

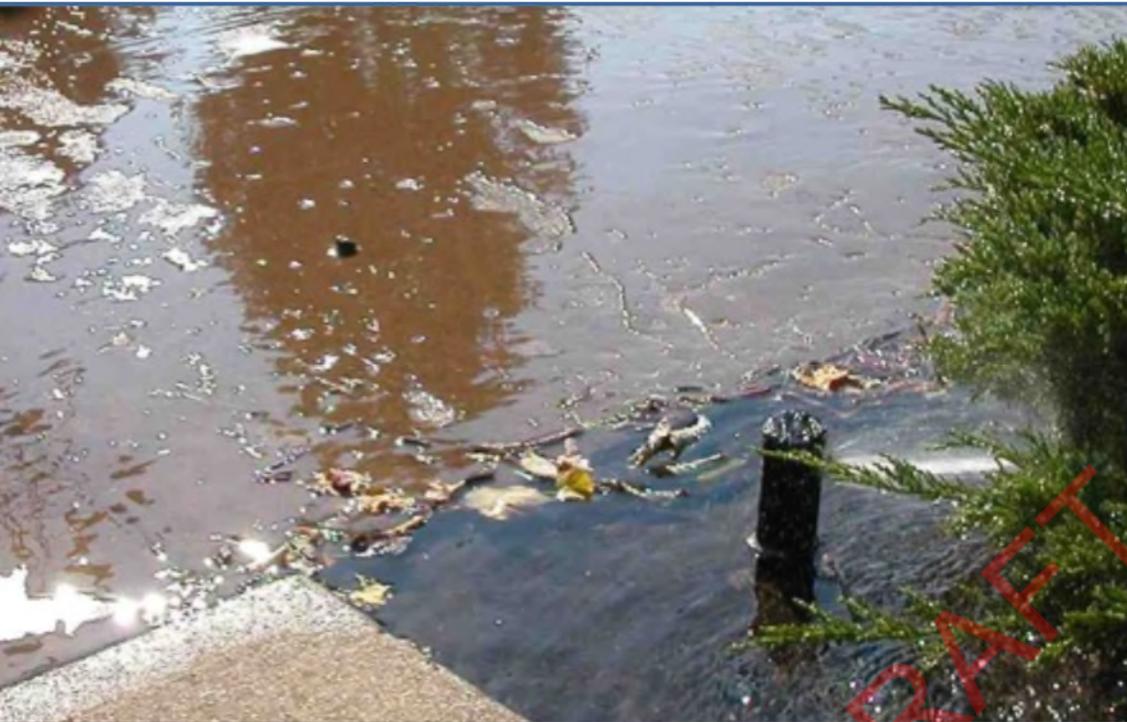
SECTION 7: CONSERVATION MEASURES

An aerial photograph showing a body of water heavily polluted with brown, turbid water and floating debris. A utility pole stands in the water, and green trees are visible on the right bank. A large red 'DRAFT' watermark is overlaid diagonally across the image.

The City's ordinances, adopted by Council, have strict provisions which encourage the efficient use of water while penalizing wasteful use. The City's water staff are also committed to water use efficiency through the use of management practices and customer assistance programs.

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CONSERVATION MEASURES

Conservation measures, including those aimed at leak detection (pictured) are an essential part of the City's policies.

7.1 OVERVIEW

As a result of diminished existing supplies and difficulty in developing new supplies, water conservation is important to Southern California's sustainability. Therefore, the City acknowledges that efficient water use is the foundation of its current and future water planning and operations policies. The City implements water conservation through a combination of programs, resources, and policies.

To conserve California's water resources, multiple public water agencies and other interested parties of the California Urban

Water Conservation Council (CUWCC) drafted the Memorandum of Understanding Regarding Urban Water Conservation (MOU) in 1991. The MOU establishes 14 Best Management Practices (BMPs) which are defined roughly as policies, programs, practices, rules, regulations, or ordinances that result in the more efficient use or conservation of water.

7.1.1 UPDATES TO BMPs FOR 2015 UWMPs

In previous years, the 14 CUWCC BMPs coincided with the 14 Demand Management Measures (DMMs) defined in the UWMP Act. The DMMs are intended to



reduce long-term urban demands from what they would have been without their implementation. The DMMs are in addition to programs which may be instituted during occasional water supply shortages.

For 2015 UWMPs, the Department of Water Resources (DWR) has refined the list of DMMs required to be reported in the 2015 UWMPs.

- **Water Waste Prohibition Ordinances**
- **Metering**
- **Conservation Pricing**
- **Public Education & Outreach**
- **Programs to Assess and Manage Distribution System Real Loss**
- **Water Conservation Program Coordination and Staffing Support**
- **Other Demand Management Measures**
(that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented)

As with previous UWMPs, agencies that are members of the CUWCC can submit the BMP annual reports in lieu of providing a description of each DMM in the UWMP.

7.2 CUWCC MEMBERSHIP

Previously, the City became a member of the CUWCC by signing the MOU and since that time has implemented the water conservation measures stipulated by the CUWCC. The City actively implements all five of the measures with good faith effort by achieving and maintaining the staffing, funding, and in general, the priority levels necessary to achieve the level of activity called for in each BMP's definition as described in the MOU.

Water conservation is an integral part of the City's water policies. In past years, the City has previously been required to submit bi-annual BMP reports to the CUWCC that document the implementation of each BMP. As of 2015, the BMP reports can be submitted annually. Although the City has not consistently submitted the BMP reports, they have implemented the conservation measures as described later in this Section.

The CUWCC helps create extra urgency for the City in implementing conservation measures.

Recently, the City did not renew their CUWCC membership, for various reasons, but in part due to City staff reductions which rendered the completion of the BMP reports difficult. As part of this UWMP process, however, the City is implementing conservation measures, and, if feasible, may renew its CUWCC membership.



7.2.1 UPDATES TO CUWCC BMPs

As with DWR’s DMMs, the CUWCC BMPs have changed for CUWCC members. The BMPs are now listed as

- **BMP 1:** Utility Operations
- **BMP 2:** Public Education & Outreach
- **BMP 3:** Residential Programs
- **BMP 4:** Commercial, Institutional, and Industrial Programs
- **BMP 5:** Landscape Programs

The changes listed above are reflected in the annual CUWCC BMP reports from recent years.

7.3 CURRENT CONSERVATION MEASURES

As signatory to the MOU through the end of 2016, the City has committed to using good-faith efforts to implement the BMPs. The City is unique in that it only has one source of supply which happens to be mostly unlimited (due to IID’s vast supply rights). The conservation programs implemented in the City are tailored to address the characteristics of this community. As such, the City has focused more on 1) on public information efforts (including mailers, flyers, and educational programs), 2) irrigation and landscape limitations, and 3) water losses/waste (both system losses and water waste). The City has focused less on rebates, retrofits, and audits as those items

do not have as much impact. Nevertheless, the City is committed to “good faith effort” to implement the BMPs as shown below in

Table 7.1:

**Table 7.1
City BMPs (CUWCC)**

BMP
<p>BMP 1: Utility Operations <i>Deals with water waste prohibitions, water efficiency ordinances, metering, conservation pricing, and other items related to managing water use</i></p>
<p>BMP 2: Public Education & outreach <i>Deals with outreach efforts including emails, newsletters, advertisements, presentations, promotions, etc. related to outreach & education</i></p>
<p>BMP 3: Residential Programs <i>Deals with showerheads, faucets, toilets, and leak detection surveys related to residential water use and rebates for water conserving fixtures</i></p>
<p>BMP 4: Commercial, Institutional, & Industrial Programs <i>Deals with toilets, urinals, steamers, cooling towers, food/restaurant equipment, medical equipment, and items related to commercial, institutional, and industrial water use</i></p>
<p>BMP 5: Landscape Programs <i>Deals with establishing parameters for large landscapes, including measurements, budgets, audits, prohibitions, incentives, etc., related to large landscapes</i></p>



7.4 IMPLEMENTATION

Although the City has not submitted the BMP reports required of CUWCC members, the City has committed to “good-faith effort” to implement the BMPs to the extent practical. The following is a list of the City’s conservation measures in accordance with the BMPs that are currently listed on CUWCC’s website:

1. Utility Operations

- 1.1. Operations Practices
- 1.2. Water Loss Control
- 1.3. Metering with Commodity
- 1.4. Retail Conservation Pricing

2. Public Education & Outreach

- 2.1. Public Outreach
- 2.2. School Education Programs

3. Residential

4. Commercial/Industrial/Institutional

5. Landscape

BMP 1: UTILITY OPERATIONS (Now Corresponds with DMMs 1, 2, 3, 5, & 6)

BMP 1.1 OPERATIONS PRACTICES

Conservation Coordinator

At the time of the 2010 UWMP, the City did not have a designated staff person responsible for program management, tracking, planning, and reporting on the BMP implementation (due to budget

constraints). Although it was the City’s intent to fill that role at that time, due to continued budget and staff restrictions, the City has decided that conservation activities be shared amongst City water staff. The City believes that due to its size and budget constraints, this better serves the City’s needs. In addition to City water staff, other City staff do on occasion support conservation program activities.

Water Waste Prevention

In August & September 2014, the City of Calexico passed Ordinance Nos. 1155 and 1156 which amended the City code to prevent water waste. The purpose of the new City code is essentially to conserve the City’s water supply for the greatest public benefit and to adopt provisions that will change the water-use habits of customers. The City code primarily restricts landscape irrigation but also addresses water waste, car washing, washing down of driveways, and decorative fountains, etc. More on the City’s 2014 Ordinance and Water Code can be found in **Section 8**.

BMP 1.2 WATER LOSS CONTROL

In accordance with recent production and demand data (DWR Form 38), the City has averaged about 20% water loss or “non-revenue water” over the past five years. Some of this “loss” is due to unmetered



landscape use at City-owned facilities (parks, lawns at institutional properties). Some of this “loss” is also due to inaccuracy of metered readings or the metered readings at different points in time (production/consumption measured on different days yielding different results). The rest of this amount is due to actual system losses. The City’s 2010 UWMP identified that water loss was an issue and estimated that the City would bring water loss under 10 percent within the next 10 years (by 2020). As part of this process, the City planned to complete water audits of its system using American Water Works Association (AWWA) water audit software. As part of this 2015 UWMP, the City has prepared AWWA water loss worksheets (see **Figure 7.1** on the following page) to help determine water losses and the cost of those losses.

The AWWA audits require a detailed and technical approach, and seeks to separate apparent water losses from overall water loss totals to reveal the Real Losses:

- “Water Losses”: System Input minus authorized or metered consumption.
- Apparent Losses: Unauthorized or unmetered consumption.
- Real Losses: “Water Losses” minus apparent losses. The actual volume of water lost through leaks, breaks, etc.

Figure 7.1 on the following page provides results of the AWWA water audit for 2015. The results of the audit indicate that, although the City’s meters appear to be operating well and the City is very effective and quick in responding to reported leaks, the City’s leakage index (the ratio of real loss to unavoidable loss) indicates room for improvement. The recommendations from the water audit (Under the tab “Loss Control Planning”) encourages the City to improve tracking of leak and repair time, to consider reducing system pressure, and to enhance metering. This could be achieved by simply metering (but not billing) City-owned landscapes. The City is currently evaluating these suggestions.

BMP 1.3 METERING WITH COMMODITY RATES

The City ordinances currently require meters for all service connections. Meters older than 10 years are inspected and replaced if necessary. The City reads the meters and bills customers based on volume of water used on a monthly basis. The customers are billed based on the volume of water used, the size of the meter and the type of connection. The City keeps records of the historical usage, meter size and type of connection. There are no unmetered customers except some parks and public spaces that are unmetered (since they are owned by the City).



AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association

Water Audit Report for: **City of Calexico Water Department (1310002)**
 Reporting Year: **2015** 1/2015 - 12/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where

WATER SUPPLIED

----- Enter grading in column 'E' and 'J' ----->

Volume from own sources:	+ ?			acre-ft/yr	Master Meter and Supply Error Adjustments
Water imported:	+ ?	9	5,753.000	acre-ft/yr	Pont: <input type="radio"/> Value: <input type="text"/>
Water exported:	+ ?			acre-ft/yr	<input type="radio"/> <input type="radio"/>
WATER SUPPLIED:				5,753.000	acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered:	+ ?	9	4,650.000	acre-ft/yr	Click here: ? for help using option buttons below	
Billed unmetered:	+ ?			acre-ft/yr		
Unbilled metered:	+ ?	8		acre-ft/yr		
Unbilled unmetered:	+ ?		71.913	acre-ft/yr		
Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed						
AUTHORIZED CONSUMPTION:				4,721.913	acre-ft/yr	Pont: <input checked="" type="radio"/> Value: <input type="text"/>

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption)

Apparent Losses

Unauthorized consumption:	+ ?		14.383	acre-ft/yr	Pont: <input type="radio"/> Value: <input type="text"/>	
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed						
Customer metering inaccuracies:	+ ?	5	0.000	acre-ft/yr	<input checked="" type="radio"/> <input type="radio"/>	
Systematic data handling errors:	+ ?		11.625	acre-ft/yr	<input type="radio"/> <input type="radio"/>	
Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed						
Apparent Losses:				26.008	acre-ft/yr	<input checked="" type="radio"/> <input type="radio"/>

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **1,005.080** acre-ft/yr

WATER LOSSES: **1,031.088** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **1,103.000** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	9	75.0	miles
Number of active AND inactive service connections:	+ ?	8	8,336	
Service connection density:	+ ?		111	conn./mile main
Are customer meters typically located at the curbside or property line?			Yes	(length of service line, beyond the property boundary, that is the responsibility of the utility)
Average length of customer service line:	+ ?			
Average length of customer service line has been set to zero and a data grading score of 10 has been applied				
Average operating pressure:	+ ?	9	62.0	psi

COST DATA

Total annual cost of operating water system:	+ ?	10	\$6,000,000	\$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	4	\$14.63	\$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+ ?	8	\$177.00	\$/acre-ft <input type="checkbox"/> Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 77 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Customer retail unit cost (applied to Apparent Losses)
- 2: Customer metering inaccuracies
- 3: Water imported

Figure 7.1: AWWA Water Audit Software



BMP 1.4 RETAIL CONSERVATION PRICING

All of the City’s customers are metered with a two-tier conservation rate structure which punishes excessive use of water as indicated by **Table 7.2** below:

**Table 7.2
Current (2015) City Water Rate Examples**

Tier	Pricing
Single Family Residential	
Tier 1 (0-3 CCF)	\$43.89 (tot.)
Tier 2 > 3 CCF	\$2.22 (per 100 cu. ft.)
Multi-Family Residential	
Tier 1 (0-3 CCF)	\$43.89 (tot.)
Tier 2 > 3 CCF	\$2.22 (Excess per 100 cu. ft.)
Commercial	
Tier 1 (0-1 CCF)	\$48.89 (tot.)
Tier 2 > 1 CCF	\$3.01 (Excess per 100 cu. ft.)

Although this rate structure helps conserve water, these rates were established in 2008/2009, during the downturn in the economy, to ensure that revenues can be maintained with the base rate (\$43.89). Since they have been in place for some time, the City may want to consider rate adjustments in the future.

**BMP 2: PUBLIC EDUCATION & OUTREACH
(Now Corresponds with DMM 4)**

BMP 2.1 PUBLIC OUTREACH

Public Information is a primary focus of the City’s conservation program. Like many cities, the City’s public information programs focuses on three key efforts:

- 1 Public Information Efforts:**
Information materials and multimedia presentations
- 2 Community Relations:**
Customer participation programs and special events
- 3 Media Relations:**
Advertising, press releases and local media contacts

The City communicates with its customers in a variety of ways including:

- Newsletters
- Intermittent Billing Inserts
- Signs/Posters
- Media press releases
- Regular presentations to community group and council meetings
- Information sharing via Multi-Agency Meetings
- Electronic distribution of press release, water conservation



publications (brochures, programs and newsletters)

- Education (schools & libraries)
- Informative Website that provides tips, rebate information, educational resources and more (<http://www.calexico.ca.gov/>)

Overall activities and expenditures for this BMP/DMM are summarized in **Table 7.3** below:

**Table 7.3
Public Information Activities (2011-2015)**

Item	Y/N
Website/Ads	Yes
Inserts/Brochures	Yes
Bill Showing Usage Comparison to Previous	Yes
Toilet Tab Rulers	Yes
Coordinate with Council to Inform Residents	Yes
Expenditures	\$8,000/yr.

BMP 2.2 SCHOOL EDUCATION PROGRAMS

As indicated in the 2010 UWMP, the City has recently been implementing a school education program to promote water conservation and water conservation-related benefits. The program consists of art contests, presentations, and tours of the City’s Water Treatment plant, as shown in **Table 7.4** below:

**Table 7.4
School Education Activities (2011-2015)**

Item	Y/N	Activities
Grades 1st to 6th	Yes	Art Contest, Brochures, Flyers, Tours
Expenditures	\$3,000/yr.	

BMP 3: RESIDENTIAL PROGRAMS (Now Corresponds with DMMs 6 & 7 "Other")

The largest customer class in the City service area is residential, accounting for about 87 percent of customers and about 75 percent of total use. The City, therefore, has focused the majority of its conservation efforts on residential users.

Residential Assistance (General)

As part of the City’s water meter replacement program, the City is in the process of gradually replacing old meters with more advanced meters that use AMI technology. The primary goal of this meter replacement program is to manage customer leaks; the secondary goal was to obtain better, more-accessible information about City customers and their water use patterns.

With the AMI meters, the City will be able to access information proactively. The AMI meters can be read remotely, with data collecting to the City’s SCADA network. The



technology will allow the City to run reports which identify homes showing a constant water use in the preceding 24-hour period.

The use of AMI technology has reduced costs and increased efficiency of residential surveys.

That way, the City will be able to tell if an on-site audit is necessary. If homeowners are present, they are provided an audit, dye tablets and other information to help them locate and fix

the leak. If the homeowners are not present and the leak is significant, the City will shut off the water. **Table 7.5** below shows the number of audits conducted over the past five years.

**Table 7.5
Water Surveys (2011-2015)**

Year	Surveys Offered/Completed*
2015	500
2014	500
2013	500
2012	500
2011	500

**Numbers are approximate and represent both computerized surveys and in-person surveys.*

The AMI data can also be used to ensure compliance with local ordinances, particularly the landscape watering restrictions. If customers are watering on non-irrigation days or during non-irrigation hours, this will show up on the Exception Report and staff may visit the homes. The penalties range from a warning on the first

incident, penalties up to 100 percent of the consumption charge for repeat violations, up to finally putting a restrictor on the meter for recalcitrant customers.

Not only does the City benefit from the AMI meters, but customers who want to track their use can go online to the City’s website and pay their bills. The City’s website has records of past bills and customers can track their usage and compare usage to other months. If a customer desires to have an audit, they can request an audit and the City can have a staff member perform a water conservation survey of the home, provide water efficiency suggestions, and/or inspection. The City may recommend showerheads, faucet-aerators, high-efficiency toilets, landscape timers, drip irrigation, and other items that meet the current water efficiency standards.

California Civil Code Section 1101.4 and 1101.5 requires that after January 1, 2014, all noncompliant plumbing fixtures in any single-family, multi-family residential real property and any commercial residential real property be replaced with water-conserving plumbing fixtures when a permit is taken out for building additions, alterations. Also, State law requires that after January 1, 2017, noncompliant plumbing fixtures in any single-family residential property be replaced with water-conserving plumbing fixtures, and shall be verified at the time of sale or



transfer. The City is currently in compliance with these requirements, and the City’s building department will verify that these codes are being enforced when a building permit is issued.

Residential Assistance (Landscape)

As with the indoor program, customers can request audits and one can be provided for them which will help them with landscape efficiency. The current program based on AMI data as described previously. The AMI data is also used to ensure compliance with local ordinances, particularly the landscape watering restrictions mentioned in **Section 8**. If customers are watering on non-irrigation days or during non-irrigation hours, this will be known to the City and staff will take corrective action. The penalties range up to a \$500 fee or criminal action.

Residential Assistance (HE Washers & Low-Flow Toilets)

Due to funding difficulties with the State’s rebate programs for HE washers and toilets, the City has not directly participated in the HE washer and toilet programs in the past five years. The costs and time of City staff involvement simply would not be effective at this time. However, as part of its public education and outreach programs discussed previously, the City does actively and strongly encourage its customers to replace

old washers and toilets with water efficient ones. Further, as a customer of the Imperial Irrigation District (IID), rebates are available to residents. The approximate number of homes which installed new HE washers and/or toilets in the past five years is estimated in **Table 7.6** below:

**Table 7.6
HE Washers & Toilets (2011-2015)**

Year	Washers	Toilets
2015	10	25
2014	10	25
2013	10	25
2012	10	25
2011	10	25

**Numbers are approximate and are based on previous customer interest.*

BMP 4: COMMERCIAL, INDUSTRIAL, & INSTITUTIONAL PROGRAMS (CII) (Now Corresponds with DMMs 6 & 7 "Other")

The City has about 541 commercial and institutional metered accounts, but at only 6.75%, the CII sector use does not account for a large portion of consumption in the City’s service area. The City primarily focuses on assistance to residential customers. However, as customers of the City’s water system, CII users have the same ability to access their own bills online showing usage data and make comparisons. If desired, the CII customers can request audits and the City can conduct an audit of the premises. Over the past five years, the



number of CII audits conducted is estimated in **Table 7.7:**

**Table 7.7
CII Surveys (2011-2015)**

Year	Comm. Surveys Offered/Comp.*	Ind. Surveys Offered/Comp.**
2011	100	0
2012	100	0
2013	100	0
2014	100	0
2015	100	0

**Numbers are approximate and represent both computerized surveys and in-person surveys.*

***City only had one industrial account up until 2015.*

BMP 5: LANDSCAPE PROGRAMS (Now Corresponds with DMMs 6 & 7 "Other")

Due to the City’s hot, arid climate, water demand during the summer months is much higher than during the winter. Much of the summer demand placed on the City’s water distribution system is used for irrigation purposes.

New development in the City is required to use water efficient landscaping, such as Xeriscape. Landscaping located in commercial, industrial, and multifamily residential developments shall include a water efficient irrigation system in accordance with specifications provided by the City. Prior to the issuance of a building permit, a landscape documentation package is submitted by the developer for

review and approval that includes a water conservation concept, calculation of the maximum applied water and estimated water use, irrigation design plan and landscape irrigation audit schedule. The City will then review and issue parameters governing the new development’s water use budget, which may not exceed 100% of ETo on an annual basis.

The City preserves water use records and budgets for customers with dedicated landscape irrigation accounts for at least four years. The City’s records will consist of the following:

- a) Number of dedicated irrigation meter accounts.
- b) Number of dedicated irrigation meter accounts with water budgets.
- c) Aggregate water use for dedicated non-recreational landscape accounts with budgets.
- d) Aggregate acreage assigned water budgets and average ETo for dedicated non-recreational landscape accounts with budgets.
- e) Number of accounts 20% over-budget.
- f) Number of accounts 20% over-budget offered technical assistance.
- g) Number of accounts 20% over-budget accepting technical assistance
- h) Aggregate acreage of areas assigned water budgets and average ETo for landscape accounts with budgets.



The California Irrigation Management Information System (CIMIS) provides real time weather information to assist in irrigation scheduling. Although CIMIS was initially designed to help agricultural growers and turf managers develop water budgets for determining when to irrigate and how much water to apply, the user base has expanded over the years. In addition to those mentioned above, current CIMIS data users include local water agencies, fire fighters, air control board, pest control managers, etc. There are a number of active CIMIS stations in the Imperial Valley, including in Seeley and Westmorland. These stations can provide evapotranspiration (ET_o) information for the purpose of developing landscape water budgets and irrigation scheduling. It is estimated that this BMP will result in a 15%-

20% reduction in demand for landscape irrigation.

7.5 EVALUATING EFFECTIVENESS OF BMPs/DMMs

The City will continue to track all program activities including outreach activities, rebate distribution, audits and leak interventions. Program effectiveness and per capita use will be monitored through the billing and consumption system. For example, the City will measure impacts of the new leak program by tracking leak events, duration and losses as the program progresses. The City will continue to develop its AMI system as a tool to measure effectiveness and to communicate that information to its customers.