Chapter 2
Reducing Water Use

2.1 Introduction and Need

Water in California, and particularly Sonoma County, serves essential health and societal needs, and supports agriculture, commerce, and industry. Because opportunities to secure new or additional water supplies and water rights are limited, reducing water use through conservation is the most efficient and sustainable approach to providing long-term water supply reliability. The recent drought conditions of 2007-2009 and increasing environmental considerations highlight the importance of water conservation.

The Sonoma County Water Agency (SCWA) is committed to effectively manage the resources in its care for the benefit of people and the environment in its service area. In support of this mission, SCWA recently conducted a strategic planning process (2008). The goal of the planning process was to identify and develop the key strategic priorities that would help the Agency achieve its mission while also providing a reliable water supply source over the long term. Promoting and increasing water conservation was one of the core strategies identified by SCWA. Promoting and coordinating water conservation efforts with its water contractors is an important approach to assist them in achieving their own water supply needs.

This chapter is organized into three sections. Section one describes state and national conservation standards and policies that help guide and direct conservation efforts; section two describes the existing Sonoma County conservation programs; and section three describes additional opportunities to conserve more water beyond the current 2010 baseline. The sub-sections of this chapter include:

- 2.2 State Conservation Directives
- 2.3 National Conservation Standards
- 2.4 Existing Sonoma County Programs to Reduce Interior Water Use
- 2.5 Existing Sonoma County Programs to Reduce Exterior Water Use
- 2.6 Conservation Implementation and Enforcement in Sonoma County
- 2.7 Opportunities for Additional Conservation
- 2.8 Estimating Potential Water Savings

Following the state and national standards described in Sections 2.2 and 2.3, Sections 2.4 – 2.6 together describe existing water use and conservation programs in Sonoma County. In this

guidebook, a significant effort has been made to accurately describe and identify the extent of existing conservation programs. This is important for several reasons, including that it provides a basis for understanding what is already occurring and what more can be done. What additional conservation efforts can be achieved? This topic is the focus of the final two sub-sections of the Chapter. Section 2.7 identifies opportunities to increase water savings through implementation of new programs, technologies, and policies. Lastly, Section 2.8 seeks to summarize and quantify historic, present, and future water conservation efforts as a means to frame future conservation directions and policy development.

2.2 State Conservation Directives
2.3 National Conservation Standards
2.4 Existing Sonoma County Programs to Reduce Interior Water Use
2.5 Existing Sonoma County Programs to Reduce Exterior Water Use
2.6 Implementation and Enforcement in Sonoma County
2.7 Opportunities for Additional Conservation
2.8 Estimating Potential Water Savings

2.2 State Conservation Directives

This section describes statewide water conservation programs, policies, and legislation that help guide local efforts in Sonoma County. Responsible water use and conservation has been promoted by the State of California and its Department of Water Resources (DWR) and State Water Resource Control Board (SWRCB) since the late 1970's following the severe 1976-1977 drought. The California Constitution and Water Code require that the State's water resources be used beneficially to the fullest extent possible, and that waste, unreasonable use, or unreasonable methods of water use be prevented. A number of legislative bills have been passed to address declining water supplies and efficient water use. These key legislative actions are described below.

Urban Water Management Planning Act

The California State Legislature enacted the Urban Water Management Planning Act (UWMP) in 1983. The Act requires every urban water supplier that directly or indirectly serves greater than 3,000 customers (or provides greater than 3,000 acre-feet annually) to adopt and submit an urban water management plan to DWR at least once every 5 years. These plans help water suppliers ensure that they have sufficient water supplies to meet the long-term needs of water customers during normal, dry, and multiple-drought years. A water shortage contingency plan is a component of the overall assessment and outlines stages of action for demand reduction by up to 50%.

As mandated by the 1983 UWMP Act, SCWA and local water retailers have prepared urban water management plans. The most recent versions of these plans were completed in 2005, and were subsequently adopted. The next round of urban water management plan updates is required for 2011. Sonoma County water retailers that meet the requirements of the Act (stated above) and currently have an adopted 2005 UWMP in the SCWA service area include:

- City of Cotati
- City of Healdsburg
- City of Petaluma
- City of Sonoma
- Sonoma County Water Agency
- Sweetwater Springs

- City of Rohnert Park
- City of Santa Rosa
- City of Sebastopol
- Valley of the Moon Water District
- Town of Windsor

These UWMPs are generally available from each entity's website.

As part of the UWMP development process, SCWA prepared and adopted a water conservation plan. This plan sought to reduce water demand by over 9,800 AFY by 2030 (Jasperse pers. comm.) Additionally, in 2008 SCWA completed a detailed water demand analysis which evaluated various levels of water conservation efforts in order to project future reductions in water demand (Brown and Caldwell 2008). This report is discussed further in Section 2.8 *Estimating Potential Water Savings*.

Demand Management Measures (AB 1420)

In February 2007, Assembly Bill 1420 was passed to approve funding to implement water demand management measures described in local Urban Water Management Plans. The UWMPs require urban water suppliers to describe their current or planned water demand management measures. Under AB 1420, state water management grants or loans sponsored by DWR, SWRCB, and the California Bay-Delta Authority will provide funding to implement demand management projects including surface or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation programs.

Statewide Water Conservation Goal

In November 2009, Governor Schwarzenegger approved Senate Bill 7 (SB 7) establishing a statewide goal of 20 percent reduction in urban per capita water use by December 31, 2020. The bill requires every urban retail water supplier to develop a 2020 water use target. To develop the 2020 water use target, water suppliers must first calculate their average gross water use. In an effort to standardize calculation of average gross water use and 2020 water use targets, SB 7 includes specific methods for water suppliers to use in calculating these values.

The bill states that the water use baseline, reported in gallons per capita per day (gpcd), be determined using one of the following methods:

1. a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010; or
2. a 15-year continuous period ending no earlier than December 31, 2004, and no later than December 31, 2010, if at least 10% of 2008 demand was met through recycled water use.

SB 7 outlines four methods to determine water use targets:

1. Assume the water use target equals eighty percent of the baseline per capita daily water use; or

2. Assume the water use target is the per capita daily water use calculated as the sum of the following performance standards:
    a. 55 gallons per capita daily indoor residential water use; plus
    b. Landscape irrigation standard of the local Model Water Efficient Landscape Ordinance; and
    c. 10-percent reduction in use from the baseline commercial, industrial, and institutional water uses by 2020; or
3. Assume the water use target equals ninety-five percent of the applicable Hydrologic Region Target, as set forth in the State Water Resource Control Board's draft *20x2020 Water Conservation Plan* (dated April 30, 2009); or
4. Use a forthcoming method to calculate the water use target to be developed by the State through a public process by December 31, 2010.

Each water supplier will be responsible for determining its chosen method and reporting this method in their 2010 Urban Water Management Plan. Regardless of the chosen method, SB 7 states that per capita water use reduction should not be less than 5%. By 2015, 50% of the 2020 goal would need to be met by urban retail water suppliers. If the 2015 target is not met, non-compliant urban water suppliers will not be eligible for state-sponsored water grants or loans beginning on July 1, 2016.

CALGREEN Building Code

The CALGREEN Code is the nation's first statewide green building standards code and will take effect January 1, 2011. In 2007, Governor Schwarzenegger directed the California Building Standards Commission to adopt green building standards for residential, commercial, and public building construction for incorporation into 2010 building code updates.

The 2010 Green Building Standards Code will require:

- 20 percent mandatory reduction in indoor water use, with voluntary goal standards for 30, 35 and 40 percent reductions;
- Separate water meters for nonresidential buildings' indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects;
- Diversion of 50 percent of construction waste from landfills, increasing voluntarily to 65 and 75 percent for new homes and 80 percent for commercial projects;
- Mandatory inspections of energy systems (i.e. heat furnace, air conditioner, mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity according to their design efficiencies; and
- Low pollutant-emitting interior finish materials such as paints, carpet, vinyl flooring and particle board.

The CALGREEN Code will be a comprehensive and uniform regulatory code for all residential, commercial, hospital and school buildings, ensuring that every new building in California is built using environmentally advanced construction practices.

Like California's existing building code provisions that regulate construction projects throughout the state, the mandatory CALGREEN code provisions will be inspected and verified by local and state building departments.

High Efficiency Toilet Standards (AB 715)

In October 2007 the State adopted Assembly Bill 715 (AB 715) to establish new water use standards for toilets and urinals. Beginning in January 2014, all toilets and urinals sold or installed in California shall be 1.28 gallons per flush and 0.5 gallons per flush, respectively. A timeframe is outlined for manufacturers to report compliance based on models sold in California. The schedule mandates that 50% of toilets and urinals installed in the state meet the requirements by January 1, 2010, 67% by January 1, 2011, 75% by January 1, 2012, 85% by January 1, 2013, and 100% by January 1, 2014.

Statewide Retrofit on Resale (SB 407)

In October 2009, a senate bill was passed to impose a state mandated, local program to inspect and require that all building fixtures meet specific water use criteria prior to resale of a property. The bill establishes a 2014 requirement that all residential, multifamily and commercial buildings be equipped with high efficiency fixtures prior to the local building department issuing the final permit approval for building alterations/improvements of the property. All non-compliant plumbing fixtures must be replaced by property owners by 2017 for single family homes and 2019 for commercial and multifamily homes. By 2017, a seller or transferor of residential, multifamily or commercial real property must disclose to a purchaser or transferee, in writing, whether the property includes non-compliant plumbing.

Water Conservation in Landscaping Act (AB 325, AB 2717, AB 1881)

Recognizing that landscape irrigation comprises the single largest water use component in many developments, Assembly Bill (AB) 325 was passed in 1990 to promote the design, installation, and maintenance of water-efficient landscapes. A model landscape ordinance was drafted to help local land use agencies adopt or develop their own ordinances. Conservation goals, compliance mechanisms, and specific enforcement actions were left to local agencies and not outlined in the model ordinance. In 2001 the State reviewed the implementation of AB 325 and found a majority of land use agencies (90%) had adopted an ordinance, but that the ordinances were weakly structured with very little monitoring or enforcement actions (Western Policy Research 2001).

As a result of the AB 325 review process, AB 2717 was passed in 2004 to evaluate and recommend water use efficiency approaches for urban irrigated landscapes. The bill directed the California Urban Water Conservation Council (CUWCC) to convene a stakeholder task force

composed of public and private agencies. The Task Force adopted a comprehensive set of 43 recommendations and concluded that the Department of Water Resources (DWR) should revise the Model Water Efficient Landscape Ordinance and upgrade the California Irrigation Management Information System (CIMIS).

The Water Conservation in Landscaping Act of 2006 (AB 1881) enacts many of the CUWCC Landscape Task Force recommendations, including requiring DWR to update the model landscape ordinance. AB 1881 requires local agencies to adopt the updated model ordinance (or equivalent) by January 1, 2010, or it will be automatically adopted by statute. Also, the bill requires the California Energy Commission (CEC), in consultation with DWR, to adopt, by regulation, performance standards and labeling requirements for landscape irrigation equipment, including irrigation controllers, moisture sensors, emission devices, and valves to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy or water (DWR 2009).

Model Water Efficient Landscape Ordinance

As a result of Assembly Bills 2717 and 1881, the *Model Water Efficient Landscape Ordinance* was updated in September 2009 and became effective on January 1, 2010.

The Model Ordinance requires submittal of a *Landscape Documentation Package* to the local planning agency as part of project plan or design review.

The Model Water Efficient Landscape Ordinance requires a Landscape Documentation Package including: a completed water efficient landscape worksheet, a soil management report, a landscape design plan, an irrigation design plan, a grading design plan, and irrigation and maintenance schedules.

The Model Ordinance applies to:

- New construction and rehabilitated landscapes for public agency and private development projects (developer-installed single-family and multi-family projects) with a landscape area equal to or greater than 2,500 square feet (5,000 square feet if homeowner-installed) that require a building or landscape permit, plan check, or design review.
- Existing landscapes installed before January 1, 2010 with a dedicated or mixed use water meter and over one acre in size.
- Cemeteries (new and rehabilitated cemeteries over one acre in size must complete the water-efficient landscape worksheet; a landscape and irrigation maintenance schedule; irrigation audit, irrigation survey, and irrigation water use analysis performed by a certified landscape irrigation auditor; and prevent runoff from target landscape areas)

In compliance with the state law, Sonoma County collaborated with SCWA, cities, landscaping contractors, landscape architects, and other interested parties to develop a version of the State Water Efficient Landscape Ordinance that would meet or exceed the legislation, while at the same time provide a standardized or similar ordinance for adoption across the region. The City of Santa Rosa and other cities in Sonoma County have adopted or intend to adopt this Ordinance for their jurisdictions. The County of Sonoma adopted the Ordinance on December 8,

2009 for all unincorporated areas of Sonoma County. The Sonoma County Water Efficient Landscape Ordinance and the version adopted by the City of Santa Rosa are available at their respective websites.

Membership in California Urban Water Conservation Council

SCWA became a member of the California Urban Water Conservation Council (CUWCC) in June 1998. The CUWCC was created to promote collaboration between water utilities, environmental groups, and other interested parties in an effort to increase water conservation statewide. Through a signed memorandum of understanding (MOU) with CUWCC, SCWA pledged to (a) expedite reasonable water conservation measures in urban areas, and (b) estimate water conservation savings from proven and reasonable conservation measures. SCWA implements all of the CUWCC's wholesale BMPs and some retail BMPs on behalf of some of its water retailers. All SCWA's retailers are signatories to the CUWCC plan.

> *"The Sonoma County Water Agency is the only wholesale water agency in the state to have 100% of its retail water agencies signatories to the California Urban Water Conservation Council and committed to implementing best management practices for water conservation." (SCWA 2008b)*

California Water Plan

In 1957, DWR began publishing the *California Water Plan* to describe current water supplies, water usage, and future water demand. The California Water Plan is updated every five years and has a planning horizon of 30 to 50 years. The last update was published in 2005.

The California Water Plan presents data gathered over the previous five years and evaluates water supplies for agricultural, urban, and environmental water uses. The plan identifies gaps between water supply and uses. It also identifies existing and proposed statewide water demand and supply augmentation programs and projects to address statewide needs.

The 2009 plan update (currently in draft form) identifies opportunities and challenges to balancing the state's water supply and demand for the next 50 years. The plan is primarily a strategic guidebook for implementation statewide.

Integrated Regional Watershed Management (IRWM)

Integrated Regional Water Management (IRWM) is an initiative identified in the 2005 California Water Plan Update. Its purpose is "to promote integrated regional water management to ensure sustainable water uses, reliable water supplies, better water quality, environmental stewardship, efficient urban development, protection of agriculture, and a strong economy."

The IRWM initiative supports the fostering of regional partnerships, development and implementation of integrated regional water management plans, and diversification of regional water portfolios. The program is overseen by the DWR and SWRCB, which issue Proposition 50 and 84 grant funding for local support of the IRWM initiative. The SCWA has been an important regional partner for both the San Francisco Bay and North Coast IRWM efforts.

2.3 National Conservation Standards

2.2 State Conservation Directives
2.3 National Conservation Standards
2.4 Existing Sonoma County Programs to Reduce Interior Water Use
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Besides California-based conservation efforts, it is also useful to recognize nationally-targeted conservation programs. To encourage efficient water and energy use throughout the nation, federal regulatory agencies established programs to set conservation standards and provide conservation education and training programs. **ENERGY STAR** is a joint program of the U.S. Environmental Protection Agency (USEPA) and the U.S. Department of Energy (USDOE). The program was introduced by the USEPA in 1992 as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions (USEPA 2009a). Only products that meet strict energy efficiency guidelines set by the USEPA and the USDOE can carry the ENERGY STAR label. The ENERGY STAR label is included on over 60 product categories, including major appliances, office equipment, lighting, home electronics, new homes, and commercial/industrial buildings.

ENERGY STAR-labeled products deliver the same or better performance as comparable models. The USEPA estimates that families can save about a third of their energy bill by purchasing ENERGY STAR labeled products (USEPA 2009a). In addition to devices which are simply energy saving (CFL or LED light bulbs, low-energy computer monitors, etc), the program has also greatly influenced the widespread use of technological innovations that are both water and energy-efficient, including dishwashers, HE clothes washers, on-demand tankless water heaters, and more.

WaterSense is a partnership program sponsored by the USEPA. Similar to the ENERGY STAR program, the USEPA created WaterSense to serve as a national product label to help Americans identify high-performance, water-efficient products and to support professional certification programs that embrace and encourage the use of water-efficient design. The USEPA establishes the minimum requirements for efficiency and performance in order to earn the WaterSense label. Products bearing the WaterSense label are generally 20 percent more water-efficient than similar products in the marketplace (USEPA 2009b).

The WaterSense program has the ability to influence a broader audience, including manufacturers, retailers and distributors, promotional partners, and landscape irrigation professionals through WaterSense certification training and partnership programs. In collaboration with WaterSense partners, the USEPA hopes to encourage water-efficient behaviors and increase the popularity of water-efficient products.

Table 2-1 compiles current national efficiency standards for residential and commercial water-using fixtures and appliances, including standards established by the ENERGY STAR and WaterSense programs (USEPA 2008a).

Table 2-1: Water-Using Fixtures and Appliances Standards

Water Use	Standard for Residential Use	Standard for Commercial Use
Toilets	U.S. efficiency standard for new residential toilets is 1.6 gallons per flush (gpf). The WaterSense standard for new toilets is 1.28 gpf with 350 grams of waste removal.	Commercial toilets - 1.6 gallons per flush (gpf). Commercial urinals - 1.0 gpf. WaterSense urinals – 0.5 gpf or less
Showers	Maximum water output of 2.5 gallons per minute (gpm) at a pressure of 80 pounds per square inch (psi). Standards for WaterSense fixutres are 1.5 gpm at 80 psi.	No standards have been established for commercial showerheads.
Faucets	Bathroom faucets - 2.2 gpm at 60 psi or less WaterSense standards: - maximum 1.5 gpm at 60 psi - minimum of 0.8 gpm at 20 psi	Maximum of 0.5 gpm at 60 psi
Clothes Washing Machines	Less than 8 gallons of water per cycle, per cubic foot. Energy Star standards are less than 4.5 gallons per cycle per cubic foot.	Maximum of 9.5 gallons per cycle, per cubic foot
Dishwashers	On January 1, 2010, new standard dishwashers must operate at less than or equal to 6.5 gallons per cycle, and new compact dishwashers must operate at 4.5 gallons per cycle or less. Effective July 1, 2011, the requirement reduces to 5.0 gallons per cycle and 3.5 gallons per cycle, respectively. Standards for WaterSense fixtures are less than 4.25 gallons per cycle.	Energy Star standards for both high- and low-temperature dishwashers as follows: High-Temperature: 0.70 gallons per rack Low-Temperature: 1.0 gallons per rack

2.4 Existing Sonoma County Programs to Reduce Interior Water Use

2.2 State Conservation Directives
2.3 National Conservation Standards
2.4 Existing Sonoma County Programs to Reduce Interior Water Use
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This section presents an overview of existing conservation programs for interior water use in Sonoma County. These existing efforts represent a 2010 baseline condition for indoor water use practices and existing conservation programs. This section is organized as follows:

2.4.1 Interior-focused Educational Programs

2.4.2 Interior Water Use Assessment and Equipment Installation Programs

2.4.3 Interior Rebate and Discount Programs

2.4.1 Interior-focused Educational Programs

Section 2.4.1: Interior-focused Educational Programs
- Residential Educational Programs
- Commercial Educational Programs

Residential Educational Programs

Educating the public about the importance of using water wisely is essential to achieving water conservation goals. People can change their water use behavior when provided with accurate consumption information. This is especially true when residents will benefit from potential cost savings. A commitment to conservation is also strengthened when residents have a shared and broader understanding about water needs for Sonoma County. To achieve this, SCWA and other local retailers maintain public information programs that use multiple strategies to convey information. Printed mailings are used to disseminate information, including pamphlets, brochures, newsletters, and bill inserts. These printed materials seek to set voluntary goals and highlight conservation programs and tips for water reduction and conservation. Other media approaches including traveling exhibits, special events like the County Fair, information centers, public television, radio, print, slide/films, and video advertising conservation campaigns are also used to inform the public (SCWA 2009).

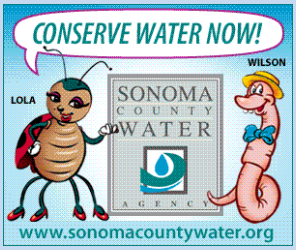
SCWA and local retailers all maintain web pages dedicated to water conservation. These pages list and summarize voluntary reduction goals and provide references for customers, including water reduction tips, conservation rebate and incentive programs, and links to other information sources. Some retailers, such as the City of Santa Rosa, have interactive conservation calculators to help customers estimate savings using different methods to reach conservation goals.

In addition to these broad-based communications, SCWA and some local retailers also respond to requests from individual consumers, businesses, and organizations that want water education and conservation information. Upon request, public or conference speakers and tour leaders are available to educate individuals and organizations about water conservation. SCWA staff gives presentations to community groups, neighborhood associations, and other interested

parties about water conservation. SCWA offers free environmental education programs for schools within their service area. These programs are designed to support California education standards while fostering water conservation and environmental stewardship. There are a variety of activities available for school children of all ages, including assembly programs, watershed field trips, recess activities, and classroom presentations.

Recent SCWA Community Outreach Programs:

✓ **2006 and 2007 Summer Water Wisely Campaign**



In an effort to reach out to local children and promote outdoor water conservation, SCWA devised two characters to promote water conservation efforts. Lola the ladybug and Wilson the worm are SCWA's water conservation mascots or "spokes-bugs." They appear in television and radio commercials, newspaper ads, billboard ads, movie theater ads, and on websites. The messages are provided in both English and Spanish.

✓ **Less is More Campaign**

The Less is More conservation campaign was initiated in 2008 to educate the community about SCWA's water supply system and the need to protect it. The campaign promotes a list of top 10 water conservation tips that incorporate water-saving measures for indoors and outdoors. The "Less is More" slogan and information were relayed to the public via websites, movie theater ads, radio spots, newspaper articles and ads, bus panels, mall posters, and information brochures – in English and Spanish languages.

✓ **Save our Water Campaign**

In 2009, SCWA began participating in the statewide "Save Our Water" campaign. SCWA's campaign advertisements included additional radio ads, bus panel ads, mall banners, movie theater ads, and weekly water storage updates in Sonoma and Marin counties as part of a statewide effort.

These SCWA outreach efforts support the CUWCC-SCWA MOU and statewide directives described in Section 2.2 above.

Commercial Educational Programs

In addition to the outreach and educational approaches described above, which generally apply to residential users, several additional informational programs are directed to commercial enterprises. These include conferences for business leaders and conservation articles for a variety of business publications, which are provided through a cooperative partnership between SCWA and the Sonoma County Economic Development Board. Additionally, SCWA is a partner of the Sonoma County Business Environmental Alliance (BEA), whose mission is to promote responsible environmental practices by local businesses through business-to-business communication and support. Through annual meetings and workshops, the BEA provides water conservation resources targeted at the commercial sector. More information on BEA's outreach efforts is available on their website: http://www.sonoma-county.org/bea.

Sonoma County Green Business Program is a partnership of government agencies and utilities that assists, recognizes, and promotes local organizations, focusing on small- to medium-sized consumer-oriented businesses that volunteer to operate in a more environmentally responsible way. To be certified, participants must be in compliance with all environmental regulations and meet program standards for conserving resources, preventing pollution, and minimizing waste. Certified green businesses receive recognition through a ceremony hosted by the Sonoma County Board of Supervisors; listing on the Sonoma Green Business Program and the Bay Area Green Business Program websites; media coverage, promotional events, and special recognition; window decals, certificates, and promotional materials for the business; and the Green Business logo to use in advertising. More information on this program and certification requirements is available on their website: http://www.sonoma-county.org/sonomagreen.

GreenPlumbers is a certificate program offered worldwide by the Master Plumbers and Mechanical Services Association, and it is gaining recognition in Sonoma County. Goals of the program are to provide specific training for local plumbers for water and energy conservation services and provide special recognition for trained personnel. The program offers accreditation in environmental and technical issues, including solar hot water systems, water-efficient technologies, and inspection report services. GreenPlumbers-certified staff can increase business marketability and comply with requirements of some green business programs. Greater detail about this program is available at the GreenPlumbers website: http://www.greenplumbersusa.com.

2.4.2 Interior Water Use Assessment and Equipment Installation Programs

Section 2.4.2: Interior Water Use Assessment and Equipment Installation Programs
- Residential Use Assessments
- Commercial Use Assessments

Residential Use Assessments

Most water retailers in Sonoma County provide free indoor water use surveys for service area customers. These programs are designed to help residents identify sources of water waste and reduce interior water use. The surveys include: evaluating indoor water using appliances, checking plumbing fixtures for leaks, measuring flow rates of all showerheads and faucets, and checking toilet flush volumes.

During the home assessment, residents are given information about appliance and fixture rebate programs available in their service area (including high efficiency toilets, clothes washers, etc.). Once the home survey is completed, a summary report is given that describes the current water use status and specific water savings recommendations for the specific home. To participate, residents must contact their water providing agency and schedule an appointment.

Free Water Saving Devices
SCWA and other Sonoma County water retailers offer free low-flow and water-saving devices including faucet aerators, efficient showerheads, toilet flappers, and dye tabs to check for toilet leaks.

The following examples highlight relatively simple, yet significant, potential savings afforded by home water use assessment programs. These water savings are estimated by the California Urban Water Conservation Council (CUWCC 2009):

- A family of four can save 1,700 gallons of water per year by simply installing low-flow kitchen and bathroom aerators.
- Fixing faucet leaks can save anywhere between 190-3,290 gallons per month.
- Fixing silent toilet leaks and can save up to 30-500 gallons of water per month.

Petaluma's Certified Water Conserving Residence Program
The Certified Water Conserving Residence program was developed as a collaborative effort between the City of Petaluma's Water Resource and Conservation Department and the North Bay Association of Realtors in order to increase participation in the City's water use survey program. This program is designed for home sellers to market their house as water-efficient and free of leaks, both indoors and outdoors.

To obtain certification, homeowners must participate in a water use survey and implement all "priority one" recommendations identified in the survey. Upon implementation of the priority one items and completion of a post-installation survey, the homeowner will receive a certificate stating that the home is certified by the City of Petaluma as a water conserving residence. The certificate is valid for 5 years.

Commercial Use Assessments

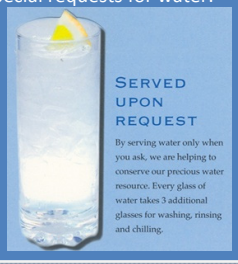
Similar to the residential programs described above, commercial water use assessments are offered through local water retailers at no charge. The Sonoma County Business Environmental Alliance promotes this service for commercial customers located within SCWA's service area.

Water conservation can lower business costs by reducing water, wastewater, and energy expenses. Participation in the water use assessment generally includes staff interviews to discuss operational or business-related water uses, a walk-through tour of the business or facility, and a leak/flow rate evaluation of indoor water fixtures. Once completed, a written description of water use patterns is provided with recommendations to increase efficiency for the business. Based on the site findings, water retailers offer financial incentives (usually in the form of rebates) or free devices to offset the cost of implementing conservation recommendations. To participate, businesses must contact their local water provider to schedule an appointment.

Free Devices for Commercial Users

Free water-saving devices for commercial users include hose nozzles, faucet aerators, and showerheads.

The City of Petaluma offers free water conservation signs for hotels and restaurants. Signs can be placed in guest rooms or on table tops and encourage patrons to conserve water by re-using towels and bedding and by making special requests for water.



2.4.3 Interior Rebate and Discount Programs

Section 2.4.3: Interior Rebate and Discount Programs

- Water Efficiency Toilet Programs
- Clothes Washer Rebate Programs
- Other Commercial Equipment Rebate Programs
- Municipal Water Efficient Technology Programs

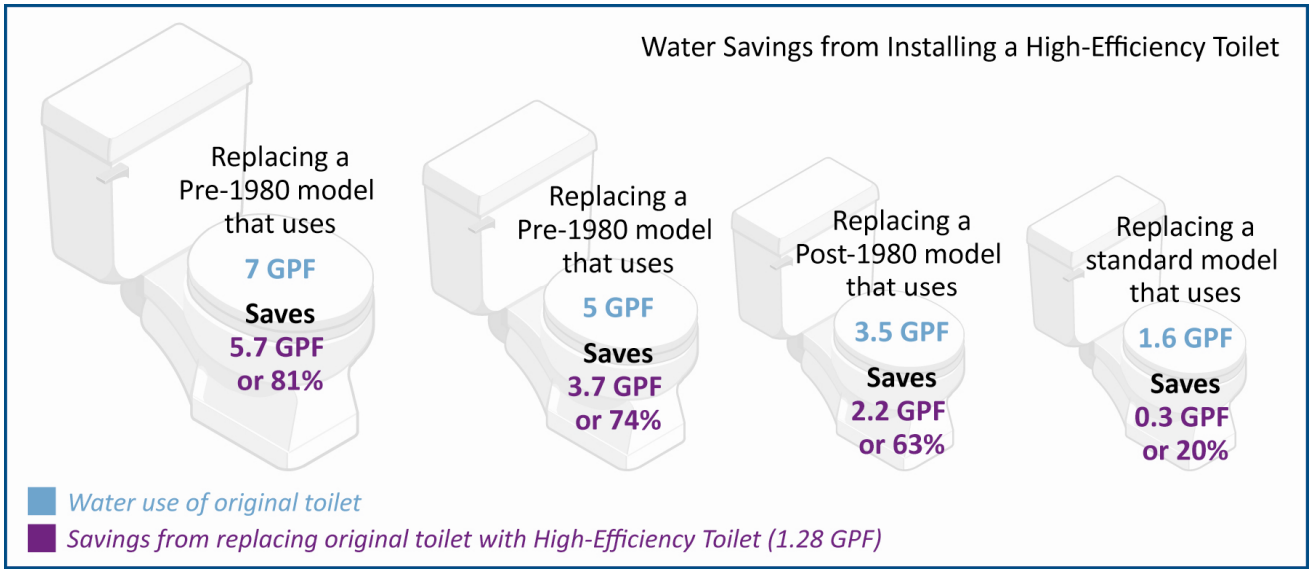
High Efficiency Toilet Programs

Residential

As introduced in Chapter 1, toilets account for about 33% of residential indoor water consumption in California (Pacific Institute 2003). Toilet replacement programs are available to those who wish to replace older toilets with new high-efficiency models. High-efficiency toilets (HET) go beyond the current national standard of 1.6 gallons per flush (gpf) and use 1.28 gallons or less per flush. The latest HET models use only 0.8 gpf (BuildingGreen 2009). In general, replacing older toilets can result in significant water savings. For example, replacing a typical 3.5 gallon toilet with a HET model can save a family of four 13,300 gallons of water per year (MWRA 2006). **Figure 2-1** illustrates water savings from using a high-efficiency toilet as compared to older models.

Water Conservation Fact:
If every US home replaced all toilets with HETs, the yearly estimated savings would be 640 billion gallons – or two weeks of flow over Niagara Falls. (USEPA 2008b)

Figure 2-1: Chronology of Toilet Water Use and Savings



Toilet rebate programs are implemented by all water retailers and sanitation districts and zones within SCWA's service area. The rebate amount and qualifications vary by retailer, but generally provide $50 to $150 per fixture and require an inspection of the fixture prior to or after installation. In addition to rebate offers, sanitation districts and zones operated by SCWA have also offered "direct install" or free installation of the fixture.

Commercial High Efficiency Toilet Programs

Commercial toilet replacement programs are similar to residential programs: they aim to replace older toilets with high-efficiency models. Commercial toilet replacement programs conducted by water retailers and sanitation districts and zones within the SCWA service area offer between $50 and $300 per fixture and may provide free installation. Urinals are another common source of excessive water consumption in commercial buildings. While the national standard for urinals set in 1994 is 1 gallon per flush, older fixtures can use up to 5 gpf. Newer, high-efficiency urinal (HEU) models now range from 0 (no-water urinals) to 0.125 gpf. MMWD estimates potential annual water savings per HEU at roughly 16,000 – 23,000 gallons for an office setting, and 10,600 – 15,000 gallons for school restrooms. The higher savings estimates are based on savings compared to no-water urinals (MMWD 2009). Agencies that currently provide rebates for installation of HEUs include the City of Petaluma, City of Santa Rosa, City of Rohnert Park, and all SCWA-operated sanitation districts and zones. Rebates provided vary up to $450 per HEU and free installation may also be provided.

Dual-flush toilets allow variable flushing rates: 1.28-1.6 gpf for solids and 0.8-1.1 gpf for liquids. **Dual-flush toilets are installed in many of SCWA's office facilities.**

Clothes Washer Rebate Programs

Residential

Water retailers throughout Sonoma County offer rebates for residential high-efficiency clothes washers (HECW). The program only credits HECWs that are listed as "Tier 3" on the Consortium for Energy Efficiency's Clothes Washer Qualifying List. Residential HECWs can save up to 50% of

the water used and 65% of the energy used as compared to conventional, top-loading machines (NMWD 2009). The total rebate amount offered varies slightly with individual retailers, and generally provides $75 to $125 per HECW. Rebates are often supplemented by the Pacific Gas and Electric Company (PG&E) and federal and state grant programs.

Commercial and Multi-Family Washer Rebate Programs

Similar to the rebate program for residential HECWs described above, a commercial program is also available for businesses and multi-family residential complexes seeking to replace older washing machines. Replacing washers in laundromats, multi-family properties, and businesses/institutions with on-site laundry services can lead to substantial water and energy savings. Commercial washer rebate programs typically provide rebates only where the HECWs meet the Consortium for Energy Efficiency's standards for commercial, family-sized water initiative. Commercial HECWs can save up to 30% water use and 50% energy use compared to conventional top-loading machines used in commercial applications (CEE 2009). The total rebate amount offered per unit varies with retailers and generally provides between $125 and $450 per HECW. Again, commercial washer rebate programs are commonly supplemented by PG&E and grant funding.

Water Conservation Fact:
By replacing an old clothes washer with a new high-efficiency washer a family can save 5,100 gallons of water per year. (City of Cotati)

Other Commercial Equipment Rebate Programs

Beyond the rebates for toilets and washers described above, water retailers and sanitization districts and zones within SCWA's service area provide additional rebate offers for the following commercial appliances. These include:

- Water-efficient ice machines (up to $600)
- Connectionless food steamers (up to $600)
- Medical equipment steam sterilizers (up to $700)
- Dry vacuum pumps (up to $250)
- Water brooms (up to $700)
- Cooling tower pH controllers (up to $1,500)
- Connectivity controllers (up to $5,000)

Restaurant/Laundromat Rate Discounts

The cities of Santa Rosa and Petaluma offer discounts for wastewater connection fees for restaurants and laundromats that install and use the most water-efficient hardware, fixtures, and appliances. In Petaluma, applicants are eligible for a 50% reduction in the wastewater connection fee upon city approval. A similar fee reduction for businesses in the City of Santa Rosa is determined on an individual basis.

Sonoma County Energy Independence Program (SCEIP)
The County of Sonoma SCEIP program also provides property owners the opportunity to finance the installation of high efficiency toilets, low flow shower heads, bathroom sink aerators, rain cisterns, hot water recirculation systems and on-demand hot water systems, demand initiated or instantaneous hot water heaters, demand initiated water softeners, and hot water pipe installation. Financing for commercial upgrades are provided for pre-rinse spray valves, waterless or high-efficiency urinals, and bathroom sink aerators.

Municipal Water-Efficient Technology Programs
Under its Water-Efficient Technologies Program, the Town of Windsor offers financial incentives (up to $10,000) to commercial, industrial, and institutional water customers to implement process and equipment changes that reduce water use by at least 50,000 gallons per year. Rebate amounts vary based on sustained water savings achieved.

- For water only service accounts, the rebate amount is $4.50 per thousand gallon reduction in water use per year - or 50% of the project cost (excluding labor), whichever is less.
- For water and sewer accounts, the rebate amount is $11.40 per thousand gallon reduction in water use per year - or 50% of the project cost (excluding labor), whichever is less.
- Maximum rebate is $10,000 per project.

The City of Santa Rosa sponsors a Sustained Reduction Rebate Program, which offers rebates of $200 for every 1,000 gallons of sustainable reduction in water use and wastewater flow that is achieved through measures other than toilet/faucet/showerhead replacement. Additional information about how to participate in this program is available by contacting the City's Water Conservation Department.

Sanitation districts and zones operated by SCWA sponsor a similar sustainable reduction rebate program. Rebates are offered for every gallon of water saved, as opposed to a minimum target like Santa Rosa's program. For example, the Sonoma Valley County Sanitation District rebates $3.56 for each gallon saved, while the Occidental County Sanitation District rebates 20 cents for each gallon saved.

The City of Petaluma offers a customized Commercial, Industrial and Institutional (CII) water savings incentive program, which provides financial incentives for CII accounts that have participated in the City's free Water Use Assessment Program (see discussion above on *Water Use Assessments and Equipment Installation – Commercial Use Assessments*). After the commercial water use assessment has been completed, the City will analyze the recommendations of the findings report and determine if the site qualifies for a financial incentive. Financial incentives will be provided after analyzing the cost-benefit ratio of each

proposed project. Incentives are tailored to each site, depending upon varying water savings potentials.

2.5 Existing Sonoma County Programs to Reduce Exterior Water Use

2.2 State Conservation Directives
2.3 National Conservation Standards
2.4 Existing Sonoma County Programs to Reduce Interior Water Use
2.5 Existing Sonoma County Programs to Reduce Exterior Water Use
2.6 Implementation and Enforcement in Sonoma County
2.7 Opportunities for Additional Conservation
2.8 Estimating Potential Water Savings

This section describes existing conservation programs to reduce outdoor water use in Sonoma County and is organized according to the following three sub-sections:

2.5.1 Outdoor Water Educational Programs

2.5.2 Exterior Water Use Assessment and Equipment Installation Programs

2.5.3 Exterior Rebate and Discount Programs

2.5.1 Outdoor Water Educational Programs

Section 2.5.1: Outdoor Water Educational Programs
- Residential-focused Education Programs
- Commercial-focused Education Programs
- Programs that Focus on Simple Outdoor Water Saving Tips

The same approach to educating the public about the importance of using water wisely indoors is also applied to outdoor water use. Several of the outreach and educational programs mentioned above in Section 2.4 are also applied to outdoor water conservation education. However, SCWA and its retailers also broadcast information specific to exterior conservation. In addition to website links to other outdoor water savings ideas and tips, the following outdoor water tools are available online for interested parties:

- Educational videos and tutorials are offered on the City of Petaluma and the North Marin Water District websites.
- The City of Santa Rosa's website includes a water use efficiency calculator to determine the appropriate irrigation needs for specific landscapes. Using this calculator, customers can easily input landscape type and area information and receive instant results showing both outdoor water goals and actual water use for the past two years. Based on the differences between actual use and appropriate use, individuals can implement different measures to conserve or more efficiently use water to reach goals.

California Irrigation Management Information Systems (CIMIS) is a network of over 120 automated weather stations operated throughout the state by DWR. Within Sonoma County, CIMIS stations are located in Bennett Valley, Healdsburg, Santa Rosa, Petaluma, Valley of the Moon, and Windsor. These stations are used to predict the local area water needs. More information on station locations and data is found with the appropriate water retailer or the CIMIS online information center: http://wwwcimis.water.ca.gov/cimis/info.jsp.

- SCWA hosts the contents of the Water Wise Gardening CD for Sonoma and Marin Counties on its conservation webpage. This informational website provides extensive lists of plants specifically adapted to the local climate, virtual garden tours, and offers tips and ideas for creating water-efficient landscapes.

- California Irrigation Management Information Systems (CIMIS) stations provide evapo-transpiration (ET) data characterizing on-site evaporation conditions. This data allows individuals to manage landscape irrigation by matching watering times and amounts with the current ET rates.

Exterior water use education is also provided through public demonstration gardens and local classes and seminars. Local demonstration gardens are operated by the City of Cotati (La Plaza Garden), the City of Santa Rosa (Luther Burbank Home and Gardens), City of Petaluma, City of Sonoma, and Town of Windsor. These gardens are open to the public and provide examples of xeriscaped trees, plants, and groundcovers that are especially suited to the local climate.

A xeriscaped garden

Water seminars are held on a regular basis by the City of Santa Rosa, City of Petaluma, City of Sonoma, and the Valley of the Moon Water District. These seminars usually include demonstrations and presentations about installing and using drip or efficient irrigation equipment, and about selecting and managing low water use plants suitable to the local climate.

Commercial-focused Educational Programs

Several informational programs specifically directed to commercial customers are also offered in addition to those described above (e.g., Sonoma County Economic Development Board, the Sonoma County Business Environmental Alliance, GreenPlumbers). This includes the Qualified Water Efficient Landscaper Certificate Program (QWEL), which is supported by SCWA and its retailers. QWEL is one of two approved USEPA WaterSense Irrigation Auditor training programs in the nation, and was developed in cooperation with the California Landscape Contractors Association, SCWA, City of Santa Rosa, and Santa Rosa Junior College. The Program provides training for local landscape professionals to reduce landscape water demand by incorporating greater water efficiency in landscape design, maintenance, and operation. In order to receive certification, landscapers are required to attend educational classes that are based on the principals of proper plant selection for the local climate, irrigation system design and maintenance, and irrigation system programming and operation. QWEL graduates are posted on supporting agencies' websites and listed on brochures mailed out to customers. More information on the program can be found on the QWEL website at: http://www.qweltraining.com/.

Bay Friendly Landscaping is a holistic approach to gardening and landscaping that works in harmony with the natural conditions of the San Francisco Bay Watershed. Bay-Friendly practices foster soil health, conserve water and other valuable resources while reducing waste

and preventing pollution. Russian River Friendly Landscaping is being developed for the North Bay using Bay Friendly Landscaping as a model.

The City of Santa Rosa, City of Petaluma, City of Sonoma, and the Valley of the Moon Water District also offer professional landscape workshops throughout the year to provide demonstrations and presentations on efficient irrigation equipment, and selection and management of drought-tolerant plants.

Programs that Focus on Simple Outdoor Water Savings Tips

The outreach and educational programs described above typically provide easily understood and achievable tips to save water outdoors. **Table 2-3** below shows the City of Cotati's outdoor water conservation guidance. This guidance is also generally representative of other municipal efforts in the County.

Table 2-3: Outdoor Water Conservation Guidance

Irrigation	▪ Direct downspouts and other runoff towards shrubs and trees, or collect and use for your garden. ▪ Check your sprinkler system frequently and adjust sprinklers so only your lawn is watered and not the house, sidewalk, or street. ▪ Use sprinklers for larger areas of grass. Water small patches by hand to avoid waste. ▪ Minimize evaporation by watering during the early morning hours, when temperatures are cooler and winds are lighter. ▪ Adjust watering schedules each week to match seasonal weather conditions and landscape requirements and set watering cycles to shorter periods according to the season. ▪ Install a rain shut-off device on your automatic sprinklers to eliminate unnecessary watering. ▪ Use a screwdriver as a soil probe to test soil moisture. If it goes in easily, don't water. ▪ Teach your family how to shut off your automatic watering systems. Turn sprinklers off if the system is malfunctioning or when a storm is approaching. ▪ Check outdoor faucets, pipes, and hoses for leaks. ▪ Report significant water losses from broken pipes, fire hydrants or errant sprinklers to the property owner. ▪ Know where the master water shut-off valve for your home is located.
Lawn care	▪ Aerate your lawn. Punch holes in your lawn about six inches apart so water will reach the roots rather than run off the surface. ▪ Adjust lawn mowers to a higher setting. Longer grass shades root systems and holds soil moisture better than a closely clipped lawn. ▪ Regularly weed lawn and garden areas. Weeds compete with other plants for nutrients, light, and water.

Plant placement and care	▪ Plant during the spring or fall when the watering requirements are lower. ▪ Landscape with xeriscape trees, plants and groundcovers. ▪ Group plants with the same watering needs together. ▪ More plants die from over-watering than from under-watering. Be sure only to water plants when necessary. ▪ Use drip irrigation for shrubs to apply water directly to the roots. ▪ Leave lower branches on trees and shrubs and allow leaf litter to accumulate on top of the soil. This keeps the soil cooler and reduces evaporation. ▪ While fertilizers promote plant growth, they also increase water consumption. Instead, start a compost pile. Using compost when planting adds water-holding organic matter to the soil. ▪ Use a layer of organic mulch around plants to reduce evaporation and save hundreds of gallons of water a year. ▪ Use ice cubes to water hanging baskets, planters, and pots to eliminate water overflow.
Other outdoor tips	▪ Avoid use of recreational water toys that require a constant flow of water (e.g., Slip 'n Slides). ▪ Use a broom instead of a hose to clean driveways or sidewalks and save up to 80 gallons of water every time. ▪ Check evaporative cooling systems annually for higher efficiency. Also, direct the water drain to a flowerbed, tree, or your lawn. ▪ Equip ornamental water features (fountains and ponds) with recirculating water systems and avoid spraying water into the air. Trickling or cascading fountains lose less water to evaporation. ▪ Install covers on pools and spas and check for leaks around your pumps, especially if you have an automatic refilling device. And when backwashing your pool, consider using the water on your landscaping. ▪ Check water meter readings and bills to track water usage.

City of Cotati: <http://www.ci.cotati.ca.us/sections/services/water-conservation-tips.cfm#outdoor>

2.5.2 Exterior Water Use Assessment and Equipment Installation Programs

Section 2.5.2: Exterior Water Use Assessment and Equipment Installation Programs
- Water Use Assessments
- Free Outdoor Water-saving Devices

Water Use Assessments

Generally conducted during the interior water use assessments (Section 2.4 above), outdoor water use assessments are also provided free of charge by the majority of water retailers in Sonoma County. The following items are evaluated for efficiency and general condition:

- Flow and leaks
- Sprinklers and irrigation systems
- Irrigation runtimes
- Landscaping
- Water meters

Residential irrigation water use accounts for nearly 33% of the total water use during peak summer months (MMWD 2009)

Survey technicians teach customers how to read water meters so they can keep track of water usage. Once the assessment is completed, a summary report is provided that describes the current water use status and specific water savings recommendations. Customers may also receive a free custom irrigation schedule based on site-specific landscape conditions. Exterior water use assessments are conducted at residences and commercial business properties.

Based on the assessment results, retailers may offer financial incentives (usually in the form of rebates or discounts) to help offset the cost of implementing conservation recommendations.

Free Outdoor Water-saving Devices

The use of automatic shut-off nozzles for outdoor water hoses is promoted as a simple conservation technique. Several retailers, including the cities of Petaluma, Santa Rosa, Sonoma, and the Valley of the Moon Water District, offer these devices free of charge to service area customers.

The City of Petaluma also lends free catch cans (see photo below) to help customers determine the distribution efficiency of their irrigation systems. By placing the catch-cans within the irrigated area, customers are able to estimate how evenly water is being distributed. By ensuring that water is being applied uniformly, system run-time can be reduced.

Catch-cans (J. Kowalski – Oregon State University 2008)

2.5.3 Exterior Rebate and Discount Programs

Section 2.5.3: Exterior Rebate and Discount Programs
- Efficient Irrigation Programs
- Other Rebate Programs

Efficient Irrigation Programs

Water retailers offer multiple programs designed to improve the efficiency of landscape irrigation and reduce exterior water use. These programs include turf-removal/conversion, landscape amendments, and efficient irrigation system installation, and each are discussed below. Generally, a common component of these programs is an initial consultation, usually in the form of a use assessment or audit.

Landscape Equipment Rebate Programs

One of the CUWCC BMPs involves implementation of a rebate program for replacement of landscape equipment with more efficient equipment. Eligible equipment includes water pressure-regulating devices, check valves, sub-meters, smart controllers (weather-based), moisture and flow sensors, high-efficiency sprinkler nozzles, rain shut-off devices, and soil conditioners and amendments.

The amount and restrictions for rebates vary throughout the county. The Valley of the Moon Water District's *Landscape Equipment Rebate* program provides rebates of up to 100% for the installation of recommended improvements if water savings are demonstrated.

Residential Turf Conversion Programs

Turf conversion programs (typically referred to as "Cash for Grass" programs) offer water customers cash in exchange for reducing the amount of lawn area in their landscapes. Though specific requirements for the newly converted area may vary, typically lawns may not be converted into new swimming pools, building extensions, patios, decks, other hardscape features, or areas that include high-water use plants. In addition, the existing sprinkler system must be removed or replaced with drip systems or independent irrigation systems.

Soil Moisture Sensor (Delta-T Devices 2007)

To verify that the conversion area is eligible, an inspection is conducted to confirm that the existing lawn is healthy and regularly watered with a sprinkler system (dead or already removed lawns do not qualify for the rebate).

Turf conversion programs often include rebates to upgrade the existing irrigation system and post-conversion landscape. Items eligible for these rebate programs include drip irrigation systems and mulch.

Rebate amounts vary by water retailer from $0.50 to $1 per square foot of turf removed. Some programs have maximum rebate limits. Some programs offer up to $350 in rebates for upgrades to irrigation systems.

Commercial Turf Conversion Programs
Fewer turf conversion programs are currently offered for commercial customers. However, these programs are virtually identical to those described above for residential customers. The major exception is that the maximum rebate allotments are generally much higher for commercial applications. For example, the City of Santa Rosa's program offers up to $2,500 and the City of Sonoma offers $3,000 rebates for replacement of turf.

Smart Irrigation Controller Programs
Weather-based irrigation controllers (smart controllers) are an effective technology for reducing outdoor water use. Smart controllers operate based on weather data and site information, including plant type and sprinkler system output, to automatically adjust watering times and frequency. Use of smart controllers can reduce landscape water use by upwards of 30% (NMWD 2009). The City of Petaluma offers up to $900 rebate for commercial and multi-family residential accounts and requires rain sensors and 2-year minimum operation of smart control devices on-site. The Sonoma Valley County Sanitation District and the Airport/Larkfield/Wikiup Sanitation Zone have both offered a rebate of 50% of total project cost for commercial customers to install these devices.

Rotating Nozzle (Central Basin Municipal Water District 2009)

City of Sonoma Energy and Water Efficiency Loan Program
The City of Sonoma has a program that enables businesses and residents to borrow money for water conservation improvements. Outdoor improvements are also eligible under this program including: high efficiency irrigation systems, evapotransporation systems, smart irrigation controllers, and recycled water use.

Sonoma County Energy Independence Program (SCEIP)
The County of Sonoma partnered with SCWA to launch this program in late March 2009. SCEIP is a financing mechanism through the County to help home and building owners finance energy and water efficiency retrofits. The program provides financing for permanent installation of water conserving devices. Visit the website at www.sonomacountyenergy.org for the eligible improvements list.

Landscape Budget Programs
Landscape budgets for commercial/industrial customers can help identify actual irrigation needs for their specific landscape composition. This program goes beyond simple use audits and establishes definitive water goals for irrigation.

All water retailers within SCWA's service area have developed landscape water budgets for most dedicated irrigation accounts. The budgets are compiled from measurements of irrigated turf and shrubs at the site and based on the calculated area and local evapotranspiration data. The budget allows maintenance staff to compare landscape water use with water needs and

prioritize audits at the poorest-performing sites. Some cities send notices to their dedicated irrigation accounts about their water budget performance. The City of Santa Rosa uses water budget-based billing to encourage watering efficiency.

The City of Santa Rosa's *Irrigation Efficiency Rebate* program offers rebates to commercial customers who have a dedicated irrigation meter and have completed a landscape-specific irrigation budget for the property. Rebates are issued based on how closely monthly irrigation water use matches the calculated water budget.

Rebates for Separate Water Meters for Landscaping

Installing separate water meters for indoor and outdoor water use can have the following advantages:

- ability to monitor irrigation water use separate from indoor water use;
- isolate location of leaks easier;
- receive monthly updates on irrigation water use efficiency; and
- ensure that wastewater charges will only be assessed on water that flows through the indoor meter.

To encourage use of split meters by commercial customers, the City of Santa Rosa offers a 100% reimbursement of the costs associated with installing a separate meter for irrigation water use (not including labor). Reimbursement includes: the Encroachment Permit, Building Permit, City of Santa Rosa meter and processing fee, backflow device, and pressure regulating device. Once the application is submitted and approved, the applicant may complete the service split and submit the receipts for reimbursement.

Other Rebate Programs

Residential Pool Cover Program

Using a pool cover regularly can reduce evaporation by 90 to 95 percent (MMWD 2009). According to the Marin Municipal Water District's website, an average pool (18 feet x 36 feet) loses about 1 inch of water per week in the peak of summer if it is not covered. This can lead to an annual water loss of 7,000 gallons.

The North Marin Water District offers a 25% rebate (up to $50) for purchasing approved pool covers. Most water retailers within SCWA's service area recommend installing pool covers. Pool cover rebate programs have not been established in Sonoma County because many retailers have found that such programs historically have not been cost effective.

2.2 State Conservation Directives
2.3 National Conservation Standards
2.4 Existing Sonoma County Programs to Reduce Interior Water Use
2.5 Existing Sonoma County Programs to Reduce Exterior Water Use
2.6 Implementation and Enforcement in Sonoma County
2.7 Opportunities for Additional Conservation
2.8 Estimating Potential Water Savings

2.6 Water Conservation Implementation and Enforcement in Sonoma County

Most of the planning agencies within SCWA's service area have incorporated water conservation policies into their general plans and city and county codes. Similarly, local water providers have adopted water conservation regulations and ordinances. These measures provide the authority to implement and enforce water conservation actions, particularly within planned future growth areas. In general, SCWA's water retailers have adopted water waste and non-essential water use policies, landscaping standards, and emergency water shortage policies (refer to **Appendix 1** for a detailed review of these local policies and standards). Additionally, as discussed in Section 2.2, some local communities have adopted Water Efficient Landscape Ordinances and the State's model landscape ordinance is in effect (since January 2010) for local agencies that have not adopted their own Water Efficient Landscape Ordinance. A copy of the County's ordinance can be reviewed online at: <http://www.sonoma-county.org/prmd/docs/landscape_ord/index.htm>.

Local agency policies and standards are commonly applied to new projects (both public and private) that require either a building permit, conditional use permit, design review by the city or county, or a utilities certificate from a local municipality. The following project types are subject to conformance with these policies and standards: office, commercial, industrial and institutional landscaping, park and greenbelt landscaping, and developer-installed landscaping for multi-family residential and in-common areas. In general, single-family home backyards have not been subject to these policies and standards.

To comply with these local water use requirements, verification is needed at the following project stages: preliminary design review, final design review, building permit/plan check, and completion of installation. The project review and approval process may vary, but, ultimately, applicants must obtain approval for final site design plans that include the conservation measures before construction may begin. Once the project is complete, an inspection may be conducted to check for compliance and proper installation of water use features.

Typically, these water use policies and standards do not apply to registered historical sites, ecological restoration projects that do not require permanent irrigation systems, properties irrigated with private well water, or properties irrigated with recycled water or zoned for agricultural cultivation. However, owners of these excluded properties are encouraged to implement efficient landscape water use practices.

The full details of the project approval requirements are available directly from the water retailer and/or the appropriate planning agency (most information is accessible online)[1].

2.7 Opportunities for Additional Water Conservation

This section describes additional water conservation opportunities that could be implemented to supplement or augment existing programs and are well suited to Sonoma County. These opportunities were researched from other successful programs implemented throughout California, the nation, and other foreign countries. The following types of additional conservation opportunities are presented.

2.2 State Conservation Directives
2.3 National Conservation Standards
2.4 Existing Sonoma County Programs to Reduce Interior Water Use
2.5 Existing Sonoma County Programs to Reduce Exterior Water Use
2.6 Implementation and Enforcement in Sonoma County
2.7 Opportunities for Additional Conservation
2.8 Estimating Potential Water Savings

- Educational and Outreach Opportunities
- Land Use Planning and Design for Conservation
- Additional Rebate Opportunities
- Retrofits and Equipment Upgrade Opportunities

2.7.1 Educational and Outreach Opportunities

Section 2.7.1: Educational and Outreach Opportunities
- Establish Numeric Goals or Targets
- Additional Public Involvement

Establish Numeric Goals or Targets

Existing educational and community awareness programs can be expanded to include numeric targets or dates to reach conservation goals. Slogans with numbers are effective at gaining public interest in a program. For example, in the late 1990's government health departments promoted the slogan "5-a-day" to promote consumption of five fruits and vegetables per day for better health. In 2007, the "I drive 55 mph" conservation project was initiated to promote fuel economy, safe driving, and pollution reduction. Incorporation of a numeric goal that is tangible to the general public can increase water conservation results.

[1] As an example of the water use requirements enforced by local agencies, the Sonoma County Permit and Resource Management Department (PRMD) drafted water conservation specifications into their design and construction standards for new development. These conservation standards include specifications for indoor water uses, such as faucet and toilet flow rates. The standards, if adopted, would apply to new residential and commercial development, as well as building retrofits.

Calleguas Municipal Water District's 20-Gallon Challenge Logo

In Ventura County (southern California) the "20-gallon challenge" campaign encourages residents to voluntarily conserve at least 20 gallons of water per day. To positively reinforce water conservation activities, a special appreciation certificate is awarded to customers who successfully achieve the goal. Water wholesalers and retailers currently promoting the "20-gallon challenge" are the Metropolitan Water District of Southern California including all of its retailers and subsidiary districts, and the Santa Clara Valley Water District. In 2008, the City of San Diego reduced its water demand by 6.3%, with the help of the 20-Gallon Challenge (Musaraca 2008).

Saving 20 Gallons a Day

To save 20 gallons one may repair leaks and broken sprinkler heads or fix leaky faucets, either of which could save 20 gallons of water per day. Or combine several smaller tasks, such as only running the dishwasher when full (2-4.5 gallons per load), turning the water off while brushing (2 gallons per minute), turning off the water while rinsing dishes (2.5 gallons per load), and shortening showers by five minutes (2.5 gallons per minute), all of which can add up to 20 gallons of water per day. (Calleguas Municipal Water District 2009)

Additional Public Involvement

Many of the existing public involvement programs sponsored by retailers throughout Sonoma County successfully reduce water consumption. These programs should continue to reach out to residential water users, especially children, and increase their focus on commercial water users. The existing standards implemented by most retailers in the county require installation of efficient water fixtures for new construction projects only. Upgrades to water fixtures in existing businesses have not been as popular as in the residential sector. With a reduction in commercial construction in recent years (2008-2009) many businesses have closed or downsized. As there are no requirements (i.e., city policies or mandates) to replace water fixtures when tenants change, there are missed opportunities to implement water conserving measures. Overall, there are fewer incentives for building owners and commercial tenants to conserve water under such economic conditions.

To encourage increased public participation in water conservation efforts for both the residential and commercial sectors, the City of Tucson's Water Department implements a unique program. This public involvement program could be a good model to be applied in Sonoma County. It is described below.

Tucson Community Conservation Task Force

The Tucson Community Conservation Task Force was initiated by the City of Tucson's Water Department and is a committee of various community stakeholders who provide input on new water conservation strategies proposed by the City. The task force reviews and comments on the new strategies, and makes community-supported conservation recommendations to the City. In this way, the City can be assured that the conservation strategies selected are appropriate and will be supported by the public. Community input also allows the city to tailor the programs to best suit behaviors of the variety of water users in the city. Through the Community Conservation Task Force, the city ensures the success of conservation programs before they are implemented (City of Tucson Water Department 2006). This program has been highly successful.

City of Rohnert Park Water Conservation Sub-Committee
The Water Conservation Sub-Committee of Rohnert Park was initiated by City elected officials to establish a relationship with City staff, SCWA, and various community stakeholders. The Sub-Committee meets monthly to discuss current issues, program proposals, and other water related issues. The meetings have helped to facilitate open communication between the City and SCWA while providing a forum for customer input.

Community Based Organization Partnerships (CBO)
CBO's have been used in the past to distribute fixtures, but new opportunities have arrived to showcase the skills of master gardeners, nonprofit garden groups and other local initiatives to promote sustainable water management practices. The City of Petaluma recently partnered with *Daily Acts* (a local non-profit) and held a widely attended sheet mulching workshop. The demonstration mulch area was on City property and was planted with low water use plants. The edible plants will be harvested and distributed by *Petaluma Bounty*, a local nonprofit food bank. Many community gardens would appreciate the opportunity to partner with local cities or other utilities in this way. The Sonoma County iGROW campaign can provide outreach and other tools to facilitate these partnerships.

2.7.2 Land Use Planning and Design for Conservation

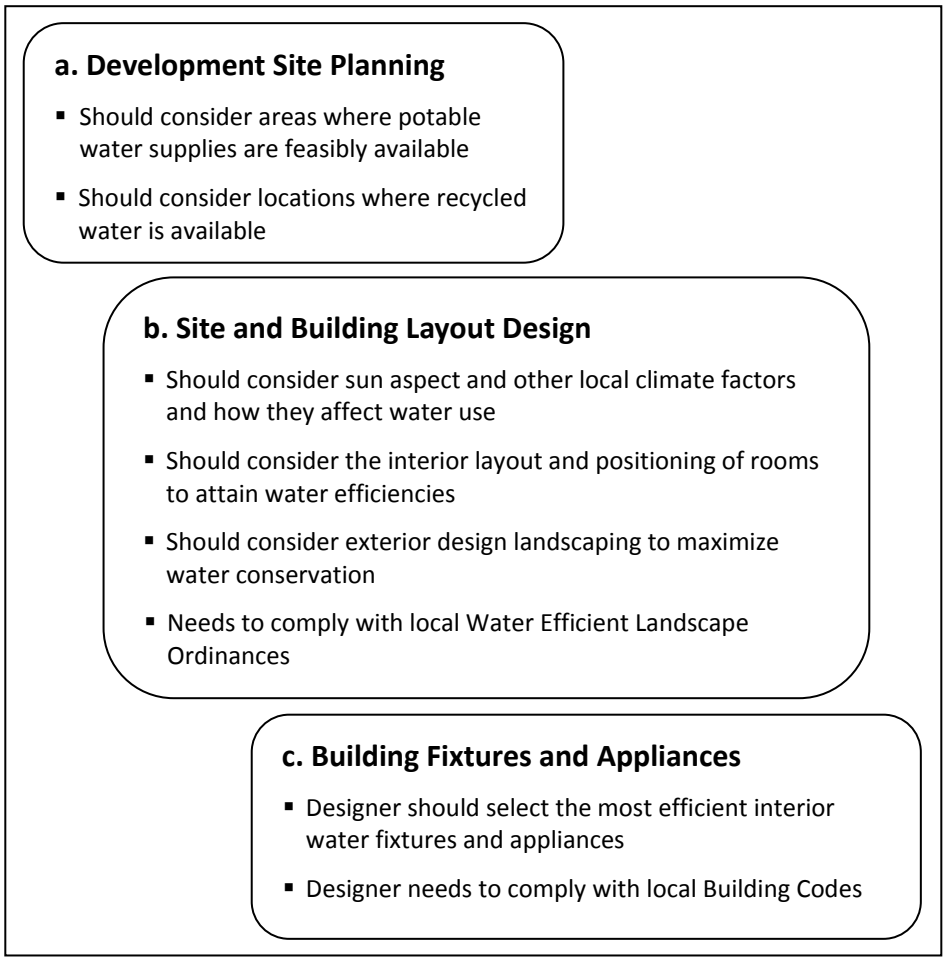
Land use planning can be conducted with more specific focus toward saving water. Good land use planning and development design should consider water conservation approaches throughout all phases of the design process. As summarized in **Figure 2-2**, water conservation can be integrated and emphasized during the siting process and the on-site design of the development and its buildings, through complying with local ordinances, and in selecting appropriate interior/exterior fixtures and appliances.

Development siting should consider the availability of recycled water and how water reuse opportunities may reduce the overall water demand for a development. Water reuse approaches are reviewed in more detail in Chapter 3. The on-site building design should consider site characteristics that affect water use such as sun aspect, the sizing and shape of surfaces and structures for their water use efficiency.

Site and building design should consider the development's (or building's) overall water uses and demand, and landscaping and irrigation needs. The building layout should consider efficient room locations including locating kitchens and bathrooms near water heaters to reduce "down the drain" waste that occurs while waiting for hot water to travel through the pipes. Installing on-demand hot water systems may be an even better solution to this problem. For landscaping, good site planning and design involves selecting suitable plant species and locations for the site's specific climate, soil, and drainage conditions and to maximize irrigation efficiency.

Complying with local water conservation regulations and ordinances ensures conservation measures are implemented and water savings occur. Cities are passing ordinances that include minimum water use requirements for landscaping, appliances, and water fixtures in new development and redevelopment projects. Additionally, local developers and landowners have a responsibility to meet state-level conservation requirements (see previous discussions in Section 2.2. As a means to document compliance with water conservations goals, Appendix 3 includes a planning checklist intended for completion by the developer and for review by the local planning department.

Figure 2-2: Summary of Land Use Planning Considerations for Conservation



The following sections describe programs where water conservation approaches are integrated directly into the land use planning process. These programs offer examples to Sonoma County on how such approaches can be integrated into the land use planning process.

Build It Green

Build It Green (BIG) offers Green Building Guidelines for new home construction, home remodeling, and multifamily construction. The Guidelines were developed to address specific climate and market conditions in California. The Guidelines are based on sound building practice and engineering. In their development, the Guidelines were reviewed and refined by a diverse set of residential building stakeholders including production builders, contractors, architects and designers, multifamily home developers, state and local government leaders, regional and national building-science experts, product manufacturers and suppliers, and green building advocates.

Cities in Sonoma County that have a green building program typically use LEED® guidelines for new commercial construction and Build It Green guidelines for new residential construction.

The Green Building Program approved by the County Board of Supervisors in 2009 also uses LEED® and BIG guidelines and sets compliance thresholds at 40 points under the new 2009 LEED® Version 3 commercial Green Building Rating System and 50 points under the new BIG 2008-2011 Green Point Rating System for residential construction. Developing a countywide green building ordinance on these existing guidelines provided consistency among local jurisdictions and met objectives set in the Sonoma County General Plan 2020, Open Space and Resource Conservation Element, Policy ORSC-14f. Both plan check and inspection verification is conducted by a third party green rater who is certified under the applicable green building rating system. Standards include points for water-efficient landscape irrigation systems and practices, hot water heating and delivery systems, high-efficiency toilets, dishwashers and clothes-washers.

Conservation Offset Programs

The Department of Water Resources, in its 2005 California Water Plan Update (see Section 2.2 for a discussion of the Water Plan), identified an offset program as an under-utilized technique that can greatly aid in conservation efforts. A Conservation Offset Program requires residential or commercial developers to save at least the same amount of water as the water demand for the project (1:1 ratio). Some water districts require new developments to implement actions to save two or more times the projected water demand for the project, resulting in a 2:1 offset ratio. In such a case the development requires half the water to operate compared to past conventional development designs. A development can achieve such water savings through cutting-edge urban designs and reliable water-saving indoor and outdoor technologies, such as those discussed previously in this chapter.

Offset programs have already achieved results in some California communities, including the City of San Luis Obispo (2:1 offset), Soquel Creek Water District, Santa Cruz County (1.2:1 offset), and Cambria, in San Luis Obispo County (offset 7-8% of water use per year). Through these programs, discussed in detail below, water-short communities are able to develop and grow while conserving water at the same time.

The City of San Luis Obispo began its 2:1 water demand offset program in 1998 with the goal of expanding the number of homes or businesses in the area without negatively impacting local water supplies. San Luis Obispo requires developers to reduce the water impact of a project by half. The amount of water "normally required" for a project is referred to by the City as the "water use factor." This factor is based on water use data and is established by the City. Projects are assigned "water use factors" depending on the average lifetime water use of similar projects. New development projects must use half as much water as similar development projects under existing conditions. This program is mandatory and does not allow developers to opt out of the program by purchasing credits or paying fees. Common retrofits include upgrading inefficient showerheads or toilets. Landscaping changes are not used for calculating the savings ratio, as these changes can easily be reversed (Anderson 2006).

Soquel Creek Water District in Santa Cruz County has an offset program similar to that of San Luis Obispo. The program utilizes a list of "water use factors" (based on the water uses of similar projects) to determine the amount of water offset needed for each project. However, the program differs in that the offset ratio is 1.2:1, less than San Luis Obispo's 2:1 ratio. This program is unique in that it encourages developers to not only install water conservation elements for the proposed development, but it also provides credit for installation of water conservation measures at other locations to achieve the 1.2:1 water use offset at the proposed development (Anderson 2006). In other words, if the proposed project cannot meet the 1.2:1 water use offset, the project proponent can fund water use upgrades at an adjacent property, such as replacing turf or installing water-efficient fixtures, to achieve the mandatory offset for the proposed project. Thus, the program allows development flexibility while attaining water conservation goals. The program is intended to "neutralize" the impact new developments have on the region's water supply and maximize water conservation. As a result of this program, more water service connections are approved, yet water consumption in the region has decreased overall (Soquel Creek Water District 2009).

The City of Cambria refers to its over-20-year-old offset program as "Retrofit-to-Build." In order to build a new project (residential, commercial, or agricultural), developers are required to attain water conservation "points" by implementing retrofits to plumbing fixtures. Point requirements vary from 80 to 325 points per unit of development (such as a building or home). A typical home requires offsets equivalent to 166-216 points. Farm irrigation retrofits are also accepted. One point is equivalent to 1.47 gallons of water per day. Alternatively, developers can purchase points for $50 each. The number of points that developers are required to pay for

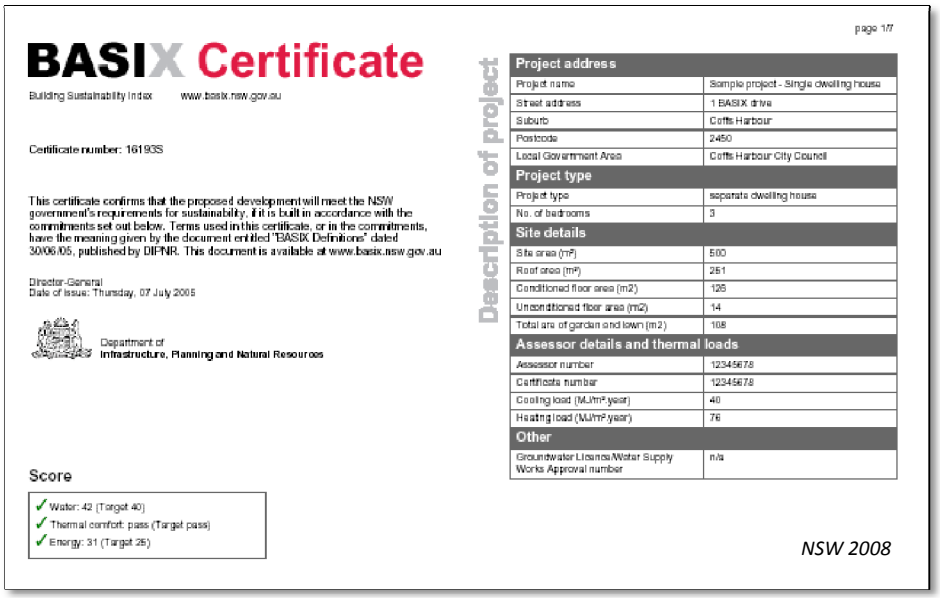
or earn through retrofits are based on the number of bathrooms and lot size. This program has successfully resulted in a 7-8% reduction in total water use for the City (Anderson 2006).

Online Design Tool - BASIX Program from Australia

The Australia New South Wales (NSW) Government has implemented a program called BASIX (the Building Sustainability Index) that, if used in Sonoma County, could substantially increase local water savings from new development and redevelopment projects. BASIX is an online design tool that evaluates the water and energy efficiency of proposed new homes and their landscaping (2006a). The NSW government requires all new single and multiple family home designs (as well as kitchen remodels and room additions) to be BASIX-Certified. This means that each new home design must meet water and energy targets (set by the NSW government) before the project is approved for construction (see **Figure 2-3** for an example of a BASIX certificate).

> **Water Conservation Fact:**
> Australia's BASIX program requires residents to build water and energy-efficient homes, yet allows a large degree of creativity. (NSW 2006a)

Figure 2-3: BASIX Certificate



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BASIX Certificate

Building Sustainability Index www.basix.nsw.gov.au

Certificate number: 161935

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 30/06/05, published by DIPNR. This document is available at www.basix.nsw.gov.au

Director-General
Date of issue: Thursday, 07 July 2005

Department of
Infrastructure, Planning and Natural Resources

Description of project

Project address	
Project name	Sample project - Single dwelling house
Street address	1 BASIX drive
Suburb	Coffs Harbour
Postcode	2450
Local Government Area	Coffs Harbour City Council
Project type	
Project type	separate dwelling house
No. of bedrooms	3
Site details	
Site area (m²)	500
Roof area (m²)	251
Conditioned floor area (m2)	125
Unconditioned floor area (m2)	14
Total area of garden and lawn (m2)	108
Assessor details and thermal loads	
Assessor number	12345678
Certificate number	12345678
Cooling load (MJ/m² year)	40
Heating load (MJ/m² year)	76
Other	
Groundwater Licence/Water Supply Works Approval number	n/a

Score

✓ Water: 42 (Target 40)
✓ Thermal comfort: pass (Target pass)
✓ Energy: 31 (Target 25)

NSW 2008

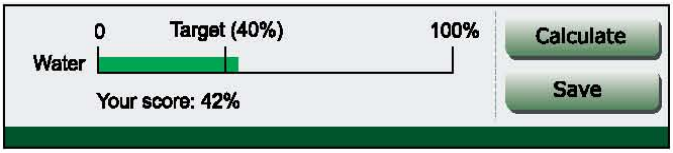
The BASIX system uses an on-line assessment tool to evaluate a home design in terms of its water conservation potential. Using the entered home design information, BASIX will assess whether or not the home design complies with the energy and water efficiency targets. If the design does not achieve BASIX standards, the program will offer alternative adjustments to the design to achieve efficiency targets. Prospective home builders must choose among these alternatives and alter their home design in order to meet government building standards and gain construction approval. The BASIX program is easy to use, and does not require that custom designs be replaced with cookie-cutter homes. The tool also considers the location, size, and

type of housing unit, thus a BASIX home can be custom designed to a specific environment or situation.

While BASIX offers many alternatives to meet home design standards, there are a few technologies that BASIX especially promotes. These include: high efficiency shower-heads, dual-flush toilets, water-saving aerators, and flow-regulators. BASIX will also suggest water reuse technologies and techniques such as connecting a rainwater tank to toilets, laundry, and garden use; increasing the amount of roof area that goes into the water tank (i.e. designing a roof so that more rainwater can be collected); and increasing the size of the home's water storage tank. These topics, as well as their constraints, are further discussed in Chapter 3 *Water Reuse*. For outdoor water use, BASIX promotes the use of native and/or low-water use plants in a home's landscaping (NSW 2006b). Including such features into the development design increases the amount of water savings, and allows new homes to achieve the BASIX water target.

The water and energy targets in the BASIX program are unique in that they are based upon current NSW statewide average water and energy use values. The targets could potentially be modified to reflect California averages. The developer is required to design the home to meet 0-40% water savings compared to the NSW statewide averages. Target calculations are dependent on the location of the development (NSW 2006b). **Figure 2-4** shows an example of a BASIX "progress bar," which helps developers assess the water efficiency of their overall home design. The 0% savings mark represents the NSW statewide average water use. The majority (90%) of new developments are required to meet the 40% target. Under the BASIX program, a new home is not allowed to use more water than the current NSW statewide average. Thus, most new homes automatically save up to 40% more water compared to existing, non-BASIX-Certified homes (NSW 2006b).

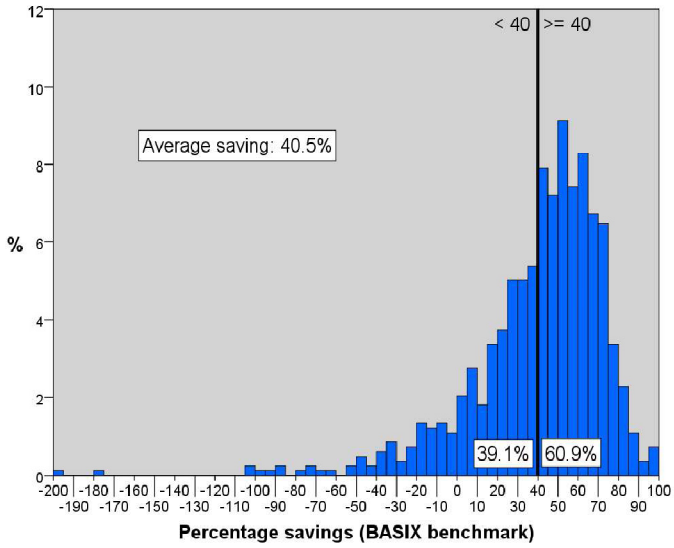
Figure 2-4: BASIX Water Target Progress Bar



In this figure, a green bar indicates a "passing score," while a red bar indicates that a user must add more water-efficient technologies to the design. (NSW 2009a)

The NSW Government set the 40% potable water reduction goal (compared to the NSW statewide average) for new homes in 2004. By 2008, most new homes met this target, and the average water savings of new homes was 40.5%, according to the 2007-2008 BASIX Monitoring Study (see **Figure 2-5**) (NSW 2008; 2009a). Of the BASIX-Certified homes monitored in the study, over 60% actually saved *more* water than the 40% water savings target; 39% met or fell below the water savings target; and about 10% fell below the 0% target, meaning that those homes used more water than the NSW statewide average (NSW 2009a).

Figure 2-5: 2007-2008 BASIX Monitoring Study



Water savings of BASIX homes from the 2007-2008 BASIX Monitoring Study. The bold black line represents the 40% Water Target. The blue area to the right represents those who saved more than the 40% target, while the blue area to the left represents those who did not. (NSW 2008)

The BASIX program is proven to successfully reduce water use through application of smart design, efficient technologies, and achievable goals. The online entry form, another innovative tool, generates a database of information to track the program's success. This program can and should be expanded to include the commercial sector. More information about BASIX can be found at this website: http://www.basix.nsw.gov.au/information/index.jsp.

2.7.3 Additional Rebate Opportunities

Section 2.7.3: Additional Rebate Opportunities
- Residential Water Submeter Rebate Program
- Water Softener Replacement Rebate

As discussed previously in this chapter, most water retailers in Sonoma County offer rebates for replacement of fixtures or equipment with more water-efficient ones. Water purveyors throughout the state and nation generally offer the same rebates as those offered in Sonoma County. Below, a few noteworthy rebate programs that offer potential additional water savings, and are not currently used in Sonoma County are described.

Tier 2 Measure Analysis and Implementation

As previously mentioned for the 2005 UWMP, a detailed water demand analysis was conducted to evaluate existing water conservation efforts and project future possible reductions. This analysis included a specific set of conservation programs that go beyond the current CUWCC BMP's. These additional measures are referred to as Tier 2 Measures. These measures should

be considered as a viable option when considering implementation of future conservation programs.

Pay as You Save (PAYS)

PAYS was developed by the Energy Efficiency Institute to provide a model to obtain and install money-saving resource efficiency products with no up-front payment and no debt obligation. The high efficiency products are paid off over time through a charge on utility bills. The monthly charge is always lower than the product's estimated savings and it remains on the bill for that location until all costs are recovered (unless the occupants move, whereby the charge is stopped). PAYS America, Inc. is a nonprofit organization that assists local utilities in setting appropriate monthly charges that are less than the estimated savings.

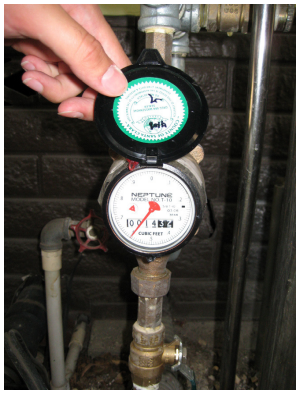
Local entities implementing a direct installation high efficient fixture replacement program should direct site owners and developers to PAYS as a means to support their participation in the program. Implementing direct installation and PAYS programs together will provide a cost share by the site owner and allow water retailers to achieve and track water demand reductions and energy savings associated with fixture replacements.

Residential Water Submeter Rebate Program

Typically, single water meters are used for multiple-family living spaces such as apartments, condominiums, and mobile parks. The owner of such complexes usually pays the water bill as a singular payment for the entire complex. The result is that individuals and families in such multiple living spaces are not accountable for their water use or their conservation efforts. Because renters cannot monitor their water usage, they cannot determine if they are using too much water. Similarly, because they are not rewarded for their conservation efforts, they have less incentive to conserve.

Water submeters allow individual renters to track and be responsible for their own water use. The California Urban Water Conservation Council (2007) considers "Multi-Family Submetering" to be a good step toward increasing water conservation.

The Santa Clara Valley Water District offers a rebate for apartment and condominium complexes or mobile home parks that switch from one water meter per building or mobile home park to individual water submeters. Rebates of up to $100 are offered for each water submeter installed. The Santa Clara Valley Water District found that complexes that added individual water submeters resulted in an average of 25% water reduction (Santa Clara Valley Water District 2002c).



Water Submeter (Santa Clara Valley Water District 2002b)

Water Softener Replacement Rebate

Many residents using ground water supplies do not like the high mineral content of ground water, often referred to as "hard water." Though safe to drink, such "hard" minerals have a detectable taste and odor, hinder soap lather, and accumulate as white or gray deposits on pipes and faucets, which results in frequent clogging. To address these problems, many residents install a water softener. This appliance utilizes calcium carbonate and a special resin to treat water before it is distributed throughout the home. The salt and resin remove the minerals from the water and the remaining brine is disposed to the sewer or soil. A traditional water softener treats an entire tank of water at a time.

Demand Initiated Regeneration Water Softener (Santa Clara Valley Water District 2002a)

Any treated water that is not used within a set amount of time is flushed to the sewer.

To save water, demand initiated regeneration (DIR) water softening systems generate soft water "on demand," or based on how much water the household uses, rather than at a set time and quantity. This technology saves both water and energy. If the softener runs only when water is needed, it eliminates the amount of water that would be flushed to the sewer had the system continually run (City of Palo Alto 2009). Efficient water softeners use 5 gallons (or less) of water to remove 1,000 grains of hardness. At its most efficient, a DIR system can use 1.8 gallons per 1,000 grains of hardness, or 57 gallons of water used per cycle, with a total use of 3,340 gallons of water per year (Pentair Water 2008). It is estimated that DIR systems can save between 5,000 and 15,000 gallons of water per year in comparison to inefficient water softeners (Shaparenko 2009).

The Santa Clara Valley Water District (SCVWD) offers a $150 rebate for the replacement of a residential timer-based water softener with a DIR water softener, and a $400 rebate for commercial water softener replacements. The new commercial water softener must be a DIR type, and only one can be rebated per site (SCVWD 2002a).

Water Conservation Opportunities for the Industrial Sector

The Israel Ministry of Environmental Protection (2005) has shown that techniques such as process metering, pipe mapping, and pressure reductions in the industrial sector can significantly conserve water. Process metering is when an industrial process that uses water is sub-metered, or measured and evaluated, either through long-term or spot metering. Through this technique, water consumption can be monitored and measured for various processes (Distrigas 2008). Mapping of pipes can assist in determining locations of leaks or other maintenance needs in order to ensure the most efficiency in plant processes. Water pressure-reducing valves can reduce the amount of water running through pipes by 50%; because much of the excess water is wasted, this technology can produce up to 50% water savings (Watts 2009). The Israel Ministry of Environmental Protection (2005) also claims that steam and pressure reduction significantly conserves water. Implementation of these techniques and technologies has enabled Israel to develop its industrial sector with little increase in water use.

2.7.4 Retrofit and Equipment Upgrade Opportunities

Section 2.7.4: Retrofit and Equipment Upgrade Opportunities
- Retrofit of Existing Car Washes
- Automatic Shut-off Faucets
- Alternative No-water Toilets
- Commercial Dishware Sensors
- Medical and Laboratory Equipment Upgrades
- Vacuum-assisted Dry Street Sweepers

Some new water-efficient technologies are available to the public, but are not yet widely promoted or available through rebate programs. Opportunities for water savings through additional rebate programs include car wash retrofits, residential faucets upgrades, no or low-water toilets, commercial dishwasher upgrades, medical equipment upgrades, and upgraded street sweepers. These technologies are not currently widely-used in commercial and/or residential settings (or are still in the research stage) in the U.S., but have a high potential for water savings and often have other positive effects on the environment such as reducing demand for wastewater treatment and reducing energy demand). The products described below could be candidates for future rebate programs in Sonoma County, or included in future water conservation outreach and education efforts.

Retrofit of Existing Car Washes

California has approximately 1,500 commercial car washes. There are about 20-30 commercial car washes in Sonoma County. Efficient car washes can wash up to 1,000 cars a day, meaning that up to 1.5 million cars can be washed in California per day (usw.org 2009). Car washes with no water reclamation system (to recycle and reuse the wash water) use between 15-85 gallons per vehicle (gpv). Car washes with a full reclamation system use between 8-32 gpv. Installing a reclaim system on all the state's car washes could save up to 80 million gallons of water per day in California. While retrofitting car washes may provide good conservation opportunities, the costs of such retrofits are high and such upgrades may not be possible due to space and plumbing needs. Conveyor car washes and in-bay automated washes usually have enough space to house or install a reclamation system. However, older self-service facilities would likely require a complete remodel. In such cases, a retrofit may be too costly. Currently, Sonoma County does not have any car wash retrofit programs. Development of such a program could provide additional water savings (Brown 2009).

Residential Automatic Faucet Upgrades

A standard residential faucet must be hand-operated to turn it on and off. A standard faucet has a flow rate of 1.3 gallons per minute, or 0.02 gallons per second. When conducting common kitchen or bathroom activities such as washing dishes or lathering hand soap, water is often wasted during the moments when one steps away from the sink or when the water is not directly in use, yet the faucet still runs. Automatic faucets that shut off and prevent constant running water can save up to 70% of faucet water use (The Energy Observer 2003). Some systems are mechanical and use a bar or foot pedal to press against to enable water flow. Other systems use a non-timed electronic sensor that shuts off the water immediately. Such faucets are already commonly used in public restrooms and hospital facilities, but have yet to become

popular in the residential sector. Automatic faucets have the potential to save a half a gallon or more of water per day that is wasted through careless faucet uses (The Pacific Institute 2003). Establishment of a rebate program for automatic faucets would promote water savings.

Alternative No or Low-Water Toilets

As described in Section 2.4.3 above, new toilet replacements are an easy and popular approach to conserving water, and there are many attractive rebate programs. However, recommended toilets often still use a significant amount of water. Alternatively, composting and incinerating toilets use no or very little water. These toilets are not just for public parks and construction sites. Though not currently permitted in Sonoma County, new alternative toilet models have been developed for home and commercial use.

A Water-less Composting Toilet and a removable composting chamber (green container to the left of the toilet) (Envirolet 2005)

Composting toilets are generally not connected to septic or municipal sewer systems; some composting toilets require connections to drain excess liquids. Composting toilets resemble standard water-based toilets in general shape and comfort. The composting process occurs in the toilet's composting and drying chambers. Bacteria inside the composting chamber breaks down solids, and the drying chamber promotes liquid evaporation and reduces the volume of remaining solids. Composting toilets are vented to the outside, so no foul odors associated with the compost are detected inside the home. These toilets come in various types, including part-time models (those only used on a limited basis), electric versions (which include heaters that speed up the composting and dehydration process), and automatic composting toilets (which mix the compost every time the seat is lowered) (InspectAPedia 2009a). Others require large underground compost chambers constructed beneath the toilet. Electricity is required by some models to power venting fans or to aerate the compost. Composted waste is emptied from the toilet at intervals ranging from one or two months to 12 months, depending on level of usage and toilet design (InspectAPedia 2009a). While composting toilet manufacturers may indicate that compost processed in toilets could potentially be used for gardening applications or soil amendments, such applications are not currently permitted in Sonoma County.

An Electric Incinerating Toilet (The Spinalis Foundation 2008)

In 2010, SCWA will commence implementation of a pilot study to install and evaluate the feasibility of composting toilets in the Occidental area. Consumer preferences, as well as current regulatory requirements, may prevent the widespread use of such composting toilets in the near term.

Incinerating toilets can be used in places that are not compatible with septic systems, such as remote cabins, guest rooms, or pool houses. These toilets use energy (electricity or gas) to destroy waste by incineration (i.e., burning); no water source is needed for this type of toilet. When properly installed and maintained, a venilation system removes residual odors and only a small

amount of ash requires disposal (InspectAPedia 2009b). While incinerating toilets can greatly reduce interior water use they do require significantly more energy to operate compared with a standard toilet.

Commercial Dishware Sensors

In conveyor type dishwashers, hot water flows continuously while the unit is turned on. This results in wasted water and energy to produce heated water. Dishwashers are considered one of the most water-intensive appliances in a commercial kitchen. To reduce water use in commercial kitchens, dishwashers can be upgraded with a sensing arm or dishware gate that will detect the presence of dishes and automatically shut off when there are no dishes on the conveyor. Installation of commercial restaurant dishware sensing throughout California has the potential to save an average of 6,500 AF (acre feet) of water per year, according to the Pacific Institute (2003).

The Massachusetts Water Resources Authority studied one restaurant that saved 225,000 gallons of water annually by installing a dishware sensing gate. The device costs about $1,200 to install, but provides an annual water cost savings of about $2,700, paying for itself in about five months (MWRA 2008). There are many restaurants throughout Sonoma County that could save additional water through installing dishwasher sensor systems.

Medical and Laboratory Equipment Upgrades

Hospitals and medical facilities require water for equipment processing, cleaning, or cooling. X-ray equipment, vacuum pumps, sterilizers, hood exhaust systems, medical water filters and other equipment all use significant water amounts. Additional water saving opportunities include the following:

- Water-efficient X-ray Equipment. Standard and large-frame x-ray machines require water for development of x-ray films. Digital x-ray equipment eliminates the need for water because there are no x-ray films to develop. Digital x-ray equipment can reduce water use for film developing by 95%. Water-saving kits installed onto the film developers of large-frame x-ray equipment eliminate the need for continuous water cooling, thus eliminating the need for water altogether (ADWR 2009a). Additionally, x-ray machines with recirculation systems can be used during an emergency where water supplies are cut off, as they only need 15 gallons of (bottled) water and a power source in order to operate (CUWCC 2008b).

> The City of Bakersfield offers a $2,000 rebate for x-ray film processor recirculation systems that can reduce the water usage by up to 98% (CUWCC 2008b).

- Water-efficient Vacuum Pumps. Standard vacuum pumps, such as those used in hospitals and dentist offices used to perform medical procedures, are wet or use water to create the vacuum. A standard venturi aspirator system utilizes 1 million gallons of water per year in order to function (ADWR 2009a). Replacement of wet vacuum pumps with dry vacuum pumps completely eliminates water use in this type of equipment.

- Sterilizers. Sterilizers can represent a large amount of water use in a medical facility. Table top steam sterilizing units use 30 to 100% less water than free standing models (ADWR 2009a). Free- standing sterilizing units with a recirculation system will reduce water use significantly. Older models can be retrofitted with water saving kits (ADWR 2009a).

Laboratory Exhaust Hood (ADWR 2009a)

- Exhaust Hood Systems. Medical facilities and laboratories use hood exhaust systems (see above) to control chemical fumes. Standard hood exhaust systems use water to create suction to remove vapors. Replacement of exhaust hoods with dry systems can result in 100% water savings. If replacement of the unit is not feasible, the water flow rate can be reduced and recirculation systems or alternative water sources can be connected. These upgrades can save between 10 and 75% of the water normally used by a standard exhaust hood (ADWR 2009a).

- Medical Water Filters. Filtered water is required for many medical uses, such as for kidney dialysis and intravenous fluids, or for patients with compromised immune systems. Thus, many hospitals and medical offices have on-site water filters to treat water to the degree needed to administer to patients (Biologically Pure Water 2009). Use of the most water-efficient water filters, such as resin deionization and reverse osmosis with minimal steam generation, and filters that treat water on-demand as opposed to continual filtration, can save between 30-100% of the water compared to standard medical filtration practices (ADWR 2009a).

Vacuum-Assisted Dry Street Sweepers and Recycled Water for Sweepers

Standard street sweepers are used in nearly every city throughout the state, and use water to reduce the dust particles in the air that result from sweeping. The abundance of these street sweepers and their high water use encouraged the California Urban Water Conservation Council to include street sweepers in a four-year research project to study potential best management practices (CUWCC 2007). The Santa Clara Valley Urban Runoff Pollution Prevention Program promotes vacuum-assisted dry sweeping, which uses no water but retains the ability to efficiently sweep roads. Vacuum-assisted dry sweeping technology uses tandem sweeping equipment, which combines mechanical and vacuum-assisted sweepers to remove dirt from streets. A continuous filtration system stops fine particulates from escaping into the air (SCVURPPP 2007).

The City of Long Beach recently began using recycled water in their street sweepers. The city estimates 13 million gallons of potable water per year, or 28 gallons of water per year per person, will be saved as a result (Long Beach Post 2009). Use of recycled water offsets the need for potable supplies. However, no matter the source of water, standard street sweepers still utilize water to function. Dry sweepers do not require water to function, and are thus preferred

over recycled water sweepers. If all standard street sweepers in California were replaced with dry sweepers, the state could save 1 billion gallons per year (U.S. Census 2000 2009).

2.2 State Conservation Directives
2.3 National Conservation Standards
2.4 Existing Sonoma County Programs to Reduce Interior Water Use
2.5 Existing Sonoma County Programs to Reduce Exterior Water Use
2.6 Implementation and Enforcement in Sonoma County
2.7 Opportunities for Additional Conservation
2.8 Estimating Potential Water Savings

2.8 Estimating Potential Water Savings

As described throughout this chapter there are many types of water conservation measures and programs. In many cases, effective conservation approaches have now been successfully implemented for many years since the onset of more formal water conservation efforts in California in the 1970s and 1980s.

Though progress has been made there are still many opportunities for additional conservation and water savings in Sonoma County. **Table 2-4** is provided to compare past, present, and future water uses as a way to summarize where conservation has been effective, but also what more can be done. Table 2-4 compares water uses for interior and exterior fixtures, appliances, and other uses. In Table 2-4, year 1980 is used as a relative baseline to gauge past water consumption from an earlier period. Year 2009 is used to characterize the current water uses. The third column of Table 2-4 presents additional projected water uses and savings in the future. Future water savings in Table 2-4 are based on published standards provided by federal and state conservation programs, such as EPA's WaterSense and the CUWCC (Brown and Caldwell 2008).

As shown in Table 2-4, the most apparent water savings are achieved through continued upgrades to toilets, urinals, and landscaping. While significant water savings have been achieved in the past 20 to 30 years, the continued use and application of more efficient technology, together with more stringent standards and regulations will provide additional savings.

However, it is important to consider that achieving higher conservation goals may be difficult due to lag times in regulating new technology, as well as consumer tastes. For example, consumer and regulatory uncertainties regarding composting toilets have prevented local application of this technology and its water-saving potential.

The degree of attainable water savings varies by region, population, community type, water uses, feasibility of implementation, and other factors. Quantifying water savings realized from water conservation measures has been conducted by many agencies, including SCWA. In 2008, SCWA undertook a water demand analysis and developed a decision support model to estimate potential water savings through implementing conservation measures (Brown and Caldwell 2008). The objective of the study was to assist individual retailers in customizing their conservation programs and thereby reduce their water demands. The investigation calculated the amount of water savings that would be realized after implementing a suite of conservation

measures for specific retailers from 2004 through 2030. Incorporated into the demand analysis were projected growth rates, water usage rates, water demands, and standard conservation water savings (current at the time). Calculated potential water savings were developed for each individual water retailer based on a specific suite of measures tailored to each retailer's service area.

While the 2008 water demand analysis provides projected water savings for each water retailer, the results are not additive to generate a net countywide savings amount. Also, soon after the report was completed, the federal and state standard conservation savings percentages were updated. Though developed recently, the water demand analysis and report soon became outdated due to changing population and water use projections that were affected by recent economic conditions. Though this study achieved its objectives, it illustrates how difficult it is to quantify water savings over a large area with varied water demands. In the future, continued monitoring and reporting on the results and effectiveness of past conservation approaches and programs will help target more effective conservation efforts.

Table 2-4: Water Use in California – Past, Present, and Future

Water Use Type	Fixture/Appliance/ Application	1980 Water Use	2009 Water Use	Future Water Use and Savings	
				Water Use	Additional Water Savings[2]
Residential Interior Use	Toilets	6 gallons per flush	1.6 gpf (national average)	1.1 gpf	45-55%
	Dishwashers	10 gallons per load	9 gallons per load (national average)	4.25 gallons per cycle	34%
	Leaks	22 gallons per household per day	9.5 gallons per person per day (national average)	4.7 gallons* (routine leak detection and repair)	50%
	Clothes Washers	44 gallons per load	41 gallons per load (national average)	20 gallons per load (HECWs)	50%
	Showers	5 gallons per minute	2 gpm (national average)	1.5 gpm	15%
	Faucets		1 gpm (national average)	0.8-1.5 gpm	15%
Commercial Interior Use	Pre-rinse spray valves		2.5 gpm	1 gpm	10%
	Urinals			0-0.125 gpf	65-75%
	Faucets			0.5-2.0 gpm	10%
	Dishwashers		2.4 gallons per rack per load	0.5-1.0 gallons per rack per load	10%
Residential Exterior Use	Lawn Watering/Irrigation		8-18 gpm	1-2 gpm (if turf replaced)	9% - Rain Sensor Retrofit 20-40% - Cash for Grass Rebates 15% - Irrigation Meter Rebates 15% - Smart Irrigation Controller Rebates 15% - Financial Incentives/Rebates for Irrigation Upgrades 90% - Synthetic Turf Rebate
	Pools				Homes without pools save 58%
	Car Washing		15-85 gallons per vehicle	8-32 gallons per vehicle	

[2] Additional Water Savings percentages reflect potential savings compared to 2004 standard water use rates. These savings percentages provide a general estimate of additional potential water savings achievable toward the Year 2030 planning horizon (From Brown and Caldwell 2008). *=information from University of Kentucky 1999