

Section 4 - Water Conservation

- (2) Include a cost-benefit analysis, identifying total benefits and total costs.*
- (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.*
- (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.*

(j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

This section describes CVWD water conservation goals, its existing and proposed conservation programs and addresses all of the requirements of the UWMP relative to demand management.

4.2 WATER MANAGEMENT PLAN CONSERVATION GOALS

Water conservation is an important component of water resource management, not only for CVWD but also for the entire Southern California region. For a variety of reasons, the Coachella Valley region remains a high growth area. This growth in population puts pressure on CVWD to meet the anticipated water demand over the next 25 year and beyond. Implementation of conservation programs helps reduce the expected increase in water demand.

CVWD has had a water conservation program since the 1960s. However, a significant expansion of the program's scope and goals has been spawned by the CVWMP (CVWD, 2002a). The implementation phase of this plan is presently under development and is due to be completed in early 2006.

CVWD recognizes the importance of conserving water in order to reduce pressure on the groundwater supply. CVWD's conservation goals have been identified as a part of the CVWMP to reduce water use through conservation programs, which are listed in **Table 4-1**. The expansion and elaboration of these goals and their associated schedule will be addressed in the CVWMP Implementation Task Force Recommendations, which is presently being prepared.

The State Memorandum of Understanding (MOU) regarding Urban Water Conservation in California sets guidelines to achieve a baseline level of water conservation in a given water service area (CUWCC, 2004). Signers of the MOU agree to comply and set goals to meet the standards outlined in the MOU. CVWD is not a signatory to the MOU. Therefore, a discussion of the following 14 Demand Management Measures (DMM) listed in **Table 4-2** is included below. In addition to these DMMs, other actions being taken by CVWD to conserve water are discussed later in this section.

**Table 4-1
Minimum Water Conservation Goals**

Water Use Category	Percent of 2005 Use Conserved Goal	Schedule for Goal
Municipal	10%	2010
Golf Courses		
Existing in 1999	5%	2010
Built after 1999	Case-by-Case	
Industrial	Case-by-Case	
Crop Irrigation	7%	2015
Fish Farms	Case-by-Case	
Duck Clubs	Case-by-Case	
Greenhouses	Case-by-Case	
Total Demand	7%	2015

Source: (CVWD, 2002a)

**Table 4-2
Demand Management Measure Programs**

DMM No.	Demand Management Measures
1	Water Survey Program for Single-Family and Multi-Family Residential Customers
2	Residential Plumbing Retrofit Program
3	System Water Audits, Leak Detection and Repair Program
4	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections Program
5	Large Landscape Conservation Programs and Incentives Program
6	High-Efficiency Washing Machine Rebate Program
7	Public Information Program
8	School Education Program
9	Conservation Programs for CII Accounts Program
10	Wholesale Agency Programs
11	Conservation Pricing Program
12	Water Conservation Coordinator Program
13	Water Waste Prohibition Program
14	Residential Ultra-Low-Flush Toilet Replacement Program

Indoor water use conservation is broken down into two components, active and passive. Active water conservation is defined as reduction in water used due to a direct incentive program being implemented by CVWD. Passive water conservation is that which is accomplished by customers upgrading their plumbing, water fixtures and water using appliances without incentives from their water provider.

It should be noted that most CVWD water and wastewater customers have been brought online within the last 30 years. For this reason, and the fact that about 80 percent of water use in CVWD is for irrigation, CVWD expects that its programs targeting outdoor water use will be the most cost effective method to foster water conservation within its service area.

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It should also be noted that water losses and treated wastewater in the CVWD service area are captured and returned to the watershed groundwater basin or are otherwise reused for irrigation.

4.3 WATER SURVEY PROGRAM FOR SINGLE-FAMILY AND MULTI-FAMILY RESIDENTIAL CUSTOMERS

In the initial stages of planning, CVWD is preparing to implement a water survey/audit program. The implementation plan of this program will be included in the CVWMP Implementation Task Force Recommendations. The program will address indoor and outdoor residential water use. CVWD will provide residential water surveys/audits consisting of the following:

- **Indoor:** CVWD will provide homeowners with a self-test interior water use audit kit and demonstrate its use.
- **Outdoor:** CVWD staff will conduct an abbreviated outdoor landscape water audit modeled after the intensive audit procedure utilized on large landscapes and golf courses. The service will be offered to residential water users who use greater than 500 gpd/account consumption rates.

Table 4-3 below shows the historical number of residential customers in CVWD's service area. These residential customers have the potential to be positively impacted by the program. As this program is still in the planning phases, goals to be reached by 2010 have not yet been developed. These goals will be clearly defined in the CVWMP Implementation Task Force Recommendations. An evaluation of the success and cost/benefit of the program will be developed to identify conservation trends from surveyed households.

Table 4-3
Historic Residential Water Customers Summary

Residential Customers	1999	2000	2001	2002	2003	2004
Single Family	63,695	67,008	70,595	73,442	76,469	79,685
Multi Family	2,411	2,449	2,503	2,558	2,650	2,755
<i>Duplex/Triplex</i>	1,052	1,064	1,084	1,098	1,137	1,192
<i>Multiple Dwellings</i>	616	623	625	626	656	679
<i>Apartments</i>	742	762	794	835	858	884
Total Residential	66,105	69,457	73,098	76,000	79,119	82,440

Source (BV, 2005a)

4.4 RESIDENTIAL PLUMBING RETROFIT PROGRAM

In 1992, CVWD launched a program that included low flow showerhead distribution and plumbing fixture rebates. The community met the program with limited interest. Out of 1,000 kits that were assembled, only 350 were picked up in two years. Presently, residential plumbing upgrades are being realized via advances in local plumbing codes, which set higher appliance water efficiency standards for all new construction as well as renovations. Presently, CVWD has no active incentive program for customers to retrofit existing plumbing fixtures. CVWD has legal authority to develop this DMM. It is projected that with the increased awareness of today's public, a completed CVWMP Implementation Task Force Recommendations, and targeted

promotions, an active plumbing retrofit incentive program could be more effective than in the past and subsequently reduce water consumption.

Plumbing retrofit products such as low-flow showerheads and faucet fixtures have been on the market more than 10 years and are now sufficiently developed to be technically sound products. The use and/or distribution of these products have social value as it brings conservation products, literally, in direct contact with area users, thereby raising awareness of water conservation efforts. Furthermore, the use of these products has the potential to reduce customer water bills. The use of these products provides neither significant direct or indirect health benefit nor detriment. Although this DMM is financially feasible, CVWD's primary focus will be to reduce outdoor water use, which accounts for 80 percent of water use in CVWD's service area. This DMM will be reviewed as part of the CVWMP Implementation Task Force Recommendations. **Table 4-4** and **Table 4-5** show the affects of passive conservation practices, a rate of fixture replacement by customers due to property turn over, remodeling etc.

**Table 4-4
Historic Conversion of Plumbing Fixtures**

Actual	2001	2002	2003	2004	2005
# of single family devices	401	439	476	511	546
# of multi-family devices	11,236	12,304	13,341	14,347	15,322
Percent of 1992 Fixtures Upgraded	24%	26%	28%	31%	33%
Actual expenditures - \$	\$0	\$0	\$0	\$0	\$0
Actual water savings - acre-ft/yr	565	618	670	721	770

**Table 4-5
Projected Conversion of Plumbing Fixtures**

Planned	2006	2007	2008	2009	2010
# of single family devices	580	613	644	675	705
# of multi-family devices	16,268	17,186	18,076	18,940	19,777
Percent of 1992 Fixtures Upgraded	35%	37%	39%	40%	42%
Projected expenditures - \$	\$0	\$0	\$0	\$0	\$0
Projected water savings - acre-ft/yr	982	1,182	1,369	1,545	1,711

Natural replacement of fixtures is estimated at 2 percent and the proposed program would distribute fixture kits with the goal of 10 percent replacement rate assuming that 75 percent of kits distributed are installed. CVWD would therefore be augmenting the replacement rate by 5.5 percent. This program will result in reaching a 75 percent of fixture replacement by 2013, the goal established in the MOU for the completion of this program. Without this program, 75 percent fixture replacement would occur near the year 2023.

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4.5 SYSTEM WATER AUDITS, LEAK DETECTION AND REPAIR PROGRAM

CVWD has no plans to expand its residential water audit or leak detection activities, which are presently performed on an as needed basis. CVWD has legal authority to develop this DMM. CVWD routinely evaluates historical data on water production and consumption. As shown in **Table 2-11**, between 1999 and 2004, annual water losses have not exceeded 9.9 percent and with an average annual water loss of 8.8 percent. According to CUWCC, an existing system is considered to be in excellent condition when water losses are lower than 10 percent (Fiske, 2001). As the CVWD water losses are below this recommendation, the expansion of current leak detection and repair program is not necessary at this time. Although leak and/or line break repairs are performed by CVWD, no records of these activities, including system audits or leak detection program data are available. CVWD will expand its record keeping associated with their leak detection activities as part of the CVWMP Implementation Task Force Recommendations with data including, but not limited to:

- Incident description
- Number of leaks repaired per year
- Annual leak repair cost
- Water leak size
- Suspected water loss duration
- Cost of leak detection/mile of pipeline

The domestic water system was directly built as well as added to the system as communities were built on neighboring County land, developed into cities and thereafter incorporated into CVWD's service area. **Table 4-6** below is a summary of the amount of distribution piping in the CVWD system. The bulk of pipelines installed and acquired by CVWD were installed in the 1970s to present. Consequently, aging infrastructure is not a significant component of water losses.

Table 4-6
CVWD Distribution Piping Summary

Year	Distribution Piping (miles)
1992	1,401
1993	1,429
1994	1,451
1995	1,479
1996	1,523
1997	1,568
1998	1,605
1999	1,645
2000	1,670
2001	1,680
2002	1,731
2003	1,782
2004	1,872

Source: CVWD annual reports 1992 through 2005

CVWD, on an as needed basis, performs the monitoring and repair of water leaks and breaks. CVWD's goals are to maintain less than a 10 percent annual water loss in their distribution system. This goal will be measured by reviewing monthly water consumption and production data currently being tracked by CVWD. Expansion of this program would enhance the agency's knowledge and awareness of their system, which would allow them to more accurately target problem areas for future maintenance or replacement.

4.6 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS PROGRAM

One hundred percent of CVWD's customers are metered. The meters are billed based on volume of use. CVWD does have mixed use meters serving both domestic use and landscaping irrigation. All future water users require metering on their service connection. No commodity rate program or retrofitting program is required because 100 percent of existing water users are metered.

4.7 LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES PROGRAM

Within the CVWD service area, there are two principal groups of large landscape customers—those with separate irrigation meters on the domestic water system and those with private wells for golf course or agricultural irrigation. Irrigation accounts for approximately 80 percent of total domestic water usage and large landscape customers represent about 30 percent of domestic water use. Over 80,000 acre-ft/yr of groundwater is pumped by private well owners for golf course irrigation in CVWD. One of CVWD's goals is to reduce new water use by these customers. CVWD has legal authority to develop this DMM. **Table 4-7** shows a summary of ongoing and proposed water conservation measures that are or will be undertaken by CVWD associated with its large landscape irrigators. The activity status of each of the conservation measures is also included, which shows that some activities are functioning presently and others are planned for the near future. The projected cost benefit of the proposed and ongoing programs under this DMM will be explored in CVWMP Implementation Task Force Recommendations.

4.7.1 Expand Landscape Irrigation Retrofit Low-Interest Loan Program

The intent of the current irrigation retrofit low-interest loan program is to assist large domestic water meter users with older, inefficient irrigation systems with financing improvements. The current program offers low interest (3 percent) loans for up to \$50,000 for the replacement of inefficient irrigation systems. The program was initiated in 1992 and averaged only two loan approvals per year through 1996. In the past three years, only one loan application has been both submitted and approved. Four homeowner associations expressed interest in obtaining a loan in FY 2004-2005 by requesting application forms, but none have applied. **Table 4-8** shows the program activity between 2001 and 2005.

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**Table 4-7
Large Landscape Conservation Program Summary**

Short Term Projects	Status
Expand landscape irrigation retrofit low-interest loan program (\$50,000 cap)	Ongoing
Commercial Protector Del Agua Program	Ongoing
Water audits for large water users	Ongoing
Adoption of model landscape ordinance by Coachella Valley cities to establish water budget and landscaping criteria for new development	Ongoing
Plan checking for compliance with landscape ordinance	Ongoing
Random inspection of landscape projects in compliance with landscape ordinance approval plans	Proposed
ETo Clock Rebate Pilot Program	Proposed
Curbside sprinkler retrofit rebate/loan program	Proposed
Full time inspection of landscape projects to insure installation matches approved plans	Proposed
Long Term Projects	
Maximum Water Allowance tiered rate pilot program for Class 11 meters only	Proposed

**Table 4-8
Large Landscape Irrigation Loan Program Summary 2001-2005**

Actual	2001	2002	2003	2004	2005
# of budgets developed	0	0	2	0	0
# of surveys completed	0	0	2	0	0
# of follow-up visits	0	0	2	0	0
actual expenditures - \$	\$0	\$0	\$50,000	\$0	\$0
actual water savings - acre-ft/yr	0.0	0.0	25.5	0.0	0.0

Source: Correspondence with Conservation Coordinator (CVWD, 2005e)

CVWD proposes to revise this program. The new program would increase participation by widening eligibility criteria. The loan cap would be increased to \$100,000 per participant, which will increase the accessibility of the program as well as accommodate increased irrigation system hardware costs since 1992.

The goal of this program is to increase program participation to a minimum of six loans per year by expanding eligibility to a larger selection pool consisting of all Class 11 irrigation meter sites, all landscape recycled water user sites, all landscape canal water user sites and all sites utilizing private groundwater wells as their source of landscape irrigation water. Measurement of these goals through 2010 will be performed by comparing the number of loans implemented per year versus the goal number of loans to be implemented. Prior to CVWD's recent conservation efforts, no goals had been established for this program.

4.7.2 Commercial Protector Del Agua Program

Commercial and recreational landscape irrigation systems are often improperly installed, poorly maintained and inefficiently scheduled by transitory landscape maintenance personnel who are often unskilled and uneducated in the science and practice of landscape irrigation efficiency. Career landscape maintenance professionals have little or no in-valley, irrigation science educational opportunities.

The original Protector Del Agua program was developed by the Irrigation Training Research & Training Center at Cal Poly San Luis Obispo as an introductory landscape irrigation water conservation training program for the landscape industry employee.

The 3-hour program consisted of a 1-hour slide show illustrating basic landscape irrigation conservation principles followed by a series of hands-on laboratory demonstration exercises. The program was given in either the English or Spanish language and concluded with the awarding of Certificates of Completion.

It was offered to the local landscape industry in the early 1990s by the three Coachella Valley water districts through the local Resource Conservation District.

Approximately 300 landscape employees were awarded certificates before attendance began to drop off and the program was discontinued locally. The program was continued and expanded by Metropolitan who subcontracted out the execution of the improved and expanded landscape water conservation training program to Water Wise Consulting. This firm will contract with CVWD to bring this newly revised and expanded program to those larger CVWD water users employing landscape maintenance employees or a professional landscape maintenance service.

The goal of this program is to continue to provide, develop and improve the Protector Del Agua program through 2010 via the use of a contracted consultant to run the program. The measure of success of this program will be performed by surveying participants in the program as well as monitoring and measuring the annual attendance at the program.

4.7.3 Water Audits for Large Water Users

The purpose of the large landscape irrigation audit program is to assist the user in maximizing the efficient operation of the irrigation system by measuring performance, generating irrigation schedules and recommending improvement actions.

The goals of this audit program are to determine the irrigation uniformity, efficiency and application rate of each approved site, suggest modifications in design, operation, maintenance and scheduling and estimate the water and energy savings associated with the suggested modifications. A report summarizing the audit's findings and recommendations is hand-delivered and explained to the irrigation manager.

Audit sites are chosen based on excessive water consumption or in response to a request for audit services. CVWD's Water Management Specialist evaluates and approves each site. A Notice to Proceed Letter is sent to the Resource Conservation District authorizing the audit. CVWD staff

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also conduct audits periodically. All auditors must take the Irrigation Association's Landscape Irrigation Auditor course and pass the Certified Landscape Irrigation Auditor's Examination.

Once a site is approved, the owner or operator of the facility is contacted and an appointment is made to conduct the audit. After measurements and calculations are completed, a summary report and custom irrigation schedules are delivered to CVWD for approval. Upon approval, the report is delivered and explained to the site operator by the auditor. Payment is then authorized to the auditor. The large landscape audit program operates continuously and completes approximately 20 landscape audits per year. The success of this program will be measured by the annual water reduction achieved by large water users participating as a result of the program.

4.7.4 Adoption of Model Landscape Ordinance by Coachella Valley Cities to Establish Water Budget and Landscaping Criteria for New Development

CVWD has developed a landscape irrigation ordinance, CVWD's Landscape Water Conservation Ordinance No. 1302, for acceptance and implementation by cities and communities within its service area. (**Appendix G**) As shown in **Table 4-9**, three cities have accepted this ordinance which was unveiled in 2003 and five cities meet or exceed the CVWD ordinance.

Table 4-9
City/Community Compliance with CVWD Landscape Irrigation Ordinance

No.	City/Community Name	CVWD Landscape Irrigation Ordinance Status
1	Rancho Mirage	Accepted
2	Palm Desert	Meets or exceeds CVWD Ordinance
3	Indian Wells	Meets or exceeds CVWD Ordinance
4	Coachella	No Ordinance
5	Indio	Under Review
6	Cathedral City	No Ordinance
7	Palm Springs	Accepted
8	La Quinta	Accepted
9	Riverside County (Unincorporated Communities)	Has lower standard ordinance

The development of this program is still in progress. The goal of the program is to have all cities and communities in CVWD's service area in compliance or exceeding the completed irrigation ordinance within the next year. The measure of the programs success will be the percent of properly installed irrigation system in alignment or exceeding the landscape ordinance.

4.7.5 Plan Checking for Compliance with Landscape Ordinance

New and rehabilitated landscape sites are required to submit water conserving landscape plans to CVWD's Water Management Department for a plan check prior to construction. The plan check is conducted to insure that the water conserving features of the new landscape meet the provisions of CVWD's Landscape Water Conservation Ordinance No. 1302. Each proposed site is given an annual maximum water allowance based on planted area, plant water use zone, moderate landscape plant water use rates and high irrigation system application efficiency. The landscape designer must utilize a combination of plant choice and irrigation system choice such

that the estimated annual water use of the finished landscape does not exceed the annual maximum water allowance assigned. In addition certain irrigation system design practices are mandated, such as setting sprinklers back from street curbs, or prohibited, such as overhead sprinkling of street median strips.

The site plans and calculations are submitted to CVWD's Water Management Department for review and correction. Once the plans are in full compliance with the ordinance, the plans are signed and the developer is allowed to apply for water service and proceed with construction.

Fees are charged for this plan check service. Including income from these fees, the cost to CVWD to implement this program is approximately \$81,000/year. Based on past performance, annual water savings generated by this program is approximately 1,644 acre-ft/yr.

The goal of this program is to reduce landscape irrigation consumption by mandating high efficiency irrigation systems and low water use landscaping wherever possible. To determine the success of the program, the pre and post plans check water use will be recorded.

4.7.6 Random Inspections of Landscape Projects for Compliance with Landscape Ordinance

All new and rehabilitated landscape sites are required to submit water conserving landscape plans to CVWD's Water Management Department for a plan check prior to construction. The plan check is conducted to insure that the water conserving features of the new landscape meet the provisions of CVWD's Landscape Water Conservation Ordinance. Recent investigations of excessive water use and nuisance water complaints have revealed that many of these new sites did not construct their landscape to include the approved water conservation features.

The purpose of the random inspection program is to ensure that plan-checked, water conserving landscapes are being installed as approved by conducting random onsite inspections. The inspections thereby indirectly signal to the landscape construction industry that CVWD is spot checking completed landscape irrigation systems for plan-check compliance and will require errors and omissions to be corrected or face the possibility of discontinued water service.

Once a number of violators have been required to make expensive corrective actions, word of mouth communication among contractors is expected to encourage compliance without the necessity of a full time inspection program of all approved sites (currently about 140 per year). The measurement of success of this program will be the recorded percent of "in-compliance" designation of each randomly inspected site. The goal of the program is that 100 percent of the randomly inspected sites will be near or in compliance with CVWD ordinances by 2010.

4.7.7 ETo Clock Rebate Program

The purpose of this rebate program is to financially assist large water users in reducing landscape irrigation water consumption by purchasing an advanced irrigation controller capable of synchronizing their landscape irrigation schedules with seasonal variations in Coachella Valley reference evapotranspiration (ET_o) rates.

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ETo is a scientific description of the rate at which plant water use varies with the weather. Since the weather changes from season-to-season, week-to-week and even day-to-day, programming irrigation controllers frequently and efficiently remains one of the landscape industry worker's most neglected tasks.

It is not only neglected, but it is also a skilled task requiring special knowledge of soil, plant, and weather conditions not possessed by the average landscaper. Providing educational opportunities to master the art and science of irrigation is one solution to this problem. An alternative solution for the commercial landscaper is a new type of irrigation clock that reprograms itself according to seasonal variations in ETo after the initial calibrating program has been professionally installed.

Another alternative is for CVWD to broadcast ETo data directly to commercial clocks. This alternative would allow CVWD to partition ETo data to each of the five identified ETo zones within the Coachella Valley as well as to shut off all receiving clocks during rain or high wind conditions.

Both approaches have been previously budgeted and were implemented as an experimental trial project in 2005. Assuming documentation of successful reduction in irrigation applications, each program will be expanded and continued into 2006. CVWD will offer a rebate coupon to eliminate the additional cost of the advanced controller in order to encourage the adoption of this new technology. The measurement of success of this program will be documenting water reduction by each participating user as well as showing an annual increase in applications for the rebate as the region grows.

4.7.8 Curbside Sprinkler Retrofit Program

The purpose of this rebate program is to provide financial incentive to assist large landscape irrigation system owners and operators in eliminating landscape irrigation street water applications by purchasing and installing new sprinklers with improved water application efficiency. Street water from improperly chosen and positioned curbside sprinkler heads is one of CVWD's most common and visible examples of water waste. The problem stems almost entirely from improper sprinkler choice and positioning.

CVWD has eliminated the source of this problem from new developments by specifying strict rules regarding sprinkler choice and placement in its plan check program. Many older developments, however, were completed prior to the plan check program and continue to irrigate street sidewalk surfaces. The curbside sprinkler retrofit program provides an economic incentive to the owner or operator of large landscape irrigation systems to upgrade the curbside sprinkler irrigation stations to the current Landscape Water Conservation Ordinance specifications of pressure regulating stems, adjustable arc nozzles, low trajectory nozzles, pressure compensating nozzles and Seal-a-Matic sprinkler bodies. Sprinklers with these run-off elimination options are more costly than conventional sprinklers. CVWD will offer a rebate coupon to make up the cost difference to encourage purchase and installation. The measurement of the success of this program will be a marked reduction in curbside over-irrigation complaints and a reduction in water use by applicant to this program.

4.7.9 Full-Time Inspection of Landscape Projects to Insure Installation Matches Approved Plans

A small number of plan check compliance inspections conducted by the Water Management Department in response to nuisance water or excessive water use complaints revealed that many of the sources of these complaints were sites which did not install their landscapes to the specifications of their signed and approved landscape water conservation design plans. With the hiring of a second Water Management Specialist in 2002, the Water Management Department initiated a plan check inspection program of randomly selected sites.

The results of the 2002 program revealed a large number of sites that were out of compliance with their approved plan and required expensive and time consuming corrections by the landscape contractor. Under this new proposed program, a full-time inspector would be hired to conduct random inspection of new irrigation construction sites. It is expected that the possibility of a random inspection resulting in the requirement of expensive corrections will serve as a sufficient motivation for contractors to install these landscapes according to their approved specifications. If the threat of a possible inspection is not sufficient motivation for contractors to install irrigation systems as approved, mandatory inspections on all job sites would ensure full compliance with the Landscape Water Conservation Ordinance and assist CVWD in realization of its full water conservation potential.

The scope and number of inspectors hired under this will depend on biannual reviews of the success of the program. The primary goal of this program will be that site inspections will report no major system modifications required. Major system modifications shall be defined as requiring more than 3 days of work to bring system in to compliance with CVWD approved plans or costing the contractor over \$3,000. The goal of this program will be to obtain 100 percent compliance (no major modifications required) by 2010, in other words, a 25 percent increase in compliance per year beginning in 2006. The measurement of success of this program will be the recorded percent of “in-compliance” of each inspected site. If, in the event that the primary goal of the program is lagging and not being consistently met or exceeded after 4 review periods, CVWD will require mandatory inspection of all irrigation construction sites and hire the necessary staff to perform this task.

The secondary goal of this program will be the percent of projects completed in accordance with CVWD approved plans each year. It should be noted that although many construction sites may be out of compliance and require major modification, which does not go towards the program’s primary success, they may go towards the secondary goal of the program.

4.7.10 Maximum Water Allowance Tiered Rate Pilot Program for Class 11 Meters Only

This proposed conservation program is still under review and has not been fully defined by CVWD. It is the plan of CVWD to develop the scope and assess the feasibility of this program as part of the CVWMP Implementation Task Force Recommendations.

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4.8 HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAM

Presently, CVWD does not provide high-efficiency washing machine rebates. CVWD is the principal water and wastewater provider within its service area and has legal authority to develop this DMM. Nearly all of the wastewater generated in CVWD is reused or is returned to the groundwater. CVWD is presently developing its water CVWMP Implementation Task Force Recommendations where the high-efficiency washing machine rebate DMM will be discussed.

The promotion and use of high-efficiency washing machines has social value as it brings conservation products, literally, in direct contact with area users, thereby raising awareness of water conservation efforts. Furthermore, the use of these products has the potential to reduce customer water, wastewater, gas and electric bills. The use of these products provides no direct health benefit or detriment. The indirect benefits of this are that less energy and detergents are used to operate the machines. This would reduce the need for groundwater pumping and replenishment, collection, treatment and the subsequent reuse or disposal of wastewater as well as the numerous environmental benefits of reducing energy consumption.

Exhibit 1 of the MOU guidelines provides a guideline for calculating the benefits of this program were used (CUWCC, 2004). By 2006, there would be a projected minimum of 16,000 customers with old washing machines that could participate in the program. Analysis shows that this program would not be cost beneficial for a two-year period and would have a cost-to-benefit ratio of just less than 1.0. This analysis of the program assumes a cost of water of \$573 and does not include savings to the customer due to lower water and electric bills as well as soap. The analysis assumes a program issuing 1,000 rebates per year at \$200 per rebate for the two-year program period. This program is not economically feasible as shown in **Table 4-10**.

Approximately 80 percent of water use in the CVWD service area is for irrigation purposes. Nearly all discharge from washing machines would be discharged to CVWD's sewer system where essentially all water is recycled. The implementation of this program would not significantly save discarded water in the CVWD service area. Because of this phenomenon, CVWD has chosen to focus primarily on outdoor water use conservation programs. CVWD will investigate the feasibility of supplementing a washing machine rebate program with outside funding sources, which could prolong the program and increase its benefit to the public.

Table 4-10
Washing Machine Rebate Cost Effectiveness Summary

Amortized Costs (\$/yr)	\$45,108
Amortized Benefits (\$/yr)	\$28,675
Discount Rate	4%
Time Horizon	15
Cost of Water	\$967
Water Savings (acre-ft/yr)	46.7

4.9 PUBLIC INFORMATION PROGRAMS

There are several public information programs being operated presently by CVWD. The purpose of these programs is to educate the public on conservation programs being planned and/or implemented by CVWD as well as educational tips that customers can use to lower their water usage. **Table 4-11** below is a list of CVWD's current public information tools, several of which will be expanded as part of the CVWMP Implementation Task Force Recommendations.

**Table 4-11
Public Information and Education Programs**

Projects	Status
Publications – Lush and Efficient	Ongoing
Demonstration Garden	Ongoing
Annual Horticulture workshop	Ongoing
WMP Education – in-house and for Public	Ongoing
Expanded water education program for residential users	Ongoing
Add water conservation page to CVWD website, including water use calculator	Ongoing

4.9.1 Publications – Lush and Efficient

CVWD prepared *Lush and Efficient: A Guide to Coachella Valley Landscaping* (CVWD, 2001). CVWD staff is currently working with a publisher to create an updated version of this highly popular book, although it will not be complete for distribution until 2006. Funds for the new edition have already been approved by the Board of Directors. First printed in 1988 as a 64-page publication, it was revised, expanded and reprinted in 2001 as a 160-page book. Approximately 1,500 of the 2001 edition are still available for distribution. The books are available for purchase directly from CVWD for \$10 and retail outlets for about \$20. They are distributed free to select tour groups and participants in CVWD's annual landscape workshop.

In 2004, the Board of Directors approved funding for an interactive, water-efficient landscaping CD, which will compliment the 2006 book. Through the CD, users will be able to view sample water-efficient yards and select plants based on a variety of criteria. The measurement of interest and success of this program will be to show a steady and/or increase in the number of copies distributed.

4.9.2 Demonstration Gardens

The major portion of metered water distributed by CVWD is used outside with about 70 – 80 percent of purchased water being used to maintain landscapes. Since CVWD's boundaries fall within the California Department of Water Resources' highest ET zone (18), it takes more water to grow landscapes here than in any other portion of California. The Coachella Valley shares this highest water use designation with the Palo Verde Valley, Imperial Valley and Death Valley.

One way to reduce landscape water requirements is to use native desert plants in landscaping. Desert native plants have evolved both anatomical and physiological mechanisms that allow them to survive on annual rainfall alone.

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Within the Coachella Valley, which is one of the lowest annual rainfall areas in the state, desert plants from other, wetter deserts can be utilized with a minimum amount of irrigation. CVWD has identified and illustrated these plant choices in its publication *Lush & Efficient*. CVWD's two demonstration gardens, one at its headquarters in Coachella and the other at its office in Palm Desert, provide the landscape industry and the general public an opportunity to observe the plants in a landscape setting. DWA also has a demonstration garden at its headquarters. The gardens also provide an opportunity for CVWD's Water Management staff to vary the water applications to the plants and determine an effective water-use "plant factor" for calculating irrigation water schedules for low water-using plants from local ET weather stations.

Initiated in 2002, CVWD has spent \$158,000 through 2005, to build the demonstration gardens. CVWD has not maintained separate operations, maintenance, security, staffing and other cost data. CVWD will begin monitoring this data for inclusion it in its CVWMP Implementation Task Force Recommendations as well as monitor the number of visitors entering the gardens and perform surveys of visitors to the facilities. The objective measurements of interest and success of this program will be attendance at the gardens and subjective measurements achieved through the feedback from visitor surveys.

4.9.3 Annual Horticulture Workshop

Started 18 years ago with about 30 people attending a half-day session at College of the Desert, this program has been sold out nearly every year since despite increases in the number of presentations. In 2004, CVWD offered the half-day classes four times to more than 400 attendees. Speakers include CVWD staff and community members who are experts in various fields related to landscaping. Participants are given a copy of *Lush & Efficient* and other xeriscape information. The measurement of interest and success of this program will be through steady and/or increase in the number of people attending the course offered under this program.

4.9.4 WMP Education – In-House and for Public

CVWD educates staff about the CVWMP through internal newsletters. The public was educated through the first Coachella Valley Water Symposium, a daylong event held at the Renaissance Esmeralda in Indian Wells in October 2004. The event featured expert speakers in all the stakeholder groups and was well attended by community leaders. The main goal of the symposium was to solicit stakeholder input on how to implement the goals of the CVWMP. The public also is educated through external newsletters and brochures, the public display at the Riverside County Fair and National Date Festival and speaking engagements. The measurement of success of this program will be to maintain the steady distribution of this publication based on monitored interest in the content.

4.9.5 Expanded Water Education Program for Residential Users

While CVWD has a long-standing tradition of promoting conservation at the Riverside County Fair and National Date Festival through a booth and display, 2005 will be the first in which the display – with a heavy emphasis on residential landscaping – is loaned to other government agencies to be showcased to a larger number of people. In 2004, the display made a record number of appearances at various conferences and events, including the Association of

California Water Agencies (ACWA), Colorado River Water Users Association (CRWUA), AgSummit 6 and the Coachella Valley Water Symposium.

Under this program, welcome packets will be distributed to new residential accounts. The packet provides basic information about CVWD, but is more heavily aimed at water conservation techniques. This program is currently being developed and success of the program will be monitored by surveying users subject to this program.

4.9.6 Add Water Conservation Page to CVWD Website, Including Water Use Calculator

CVWD’s website needs a section devoted to conservation, further divided for homeowners, businesses, golf courses, and agriculture. The site, currently in its infancy (<http://www.cvwd.org/Conservation.htm>), should grow to include tips, articles, a suggested irrigation guide for grass lawns and water-efficient landscaping, and a water-use calculator among other ideas. A sister site developed by CVWD called *Mind Your Water* (www.mindyourwater.com) is linked to the CVWD website and describes many of CVWD’s current conservation efforts, includes water saving tips as well as recent conservation press releases. The purpose of this site is to emphasize the need to reduce outdoor water use, and provides information on how to conserve water in landscaping. The measurement of interest and success of this program will be to show a steady and/or increase in the number of hits to the proposed web site.

4.10 SCHOOL EDUCATION PROGRAMS

CVWD has legal authority to develop this DMM. CVWD has an established school education program. CVWD has a manager of the program as well as several full time teachers on staff implementing the program. Presently there are two components to the program. The first is the presentation of classroom lesson plans and the second is science fair promotion and sponsorship. **Table 4-12** below is a statistical summary of the achievements of the program. All school lesson plans were developed using California State Board of Education Standards and Frameworks.

**Table 4-12
School Education Program Summary**

Parameter (2004-2005)	Affected Audience
Grade visited – State Board of Education standard	Kindergarten – CA Health Framework; Expectation #3
	2 – CA Health Framework; Expectation #3
	3 – CA Social Science Framework; Standard 3.2
	4 - CA History-Social Science Framework (Local History)
	5 – CA Science Framework; Earth Science; Standard(s) 5.3a-e & 5.4a-d
	6 - CA Science Framework; Earth Science 6.1b & 6.2a-d
Students taught	15,784
Science fair awards sponsored	12
Science fair conservation materials distributed	7,500
Total students benefited by program	16,356

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To measure the effectiveness of the program, participating audiences will be surveyed and their responses recorded. The cost to implement this program will also be monitored so that a cost-benefit ratio for both direct and indirect benefits can be measured. Future goals of the program include expanding the grade level of students taught as well as the development of classroom materials that can be distributed to classroom teachers.

4.11 CONSERVATION PROGRAMS FOR CII ACCOUNT SUMMARY

The CVWD service area is not a heavily industrialized area and most water use, up to 80 percent in fact, is used for irrigation. Much of existing passive conservation by commercial, industrial and institutional (CII) customers is due to current plumbing codes. CVWD has legal authority to develop and implement this DMM. The programs in **Table 4-13** are currently under development by CVWD and the feasibility of each will be reviewed as part of the CVWMP Implementation Task Force Recommendations.

Table 4-13
CII Water Conservation Program Summary

Long Term Projects	Status
Restaurant pre-rinse spray valve rebate Program (Class 8 meters)	Proposed
Hotel low-flow shower/faucet rebate/loan Program (Class 8 meters)	Proposed
Toilet replacement/rebate program	Proposed
Water Broom	Proposed

4.12 WHOLESALE AGENCY PROGRAMS

CVWD is not a wholesale water provider to any agency, municipality or group and therefore does not require the implementation of this DMM.

4.13 CONSERVATION PRICING PROGRAM

Conservation pricing provides incentives to customers to reduce average or peak use, or both. Such pricing includes:

- Rates designed to recover the cost of providing service
- Billing for water and sewer services based on metered water use

Conservation pricing is also characterized by one or more of the following components:

- Rates in which the unit rate is constant regardless of the quantity used (uniform rates) or increases as the quantity used increases (increasing block rates)
- Seasonal rates or excess-use surcharges to reduce peak demands during summer months
- Rates based upon the long-run marginal cost or the cost of adding the next unit of capacity to the system

CVWD has an existing uniform rate billing structure for all customers. This rate varies by cost center. **Table 4-14** Below is a summary of the historical and current rates system for CVWD. As described in the MOU, this rate structure can be classified as “conservation pricing”.

**Table 4-14
CVWD Billing Rate Summary**

	Charges Effective 7/1/1999	Charges Effective 7/1/2000	Charges Effective 7/1/2001	Charges Effective 7/1/2002	Charges Effective 7/1/2003	Charges Effective 1/1/2005
Meter Size (Inches) Monthly Readiness to Serve Charge (\$/meter)						
5/8	5.50	5.50	5.50	5.50	5.50	5.50
3/4	5.50	5.50	5.50	5.50	5.50	5.50
1	5.50	5.50	5.50	5.50	5.50	5.50
1-1/2	9.00	9.00	9.00	9.00	9.00	9.00
2	12.00	12.00	12.00	12.00	12.00	12.00
3	20.00	20.00	20.00	20.00	20.00	20.00
4	25.00	25.00	25.00	25.00	25.00	25.00
6	30.00	30.00	30.00	30.00	30.00	30.00
Multiple Unit Charge Above first unit (\$/unit)						
All Users	3.25	3.25	3.25	3.25	3.25	3.25
Consumption Charge (\$/ccf)						
Cost Center 11	0.75	0.80	0.80	0.84	0.84	0.89
Cost Center 23	0.93	0.98	0.98	0.98	0.99	1.07
Cost Center 26	0.66	0.68	0.68	0.68	0.82	0.84
Cost Center 35	0.59	0.61	0.61	0.61	0.64	0.66
Standby/Availability Charge (\$/acre) of vacant land or per lot if lot is less than one acre						
All Lots	23.00	23.00	23.00	23.00	23.00	23.19

CVWD also charges for sanitation services. Residential customers are charged a flat monthly rate per equivalent dwelling unit (EDU) varying from \$15.10 to \$22.60 per EDU depending on location. Commercial customers are charged a unit rate per 100 cu.ft. of water used. This rate varies from \$0.77 to \$1.08 per 100 cu.ft.

Irrigation (canal water) customers are charged a unit rate per acre-foot of water used. CVWD has not evaluated the effect of alternative rate structures on Canal water usage.

CVWD has the legal authority to implement this DMM. Direct benefits of this program would impose financial incentives to water users to implement water conservation practices. Negative impacts could include a potential decline in growth of both residential and business development. It is unclear at this time if a restructured water rate program would effectively provide a reduction in water use with minimal impact to local water users. CVWD will perform a rate analysis to determine the feasibility of this program from both CVWD and user perspective.

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4.14 WATER CONSERVATION COORDINATOR PROGRAM

CVWD currently has an active water conservation coordinator as well as support staff for CVWD's conservation program. Supporting positions include a water management supervisor, water management specialist, water management technician, and a water management aide. Conservation staffing began in 2001 with a staff of two people including a water management specialist and a water management technician. In 2005, a water conservation coordinator was appointed who now manages the four person conservation staff. A staff of up to 15 is planned for the years up to 2010 (**Table 4-15, Table 4-16**).

Table 4-15
Historic CVWD Conservation Staffing Summary

Actual	2001	2002	2003	2004	2005
# of full-time positions	2	3	4	4	5
# of full/part-time staff	0	0	0	0	0
actual expenditures - \$	\$141,200	\$226,100	\$299,600	\$321,466	\$377,500

Table 4-16
Projected CVWD Conservation Staffing Summary

Planned	2006	2007	2008	2009	2010
# of full-time positions	6	8	11	13	15
# of full/part-time staff	0	0	0	0	0
projected expenditures - \$	\$587,560	\$828,891	\$1,186,400	\$1,466,100	\$1,801,700

4.15 WATER WASTE PROHIBITION PROGRAM

CVWD does not have a water waste prohibition ordinance. CVWD has legal authority to develop this DMM. CVWD has historically transferred this authority to each of the member cities within its boundaries, some of which respond to and enforce citizen complaints about water waste. **Table 4-17** is a summary that shows how each member City addresses water waste within their boundaries. As the table shows, not all cities have methods to control water waste in their communities. Reducing visible water waste incidents such as a rigorous broken sprinkler head program has a minor direct impact on water conservation by reducing water wasted by these systems. Indirect social benefits of this program include raising the image of water conservation "at home" and helps to maintain aesthetic quality of a given community. The challenges to the program are the costs to implement the program.

CVWD will review and develop, if appropriate, a model water waste ordinance that could be uniformly adopted by its member cities and the county as part of the CVWMP Implementation Task Force Recommendations. The use of a community/volunteer based model, which would use volunteers to be responsible for patrolling and reporting violators could be used to add to the cost feasibility of this program. Through simple promotions on its web site or in its monthly billing, CVWD can engage the public in reporting to the agency with specific data on water waste incidents to help CVWD identify and resolve unchecked occurrences. If implemented, future water savings from the program could be developed and recorded.

**Table 4-17
Water Waste Prohibition City Program Summary**

No.	City/Community Name	Landscape Irrigation Ordinance Status
1	Indian Wells	No official punitive measures
2	Coachella	No official punitive measures
3	Indio	Will enforce and/or temporarily shut of water if broken sprinkler head complaint filed
4	Rancho Mirage	No official punitive measures
5	Palm Desert	Pool draining permit required, City will send warnings for broken sprinkler heads, otherwise no official punitive measures
6	Cathedral City	Pool draining permit required, otherwise no official punitive measures
7	Palm Springs	Pool draining permit required, otherwise no official punitive measures
8	La Quinta	Pool draining permit required, City will send warnings for broken sprinkler heads, otherwise no official punitive measures
9	Riverside County	No official punitive measures

CVWD’s water softener ordinance falls under the CVWD Regulation Governing Sanitation Services, Part IX, Paragraph 9-1, Item 19, which specifically prohibits brine discharges to its waste water collection system. CVWD staff checks commercial sites as part of its sanitation system source control program, checking approximately 1,800 sites per year. In 2004 and 2005, one quarter of one CVWD employees time was dedicated to the program. This should increase to one full time staff person working on this program 100 percent of their time by 2006 or 2007 for a cost of about \$120,000.

In the residential sector, CVWD is producing a pamphlet to inform homeowners of the prohibition of brine discharge. There are no punitive measures planned.

4.16 RESIDENTIAL ULTRA-LOW-FLUSH TOILET REPLACEMENT PROGRAM

Presently there is no ultra-low-flush toilet (ULFT) replacement program provided by CVWD. CVWD is the principal water and wastewater provider within its service area and has legal authority to develop this DMM. Nearly all of the wastewater generated in CVWD is reused or is returned to the groundwater basin by percolation. In addition, the significant new construction in recent years must comply with the plumbing code requirements for installation of ULFTs. Consequently, the water savings benefits of such a program are relatively low. CVWD is presently developing its water CVWMP Implementation Task Force Recommendations where this program will be discussed.

The promotion and use of these toilets has social value as it brings conservation products, literally, in direct contact with area users, thereby raising awareness of water conservation efforts. Furthermore, the use of these products has the potential to reduce customer water and electric bills. The use of these products provides no direct health benefit or detriment.

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ULFTs were first introduced to the US market in 1980 and the manufacturing of older, less efficient toilets designs was halted shortly thereafter. It is estimated that natural replacement of residential toilets occurs every 20-30 years or at a rate of about 3 percent per year (CUWCC, 2004). Using this methodology, approximately 25 percent of the toilets from pre-1980 would still be installed in 2025. If a nine-year program were implemented as described in **Table 4-18**, CVWD could reach nearly a 99 percent level of conversion. Initial calculations of the benefits of this program show a 1.9 benefit-to-cost ratio. **Table 4-19** and **Table 4-21** below shows the present passive conversion of toilets to ULFTs for single and multi-family customers and **Table 4-20** and **Table 4-22** show the proposed conversion schedule. As 80 percent of water use in the CVWD service area is used outdoor, CVWD's conservation programs will focus primarily on outdoor water conservation measures.

**Table 4-18
ULFT Cost Effectiveness Summary**

Amortized Program Costs	\$22,564
Amortized Program Benefits	\$42,841
Discount Rate	4%
Time Horizon (yrs)	9 yrs
Cost of Water (\$/acre-ft)	\$355
Water Savings (acre-ft/yr)	64

**Table 4-19
Actual Single Family Actual ULFT Conversion**

	2001	2002	2003	2004	2005
total # of ULF rebates	0	0	0	0	0
cumulative # of ULF passive installs	9,538	9,899	10,253	10,600	10,939
total # of ULF installs	9,538	9,899	10,253	10,600	10,939
total annual # of ULFT installs	368	361	354	347	340
projected expenditures - \$	\$0	\$0	\$0	\$0	\$0
projected water savings - acre-ft/yr	477	495	513	530	547

**Table 4-20
Planned Single Family Planned ULFT Conversion**

	2006	2007	2008	2009	2010
total # of ULF rebates	2,426	4,582	6,497	8,195	9,698
cumulative # of ULF passive installs	11,272	11,599	11,918	12,232	12,539
total # of ULF installs	13,698	16,181	18,415	20,427	22,237
total annual # of ULFT installs	2759	2483	2235	2011	1810
projected expenditures - \$	\$230,817	\$230,817	\$230,817	\$230,817	\$230,817
projected water savings - acre-ft/yr	685	809	921	1,021	1,112

**Table 4-21
Actual Multi-Family Actual ULFT Conversion**

	2001	2002	2003	2004	2005
total # of ULF rebates	0	0	0	0	0
cumulative # of ULF passive installs	328	341	353	365	377
total # of ULF installs	328	341	353	365	377
total annual # of ULFT installs	13	12	12	12	12
projected expenditures - \$	\$0	\$0	\$0	\$0	\$0
projected water savings - acre-ft/yr	16	17	18	18	19

**Table 4-22
Planned Multi-Family Planned ULFT Conversion**

	2006	2007	2008	2009	2010
total # of ULF rebates	84	158	224	282	334
cumulative # of ULF passive installs	388	399	410	421	432
total # of ULF installs	472	557	634	703	765
total annual # of ULFT installs	95	85	77	69	62
projected expenditures - \$	\$7,946	\$7,946	\$7,946	\$7,946	\$7,946
projected water savings - acre-ft/yr	24	28	32	35	38

4.17 RESIDENTIAL CONSERVATION PROGRAMS

Table 4-23 shows a summary of proposed water conservation measures that will be taken by CVWD associated with its local residences. The activity status of each of the conservation measures is also included, which shows that some activities are functioning presently and others are planned for the near future. The cost benefit and water savings of this program will be developed as part of the CVWMP Implementation Task Force Recommendations.

4.17.1 Generate ETo Zone Map Program

Reference evapotranspiration (ET_o) refers to an is a measurement of water consumption from an irrigated area. With ET_o information, the irrigator has a reliable standard by which to determine how much irrigation water to apply with each irrigation. The California Department of Water Resource's CIMIS (California Irrigation Management Information System) obtains this information from a series of special ET_o weather stations located throughout California. CVWD maintains five permanent CIMIS stations within the Coachella Valley and currently broadcasts one all-encompassing average ET_o prediction figure to be used valley-wide for irrigation scheduling through its weather forecasting service. Two years of data from an ongoing urban "Non-Ideal" CIMIS site study using portable weather stations have given us enough data to indicate that there are at least five distinct ET_o zones in the Upper Valley with an ET_o variance range of 35 percent. In other words, landscape plants in the Upper Valley areas require

**Table 4-23
Residential Programs**

Short Term Projects	Status
Generate ETo zone map	Ongoing
Residential ETo clock rebate program	Ongoing
Residential Curbside sprinkler retrofit rebate/loan program	Proposed
Residential Protector Del Agua program	Proposed
Generic (peel off) irrigation schedule guide for lawn watering with reference to website	Proposed
Develop residential landscape irrigation schedule website	Proposed
Residential water audits (indoor/outdoor)	Proposed
Long Term Projects	
Landscape irrigation retrofit financial incentive program	Proposed
Residential water restrictions – days/hours	Proposed
Low interest loans to improve landscaping	Proposed
Tiered water rates – residential	Proposed
Cash for Grass	Proposed

35 percent less water on any given day than the same plants along Interstate 10, but the average residential homeowner is typically unaware of these geographical differences in local plant water use. A local ETo map is currently under construction for distribution to urban landscape irrigators. It is hoped that further study will reveal even more precise ETo zone boundaries allowing for reduced residential water applications within those areas of the Coachella Valley characterized by lower ETo rates. The measurement of success of the program will be the continuation of data recording, expanding testing station technology and successful implementation of the data into CVWD’s other water conservation programs.

4.17.2 Residential ETo Clock Rebate Program

The purpose of this rebate program is to financially assist residential water users in reducing landscape irrigation water consumption by purchasing an advanced irrigation controller capable of synchronizing their landscape irrigation schedules with seasonal variations in Coachella Valley evapotranspiration rates. This program, presently in a pilot phase and described under **Section 4.7** of this report, is aimed at reducing irrigation water consumption. CVWD will offer the homeowner a rebate coupon to eliminate the additional cost of the advanced controller in order to encourage the adoption of this new technology.

If determined to be successful, the pilot program will be expanded for both residential and large-scale irrigators. The measurement of success of this program will be to maintain and/or increase the number of applications to this program each year and track and show a decrease in applicant water usage at their home by comparing pre- and post-timer installation data for applicants to the program. This program was approved by Board in September 2005. Rebates are \$50 for a 6-station and \$100 for an 8-station controller.

4.17.3 Residential Curbside Sprinkler Retrofit Program

The purpose of this rebate program is to provide financial incentives to assist residential irrigation system owners and operators in eliminating landscape irrigation street water applications by purchasing and installing new sprinklers with improved water application efficiency. As discussed earlier in **Section 4.7** of this report.

CVWD will offer a rebate coupon to make up the cost difference to encourage the purchase and installation of curbside sprinklers. The measurement of the success of this program will be a marked reduction in curbside over-irrigation complaints and a reduction in water use by applicants to this program.

4.17.4 Residential Protector Del Agua Program

Residential landscape irrigation systems are often improperly installed, poorly maintained and inefficiently scheduled by owners who are often unskilled and uneducated in the science and practice of landscape irrigation efficiency. The purpose and scope of this program is described in **Section 4.7** of this report.

The goal of this program is to continue to provide, develop and improve the Protector Del Agua program through 2010 via the use of a contracted consultant to run the program. The measure of success of this program will be performed by surveying participants in the program as well as monitoring and measuring the annual attendance at the program.

4.17.5 Generic (Peel-off) Irrigation Schedule Guide for Lawn Watering with Reference to Website

The setting of the irrigation clock to irrigate turf grass is one of the homeowner's most difficult tasks. In order to program lawn irrigation efficiently, the programmer must know his irrigation system's distribution uniformity and precipitation rate. This requires a catch-can test and complicated mathematical computations. Most residential landscape irrigators simply guess and adjust the clock according to plant response. Since most irrigated landscape plants do not respond adversely to over-irrigation, the average residential turf grass irrigation schedule over waters.

CVWD, which has sponsored irrigation system auditing since 1987, has accumulated enough catch-can test data that it can create a simple, but effective, generic monthly irrigation schedule based on the average catch-can test results from over 400 local landscape irrigation audits on both spray-head and rotary sprinklers. This schedule will be printed out as a sticker to place on the clock as an effective, starting point, reference to turf grass sprinkler scheduling.

A reference to CVWD's website will provide the means to obtain a more precise irrigation schedule based on on-site measurements.

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4.17.6 Develop Residential Landscape Irrigation Schedule Website

In an attempt to assist the California homeowner with the procedures and calculations involved in synchronizing the landscape irrigation schedule with plant water requirements and irrigation system performance parameters, two public agencies, the University of California, Davis and California State University, Fresno have developed internet turf grass irrigation scheduling guides that walk the consumer through the development of a customized irrigation schedule.

CVWD will test the applicability of these statewide programs to the unique climate of the Coachella Valley, determine each program's user friendliness and provide a link to one of these services on its website. If customer feedback indicates that more local plant, soil, or water-use detail is required than is provided by these state-wide programs, or that the programs are too difficult to execute, CVWD will construct its own irrigation scheduling website program, to optimize savings and simplify use. The measurement of interest and success of this program will be to show a steady and/or increase in the number of hits to the proposed web site and show a low or lowered water use by registered users of the web site.

4.17.7 Landscape Irrigation Retrofit Financial Incentive Program

Under this proposed program, subsidies would be provided to convert existing irrigation systems to high efficiency systems. This proposed conservation program is still under review and has not been fully defined by CVWD. It is the plan of CVWD to develop the scope and assess the feasibility of this program as part of the CVWMP Implementation Task Force Recommendations.

4.17.8 Residential Water Restrictions – Days/Hours

This program would restrict the time of day residential units could irrigation on their property. This proposed conservation program is still under review and has not been fully defined by CVWD. It is the plan of CVWD to develop the scope and assess the feasibility of this program as part of the CVWMP Implementation Task Force Recommendations.

4.17.9 Low Interest Loans to Improve Landscaping

This program would expend low interest loans to residential customers to improve their irrigation systems. This proposed conservation program is still under review and has not been fully defined by CVWD. It is the plan of CVWD to develop the scope and assess the feasibility of this program as part of the CVWMP Implementation Task Force Recommendations.

4.17.10 Tiered Water Rates – Residential

This program would change the present residential billing rate system to a tiered system to provide further incentive for customers to conserve water. This proposed conservation program is still under review and has not been fully defined by CVWD. It is the plan of CVWD to develop the scope and assess the feasibility of this program as part of the CVWMP Implementation Task Force Recommendations.

4.17.11 Cash for Grass Program

The purpose of this program would be to offer residential customers a buy-back rebate for converting irrigated, grass turf landscaping in their yard to high efficiency Xeriscape landscaping. This program has been implemented successfully in many communities in the United States. These communities include Albuquerque NM, El Paso TX as well as Las Vegas NV. The programs have been able to provide economically feasible rebates ranging from \$0.20 to \$0.50 per square foot of grass turf removed. Due to the success of these major programs, CVWD will review the feasibility of this program as part of their CVWMP Implementation Task Force Recommendations.

4.18 GOLF COURSES WATER CONSERVATION

CVWD does not deliver domestic water for golf course irrigation. However, it does deliver Canal water, recycled water or a blend of canal and recycled water to selected golf courses. Most golf course demand is met by private groundwater pumping. One element of this is golf course water conservation measures. CVWD’s Water Management Plan Implementation Task Force is evaluating a variety of measures to reduce golf course water use.

Table 4-24 below shows a summary of proposed water conservation measures that will be taken by CVWD associated with its golf courses. The activity status of each of the conservation measures is also included, which shows that some activities are functioning presently and others are planned for the near future.

**Table 4-24
Golf Course Conservation Programs**

Short Term Projects	Status
<i>Efficient Irrigation Practices for Courses Existing in 2003</i>	
1. Irrigation audits on all golf courses	Ongoing
2. Provide soil moisture monitoring services	Proposed
<i>Efficient Irrigation Practices for Courses Built After 2003</i>	
1. Plan checking: Reduce recreational turf plant factor of 0.82 to 0.7 on fairways and 0.6 on rough/driving range	Proposed
2. Complete irrigation audits on all new golf courses	Proposed
3. Provide soil moisture monitoring services	Proposed
Inspect golf courses for plan check compliance	Proposed
Monitor maximum allowable water allowance compliance for new courses	Ongoing
Golf Course Water Efficiency Certificate program	Proposed
Long Term Projects	
Golf course turf restrictions	Ongoing
Tiered groundwater overdraft surcharge – supplemental impact fee	Proposed
Tiered Water Pricing	Proposed

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4.18.1 Efficient Irrigation Practices for Courses Existing in 2003

Irrigation Audits on All Golf Courses

The purpose of the golf course irrigation audit program is to assist the irrigator in maximizing the efficient operation of the irrigation system by measuring performance, generating irrigation schedules and recommending improvement actions.

The goals of this audit program are to determine the irrigation uniformity, efficiency and application rate of each approved site, suggest modifications in design, operation, maintenance and scheduling and finally estimate the water and energy savings associated with the suggested modifications. A report summarizing the audit's findings and recommendations is hand-delivered and explained to the golf course irrigator.

Audit sites are chosen based on excessive water consumption or in response to a request for audit services. CVWD's Water Management Specialist evaluates and approves each site. A Notice to Proceed Letter is sent to the Resource Conservation District authorizing the audit. CVWD staff also conduct audits periodically. All auditors must take the Irrigation Association's Golf Course Irrigation Auditor course and pass the Certified Golf Course Irrigation Auditor's Examination.

Once a site is accepted for auditing, the owner or operator of the facility is contacted and an appointment is made to conduct the audit. After measurements and calculations are completed, a summary report and custom irrigation schedules are delivered to CVWD for approval. Upon approval, the report is delivered and explained to the site operator by the auditor. Payment is then authorized to the auditor. The golf course audit program operates continuously and completes approximately five audits per year. Sixty-nine existing golf courses have received audits to date. The measurement of interest and success of this program will be to show a steady and/or decrease in the water use at each of the audited golf courses.

4.18.2 Provide Soil Moisture Monitoring Services

The current trend in golf course irrigation scheduling is to utilize weather-based stations to determine ET rates and schedule irrigation accordingly. In addition to utilizing ET rates to schedule irrigation, water application control can be gained by knowing the amount of water that reaches the plant roots or beyond. Soil moisture monitoring is key to providing this information.

With each irrigation application comes spray drift, evaporation losses and irrigation system inefficiencies. Conservatively estimating a 0.02 inch loss per irrigation application, a 125 acre golf course irrigating every day will lose 7 inches of water per year or 73 acre-feet annually. Furthermore, the practice of light, frequent irrigation promotes shallow roots and concentrates salts in the diminished, active root zone. In both instances, additional irrigation water is often required to grow high quality turf grass.

The purpose of a CVWD soil moisture monitoring program is to encourage golf course superintendents to fully utilize their soil's available water holding capacity to save water by reducing the number of daily irrigation applications, promoting deep and healthy roots and

reducing the build up of salts in the active root zone. It is important to note that monitoring soil moisture levels is not a substitute for monitoring ET rates.

Efficient irrigation schedules require both soil moisture and ET data in the determination of frequency and duration of irrigation applications. CVWD's Golf Course Water Management Specialist will initially assist the golf course superintendent in the use of a CVWD -owned soil moisture sensor in refining irrigation applications. If the superintendent is convinced of the utility of incorporating soil moisture readings into his or her scheduling calculation, CVWD will rebate 50 percent of the cost of a soil moisture sensing system up to \$1,000 for use on the golf course. The measurement of interest and success of this program will be to show a steady and/or decrease in the water use at each of the participating golf courses.

4.18.3 Plan Checking: Reduce Recreational Turf Grass Plant Factor of 0.82 to 0.7 on the Fairways and 0.6 on the Roughs and Driving Range

CVWD adopted Ordinance No. 1302 in March 2003. It establishes effective water efficient landscape requirements for newly established and rehabilitated landscapes including golf courses.

The ordinance allows flexibility of landscape system design by establishing plant water use factors (PF). These factors can be multiplied by their planted area and divided by irrigation efficiency to indicate total irrigation water use over a given landscape area. The product is called the estimated water use (EWU). By comparing the EWU to the maximum water allowance (MWA) established by the ordinance, it can be determined whether a proposed landscape complies with the ordinance.

Normal management of a combination of warm and cool season landscape turf in the Coachella Valley is assigned a PF of 0.70. For purposes of the ordinance, landscape turf is distinguished from recreational turf. Recreational turf is defined as turf that serves as a playing surface for sports and recreational activities. Athletic fields, golf courses, parks and school playgrounds are all examples of areas utilizing recreational turf grass.

The current landscape water conservation ordinance assigns recreational turf grass a PF of 0.82 to compensate for the wear and tear of vehicular and foot traffic on golf courses, sports turf and other heavily trafficked turf grass areas. This gives any golf course turf grass area an MWA value that is 17 percent higher than landscape turf that has a PF of 0.70.

Field observations of golf course traffic patterns, however, have revealed that some areas of the golf course roughs and driving range receive very little traffic, while other areas receive only moderate traffic (fairways). Greens and tees receive heavy traffic because every player crosses the same area.

The intent of this program is to work with the golf course industry to develop a zonal PF MWA that conserves water while maintaining high golf course turf grass quality. The goal is to reduce PFs to 0.6 on driving range/rough areas and to 0.7 on fairways after demonstrating acceptable turf quality and water savings through voluntary adoption on one or two golf courses.

Section 4 - Water Conservation

In lieu of, or in addition to assigning new plant factors, CVWD, in cooperation with golf industry representatives may work to establish other needed requirements. Prescriptive alternatives could include a maximum acreage of turf/spray per hole, a maximum percentage of turf/spray on the entire golf course, establishment of leaching factors, or other considerations. The measurement of interest and success of this program will be to show a steady and/or decrease in the water use at each of the participating golf courses.

4.18.4 Complete Irrigation Audits On All New Courses

The purpose of the golf course irrigation audit program is to assist the irrigator in maximizing the efficient operation of the irrigation system by measuring performance, generating irrigation schedules and recommending improvement actions as described in **Section 4.7** of this report. The measurement of interest and success of this program will be to show a steady and/or decrease in the water use at each of the participating golf courses.

4.18.5 Inspect Golf Courses For Plan Check Compliance

The only way to insure that irrigation and landscape systems are installed according to approved plan is to conduct on-site inspections. CVWD currently does not have personnel assigned to conducting these inspections. The goal of this program is to conduct on-site inspections for every new golf course that is installed. The result of these inspections would be verification of proper installation, or follow up to insure that installations out of compliance will be brought into compliance. The measurement of success of this program will be that audited golf courses comply with conservation mandates by CVWD.

4.18.6 Monitor Maximum Water Allowance Compliance

One feature of the plan check program is the assignment of an Annual MWA to each golf course based on planted area and the installation and operation of an efficient irrigation system. The purpose of the golf course MWA compliance monitoring program is to determine whether each golf courses' annual consumption falls below its assigned MWA value.

At the close of each calendar year, CVWD's Golf Course Water Management Specialist will obtain each new golf course' water records and compare consumption to allowance. Those courses failing to meet their MWA for two consecutive years will be required to participate in CVWD's irrigation audit program, or similar appropriate program, to assist irrigators in meeting their assigned MWA. The measurement of the success of this program will be to show a that the reviewed courses comply with their MWA values.

4.18.7 Golf Course Water Efficiency Certificate Program

The California Certified Water-Efficient Golf Course Program is a new education program being promoted by the California Golf Course Superintendent's Association. The purpose of the golf course irrigation self-audit program is to educate the golf course superintendent in the principles of efficient irrigation management by administering a self-test questionnaire covering the knowledge required to efficiently irrigate his or her individual course. Points are assigned each

question and the accumulation of sufficient points results in being designated a California Certified Water-efficient Golf Course.

The goal will be for the Golf Course Water Management Specialists to work with the local Hi-Lo Desert Golf Course Superintendent's Association to get every golf course within the Coachella Valley certified as Water Efficient within five years. The measurement of interest and success of this program will be that the program is implemented as a permanent program that all courses will be required to comply with.

4.18.8 Golf Course Turf Restrictions

This measure could include restrictions on the allowable acreage of turf on new golf course. Such restrictions would be in addition to the limitations included in the existing landscape ordinance.

This proposed conservation program is still under review and has not been fully defined by CVWD. It is the plan of CVWD to develop the scope and assess the feasibility of this program as part of the CVWMP Implementation Task Force Recommendations.

4.18.9 Tiered Groundwater Overdraft Surcharge – Supplemental Impact Fee

This measure could include the development of a surcharge or supplemental impact fee in addition to the groundwater replenishment assessment. Current State law requires that replenishment assessments in an area of benefit be uniform for all pumpers. Consequently, CVWD may not currently have the legal authority to implement this measure.

This proposed conservation program is still under review and has not been fully defined by CVWD. It is the plan of CVWD to develop the scope and assess the feasibility of this program as part of the CVWMP Implementation Task Force Recommendations.

4.18.10 Tiered Pricing

This measure could include the development of tiered water pricing for golf courses. Since CVWD does not serve domestic water for golf course irrigation, this measure would likely apply to Canal or recycled water service.

This proposed conservation program is still under review and has not been fully defined by CVWD. It is the plan of CVWD to develop the scope and assess the feasibility of this program as part of the CVWMP Implementation Task Force Recommendations.

