

ANAHEIM PUBLIC UTILITIES

**CITY OF ANAHEIM
WATER USE EFFICIENCY MASTER PLAN**

FEBRUARY 2014



*MADDAUS
WATER
MANAGEMENT INC.*



Acknowledgment

The Water Use Efficiency Master Plan was made possible with the generous support of:



TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	6
2. INTRODUCTION	10
2.1 Project Background and Overview of the Anaheim Public Utilities' Water System	10
2.2 Purpose and Scope of Plan	11
2.3 Plan Development	12
3. ANALYSIS OF WATER DEMANDS	14
3.1 Production versus Consumption	14
3.2 Consumption by User Category	15
3.3 Demand Analysis	15
4. ALTERNATIVE WATER USE EFFICIENCY MEASURES	17
4.1 Water Use Efficiency Master Plan Objective and Approach	17
4.2 Potential New Water Use Efficiency Measures	17
4.3 Screening of Water Use Efficiency Measures	17
5. COMPARISON OF INDIVIDUAL WATER USE EFFICIENCY MEASURES	19
5.1 Water Use Efficiency Measures Evaluated in DSS Model	19
5.2 Perspectives on Benefits and Costs	23
5.3 Measure Assumptions	24
5.4 Comparison of Individual Measures	24
6. RESULTS OF WATER USE EFFICIENCY PROGRAM EVALUATION	27
6.1 Selection of Measures for Programs	27
6.2 Optional Water Use Efficiency Alternative Programs: A, B and C	27
7. STAFFING, BUDGETING, AND DATA MONITORING	32
7.1 Measure Selection Criteria and Process	32
7.2 Projected Water Savings	32
7.3 Estimated Implementation Staffing	32
7.4 Estimated Implementation Budget	33
7.5 Monitoring Progress	33
7.6 Water Use Reduction Evaluation	35
7.7 Opportunities, Partnerships and Stakeholder Group Participation	35
7.8 Recommended Next Steps	35
7.9 Conclusions	36
REFERENCES	37
APPENDIX A: KEY ASSUMPTIONS FOR THE DSS MODEL	39
A.1 Present Value Analysis and the Utility and Community Perspective	40
A.2 Present Value Parameters	40
A.3 Assumptions about Measure Costs	41
A.4 Assumptions about Measure Savings	41

A.5 Assumptions about Avoided Costs.....	41
APPENDIX B: WATER USE EFFICIENCY MEASURES CONSIDERED FOR EVALUATION	42
APPENDIX C: COMMUNITY OUTREACH PROGRAM.....	48
C.1 Background.....	48
C.2 Overview	48
C.3 Voluntary-Incentives Based Approach	49
C.4 Regional Coordination.....	50
C.5 Community Outreach Program	50
C.6 Communication Platforms.....	51
APPENDIX D: ENHANCED COMMUNITY OUTREACH PROGRAM AND FUNDING MECHANISMS	54
D.1 Enhanced Community Outreach Program	54
D.2 Grants and Other Funding Programs	55
D.3 Enhancing Social Media Use	58
APPENDIX E: WATER-ENERGY NEXUS	61
E.1 Water-Energy Programs	61
E.2 Water – Energy Projects.....	62
E.3 Funding Mechanisms.....	62
APPENDIX F: FEEDBACK FROM PUBLIC STAKEHOLDER MEETINGS	63
APPENDIX G: RESOLUTION AND ORDINANCES	69

FIGURES

Figure 3-1: Total Production vs. Total Consumption*	14
Figure 3-2: Consumption by User Group.....	15
Figure 6-1: Per Capita Water Savings with Different Program Options	29
Figure 6-2: Present Value of Utility Costs vs. Water Saved in 2040	31
Figure 7-1: Components of Tracking Tool Development	34
Figure D-2: Social Media Success	60

TABLES

Table 1-1: Elements of Selected Water Use Efficiency Program.....	8
Table 1-2: Per Capita Water Savings of Selected Water Use Efficiency Program	9
Table 5-1: New and Existing Water Use Efficiency Measure Descriptions.....	19
Table 5-2: Estimated Water Use Efficiency Measure Costs and Savings.....	26
Table 6-1: Comparison of Program Estimated Costs and Water Savings in 2040	30
Table A-1: List of Key Assumptions	39
Table B-1: Water Use Efficiency Measures	42
Table D-1: Quick Statistics of Existing Social Networking Channels.....	58
Table E-1: APU’s Report of Overall Water and Energy Savings	61

1. EXECUTIVE SUMMARY

The purpose of the Executive Summary is to briefly describe the Anaheim Public Utilities (APU) Water Use Efficiency Master Plan (Plan). The evaluation process and assumptions used to develop this Plan are included, as well as strategies for future implementation. The Plan outlines a set of feasible and cost-effective programs to expand APU's water use efficiency efforts to assure adequate future water supplies.

Key benefits of the Plan include:

- Bolstering APU's long-term water reliability through cost-effective water use efficiency measures;
- Helping reduce per capita water use to meet state mandated per capita consumption targets; and
- Benefits to the environment.

State Mandated Water Conservation

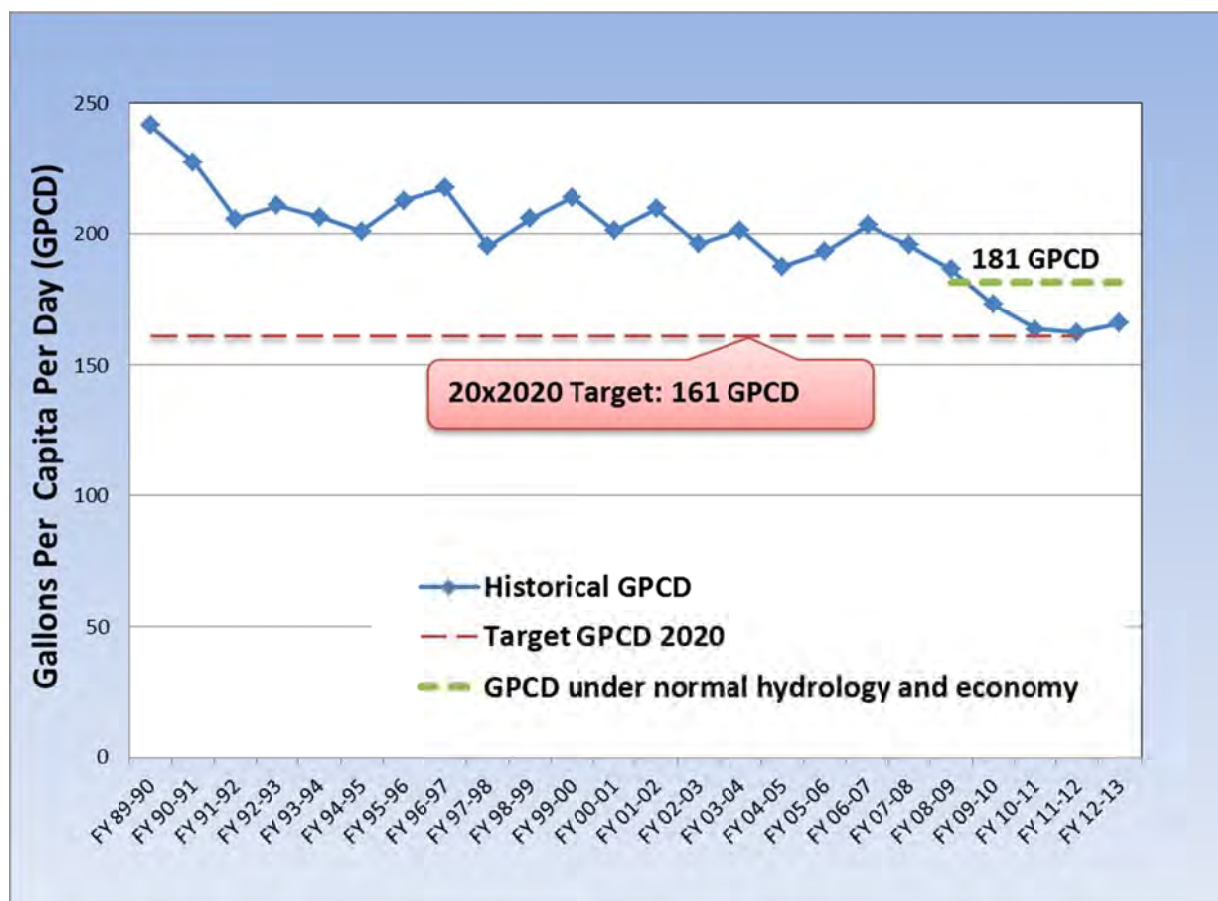
Senate Bill x7-7 (SBx7-7) or "The Water Conservation Act of 2009" was enacted to ensure California continues to have reliable water supplies, requiring urban water agencies to reduce per capita water use by 20% before December 31, 2020. The law establishes that the base daily per capita use be based on total gross water use, divided by the service area population. APU plans to use a combination of water use efficiency (WUE) measures and recycled water to help meet the per capita consumption water use targets.

Water Reduction Targets Methodology

The baseline of 201.6 gallons per capita per day (GPCD) was calculated by using a 10-year base period (fiscal year (FY) ending June 1996 -June 2005) average. Of four compliance methods, APU chose Option 1 – a simple 20% reduction from the baseline. As a result, APU's 2020 water use target is 161.2 GPCD¹. The APU per capita water use has had a general downward trend in the past several years due to a variety of factors including weather conditions and the economy. The water use in the past five years (FY 2008-2009 to FY 2012-2013) has averaged approximately 170 GPCD². The following chart also depicts the downward trend, and also shows Anaheim's approximate GPCD under "normal" weather and economic conditions.

¹ City of Anaheim 2010 Urban Water Management Plan Table 2-8 "Preferred Compliance Option and Water Use Targets" page 2-9.

² Population data is based on Center for Demographic Research (CDR) at CSU Fullerton. 2001 to 2010 are based on 2010 census. Numbers from the 2000s decade were revised by CDR in May 2012 to reflect the findings of the 2010 Census. Demand data provided by APU staff.



Plan Development Methodology

The process used to develop the Plan included analyzing water use efficiency measures and programs using the Least Cost Planning Water Demand Management Decision Support System Model (DSS Model). The evaluation includes measures directed at existing customers and measures addressing new development to help ensure that new and existing residential and business customers become increasingly more water efficient.

Table 1-1 shows the three program options, each comprised of various water use efficiency measures.

Table 1-1: Elements of Selected Water Use Efficiency Program

Conservation Programs and Measures Anaheim, California			
Measure Name	Program A	Program B	Program C
Water Loss Reduction Program		✓	✓
Residential Indoor/ Outdoor Water Use Surveys	✓	✓	✓
High Efficiency Washer (HECW) Rebates	✓	✓	✓
High Efficiency Toilet (HET) Rebates	✓	✓	✓
Rain Sensors Rebates			✓
Large Landscape Water Use Surveys	✓	✓	✓
Turf Removal- SF	✓	✓	✓
Turf Removal- MF and CII	✓	✓	✓
Weather Based Irrigation Controller Rebates	✓	✓	✓
Rotating Sprinkler Nozzle Rebates	✓	✓	✓
Soil Moisture Sensor Rebates			✓
CII Water Use Survey Program		✓	✓
Customized CII Incentive Program		✓	✓
Water Savings Incentive Program		✓	✓
Enhanced Water Savings School Incentives Program			✓
Outdoor Use Education and Training Programs	✓	✓	✓
Public Information Program	✓	✓	✓
School Education	✓	✓	✓
Customer Award Program		✓	✓
Promote Green Buildings		✓	✓

CII = Commercial, Industrial and Institutional SF = Single-family MF = Multi-family

Program A represents APU's existing set of measures (i.e., "status quo option"). **Program B** includes additional cost effective programs that could be added for greater water savings, targets compliance with the California Urban Water Conservation Council's Best Management Practices, incorporates APU customers' feedback on new programs, and represents the minimum set of measures needed to meet the state mandated water reduction target of 20% by the year 2020. **Program C** includes all the measures analyzed; including measures from Programs A and B.

Program B - Most Cost-Effective Option

A cost effective program is one with a Benefit-Cost Ratio greater than 1.0. All three programs evaluated are cheaper than \$967 per acre-foot (AF). This value of \$967/AF provided by APU staff represents the average cost of water supplies for the years 2012 to 2032, which includes purchasing treated water from Metropolitan Water District of Southern California (MWD) and Orange County Water District (OCWD), as well as APU's energy, treatment, and facilities improvement costs. The recommended Program B for APU has a water utility cost of \$508/AF as shown in Table 1-2.

Program B is designed to meet the USBR's grant agreement GPCD target of 23 GPCD when considering normalization of existing demand for weather and economy. Based on an analysis of the cost to APU to save water, Program B is the most cost-effective option. Moreover, the implementation of Program B will facilitate the

investment in water use efficiency programs essential for meeting SBx7-7 water reduction targets, and ensuring an adequate water supply for Anaheim. The associated per capita water savings and costs for the three programs are shown in Table 1-2.

Table 1-2: Per Capita Water Savings of Selected Water Use Efficiency Program

Long Term Conservation Per Capita Water Use Savings									
Program	GPCD savings in 2015	GPCD savings in 2020	GPCD savings in 2025	GPCD savings in 2030	GPCD savings in 2035	GPCD savings in 2040	Utility Benefit to Cost Ratio	Average Annual Program Cost (2014-2018)	Utility Cost of Water Saved (\$/AF)
Per Capita Water Savings from the Plumbing Code	1.12	3.12	5.56	7.99	9.56	10.73	N/A	N/A	N/A
Per Capita Water Savings from the Plumbing Code and Program A "Existing Program" 11 measures	2.50	4.91	7.42	9.87	11.51	12.70	1.20	\$648,200	\$522
Per Capita Water Savings from the Plumbing Code and Program B - 16 measures	2.66	5.37	8.02	10.61	12.37	13.68	1.21	\$867,000	\$508
Per Capita Water Savings from the Plumbing Code and Program C - 20 measures	2.69	5.53	8.27	10.85	12.61	13.92	1.16	\$975,900	\$528

GPCD = gallons per capita per day

Program B Implementation Plan

The most effective course of action is to continue to remain flexible and review per capita water use on an annual basis. Due to the current and future demand variability, it is recommended, to invest in water use efficiency and anticipate the rebound of water demands to “normal” levels experienced before the economic downturn.

Therefore, successful implementation of the Plan will require increased effort and commitment of resources on the part of APU. New water use efficiency measures (identified in Program B) will need to be employed, and existing measures will require higher participation rates to achieve water reduction goals. Recommendations to assist with implementation of Program B:

- **Budget:** The recommended Program B will cost a total of \$867,000 per year in customer rebates, marketing activities, and staff time to implement these programs. APU will continue to seek associated federal, state, and local grant funding and partner with customers and other agencies whenever appropriate and feasible.
- **Prioritize Measures for Implementation:** Measures that are relatively easy to operate with limited staff and those that contribute the most to meeting water saving targets are given the highest priority for implementation.
- **Work Plan:** Prepare an annual work plan for each year in concert with the budget planning process. This should include reviewing the goals and progress towards achieving the mandated 2020 goal (and CUWCC BMPs), customer participation levels; actual expenditures and cost per AF saved, and adjusting program parameters, budget, marketing plans, and other inputs to ensure successful implementation.
- **Program Data Management / Tracking:** Select a method to manage and measure participation, expenditures, results, and other data to gauge successes and areas that need improvement.

2. INTRODUCTION

This section provides an overview of the City of Anaheim, APU's water system, describes the purpose and scope of the Plan, and provides a project history of the steps used to complete the Plan.

2.1 Project Background and Overview of the Anaheim Public Utilities' Water System

Situated between Los Angeles and San Diego, the City of Anaheim (City) in Orange County was first incorporated by the state legislature in 1870. Anaheim is one of the nation's premier municipalities and is one of California's most populous cities. A bustling hub of industry, tourism, professional sports, and convention activities, Anaheim attracts approximately 20 million visitors (40 million in all of Orange County) each year.

The City operates under a Charter with a Council-Manager form of government. The City Council is responsible for determining policy for the City as well as citizen appointments to the seven-member Public Utilities Board. The APU general manager is responsible for all utility operations and reports to the City manager. The City commenced water operations in 1879 and metering of customers began in 1890. Wells were the sole source of water for the City until the 1940's when supplemental water from the Colorado River was made available by Metropolitan Water District of Southern California (MWD) via the Colorado River Aqueduct.

APU currently serves water to approximately 355,000 people covering an area of 49 square miles. APU's service area excludes several small pockets within the City limits served by other water purveyors and includes some areas beyond city limits. Service area population is expected to increase by about 15% between 2010 and 2035 to approximately 410,000 people. Much of the growth is attributed to new development and redevelopment.

In Fiscal Year³ 2012-13, APU's existing water supply consisted of approximately 68% groundwater and 32% imported water from MWD. Current water demand is approximately 66,000 acre-feet per year (AFY), which is projected to increase to 77,700 AFY in 2035⁴. In addition, Anaheim provides a portion of its demand with recycled water. The City recently constructed a Water Sustainability Campus adjacent to City Hall. In its initial phase, the facility can provide up to 50 AFY of recycled water for landscape irrigation and toilet flushing. The facility can be expanded to produce up to 110 AFY of recycled water.

Anaheim also participates in regional water recycling through the Groundwater Replenishment System (GWRS) operated by the Orange County Water District (OCWD). In 2011, the City started purchasing the GWRS water for use at its newly constructed Canyon Power Plant to control and/or reduce air emissions and for landscape irrigation. GWRS water will also be used for cooling tower make up water, toilet flushing, and landscape irrigation at the Anaheim Regional Transportation Intermodal Center, which is currently under construction.

APU has also developed several recycled water project alternatives through its 2011 Citywide Water Recycling Facilities Plan. The study analyzed recycled/non-potable water from various sources for potential reuse opportunities throughout the City, and defined and prioritized feasible water recycling projects. The potential recycled water users include parks, golf courses, school yards, homeowners associations, and freeway/street landscaping. In 2012, a City feasibility study of delivering GWRS recycled water to the Anaheim Resort and Platinum Triangle area concluded that the recycled water could be used for cooling towers make up water,

³ APU's Fiscal Year is from July 1 through June 30th.

⁴ City of Anaheim 2010 Urban Water Management Plan Table 2-9 Current and Projected Water Demands (AFY), p. 2-10.

commercial laundry use, toilet flushing in new dual plumbing buildings, and for irrigation in parks, schools, and streetscape/landscape areas.

Over the years, APU has continued to strengthen its water use efficiency expertise through its participation in various water conservation initiatives. In 1991, Anaheim demonstrated its commitment to promoting water conservation by becoming one of the original signatories to the California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding. APU actively participates in various MWD rebate programs and has developed and implemented various local water use efficiency programs; both on its own and in partnership with the Municipal Water District of Orange County (MWDOC). In response to the 2007-2009 drought, the Anaheim City Council approved various policy changes, including the adoption of Resolution No. 2008-154 (Appendix G) to implement voluntary water use efficiency measures, and the amendment of its Water Reduction Provisions and Landscape Water Efficiency ordinances (Appendix G).

Elevating the importance of implementing water use efficiency programs and measures throughout California resulted from the passage of "Water Conservation Act of 2009" or Senate Bill (SBx7-7). The bill established a statewide goal of 20% reduction in urban water use by the year 2020, thereby making water use efficiency an even higher priority for the City.

Hence, to facilitate the development of this Plan, APU submitted an application for grant funds to the U.S. Bureau of Reclamation (USBR); in September 2011, APU was awarded a \$72,000 grant. This Plan will set the framework to achieve state-mandated water reduction targets and, in parallel, achieve the water savings goal per the USBR's grant agreement. Furthermore, the Plan aligns with APU's overall water supply portfolio to ensure customers are provided with a cost-effective, long-term reliable water supply.

2.2 Purpose and Scope of Plan

The purpose of this Plan is to identify and implement cost-effective water use efficiency strategies that will further reduce water consumption within APU's service territory. The Plan identifies a number of cost-effective, water use efficiency projects and programs that businesses, residents, and the City can implement over the short-term (2014-2019) to reach the mandated 2020 per capita water consumption goal, as well as long-term (2020 and beyond). Key benchmarks for the proposed strategies include: 1) cost-effectiveness, 2) compliance with CUWCC Best Management Practices (BMPs), and 3) ability to help achieve the statewide mandate to reduce per capita water use by 20% by 2020.

The following describes the scope of the Plan:

1. Evaluate water use efficiency program options that, if implemented in a widespread manner across the service area, could result in significant reductions in per capita water usage. A cost-benefit analysis was to be conducted on the range of options to help identify and rank water use efficiency programs and projects in order to develop a flexible portfolio to best meet water savings goal. Potential water savings from the individual programs and combinations thereof were determined to assess their per capita water use reduction potential.
2. Analyze the City's past water demand from 1985 to present, taking into consideration population, housing, and employment data, as well as weather conditions, lingering drought impacts, and other key economic indicators, such as housing statistics. Work with APU staff to generate a forecast model and scenario-based water demand results through 2040, with and without additional water use efficiency measures.

3. Develop a framework for a recognition/reward program for residents and businesses who implement practices that result in water savings. The reward program will target customers who have excelled at achieving significant water savings and set an example of water use efficiency practices.
4. Evaluate APU's current public outreach program and provide suggestions for additional marketing efforts.

2.3 Plan Development

The Plan was prepared by the Project Team consisting of Maddaus Water Management (MWM) and ARCADIS working in close collaboration with APU staff. The Plan development included review of past documentation and data analyses previously performed. APU provided data and information listed below:

- Prior year(s) water use data on a monthly basis for the different classes of water users.
- Avoided cost for the water system.
- Complete descriptions of past, present, and proposed water use efficiency programs including historic annual participation rates derived from reports filed with the CUWCC.
- Planning documents including:
 - o Anaheim's 2010 Urban Water Management Plan
 - o Anaheim General Plan
 - o Metropolitan's 2010 Integrated Resources Plan
 - o Metropolitan's 2010 Long Term Water Use Efficiency Plan
 - o State's 20x2020 Water Use Efficiency Plan
 - o SCAG Sustainable Communities Strategy and Compass Blueprint
 - o Land Use Data
- Climate conditions including temperature, rainfall, and reference evaporation rate.
- Current water rate structure and any projected changes.
- Historical and projected water system service area population, employment, housing data and growth projections through the year 2040 provided by MWD staff.
- Water use efficiency related ordinances (e.g., water waste and landscape).
- Customer characteristics and data needed to characterize water use efficiency measures such as the number of facilities or businesses of a particular type.

Project Timeline:

May - June 2012

- MWM selected to prepare Water Use Efficiency Master Plan.
- Kick off Meeting and data request submitted.

June - December 2012

- Data collection and analysis from APU.
- Project Team conducts literature review.
- Analyzed the historical water use using detailed econometric analysis

January – August 2013

- MWM worked with APU staff to use econometric analysis information to develop demand projection and ran demand scenarios in the Least Cost Planning Model Decision Support System (DSS Model).

- Prepared measure list for review. Then held a public workshop for input into the planning effort including a request for input for additional ideas for new and innovative water use efficiency measures.
- APU reviewed and finalized list of water use efficiency measures for analysis with input from MWD, MWDOC and customer feedback.

September 2013 - January 2014

- MWM worked directly with APU staff to design individual water use efficiency measures (program start and end date, assumed participation rates, incentive and utility cost values, etc.).
- Reviewed marketing programs/outreach program.
- APU held four in person meetings with various stakeholder groups to obtain feedback on proposed water use efficiency measures
- Reviewed potential grant funding, financing mechanisms and other funding opportunities.

January – February 2014

- Set up and calibrated a DSS Model to evaluate water savings, costs and benefits from potential water use efficiency measures.
- Completed Draft Water Use Efficiency Master Plan.
- Finalized Water Use Efficiency Master Plan.
- Water Use Efficiency Master Plan will be presented to the APU Board in spring 2014.

In summary, the Plan has been a thorough data collection/evaluation process of various statistical data, reports, existing and new water use efficiency efforts, and customer input within the context of APU's goals and resources.

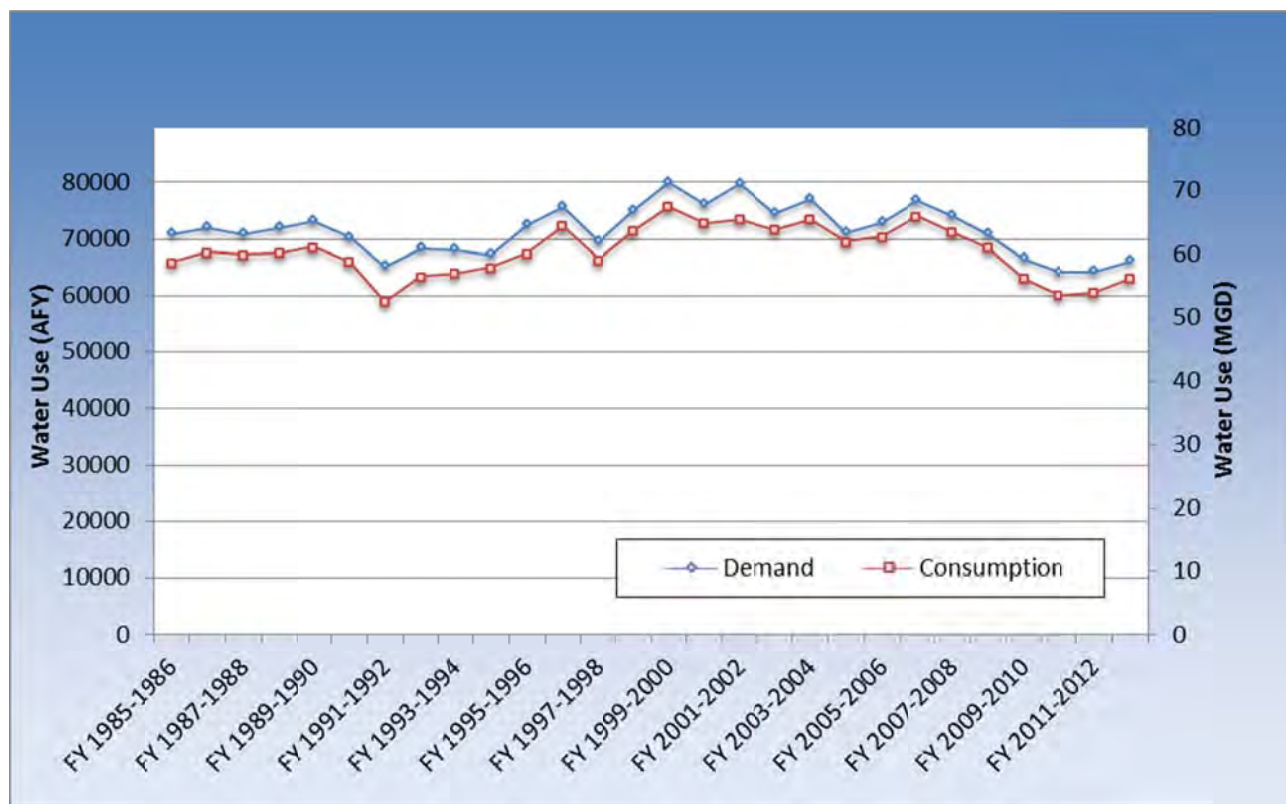
3. ANALYSIS OF WATER DEMANDS

Historical water use patterns were analyzed based on water demand and consumption data provided by APU for the period 1985 through 2012. For the regression analysis, ten years of monthly water consumption and demand were analyzed (years 2000 to 2010) to derive demand equations and average demand factors. Data from residential and commercial customers was analyzed separately. Residential water use was broken down into single-family and multi-family categories. Other non-residential categories of use were analyzed together as commercial/institutional/industrial customer use.

3.1 Demand versus Consumption

Total water demand and consumption (billed potable water) data were compared over the period 1985 to 2013. Figure 3-1 illustrates the total system demand versus total consumption for APU's service area. Water demand is the total water supply fed into the system and was measured at their respective sources. Water consumption data was measured at the customer meters. The difference between the demand and consumption is the non-revenue water. Note the downward trend that began in 2007 and continued to 2013, due to a variety of factors including the economy, weather, demographic changes, and water rate increases.

Figure 3-1: Total Demand vs. Total Consumption*



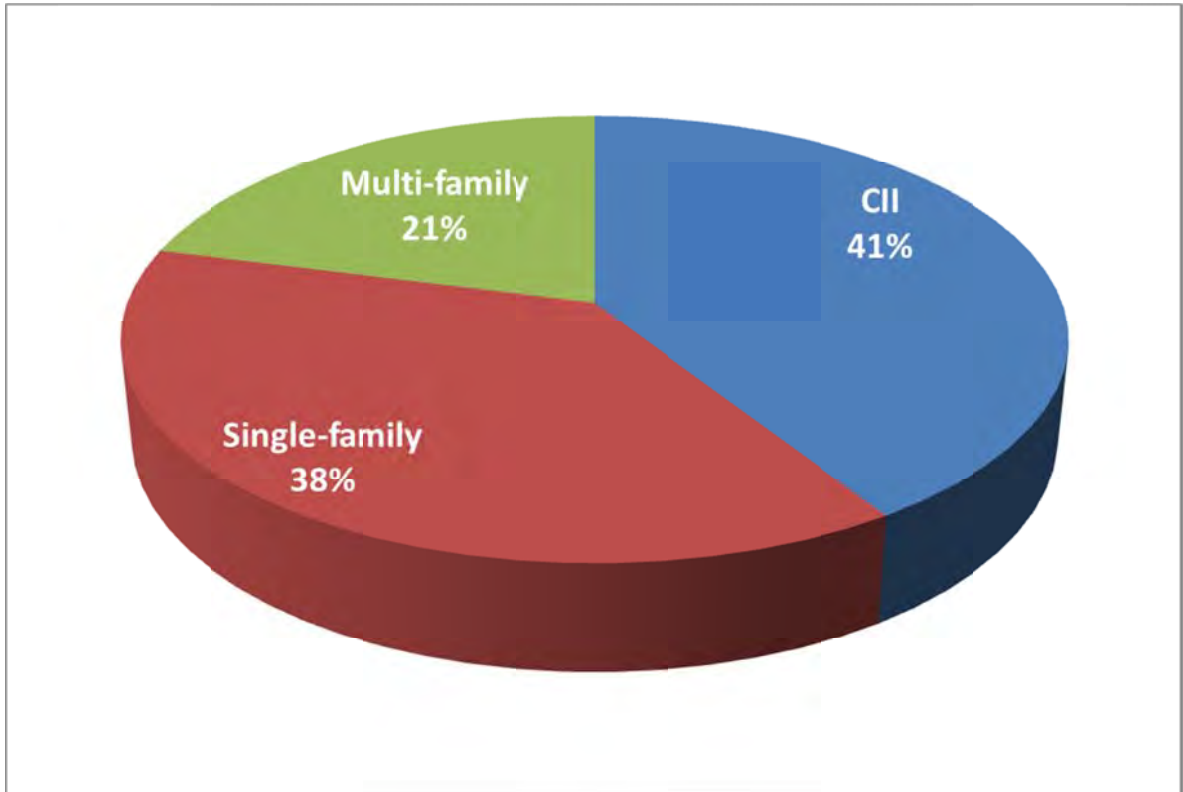
*Based on City provided data. The above figure only includes potable water; it does not include non-potable groundwater for Dad Miller Golf Course irrigation and recycled water.

3.2 Consumption by User Category

This Plan has organized users into single-family residential (SF), multi-family residential (MF), and commercial/institutional/industrial (CII). Single-family residences and CII are the largest categories of water users, each consuming approximately 40% the water consumed in the service territory, as shown in Figure 3-2. The CII sector includes approximately 20 million visitors per year to Anaheim due to its world-famous Disneyland Resort, the Anaheim Convention Center (LEED-certified and the largest on the west coast), Angels Stadium, Honda Center, and other entertainment and hotel venues. It is anticipated that per capita water use will increase in the future as the APU customers recover from the economy and recent drought periods.

Figure 3-2: Consumption by User Group

2000 to 2010



3.3 Demand Analysis

Many U.S. water utilities in addition to APU are under intense pressure to reduce consumption. This is due to hydrologic deficits, fish protection legislation, and/or water use reduction targets set by government. Droughts and recessions have also impacted revenues creating challenges in maintaining a reliable, high quality water supply at the lowest cost. As a result, specifically in urban areas, implementing water use efficiency programs has proven to be the most cost-effective way in meeting demands and managing rising water production costs.

The Plan was greatly enhanced by utilizing a Microsoft Excel-based demand forecast tool (DSS Model). The DSS Model incorporates historical water demands for Anaheim, and incorporates the effects of economy, weather, and water rates parameters on forecasted water demands.

In addition, the DSS Model was used to develop water conservation program needs. The quantification of the above items allows APU better plan for the future for both water demands and conservation programs.

APU can now utilize statistical analysis along with the DSS Model to enhance water resources planning. Water demands projections were run for seven possible future situations including:

- Normal Year
- Wet Year
- Dry Year
- Bad Economy 5 Years
- Bad Economy, Wet Year
- Rebound from Bad Economy
- Good Economy

The benefit of running multiple demand scenarios is to create a “range” of demands using the best available data. Knowledge of a range of demands allows APU to better plan for: (a) financial stability; (b) water capital infrastructure needs; and (c) investments in water use efficiency programs to ensure conservation targets are met. Overall, this additional information provides APU a better understanding of the overall range in per capita water use, which not only assists with demand projections, but also future water savings quantification.

The conservation analysis in this report used the rebound from bad economy scenario as a basis for calculations as it appeared to be the most probable scenario at the time this Plan was published.

4. ALTERNATIVE WATER USE EFFICIENCY MEASURES

In order to develop a Plan that would result in the greatest ease and efficiency of program administration, the lowest cost of implementation, and the greatest water savings, proposed measures were screened by APU staff, incorporating information from MWD, MWDOC, and APU customers. The screening reviewed existing implementation methods, and new, additional water use efficiency measures. Based on the results of the screening process, APU identified 20 measures for further evaluation.

4.1 Water Use Efficiency Master Plan Objective and Approach

One of the main goals of the Plan is to reduce per capita water use. One option to accomplish this goal would be to add new measures to existing programs. For example, new technologies enable customers to be more efficient with their water use without requiring major behavior changes.

Experience by many utilities has shown there is a reasonable limit to how many measures can be feasibly implemented at one time. Programs that consist of a large number of measures are historically 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 “living” process where new opportunities may be adopted as new technologies become available over time. Program timelines can also be adjusted, but with the recognition that doing so will impact the savings objectives.

4.2 Potential New Water Use Efficiency Measures

New measures were designed with an implementation schedule reflecting dates sometime in the future when APU might begin such programs.

Consultants and APU staff reviewed APU’s existing water use efficiency program, identified current and new measures that may be appropriate for Anaheim’s customer base, and screened these measures to develop a short-list for a detailed benefit-cost analysis. Table 5-1 includes 20 potential water use efficiency measures in four customer categories:

- All Customers
- Residential
- Commercial
- Distribution System (System)

The table includes measures, devices and programs (e.g., direct install high efficiency toilets) that can be used to achieve water use efficiency, methods through which the device or program will be implemented and what distribution method, or mechanism, can be used to activate the device or program. The list of potential measures was drawn from MWM and APU’s general experience and review of local water agencies’ water use efficiency programs.

4.3 Screening of Water Use Efficiency Measures

A screening process was undertaken to reduce the number of new measures to be considered to a more manageable number and to eliminate measures not well suited for APU. The result of this process was a short-list of measures for further evaluation using water savings analysis and benefit-cost analysis with the DSS Model.

This evaluation was specific to the water use characteristics, economies of scale, demographics, and other factors that are unique to APU.

Qualitative Criteria

The screening criteria included:

- **Technology/Market Maturity** – Refers to whether the technology needed to implement the water use efficiency measure, such as an irrigation control device, is commercially available and supported by the local service industry. A measure was scored high if the technology was widely available in the service area and scored low or eliminated if the technology was not commercially available or not supported by the local service industry.
- **Service Area Match** – Refers to whether the measure or related technology is appropriate for the area’s climate, building stock, and lifestyle. For example, promoting native and/or water efficient landscaping may not be appropriate where water use analysis indicates little outdoor irrigation. Thus, a measure scored low in this category if it was not well suited for the area’s characteristics and could not save water. A measure scored high in this criterion if it was well suited for the area and could save water.
- **Customer Acceptance/Equity** – Refers to whether retail customers within the service area would be willing to implement and accept the water use efficiency measures. For example, would retail customers attend homeowner irrigation classes and implement lessons learned from these classes? If not, then the water savings associated with this measure would not be achieved and a measure with this characteristic would score low for this criterion. This criterion also considers retail customer equity where one category of retail customers receives benefit while another pays the costs without receiving benefits. Retail customer acceptance may be based on:
 - convenience;
 - economics;
 - perceived fairness; and/or
 - aesthetics.

Based on the above criteria, as well as input from other interested parties, APU staff decided if a measure was a “Yes” or “No”. Measures with a “No” were eliminated from further consideration, while those with a “Yes” passed into the next evaluation phase: cost-effectiveness analysis using the DSS Model.

5. COMPARISON OF INDIVIDUAL WATER USE EFFICIENCY MEASURES

5.1 Water Use Efficiency Measures Evaluated in DSS Model

Table 5-1 presented below defines the measures that were analyzed for possible inclusion into the Plan.

Table 5-1: New and Existing Water Use Efficiency Measure Descriptions

Measure Name	New or Existing	Description
Water Loss Reduction Program	New	Program will conduct an annual audit of the water system infrastructure and address water loss issues. Goal would be to lower the Infrastructure Leakage Index (ILI) and non-revenue water every year by a pre-determined amount based on cost-effectiveness. These programs typically pay for themselves based on savings in operational costs. Saved rate revenue can be directed more to system repairs/replacement and other costs. Over the past 10 years, APU's annual water losses have ranged from 2.6% to 6.5%.
Residential Indoor/ Outdoor Water Use Surveys	Existing	Program will provide indoor/outdoor water use surveys for existing single family and multi-family residential customers (4 units or more). Target those with high water use and provide a customized report to owner. Anaheim currently provides residential customers with free indoor and outdoor water use surveys through its Home Utility Check-Up Program. Rebates for water saving devices are offered through MWD's SoCal Water\$mart program. APU is also eligible for assistance from MWD's Member Agency Allocation Funding to implement this program.
High Efficiency Washer (HECW) Rebates	Existing (MWD's SoCal Water\$mart)	Program will provide rebates for the installation of HECWs with a water factor of 4.0 or less. This is consistent with MWD rebate criteria. Rebate amounts would reflect the incremental purchase cost and will range from \$80-135, varying with the water factor of new machines. Rebates currently offered to residential customers through MWD's SoCal Water\$mart program. HECWs also qualify for Gas Company rebates of \$35 or \$50. HECWs must meet current minimum ENERGY STAR standards to receive a \$35 rebate and must have a Modified Energy Factor (MEF) of 2.4 or greater and a water factor of 4.0 or less to receive a \$50 rebate. In FY13/14, MWD temporarily increased the rebate amount to \$110 from \$85 due to grant funding from the U.S. Dept. of Interior (effective while funding available). Total potential combined rebate value for customers is \$145/\$160 (\$110-MWD, \$35/\$50-Gas Co.)
High Efficiency Toilet (HET) Rebates	Existing (MWD's SoCal Water\$mart)	Program will provide a rebate for the installation of any toilet flushing at 1.28 gallons per flush (gpf) or less and that includes dual flush technology. Rebate amounts would reflect the incremental purchase cost. MWD is currently offering a \$50 toilet rebate to residential customers through its SoCal Water\$mart program. The incentive program will end in June 30,

Measure Name	New or Existing	Description
		2014. Plumbing standard changes (SB 407), effective January 2014, requires multi-family and commercial properties to replace toilets that use more than 1.6 gpf (and urinals that use more than 1.0 gpf) with more efficient models by 2019. In 2014, MWD is offering the following rebates: •SF HET - \$50 •MF HET - \$50 •CII HET - Rebate for matching bowls & tanks - \$100 •CII HET - Rebates for matching bowls & flushometer valves - \$100
Rain Sensors Rebates	New	Program will provide a rebate or free rain sensor shut-off device for existing irrigation controllers. A rain sensor is designed to halt irrigation in response to rainfall. This measure is most effective in areas with intermittent rain in peak watering seasons. APU is interested in offering this program because it is practical to implement for customers by using a wireless version, and is particularly cost effective.
Large Landscape Water Use Surveys	Existing (MWD's Large Landscape Surveys)	All public and private irrigators of large landscapes, including residential and commercial, would be eligible for free landscape water surveys. Customers with high water use would be targeted and provided a customized report. In February 2010, APU began offering a Large Landscape Water Use Survey Program. MWD's Large Landscape Surveys include irrigation system evaluation, development of water budget and irrigation schedule, and survey report. Incentives are limited to the full cost of the survey; no restriction on application for additional landscape device rebates. Project information is required to redeem the \$200 per acre rebate.
Turf Removal-SF	Existing (MWD's SoCal Water\$mart)	Existing program provides a per square foot incentive to remove turf and replace with low water use plants, hardscape or artificial turf. In FY 13/14 MWD's turf removal incentive is \$1.00 per square foot. APU is proposing to enhance MWD's turf removal incentive and provide \$2 per square foot to all Utility customers. At least 250 sq. ft. of turf must be removed. Projects less than 250 sq. ft. only qualify if turf is completely eliminated. There is no maximum.
Turf Removal-MF and CII	Existing (MWD's SoCal Water\$mart)	Existing program provides a per square foot incentive to remove turf and replace with low water use plants, hardscape or artificial turf. In FY 13/14 MWD's turf removal incentive is \$1.00 per square foot. APU is proposing to enhance MWD's turf removal incentive and provide \$2 per square foot to all Utility customers. At least 250 sq. ft. of turf must be removed. Projects less than 250 sq. ft. only qualify if turf is completely eliminated. There is no maximum.
Weather Based Irrigation Controller	Existing (MWD's SoCal Water\$mart)	Existing program provides a per station rebate for the purchase of a WBIC. The WBICs have on-site weather sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly.

Measure Name	New or Existing	Description
(WBIC) Rebates		Rebates are currently offered to customers through MWD's SoCal Water\$mart Program. Residential rebates are currently \$80 per account for less than one irrigated acre or \$25 per station for one irrigated acre or larger. CII accounts receive \$25 per station.
Rotating Sprinkler Nozzle Rebates	Existing (MWD's SoCal Water\$mart)	Existing program provides rebates to replace standard spray sprinkler nozzles with rotating nozzles that have lower application rates. Residential nozzles typically range from \$3 to \$7 per nozzle, while CII nozzle unit costs go up to \$30. Rebates are currently offered to customers through MWD's SoCal Water\$mart Program. Residential rebates are currently \$4 per nozzle with minimum purchase of 15 per home. CII rebates for pop-up spray heads retrofits are currently \$4 per nozzle with minimum purchase of 15 per site. Large rotary nozzles rebates are \$13 per set. Minimum 8 sets (2 each) per site required.
Soil Moisture Sensor System (SMSS) Rebates	Existing (MWD's SoCal Water\$mart)	Existing program offers a SMSS rebate to assist customers with monitoring the level of moisture in the soil, and halts irrigation if the soil is wet or permits irrigation if the soil is dry. FY 13/14 MWD's SoCal Water\$mart SMSS incentive is \$80 for less than one irrigated acre and \$25/station for one irrigated acre or larger.
CII Water Use Survey Program	Existing (MWD's SoCal Water\$mart)	All CII water customers would be offered a free water use survey that would evaluate business practices and identify opportunities to save water and money. The surveys would be offered to all CII water users such as hotels, restaurants, commercial properties, and schools. The survey would identify inefficient equipment, recommend replacement equipment, calculate potential water savings, and identify available rebates. Equipment would include x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray rinse valves, replace once through cooling, and add conductivity meters on cooling towers. MWD's SoCal Water\$mart Program offers rebates for various devices. Anaheim offered the CII Water Use Survey Program in the past, but eliminated it due to budget reductions. APU is interested in reinstating this program to also comply with the CUWCC BMPs.
Customized CII Incentive Program	New (APU specific)	After the free water use survey has been completed on site, APU will analyze the recommendations provided in the report with the customer. APU staff will also provide assistance with completing rebate applications. Rebates may include such items as x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray rinse valves, replace once through cooling, and add conductivity meters on cooling towers. APU may consider offering customized incentives for water-saving measures that are not funded under MWD's SoCal Water\$mart Program or to supplement existing incentives in order to make the water use efficiency project cost feasible for the customer. The incentives would be based on actual, proven water savings resulting from implementing the measures.

Measure Name	New or Existing	Description
Water Savings Incentive Program	Existing (MWD's Water Savings Incentive Program)	Identify projects and/or customers that may qualify for MWD's Water Savings Incentive Program (WSIP). This program provides financial incentives for customized water efficiency projects including: • Installation of commercial or industrial high-efficiency equipment. • Industrial process improvements. • Agricultural and landscape water efficiency improvements. • Water management services. The program is open to all CII, agricultural, and large landscape customers with qualifying projects within MWD's service area.
Enhanced Water Savings School Incentives Program	Existing (MWD Public Agency Landscape Program)	Program will provide schools enhanced financial incentives to replace indoor fixtures and upgrade landscape irrigation systems. In FY 13/14, MWD launched the Public Agency Landscape Program to provide up-front, enhanced incentives for public agencies to install water-efficient landscape devices. This program will run through June 30, 2016. In 2014, MWD is offering the following rebates: • Weather-based or central computer irrigation controller - \$40 per station. • Large rotary nozzles - \$13 per set (minimum 8 sets per application). • Rotating nozzles for pop-up spray head retrofits - \$6 per nozzle (minimum 15 nozzles per site). APU will continue to help local public schools maximize Proposition 39 funds (as described in Appendix D) for water use efficiency projects. Assistance will include technical assistance in identifying areas for possible water savings, calculating the potential savings, and identifying other funding opportunities.
Outdoor Use Education and Training Programs	Existing (APU specific)	Organize and sponsor a series of educational workshops for educating homeowners in efficient landscaping and irrigation principles. Utilize guest speakers, showcase California Friendly landscaping gardens, and offer incentives, such as a free drought-tolerant plant coupon. This program can include a bilingual certification for local irrigation professionals. This certification program resulted from recommendations by homeowners associations and landscape professionals who attended one of the stakeholder meetings held to obtain customer feedback on the proposed measures. APU currently offers a landscape workshop series to residents. In FY 13/14, three classes will be offered at the Downtown Community Center in addition to one-hour Edible Gardening Q&A sessions at four community gardens. Online classes are also available through MWD's website. The goal is to raise awareness of watering practices, and demonstrate that using less water will not interfere with keeping landscapes green and healthy. Staff will also coordinate, when possible, with the Public Works Department's free mulch/compost program and other Anaheim "Green" events or learning opportunities.

Measure Name	New or Existing	Description
Public Information Program	Existing	Public education is used to raise awareness of water use efficiency measures available to customers. Anaheim is maintaining a voluntary, incentive-based approach. Programs include: •New outreach campaigns - The current campaign "Let's Do Our Part" emphasizes the importance of Anaheim doing its part to resolve the State's current water crisis. •Marketing tools - Promote messaging through bill inserts, printed educational material, poster contests, speakers to community groups, landscape workshops, 3-1-1 hotline, website, social media (Facebook), how-to landscaping videos, radio and television time, and signage at demonstration gardens. Past efforts include, the Water wise Garden at Amtrak Station, Water Sustainability Campus, Tiger Woods Learning Center, and Energy Field. •Speakers bureau/ Event participation - Conduct presentations at Neighborhood Council and homeowners association board meetings, Farmer's Market booth, special events, etc.
School Education	Existing (MWDOC and Orange County Department of Education)	APU works with local school districts and nonprofits (Discovery Science Center, Inside the Outdoors, Founder's Park, Boys & Girls Club, and the Community Services Department, etc.) to develop water use efficiency classroom curriculum and programs. Existing programs are offered through contracts with MWDOC and the Inside the Outdoors. APU also participates in the Orange County's Children's Water Education Festival, MWD's poster contest and Solar Cup. Additional student activities include student video contests, Kidsville ads, and sponsorship of the Library Summer Reading Club.
Customer Award Program	New (APU specific)	An annual awards program for residences that significantly reduce water use. Homeowners would receive a plaque or certificate of recognition, such as the "Beautiful Landscape" community award. A past example of a similar program is the Save Our Water, "Real People, Real Savings" campaign. APU may also consider partnering with the non-profit "Anaheim Beautiful". A separate program would recognize CII customers that have achieved high water savings by improving their business processes or investing in water efficient irrigation/landscape devices (i.e., HOAs, schools, businesses, etc.).
Promote Green Buildings	New (APU specific)	The Orange County Chapter of the U.S. Green Building Council awarded the City of Anaheim 2011/12 top "Eco-City" in Orange County. APU staff would work with local Green Building associations, developers, designers, vendors to promote incorporating water efficiency into building design. APU may consider partnering with the City's Planning Department to identify projects and distribute outreach material, as well as co-sponsor an award program.

5.2 Perspectives on Benefits and Costs

The determination of the economic feasibility of water use efficiency programs involves comparing the costs of the programs to the benefits provided. This analysis was performed using the Least Cost Planning Decision Support System (DSS) Model developed by MWM. The DSS Model has received the endorsement of the CUWCC, and calculates savings at the end-use level; for example, the model

determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. Additional detail on the DSS Model and assumptions can be found in Appendix A.

5.3 Measure Assumptions

Appendix B includes the assumptions used in the DSS Model to evaluate the water use efficiency measures selected by APU. Assumptions regarding the following variables were made for each measure:

- Targeted Water User Group End Use – Water user group (e.g., single-family residential) and end use (e.g., indoor or outdoor water use).
- Utility Unit Cost – Cost of rebates, incentives, and contractors hired by APU to implement measures.
- Retail Customer Unit Cost – Cost for implementing measures that is paid by retail customers (i.e., remainder of a measure’s cost that is not covered by a rebate or incentive).
- Utility Administration and Marketing Cost – The cost to the utility for staff time, general expenses and overhead needed to implement and administer the measure, including consultant contract administration, marketing, and participant tracking. The unit costs vary greatly according to the type of customer and implementation method. For example, a measure might cost a different amount for a single-family account than a multi-family account. Rebate program costs are different than costs to develop and enforce an ordinance requirement or a direct installation program. Typically, water utilities incur increased costs with achieving higher market saturation, such as more surveys per year. The model calculates the annual costs based on the number of participants each year. The general formula for calculating annual utility costs is:

Annual Utility Cost = Annual market penetration rate x total accounts in category x unit cost per account x (1+administration and marketing markup percentage)

Annual Customer Cost = Annual number of participants x unit customer cost

Annual Community Cost = Annual utility cost + annual customer cost

5.4 Comparison of Individual Measures

Table 5-2 presents the cost-effectiveness of each individual water use efficiency measure without the interaction or overlap from other measures that might address the same end use(s). Cost-effectiveness defines how much water the measures would save by the year 2040, how much they would cost, and the cost of water saved per unit volume if the measures were implemented on a stand-alone basis without interaction or overlap from other measures.. Savings from measures which address the same end use(s) are not directly additive. The model uses impact factors to avoid double counting in estimating the water savings from programs of measures. For example, if two measures are planned to address the same end use and both save 10% of the prior water use, then the net effect is not the simple sum (20%). Rather it is the cumulative impact of the first measure reducing the use to 90% of what it was without the first measure in place and then reducing the use another 10% to result in the use being 81% of what it was originally. In this example the net savings is 19%, not 20%. Using impact factors, the model computes the reduction as follows: $0.9 \times 0.9 = 0.81$ or 19% water savings.

Cost categories are defined below:

- Utility Costs - those costs that APU as a water utility would incur to operate the Water Use Efficiency Program, including administrative costs.
- Utility Benefits - the avoided cost of producing water at the identified rate of \$967/AF; equivalent to Anaheim's average cost of water for the period from 2012 to 2032. Note that the actual avoided cost of water could be much higher; equivalent to the highest cost of alternative water supplies (such as MWD full service, treated Tier 2 water).

The column headings in Table 5-2 are defined as follows:

- Present Value (PV) of Utility Costs and Benefits (\$) = the present value of the 29-year time stream of annual costs or benefits (2012 to 2040), discounted to the base year.
- Utility Benefit to Cost Ratio = PV of Utility Benefits divided by PV of Utility Costs.
- Cost of Water Saved per Unit Volume (\$/AF) = PV of Utility Costs over the 28 future years plus the cost in the first year divided by the 29-Year Water Savings volume in AF. This value is compared to the utility's avoided cost of water as one indicator of the cost effectiveness of water use efficiency efforts. It should be noted that the value somewhat undervalues the cost of water saved because program costs are discounted to present value and the water savings is not.

It should be noted that the benefits of the turf removal and rotating sprinkler nozzle replacement were underestimated in Table 5-2. In calculating the cost of turf removal, a 5-year life for the replacement material was assumed, while the life is normally in the 10 year range. Therefore, the 5-year life assumption resulted in much lower benefit than is normally expected.

Table 5-2: Estimated Water Use Efficiency Measure Costs and Savings

Conservation Measure Costs and Savings					
Measure Name	Present Value of Utility Benefits	Present Value of Utility Costs	Utility Benefit to Cost Ratio	Water Savings in Year 2040 (AFY)	Cost of Water Saved per Unit Volume (\$/AF)
Water Loss Reduction Program	\$1,045,754	\$886,509	1.18	71	\$522
Residential Indoor/ Outdoor Water Use Surveys	\$2,374,181	\$1,222,483	1.94	149	\$325
High Efficiency Washer (HECW) Rebates	\$1,012,939	\$296,940	3.41	60	\$185
High Efficiency Toilet (HET) Rebates	\$852,097	\$186,827	4.56	47	\$142
Rain Sensors Rebates	\$1,019,816	\$413,095	2.47	84	\$235
Large Landscape Water Use Surveys	\$31,822	\$505,443	0.06	2	\$10,091
Turf Removal- SF	\$140,260	\$378,442	0.37	17	\$1,527
Turf Removal- MF and CII	\$870,203	\$1,571,302	0.55	112	\$1,008
Weather Based Irrigation Controller Rebates	\$1,284,645	\$672,727	1.91	83	\$324
Rotating Sprinkler Nozzle Rebates	\$2,519,851	\$4,157,460	0.61	161	\$1,039
Soil Moisture Sensor Rebates	\$415,701	\$1,435,987	0.29	32	\$2,069
CII Water Use Survey Program	\$1,696,506	\$1,571,134	1.08	229	\$511
Customized CII Incentive Program	\$593,777	\$479,021	1.24	80	\$445
Water Savings Incentive Program	\$272,431	\$251,233	1.08	19	\$560
Enhanced Water Savings School Incentives Program	\$147,776	\$127,525	1.16	18	\$464
Outdoor Use Education and Training Programs	\$1,169,392	\$454,986	2.57	85	\$237
Public Information Program	\$3,666,894	\$1,397,981	2.62	214	\$246
School Education	\$183,345	\$830,800	0.22	11	\$2,927
Customer Award Program	\$102,323	\$92,044	1.11	14	\$492
Promote Green Buildings	\$526,581	\$120,034	4.39	37	\$137

CII = Commercial, Industrial, Institutional

HET = High Efficiency Toilet

HECW = High Efficiency Clothes Washer

MF = Multi-Family

SF = Single-Family

6. RESULTS OF WATER USE EFFICIENCY PROGRAM EVALUATION

6.1 Selection of Measures for Programs

The following section provides a summary of the measures included in each of the three alternative programs, which are designed to illustrate a range of various measure combinations and resulting water savings. Four key items were taken into consideration during measure selection for Programs A, B and C:

1. Existing APU water use efficiency measures;
2. Programs run by MWD (as mentioned earlier APU purchases water from MWD);
3. Measures required by the CUWCC; and
4. New and innovative measures.

6.2 Optional Water Use Efficiency Alternative Programs: A, B and C

These programs are not intended to be rigid frameworks but rather to demonstrate the range in savings that could be generated if selected measures were run together. In this step, the Consultant has accounted for a percent overlap in water savings and estimates combined savings from packages of measures.

Program A – “Existing Program” – 11 measures

The “Existing Program” option includes the measures that APU currently offers.

1. Residential Indoor/ Outdoor Water Use Surveys
2. High Efficiency Washer (HECW) Rebates
3. High Efficiency Toilet (HET) Rebates
4. Large Landscape Water Use Surveys
5. Turf Removal- SF
6. Turf Removal- MF and CII
7. Weather Based Irrigation Controller Rebates
8. Rotating Sprinkler Nozzle Rebates
9. Outdoor Use Education and Training Programs
10. Public Information Program
11. School Education

Program B – “Enhanced Program” – 17 Measures

“Program B” includes all measures in Program A plus 6 additional measures that are both cost-effective and save significant amounts of water. Key benchmarks for the proposed strategies include: 1) cost-

effectiveness, 2) compliance with CUWCC's BMPs, 3) ability to help achieve the statewide mandate to reduce per capita water use by 20% by 2020, and 4) feedback from APU customers. Program B includes:

1. CII Water Use Survey Program
2. Customized CII Incentive Program
3. Water Savings Incentive Program
4. Customer Award Program
5. Promote Green Buildings
6. Water Loss Reduction Program

Program C – “All 20 Measures Analyzed”

Program C includes all of the 20 measures analyzed. It includes all measures in Program B, and the three additional measures:

1. Rain Sensors Rebates
2. Soil Moisture Sensor Rebates
3. Enhanced Water Savings School Incentives Program

Per Capita Water Savings with Different Program Options

Figure 6-1 shows estimated average per capita per day savings with the plumbing codes only, and each of the alternative programs (Program A, B, and C). Plumbing code includes current state and federal standards (including Cal Green, SB 407 and AB 715) for items such as toilets, showerheads, faucets, pre-rinse spray valves.

Table 6-1 shows the estimated per capita savings in five year increments for all three programs. The savings depicted in Table 5-2 are solely from the water use efficiency programs, and do not include the plumbing code savings.

Figure 6-1: Per Capita Water Savings with Different Program Options

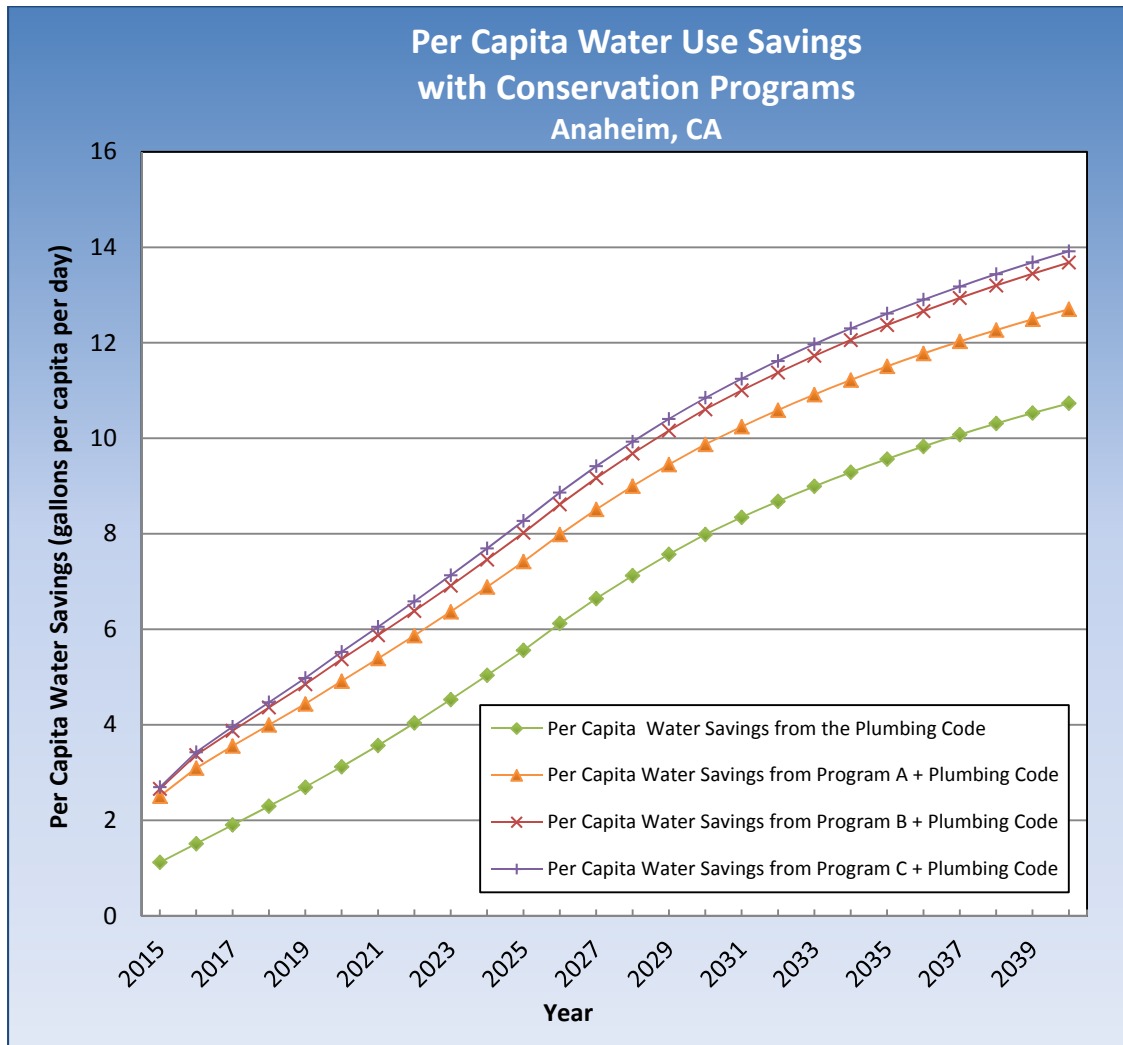
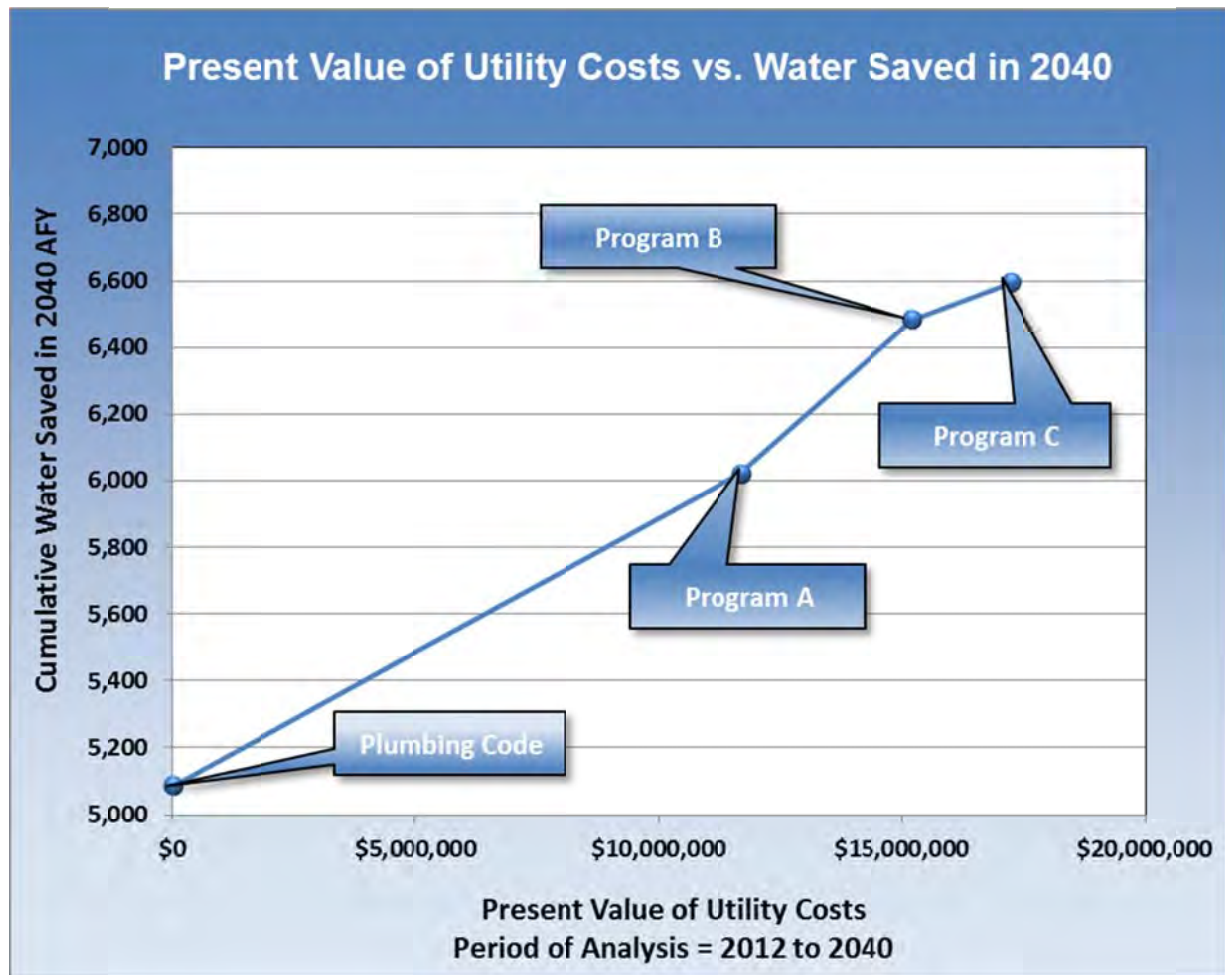


Table 6-1: Comparison of Program Estimated Costs and Water Savings in 2040

Long Term Conservation Per Capita Water Use Savings									
Program	GPCD savings in 2015	GPCD savings in 2020	GPCD savings in 2025	GPCD savings in 2030	GPCD savings in 2035	GPCD savings in 2040	Utility Benefit to Cost Ratio	Average Annual Program Cost (2014-2018)	Utility Cost of Water Saved (\$/AF)
Per Capita Water Savings from the Plumbing Code	1.12	3.12	5.56	7.99	9.56	10.73	N/A	N/A	N/A
Per Capita Water Savings from the Plumbing Code and Program A "Existing Program" 11 measures	2.50	4.91	7.42	9.87	11.51	12.70	1.20	\$648,200	\$522
Per Capita Water Savings from the Plumbing Code and Program B - 16 measures	2.66	5.37	8.02	10.61	12.37	13.68	1.21	\$867,000	\$508
Per Capita Water Savings from the Plumbing Code and Program C - 20 measures	2.69	5.53	8.27	10.85	12.61	13.92	1.16	\$975,900	\$528

Figure 6-2 illustrates how marginal returns change as more money is spent to achieve water savings. As the figure shows, Program B is the most cost-effective program, where minimal added investment (to Program A) yields significantly more water savings.

Figure 6-2: Present Value of Utility Costs vs. Water Saved in 2040



These cost parameters are derived from the estimated annual utility costs. Program A, B, and C costs are presented in Table 6-1.

7. STAFFING, BUDGETING, AND DATA MONITORING

This section presents an overview of the Plan options for APU's service area. The Plan includes several elements, including: (1) program staffing needs; (2) overall benefits of the Plan; and (3) recommended next steps.

7.1 Measure Selection Criteria and Process

The 20 measures analyzed in this Plan were selected during the screening process described in Section 4 of this report.

7.2 Projected Water Savings

A high percentage of APU's service area water usage is associated with residential water use as well as commercial and industrial activity. As a result, there is water use efficiency potential for both sectors. Overall conclusions regarding projected water savings are:

- The average cost of water saved from the Plan from the utility standpoint ranges from \$508/AF to \$528/AF, as shown on Table 6-1. This is significantly less than the avoided cost of water at \$967/AF.
- All Programs can reduce per capita water use in a cost effective manner to reach the mandated 2020 per capita target goal.

7.3 Estimated Implementation Staffing

As part of this planning effort, consideration has been given to program staffing levels. Current and future staff needs to implement the water use efficiency plan are presented in this section.

APU currently has one water use efficiency staff full-time equivalent (FTE). This staff FTE for the current program efforts does not include rebate programs operated by MWD for the benefit of its member retailers. It is recommended that new water use efficiency programs be administered by dedicated staff. The total number of FTE staff required would ultimately depend on which Program APU selects to pursue and the actual participation levels achieved.

Program Manager: Water Efficiency Programs Manager, 1 FTE will manage all water use efficiency programs and assist with measure and policy development.

Administration Staff: 1 FTE will have the following duties:

- o Schedule inspections and water surveys for residential, commercial, and institutional customers
- o Verify field data in database
- o Document reports
- o Process rebate requests
- o Update water use efficiency website
- o Assist with public education materials

- o Assist with attendance at community and business events, such as Farmer Market's booth, and home/garden shows
- o Accompany inspectors on site visits

Field Inspection Staff: 2 FTE will have the following duties:

- o Conduct inspections and water surveys (residential, CII and landscape)
- o Complete data entry into handheld tablets while in the field
- o When not doing an inspection - help administrative staff with set up and documentation
- o Help administrative staff with other duties as time permits
- o Network with representatives of residential, CII and landscape customers (e.g. landscape companies, HVAC, etc.)

The level of staff and funding source will be further discussed and reviewed by APU. It can be concluded that significant staff effort will be required for successful program implementation. It is likely some of these staff may be located in multiple groups within APU; primarily within the Water Resources and Planning, and Business and Community Programs divisions.

7.4 Estimated Implementation Budget

The estimated annual cost to APU to implement the recommended Program B as described in the Plan is approximately \$867,000. The cost includes additional staff time and expenses (materials, rebates, giveaways, etc.). This value, which is close to pre-recession FY 2008 and FY 2009 water use efficiency budgets, will ensure APU will reach the SBx7-7 targets even if the demands rebound as the economy recovers.

This budget was developed using the DSS Model for the level of activity by year while working closely with APU staff. The opportunities for cost sharing partnership with other utilities or other means for lowering the cost of a water use efficiency measure, such as grants and wholesale agency incentives, would lower the budgetary needs for implementation. APU should develop a detailed annual work plan, and use the DSS Model to monitor progress on demand reductions along with updates to the implementation cost estimates and associated budgets on an annual basis.

7.5 Monitoring Progress

The Plan includes on-going monitoring of program participation and effectiveness. Monthly data of each water use efficiency measure and monthly rebate program data will be transferred into the CUWCC's BMP database for reporting purposes to track and monitor the current level of compliance. As shown in Figure 7-1 the program tracking incorporates the following data:

- Customer information – Name, address, account number, type of business (CII customers).
- WUE measure or device – Type (including make and model), quantity, unit water savings, life expectancy.
- Cost information – Incentive funding levels.

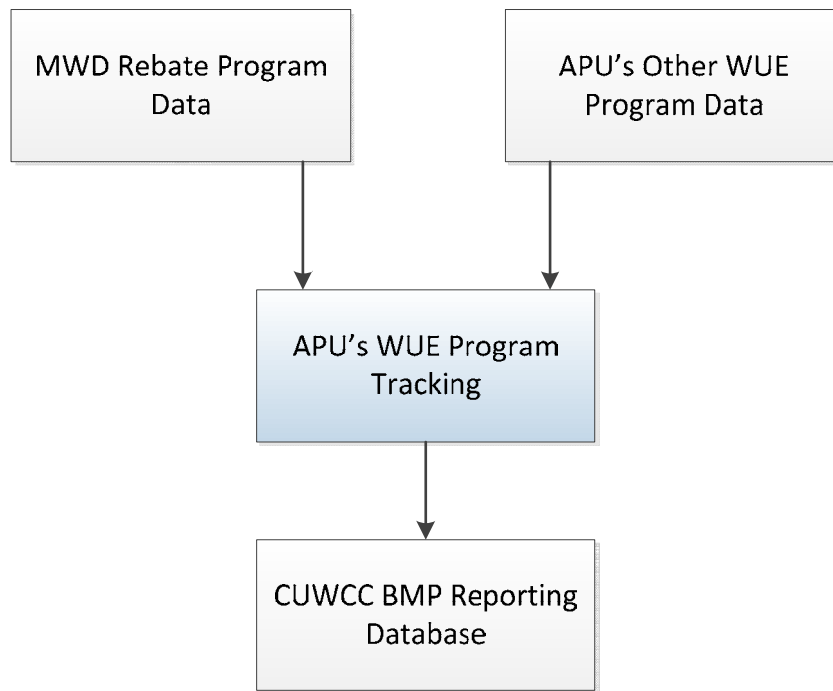


Figure 7-1: Components of Implementation Tracking

Each year, a report will be prepared by APU staff to analyze the progress on meeting the targeted water savings. It will be imperative to track activities and program participation as well as water demand to understand the level of progress being made in meeting overall goals.

The overall program participation may be evaluated by tracking metrics, such as the following:

- Number of hits on the public information campaign website.
- Number of water bills with campaign messaging.
- Number of customers reached by water bills with campaign messaging.
- Quantity of radio and television advertising.
- Cost of advertising.
- Number of impressions generated by radio and television advertising.
- Number of teachers implementing lesson plans about water and water use efficiency.
- Number and age range of students reached through teacher lesson plans.
- Number of contests held to promote water efficiency.
- Age of students participating in contests.
- Number of workshops.
- Cost of each workshop.
- Workshop attendance.
- Number of demonstration gardens installed and cost of installation/ maintenance.
- Number of citizen visits or tours of the Water Sustainability Campus demonstration garden (adjacent to City Hall).
- Customer satisfaction with the program; results of customer satisfaction surveys; received complaints.

Program participation by individual accounts may be evaluated by tracking the following:

- Number of occupants in the home/business.
- Number and type of rebates or other incentives issued, including water saving details for rebates such as efficiency level of washing machine installed through incentive program.
- Water use before and after documented changes in replacement of fixtures or other implementation, including quantifiable behavioral change resulting from audits or usage surveys.

7.6 Water Use Reduction Evaluation

In order to track the success of the program and the reduction of water use to meet APU's goals, water consumption should be recorded before and after program initiation. If the residence or business does not decrease water use, then steps should be taken to identify whether the customer's conditions have changed (for example, if a home has been sold or if additional tenants have moved into a commercial facility.)

Maintaining a database of water use records will be needed to measure water savings. In addition, data may be normalized to account for events that will affect water use such as:

- Abnormal weather
- Economic conditions, such as recessions and recoveries
- Water price increases
- Changes in plumbing and appliance code regulations

Also, for tracking individual account water use changes, the following may be considered:

- Changes in home ownership
- Changes in occupancy or uses of the facility

In order to address the above factors, 5 to 10 years of monthly pre-program initiation water use data and 2-3 years of post-program initiation water use data should be gathered and statistically evaluated by qualified professionals.

7.7 Opportunities, Partnerships and Stakeholder Group Participation

APU has been partnering with other public agencies and local stakeholder groups who could provide cost-sharing or in-kind program support for the Plan. APU should continue or extend these partnerships as a means to both achieve program goals for minimum cost and maximize outreach and customer awareness and/or participation. Detailed information on possible partnerships for APU is provided in Appendix D. Currently, APU water use efficiency staff is collaborating with energy efficiency staff as described in Appendix E.

7.8 Recommended Next Steps

Successful implementation of the Plan will require an increase in efforts on the part of the APU. New water use efficiency measures will need to be employed and continued participation by APU customers is key to achieve Plan goals. The recommended Program B will cost approximately \$867,000 per year to implement associated measures.

Recommendations to assist with implementation include the following next steps:

- Review program staff needs and increase staffing accordingly to adequately support program needs.
- Prioritize measures for implementation, with the highest priority given to programs that generate significant water savings and will contribute the most to meeting water saving targets and/or can be implemented with relative ease. Prioritization will be based on key questions to determine measures, budget and schedules for the Plan:
 1. What level of support would be required from water use efficiency staff to run the selected measures?
 2. What other support is needed (e.g., outsourced support or other sources of funding) to operate these programs?
- Develop implementation plans that describe in detail how each Plan measure will be implemented.
- Prepare an annual work plan for each Plan year in concert with the budget planning process.
- Form partnerships and apply for grants where appropriate.
- Set up a method to record and manage measure participation, cost and other data to gauge successes and areas that need improvement.
- Annually review the Plan participation, projected water savings, and expected per capita water use reductions to ensure the Plan is on track to meet 2020 water use efficiency goals. Use the input from the annual work planning process to amend budgets, staffing, contracting, schedule, etc. to stay on track.

7.9 Conclusions

Water Use Efficiency Analysis Findings:

1. Creating expanded water use efficiency efforts is a feasible and cost-effective means of meeting 2020 water reduction targets, assuring adequate future water supplies, and potentially deferring costly infrastructure improvements.
2. Successful implementation of the recommended Plan B should reduce per capita water by 13 GPCD on top of the savings already obtained from historical APU water efficiency efforts. While the water use efficiency actions identified can have a significant cost, the cost of doing no conservation and having to address increased demands through engineering solutions exceed the cost of implementing new water use efficiency measures. Producing well water and purchasing water from MWD, OCWD, and alternative water supplies (such as seawater desalination and dry year transfers) have a significantly higher cost than implementing each of the Programs A, B, or C.
3. The recommended course of action is to review per capita use on an annual basis and adjust water reduction targets according to forecasted water demands. This will allow APU to identify and implement the most cost-effective water use efficiency programs needed to achieve the SBx7-7 water reduction target by the year 2020.

REFERENCES

- American Water Works Association (1999). *Research Foundation, Residential End Use Study*. AQ4
- American Water Works Association (2006). *Manual of Water Supply Practice, M52, Water Conservation Programs –A Planning Manual*. American Water Works Association. Available at: <http://www.awwa.org>
- American Water Works Association (2007). *Manual of Water Supply Practice, M50, Water Resources Planning*. AWWA. Available at: <http://www.awwa.org>
- American Water Works Association (2009). *Manual of Water Supply Practice, M36, Water Audits and Loss Control Programs*. 3rd edition. AWWA. <http://www.awwa.org>
- 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, *Oregon Single-Family Water Use Efficiency Study*, Department of Water Resources, Sacramento California, (2011) <http://www.aquacraft.com/sites/default/files/pub/DeOreo-%282011%29-California-Single-Family-Water-Use-Efficiency-Study.pdf>
- DeOreo, W.B., P.W. Mayer, E.M. Opitz, B. Dziegielewski, J.C. Kiefer, W.Y. Davis, and J.O. Nelson. (1999). *Residential End Uses of Water: Final Report*. AWWA Research Foundation. Denver, Colorado. http://www.waterrf.org/PublicReportLibrary/RFR90781_1999_241A.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*. Published by AWWA, Research Foundation and American Water Works Association with Cooperation of the U.S. Bureau of Reclamation, Denver, Colorado (2000). Catalog No.90806. 264 pp. ISBN 1-58321-035-0.
- California Urban Water Conservation Council, *Best Management Practices (BMP) Cost and Savings Study* (2005)
- "High Efficiency Plumbing Fixtures - Toilets and Urinals" Koeller & Company (2005)
- Mayer, Peter W., Erin Towler, William B. DeOreo, Erin Caldwell, Tom Miller, Edward R. Osann, Elizabeth Brown, Peter J. Bickel, Steven B. Fisher. (2004) *National Multiple Family Submetering and Allocation Billing Program Study*. Aquacraft, Inc. and the East Bay Municipal Utility District
- U.S. Department of Energy, *EnergyStar Calculators*, Internet address: www.energystar.gov
- Vickers A. (2001). *Handbook of Water Use and Conservation*. WaterPlow Pres. Relevant City planning documents including:
- *Anaheim's 2010 Urban Water Management Plan*
 - *Anaheim General Plan*
 - *Metropolitan's 2010 Integrated Resources Plan*
 - *Metropolitan's 2010 Long Term Conservation Plan*

- *Various MWDOC planning documents*
- *State's 20x2020 Water Conservation Plan*
- *SCAG Sustainable Communities Strategy and Compass Blueprint*
- *Other regional water reduction plans*
- *Land Use Data*

APPENDIX A: KEY ASSUMPTIONS FOR THE DSS MODEL

The table below shows the key assumptions used in the model. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of estimated real water losses.

Table A-1: List of Key Assumptions

List of Baseline Demand Projection Assumptions for DSS Model Anaheim	
Parameter	Model Input Value, Assumptions, and Key References
Model Start Year	2012
Water Demand Factor Years (Base Years)	Average of Years: 2003-2012
Peak Day Factor	1.60
Unaccounted for Water in the Start Year	4.6%
Population Projection Source	Provided by MWD staff
Avoided Cost of Water \$/AF	\$967 Provided by APU staff
Distribution of Water Use Among Categories	Single Family : 38% Multifamily: 21% CII: 41%
Residential End Uses	CA DWR Report "California Single Family Water Use Efficiency Study", 2011, AWWARF Report "Residential End Uses of Water" 1999, Agency supplied data on costs and savings, professional judgment where no published data available
Non-Residential End Uses, %	AWWARF Report "Commercial End Uses of Water" 1999
Efficient Residential Fixture Current Installation Rates	U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Reference "High Efficiency Plumbing Fixtures - Toilets and Urinals" Koeller & Company July 23, 2005. Reference Consortium for Efficient Energy (www.cee1.org)
Water Savings for Fixtures, gal/capita/day	AWWARF Report "Residential End Uses of Water" 1999, CA DWR Report "California Single Family Water Use Efficiency Study", 2011, Agency supplied data on costs and savings, professional judgment where no published data available
Non-Residential Fixture Efficiency Current Installation Rates	U.S. Census, assume commercial establishments built at same rate as housing, plus natural replacement as well as using data for APU programs from 1999 to 2013 as provided by MWD programs
Residential Frequency of Use Data, Toilets, Showers, Washers, Uses/user/day	Falls within ranges in AWWARF Report "Residential End Uses of Water" 1999 A 3% replacement rate corresponds to 33 year life of a new fixture. A 6.67% replacement rate corresponds to 15 year washer life based on "Bern Clothes Washer Study, Final Report, Energy Division, Oak Ridge National Laboratory, for U.S. Department of Energy, March 1998, Internet address: www.energystar.gov

A.1 Present Value Analysis and the Utility and Community Perspective

Present value analysis using constant FY 2014 dollars and a real discount rate of 3% is used to discount costs and benefits to the base year. From this analysis, benefit-cost ratios of each measure are computed. When measures are put together in programs, the model is set up to avoid double counting savings from multiple measures that act on the same end use of water. For example, multiple measures in a program may target toilet replacements. The model includes assumptions to apportion water savings between the multiple measures.

Economic analysis can be performed from several different perspectives, based on which party is affected. For planning water use efficiency programs for utilities, the perspectives most commonly used for benefit-cost analyses are the “utility” perspective and the “community” perspective. The “utility” benefit-cost analysis is based on the benefits and costs to the water provider. The “community” benefit-cost analysis includes the utility benefit and costs together with account owner/customer benefits and costs. These include customer energy and other capital or operating cost benefits plus costs of implementing the measure, beyond what the utility pays.

The utility perspective offers two advantages. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving versus supplying increased quantities of water. Second, revenue shifts are treated as transfer payments, which means program participants will have lower water bills and non-participants will have slightly higher water bills so that the utility’s revenue needs continue to be met. Therefore, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. It should be noted that there is a significant difference between the utility’s savings from the avoided cost of procurement and delivery of water and the reduction in retail revenue that results from reduced water sales due to water use efficiency. This budget impact occurs slowly, and can be accounted for in water rate planning. Because it is the water provider’s role in developing a water use efficiency plan that is vital in this study, the utility perspective was primarily used to evaluate elements of the Plan.

The community perspective is defined to include the utility and the customer costs and benefits. Costs incurred by customers striving to save water while participating in water use efficiency programs are considered, as well as the benefits received in terms of reduced energy bills (from water heating costs) and wastewater savings, among others. Water bill savings are not a customer benefit in the aggregate for reasons described above. Other factors external to the utility, such as environmental effects, are often difficult to quantify or are not necessarily under the control of the utility. They are therefore frequently excluded from economic analyses, including this one.

A.2 Present Value Parameters

The time value of money is explicitly considered. Typically the costs to save water occur early in the planning period whereas the benefits usually extend to the end of the planning period. A long planning period of 20-30 years is typically used because costs and benefits that occur beyond 2040 years have very little influence on the total present value of the costs and benefits. The value of all future costs and

benefits is discounted to the first year in the DSS Model (the base year, which in this case is 2012), at the real interest rate of 3.0%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). Cash flows discounted in this manner are herein referred to as “Present Value” sums.

A.3 Assumptions about Measure Costs

Costs were determined for each of the measures based on industry knowledge, past experience and data provided by APU. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that will be used in marketing the measure. The model was run for 28 years (each year between FY 2012 and FY 2040). Costs were spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

Lost revenue due to reduced water sales is not included as a cost because the water use efficiency measures evaluated herein generally take effect over a long span of time that is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations and savings on variable costs such as energy and chemicals.

A.4 Assumptions about Measure Savings

Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to seven years after the start of implementation, depending upon the implementation schedule. For every water use efficiency activity or replacement with more efficient devices, there is a useful life. The useful life is called the “Measure Life” and is defined to be how long water use efficiency measures stay in place and continue to save water. It is assumed that measures implemented because of codes, standards or ordinances, like toilets for example, would be “permanent” and not revert to an old inefficient level of water use if the device needed to be replaced. However, some measures that are primarily behavioral based, such as residential surveys, are assumed to need to be repeated on an ongoing basis to retain the water savings (e.g., homeowners move away and new homeowners may have less efficient water using practices around the home). Surveys typically have a measure life on the order of five years.

A.5 Assumptions about Avoided Costs

The estimated avoided cost of water is \$967/AF which was provided by APU staff. This is the average cost of blended water for the 2012-2032 period including purchases from MWD and OCWD as well as APU’s energy, treatment, and facilities improvement costs.

APPENDIX B: WATER USE EFFICIENCY MEASURES CONSIDERED FOR EVALUATION

Table B-1: Water Use Efficiency Measures

Measure Name	1 Water Loss Reduction Program	2 Residential Indoor/ Outdoor Water Use Surveys	3 High Efficiency Washer (HECW) Rebates	4 High Efficiency Toilet (HET) Rebates
Applicable Customer Classes	System	SF and MF	SF and MF	SF and MF 4 or less units
Applicable End Uses	Non Revenue Water	Indoor/Irrigation	Clothes Washing	Toilets
Market Penetration by End Of Program (%)	100%	15%	10%	10%
Annual Market Penetration (%)	100%	0.4%	1%	0.5%
Use Only New Accounts		FALSE		FALSE
Water Use Reductions For Targeted End Uses Description	0.25% of production each year until FY 21/22, then maintenance program until 2040	5%		63%
Annual Accounts Assumes per year	62,901	214	400	250
Water Use Reductions For Targeted End Uses	1%	5% indoor / 10% outdoor	37%	63%
Evaluation Start Year	2015	2006	2008	2008
Evaluation End Year	2040	2040	2017	2016
Program Length, years	26	35	10	9
Measure Life, years	Permanent	5	Permanent	Permanent
Saves Hot Water	No	Varies	Yes	No
Utility Unit Cost for SF accounts, \$/account	See note below	\$82	\$110	\$50
Utility Unit Cost for MF accounts, \$/account	See note below	\$82	\$110	\$50
Utility Unit Cost for non-Res accounts, \$/account	See note below	\$0	N/A	\$100
Customer Unit Cost, \$/SF account	NA	\$0	\$550	\$150
Customer Unit Cost, \$/MF account	NA	\$0	\$550	\$150
Customer Unit Cost, \$/non-Res account	NA	\$0	NA	\$200-400
Annual Utility Admin & Marketing Cost	20%	30%	10%	10%
Affected Units	System	Account	Washers	Toilets
Notes	BMP 1.2 - Retail Agency Water Loss Control	Approximately 1,750 surveys are completed per year. 150 online surveys estimated to be completed per year; in FY 12/13 175 online surveys were completed. The outside/landscape water audit is tracked separately for SF and MF. 500 audits are estimated for SF and 50 for MF per year.	# of devices FY 2008 - 847 FY 2009 - 781 FY 2010 - 860 FY 2011 - 910 FY 2012 - 477 FY 2013 - 331 FY 2014 (July-Dec. 23) - 133	# of devices FY 2008 - 78 FY 2009 - 2,771 FY 2010 - 619 FY 2011 - 145 (83 sfr/62 CII) FY 2012 - 0 (Review MWD addendum) FY 2013 - 165 (CII) FY 2014 (July-Dec. 23) - 55
Basis of Water Savings	Holding for analysis of water use data and estimated potential savings. Test at 1% reduction, say from 8% NRW to 7%.	FY12/13 WUE Programs Annual Report from KEMA (contractor) calculates savings based on number of items/devices distributed or installed (showerheads, flappers, aerators, hose nozzles, toilet dams, and dye tabs).	From Energy Star website calculator downloaded on September 20, 2013. Annual water savings between conventional and energy Star machine is 37%.	Calculated from fixture models based on flush volume HET vs. 3.5gpf.
Basis of Utility Costs	If the water leak detection factor exceeds 2%, Utility staff would need to implement a more aggressive Leak Detection Program that may range from \$20,000 to \$200,000 per year.	\$128,000; FY 13/14 MWD credit of \$40,000. APU budgets \$16,000 for survey supplies; items include showerheads, flappers, aerators, hose nozzles, toilet dams, and dye tabs.	Fully funded through MWD incentive program. Nominal admin and marketing costs.	
Basis of Customer Costs	To be determined.	Free.	Unit purchase cost and delivery.	MWM estimate for plumber install.

	5	6	7	8
Measure Name	Rain Sensors Rebates	Large Landscape Water Use Surveys	Turf Removal- SF	Turf Removal- MF and CII
Applicable Customer Classes	SF, MF, CII	CII and Municipal	SF and MF 4 or less units	CII/Large MF 6,000 ft. or more
Applicable End Uses	Irrigation	Irrigation	Irrigation	Irrigation
Market Penetration by End Of Program (%)	10%	3%	10%	10%
Annual Market Penetration (%)	1.0%	0.1%	0.3%	0.4%
Use Only New Accounts				
Water Use Reductions For Targeted End Uses Description		15%		
Annual Accounts Assumes per year	500	6	169	25
Water Use Reductions For Targeted End Uses	5%	10%	15%	10%
Evaluation Start Year	2015	2010	2012	2013
Evaluation End Year	2025	2040	2040	2040
Program Length, years	10	31	29	28
Measure Life, years	Permanent	3	Permanent	Permanent
Saves Hot Water	No	No	No	No
Utility Unit Cost for SF accounts, \$/account	\$60	\$0	\$1,000	N/A
Utility Unit Cost for MF accounts, \$/account	\$60	\$0	\$1,000	\$1,500
Utility Unit Cost for non-Res accounts, \$/account	\$0	\$2,000-\$5,500	\$0	\$1,500
Customer Unit Cost. \$/SF account	\$50	\$0	\$2,000	N/A
Customer Unit Cost. \$/MF account	\$50	\$0	\$2,000	\$7,500
Customer Unit Cost. \$/non-Res account	\$0	\$0	N/A	\$7,500
Annual Utility Admin & Marketing Cost	25%	10%	10%	10%
Affected Units	Sensors	Account	Account	Account
Notes		BMP 5 Programmatic, Traditional: Landscape Total agreement is \$115,200. Expenses thru June 2013 are \$63,313 for 24 completed surveys: FY 2010 - 1; \$2,100 FY 2011 - 10; \$23,875 FY 2012 - 8; \$18,775 FY 2013 - 5; \$18,563 FY 2014 - 5 in queue; TBD Based on the number of active irrigation controller stations on site; on average \$2,600 per site.	BMP 5 Programmatic, Traditional: Landscape # of completed projects and total sq. ft.: FY 2008 - 4,535 sq. ft. (synthetic turf) FY 2009 - 8; 7,735 sq. ft. (synthetic turf) FY 2010 - 15; 13,555 sq. ft. (synthetic turf) FY 2011 - 3; 4,122 sq. ft. (synthetic turf) FY 2012 - 3; 6,652 sq. ft. (turf removal) FY 2013 - 12; 18,065 sq. ft. FY 2014 - 3; 2,029 sq. ft. (July-Dec.23)	BMP 5 Programmatic, Traditional: Landscape completed projects total sq. ft.: FY 2009 - 20,093 sq. ft. (synthetic turf) FY 2010 - 65,300 sq. ft. (synthetic turf) FY 2011 - 85,393 sq. ft. (synthetic turf)
Basis of Water Savings	Water savings percentage is low. There are only rain events avoided in the Spring and Fall in the Anaheim area; however Anaheim is interested in this program to raise public awareness during drought periods.	CUWCC Cost and Savings Study (2005) reports 20% savings first year declining to 6% in third year, pg 2-102-105.	CUWCC Cost and Savings Study (2005) reports up to 39% savings in Phoenix in summer. Assume 50% of landscaping removed and replaced with low water use that uses 50% less water so overall irrigation savings of 25%.	CUWCC Cost and Savings Study (2005) reports up to 39% savings in Phoenix in summer. Assume 50% of landscaping removed and replaced with low water use that uses 50% less water so overall irrigation savings of 25%.
Basis of Utility Costs	Based on Wireless Rain Sensor (like Hunter Rain Click).	Surveyed site encouraged to participate in MWD's SoCal WaterSmart rebate program for irrigation equipment.	Increase incentive up to \$2/square foot.	Increase incentive up to \$2/square foot.
Basis of Customer Costs	Provide a rain sensor shut-off device for an existing residential irrigation controller. Assume customer does installation.	Covers material and labor costs to upgrade system.	Net cost to customer may range from \$3 to \$8/square foot based on 1,000 square feet.	Net cost to customer may range from \$3 to \$8/square foot based on 1,000 square feet.

	9	10	11	12
Measure Name	Weather Based Irrigation Controller Rebates	Rotating Sprinkler Nozzle Rebates	Soil Moisture Sensor Rebates	CII Water Use Survey Program
Applicable Customer Classes	SF, MF and CII	SF, MF and CII	SF, MF and CII	CII
Applicable End Uses	Irrigation	Irrigation	Irrigation	CII Indoor / Outdoor / Process
Market Penetration by End Of Program (%)	16%	93%	14%	100%
Annual Market Penetration (%)	0.5%	3.0%	0.5%	4%
Use Only New Accounts				FALSE
Water Use Reductions For Targeted End Uses Description				
Annual Accounts Assumes per year	306	1834	306	20
Water Use Reductions For Targeted End Uses	10%	5%	10%	10%
Evaluation Start Year	2009	2010	2013	2014
Evaluation End Year	2040	2040	2040	2040
Program Length, years	32	31	27	27
Measure Life, years	Permanent	5	10	Permanent
Saves Hot Water	No	No	No	Yes
Utility Unit Cost for SF accounts, \$/account	\$150	\$4	\$250.00	
Utility Unit Cost for MF accounts, \$/account	\$150	\$4	\$250	
Utility Unit Cost for non-Res accounts, \$/account	\$325	\$4	\$500	\$3,000
Customer Unit Cost. \$/SF account	\$250	\$1	\$250	
Customer Unit Cost. \$/MF account	\$250	\$1	\$250	
Customer Unit Cost. \$/non-Res account	\$600	\$1	\$500	\$0
Annual Utility Admin & Marketing Cost	10%	10%	25%	25%
Affected Units	Account	Account	Account	Account
Notes	BMP 5 Programmatic, Traditional: Landscape <u># of devices</u> FY 2009 - 68 (9 sfr/59 CII) FY 2010 - 51 (5 sfr/46 CII) FY 2011 - 47 (12 sfr/35 CII) FY 2012 - 83 (22 sfr/61 CII) FY 2013 - 29 (17 sfr/12 CII) FY 2014 - 31 (5 sfr/26 CII) (July-Dec. 23)	BMP 5 Programmatic, Traditional: Landscape <u># of devices</u> FY 2010 - 542 (273 sfr/164 CII/105 Lrg CII) FY 2011 - 754 (372 sfr/382 CII) FY 2012 - 39,431 (751 sfr/38,680 CII) FY 2013 - 1,272 (459 sfr/813 CII) FY 2014 - 224 (224 sfr) (July-Dec. 23)		Assume small savings of 5% on their own w/o rebates.
Basis of Water Savings	Industry standards.	Industry standards.	Industry standards.	CUWCC Cost and Savings Study (2005) reports potential savings range from 11 to 29%, assuming all projects are implemented. Assume 30% potential and 35% compliance, CUWCC Cost and Savings Study, 2005, pg 2 66-68. Assume 5% due to survey only, rest of savings come from participation in an incentive program.
Basis of Utility Costs	Program marketing only.	Program marketing only.	Program marketing only.	CUWCC Cost and Savings Study (2005) reports costs range from \$600 to \$8,000.
Basis of Customer Costs	Equipment.	Equipment.	Equipment.	Covers labor costs.

	13	14	15	16
Measure Name	Customized CII Incentive Program	Water Savings Incentive Program	Enhanced Water Savings School Incentives Program	Outdoor Use Education and Training Programs
Applicable Customer Classes	CII	CII/Large MF 4 or more units/Irrigation/Ag	CII/Schools	SF, MF, CII
Applicable End Uses	CII Indoor / Outdoor / Process	CII Indoor / Outdoor / Process	CII Indoor / Outdoor / Process	Irrigation
Market Penetration by End Of Program (%)	25%	25%	0.5%	11%
Annual Market Penetration (%)	1%	1%	0.04%	1%
Use Only New Accounts	FALSE			
Water Use Reductions For Targeted End Uses Description	20%			
Annual Accounts Assumes per year	5	5	3	500
Water Use Reductions For Targeted End Uses	15%	15%	15%	5%
Evaluation Start Year	2014	2014	2020	2010
Evaluation End Year	2040	2040	2030	2020
Program Length, years	27	27	11	11
Measure Life, years	Permanent	Permanent	varies	10
Saves Hot Water	Yes	No	No	No
Utility Unit Cost for SF accounts, \$/account			\$0.00	\$25
Utility Unit Cost for MF accounts, \$/account			\$0	\$25
Utility Unit Cost for non-Res accounts, \$/account	\$3,500	\$7,500	\$2,500	\$25
Customer Unit Cost. \$/SF account			\$0	\$25
Customer Unit Cost. \$/MF account			\$0	\$25
Customer Unit Cost. \$/non-Res account	\$6,000	\$7,500	\$5,000	\$25
Annual Utility Admin & Marketing Cost	40%	10%	25%	75%
Affected Units	Account	Account	Account	Account
Notes	Assume 25% of surveyed accounts participate in customized rebate program and save 15%, others may participate in SoCal WaterSmart through Measure 1.	Anaheim may consider adding supplemental funding to MWD's base incentives. Programmatic BMP/CII		BMP 2.1 - Public Information <u>Annual expenses vary:</u> FY 2010: \$24,500 FY 2011: \$4,600 FY 2012: \$4,600 FY 2013:\$3,500 (3 classes) FY 2014: \$2,700 (4 classes)
Basis of Water Savings	Engineering estimate of average savings.	MWD provided \$0.46/1000 g estimated and \$0.60/1000 g (performance-based) measured in the future.	Industry standards.	Assume 3 classes per year, attended by 30 each class or 90 homeowners attend and take action to save 20% of current outdoor use. 90 is 0.3%/yr. participation. Goal to increase to 1%/yr.
Basis of Utility Costs	Assume cost may triple as more expensive rebates requested.	Program administration and marketing.	Program administration and marketing.	Program administration, marketing, and staffing.
Basis of Customer Costs	Covers labor costs.	Equipment, installation labor, permit fees.	Equipment.	Free.

	17	18	19	20
Measure Name	Public Information Program	School Education	Customer Award Program	Promote Green Buildings
Applicable Customer Classes	SF	SF	SF, MF and CII	CII
Applicable End Uses	SF, MF	SF, MF	All	All
Market Penetration by End Of Program (%)	100%	10%	0%	6%
Annual Market Penetration (%)	50%	5%	0.04%	1.0%
Use Only New Accounts				
Water Use Reductions For Targeted End Uses Description	0.5%	0.25%		
Annual Accounts Assumes per year	49984	4998	25	69
Water Use Reductions For Targeted End Uses	0.5%	0.3%	10.0%	15.0%
Evaluation Start Year	2008	2006	2015	2015
Evaluation End Year	2040	2020	2020	2020
Program Length, years	33	15	6	6
Measure Life, years	2	2	Permanent	Permanent
Saves Hot Water	Yes	No	No	No
Utility Unit Cost for SF accounts, \$/account	\$4	\$2	\$100	\$0
Utility Unit Cost for MF accounts, \$/account	\$24	\$12	\$250	\$0
Utility Unit Cost for non-Res accounts, \$/account	\$0	\$0	\$500	\$500
Customer Unit Cost. \$/SF account	\$0	\$0	\$100	\$0
Customer Unit Cost. \$/MF account	\$0	\$0	\$250	\$0
Customer Unit Cost. \$/non-Res account	\$0	\$0	\$500	\$5,000
Annual Utility Admin & Marketing Cost	75%	30%	30%	30%
Affected Units	Account	Account	Account	Account
Notes	BMP 2.1 - Public Information Annual expenses vary: FY 2010: \$82,100 FY 2011: \$24,800 FY 2012: \$8,900 FY 2013: \$7,500 (Solar Cup sponsorship) FY 2014: \$17,500 (budget)	BMP 2.1 - Public Information Poster Contest (annual) - \$580 to \$4,000 Discovery Science Program K-5 grades from 46 Anaheim elementary schools; 10,000 students participated in 2013. Since 1998 over 100,000 students have been reached through the MWDOC program. Education Program (includes MWDOC). Budget/ #presentations/ #students reached FY 2010: \$38,200 FY 2011: \$47,100 (88/ 7,253) FY 2012: \$33,000 (158/ 10,320) FY 2013: \$34,600 (46 / 10,000) FY 2014: \$30,000 (TBD/10,135 (proj.))		
Basis of Water Savings	N/A	N/A	Estimate	Estimate
Basis of Utility Costs	Program administration, marketing, and staffing.	Program administration, marketing, and staffing. MWDOC contract - \$30,000/yr. (expires 12/2013) Anaheim budget - \$10,000		
Basis of Customer Costs	Free.	Free.	Free.	Free.

Notes:

SF = Single-Family Residential
MF = Multi-Family Residential
CII = Commercial/Institutional/Industrial
SYSTEM = APU Water Utility

APPENDIX C: COMMUNITY OUTREACH PROGRAM

C.1 Background

Since 2003, the City of Anaheim, a member agency of the Metropolitan Water District of Southern California (MWD), has participated in and benefited from MWD's annual advertising, education and community outreach campaigns. MWD's website bewaterwise.com and California Friendly brands have successfully encouraged Southern California consumers and business owners to make permanent changes in their everyday uses of water.

During the 2007-2009 drought, MWD significantly increased its outreach efforts to communicate the change from voluntary to mandatory water use efficiency in many Southern California cities and communities. APU leveraged MWD's investments to conduct an aggressive public awareness campaign publicizing water supply challenges and the need for water use efficiency. To ensure regional consistency, APU aligned its water use efficiency messaging with MWD's outreach campaigns by developing "Don't be a Water Waster. Be Water Wise", "Saving Water, A Better Way of Life!", and the recent "Because Every Drop Counts..." Through this coordinated campaign, APU successfully implemented a voluntary, incentive-based approach that reduced residential water use by about 13% between 2008 and 2012.

Looking to the future, it is evident that APU must continue to develop strategies and methodologies that maximize efficient water use by residents and businesses. In addition, Anaheim expects population growth of nearly 10% between 2013 and 2025 when residential developments that stalled during the recession are completed. Moreover, SBx7-7 which mandates a 20% reduction in urban per capita water use through greater water use efficiency by the year 2020 has made it essential to develop a long-term water use efficiency ethic in our communities.

C.2 Overview

APU recognizes water use efficiency is an integral component of current and future water supply strategy. Since the early 1990's, as one of the original signatories to the CUWCC's Memorandum of Understanding, Anaheim has been designing, implementing and monitoring water use efficiency programs that meet or exceed the goals of the CUWCC's BMPs.

APU's experience has shown that financial incentives and drought messaging do not always result in consumers permanently changing their water-use behaviors. Therefore, APU's objective is to communicate that water is a valuable, finite and precious commodity in order to develop a water use efficiency ethic that leads consumers to permanently change their water use behavior, quickly adopt new water saving technologies, and choose climate-appropriate landscapes. Without changing consumers' perception of the value of water, per capita water use will likely increase to pre-drought and pre-recession levels when water supplies return to normal and the economy improves. A change in the public's perceived value of water is critical in ensuring long-term regional water supply reliability.

APU's Water Use Efficiency Master Plan (Plan) is based on a voluntary, incentives-based approach to water use efficiency that utilizes new communication programs emphasizing the value of water and targeting specific

segments of the community. By encouraging customers to participate in our water saving incentive programs, APU will help secure a reliable water supply for the community and region.

C.3 Voluntary, Incentives-Based Approach

APU emphasizes a voluntary and incentive-based approach over mandates and penalties to encourage customer adoption of long-term water use habits. This approach is defined in the Anaheim City Council resolution of September 2008 which asks APU customers to voluntarily reduce water use through various water use efficiency measures. The benefit of this approach is that through education APU can work towards changing customer behaviors concerning water use. In addition, APU is demonstrating that agencies have an alternative to implementing harsh water use restrictions, financial penalties, and temporary rate increases to achieve desired water conservation targets. APU continues to support this initiative by implementing an extensive water use efficiency outreach campaign, providing a broad range of water saving programs and workshops for our customers, as well as offering rebates, incentives, and water-saving measures to encourage water use efficiency.

Leading By Example

The City of Anaheim strives to be a model for other municipalities by reducing its water use. Examples of City departments working together to save water include efficiency retrofits at public facilities, using water-efficient brooms to clean paved surfaces, and installing artificial turf or weather-based irrigation controllers in public areas. To date, over 75% of the City's parkway and median irrigation systems have been replaced with centralized, weather-based irrigation systems, which have collectively reduced water use by approximately 20%. Staff also conducts weekly inspections of irrigation systems to prevent leaks and runoff, and plants California Friendly landscaping throughout Anaheim.

- **Key projects:**

- *Waterwise Demonstration Garden* – dedicated to Sally White for her many years of community service, showcases water efficient gardening at the Anaheim Train Station located at 2150 E. Katella Avenue.
- *Energy Field* – provided a new green space to the local community with the installation of over 65,000 square feet of artificial turf in the main play area. This is the largest artificial turf installation funded by the utility to convey alternatives to turf and benefits of saving water.
- *Orphaned Parkways Program* – launched in partnership with the Public Works Department. The goal was to enhance the community's aesthetics while conserving water. Turf in parkways and medians was removed and replaced with artificial turf. A total of 12 parkways and median locations were upgraded resulting in the installation of over 16,000 square feet of artificial turf and savings of more than 350,000 gallons of water per year.
- *Do-It-Yourself (DIY) Homeowner Landscape* – developed a new process to assist individual homeowners who prefer to complete a landscape project, of at least 5,000 square feet or greater, on their own without the assistance of a landscape professional. This included providing a Landscape Water Use Efficiency Customer Kit with information about the new landscaping requirements and water saving rebates at customer counters. The APU website was updated to include new online tools, including an excel-based form. The online form

provides instructions on how to design low-water use landscapes and calculate water savings based on plant selection and irrigation system upgrades.

- o *Anaheim Resort Centralized Weather-Based Controllers and Rotary Nozzles Project* – implemented a \$100,000 grant awarded from the USBR, to partially fund the purchase of irrigation equipment to retrofit the irrigation system encompassing 50 acres of landscaping in the Anaheim Resort Maintenance District.

In addition, APU has implemented policy changes to respond to worsening drought conditions throughout California, as well as to comply with legislative mandates. For instance, in September 2008, City Council adopted Resolution No. 2008-154 to implement voluntary water conservation measures. Shortly after, the Planning Department updated the Chapter 18.46 of Title 18 Landscaping and Screening to allow the use of artificial turf up to 100% of the front yard (18.46.055 Artificial Turf Standards). In April 2009, to prepare for potential worsening drought conditions APU updated the Chapter 10.18 of Title 10 Water Reduction Provisions Ordinance. In response to Assembly Bill 1881 (Laird), in December 2009, APU amended the Chapter 10.19 of Title 10 Landscape Water Efficiency Ordinance (Appendix G) to reflect new landscaping requirements.

C.4 Regional Coordination

APU coordinates its water use efficiency priorities, messaging and outreach activities with MWD and Municipal Water District of Orange County (MWDOC) to ensure consistency throughout the region. APU's Communications Group and Water Use Efficiency staff continue to participate in MWD and MWDOC's work groups and informational meetings to learn about outreach strategies and messaging priorities. These include the MWD's Public Information Officer's Working Group, MWD's Member Agency Education Coordinators, MWDOC's Water Use Efficiency Coordinators Work Group, and MWDOC's Public Affairs Workshop Committee.

C.5 Community Outreach Program

APU will continue to invest in education and outreach activities that raise public awareness of water's value and its supply challenges, as well as the importance of using water wisely. APU will review its water use efficiency messaging and develop new marketing materials at least annually to reflect current water supply availability conditions, and ensure consistency with regional outreach efforts. Existing community outreach programs are discussed below.

Water Awareness Month

Water Awareness Month started as a joint effort between the Department of Water Resources (DWR) and the Association of California Water Agencies (ACWA) during California's 1987-1992 drought as an effort to educate the public about the importance of water use efficiency and conservation. Over the years, it has become the keystone of APU's community outreach effort by featuring an aggressive schedule of activities and promotions focused on students and residential customers every year in May.

Water Awareness Month features:

- The Anaheim City Council adopted a resolution to declare May to be "Water Awareness Month."
- The results of a childrens' Water Conservation Poster Contest are announced, and the 18 winning posters are prominently displayed in a public location, such as the City Hall lobby.
- A pre-game ceremony held on the field at Angel Stadium showcases the winning students and promotes the water use efficiency message to the baseball game fans in the stands.

- APU participates in the Orange County Children’s Water Education Festival, the largest event of its kind in the nation. This annual festival is a fun and hands-on opportunity for students and teachers to learn about local water issues and how they can protect water supplies and their environment. Each year, the festival hosts students from about 65 schools with the attendance of more than 7,000 third, fourth, and fifth grade students and their teachers.
- Local high school teams sponsored by APU participate in the MWD’s Solar Cup event. Each team builds a solar-powered boat to race in the event, and builds and displays a model of a solar-energy solution to a water-related problem or issue. APU-sponsored teams frequently win significant awards and the winning teams are later introduced at a meeting of the APU Board.
- Free residential California Friendly landscape workshops, held on Saturdays, teach water-saving landscaping techniques to residents. Typically, a series of three classes are held in the spring.

School Education

- In partnership with the MWDOC and the Discovery Science Center, APU will continue to provide water use efficiency education to all public and private elementary schools in Anaheim. Over 10,000 students participate each year in interactive workshops to learn about the importance of saving water. Based on MWDOC’s “Ricki the Rambunctious Raindrop” mascot, this program encourages students to participate in the MWDOC’s “Be a Water Hero” water use efficiency pledge program, in which students pledge to save water and receive a free gift for being a “Water Hero”. Cumulatively, this collaborative school education program has reached over 100,000 Anaheim elementary students since 1998.

C.6 Communication Platforms

APU’s Water Use Efficiency and Communications staff work closely together to implement a wide variety of outreach programs and activities:

Advertising

- Develop a new outreach campaign “Let’s Do Our Part” to promote a long-term water conservation ethic, and support the current statewide drought messaging. The campaign would include posters and ads for water awareness month activities.
- Update APU’s website to reflect the City’s transition from “Water Conservation” to “Water Use Efficiency” home page www.anaheim.net/savewater.
- Ensure the Water Use Efficiency page on APU’s website provides accurate information on water-saving tips, rebates, and incentives for both business and residential customers.
- Develop direct link on APU’s home page to the Water Use Efficiency page www.anaheim.net/savewater.
- Promote Anaheim Anytime for reporting water waste throughout the city.
- Write/submit articles for Anaheim Chamber Business Digest (Fall issue).
- Write/submit front-page article on water efficiency for At Your Service newsletter (September-October issue).
- Write/submit article for Anaheim Magazine (Fall issue).
- Celebrate Water Awareness Month each year in May, which includes the display of promotional posters at Anaheim West Tower and City Hall buildings, community centers, libraries, and police

departments; educational tip cards for the public to take home; ads in the Anaheim Bulletin (a neighborhood newspaper published by The Orange County Register), Facebook posts, and APU's website updates.

- Promotion of monthly irrigation schedules in our customer newsletter 3 times per year and creation of irrigation schedule magnets for distribution at community events.

Media

- Media releases promote water use efficiency awareness and incentive programs on Anaheim Cable Channel 3 (August through October).
- Each quarter, print water use efficiency message on water/electric bills.
- Include bill insert for At Your Service newsletter (spring issue).
- Localize MWD water use efficiency ads for use in Anaheim Hills News/Anaheim Bulletin (Fall issue).
- Display targeted message marquee advertising at the Honda Center, Convention Center, and Angel Stadium.
- Promote residential California Friendly landscape workshops (three-class series) through advertising with Orange County Register insert and press release.
- Broadcast Cable TV Public Service Announcement (PSA) to promote water use efficiency awareness and incentive programs, as well as water-saving tips.

Public Awareness

- APU's water and electric field staff promote water use efficiency throughout the City by distributing door hangers at customers' residences/businesses as a friendly reminder to reduce water waste.
- During 2007-2010, APU issued The Water Pipeline, a bi-monthly electronic newsletter, to provide drought response actions, water saving achievements, and other policy issues to subscribers. These included residents, businesses, policy makers and visitors.
- Provide Landscape Water Use Efficiency Customer Kits to help businesses, developers, and residents design and complete water efficient landscape projects. The Kit contains a copy of the City's Landscape Water Efficiency Ordinance, information about water saving landscape devices, low-water use plants, and rebates. The Kit is available at the Planning Department and Water Development customer counters.
- Distribute mailer on water-saving rebates/incentives to community organizations.
- Promote the use of Anaheim 311 to report water waste 24 hours a day. Anaheim 311 is a convenient, non-emergency hotline that allows residents, businesses and visitors to contact the City by dialing 311.
- Promote the use of Anaheim Anytime; a web-based customer response management system that provides easy access for the public to submit water use efficiency questions or report water waste 24 hours a day.
- Send monthly watering reminders (i.e. adjust sprinklers) through Anaheim Alert.
- Offer free residential California Friendly landscape workshops (three-class series) at the Downtown Community Center on Saturdays every spring.

Community Events

- Informational booths provide the community the opportunity to ask staff questions about APU's water use efficiency programs, and receive water-saving tips and special water-conserving promotional items. We collaborate with Electric Utility staff to distribute water use efficiency program information at approximately 50 events each year, including booth presence at least once a month at the Downtown Anaheim Farmer's Market.
- Water Use Efficiency staff participates in the following events:
 - o Orange County's Children's Water Festival (March)
 - o Water Awareness Month (May)
 - o MWD Solar Cup Competition (May)
 - o Orange County Water Summit (May)
 - o Water Utility groundbreaking ceremonies and dedication events, such as the Water Sustainability Campus dedication event (May 2013).

Social Media

Social media is a low cost to no cost communication tool to connect with our customers. It can meet real-time communication needs, such as alerts and other emergency responses. Social media is an effective supplemental communication channel to inform customers of water use efficiency and to increase awareness and program participation.

APPENDIX D: ENHANCED COMMUNITY OUTREACH PROGRAM AND FUNDING MECHANISMS

D.1 Enhanced Community Outreach Program

Anaheim Public Utilities (APU) has established a solid base of water use efficiency outreach and activities. It now proposes to enhance those efforts in four new areas of emphasis:

- Increasing community engagement through facility tours and a Speakers Bureau;
- Offering a Customer Reward/Recognition Program;
- Obtaining grant funding to support programs and projects; and
- Providing customers with financing tools or funds for major water use efficiency improvements.

Community Engagement

APU will bolster community outreach to its customers through public facility tours and a speakers' bureau⁵. As an example, staff can offer school tours of the new Water Sustainability Campus or collaborative tours of Orange County Water District recharge basins in Anaheim. The APU Speakers' Bureau will provide expert speakers on various water topics to local organizations such as Rotary clubs, neighborhood associations, Chamber of Commerce, community college classes, etc.

APU will also explore social media platforms that can be used to enhance community outreach efforts. See Section D.3 of this appendix for details.

Customer Reward/Recognition Program

APU will develop one or more reward/recognition programs for businesses and residents who implement practices that result in water savings. Such as an annual awards program for residences that significantly reduce water use. Homeowners with the highest water savings would receive a plaque or certificate of recognition. Another option would be to develop a "Beautiful Landscape" community award program for residents. APU may also consider partnering with the non-profit "Anaheim Beautiful" to recognize homeowners associations. For CII customers, a separate program would recognize businesses that achieve high water savings by improving industrial processes or investing in water efficient landscape or irrigation devices.

Model Business Recognition

Customers and working partners who have significantly reduced their water use as a result of working with APU may become the "model business" or "model resident" to motivate other customers to follow their examples. A simple acknowledgement of model customers will be made on APU's website, social media feeds, and bill inserts, subject to the customers' agreement. APU will also offer to provide signs or banners for

⁵ Irvine Ranch Water District (IRWD) offers "Always Water Smart Resident Tours" hosted by IRWD Board member and features a tour of water treatment facilities, water reclamation plant, and San Joaquin Marsh.

display at the customer's location⁶. For example, schools that implement water saving projects can receive "Water-Wise School" banners.

Annual Award Program

APU should investigate establishing a more formal recognition program, such as annual award programs, potentially in partnership with organizations such as Anaheim Beautiful, Inside the Outdoors, and Anaheim Chamber of Commerce. APU should also reach out to other local organizations with similar values, such as the U.S. Green Building Council, who may also be interested in recognizing businesses and individuals that make significant contributions in water use efficiency through best practices, efficiency, and innovation⁷.

WaterSmart Certification Program

APU may implement a WaterSmart Business Certification Program⁸ for its commercial, industrial, institutional (CII) customers. To obtain the certification, the customer must submit an application. APU staff then performs a site water use survey to determine if the site meets the program's water use efficiency criteria. If the site meets the criteria, it will be certified. Recommendations and APU financial incentives may be offered to sites where improvements are needed.

Customer Appreciation Events

Customer appreciation events provide ample outreach opportunities to the community and shows appreciation to the local community as a whole⁹. APU can adopt the customer appreciation concept applicable to its customer base and may choose to focus on certain customer sectors. For example, a small business customer appreciation event may be created through a partnership with the Anaheim Chamber of Commerce.

D.2 Grants and Other Funding Programs

Financial assistance from grants awarded by local, state, regional or federal agencies can provide an important source of funding to WUE programs. This section provides a summary of water grant programs available to Southern California water providers through MWD, MWDOC, USBR, and the California Department of Water Resources (DWR).

MWD Water Savings Incentive Program (WSIP)

The funding MWD provides through this program allows APU to work with its large water-using customers, including CII, agricultural and large landscape to improve water use efficiency. The water savings potential of individualized projects helps MWD's 5,200 square mile service area achieve its efficiency goals. WSIP provides financial incentives for customized water efficiency projects including:

⁶ Eastern Municipal Water District offers this program.

⁷ Silicon Valley Water Conservation Awards <http://www.waterawards.org/> (Santa Clara Valley Water District)

⁸ East Bay Municipal Utility's District WaterSmart Business Certification Program <http://www.ebmud.com/for-customers/for-commercial-customers/watersmart-business-certification-program>

⁹ IRWD held a community event to commemorate its 50th anniversary

- Installation of commercial or industrial high-efficiency equipment;
- Industrial process improvements;
- Agricultural and landscape water efficiency improvements; and
- Water management services.

MWD Grant Programs

MWD's Innovative Conservation Program (ICP) provides funding in cooperation with the USBR, Southern Nevada Water Authority (SNWA), and the Central Arizona Project (CAP) for research that will document water savings and reliability of innovative water savings devices. The objective is to evaluate the water saving potential and reliability of innovative water saving devices, technologies, and strategies. New projects are identified and evaluated every other year. All interested parties including public, private, or non-profit organizations are eligible for funding, which is available each year. In FY 2013 the program budget was \$450,000 or \$50,000 per project. All proposals are competitively evaluated.

MWD's Local Resources Program (LRP) provides financial incentives for the development of water recycling and groundwater recovery supplies that replace an existing demand or prevent a new demand on MWD's imported water supplies either through direct replacement of potable water or increase regional groundwater production. Public and private water utilities within MWD's service area are eligible for financial incentives up to \$250 per acre-foot of water produced over a 25-year term. The funding amount is recalculated annually based on eligible project cost incurred each year and MWD's applicable water rates. Project applications are accepted on an open and continuous basis until MWD's target yield of 174,000 AFY is fully subscribed.

MWD also provides sponsorship to community-based organization through its Community Partnering Program to promote discussion and educational activities for regional water use efficiency and WUE programs, such as water awareness programs, water-related educational outreach programs, and public policy water conferences.

APU intends to utilize MWD's various funding programs where appropriate to enhance outreach activities.

USBR Grant Programs

USBR provides financial assistance in the form of grants to eligible entities through the WaterSMART Program, CALFED Water Use Efficiency Grant Program, and Water Conservation Field Services Grant Program. These grant programs provide funding to various types of projects, including planning, research, pilot, demonstration, implementation, and construction projects. USBR grants typically require a 50% cost share through matching funds and in-kind contribution. Award ceilings vary by program and funding cycle.

There are four WaterSMART grant programs:

- Water and Energy Efficiency Grants provide funding to projects which seek to conserve and use water more efficiently, increase the use of renewable energy, protect endangered species, or facilitate water markets.
- System Optimization Review Grants provide funding to analyze system-wide efficiency that will improve the effectiveness and operations of a delivery system, district, or water shed. Improvements

recommended in the Review may then be eligible for funding under WaterSMART Water and Energy Efficiency Grant.

- Advanced Water Treatment and Pilot and Demonstration Project Grants provide funding to pilot and demonstration projects that address technical, economic and environmental viability of treating and using brackish groundwater, seawater, impaired waters or otherwise create new water supplies within a specific locale.
- Grants to Develop Climate Analysis Tools provide funding to projects that develop tools to assess the impacts of climate change on water resources and inform management decisions with respect to those impacts.

The CALFED Water Use Efficiency Grant Program provides funding to projects which accelerate the implementation of cost-effective actions that provide statewide benefits through water use efficiency, reduce the demand for Bay-Delta water and can result in significant benefits to water quality, water supply reliability, and in stream flows.

The Water Conservation Field Services Grant Program provides funding to programs designed to encourage water use efficiency, assist water agencies to develop and implement effective water management and water use efficiency plans, coordinate with State and other local water use efficiency plan efforts, and generally foster improved water management on a regional, statewide and watershed basis.

MWDOC Choice Program

MWDOC provides a range of services to member agencies and the Cities of Anaheim, Santa Ana, and Fullerton offered under the MWDOC Choice Program. The Choice services applicable to water use efficiency programs include:

- Water Use Efficiency - MWDOC administers a range of water use efficiency programs for member agencies (3-5 years commitment from agencies). The costs to participants will be in proportion to the benefits received (incentive payments from MWD and other sources of funding).
- School Education Program - MWDOC provides school education programs where each participating agency can set a target number of students. The cost to the agency is based on the number of students.

Other programs offered under Choice are the South Orange Coastal Ocean Desalination Program, Huntington Beach Ocean Desalination Program, and the Second Lower Cross Feeder.

DWR Grant Programs

The California Department of Water Resources offers financial assistance under the Agricultural and Urban Water Use Efficiency (Proposition 50) Grant Program. This program provides funding to agricultural and urban water use efficiency projects with statewide benefits. Funding is available for implementation, research, and demonstration projects. Agricultural and urban water suppliers must comply with SBx7-7, AB 2572, and AB 1420 to be eligible for the grant. Cost shares are required for certain project categories and are determined on a project by project basis; proportional to the relative balance of local and Bay-Delta water use efficiency benefits.

Proposition 39 (California Clean Energy Jobs Act)

California State Legislature adopted Proposition 39 or the California Clean Energy Jobs Act in 2012. This legislature will allocate \$2.5 billion dollar of funding over five years to California schools to support efficient energy and alternative energy projects. APU is currently assisting local public schools to maximize Proposition 39 funds for water use efficiency projects by providing technical assistance in identifying areas for possible water savings, calculating the potential savings, and identifying other funding opportunities.

Customer Financing Options

Anaheim expects population growth of nearly 10% between 2013 and 2025 when residential developments that stalled during the recession are completed. Accordingly, APU could investigate the feasibility of offering a water demand offset program to new commercial development projects in Anaheim. Also known as “net zero” development, the term suggests that water demand from new development will have no impact on the existing water supply. A water demand offset program requires developers of new and expanded water service to offset the amount of water the development is projected to use. The offset is achieved by developers retrofitting inefficient water devices (indoor and outdoor) with high efficiency ones at existing residential and commercial establishments owned by others. The program may require the developers to carry out the retrofitting themselves to obtain offset credits or the developers may have the option to purchase the offset credits from the water utility who carry out the retrofitting. Credits may also be given to developers who install high efficiency fixtures in the new proposed developments. Offset measures may also extend beyond water use efficiency measures to include other facets of development, such as groundwater recharge, storm water runoff, and wastewater management.

D.3 Enhancing Social Media Use

Social media is a low cost communication tool to connect with intended audiences. The use of social media as a means to reach target customers has become increasingly mainstream for businesses and organizations, including for public utilities. For water utilities, social media provides many benefits. It provides a source of information for customers on the utility’s programs and offerings, as well as news announcements. It is a place for virtual conversations with customers to support public discussion, and for the utility to solicit public feedback on key issues. It can meet real-time communication needs, such as alerts and other emergency responses.

APU currently utilizes Facebook and You Tube, separate from the City of Anaheim. Table D-1 provides a snapshot of existing social networking channels.

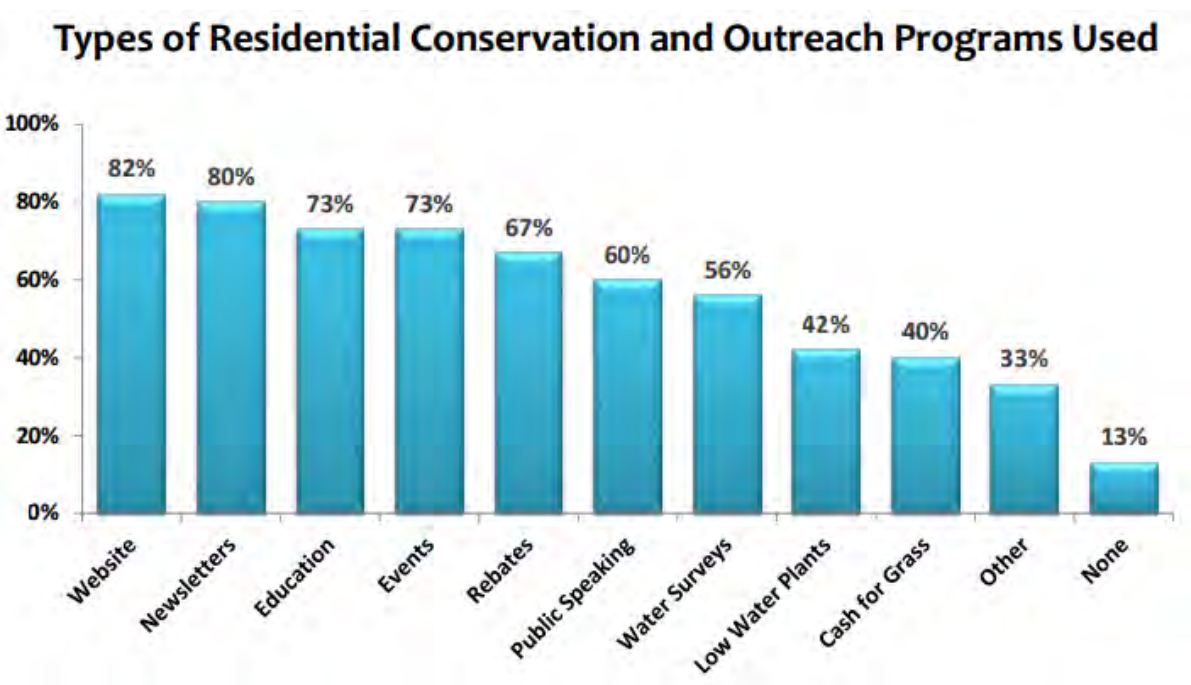
Table D-1: Quick Statistics of Existing Social Networking Channels

Statistics*	APU	City of Anaheim
Facebook Likes (Number of Followers)	581	3,781
You Tube Subscribers	14	137
Instagram	No	Yes
Pinterest	No	Yes

*Statistics as of 1/31/2014.

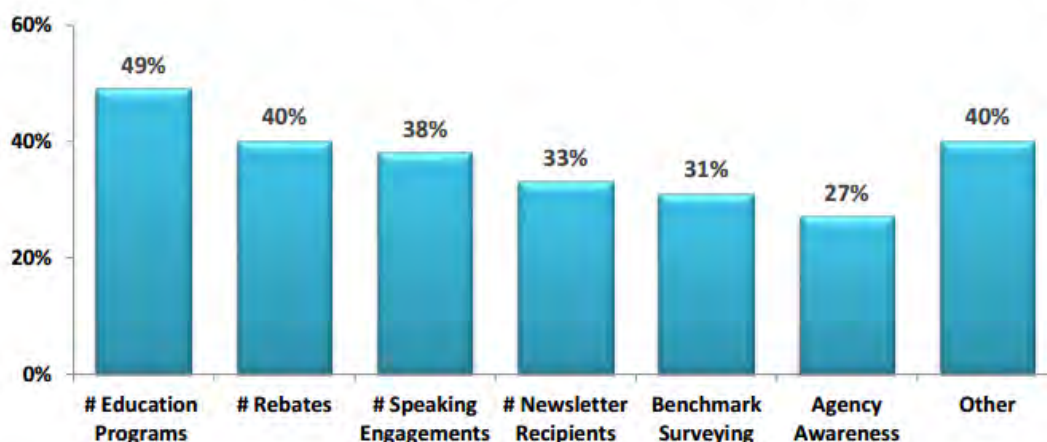
APU may consider the following steps when exploring social media platform development:

- Identify what the use of social media will help APU achieve. Explore what APU can use social media for. Who are APU’s intended audiences and will the use of social media help APU reach its intended audiences? Online resources are available to help identify the adoption of social media for water utilities. http://www.ema-inc.com/e_business.html#SocialMedia
<http://www.pikeresearch.com/research/social-media-in-the-utility-industry-consumer-survey>
- APU can increase its exposure by tapping into the City of Anaheim’s social media outlets since it is reaching a much wider audience. These offer a good starting point to gaining momentum while requiring minimal investment of APU’s resources. Since the City has a designated social media administrator, APU only has to provide postings with advanced notice.
- Look for ways to integrate social networking into APU’s outreach activities. Create buzz and make the most of social networking.
- According to a study by Redhill Group Inc. (a marketing research firm) in 2013 where 40 California water utilities were interviewed, findings were as follow:



53% of agencies set water use efficiency/outreach goals

Which Metrics Do You Use to Measure Success of Outreach Programs?



40% of agencies used social media for outreach efforts.

Which Social Media Outlets Does Your Organization Use?

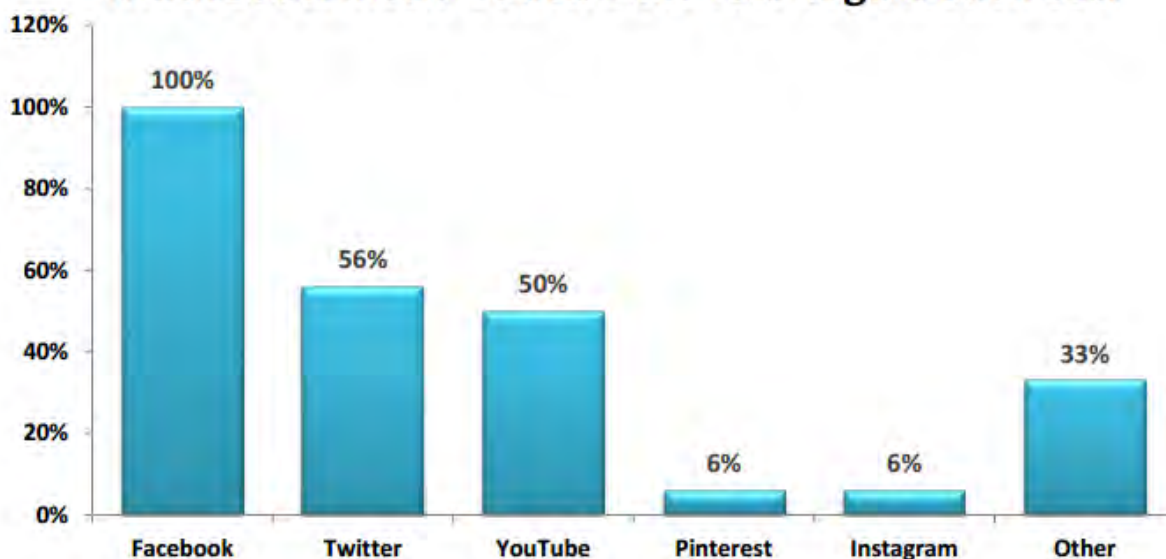


Figure D-1: Social Media Success

Source: Redhill Group, Inc. Water Smart Innovations Conference Presentation, October 2013 “Gauging Social Marketing Campaign Success ---Tools and Tips”

<http://www.watersmartinnovations.com/documents/pdf/2013/sessions/2013-W-1325.pdf>

APPENDIX E: WATER-ENERGY NEXUS

E.1 Water-Energy Programs

APU's water and power staff closely coordinate the water use efficiency and energy efficiency programs to give our customers a one-stop source of information on rebates and other assistance related to both of these programs. This also helps us maximize the effectiveness of our community outreach and communication efforts. For example, home utility audits include inspection of irrigation systems, as well as installing low-flow shower heads and faucet aerators.

We are able to claim energy savings resulting from water use efficiency because less energy is needed to transmit and pump water to Southern California from the Sacramento-San Joaquin Delta. Water use efficiency efforts in FY 12/13 generated 670,000 kWh in energy savings, which were included in APU's report of overall energy savings to the California Energy Commission.

In fiscal year 2012/13, our water use efficiency efforts involved program participation by 2,599 customers and realized annual water savings of 57 million gallons. Although CII water use efficiency programs involved only 15 participants, they resulted in annual water savings of 41 million gallons or 72% of the total water conserved.

Table E-1: APU's Report of Overall Water and Energy Savings

Project Name	Water Saved (Million Gallons)	kWh Saved	Customer Participation	Customer Rebates/Incentives
Commercial Customers				
Landscape Performance Certificate	16.9	188,087	3	n/a
Rotating Sprinkler Nozzles	1.2	12,951	0	n/a
SoCal Water Smart	2.8	36,789	2	\$10,200
Weather-based Irrigation Controllers	1.1	11,767	5	\$3,850
Water Use Survey Program	18.9	209,837	5	n/a
Subtotal	40.9	459,430	15	\$14,050
Residential Customers				
Home Incentives	3.7	48,456	331	\$28,135
Home Utility Check- Up	11.4	148,173	2,222	n/a
Rotating Sprinkler Nozzles	0.7	7,312	7	\$1,349
Weather-based Irrigation Controllers	0.2	2,752	19	\$851
Turf Removal	0.3	3,075	5	n/a
Subtotal	16.3	209,768	2,584	\$30,334
Total Savings	57.1	669,198	2,599	\$44,384

Utilities Partnerships

APU will collaborate with other utilities to deliver our water conservation messages. APU and the Southern California Gas Company will develop and implement a joint outreach and direct install program for Anaheim's large food service industry. Joint natural gas-water-electricity conservation programs are also planned for low-income residential customers and small business customers. Currently, APU's water use efficiency and energy efficiency program managers collaborate on the residential home energy audit program, outreach with the local school districts through Proposition 39, and other school educational programs. These collaborative efforts will continue to leverage APU's resources and will provide the WUE staff with a variety of cost-effective options to contact and influence more customers.

E.2 Water – Energy Projects

Water Sustainability Campus

The centerpiece of Anaheim's new Water Sustainability Campus, the first of its kind in Southern California, is a decentralized small-scale water recycling facility built in an urban environment. This facility can process up to 35 million gallons of recycled water per year and will allow APU to reduce its purchases of imported water for irrigation and other non-potable uses and the associated cost by approximately \$100,000 annually.

Each day, the facility converts 50,000 gallons of wastewater into recycled water suitable for landscape irrigation and other non-potable uses. Recycled water is used for restroom flushing and landscape irrigation in and around City Hall. Future phases will increase production to 100,000 gallons of recycled water per day.

The water recycling facility incorporates many of the LEED green building rating system and anchors the campus with various educational displays, including a rainwater harvesting system and California Friendly landscaping. An additional element of the site is the use of permeable paving, which allows rainwater to seep into the ground, thereby replenishing the local groundwater basin while reducing pollution to streams and the ocean.

Interpretative signs explain the functions and benefits of each element of this unique demonstration campus, allowing residents and visitors the opportunity to learn how to incorporate sustainability features on their own properties. A waterfall, garden, and benches make the campus an attractive experience for local residents and employees in nearby businesses.

E.3 Funding Mechanisms

Property Assessed Clean Energy Financing

Property Assessed Clean Energy (PACE) financing may be used for eligible improvements for energy efficiency, water use efficiency, or solar energy systems. APU recently approved agreements with two PACE lenders, making PACE financing available for permanent water use efficiency improvements to properties in Anaheim. The financial obligation is an assessment added to the property owner's tax bill and paid with the property taxes. The assessment only applies to properties whose owners have voluntarily chosen to use PACE financing. It is available for both residential and commercial properties.

APPENDIX F: FEEDBACK FROM PUBLIC STAKEHOLDER MEETINGS

F.1 Stakeholder Meetings

A key component of the Plan development was stakeholder meetings. Four meetings were held with various APU water customers, providing the opportunity to review and discuss the Plan's proposed 20 conservation measures and strategies. A total of 20 customers attended and contributed valuable feedback on existing rebate programs, proposed new programs, and need for technical assistance.

F.2 Customer Feedback

APU received the following comments and considered them in the development of the Plan:

- Focus on offering rebates for low-flow irrigation system; issues with wind causing uneven watering.
- Training for landscapers; consider offering Spanish bilingual courses under a certification program.
- Schools expressed interest in partnership with APU on state and federal grant funding opportunities.
- Offer cooling tower operation expertise; help save water and energy simultaneously.
- Provide a program that will offer rebates for equipment currently ineligible for such rebates under MWD's SoCal Water\$mart.
- Large landscape water use surveys are extremely valuable; a number of participants requested a survey.
- Customer recognition by APU in the form of plaques, certificates, or other incentives is valuable for communicating accomplishments to executive management.
- Promote new water saving technology with minimal maintenance.
- Continue to provide water supply updates on the APU website. Share customer success stories online or in bill inserts; quantify water savings to dollars.
- Provide forum/help connect customers (i.e. school districts, HOAs) with similar needs, so they can share ideas about irrigation systems, devices, and new technology. Selecting appropriate controllers and nozzles vary from system to system. This also applies to landscaping and turf removal options. The process can be overwhelming and poses the greatest challenge to participating in existing rebate programs.
- Landscape maintenance education is vital, such as providing "How-to" manuals, landscape classes, etc. to assist homeowners, landscape water managers, and landscapers with plant selection (low-water use vs. California Friendly), using WBICs correctly, and programming watering schedules.
- Large landscape customers suggested a Landscape Irrigation Certification Program. They explained that many of their employees are unfamiliar or uncomfortable with the newest irrigation technology and, as a result, they are not programming weather-based irrigation controllers properly and the landscape is overwatered. Several options were discussed and it was agreed that specific training for local landscape employees and recognition with a Certificate would benefit everyone. This program will include a bilingual training. APU agreed to investigate funding for employee training, such as the Employment Training Panel (ETP) Program, so that employers could pay their employees for the time needed for training.
- Implement tiered water rates; current price of water is too low.
- Emphasize a holistic approach to landscaping, i.e. the water filtration system is vital to the proper functioning of drip irrigation.
- Consider offering rebates for water softeners to encourage customers to perform proper maintenance; potential water savings from replacing the resins.

F.3 Participants

The meetings were led by four APU staff:

- Rick Shintaku, Engineering Manager – Water Resources and Planning Division
- Issis Macias, Water Efficiency Programs Manager
- Janet Coe, Business and Community Programs Division Manager
- Shant Boodanian, Business Development Specialist

The APU customers who attended a stakeholder meeting or submitted comments included:

- Anaheim City School District
- Anaheim Department of Public Works
- Anaheim Golf Operations
- Anaheim Hills Planned Community Association
- Anaheim Palms Corporate Center
- Anaheim Parks Department
- Anaheim Union High School District
- Broadmoor-Northridge Homeowners Association
- California Department of Transportation – District 12 (Caltrans)
- Disneyland Resort
- EXPO-Dyeing & Finishing, Inc.
- Firmenich
- Harvest Landscape
- Kaiser Permanente
- Metropolitan Water District of Southern California
- Municipal Water District of Orange County
- Nor-Cal Beverage Co., Inc.
- Placentia-Yorba Linda Unified School District
- PowerStone Property Management
- Ridge View Homeowners Association
- Savanna School District
- Walnut Village
- Wendt Landscape Services, Inc.
- Western Medical Center Anaheim

APPENDIX G: RESOLUTION AND ORDINANCES

RESOLUTION NO. 2008-154

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ANAHEIM IMPLEMENTING VOLUNTARY WATER CONSERVATION MEASURES.

WHEREAS, the City of Anaheim (“Anaheim”) has had an aggressive water conservation program since the early 1990s and as a reflection of Anaheim’s success, its water demand has only increased by seven percent (7%) despite a population increase of thirty-six percent (36%) over the past 20 years; and

WHEREAS, water conservation continues to become critically important to Anaheim, the State of California (“California”), and the region; and

WHEREAS, California is in the second year of a drought, with below-average rainfall, very low snowmelt runoff, and the largest court-ordered water transfer restrictions in California state history; and

WHEREAS, on June 4, 2008, Governor Arnold Schwarzenegger proclaimed a statewide drought and issued an Executive Order calling upon water providers to take action to reduce water consumption for the remainder of 2008 and to prepare for water conditions that could likely worsen in 2009; and

WHEREAS, the Metropolitan Water District of Southern California (“MWD”) Board of Directors has declared a Water Supply Alert for its member agencies, including Anaheim, to help sustain reserves and to urge all water agencies in the region to activate and enforce their existing conservation and drought ordinances, accelerate public outreach, and further develop local supplies; and

WHEREAS, the Water Supply Alert is the level immediately preceding the Water Supply Allocation level upon which MWD will cut water supplies to its member agencies, including Anaheim; and

WHEREAS, current water supply conditions require short and long-term strategies to sustain a reliable supply of water to meet current and future water demands; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ANAHEIM AS FOLLOWS:

1. The City Council hereby encourages all persons and Customers of the Public Utilities Department to reduce water usage on a voluntary basis by taking the following types of water conservation measures:

- a. Refrain from hosing or washing sidewalks, walkways, driveways, parking areas or other paved surfaces, except where necessary to protect public health and safety;
- b. Promptly repair all leaks from indoor and outdoor plumbing fixtures, including but not limited to sprinkler systems;
- c. Refrain from allowing water to run off landscaped areas onto adjoining streets, sidewalks, parking lots, or alleys;
- d. Refrain from allowing water to run off onto adjoining streets, sidewalks, parking lots or alleys while washing vehicles;

- e. Adjust landscape watering according to weather conditions to avoid excess usage; preferably limit watering to no more than every other day;
- f. Limit landscape watering between the hours of ten a.m. and five p.m.; and
- g. Offer guests in hotels, motels, and other commercial lodging establishments the option of not laundering towels and linens daily.

2. This Resolution shall take effect immediately upon adoption.

THE FOREGOING RESOLUTION was approved and adopted by the City Council of the City of Anaheim at a regular meeting of said City Council held on the **16th** day of **September, 2008**, by the following roll call vote:

AYES: Mayor Pringle, Council Members Hernandez, Sidhu, Galloway, Kring

NOES: NONE

ABSTAIN: NONE

ABSENT: NONE

CITY OF ANAHEIM

Curt Pringle

MAYOR OF THE CITY OF ANAHEIM

ATTEST:

Linda Andral

CITY CLERK OF THE CITY OF ANAHEIM

CHAPTER 10.18 WATER REDUCTION PROVISIONS

Sections:

- 10.18.010 Policy and purpose.
- 10.18.020 Definitions.
- 10.18.030 Authorization.
- 10.18.040 Application.
- 10.18.050 Water Reduction Plan implementation.
- 10.18.060 Water Reduction Plan I.
- 10.18.070 Water Reduction Plan II.
- 10.18.080 Water Reduction Plan III.
- 10.18.090 Additional water reduction measures.
- 10.18.100 Reservation of rights.

10.18.010 POLICY AND PURPOSE.

It is declared that because of prevailing water supply conditions the general welfare requires that the water resources available to the City be put to the maximum beneficial use possible, and that the waste or unreasonable use or unreasonable method of use of water be minimized, and the conservation of such water be exercised with a view to the reasonable and beneficial use thereof in the interest of the people of the City for the public welfare. The purpose of this chapter is to provide water reduction procedures to minimize the effect of a water reduction to the Customers of the City and, by means of this chapter, to adopt provisions that will significantly reduce the consumption of water thereby extending the available water required for the Customers of the City while reducing the hardship on the City and the general public to the greatest extent possible. (Ord. 5204 § 1 (part); February 26, 1991: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.020 DEFINITIONS.

As used in this chapter:

.010 "Billing Unit" means the unit amount of water used to apply water rates for the purposes of calculating commodity charges for Customer water usage and equals one hundred cubic feet or seven hundred forty eight gallons of water.

.020 "Catastrophic Water Reduction" means a condition in which the existing or projected water supply available to the City is not anticipated to or actually does not meet the ordinary water requirements of the Department or its Customers. This condition may be the result of factors including, but not limited to, supply cuts to the City's source water from the Metropolitan Water District of Southern California ("MWD") or by any other wholesale water purveyors, groundwater restrictions, emergency conditions, and/or failure of the City's or its supplier's water transmission and distribution systems.

.030 "City" means the City of Anaheim located in California.

.040 "City Council" means the legislative body of the City.

.050 "Customer" or "Consumer" means any person, persons, association, partnership, corporation, governmental agency or other entity supplied and billed for water service by the Department.

.060 "Department" means the Public Utilities Department of the City.

.070 "General Manager" means the General Manager of the Department or his or her designee.

.080 "Water Conservation Fund" means a revenue balancing account set up to receive those monies which may be generated by Water Reduction Rates.

.090 "Water Reduction Plan" means a plan that is implemented by resolution specifying water use reduction measures that permit the Department to prudently plan for and supply water to its Customers.

.100 "Water Reduction Rates" means a rate revision designed to provide indoor, health and safety water service with consumption above such level priced at an incrementally increasing cost per Billing Unit that is designed, but not limited to, recovering penalties assessed by the Metropolitan Water District of Southern California for exceeding the City's respective allocations.

(Ord. 5204 § 1 (part); February 26, 1991: Ord. 5855 §§ 14, 15; April 29, 2003: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.030 AUTHORIZATION.

.010 The various officers, departments, commissions, and agencies of the City are authorized and directed to implement the applicable provisions of this chapter upon the effective date hereof.

.020 (Repealed by 5855, 4/29/03)

(Ord. 5204 § 1 (part); February 26, 1991: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.040 APPLICATION.

The provisions of this chapter shall apply to all Customers and property served water by the Department wherever situated, and shall also apply to all property and facilities owned, maintained, operated, or under the jurisdiction of the various officers, departments, commissions, and agencies of the City. The provisions of this chapter are in addition to, and not in lieu of, the provisions of Section 10.16.380 of this Code relating to curtailed supply of electricity or water.

(Ord. 5204 § 1 (part); February 26, 1991: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.050 WATER REDUCTION PLAN IMPLEMENTATION.

The Department shall monitor and evaluate the projected supply and demand for water by its Customers. The Department shall recommend to the City Council such Water Reduction Plan(s) as provided in this chapter which permit the Department to prudently plan for and supply water to its Customers. The City Council may, by resolution, order implementation of such Water Reduction Plan(s) as provided in this chapter which it deems appropriate. At any time, the City Council may discontinue any Plan, modify any Plan, or may implement another Plan as provided in this chapter. Upon a finding by the City Council, any Water Reduction Plan then in effect shall terminate.

(Ord. 5204 § 1 (part); February 26, 1991: Ord. 5855 § 17; April 29, 2003: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.060 WATER REDUCTION PLAN I.

Upon the adoption of a resolution by the City Council ordering the implementation of Water Reduction Plan I, the following provisions shall take effect:

.010 All persons and Customers of the Department shall be encouraged to reduce water usage on a voluntary basis.

.020 City Council may, by resolution, identify specific or example water conservation measures which it deems appropriate to address the potential reduction in water supplies. Conservation measures may include some or all of the following measures or others as deemed appropriate by City Council:

.0201 Refrain from hosing or washing sidewalks, walkways, driveways, parking areas or other paved surfaces, except where necessary to protect public health and safety.

.0202 Promptly repair all leaks from indoor and outdoor plumbing fixtures, including but not limited to sprinkler systems.

.0203 Refrain from allowing water to run off landscaped areas onto adjoining streets, sidewalks, parking lots, or alleys.

.0204 Refrain from allowing water to run off onto adjoining streets, sidewalks, parking lots, or alleys while washing vehicles.

.0205 Adjust landscape watering according to weather conditions to avoid excess usage; preferably limit watering to no more than every other day. There shall be no watering days restriction when using reclaimed or other non-potable water, provided that proper signage is posted.

.0206 Limit landscape watering between the hours of nine a.m. and five p.m.

.0207 Offer guests in hotels, motels, and other commercial lodging establishments the option of not laundering towels and linens daily.

(Ord. 5204 § 1 (part); February 26, 1991: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.070 WATER REDUCTION PLAN II.

In addition to those measures implemented as part of Water Reduction Plan I, the City Council may, by resolution, order the implementation of or amendment to the Water Reduction Rates, to encourage reduction in water usage. Such Water Reduction Rates shall be prorated if adopted after the commencement of a full billing period.

(Ord. 5204 § 1 (part); February 26, 1991: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.080 WATER REDUCTION PLAN III.

In the event of a Catastrophic Water Reduction condition, the following provisions may be implemented, as appropriate, by City Council upon the adoption of a resolution:

.010 Water Reduction Rates may continue as set forth in Water Reduction Plan II or be implemented as needed to provide the price signals to Customers to achieve reduction in water usage.

.020 The Department may recommend to the City Council the adoption of mandatory conservation measures. The City Council, by resolution, may adopt such other or additional mandatory conservation measures as necessitated by the Catastrophic Water Reduction condition which shall be prohibited water uses and unlawful during a Water Reduction Plan III.

.030 The Department is authorized to shut off water supply to dedicated irrigation uses, if the Department determines that the City's water supplies are being diverted by irrigation water demands such that it impacts public health and safety, or essential governmental services such as fire, police, and emergency services. (Ord. 5204 § 1 (part); February 26, 1991: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.090 ADDITIONAL WATER REDUCTION MEASURES.

The City Council may order implementation of other water reduction measures in addition to those set forth in Sections 10.18.060, 10.18.070 and 10.18.080, and may eliminate or modify any measures if warranted by the availability of water supplies. Such changes to or additional water reduction measures shall be implemented in the manner provided in this chapter under Section 10.18.050, Water Reduction Plan Implementation.

(Ord. 5204 § 1 (part); February 26, 1991: Ord. 6138 § 1 (part); April 14, 2009.)

10.18.100 RESERVATION OF RIGHTS.

The rights of the Department hereunder shall be cumulative to any other right of the Department to discontinue service.

(Ord. 5204 § 1 (part); February 26, 1991: Ord. 6138 § 1 (part); April 14, 2009.)

CHAPTER 10.19 LANDSCAPE WATER EFFICIENCY

Sections.

- 10.19.010 Purpose.
- 10.19.020 Applicability.
- 10.19.030 Definitions.
- 10.19.040 Implementation procedures for landscape documentation packages.
- 10.19.050 Landscape water use standards.

10.19.010 PURPOSE.

The purpose of this Chapter is to establish an alternative model acceptable under Assembly Bill 1881 (Laird) as being at least as effective as the State Model Landscape Water Efficiency Ordinance in the context of conditions in the City in order to:

- .010 Promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;
- .020 Promote the values and benefits of landscapes while recognizing the need to invest in water and other resources as efficiently as possible;
- .030 Establish a structure for planning, designing, installing, and maintaining and managing water efficient landscapes in new construction and rehabilitated projects;
- .040 Establish provisions for water management practices and water waste prevention for existing landscapes;
- .050 Use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount; and
- .060 Encourage the use of economic incentives that promote the efficient use of water, such as implementing conservation pricing.

(Ord. 5349 § 1 (part); January 12, 1993: Ord. 6160 § 1 (part); December 8, 2009.)

10.19.020 APPLICABILITY.

.010 Beginning January 1, 2010, all planting, irrigation, and landscape-related improvements required by this Chapter shall apply to the following landscape projects:

.0101 New landscape installations or landscape rehabilitation projects by public agencies or private non-residential developers, except for cemeteries, with a landscaped area, including pools or other Water Features but excluding hardscape, equal to or greater than 2,500 square feet, and which are otherwise subject to a discretionary approval of a landscape plan, or which otherwise require a ministerial permit for a landscape or Water Feature;

.0102 New landscape installations or landscape rehabilitation projects by developers or property managers of single-family and multi-family residential projects or complexes with a landscaped area, including pools or other Water Features but excluding hardscape, equal to or greater than 2,500 square feet, and which are otherwise subject to a discretionary approval of a landscape plan, or which otherwise require a ministerial permit for a landscape or Water Feature;

.0103 New landscape installation projects by individual homeowners on single-family or multi-family residential lots with a total project landscaped area, including pools or other Water Features but excluding hardscape, equal to or greater than 5,000 square feet, and which are otherwise subject to a discretionary approval of a landscape plan, or which otherwise require a ministerial permit for a landscape or Water Feature;

.0104 Section 10.19.050.010 of the Landscape Water Use Standards of this Chapter shall apply to all landscaped areas installed after January 1, 2010 to which Section 10.19.020.010 is applicable.

.020 This Chapter does not apply to:

- .0201 Registered local, state, or federal historical sites;
- .0202 Ecological restoration projects that do not require a permanent irrigation system;
- .0203 Mined-land reclamation projects that do not require a permanent irrigation system;

.0204 Plant collections, as part of botanical gardens and arboretums open to the public; or

.0205 Cemeteries.

(Ord. 5349 § 1 (part); January 12, 1993: Ord. 6160 § 1 (part); December 8, 2009.)

10.19.030 DEFINITIONS.

The terms in this Chapter shall have the meaning set forth below:

.010 "Applied Water" means the portion of water supplied by the irrigation system to the landscape.

.020 "Ecological Restoration Project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

.030 "Estimated Applied Water Use" means the average annual total amount of water estimated to be necessary to keep plants in a healthy state, calculated as provided in the Guidelines. It is based on the reference evapotranspiration rate, the size of the landscape area, plant water use factors, and the relative irrigation efficiency of the irrigation system.

.040 "ET Adjustment Factor" or "ETAF" is equal to the plant factor divided by the irrigation efficiency factor for a landscape project, as described in the Guidelines. The ETAF is calculated in the context of local reference evapotranspiration, using site-specific plant factors and irrigation efficiency factors that influence the amount of water that needs to be applied to the specific landscaped area.

.0401 A combined plant mix with a site-wide average plant factor of 0.5 (indicating a moderate water need) and average irrigation efficiency of 0.71 produces an ET adjustment factor of $(0.7) = (0.5/0.71)$, which is the standard of water use efficiency generally required by this Chapter and the Guidelines, except that the ETAF for a special landscape area shall not exceed 1.0.

.050 "Guidelines" refers to the Landscape Water Efficiency Guidelines, as adopted by the City, which describe procedures, calculations, and requirements for landscape projects subject to this Chapter.

.060 "Hardscapes" means any durable material or feature (pervious and non-pervious) installed in or around a landscaped area, such as pavements or walls. Pools and other Water Features are considered part of the landscaped area and not considered hardscapes for purposes of this Chapter.

.070 "Homeowner Installed Landscape" means any landscaping either installed by a private individual for a single-family residence or installed by a licensed contractor hired by a homeowner. A homeowner, for purposes of this Chapter, is a person who occupies the dwelling he or she owns. This definition excludes speculative homes, which are not owner-occupied dwellings and which are subject under this Chapter to the requirements applicable to developer-installed residential landscape projects.

.080 "Irrigation Efficiency" means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation Efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum average irrigation efficiency for purposes of this Chapter is 0.71. Greater irrigation efficiency can be expected from well designed and maintained systems.

.090 "Landscaped Area" means all the planting areas, Turf areas, and Water Features in a landscape design plan subject to the Maximum Applied Water Allowance and Estimated Applied Water Use Calculations. The landscaped area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

.100 "Landscape Contractor" means a person licensed by the State of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

.110 "Landscape Documentation Package" means the documents required to be provided to the City for review and approval of landscape design projects, as described in the Guidelines.

.120 "Landscape Project" means total area of landscape in a project, as provided in the definition of "landscaped area," meeting the requirements under Section 10.19.020 of this Chapter.

.130 "Local Agency" means a city or county, including a charter city or charter county, that is authorized by the City to implement, administer, and/or enforce any of the provisions of this Chapter on behalf of the City. The local agency may be responsible for the enforcement or delegation of enforcement of this Chapter

including, but not limited to, design review, plan check, issuance of permits, and inspection of a landscape project.

.140 “Local Water Purveyor” means any entity, including a public agency, city, county, or private water company that provides retail water service.

.150 “Maximum Applied Water Allowance” or “MAWA” means the upper limit of annual applied water for the established landscaped area as specified in the Guidelines. It is based upon the area’s reference evapotranspiration, the ET adjustment factor, and the size of the landscaped area. The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance.

.160 “Mined-land Reclamation Projects” means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

.170 “New Construction” means, for the purposes of this Chapter, a new building with a landscape or other new landscape such as a park, playground, or greenbelt without an associated building.

.180 “Non-pervious” means any surface or natural material that does not allow for the passage of water through the material and into the underlying soil.

.190 “Pervious” means any surface or material that allows the passage of water through the material and into the underlying soil.

.200 “Permit” means an authorizing document issued by Local Agencies for new construction or rehabilitated landscape.

.210 “Plant Factor” or “Plant Water Use Factor” is a factor, when multiplied by ETo, that estimates the amount of water needed by plants. For purposes of this Chapter, the plant factor range for low water use plants is 0 to 0.3; the plant factor range for moderate water use plants is 0.4 to 0.6; and the plant factor range for high water use plants is 0.7 to 1.0. Plant factors cited in this Chapter are derived from the Department of Water Resources 2000 publication “Water Use Classification of Landscape Species.”

.220 “Recycled Water” or “Reclaimed Water” means treated or recycled waste water of a quality suitable for non-potable uses such as landscape irrigation and water features. This water is not intended for human consumption.

.230 “Reference Evapotranspiration” or “ETo” means a standard measurement of environmental parameters which affect the water use of plants. ETo is given expressed in inches per day, month, or year as represented in the Guidelines, and is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances.

.240 “Rehabilitated Landscape” means any re-landscaping project that meets the applicability criteria of Section 10.19.020.010, where the modified landscape area is greater than 2,500 square feet, is 50% of the total landscape area, and the modifications are planned to occur within one year.

.250 “Smart Automatic Irrigation Controller” means an automatic timing device used to remotely control valves that operate an irrigation system and which schedules irrigation events using either evapotranspiration (weather-based) or soil moisture data.

.260 “Special Landscape Area” means an area of the landscape dedicated solely to edible plants such as orchards and vegetable gardens, areas irrigated with Recycled Water, Water Features using Recycled Water, and areas dedicated to active play such as parks, sports fields, golf courses, and where Turf provides a playing surface.

.270 “Turf” means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.

.280 “Valve” means a device used to control the flow of water in an irrigation system.

.290 “Water feature” means a design element where open water performs an aesthetic or recreational function. Water Features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of Water Features is included in the high water use hydrozone of the landscaped area. Constructed wetlands used for on-site wastewater treatment, habitat protection or storm water best management practices that are not irrigated and used solely for water

treatment or storm water retention are not water features and, therefore, are not subject to the water budget calculation.

(Ord. 5349 § 1 (part); January 12, 1993: Ord. 5855 § 18; April 29, 2003: Ord. 6160 § 1 (part); December 8, 2009.)

10.19.040 IMPLEMENTATION PROCEDURES FOR LANDSCAPE DOCUMENTATION PACKAGES.

.010 Prior to installation, a Landscape Documentation Package shall be submitted to the City for review and approval of all landscape projects subject to the provisions of this Chapter. Any Landscape Documentation Package submitted to the City shall comply with the provisions of the Guidelines. The Landscape Documentation Package shall include a certification by a professional appropriately licensed in the State of California stating that the landscape design and water use calculations have been prepared by or under the supervision of the licensed professional and are certified to be in compliance with the provisions of this Chapter and the Guidelines.

.020 Landscape and irrigation plans shall be submitted to the City for review and approval with appropriate water use calculations. Water use calculations shall be consistent with calculations contained in the Guidelines and shall be provided to the City, as the Local Water Purveyor, in accordance with the procedures of this Chapter and the Guidelines.

.030 Verification of compliance of the landscape installation with the approved plans shall be obtained through a Certification of Completion in conjunction with a Certificate of Use and Occupancy or Permit Final process, as provided in the Guidelines.

.040 The City, as the Local Water Purveyor, has adopted Water Reduction Provisions (Chapter 10.18) that allow for enforcement of water waste prohibitions for all existing metered landscaped areas within its jurisdiction.

(Ord. 5349 § 1 (part); January 12, 1993: Ord. 6160 § 1 (part); December 8, 2009.)

10.19.050 LANDSCAPE WATER USE STANDARDS.

.010 For applicable landscape installation or rehabilitation projects subject to Section 10.19.020.010 of this Chapter, the Estimated Applied Water Use allowed for the landscaped area shall not exceed the MAWA calculated using an ET adjustment factor of 0.7, except for special landscaped areas where the MAWA is calculated using an ET adjustment factor of 1.0; or the design of the landscaped area shall otherwise be shown to be equivalently water-efficient in a manner acceptable to the City; as provided in the Guidelines.

.020 Notwithstanding any provision of this Chapter 10.19, the irrigation of landscaped areas shall be conducted in a manner consistent with all applicable rules and requirements adopted by the City relating to the irrigation of landscaped areas, and shall be subject to all penalties and incentives for water conservation and water waste prevention established and implemented by the City.

(Ord. 5349 § 1 (part); January 12, 1993: Ord. 6160 § 1 (part); December 8, 2009.)