 5,000 and 10,000 for CII & LS landscapes, respectively, on average.
>Customer Cost: Cost of the landscape conversion minus the rebate amount. Estimating landscape retrofits average about $6/. Customer costs per account will vary significantly based on landscape size.
>Admin Cost: Assume 5% mark-up for administration of this measure, including staff time to prepare materials, identify target customers using GIS, and conduct outreach.
>Savings: Industry assumptions are 20% savings for irrigation and 75% savings on outdoor leaks from installing water efficient landscaping and/or irrigation equipment. Sources for this value include: 2018 Landscape Rebate Water Savings Study from Valley Water and Southern Nevada Water Authority, 2024 Valley Water participation data. However, assuming double the savings from targeting high use accounts.
>Targets: Assumes 2% of top using CII & LS accounts are targeted annually over the next four years (until NFT compliance dates). Compliance must be in effect on the following dates: State buildings & local government agency properties - January 2027. CII properties - January 2028. HOA common areas - January 2029.

Results

Units: MG

Average Water Savings (mgd)	
	0.345131
Lifetime Savings - Present Value ($)	
Utility	$3,351,423
Community	$3,351,423
Lifetime Costs - Present Value ($)	
Utility	$9,269,237
Community	$26,924,927
Benefit to Cost Ratio	
Utility	0.36
Community	0.12
Cost of Savings per Unit Volume ($/mg)	
Utility	$2,372

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg gpd/acct
CI Irrigation	40.0%	426.8
INST Irrigation	40.0%	2,119.6
LS Irrigation	40.0%	2,669.9
CI External Leakage	150.0%	28.5
INST External Leakage	150.0%	132.5
LS External Leakage	150.0%	140.5

Targets

Target Method:	Percentage
% of Accts Targeted / yr	2.000%
Only Effects New Accts	☐

Costs

View: Utility Details

	Fixture Costs	Admin Costs	Util Total
2025	$2,222,094	$111,105	$2,333,199
2026	$2,239,988	$111,999	$2,351,987
2027	$2,257,881	$112,894	$2,370,775
2028	$2,275,775	$113,789	$2,389,564
2029	$0	$0	$0
2030	$0	$0	$0
2031	$0	$0	$0
2032	$0	$0	$0
2033	$0	$0	$0
2034	$0	$0	$0
2035	$0	$0	$0

Targets

View: Accounts

	CI	INST	LS	Total
2025	141	18	31	191
2026	142	18	32	192
2027	142	18	33	193
2028	143	18	33	194
2029	0	0	0	0
2030	0	0	0	0
2031	0	0	0	0
2032	0	0	0	0
2033	0	0	0	0
2034	0	0	0	0
2035	0	0	0	0

Water Savings

Units: mgd

	Total Savings (mgd)
2025	0.089340
2026	0.179592
2027	0.270757
2028	0.362835
2029	0.362835
2030	0.362835
2031	0.362835
2032	0.362835
2033	0.362835
2034	0.362835
2035	0.362835

Appendix D
Sacramento Water Forum Member Comments on Draft Plan Elements

From: Chris Brown <info@sacclimate.org>
Sent: Friday, May 30, 2025 4:37 PM
To: Michelle Maddaus <michelle@maddauswater.com>; William Granger <WGranger@cityofsacramento.org>; Brett Ewart <bewart@cityofsacramento.org>
Subject: Sierra Club comments of proposed changes to the city water conservation plan

William, Michele and Brett,

Thank you for meeting with me last Friday and for sharing the additional materials.

Here are some comments on behalf of the Sierra Club Motherlode Chapter.

The illustrations/questions about trees in a median strip with turf and raising the question of whether or not that was functional turf appears to be some level of confusion about what are turf water needs and trees' water needs and what the state law is intended to eliminate. For those median strips that include trees, the irrigation system should be changed to drip or bubbler systems. The turf can be replaced with low water use plants that also benefit from drip irrigation.

We think that all of the enhanced measures will likely result in some additional water savings. We especially like the Water Loss M25, and the mentions of partnerships in several of the measures.

The requirement that customers complete online water audits will most assuredly reduce participation, some for logistical issues of computer access, and some for concern about government collection of excessive amounts of data. That provision should be reconsidered.

We suggest adding to the program:

- More education on the benefits to plants of infrequent irrigation (deeper roots, and greater drought resiliency, and especially that mature trees need less frequent irrigation than other plants in landscape, especially turfgrass. While everyone can benefit from this, the most important audience are those who do not have automated irrigation systems. It is important from an environmental justice perspective not to focus only on those who can afford irrigation equipment.
- Implement a program to identify water users that are using excessive amounts of water (well above the mandated objectives) and do direct outreach to support those users in reducing excessive use through education and access to resources (i.e., rebates), as available.
- Develop landscape conversion educational materials and financial incentives to support climate ready landscapes with support of UC Davis Extension and Master Gardeners. This will have dual benefits of reducing urban heat island effects as well as reducing water consumption.
- Promote local native plants from the Sacramento area as they will require no additional water when established, and will provide important pollinator, insect and bird habitat, as well as maintain and beautify neighborhoods.
- Develop a high water use tier in the rate structure which is dedicated to paying for demand management measures. Design it so that those who use more than their "fair share" of the city's water budget target pay this tier. The logical nexus is that when all are using at or below their portion of the community wide target, there will be no need for the funding this tier generates.

We suggest adding a seat to the rate advisory committee for a member of the conservation advocacy community. As a standing committee the Rate Advisory Committee holds a lot of sway compared to community advocates who are only engaged when a rate proposal is made public.

We look forward to reviewing the draft water conservation plan when it is published later this year. We are pleased that the City continues to be a regional leader in water conservation efforts.

Chris Brown
Sierra Club othelode Chapter and Sacramento Climate Coalition

ECOS
ENVIRONMENTAL
COUNCIL
OF SACRAMENTO

CALIFORNIA NATIVE PLANT SOCIETY
Sacramento Valley Chapter

William Granger
Department of Utilities
Submitted via email to wgranger@cityofsacramento.org

May 30, 2025

RE: City of Sacramento Water Conservation Plan

Dear Mr. Granger,

The Environmental Council of Sacramento (ECOS) is a 501c3 non-profit corporation, a coalition of community-based organizations and individuals from throughout the Sacramento region that helps drive conversation and action for good planning.

California Native Plant Society (CNPS) is a non-profit environmental organization with more than 13,00013,000 members in 36 Chapters across California and Baja California, Mexico. CNPS's mission is to protect California's native plants and their natural habitats, today and into the future, through science, education, stewardship, gardening, and advocacy. CNPS's mission is to protect California's native plants and their natural habitats, today and into the future, through science, education, stewardship, gardening, and advocacy. We work closely with decision-makers, scientists, and local planners to advocate for well-informed policies, regulations, and land management practices. CNPS supports science-based, rational policies and actions, on the local, state, national, and international levels, that lead to the continued study and enjoyment of the state's botanical resources.

The ECOS Water Committee and Sacramento Valley Chapter of CNPS thank you and the Department of Utilities for the development of a strong Water Conservation Plan. Your ongoing and future strategies help to make important water-saving infrastructure available to all City residents. We also thank you for conducting a public meeting at the Water Forum and allowing us to provide input on the Plan. Please see our comments below:

- The presentation and subsequent discussion of nonfunctional turf seemed to indicate that exceptions might be given to turf areas with tree plantings. It is well understood that turf irrigation needs are not the same as irrigation necessary for trees. Replacing turf with local native plants or other deep rooted, low-water plantings accomplishes the objectives of lowering water use and promoting both healthy trees and the built environment, while also

eliminating the recurrent need to water turf. The city should proceed to actively promote removal of turf and its replacement with local native plants in all of the examples shown in the presentation.

- The presentation and discussion indicated that the city might not be fully aware of all of the available information about local native plants including their planting, care and maintenance, and where local native plants can be obtained. The Sacramento Valley Chapter of CNPS has a wealth of information on these topics. CNPS can provide extensive information on the local trees and shrubs that most benefit local insects, birds, and animals, as well as tried and tested experience regarding drought tolerance and maintenance needs for these plant species. Use of these native plants could provide plant selections numerous ecological benefits including habitat value, low maintenance needs, and carbon sequestration in addition to water conservation. The attached table provides information on locally native trees and shrubs that should be included on any preferred plant list the City uses as part of its landscape replacement program. CNPS has an additional plant list that has been developed with the input from local representatives of The Xerces Society for Invertebrate Conservation and The National Audubon Society which provides additional information on key local native plants that support our local ecology. CNPS's state organization has developed training programs for landscape professionals, landscape contractors and maintenance personnel. CNPS stands ready to meet with the City to discuss how it can assist in the City's efforts to implement the Water Conservation Plan especially with regard to turf and landscape conversion to local native plant landscapes. CNPS has been working to improve the supply of local native plants and would like to develop a partnership with water agencies and local landscape suppliers to increase the availability of these plants.

- The implementation of conservation programs aimed at reducing low-income customer landscape costs is important to CNPS. Much of the focus on landscape conversion has been on more affluent customers owing to the fact they have the resources to participate in rebate and incentive programs. CNPS would like to initiate discussions with the City to explore possible joint program efforts that can result in low-income single family and multifamily properties being able to benefit from a low water use, more affordable local native plant landscape.

- The discussion of landscape conversion also highlighted some difficulties in reaching landscape contractors and maintenance personnel to provide them with notice of City effort changes, informational resources, and training on effective conversion and maintenance practices for low water-use landscaping. We believe that a small grant or City-led focus group project with active landscape contractors and maintenance professionals would help to identify how to best communicate with such contractors and engage them in the City's landscape efficiency and replacement efforts. We would be pleased to participate with the City in the development of this type of outreach effort.

- The plan presentation included a discussion of the Utility Rate Advisory Commission and the role it will play in designing rates that both pay for the Conservation Program and help promote water conservation. ECOS is interested in learning more about the affiliations and populations

represented by the Advisory Commission and recommends that the Commission include representation of low-income and Disadvantaged Communities (DAC's), particularly for discussions of water rate setting.

- Concerns were raised regarding the burden that fixed rate costs may place on lower-income water users. The fact that there are common service needs that require higher water use-capable infrastructure (e.g., fire protection; standardized development requirements) was offered as part of the explanation for fixed components of all water customer rates. While understandable, we believe that further discussion of this issue is important to our understanding of how utility rates are established. With residential metering, State guidance on water use budgeting, and the wealth of experience the City staff have, it may be possible to assess fixed and variable water service costs in the most equitable fashion practicable. We would like to continue this discussion with the City.

- The Plan presented was short on details regarding what constitutes enhanced and augmented programs. We look forward to receiving more information on these program levels.

Thank you for your consideration. We hope to continue working with you through the implementation of the water conservation programs outlined in your Plan. Please contact us at the emails listed below for further discussion and collaboration on future programs.

Sincerely,

Ted Rauh
Chair of ECOS Water Committee
tnrauh@att.net

Lesley Hamamoto
President of the California Native Plant Society, Sacramento Valley Chapter
president@sacvalleyCNPS.org

Luz Lim
Policy Analyst of ECOS and Habitat 2020
luzlim@live.com

Appendix E Comments on the Draft City of Sacramento's Water Efficiency and Conservation Plan by Sierra Club representative to the Water Forum, received 2/23/26

Location	Comment	DOU Response to Comments
Page 11 Plan Objectives	Recommend including a conservation committee made up of community-based organizations, businesses, and water conservation advocacy organizations. These kinds of bodies have been shown to increase public support for water conservation and contribute to a creative culture of stewardship of water. Sacramento Water Utility had such a committee a number of years ago. This could be simply stated: Maintain a Community Conservation committee for regular input on the ongoing and future water conservation efforts.	The City will be communicating with outside entities and organizations as needed as they implement and refine the program. A standing committee was used in the past and it was determined that having short term task forces on specific topics were more effective for program refinement than a committee. The City will communicate with different groups which may include landscapers, property managers, leak experts or item needed, as different individuals or organizations would be best suited to provide the needed information or feedback.
Page 15 Re: the sentence "At the direction of the City, water demand projections developed in the 2023 Water Supply Master Plan (WSMP) matching consistency in demand projections,"	How did that make a difference in the results of the demand projections?	This comment was reviewed and the City used the forecast as a starting point for this project so that we were consistent with other previously reviewed and approved City planning efforts. The demand projections were from the 2023 Water Supply Master Plan as stated.
Page 30 Environmental Impacts "turf replacement programs may contribute to the heat island effect where areas with little to no landscaping suffer from increased temperatures."	Studies in the Sacramento region have shown that turf replacement which replaces turf with living low water use shrubs will reduce temperatures, not increase them. Proper program design can ensure that rebates are only offered for low water landscape plants, and public education can reinforce this point.	As noted on page 30, it does say that it "depends upon the required design elements." A sentence has been added to the report was added to clarify the current City Program. To help reduce any possible impacts, the existing City program requires replacing turfgrass with a living, water wise landscape that will cover at least a 60 percent of the former turf area.
Page 30 4.2.1 Environmental Impact: Program has environmental co-benefits. • 0 = Neutral environmental impact (i.e., allowing artificial turf to qualify for a landscape turf replacement program) text.	Allowing artificial turf should be a negative score for the environmental harms listed in the paragraph above it in the text. General comment on Scoring system: It is clear, and easy to understand, and except for the comment above I think this is a keeper.	The City reviewed this comment and has made a change to the table to state that Artificial Turf does have a negative impact on the environment and is also against the overall City goals. The text has been adjusted to remove artificial turf as an example.
Page 38 Section 4.3	What is a BCR?	BCR stands for Benefit Cost Ratio. A definition has been added on page 4 (Abbreviations and Acronyms) and on page 29 when first introducing the Utility Benefit to Cost Ratio.
Page 41-42 The elbows in the two graphs (figures 4.12 and 4.13) don't appear to have an explanation in that section.	What is the reason for the projected increase in water demands in ~2045?	It is explained near the top of page 41: "The increase in demand in 2045 is due to baseline demands aligning with the 2023 WSMP and 2020 UWMP demands per the City's direction for consistency between planning efforts." A sentence was added to explain the start year of 2017 was the first year that was not a declared water shortage.
Page 48 Graphs 5-7 and 5-8 are illustrative of the power of AMI on a very limited experience according to the text.	A more representative example would be a sample of the customers who have qualified for landscape conversion or irrigation rebates, and their before and after water use data. Recommend to include such an example.	The City has started to analyze data using AMI and published what has been done at this time. The City intends to hire a data analyst in the future to continue to analyze AMI data to inform customer programs.