



## **Residential Best Management Practices Implementation Guidebook**

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# Residential BMP Implementation Guidebook

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## INTRODUCTION

In December 2008, the California Urban Water Conservation Council (CUWCC) updated the Best Management Practices (BMPs) required under the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU)<sup>1</sup>, incorporating a broader approach to achieving water savings, improving water use efficiency, and measuring progress. In the past, agencies were limited to meeting specific implementation and reporting requirements in order to comply with the Residential BMP. However, significant progress has been made in water conserving technologies and practices over the past decade, allowing for a much broader approach going forward. Agencies may now choose to comply with the MOU through BMP implementation, Flex Track alternatives, or performance demonstrated by a reduction in gallons per capita per day (GPCD) over time.

This guidebook has been written to assist urban water agencies with understanding and successfully administering residential conservation programs in accordance with the Residential BMP. The intended audience is a Water Conservation Coordinator responsible for implementing the BMPs. Program examples and references are included to assist coordinators in developing and implementing successful programs within their service areas.

Residential water users throughout California depend on a reliable and safe supply of water for their homes. The activities described below, all part of the California Urban Water Conservation Council's Residential Best Management Practices (BMP) requirements, define the most effective, well proven water conservation methods and measures that residents, working in conjunction with water agencies, can implement. By implementing these methods and measures, homeowners, multi-family property owners, and tenants will increase water use efficiency. This program is important because it targets most water agencies' largest customer class: residential customers.

To meet the savings goals for the Council's Residential BMP, agencies may implement measures on the BMP List or select measures from the Flex Track menu. Following is a discussion of each approach. The MOU addresses coverage requirements for implementing BMPs or Flextrack. Coverage requirements are the expected level of implementation necessary to achieve full compliance. Coverage requirements may be expressed either in term of activity levels by water suppliers or as water savings achieved.

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<sup>1</sup> The Memorandum of Understanding and Best Management Practices, as amended December 10, 2008, are available in the Resource Center at [www.cuwcc.org](http://www.cuwcc.org).

## RESIDENTIAL ASSISTANCE PROGRAM

The CUWCC mandates that retail water agencies shall implement a water use efficiency program that consists of the coverage goals described in detail below or achieving water saving goals by implementing measures on the Flex Track Menu. A Residential Assistance Program is one of the requirements to implement if a retail water agency decides to implement the Programmatic BMPs instead of the Flex Track Option.

A residential assistance program, “Provide[s] site-specific leak detection assistance that may include, but is not limited to, the following: a water conservation survey, water efficiency suggestions, and/or inspection. Provide showerheads and faucet-aerators that meet the current water efficiency standard as stipulated in the WaterSense Specifications (WSS) as needed.” Each of these requirements will be discussed in the section below.

**Leak detection and assistance** is an important component of a residential program, as customers will not always realize that they have a leak, how to find it or how to fix it. The water agency is an essential partner in helping to prevent this water loss. Leak inspection and detection usually occurs because, either the customer has noticed an increase in their bills, the water agency has noticed an increase in use as compared to the previous year (if metered) or the water customer hears or sees a leak. If the customer calls, and is concerned about their high bill; first the customer service representative should compare the customer’s current usage to past usage. If use is noticeably higher, the agency should offer a water survey the customer to help them to locate the issue on their property.



*An auditor uses the meter to check for leaks.*

Leak detection is one of the many reasons that water meters are effective water use efficiency tools. Without a water meter, a customer may not detect a leak for months or longer.

Elements of residential leak inspection and detection includes the following steps:

1. Interview the customer to discuss why they think they have a leak. Have they heard or seen water pooling in places it should not be? Has their bill suddenly gone up? The interview could be conducted over the phone, by mail or in person by utility personnel, conservation staff, or introduced by a direct mail audit kit, or an internet leak detection instruction service, like [www.h2ouse.org](http://www.h2ouse.org).
2. A meter read. The water meter is one of the most important tools in detecting a leak. Information about how to locate and read a water meter should be included in the customer interview process, whether that be by mail, over the phone, online or in person.

3. If a leak is detected, it needs to be found on the property. The process could be done during a full water survey and should include turning the house valve off to determine if the leak is inside or out. For interior testing, dye tabs can be placed in toilet tanks, toilet overflow levels should be checked, and all fixtures should be checked for dripping water or pooling. Details on exterior surveys are found on page 21 in the Landscape section.
4. If the leak cannot be located using the water survey method above, a data logger can be one way to get more information about when the leak occurs, often narrowing down the cause and location
5. If the leak still cannot be found, a professional leak detection service can use more advanced technology to determine the location of the leak.
6. Once the leak is found, the inspector should provide the customer the location of leaks, possible cause, and prioritization of leaks if more than one is on-site.
7. If requested by the customer, a follow-up site visit can be scheduled to confirm leaks were repaired and that there are no additional leaks. If there is a meter, this is the easiest way to determine whether the leak has been fixed. (If there is no meter and the leak was not visible, use the leak detection gauge, the same method used to find the leak should be used to determine its repair). A follow up phone call to the customer works as well. Checking in with the customer after they receive their first bill when the leak has been assumed fixed is another way to determine if the leak is fully resolved.

There may be legal issues with water agency staff doing repairs on a customer's property. Be sure to document all findings when a leak is identified and have the customer sign any pertinent waivers.

On the water agency side some of the best practices to detecting a leak include AMR or AMI technology, high use alert letters, and coordination with field staff.

1. Automatic Meter Reading (AMR) allows drive-by or touch collection of water consumption data from water meters. Use of AMR to identify leaks remotely can be used to notify customers quickly and offer a water survey to locate the leak.

AMI uses towers or antennas to collect water use data and send it to a centralized location. The benefits of this technology include the ability for real-time data collection, possibly eliminating travel time to remote areas, and quick leak detection ability, sometimes within hours of the leak occurring.

For more information regarding these technologies, refer to the Residential Programs Flex Track Menu Options section of this guidebook.

2. Send out notification letters each billing period to single-family residences where water consumption is significantly higher than average or higher than the same period in the previous year. The letter should offer the customer a water survey. The [City of Roseville](#)

which implements a program targeting the high water use customers in their service area:

3. Coordinate with meter readers to detect possible leaks and notify customers of high water use while on site. If a leak is ongoing, send a notification letter to the customer with an offer of assistance if appropriate. Another leak check should be performed two weeks later, followed by a second letter if needed, and sometimes a fine. If the customer and meter reader verify a leak, a follow up site visit to verify the leak was repaired may be necessary.
  - a. A data logger can be a good way to determine if the leak has been fixed, as well as the intensity of the leak, the frequency and timing of a leak. A data logger is a unit that measures water flows independent of a water meter. The device is small enough to fit inside a meter box and can be programmed to record water flows at selected time intervals. The reports generated from the data logger can be helpful in finding the location of the leak or if the leak has been fixed.

**Water Surveys** are an important component in residential water conservation. A survey consists of one visit to a customer's home, and includes the assessment of indoor and possibly outdoor water use. The outdoor section of a water survey is discussed in this Guidebook, page 21. Water agencies use a variety of forms, either paper or online based to document a water survey. Examples of these forms are below:

- [Otay Water District](#)
- [The California Water Service Company - Livermore](#)

Some agencies also provide hand outs to their customers during a water survey to reinforce the message of water conservation.

- [How to Read Your Water Meter](#)



*A water survey is underway.*

The three elements of an indoor water survey are:

1. Find the water meter. Make sure all water using fixtures are turned off. Educate the customer on how to read and check for leaks at the meter. For more information about how to read a water meter, read Contra Costa Water District's, "[How to Read Your Water Meter](#)"
2. Determine the flow rates of water using fixtures in the home. Flow rate and leak detection inspection should include, but not be limited to: showerheads, faucet aerators- lavatory and kitchen, and toilets. If possible, provide WaterSense Specification showerheads and aerators for those fixtures that are higher than the current flow recommendations.
3. Even if the customer was present for the water survey, provide them with the survey results and water saving recommendations as well as an information packet with individualized, prioritized results of the water survey.

**Showerhead and Aerator Distribution** is an effective conservation strategy. Fixtures provided should be WaterSense approved. Some options for distribution include:

- Providing to customer during water survey
- Handing them out during outreach events
- Including them in "welcome" packages for new accounts
- Partnering with other local utilities that periodically visit customers
- Making the materials available at will call counters
- Mailing replacements upon request

[East Bay Municipal Utilities District](#) offers customers retrofit kits and other supplies.

After the City of Roseville meter retrofit crew installs a meter at a customer's house they leave an information packet on the customer's front door. This packet contains information about their new meter, information about the City's water conservation programs, and also a high-efficiency plumbing retrofit kit that contains a high-efficiency showerhead, two faucet

San Juan Water District performs water surveys and leak detection services to their accounts upon request. The survey is mandatory for customers who have requested a rebate for high efficiency clothes washers. Typically, a San Juan residential water survey takes approximately 30 minutes to complete. Surveys are most often performed in teams of two and are performed on homes built before 1994. One person will stay outside the home and monitor a data logger which detects the flow of water going through the meter. The other person will enter the home and turn on each fixture, one at a time and flush each toilet. The data logger will log the flow rates. Once the technician has the data downloaded, they can analyze the information. In addition to detecting leaks, the technician can also determine if the customer has high use fixtures. If the flow rate of the fixture or toilet is higher than the plumbing standard, San Juan offers a retrofit kit for fixtures and a rebate for high flush toilets. Checking the flow outdoors requires turning on the sprinkler or irrigation system. If the flow rate is higher than the precipitation rate of the sprinkler heads, then there is usually a leak and San Juan offers leak detection services. For questions contact San Juan Water District at [www.sjwd.org](http://www.sjwd.org) or (916) 791-0115.

aerators, one kitchen aerator, a toilet flapper, toilet dye tablets and Teflon tape. Information about the kit is found in the literature in the bag. If the customer requests a Water Wise House Call (or water survey) staff verifies that the products were installed and provides additional material if requested and needed. The information is tracked in the City's data management system.



## FIXTURES AND APPLIANCES

In this section we will discuss high efficiency clothes washers and toilets. Targeting either or both can be very effective options for reducing indoor water consumption. The intent is to assist agencies to design their own successful programs to help residential customers retrofit homes and realize water savings.

**High Efficiency Washer (HEW)** Replacing older inefficient clothes washing machines with HEWs can provide an excellent opportunity for water and energy savings. Studies (listed at the bottom of this section) found that resource efficient models use on average 40% less water than older inefficient models; they reduce energy consumption by up to 58%; reduce the amount of needed detergents; and improve cleaning performance. The increase in energy efficiency in high efficiency washing machines makes partnering with water agencies attractive to energy providers. Below are suggested steps for designing, marketing and implementing a HEW replacement program.

1. Decide on a program type. Water agencies often choose to offer rebates for HEWs.
2. Develop a rebate application. Investigate partnerships with other water agencies, wastewater providers, or energy providers to develop a regional program or to offer rebates jointly.
3. Provide a list of qualifying clothes washers online. (A note on silver ion washers: They are designed to release silver ions during each wash cycle which are ultimately discharged into sanitary sewer systems leading to concerns about water quality impacts. To prevent this, many utilities have removed clothes washers that utilize this technology from their list of recommended clothes washers.) The following are lists of washing machines from other entities:
  - a. [Consortium for Energy Efficiency](#)
  - b. [ENERGY STAR Qualified Clothes Washers](#)
  - c. [CUWCC](#)
4. Work with appliance stores to promote both the HEW program and qualifying models. Consider delivering applications to stores and educating their staff so they know where to direct customers for online rebate information.
5. Once the customer installs the clothes washer, the original receipt of purchase from the customer should be attached to the application submitted by the customer. The rebate amount could be placed on the customer's water bill as a credit or send as check directly to the customer.

The water efficiency of clothes washers is rated using the term "water factor" to describe and compare its water use. Water factor is measured by the quantity of water (gallons) used to wash and rinse a full load of laundry per measured cubic foot capacity of the clothes container (washer drum)<sup>1</sup>. The lower the water factor rating, the more water efficient the clothes washer. An inefficient clothes washer has a water factor rating of 12 to 13 while efficient washers have a water factor of 4 or less.

How to calculate the Water Factor: WF is the quotient of the total weighted per-cycle water consumption, Q, divided by the capacity of the clothes washer, C. If a clothes washer uses 30 gallons per cycle and has a tub volume of 3.0 cubic feet, then the water factor is 10.0. The equation is:  $WF = Q/C$

Relevant clothes washer studies:

[Boston Washer Study, 2001](#)

[Bern Clothes Washer Study, 1998](#)

**High Efficiency Toilet (HET):** Replacing older toilets with HETs is another good way to reduce indoor water consumption. Toilets are a primary source of water use inside the home accounting for nearly 30 percent of residential indoor water consumption. Toilets are also reported to be a major source of wasted water due to leaks or inefficiency.

In 1992, California's standard for toilets became the Ultra-Low-Flush Toilet (ULFT), reducing toilet flush consumption from 3.5 gallons per flush (gpf) to 1.6 gpf. Some of the early toilets were poorly engineered which resulted in poor performance. Technology has improved and in 1999 the first High-Efficiency Toilets (HETs) were introduced into the marketplace reducing each flush by 20% less water than a ULFT. The maximum effective flush volume of an HET is 1.28 gpf.

Water agencies should become acquainted with

the State retrofit-on-resale legislation (SB 407 – Padilla 2009 and AB 715 – Laird 2007), as this legislation will dictate many retrofits to more efficient toilets in the coming years. This legislation requires the replacement of old toilet fixtures with new, more efficient models beginning in 2014. It affects not only the fixtures that can be installed in new and old homes and businesses, but also the type of toilets that may be sold within the state. More details are found in Table 1 below.

There are several types of HETs: (a) single-flush gravity-fed, (b) dual-flush gravity-fed, (c) single and dual-flush and 1.0 gpf pressure-assist, and (d) flushometer valve and bowl combinations (for high-use installations). In California, only the first three are found in residential installations.

Single-flush toilets function at volumes as low as 0.8 gpf, while others function at approximately 1.0 gpf up to 1.28 gpf. Dual-flush toilets, on the other hand, provide the customer with the option to flush with a reduced flush for liquid only and a full flush for solids.

Pressure-assist toilets are also widely used in the United States. The pressure-assist toilets use available water pressure at the site to compress air in a pressure vessel inside the toilet tank. This additional air pressure increases the ability of the toilet to flush forcefully. Pressure-assist HETs are available for residential applications at various flush volumes between 1.0 and 1.28 gpf.

Table 1: Comparison of AB 715, SB 407, and CalGreen requirements.

Condition, Activity, or Event	AB 715 (2007)	SB 407 (2009)	CalGreen
<b>Sale of toilet and urinal fixtures through retail or other outlets</b>	All fixtures sold or installed after Jan 1, 2014 must be HETs or HEUs <sup>3</sup>	Not addressed	Not addressed
<b>Existing single family residential</b>			
• Resale	Not addressed	As of Jan 1, 2017, requires written disclosure by Buyer to Seller of non-compliant fixtures in property	Not addressed
• Renovation	All fixtures installed after Jan 1, 2014 must be HETs or HEUs <sup>3</sup>	Renovated SFR must be 1.6 max (toilets) or 1.0 max (urinals) on or after Jan 1, 2014 to obtain bldg or occupancy permit	1.28 maximum <u>IF</u> prescriptive path is chosen (per 4.303.1) – Jan 1, 2011
• All other SFR	Not addressed	ALL SFR must be 1.6/1.0 max by Jan 1, 2017	N/A
<b>Existing multi-family residential</b>			
• Resale	Not addressed	As of Jan 1, 2019, requires written disclosure by Buyer to Seller of non-compliant fixtures in property	Not addressed
• Renovation <sup>2</sup>	All fixtures installed after Jan 1, 2014 must be HETs or HEUs <sup>3</sup>	Renovated MFR must be 1.6 max (toilets) or 1.0 max (urinals) on or after Jan 1, 2014 to obtain bldg or occupancy permit	1.28 maximum <sup>3</sup> <u>IF</u> prescriptive path is chosen (per 4.303.1) – Jan 1, 2011
• All other MFR	Not addressed	ALL MFR must be 1.6/1.0 max by Jan 1, 2019 <sup>6</sup>	N/A
<b>New single family residential</b>	All fixtures installed after Jan 1, 2014 must be HETs or HEUs <sup>3</sup>	Not addressed	1.28 max (toilets) and 0.5 max (urinals) <sup>3</sup> <u>IF</u> prescriptive path is chosen (per 4.303.1) – Jan 1, 2011
<b>New multi-family residential</b>		Not addressed	

For more information regarding toilet fixtures and applicable State and Federal standards, visit the [CUWCC Resource Center](#).

Replacing toilets with efficient models will soon be required by State legislation. Listed below are suggestions for rebate, direct install and voucher programs:

The steps to implementing a High Efficiency Toilet Rebate program include:

1. Confirm that the customer is eligible either through the age of their property (if no retrofits have taken place), or by conducting an in-house water survey.
  - Some agencies allow 1.6 gpf to be rebated and replaced by 1.28 gpf. Other agencies only allow 3.5 gpf toilets to be replaced.
  - Determine if the customer must replace all the toilets on the property or if there is a limit to the number of toilets that will be rebated.
2. Obtain a complete customer application to document the pre-qualification of the rebate.
3. Provide your customers with an updated list of qualifying toilets. The following are suggested resources:
  - [WaterSense High Efficiency Toilets](#)<sup>2</sup>:
  - [MAP Testing](#)<sup>3</sup>
  - [CUWCC](#)
4. Once the toilet is installed the customer will submit the original receipt of purchase along with the application to the water agency.
5. The agency could either provide a credit to the customer on their water bill, or send a check directly to the customer.

To see an example of Terms and Conditions, an application and more information visit [East Bay Municipal Utility District's brochure](#). (pdf)

A Direct Install Program is another way to offer toilets to customers. To implement this type of program, the agency works with qualified sub-contractors to install HETs at little or no cost to the account holder. Associated implementation costs can be more expensive than other rebate options.

A Direct Install Program traditionally consists of the following steps:

1. Develop a list of plumbers. Plumbing contractors need to meet insurance and licensing requirements, along with any other terms and conditions the water agency specifies.
2. Eligible customers receive a list of plumbers who they can call and set up an appointment with.

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<sup>2</sup> The WaterSense label is applied to HETs that are tested by an independent laboratory and certified by an accredited certifying body as meeting rigorous criteria for both performance and efficiency.

<sup>3</sup> MAP is a voluntary testing program for toilets that measures the amount of solid material the toilet can flush.

3. Participating plumbers verify that the property is eligible, perform a water survey of the property, install the fixtures, and invoice the customer for any upgrades.
  - a. A water agency may want to supply the plumbers with showerheads and aerators that the plumber can also install when they are at the customers house.
4. The plumber then invoices the water agency based on the pre-determined rate for materials and labor.
5. [Sonoma County Water Agency](#) offers a Direct Install program to its Sanitation Zone customers. For more information about the program visit their website.

A HET Voucher program is another type of toilet retrofit program. A voucher program involves the follow steps:

1. The customer requests a voucher from the water agency. The Agency will determine if the customer is eligible to receive a new toilet by looking at the water efficiency database to see if the customer has requested the voucher previously, or by determining the age of the house or by the information provided by the customer.
2. Once eligibility is established, the voucher is sent to the customer who can redeem the new toilet from a list of select appliance stores. Often only a select few toilets are eligible for the voucher program. The appliance store is responsible for insuring that the toilet the customer purchases is eligible through the voucher program, otherwise the appliance store is responsible for covering the cost of the incorrect toilet.
3. The customer is responsible for installation and removal of the old toilet.
4. Once a month, or some other pre-determined timeframe, the appliance stores invoices the water agency for the vouchers they received from customers.

[Rancho California Water District](#) is one example of an agency that offers a toilet voucher program.

By having one large regional program cost savings are realized based on economy of scale and maximize use of limited municipal resources. This approach also allows smaller cities to implement a cost-effective program water survey program.

Developing strategic partnerships can aid the success of both clothes washing machine and toilet replacement programs. Listed below are several examples:

East Bay Municipal Utility District's (EBMUD) and the Southern California Gas Company's Energy Savings Assistance Program is a joint program that includes a no cost high-efficiency clothes washer as well as other no cost energy upgrades including attic insulation, pipe insulation, weather stripping, faucet aerators, caulking, showerheads, and more. In addition to funding from EBMUD and So. Cal Gas Co., EBUD received a grant from the U.S. Bureau of Reclamation to cover some of the costs. By partnering with EBMUD, the So. Cal Gas Co. is able to stretch their funds, increase the services they offer and offer their program to more customers.

The Bay-Area Regional [High-Efficiency Clothes Washer and Energy Rebate](#) Program is offered in the San Francisco Bay area. Water agencies teamed up with Pacific Gas and Electric Company to provide water and energy rebates. There are twelve public water agencies in this program and from 2008 -2010 the agencies provided over 10,000 clothes washer rebates with a total of 9,952 acre-feet of water savings and over 28,948,731 KWH of energy savings. This program was partially funding through the Department of Water Resources Proposition 50 grant funds.

[Sonoma County Water Agency](#) has developed a streamlined HEW application for eight agencies within their service area.

The [Be Water Smart](#) Program, sponsored by the Regional Water Authority Water Efficiency Program, includes 19 water providers, wastewater treatment facilities, and energy utilities spanning three different counties. This regional partnership provides a one-stop-shop for water and energy efficiency information, offers a combined rebate, streamlines the rebate application experience, and enhances knowledge of the synergy between energy and water programs. Also by combining rebate processing activities, administrative costs are reduced through elimination of duplicative functions.

The partnership between Solano County Water Agency (SCWA) and its member cities is another good example of collaboration to achieve greater water savings. SCWA manages a county-wide regional Residential Water Assistance Program in conjunction with its member cities. SCWA provides the program staffing and the cities share in the operating cost. The cities compile the list of high water users, since SCWA as a wholesaler does not have access to individual water use records. Notification letters are individually customized to suit the needs of each city.

## WATERSENSE SPECIFICATIONS FOR NEW DEVELOPMENT

New development is an important component in achieving agency wide water savings. Since the CUWCC’s BMPs were written, California adopted the CALGreen Building Standards Code, effective in 2011, which requires a 20 percent reduction in indoor water use from a defined baseline. CAL Green does not supersede voluntary WaterSense requirements, but instead complements them. There are components of WaterSense that go beyond CALGreen.

In addition to CALGreen, another new development program, also voluntary, that incorporates WaterSense Specifications is [Leadership in Energy and Environmental Design \(LEED\)](#). LEED is a consensus-based, market-driven program that provides third-party verification of green buildings. The rating system addresses six major areas including water efficiency.

[The City of Palo Alto](#) is going above and beyond the CALGreen requirements. They’ve integrated the current Water Efficient Landscape Ordinance, Recycled Water and Energy Efficiency Ordinance with CALGreen to meet or exceed the code requirements.

Table 2: Comparison between CALGreen and WaterSense.

<b>Indoor Efficiency Criteria</b>	<b>*CALGreen (Prescriptive requirements only<sup>4</sup>)</b>	<b>WaterSense (Home Spec, Version 1.0, 12/2009)</b>
<b>Service Pressure</b>	CALGreen contains no provisions for service pressure. It references 20, 60, and 80psi <u>only</u> with respect to the reference ASME and WaterSense standards for selected plumbing products.	Use of a Pressure Regulating Valve when the static service pressure exceeds 60 psi.
<b>Hot Water Delivery System</b>	Where the hot water source is more than 10 feet from a fixture, the potable water distribution system shall convey hot water using one of the following methods: 1. A central manifold plumbing system with parallel piping configuration (“home-run system”) is installed using the smallest diameter piping allowed by the California Plumbing Code or an approved alternate. 2. The plumbing system design incorporates the use of a demand controlled circulation pump.	Store no more than 0.5 gallons of water in any pipe/manifold between the hot water source and delivery fixture.  Timer- and temperature-based recirculating systems shall not be used to meet the criteria. On demand systems would be compliant.  Water heating (storage, solar, and tankless) is not covered within WaterSense.

<sup>4</sup> Under the Performance option, CALGreen allows alternative fixtures if a 20% reduction in total projected water use when circulated from the baseline water consumption maximums specified in Table 4.303.1 can be demonstrated.

Indoor Efficiency Criteria	<b>*CALGreen (Prescriptive requirements only<sup>4</sup>)</b>	<b>WaterSense (Home Spec, Version 1.0, 12/2009)</b>
	3. A gravity-based hot water recirculation system is used. 4. A timer-based hot water recirculation system is used. 5. Other methods approved by the enforcing agency.	
<b>Toilet (Water Closet)</b>	1.28 gallons per flush (HET) maximum	1.28 gallons per flush (HET) maximum, WaterSense labeled
<b>**Urinals<sup>5</sup></b>	0.5 gallons per flush (HEU) maximum	0.5 gallons per flush (HEU) maximum, WaterSense labeled flushing urinals
<b>Lavatory Faucet</b>	1.5 gallons per minute maximum; 0.8 gpm minimum at 20 psi.	WaterSense labeled; 1.5 gallons per minute at 60 psi; 0.8 gpm at 20 psi.
<b>Kitchen Faucet</b>	1.8 gallons per minute	2.2 gallons per minute
<b>Shower Head</b>	2.0 gallons per minute under the prescriptive requirements. Multiple showerheads within the same shower compartment (size undefined) may not exceed 2.0 gpm combined  Under the performance option, no maximum flow.	2.5 gallons per minute (per 2160 in <sup>2</sup> of shower area) maximum per shower compartment, with provision for revision when showerhead product specification is released (subsequently released at 2.0 gpm).  Requirement to be revised downward to 2.0 gpm maximum per new WaterSense specification.
<b>Dishwasher</b>	No provisions.	Energy Star qualified
<b>Clothes Washer</b>	No provisions.	Energy Star qualified with a water factor ≤6.0 gallons/cycle/cubic foot of capacity
<b>Water Softener</b>	No provisions.	Must : 1. Meet NSF/ANSI 44 Residential Cation Exchange Water Softeners; 2. Be demand initiated; 3. Have a related salt efficiency of not less than 3,350 grains of total hardness exchange per pound of salt, based on sodium chloride equivalency; and 4. Not generate more than 5 gallons of water per 1,000 grains of hardness removed during the service cycle.

<sup>5</sup> Urinals in residential and non-residential structures have the same maximum flush volume of 0.5 gallons per flush



Indoor Efficiency Criteria	<b>*CALGreen (Prescriptive requirements only<sup>4</sup>)</b>	<b>WaterSense (Home Spec, Version 1.0, 12/2009)</b>
<b>Evaporative Cooling System</b>	<ol style="list-style-type: none"> <li>1. Systems shall be designed according to ACCA Manual J or using other equivalent methods.</li> <li>2. Duct systems are sized in compliance with ACCA 29-D Manual D or other equivalent methods.</li> <li>3. Heating/cooling equipment is selected according to ACCA 36-S Manual S or other equivalent method.</li> </ol>	Use a maximum of 3.5 gallons of water per ton-hour when adjusted to maximum water use.
<b>Drinking Water Treatment System</b>	No provisions.	System shall yield at least 85 gallons of treated water for each 100 gallons of water processed. Systems shall be certified to meet applicable NSF/ANSI standards: 42, 53, 55, 58 & 62

Keeping water consumption down while new homes are built has been a challenge. One approach is to require developers to offset new project water consumption. Development fees can be established through the proper channels which can then be used to finance conservation efforts. The East Bay Municipal Utility District (EBMUD) provides a good example. [Their regulations](#) allowed EBMUD to serve additional new development without impacting existing customers through increased rates or fees, as well as avoiding additional investment in infrastructure. Lessons learned from EBMUD’s program include:

- Communicate early with land use agencies and developers;
- Emphasize proven technologies to achieve expected water savings.

The [California Water Code](#) supports this type of activity through the following sections:

- Sections 375-377: authorizes local districts to require water conservation devices and enforce water conservation programs upon finding of necessity;
- Section 1009: authorizes local districts to prepare water conservation plans that can require retrofit conservation devices be installed as a condition of service, including water reclamation devices, and;
- Section 350-359: allows that emergency conditions of water shortage authorize local districts to restrict consumption.

Conservation incentives can be a helpful tool to influence developers. Some ideas are shown below:

- Reduce service connection fees for effective conservation practices and fixtures.
- Fast track the processing of building permits and water connection applications for the inclusion of conservation practices and fixtures.

- Provide financial incentives delivered directly to the developer for the implementation of high-efficiency fixtures and designs in new development.
- Utilize recognition programs for builders for new home that meet water efficient standards.

## MULTI-FAMILY RESIDENTIAL PROGRAMS

While any of the programs discussed throughout this Guidebook may be implemented on a single-family or a multi-family scale, in some cases specific techniques have been helpful in targeting multi-family accounts. Below are suggestions that target multi-family complexes.

Installing sub-meters at each unit in a multi-family complex has many benefits. It allows the account holder to divide water bills based on actual consumption. It also enables residents to track their own water use habits. According to the East Bay Municipal Utility District (EBMUD) 2004 study, *National Multiple Family Submetering and Allocation Billing Program Study*, 85% of multi-family residents nationwide pay for their water as part of their rent; however water savings potential are high when sub-metering. Water savings can be as high as 20%<sup>6</sup> when water bills become the responsibility of the tenant. Installing submeters can be expensive; however, providing incentive programs is one way to appeal to property owners and managers. Additional information can be found in the CUWCC Utility Operations Guidebook and on [EBMUD's website](#).

Landlords or property managers will most likely prioritize the recommendations of the audit based on cost/benefit and practicality. It can be helpful to determine the rate of return for many of the options based on current water use and potential savings from the audit recommendations. An emerging trend is the desire for businesses and housing to be environmentally friendly. Demand for sustainable choices is on the rise and multi-family complexes that are water efficient could receive more attention. This could be a selling point from the agency to the property owner in getting them to invest in water use efficiency projects for their property.

Offering education programs to tenants is a low-cost option for multi-family properties. Water agencies partnering with property owners/managers can provide multiple benefits. First, it can reduce program implementation costs for both parties. Second, it keeps both parties involved during implementation. For example, if an agency provides educational program materials and the property manager distributes the materials to tenants, both parties have absorbed part of the associated costs and both parties have a vested interest in moving the program forward. Educational campaigns could also include mirror decals with water use efficiency slogans for the bathroom, information about who to contact about leaks in common areas, etc. More information on education programs can be found in the section of the guidebook entitled "Education and/or Public Outreach".

High Efficiency Toilet (HET) direct installation incentive programs can be a great target for a water savings at a multi-family property. Direct-install programs have proven effective in multi-family settings because they are straightforward to implement and they generate large amounts of savings.

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<sup>6</sup> Source: "Overview of Retrofit Strategies: A Guide for Apartment Owners and Managers" U.S. Department of Housing and Urban Development. May 2002

Many multi-family complexes have common area pools. According to the California Urban Water Conservation Council's report entitled *Best Management Practices- Pools, Spas and Fountains*, it is estimated that there are approximately 50,000 pools in multi-family complexes across California. Evaporation is one way for a pool to lose water. In populated areas where most pools are located, the evaporation rates are in the range of 50 to 75 inches per year.<sup>7</sup> To reduce this evaporation, a pool cover is always recommended. A cover can also reduce the need to add more chemicals, reduce algae growth and can conserve heat, reducing heating costs.

Pool leaks can be difficult to detect. The most common locations for leaks are where the pool and pipes are joined, at separations along the pool top and the bond beam, in the piping either on the suction or return lines to the filtration system, and in the liner of the pool itself. Installing a meter on the pool makeup line is the most effective way of monitoring pool water use and potential leaks. NOTE: Installation of the meter at the time of construction is the most cost-effective time to do it.

Splash-out (water lost as people move and splash water over the sides of the pool) and drag-out (water lost as swimmers exit the pool) also result in large losses of water over time. One way to minimize this type of water loss is to set the pool water level several inches below the edge of the pool and the over flow outlet.

For more information about pool best practices provided by the CUWCC, [click here](#) (pdf).

Many multi-family complexes have water features such as ponds and fountains. These types of water features are often the source of undetected leaks and are responsible for the loss of thousands of gallons of water. Regular inspections checking for wetness around feature or using the bucket test described in the box to the right can help identify leaks. NOTE: In warmer areas, water features can lose several inches per week to evaporation.

More information about multi-family best management practices can be found on the [CUWCC](#) website.

A simple way to check if a pool does have a leak is to use the bucket test. It is important to note that this test will not detect leaks in plumbing above the water line. Steps to conduct a pool bucket test:

- Fill a 5-gallon bucket with water about 5 inches from the top. Mark the water level.
- Place the bucket on one of the steps of the pool. Make sure the bucket is immersed in the pool at least 5in.
- Shut off the pool pump and mark the pool water level on the outside of the bucket. Turn the pool pump back on.
- After 24 hours compare the two water levels. If the pool water (marked on the outside of the bucket) goes down more than the water level inside the bucket, there's likely a leak. If the water levels have gone down equally, only evaporation has occurred.

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<sup>7</sup> "Evaluation of Potential Best Management Practices- Pools, Spas and Fountains" CUWCC, September 2010

## LANDSCAPE

Landscape irrigation water demand for single-family residences accounts for approximately 53% of urban water demand. (Irvine Ranch and Aquacraft California Single-family Water Use Efficiency Study 2011) Many factors contribute to the large amount of water used in residential landscapes. Some of the factors include: population shifts to hotter interior regions which often have larger landscaped areas; the prevalence of cool season turf grasses and other high water use plants in the landscape; irrigation systems in need of maintenance; and poorly designed irrigation systems. Even the use of automatic irrigation systems have led to increased water use. The California Water Plan Update 2013 reports use of automatic irrigation controllers has been shown to increase water use at single-family homes by more than 50% over the use at homes with manually operated irrigations systems.

In this section, we will provide suggestions that are intended to assist agencies to comply with the requirements of the Memorandum of Understanding in terms of:

- Landscape water surveys
- Incentive programs
- Waste water enforcement

### ***Landscape water survey***

1. Educate the customer about the site's landscape water use. Review the consumption history. Be sure the customer can see the difference in their winter and summer consumption patterns.
2. Schedule a site visit with the customer. Keep in mind that your agency may require a release or hold harmless agreement (add link to hold harmless agreements) be signed prior to the visit.
3. Measure landscaped area. There are options to developing a water budget:
  - Take separate measurements of low, moderate and high water use plants.
  - Measure the entire irrigated area and use an average water factor.
  - Take a physical measurement by using a measuring wheel, a laser



*A landscape auditor is taking stock of a customer's irrigation system.*

- distance meter, or any other appropriate measuring device/technique
  - Use current aerial imagery such as Google Earth Pro or GIS information to measure the site prior to your visit. Tree canopy or other obstructions may be prohibitive for the use of aerial imagery. Tip: Google Street view (if available) can be a useful tool.
  - [How To Measure Your Landscape](#)
  - [Efficient Landscape Water Use Calculator](#) is a tool designed by the City of San Diego. It's helpful in determining an efficient water schedule.
4. Review and document the irrigation schedule. Record the days, number of start times and the duration of irrigation event. A lot of accountholders don't know how to operate their irrigation controllers. This is an opportunity to educate the accountholder about controller features available to them (i.e. seasonal adjust, multiple start times, multiple programs, etc.), and how a proper schedule can help reduce the landscape water consumption, and the importance of replacing the batteries.  
NOTE: Many irrigation clocks revert to a default setting of 10 minutes per station per day if the program is lost due to a power outage.
5. Conduct a complete system audit. Have your customer turn on every station/valve.
- Verify that there are no leaks.
  - Identify areas with different precipitation rates on the same station/valve. Some options include conducting a catch-can test or area-flow test on one representative station. Others use an average precipitation rate for the type of irrigation equipment being used.
  - Determine the water pressure. High or fluctuating water pressure can cause sprinklers to mist or fog. Sprinkler and drip systems will not work properly if the pressure is too low or too high. Most sprinkler systems perform best at 30-50 psi, and most drip systems work best in the range of 20-35 psi. There are ways to adjust the pressure to suit your irrigation needs.
  - Plants with like water needs should be on the same valve (i.e. low water use plants, moderate water use plants, trees, vegetable beds, lawns, etc.).
6. Explain the importance of routine system maintenance, upgrades, and proper scheduling to improve landscape water use efficiency. System modifications can include rain sensors, smart controllers, soil moisture sensors, point source irrigation, efficient spray nozzles, etc, all of which are effective tools for landscape water use efficiency.

Water pressure is measured in pounds per square inch or psi. Attach a water gauge to an outdoor faucet and be sure to turn off all the water throughout the home. Turn the outdoor faucet on all the way and note the psi reading. Repeat this process for all your outside faucet locations. Take several readings at each location throughout the day.

Helpful Tips:

- Plants growing in shade will generally require up to 50% less water than the same plants in full sun.
- Different soil types have different infiltration rates. For example, clay soil cannot absorb water as fast as sprinklers apply it so instead of watering for one long cycle,

- use 2 or 3 shorter cycles with an hour in between. This will allow the water to soak in much better and encourage deeper roots.
- The irrigation schedule should be adjusted to reflect monthly or seasonal changes.
- The optimum time to water a landscape is pre-dawn when the sun is down, the temperature is cooler, and the wind is generally calm. Watering during the day can result in as much as 30% of the water being lost to evaporation.
- If controller manual is available, teach the customer how to program their controller.
- Contra Costa provides some helpful irrigation tips. (PDF)

Contra Costa Water District provides an irrigation schedule as a starting point for their customers based on site observations. The customer may need to fine-tune the minutes for each station. Once the minutes are fine-tuned, the customer should only need to add and remove watering days according to the provided monthly schedule. This is more manageable for the customer than changing minutes monthly or seasonally.

7. It's important to document the Landscape Water Survey visit. This provides the customer with a reference tool. Consider including:
  - both the existing and modified irrigation schedules;
  - your findings and recommendations from the system check;
  - guidelines of any applicable incentive programs; and
  - copies of any legal documents (i.e. waivers, etc.).
8. Providing an information packet is helpful. Contents might include:
  - information about available incentives;
  - a handout teaching the customer how to use their meter to calculate water usage and check for leaks;
  - a list of low-water using plants appropriate for the local climate
  - upcoming events list (i.e. relevant classes, workshops, garden tours, etc.);
  - helpful brochures (i.e. Sunset's Easy water-wise gardening, A Bay-Friendly Landscaping Guide to Mulch, or Drip Irrigation Guidelines);
  - a meter reading log;
  - locations of local irrigation supply stores;
  - websites of irrigation controller manufacturers;
  - websites that offer irrigation design or repair assistance;
  - a program evaluation postcard giving the customer an opportunity to provide comments about the water use efficiency programs.

Many water providers offer incentive programs to assist their customers in achieving water use efficiency in the landscape. Agencies that offer outdoor programs can approach customers in a variety of ways including, rebates, free merchandise, direct installation and comprehensive programs that include many options for water savings. For your reference, listed below are a few examples of such programs.

### ***Irrigation efficiency incentive programs***

- Installation of an efficient controller. Units may include digital water-use efficient models or weather-based Smart Irrigation controllers. [The Residential Runoff Reduction Study](#) was completed with Proposition 13 funds in 2008, examining the pros and cons of smart controller programs.
- Replacement of inefficient sprinkler heads with either more efficient spray heads or subsurface lawn irrigation.
- Changing micro-spray to point-source irrigation techniques, either drip emitters or in-line tubing.
- Addition of a rain shut-off device.
- Repairing leaks in irrigation system.
- Pressure reduction incentives.

### ***Landscape modification incentive programs***

- Replace turf with low water use plants.
- Mulch giveaway - The application of mulch to non-planted areas of landscapes can cut down on the amount of evaporation reducing the amount of water necessary to maintain plant health. Provide mulch to account holders for either sheet mulching a turf area or insulating non-turf areas in the landscape. The City of Petaluma has a free mulch program, [Mulch Madness](#), when a customer wants to replace their lawn with low water use plants.
  - Refer to the [Mulch Guide](#) for more details about sheet mulching and the benefits of applying mulch in your landscape.
- Replace lawn with synthetic turf – [North Marin Water District](#) has a synthetic lawn rebate for \$50.00 per 100 sq ft of lawn area replaced. The rebate is limited to \$400.00 for single family units.
  - NOTE: There have been questions regarding the environmental and health effects of synthetic turf. A number of these studies and articles are available on this topic, listed below:
    - [Evaluation of Synthetic Turf as a BMP](#)
    - CDC advisories on synthetic turf
    - Water quality impacts of artificial turf

***Water waste ordinance*** Water waste is an important issue in landscape irrigation. Sites can be easily identified by water running down street gutters, broken spray heads spraying water into the air, sprinklers spraying areas clearly off target, and sites irrigating when it's raining. A water waste ordinance can be a useful tool to stop water waste. Various examples of ordinances can be viewed here; [The City of San Diego](#), [City of Oxnard](#), and [City of Santa Rosa](#) (pdf).

Ordinances can be enforced through a variety of ways including a water waste patrol of the agency territory, online report mechanism for citizens to report water waste, or a hotline to call with reports of water waste.



**Alternative water supplies** Many agencies now allow and offer incentive programs for rainwater harvesting and graywater reuse systems to meet residential irrigation needs. However, one should check with local/regional regulations regarding possible prohibitions of rainwater harvesting and graywater systems.

Rainwater harvesting became more prevalent with Assembly Bill 1750, which allows residential landowners to install, maintain, and operate rain barrel systems and rainwater capture systems for specified purposes, provided that the systems comply with specified requirements. The legislation also allows a landscape contractor working within the classification of his or her license to enter into a prime contract for the construction of a rainwater capture system if the system is used exclusively for landscape irrigation.

Graywater is water redirected from bathroom sinks, showers, bath tubs, and washing machines to the garden. In response to drought conditions, Chapter 16A, “Nonpotable Water Reuse Systems”, of the California Plumbing Code was modified in 2009 making the use of graywater for irrigation feasible.

For examples of incentive programs, refer to Exhibit 1, Agency Incentive Program Chart.



*A Laundry to Landscape Graywater System*

Various savings studies on outdoor rebate programs have been developed and have shown sizeable water savings. It is important to consider all aspects of a new rebate program before implementation including cost effectiveness analysis, potential water savings, staffing availability and available funding. Several irrigation efficiency and landscape modification incentive programs were mentioned in the Landscape section of this document. If you are considering any of these programs it would be advisable to contact agencies offering these types of programs and request their analysis.

## **RESIDENTIAL PROGRAMS FLEX TRACK MENU OPTIONS**

Flex Track Menu options are offered as an alternative to the Residential BMPs and may be implemented instead to meet the savings goals. Agencies choosing implementation measures from the Flex Track Menu are responsible for achieving water savings equal to or greater than that which they would have achieved using only the BMP list items. Flex Track activities can include any activity that results in documented water savings, including the following actions listed below.

Contacting customers through their water/utility bills; is an effective way of capturing their attention. Using any of the following methods, an agency can target specific customer groups to ensure the most efficient use of resources resulting in water savings.

- Target customers by comparing neighborhood consumption patterns to similar neighborhoods; comparing current individual use to the same time last year; or identifying usage spikes since the last month, which could also indicate a leak. The letter could include tips for saving water and money. If an agency has an online bill payment customer base, this information can also be visible when the customer logs on to pay the bill.
- Targeting new customers; is an opportunity to educate in terms of water use efficiency. This is easily accomplished through a welcome letter introducing the new account holder to the agency and explaining the tools available to assist them.
- Target customers with the highest water use. Since landscape irrigation accounts for a large portion of water use in the residential sector, water savings are available in this area and can be another way for agencies to meet their flex track or gpcd requirements. An evaluation of Contra Costa Water District's (CCWD) [Residential Water Survey Program](#) found that the greatest water savings came from homes with annual water use over 500 gallons per day.
- Target households that have no history of participating in water use efficiency programs. Billing software is a good tool to track customer interactions and program participation.

Creating a water budget approach enables customers to control their own bills. Water budgets allow for individual tracking and specific pricing for each use pattern, resulting in a specifically-targeted economic incentive to conserve. While it may require a large initial investment for the

agency, the result is a more accurate picture of the service area and a better understanding of demand management.

Soliciting community involvement to report water waste is a good way to increase compliance of a Water Waste Ordinance without increasing staff time. Make it easy to report by phone, email, mail, website link, or any other means where the person reporting the matter has an option to remain anonymous. The City of Oxnard [Water Waste Ordinance](#) includes some progressive enforcement measures. For Example: For watering of turf, ornamental landscape, open ground crops and trees (including agricultural irrigation) in a wasteful manner such as, but not limited to, allowing water to run off onto sidewalks, driveways, gutters or streets, or allowing the pooling of water on any hard-surfaced area.

Provide promotional materials that help accountholders change their habits. People won't implement what they don't know or understand. These materials can help an agency transform their customer's behavior. Some examples include:

- Association of California Water Agencies' (ACWA) [Save Our Water](#) program
- [WaterSense](#)
- American Water Works Association's (AWWA) [Water Conservation](#)
- The CUWCC's [Public Information BMP Implementation Guidebook](#)

Educational workshops that discuss the benefits of low water use plant selection, the use of mulch, and irrigation efficiency improvements are ways to introduce water wise gardening techniques to homeowners. Make it easy, fun, and interactive. [The Bay-Friendly Landscaping & Gardening Coalition](#) offers various training programs that promote landscape water use efficiency.

- Garden tours provide an opportunity for community members to see how others have converted thirsty lawns into native or low water use landscapes. Alameda and Contra Costa County offer [Bringing Back the Natives](#)
- Rainwater harvesting can be good option in areas with adequate amounts of rainfall. The City of Santa Rosa offers a [Rainwater Harvesting Rebate](#).

Other types of water using equipment to consider are discussed below; however, there is little or no evidence of the water savings. Water efficiency practitioners are therefore strongly advised to investigate carefully any efficiency claims made before committing resources or other support for their installation or purchase. The [EPA WaterSense Guide for New Homes](#) offers some guidance.

Partnerships with welcome wagon organizations can be a great opportunity to distribute information to new residents. These types of programs are designed to acquaint the new resident with the resources in their community. This service may be free for City and County offices. Some welcome services provide an in-person site visit with new residents where the representative distributes and reviews information in the welcome packet. Ideally, agencies can request a report from the welcome wagon service that includes the name and addresses of the homes visited each month so follow up can take place.

- High-Efficiency Dishwashers: While energy and water use of residential dishwashers have been examined at length, they have not been found to be significant water savers in the home. Dishwashers have been found to consume only about 1.4 percent of all water used in the average home and dishwasher use is declining significantly. More information on residential dishwashers may be found in the CUWCC's [Residential Dishwasher Potential Best Management Practice](#) report.
- Water heaters and conveyers: Understanding the options available is important; descriptions such as tankless, recirculating, on-demand, and point-of-use water heaters are used interchangeably. Each type is discussed below.
  - Tankless water heaters: Studies have shown that tankless water heaters do not save water but rather lead to higher consumption than would be the case with traditional storage-type water heaters. (See the Council's 2010 [report on tankless water heaters](#).)
  - Recirculation system: This type of system does save water, but is most effective in non-residential settings (i.e. hotels).
  - On demand: An on-demand water heating system is one that incorporates a typical water heater in a house and pumps the hot water to the furthest part of the home by installing an electrical receptacle beneath the lavatory sink in the bathroom furthest from the water heaters. It uses a storage type water heater. No additional piping is needed. This is mainly a convenience item.
  - Point of use system: A water heater at every point that you use water in the house.
- Unlike a traditional water softener, a demand-initiated regeneration (DIR) water softener automatically responds to the water condition in relation to the demand for softened water. That is, the softener only regenerates when the water condition deteriorates to the point of need. When compared with the older technology softeners with manually set timer-based regeneration, demand-initiated softeners do provide an opportunity for water use reduction by eliminating unnecessary regeneration cycles that can waste water. In addition to achieving the efficiencies of a DIR softener, system water efficiencies may be achieved with softeners that use no more than 5 gallons of water for each 1,000 grains of hardness removed during the regeneration cycle.
- Whole-house water shutoff system: Whole house systems shut off the main water service when a leak is detected. However, there is no evidence that measurable water savings will be achieved over the long term with such devices or systems. An automatic shut-off valve is installed on the main water service pipe between the water meter and first branch pipe. These detectors may be hard-wired or wireless. The primary benefits of such systems are to prevent damage in the event of a catastrophic water leak and, in some cases, reduce homeowner's insurance premiums.

School Water Conservation kits are a water conservation program may provide school kids with conservation kits that include efficient devices and a program documentation mechanism. The program must have a pre-installation measurement component whereby the family

measures and documents the current device water use. If the device(s) are found to be of high water use then the family can install the new devices and document their new water use. The agency can then report on the number of devices installed and water savings achieved by replacing older devices with high-efficient devices. More information on this can be found in the School Education Guidebook under Establishing Partnerships.

***AMR and AMI Technology*** Both offer the technology to collect consumption data automatically. This technology saves utility providers the expense of periodic trips to each physical location to read a meter. Another advantage is that billing can be based on near-real-time consumption rather than on estimates based on previous or predicted consumption. This information coupled with analysis, can help both utility providers and customers better control the use and production of potable water.

- Automatic Meter Reading (AMR) allows drive-by or touch collection of water consumption data from water meters. This technology expedites the data collection process and allows for water meters to be read from a distance where safety is an issue. It also simplifies troubleshooting and analyzing water consumption behaviors.
- Advanced Metering Infrastructure (AMI) uses towers or antennas to collect data and send it to a centralized location. The benefits include the ability for real-time data collection, can eliminate travel time to remote areas, and reduce the need for field crews to collect data.

While intended to reduce water consumption, some of the programs listed above not provide quantifiable results. With the passing of SBx7-7 in 2009, an agency's only responsibility is to not exceed a certain gpcd (gallons per capita per day) rather than to implement specific programs. If an agency feels that it will obtain adequate savings from implementing one or more of the difficult-to-measure options listed below, that agency may be interested in participating in the gpcd option with the Council, rather than the BMP or Flex Track options. In this way, the agency is only responsible for lowering its water use rather than reporting all conservation activities and the savings associated with each of those activities.

## EDUCATION AND PUBLIC OUTREACH

Education and public outreach are an integral part of a successful water use efficiency programs, particularly in the residential sector. In the Best Management Practices (BMP), providing information to accountholders is essential for all water agencies. The purpose of this section is to provide examples of methods used including both straightforward options as well as showing examples of unique approaches.

Some of the usual methods of marketing:

- brochures, fliers and bill inserts;
- event booth/tabling at events (i.e. fairs, farmers markets, trade shows, local holiday celebrations, etc.);
- partnerships with local businesses, landscape designers and architects, irrigation equipment suppliers, nurseries etc to market programs together;
- newspaper and radio ads;
- direct letters or mailers or courtesy calls;
- presentations targeting specific groups (i.e. property managers, landscapers, homeowner associations, etc.);
- website program pages;
- social media (i.e. Facebook, Twitter, YouTube, LinkedIn, Pinterest, etc.)

Many agencies have gotten more creative in marketing by offering contests, tours, and workshops. Partnering with local professionals and organizations can help reduce costs. A few success stories are discussed below:

The Western Municipal Water District holds a landscape contest every other year. Low water use landscapes are evaluated and winners receive cash prizes, or gift certificates to local nurseries and home improvement stores. Other benefits include promoting local businesses and participation in lawn replacement programs. More specific details can be found at [Western Waterwise Landscape Contest](#).

Another contest format is the award of a landscape makeover for the contest winner. In this format, the agency will accept applications from interested customers, research historic water use patterns to determine eligibility, and choose a house in a visible location with a reasonable landscape area. As there may be a number of eligible front yards with this description, a drawing may be held. The winner of the contest gets a new water-wise garden, including removal and the installation of a water efficient garden and irrigation system. A good example of this format is the Regional Water Authority's [Ultimate Water Smart Garden Makeover](#).

The Water Replenishment District of Southern California offers [Eco Gardening](#), a series designed to teach water smart gardening to their customers. This type of workshop is targeted

for residential customers and has proven to be an effective outreach approach. Hands-on classes can be offered to help residents with plant selection, landscape design, and irrigation layout. Offering tools such as a list of approved landscape professionals, a list of low water use plants, a list of applicable incentive programs, etc. is also helpful.

Online classes could also be offered as an alternative to in-person trainings. Metropolitan Water District of Southern California's offers [mini tutorials](#) online.

Social media, an increasingly used marketing technique, is web- and mobile-based technology that supports interactive dialogue about a specific topic. Facebook, Twitter, YouTube and LinkedIn are examples of the largest social media networks. Facebook, for example has 1.1 billion people who use it every month. [Sonoma County Water Agency](#) has been successful with their social media program. In August 2012 the Agency page increased "likes" to over 370 people, with the most popular post reaching over 470 people. Their Twitter page has over 1,900 followers and receives re-tweets on a regular basis. An example of an agency's approved social media policy is the [City of Santa Rosa Social Media Policy](#).

More information on these topics can also be found in the School Education, Public Information, and Landscape Guidebooks, and in the Flex Track Options chapter in this Guidebook, page 26.