



2005 Urban Water Management Plan

May 2008

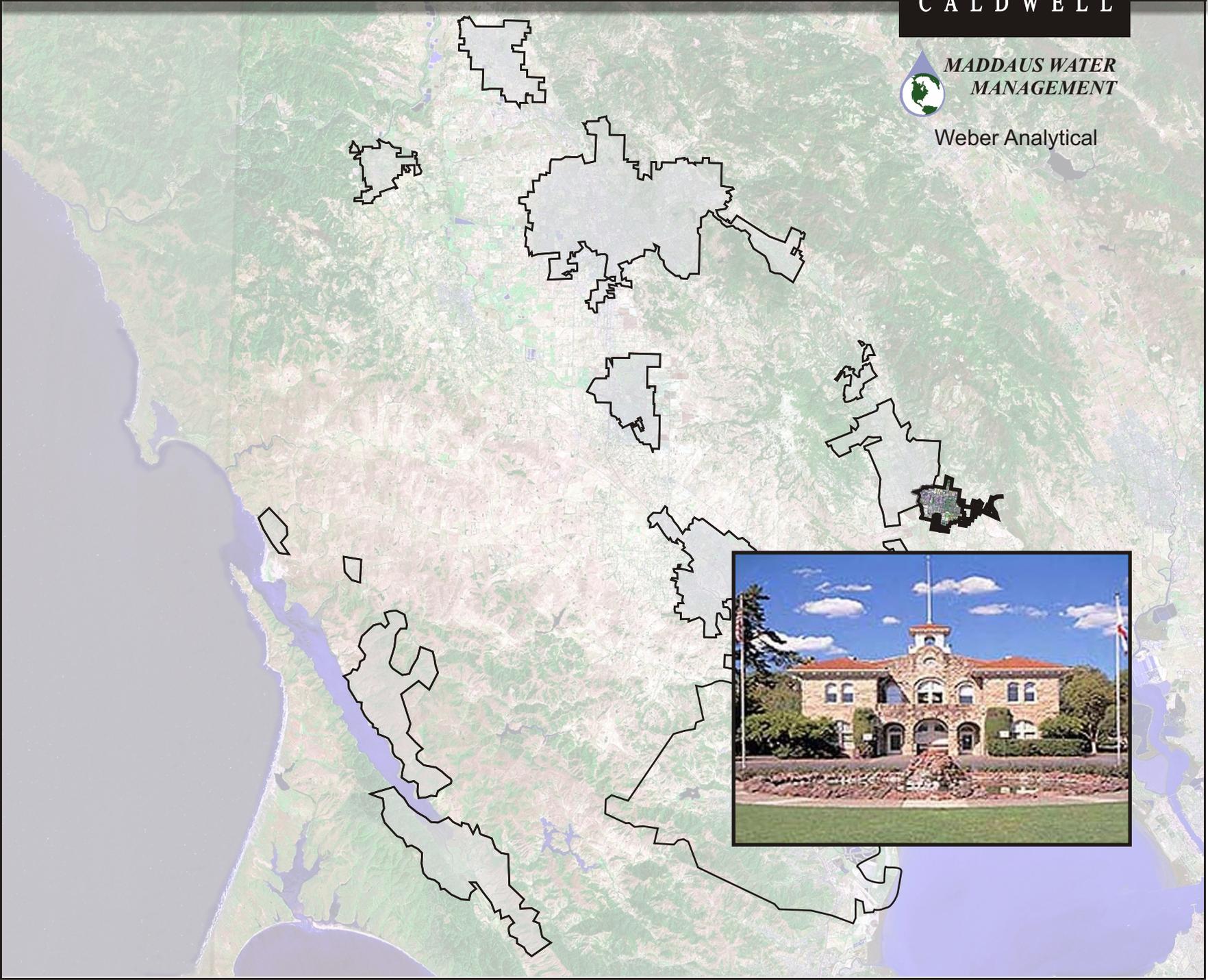
City of Sonoma

BROWN AND
CALDWELL



MADDAUS WATER
MANAGEMENT

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May 12, 2008

BROWN AND
CALDWELL

Milenka Bates
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1017/127280.005

Subject: City of Sonoma, Urban Water Management Plan

Dear Ms. Bates:

Brown and Caldwell is pleased to submit this Urban Water Management Plan which was adopted on April 16, 2008. Please do not hesitate to contact me if you have any questions or comments at (916) 853-5306.

Sincerely,

BROWN AND CALDWELL



Paul Selsky, P.E.
Vice President

PS:DM:ds

Enclosure

cc w/enclosure: George Lincoln, Sonoma County Water Agency

CITY OF SONOMA

2005 URBAN WATER MANAGEMENT PLAN

May 2008

Prepared by:

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LIST OF ACRONYMS

Act	Urban Water Management Act
ac-ft	acre-feet
ac-ft/yr	acre-feet per year
Agency	Sonoma County Water Agency
BMP	best management practice
CDFG	California Department of Fish and Game
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
cfs	cubic feet per second
City	City of Sonoma
Conservancy	California State Coastal Conservancy
CUWCC	California Urban Water Conservation Council
DSS	Decision Support System
DWR	California Department of Water Resources
EIR	Environmental Impact Report
ETo	evapotranspiration
gpm	gallons per minute
hp	horsepower
MCL	maximum contaminant level
MG	million gallons
mgd	million gallons per day
MOU	Memorandum of Understanding
NPDES	National Pollutant Discharge Elimination System
PG&E	Pacific Gas and Electric
Plan	Urban Water Management Plan
Restructured Agreement	Restructured Agreement for Water Supply
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SVCSD	Sonoma Valley County Sanitation District
SWRCB	State Water Resources Control Board
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

SECTION 1

INTRODUCTION

This Urban Water Management Plan (Plan) addresses the City of Sonoma (City) water system and includes a description of the water supply sources, magnitudes of historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years. The City receives the majority of its water from Sonoma County Water Agency (Agency), which provides water principally from the Russian River to retail water contractors in Sonoma and Marin Counties, California.

This section provides background information on the Plan, an overview of coordination with other agencies, and a description of public participation and Plan adoption.

1.1 Urban Water Management Planning Act

The City Plan has been prepared in accordance with the Urban Water Management Act (Act), as amended, California Water Code, Sections 10610 through 10656. The Act requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections or supplying more than 3,000 acre-feet (ac-ft) of water annually, to adopt and submit a plan every five years to the California Department of Water Resources (DWR). This Plan serves as a long-range planning document for the City's water supply. The Agency's urban water management plan should be consulted for details regarding the Agency's water supply (Sonoma County Water Agency, 2006b)

1.2 Resource Maximization and Import Minimization

Water management tools have been used by the City to maximize water resources. The City has been participating with the Agency in the implementation of water conservation measures. Additionally, the City is cooperating with groundwater basin studies that are being conducted in Sonoma County by the Agency and the United States Geological Survey (USGS). The City is also participating with the Agency in the development of a groundwater management plan.

1.3 Coordination

The Act requires the City to coordinate the preparation of its Plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies. The City coordinated the preparation of its Plan with its wholesale water supplier, the Agency, eight nearby water utilities that also utilize Agency water, and the Sonoma Valley County Sanitation District. In addition, the City coordinated the preparation of the water demand projections in this Plan with the City of Sonoma Draft General Plan. Table 1-1 provides a summary of the City’s coordination with the appropriate agencies.

Table 1-1. (DWR Table 1) Coordination with Appropriate Agencies

	County Agencies		Wastewater Agency Facilities	Other
	Sonoma County	Sonoma County Water Agency	Sonoma Valley County Sanitation District	Public Involvement
Participated in developing the Plan		√	√	√
Commented on the draft		√	√	
Attended public meetings		√	√	√
Was contacted for assistance	√	√	√	
Was sent a copy of the draft Plan	√	√	√	√
Was sent a notice of intention to adopt	√		√	√
Not involved/No information				

1.4 Public Participation and Plan Adoption

The City encouraged community and public interest involvement in the Plan update through public hearings and inspection of the draft document. Two public hearings and one workshop were held. The first public hearing was held on August 22, 2007. A subsequent workshop was held on September 26, 2007. A second public hearing was held on April 16, 2008. Public hearing notifications were published in the Sonoma Index-Tribune. A copy of the published Notice of Public Hearing is included in Appendix A. The public hearings and workshop provided an opportunity for all residents and employees in the service area to learn and ask questions about their water supply in addition to the City’s plans for providing a reliable, safe, high-quality water supply. Copies of the draft Plan were made available for public inspection at the City’s Administration Building.

This Plan was adopted by the City Council on April 16, 2008. A copy of the adopted resolution is provided in Appendix A.

1.5 Plan Organization

This section provides a summary of the sections in the Plan. Section 2 provides a description of the service area, climate, water supply facilities, and distribution system. Section 3 presents historical and projected water use. Section 4 describes surface and groundwater supplies. Section 5 describes recycled water. Section 6 addresses water conservation. Section 7 provides a comparison of future water supply to demand. Appendices A through D provide relevant supporting documents.

1.6 Assumptions

The evaluation and conclusions in this Plan are based in part upon assumptions made by the Agency regarding their water supply. The Agency's urban water management plan should be consulted for information about these assumptions.

SECTION 2

DESCRIPTION OF EXISTING WATER SYSTEM

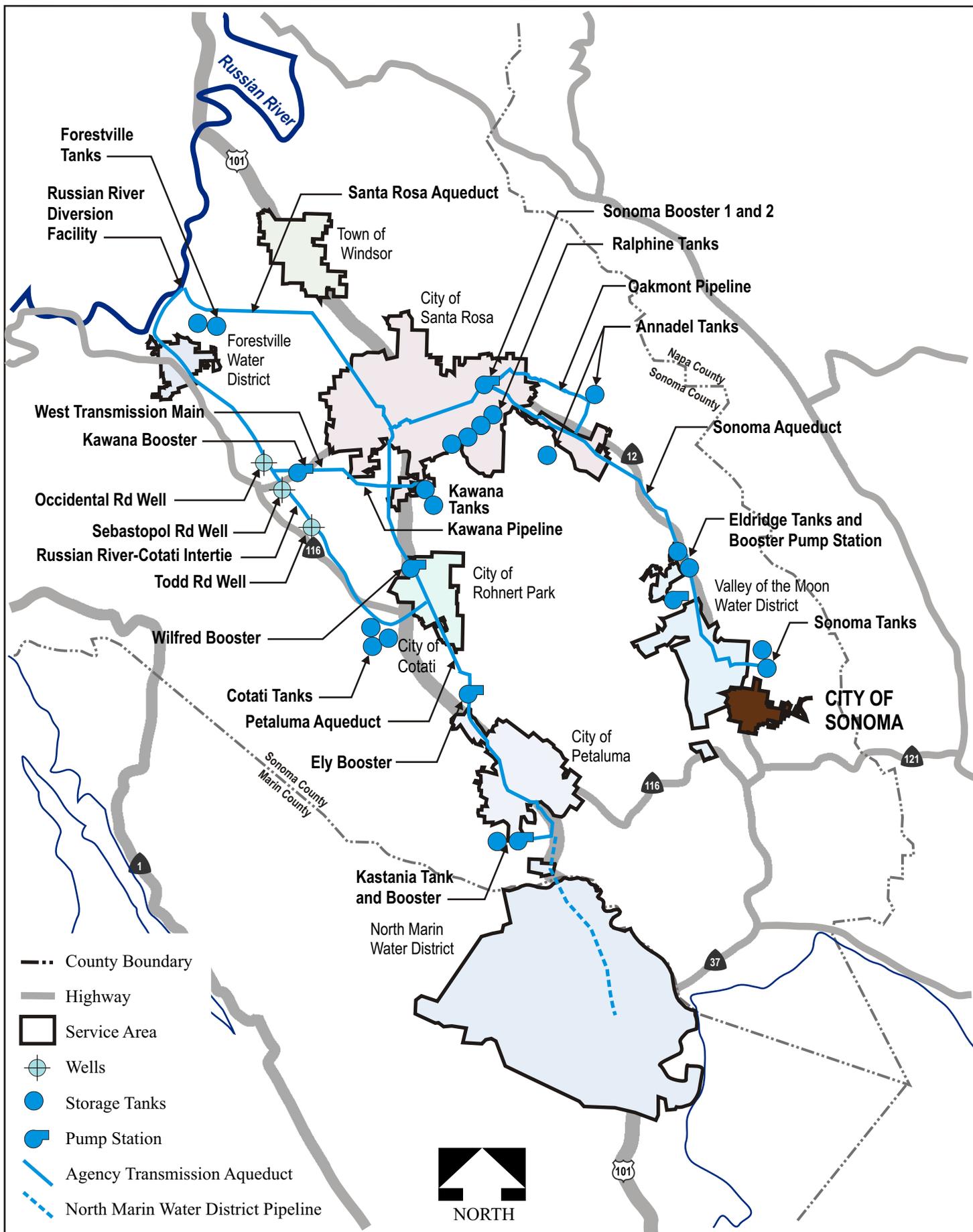
This section describes the City's service area, climate, and water supply facilities. Section 4 describes the quantities of water available to the City.

2.1 Description of Service Area

The City provides potable water to a 2005 population of approximately 10,733 people. Located in southeast Sonoma County, about 50 miles northeast of San Francisco, and along Route 12, the City spans approximately 2.2 square miles. Figure 2-1 illustrates the location of the City's service area and the Agency's transmission system.

2.2 Climate

The City's climate is tempered by its proximity to the Pacific Ocean. In common with much of the California coastal area, the year is divided into wet and dry seasons. A majority of the annual precipitation normally falls during the wet season, October to May, with a large percentage of the rainfall typically occurring during three or four major winter storms. Winters are cool, and below-freezing temperatures seldom occur. Summers are warm and the frost-free season is fairly long. Annual precipitation averages 29.6 inches. Table 2-1 summarizes monthly average evapotranspiration rates (ETo) at the Bennett Valley Station and monthly average rainfall and temperatures at the Sonoma Station.



- County Boundary
- Highway
- Service Area
- Wells
- Storage Tanks
- Pump Station
- Agency Transmission Aqueduct
- North Marin Water District Pipeline



BROWN AND CALDWELL	PROJECT	127280-005	SITE	UWMP 2005, City of Sonoma	Figure 2-1
	DATE	11-30-06	TITLE	City of Sonoma Service Area	

Table 2-1. (DWR Table 3) Climate

	Standard average ETo ^a , in	Average rainfall ^b , in	Average temperature ^b , °F
January	0.82	6.44	47.23
February	1.44	5.26	51.27
March	2.87	3.89	53.56
April	4.31	1.83	56.56
May	5.26	0.69	61.48
June	6.14	0.25	67.07
July	6.3	0.03	70.1
August	5.76	0.11	69.8
September	4.25	0.31	68.06
October	3.1	1.58	62.23
November	1.38	4.03	53.14
December	0.86	5.2	47.33
Annual	42.49	29.63	58.95

Notes:

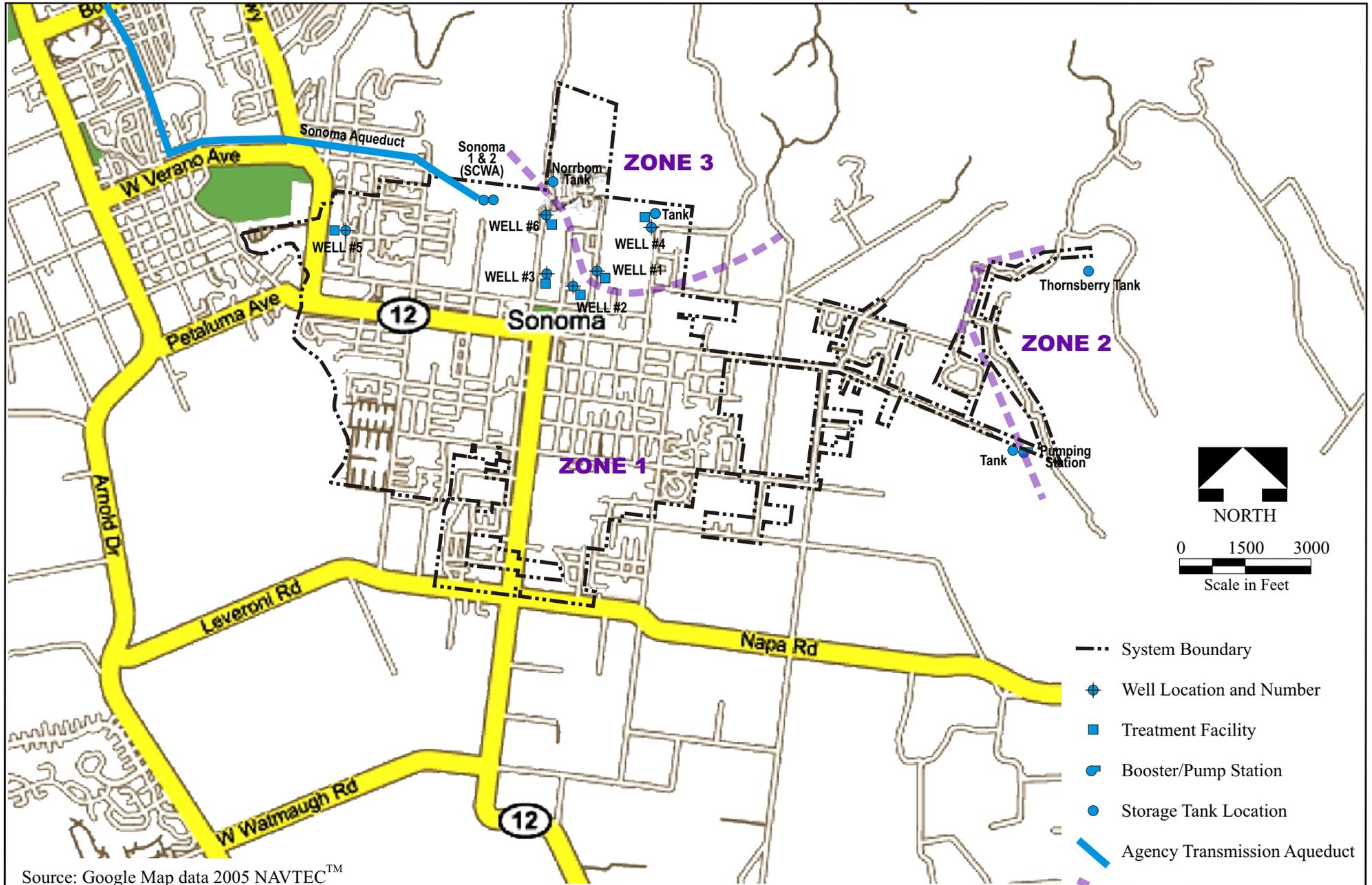
^a Data represents the monthly average from October 2000 to December 2005 and was recorded from Bennett Valley CIMIS Station 158.

ETo, or evapotranspiration, is the loss of water from evaporation and transpiration from plants.

^b 1952-2005 data recorded at Sonoma Station from NOAA website www.wrcc.dri.edu

2.3 Water Supply Facilities

The City receives most of its water supply from the Agency's Sonoma Aqueduct. The Agency's water supply is provided by diversions of water from the Russian River in addition to supplemental water from three groundwater wells located in the Santa Rosa Plain. The Agency's urban water management plan should be consulted for details regarding the Agency's water supply. The City maintains a local source of supply, in addition to the water purchased from the Agency. Figure 2-2 identifies the locations of the City's water system facilities. Table 2-2 presents the characteristics of the City's wells. The wells are normally operated only when water levels in the Agency tanks drop to a level where system pressures cannot be sustained throughout the service area. Details regarding the water supplies are included in Section 4.



Source: Google Map data 2005 NAVTEC™
City of Sonoma, revised 1991

BROWN AND CALDWELL	PROJECT 127280-005	SITE UWMP 2005, City of Sonoma	Figure 2-2
	DATE 3-14-07	TITLE Water Supply Facilities	

Table 2-2. Well Data

Well number	Capacity (gpm ^a)	Location	Notes
1	480	2 nd St. East immediately north of bike path	Active status. Well vault has minor flooding problems. Need site for building to house control, disinfection equipment, etc.
2	180	At Youth Center on Mission Terrace	Off-line.
3	180	In Depot Park	Active status.
4	180	North of Brazil St. & 4 th St. East intersection	Active status.
5	190	At rear of former Sonoma Bowl on Sonoma Highway	Stand-by status. Produces warm water of low quality. Status unlikely to change.
6	190	1 st St West northwesterly of Veterans Bldg.	Active status.

Note:
^a gallons per minute

2.4 Distribution System

Distribution facilities owned by the City include four storage tanks, two booster stations, and necessary water mains and appurtenances for distributing water to three pressure zones within the service area. Characteristics of these facilities are presented in Tables 2-3 and 2-4.

Table 2-3. Characteristics of Existing Storage Facilities

Tank name	Capacity (MG)	Year built	Type	Notes
Norrbom Road	3.00	2002	Welded Steel	Cobblestone Hill Pressure Zone, Zone 3
Napa Street	2.00	1990	Welded Steel	
Thornsberry Road	0.50	1972	Welded Steel	Upper Pressure Zone, Zone 2
Brazil Street	0.05	1952	Redwood	

Note:
MG = million gallons

Table 2-4. Characteristics of Pump Stations

Pump stations	Number/type	Position
Napa	2 Booster Pumps	Lead, Lag
Norrbom	2 Booster Pumps	Lead, Lag

SECTION 3

PROJECTED WATER USE

This section presents information regarding demographics and projections of future City water demands.

3.1 Employment, Land Use, and Population

This section describes employment and land use characteristics and current and projected future population for the City's service area.

3.1.1 Employment Characteristics

Within the City's service area, employment is primarily in the public sector and in the service and manufacturing industries. Regionally, employment in the agricultural industry is related to vineyards, livestock, orchards, silage crops, and timber. The primary industrial activities in the region include telecommunications, wine production, timber and other agricultural product processing, gravel mining and processing, energy production, and miscellaneous manufacturing. Recreation and tourism are moderate and growing industries in the region.

3.1.2 Land Use Characteristics

Land use within the City is primarily residential, but also includes agricultural, industrial, commercial, and recreational land uses. Sonoma County, by policy, concentrates urban growth within incorporated cities, not in the unincorporated area. Sonoma County has a voter-approved County-wide urban growth boundary and each city has an urban growth boundary. There are voter-approved taxes supporting open space acquisition in all of Sonoma County.

3.1.3 Population Projections

Population and employment projections were developed for the City. The population and employment forecasts are based on the draft City of Sonoma General Plan. The population projections are described in the analysis performed by Maddaus Water Management, which is presented in Appendix B. Table 3-1 provides current and projected populations through the year 2030 for the City's service area.

Table 3-1. (DWR Table 2) Population – Current and Projected

Year	Population
2005	10,733
2010	12,348
2015	12,642
2020	12,740
2025	12,838
2030	12,984

3.2 Water Use

The Agency and the City worked together to develop a water demand analysis and water demand projections. The detailed water demand analysis and demand projections are presented in the evaluations performed by Weber Analytical and Maddaus Water Management, which are presented in Appendix B. The water demand projection process consisted of projecting future demographics, evaluating historical water use characteristics, defining alternative levels of water conservation efforts, and developing resulting water demand projections. The projections include consideration of the impacts of the plumbing code and current and future water conservation efforts.

The historical water use analysis consisted of evaluating the monthly water use per account for each customer category over a 4 year period. The analysis resulted in a weather normalized annual water use per account type, expressed as gallons per day per account. The demographic projections, water use characteristics, and alternative conservation efforts were integrated using the Decision Support System (DSS) model to develop resulting demand projections. The DSS model and the water conservation assumptions are described in Section 6.

Subsequent to the development of the water demand projections for this Plan, the City initiated a water rate study that developed its own water demand projections (Nelson and Weber, 2007). A comparison is made to the rate study projection in Section 3.2.6.

3.2.1 Water Use By Customer Type

Water uses in the City include single-family, multi-family, business, irrigation, and other customers. The projected water use incorporates the water savings from past and current water conservation efforts, including plumbing code enforcement. The past, current, and projected numbers of connections and deliveries to the City's customers by sector are presented in Table 3-2.

Table 3-2. (DWR Table 12) Past, Current, and Projected Water Deliveries^a

		Water Use Sectors							Total
		Single-family	Multi-family	Business	Irrigation	Other	New Single Family		
2001 ^b	metered ^c	# of accounts	3,179	217	297	48	57	N/A	3,798
		Deliveries, ac-ft/yr	1,296	316	297	187	135	N/A	2,231
2005	metered	# of accounts	3,338	236	319	59	41	104	4,097
		Deliveries, ac-ft/yr	1,242	325	360	194	137	42	2,301
2010	metered	# of accounts	3,338	272	322	60	47	622	4,661
		Deliveries, ac-ft/yr	1,233	366	359	196	157	254	2,565
2015	metered	# of accounts	3,338	278	353	65	49	716	4,799
		Deliveries, ac-ft/yr	1,221	369	388	215	161	293	2,647
2020	metered	# of accounts	3,338	280	359	67	49	747	4,840
		Deliveries, ac-ft/yr	1,210	366	391	219	162	306	2,654
2025	metered	# of accounts	3,338	282	365	68	49	779	4,881
		Deliveries, ac-ft/yr	1,200	364	395	222	164	319	2,664
2030	metered	# of accounts	3,338	286	369	68	50	825	4,937
		Deliveries, ac-ft/yr	1,192	365	398	225	165	338	2,683

Notes:

^a The water use includes plumbing code water savings but not the other projected water conservation savings.

^b 2001 data recorded instead of less accurate 2000 data.

^c The City has no unmetered accounts.

Source: See Appendix B.

3.2.2 Water Sales to Other Agencies

The City does not currently sell water to other agencies.

3.2.3 Unaccounted-for Water and Additional Water Use

Unaccounted-for water use is unmetered water use, such as that used for fire protection and training, system and street flushing, sewer cleaning, construction, system leaks, as well as that used by unauthorized connections. Unaccounted-for water use can also result from meter inaccuracies. Table 3-3 provides the estimated quantity of unaccounted-for system water losses. More details on the assumptions made to estimate system losses are presented in Appendix B.

The City does not use water for groundwater recharge to prevent salt water intrusion (saline barriers), or for other conjunctive uses.

Table 3-3. (DWR Table 14) Additional Water Uses and Losses, ac-ft/yr

Water Use	2010	2015	2020	2025	2030
Saline barriers	0	0	0	0	0
Groundwater recharge	0	0	0	0	0
Conjunctive use	0	0	0	0	0
Raw water	0	0	0	0	0
Recycled	0	0	0	0	0
Other	0	0	0	0	0
Unaccounted-for system losses	351	353	354	357	360
Total	351	353	354	357	360

3.2.4 Conservation Savings

Table 3-4 presents the projected water savings resulting from additional conservation activities beyond savings from the plumbing code as detailed in Appendix B.

Table 3-4. Conservation Savings, ac-ft/yr

Water Use	2010	2015	2020	2025	2030
Conservation savings ^a	133	183	202	208	^b

Notes:

^a Water savings from plumbing codes are not included.

^b No conservation savings needed to match 2030 demand.

3.2.5 Total Water Use

The projected water use for the City is presented in Table 3-5.

Table 3-5. (DWR Table 15) Total Water Use, ac-ft/yr

Water Use	2010	2015	2020	2025	2030
Total water use	2,783	2,817	2,806	2,813	3,071

Note:

Sum of Tables 3-2, 3-3, and 3-4.

^a The 2030 water use is equal to the 2030 gross demand, less savings for conservation activities (plumbing code, CUWCC “Tier 1” BMPs, “Tier 2” BMPs, and new housing standards) as described in Section 6.2. The 2030 water use reflects demand in an average weather year; actual demand may vary from these estimates based on the weather year. Water conservation savings includes both additional water conservation to be achieved after June 2004, and reductions in demand resulting from the continuation of water conservation measures implemented by the City as of June 2004. But for the embedded results of those existing conservation efforts, which are summarized in Appendix B, the 2010 to 2030 gross demand grand total figure would be higher. Pursuant to the Restructured Agreement for Water Supply (see Section 4.1.2), the City must implement the CUWCC BMPs for water conservation or alternative water conservation measures that secure at least the same level of water savings. The City has also agreed to use its best efforts to secure the implementation of any water conservation measures required by the Agency’s appropriative water rights permits or licenses or applicable law. Because the water conservation savings are projections, actual demand reduction and the manner in which the demand reduction is achieved may vary.

3.2.6 Rate Study Water Demand Projection

The 2007 rate study presented a water demand projection for the City, as presented in Table 3-6. The two demand projections project a 2030 demand that is within less than a one percent difference. The two demand projections are based on different sets of data and so the nearly identical results validate each other.

Table 3-6. Total Water Use from Rate Study, ac-ft/yr

Water Use	2010	2015	2020	2025	2030
Total water use	2,757	2,801	2,905	3,017	3,091

3.3 Demand on Wholesale Supply

Table 3-7 provides the projected amount of water that the City expects to purchase from the Agency to meet water demands in the future. The City will use local groundwater and recycled water supplies to supply the difference between demand and the Agency water supply.

Table 3-7. (DWR Table 19) City Demand Projections to Wholesale Suppliers, ac-ft/yr

Wholesaler	2010	2015	2020	2025	2030
Sonoma County Water Agency	2,459	2,393	2,491	2,586	3,000

SECTION 4

WATER SUPPLY

The City uses surface water, groundwater, and in the future, recycled water, as its supply sources. Water delivered from the Agency's transmission system is augmented by local groundwater sources to meet the City's water demand. This section describes the surface water and groundwater sources, quantities, supply constraints, and the reliability and water quality of the water supply sources. Recycled water use is described in Section 5.

4.1 Surface Water

This section briefly describes the physical constraints to the Agency's surface water supply and the legal background and constraints to this supply. As described in Section 2, the Agency receives its surface water from the Russian River. More detailed information regarding the Agency's water supply and facilities can be found in the Agency's urban water management plan.

4.1.1 Description

The City receives its primary water supply from the Agency's transmission system. The Agency is supplied by the federal Russian River Project, which it operates along with the Agency's appurtenant water transmission system. The Coyote Valley Dam, which creates Lake Mendocino on the East Fork Russian River, and Warm Springs Dam, which creates Lake Sonoma on Dry Creek (a tributary to the Russian River), are the key elements of the Russian River Project. Water from the Russian River is diverted by the Agency near Forestville and conveyed via its transmission system (including diversion facilities, treatment facilities, pipelines, water storage tanks, booster pump stations, and groundwater wells) to its wholesale customers, including the City. Further detail on the City's water supply facilities and distribution system is included in Section 2.

4.1.2 Physical Constraints

The capacity of the Agency's transmission system is a physical constraint on the delivery of water to the City, particularly during high demand periods in the summer months. This physical constraint is addressed by the Memorandum of Understanding described in Section 4.1.3. Future water supply

projections are dependent upon planned infrastructure improvements being approved and constructed, as discussed in the Agency's urban water management plan.

4.1.3 Legal Constraints

The Agency's Russian River water supply is controlled and influenced by a variety of agreements and decisions. The Agency's urban water management plan should be consulted for details regarding these arguments and decisions. This section of the plan describes the issues that influence the City's water supply.

Water Rights. Four State Water Resources Control Board (SWRCB) permits¹ currently authorize the Agency to store up to 122,500 ac-ft/yr of water in Lake Mendocino and up to 245,000 ac-ft/yr of water in Lake Sonoma, and to divert and redivert 180 cubic feet per second (cfs) of water from the Russian River at the Agency's Wohler and Mirabel facilities, up to 75,000 ac-ft/yr. The Agency has applied to the SWRCB to increase the Agency's Russian River diversion limit from 75,000 to 101,000 ac-ft/yr. The City's analysis of water supply is based on both the Agency's proposed diversion of 101,000 ac-ft/yr and the 75,000 ac-ft/yr of current permitted diversions.

In the early 1990s, the Agency initiated a water project to increase the amount of water released from Lake Sonoma and diverted from the Russian River and to expand the transmission system. A challenge to the Environmental Impact Report (EIR) for the water project was partially successful, and the Agency is in the process of preparing an EIR for a new water project. The new water project must undergo environmental review in accordance with the California Environmental Quality Act (CEQA) and obtain project approval before it can proceed. The Draft EIR is anticipated to be released for public review in 2008. Final EIR certification and project approval could be considered by the Board of Directors by late 2008.

Restructured Agreement for Water Supply. The *Restructured Agreement for Water Supply* (Restructured Agreement), which was executed in 2006, generally provides for the finance, construction, and operation of existing and new diversion facilities, transmission lines, storage tanks, booster pumps, conventional wells, and appurtenant facilities. The Restructured Agreement provides the contractual relationship between the Agency and its eight contractors, including the City, and includes specific

¹ SWRCB Permits Numbers 12947A, 12949, 12950, and 16596.

maximum amounts of water that the Agency is obligated to supply to its water contractors. Maximum water allocations for each of the Agency's water contractors set forth within the Restructured Agreement were premised on the Agency's diversion/diversion water rights being increased to 101,000 ac-ft/yr and on the construction of the new facilities authorized by the Restructured Agreement. The water allocation for the City under the Restructured Agreement is 3,000 ac-ft/yr with a maximum month of 6.3 mgd. Section 3.5 of the Restructured Agreement provides a method for allocating water among these parties during periods of shortage. The City has adopted a water shortage methodology, consistent with Section 3.5, which is presented in Appendix D.

Memorandum of Understanding Regarding Water Transmission System Capacity Allocation during Temporary Impairment. The maximum delivery allocations in the Restructured Agreement assume the construction of certain additional facilities and approval by the SWRCB of increased Agency diversion from the Russian River up to 101,000 ac-ft/yr. Existing transmission system constraints have necessitated the development of an additional agreement to govern maximum water allocations during the summer months. The *Memorandum of Understanding Regarding Water Transmission System Capacity Allocation during Temporary Impairment* (Temporary Impairment MOU) is in effect between the Agency and its primary customers, including the City, until September 30, 2008. The Temporary Impairment MOU allocates the existing 92 mgd of transmission system capacity among the parties during the "summer months" of June through September. The City's allocation is a peak month of 3.8 mgd during the June to September period. The Temporary Impairment MOU also contains mechanisms for enhancing operational coordination among the Agency's customers to balance demands on the Agency's transmission system during times of high water use.

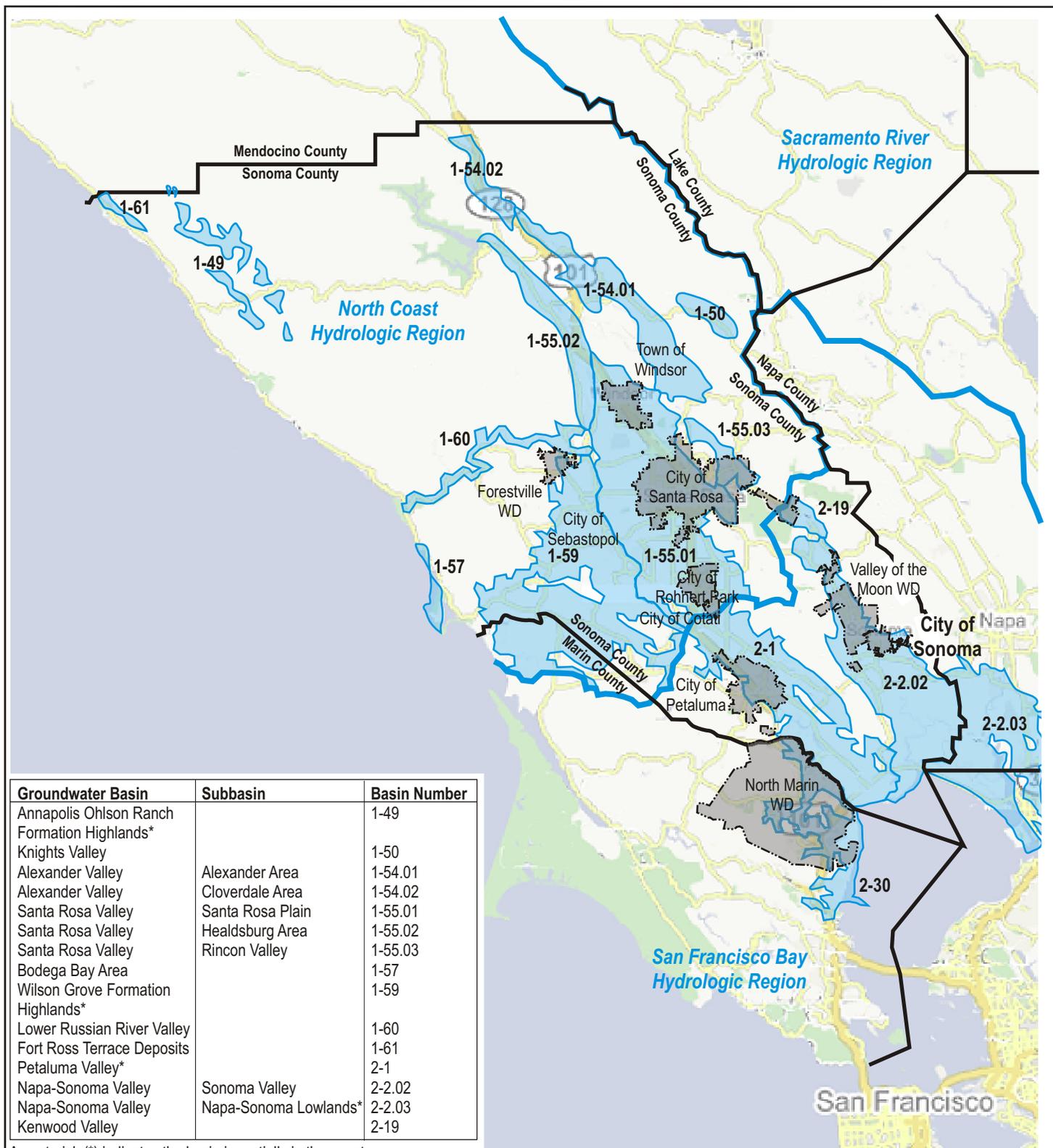
4.2 Groundwater

This section provides a description of the City's groundwater supply as well as the physical and legal constraints of this supply. The groundwater supply facilities are described in Section 2. The groundwater basin that supplements the Agency's supply is described in the Agency's Plan (SCWA, 2006) and is not repeated in this Plan.

4.2.1 Description

Groundwater basin studies are being conducted within Sonoma County by the Agency and the USGS and other stakeholders in the Alexander Valley Basin, Sonoma Valley Basin, and the Santa Rosa Plain Subbasin. In 2001, the Agency's Board of Directors authorized the Agency to enter into an agreement with the USGS to develop a cooperative study to characterize the Sonoma and Alexander Valley basins. Within the Sonoma Valley, both the Valley of the Moon Water District and the City of Sonoma served as cooperating agencies for the study, providing data and input throughout the study period. The first basin studies, including the Sonoma Valley and Alexander Valley, have recently been completed (USGS, 2006a and b). The Sonoma Valley study, summarized below, is designed to improve understanding of the groundwater resources and facilitate improved groundwater management strategies.

The Sonoma Valley Groundwater Subbasin (2-2.02) is a subbasin of the Napa-Sonoma Valley Groundwater Basin. The basin drains south-southeast and is thus part of the San Francisco Bay Hydrologic Region (DWR, 2003) (Figure 4-1). The USGS recently completed its evaluation of the geology, water levels, water quality, surface water and groundwater interactions, and recharge areas of the Sonoma Valley Subbasin. In addition, a groundwater model was developed for the Sonoma Valley to assist in identifying problem areas within the basin (USGS, 2006a). In general, the Sonoma Valley Groundwater Subbasin appears to be limited in the amount of water it can store, given the predominately fine-grained materials that comprise the basin. In Sonoma Valley, the USGS estimated that pumping in the basin has generally increased from approximately 6,200 ac-ft/yr, since the basin was last studied in 1974, to 8,400 ac-ft/yr in 2000 (approximate 25 percent increase in pumping). The USGS study did not indicate whether overdraft was occurring (the condition where the long-term discharge including pumping exceeds recharge). The USGS noted that the relatively small decrease in storage between 1974 and 2000 explains the localized nature of water level declines. The USGS noted a significant increase in pumping since 2000 that should be further evaluated. Although the USGS concluded that groundwater quality is generally acceptable within the basin, there were some localized problems identified in the basin. In particular the USGS identified the migration of high-saline water along the southern end of the basin and localized areas of thermal waters (USGS, 2006a).



Groundwater Basin	Subbasin	Basin Number
Annapolis Ohlson Ranch Formation Highlands*		1-49
Knights Valley		1-50
Alexander Valley	Alexander Area	1-54.01
Alexander Valley	Cloverdale Area	1-54.02
Santa Rosa Valley	Santa Rosa Plain	1-55.01
Santa Rosa Valley	Healdsburg Area	1-55.02
Santa Rosa Valley	Rincon Valley	1-55.03
Bodega Bay Area		1-57
Wilson Grove Formation Highlands*		1-59
Lower Russian River Valley		1-60
Fort Ross Terrace Deposits		1-61
Petaluma Valley*		2-1
Napa-Sonoma Valley	Sonoma Valley	2-2.02
Napa-Sonoma Valley	Napa-Sonoma Lowlands*	2-2.03
Kenwood Valley		2-19

An asterisk (*) indicates the basin is partially in the county.



NORTH



Scale in Miles

- County Line and Name
- ▤ System Boundary and Name
- Hydrologic Region Boundary
- Groundwater Basin and Number

Source: Google Map data 2005 NAVTEC™
DWR Bulletin 118, 2003 Update

BROWN AND CALDWELL	PROJECT 127280-005	SITE UWMP 2005, City of Sonoma	Figure 4-1
	DATE 11-30-06	TITLE Groundwater Basins	

Based on the Agency/USGS groundwater study results, the Agency funded a stakeholder assessment conducted by the Center of Collaborative Policy, a non-profit organization associated with the McGeorge Law School and California State University Sacramento to evaluate interest in developing a groundwater management plan. The Agency also developed a work plan for a groundwater management plan that would comply with AB3030 and SB1938 guidelines. In June 2006, the Agency's Board of Directors authorized the Agency to initiate a groundwater management planning process in the Sonoma Valley to help ensure the long-term sustainability of the basin's groundwater resources. The City is a participant in the groundwater management plan process. In addition, the Board of Directors approved concurrent actions authorizing execution of a "Cooperative Agreement to Provide Funding and Support Information for Sonoma Valley Groundwater Management Planning Process" between the Agency, County of Sonoma, Sonoma Valley County Sanitation District, the Valley of the Moon Water District, and the City. Also, the Board authorized a Memorandum of Understanding to "Work Cooperatively to Improve Surface and Groundwater Management and to Promote Conjunctive Use Projects and Programs in Sonoma County" between the Agency, County of Sonoma, and DWR. A Basin Advisory Panel comprised of local stakeholders has been formed to work with the Center of Collaborative Policy to develop a groundwater management plan for consideration by the Agency's Board of Directors. A Basin Advisory Panel, comprised of local stakeholders (including the City) representing a wide range of constituencies, was formed in August 2006 to work with the Center of Collaborative Policy to develop a groundwater management plan. The Panel completed the plan in the fall of 2007 and the Agency's Board of Directors approved the plan in November 2007. The City Council and Board of Directors of the Valley of the Moon Water District also approved the plan.

The water-bearing deposits underlying the City include younger and older Quaternary alluvium deposits, the Huichica and Glen Ellen Formations, and the Sonoma Volcanics. The thickness and extent (if any) of the Miocene to Pliocene Petaluma Formation beneath the District is unknown, and the Mesozoic Franciscan Complex bedrock is not exposed or encountered in wells (USGS, 2006a).

The younger Quaternary alluvium consists of stream channel, flood plain, alluvial fan, and salt marsh deposits of late Pleistocene to recent age. The younger alluvium has a large percentage of loose sand and gravel yielding water easily to wells; however, it is only a thin veneer and most wells penetrate the full thickness (Kunkel and Upson, 1960; USGS, 2006a).

The older Quaternary alluvium is composed of lenticular deposits of poorly sorted clay, silt, sand, and gravel, and is late Pleistocene in age. The older alluvium underlies the younger alluvium and is separated by an erosional unconformity (Kunkel and Upson, 1960). Wells that encounter sands and gravels in the older alluvium can yield as much as 500 to 1,000 gpm (Luhdorff & Scalmanini, 1999). According to the USGS, the Quaternary alluvium may be as much as 300 feet in the center of the valley (USGS, 2006a).

Underlying the Quaternary alluvium is the Glen Ellen Formation of late Pliocene to early Pleistocene age. The Glen Ellen Formation was deposited by alluvial fans and is composed of poorly sorted lenticular beds of clay, silt, sand, and gravel. Much of the material was derived from the Sonoma Volcanics. The Glen Ellen Formation interfingers with the Sonoma Volcanics and the underlying Huichica Formation, and is up to 900 feet thick. Permeability is generally relatively low, but water obtained from the lenses of gravel can locally be sufficient for municipal use (USGS, 2006a).

The Huichica Formation is interbedded with and partly older than the Glen Ellen Formation. The Huichica is early Pleistocene to Pliocene in age and was deposited as alluvial fans by streams that drained uplifted areas of the Sonoma Volcanics. The formation also contains a thick body of clay and silt representing possible lake or swamp deposition. There are lenses of boulders or gravel with fine material within the fine grained deposits. The Huichica's thickness exceeds 1,000 feet in parts of the valley (USGS, 2006a). Large quantities of water are not able to be pumped from the formation and are mostly developed for domestic use (Kunkel and Upson, 1960 and Luhdorff & Scalmanini, 1999).

The Miocene to Pliocene Sonoma Volcanics consist of a variable sequence of volcanoclastic tuffs, lahars, debris and mudflows, and sedimentary units interbedded with volcanic flows of andesite, basalt, and rhyolite (USGS, 2006a). The significant aquifers in the volcanics are the tuffs which include pumice beds (Kunkel and Upson, 1960). The Sonoma Volcanics are highly variable in terms of yield.

Recharge occurring in the Sonoma Volcanics is mainly from surface outcroppings in the mountains that border the Sonoma Valley (USGS, 2006a). Alluvium is recharged from percolation through sediments in local creeks and surface runoff (Luhdorff & Scalmanini, 1999).

DWR did not identify “critical conditions of overdraft” in the Sonoma Valley groundwater basin in Bulletin 118 – 80 (DWR, 1980), and has not evaluated overdraft conditions since that date (DWR, 2003). California’s Water Code Section 10631(b) only requires that urban water management plans state DWR’s characterization of the basin with respect to overdraft. While this Plan also summarizes other available information (including previous groundwater studies and investigations) and evaluates limited data, it is beyond this plan’s scope to make an independent assessment of basin conditions with respect to overdraft. Based upon the City’s own experience with the groundwater basin and on data currently available, the City considers its groundwater supply to be reliable.

The City pumps groundwater from several wells as described in Section 2.3. The amount of groundwater pumped in the last five years and future pumping projections are shown in Tables 4-1 and 4-2. As shown in Table 4-1, the City pumped up to 84 ac-ft/yr since the year 2000. Prior to 1964, the City relied on groundwater for all of its water supply. From 1960 to 1963, the amount of groundwater pumped by the City varied from 644 ac-ft/yr to 656 ac-ft/yr (City of Sonoma, 1970).

Table 4-1. (DWR Table 6) Amount of Groundwater Pumped by the City – ac-ft/yr

Basin Name	2000	2001	2002	2003	2004	2005
Sonoma Valley	0	76	84	75	69	75
Percent of Total Water Supply	0	3	3	3	3	3

Note:
Source: Brelje and Race, 2002, and Public Water System Statistics, City of Sonoma, 2004.

Table 4-2. (DWR Table 7) Amount of Groundwater Projected to be Pumped by the City – ac-ft/yr

Basin Name	2010	2015	2020	2025	2030
Sonoma Valley	324	404	285	187	21
Percent of Total Water Supply	12	14	10	7	1

4.2.2 Physical Constraints

Two areas in the basin (Fowler Creek and Buena Vista), west and east/southwest of the City, respectfully, appear to have groundwater depressions, and groundwater level declines will continue if pumping is not limited or avoided. Pumping should also be limited in the Bay Mud, and in parts of the basin that are hydraulically connected to the San Pablo Bay that are subject to salt water intrusion (USGS, 2006a; Luhdorff & Scalmanini, 1999).

4.2.3 Legal Constraints

There are no legal constraints to the City’s use of its groundwater supply. The City has no pumping right restrictions as shown in Table 4-3.

Table 4-3. (DWR Table 5) Groundwater Pumping Rights – ac-ft/yr

Basin Name	Pumping Right – ac-ft/yr
Sonoma Valley	Not limited
Total	Not limited

Note:
Source: California Department of Water Resources, 2003.

4.3 **Desalination**

There are currently no plans for desalination, and no desalination for future water supply is anticipated. However, the City is within approximately 15 miles of the San Pablo Bay; therefore, desalination of bay water (as is currently being pilot tested by Marin Municipal Water District) is a possibility. Brackish or impaired groundwater is also present between Petaluma and San Pablo Bay; therefore, desalination of groundwater is also a possibility. Nevertheless, no desalinated water supplies are projected for this Plan.

4.4 **Transfer and Exchange Opportunities**

Currently, the City does not transfer and/or exchange water with other entities. However, water transfers between the Agency’s water contractors are authorized under the Restructured Agreement. Such transfers and exchanges between Agency water contractors have been necessary in the past and may be necessary in the future to improve water reliability. No transfers or exchanges are projected for this Plan. Therefore, DWR Table 11 is not provided in this Plan.

4.5 **Projected Water Supplies**

This section provides projections of the future water supply quantities available to the City. The City has no future water supply projects planned, as summarized in Table 4-4. Future water supplies from the Agency, presented in Table 4-5, are dependent upon planned infrastructure improvements being approved and constructed, which are described in the Agency’s urban water management plan.

Table 4-4. (DWR Table 17) Future Water Supply Projects

Project Name	Projected Start Date	Projected Completion Date	Normal year ac-ft to agency	Single-dry year yield ac-ft	Multiple-Dry Year		
					Year 1 ac-ft	Year 2 ac-ft	Year 3 ac-ft
No planned project	NA	NA	0	0	0	0	0

Table 4-5 summarizes the current and projected water supplies available to the City.

Table 4-5. (DWR Table 4) Current and Planned Water Supplies – ac-ft/yr

Water Supply Sources	2010	2015	2020	2025	2030
Sonoma County Water Agency	2,459	2,393	2,491	2,586	3,000
Supplier produced groundwater ^a	324	404	285	187	21
Supplier surface diversions	0	0	0	0	0
Transfers in or out	0	0	0	0	0
Exchanges in or out	0	0	0	0	0
Recycled water (projected use) ^b	0	20	30	40	50
Desalination	0	0	0	0	0
Other	0	0	0	0	0
Total	2,783	2,817	2,806	2,813	3,071

Notes:

^a It is projected that the City could pump up to 600 ac-ft/yr during a single-dry year. See Tables 4-6 and 7-4.

^b Recycled water reported is for urban reuse only.

Another projection of water supplies is presented in Table 4-6 based on the assumptions that the Agency’s water project would not occur and the City’s groundwater pumping would not increase from current levels. The Agency’s water supply to the City is assumed to remain fixed at the projected 2015 level. The 2002 groundwater pumping amount is assumed, as directed by the City. No recycled water supply is assumed, as directed by the City.

Table 4-6. Current and Planned Water Supplies with Revised Assumptions – ac-ft/yr

Water Supply Sources	2010	2015	2020	2025	2030
Water purchased from:					
Sonoma County Water Agency ^a	2,459	2,393	2,393	2,393	2,393
Supplier produced groundwater ^b	84	84	84	84	84
Supplier surface diversions	0	0	0	0	0
Transfers in or out	0	0	0	0	0
Exchanges in or out	0	0	0	0	0
Recycled water (projected use) ^c	0	0	0	0	0
Desalinations	0	0	0	0	0
Other	0	0	0	0	0
Total	2,543	2,477	2,477	2,477	2,477

^a Assume fixed at 2015 level for 2020 to 2030.

^b Assume fixed at 2002 level as directed by the City.

^c Assume no recycled water as directed by the City.

The Agency has a number of water management strategies it is pursuing that would possibly ensure that the projected Agency supplies to the City presented in Table 4-5 would occur. These water management strategies include:

- Storm water recharge of aquifer
 - Conjunctive use to restore groundwater storage
- Groundwater banking of imported water during wet season
 - Conjunctive use to reduce summer peak demand and provide drought reliability
- Increase recycled water targeting areas of groundwater decline
- Increased water conservation

4.6 Water Supply Reliability

This section presents the projected supplies available during single-and multiple-dry water years. The City’s surface water supply from the Agency is subject to reductions during dry years. The reliability of the City’s water sources is summarized in Table 4-7. The alternate projection in water supplies described in Section 4.5 would provide the same total supply for single-dry years and multiple dry years as presented in Table 4-7, except that groundwater pumping levels would be 71 ac-ft/yr and there would be no recycled water in 2030.

Table 4-7. (DWR Table 8) Year 2030 Supply Reliability - Percent of Normal ac-ft/yr

Sources	Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years			
			Year 1	Year 2	Year 3	Year 4
Sonoma County Water Agency	3,000	2,443	3,000	3,000	3,000	3,000
Groundwater wells	21	600	21	21	21	21
Transfers in or out	0	0	0	0	0	0
Recycled water	50	50	50	50	50	50
Total	3,071	3,093	3,071	3,071	3,071	3,071
Percent of Normal	100	101	100	100	100	100

Table 4-8 lists the years upon which the data in Table 4-6 are based.

Table 4-8. (DWR Table 9) Basis of Water Year Data

Water Year Type	Base Year(s)
Normal Water Year	1962
Single-Dry Water Year	1977
Multiple-Dry Water Years	1990-1993

Factors resulting in inconsistency of supply are summarized in Table 4-9. Alternatives to replace inconsistent sources may potentially include the development of groundwater wells, aquifer storage and recovery, use of recycled water, and increased conservation. Water quality issues are not anticipated to have a significant impact on water supply reliability. If applicable in the future, chemical contamination and the lowering of maximum contaminant levels (MCLs) for naturally occurring constituents can be mitigated by constructing new treatment facilities.

Table 4-9. (DWR Table 10) Description of the Factors Resulting in Inconsistency of Supply

Name of supply	Legal	Environmental	Water Quality	Climatic
Sonoma County Water Agency ^a	Current supply is available at a consistent level of use with regard to these factors. Future supply increase may not be consistent due to delays in construction, in approval of water rights application, or in environmental documentation.		None	Drought could result in a reduction of surface water supply.
Groundwater	None	None	None	None
Recycled water	None	None	None	None

^a See Agency's urban water management plan for details.

The Agency projections that quantify water availability to the City through 2030 are presented in Table 4-10. The City acknowledges the possibility that the Agency will not be able to increase its water rights in order to supply all of the 3,000 ac-ft/yr by 2030.

Table 4-10. (DWR Table 20) Wholesaler Identified and Quantified Existing and Planned Sources of Water – ac-ft/yr

Wholesaler sources	2010	2015	2020	2025	2030
Sonoma County Water Agency	2,459	2,393	2,491	2,586	3,000

A water supply reliability comparison for the Agency supply is made in Table 4-11, considering three water supply scenarios: normal water year, single-dry water year, and multiple-dry water years.

Table 4-11. (DWR Table 21) Wholesaler Supply Reliability – ac-ft/yr

Wholesaler	Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years			
			Year 1	Year 2	Year 3	Year 4
Sonoma County Water Agency	3,000	2,443	3,000	3,000	3,000	3,000
Percent of Normal	100	81	100	100	100	100

Note:
This table represents 2030 projections.

Factors resulting in inconsistency of the Agency’s supply are included in Table 4-12.

Table 4-12. (DWR Table 22) Factors Resulting in Inconsistency of Wholesaler’s Supply

Name of supply	Legal	Environmental	Water Quality	Climatic
Sonoma County Water Agency	Current supply is available at a consistent level of use with regard to these factors. Future supply increase may not be consistent due to delays in construction, in approval of water rights application, or in environmental documentation.		None	Drought could result in a reduction of surface water supply.

4.7 Water Quality Impacts on Future Water Supply

The quality of the City’s water deliveries is regulated by the California Department of Public Health (CDPH), which requires regular collection and testing of water samples to ensure that the quality meets regulatory standards and does not exceed MCLs. Both the City and the Agency perform water quality testing, which has consistently yielded results within the acceptable regulatory limits.

The quality of existing surface water and groundwater supply sources over the next 25 years is expected to be adequate water quality based upon the City’s experience to date. Surface and groundwater water will continue to be treated to drinking water standards, and no water quality deficiencies are foreseen to occur in the next 25 years. Table 4-13 summarizes the current and projected water supply changes due to water quality.

Table 4-13. (DWR Table 39) Current and Projected Water Supply Changes due to Water Quality – Percentage

Water Source	2005	2010	2015	2020	2025	2030
Sonoma County Water Agency	0	0	0	0	0	0
Groundwater	0	0	0	0	0	0
Recycled water	0	0	0	0	0	0
Total	0	0	0	0	0	0

SECTION 5
RECYCLED WATER

Water recycling is the treatment and management of municipal, industrial, or agricultural wastewater to produce water that can be reused for beneficial uses and offset demands for potable water supplies. Water recycling provides an additional source of water that can be used for purposes such as irrigation, groundwater recharge, industrial uses, and environmental restoration. “Recycled water” is defined in the California Water Code as “water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.” CDPH sets the water quality criteria for specific uses of recycled water in Title 22 of the California Code of Regulations.

This section provides information on the amount of generated wastewater, existing disposal of wastewater, the quantity of recycled water potentially available, and existing and future potential uses for recycled water.

5.1 Coordination

The City works with a number of local agencies responsible for water supply and wastewater collection and treatment, as summarized in Table 5-1. The Agency completed the Sonoma Valley Recycled Water Feasibility Study on behalf of the City, Valley of the Moon Water District, and Sonoma Valley County Sanitation District (SVCSD) (Sonoma County Water Agency, 2006a). Additionally, the SVCSD completed an Environmental Impact Report for the Sonoma Valley Recycled Water Project in 2006, and approved the project in December 2006.

Table 5-1. (DWR Table 32) Participating Agencies

Agency Type	Agency Name	Plan Development Role
Wholesale Water Supplier	Sonoma County Water Agency	Provided recycled water supply and demand information
Local Water Supplier	Valley of the Moon Water District	Provided recycled water supply and demand information
Local Water Supplier	City of Sonoma	Provided recycled water supply and demand information
Recycled Water Provider	Sonoma Valley County Sanitation District	Provided recycled water supply and demand information
Environmental Group	Sonoma Ecology Center	Provided input and feedback to recycled water plans

5.2 Wastewater Quantity and Disposal

This section provides information on the wastewater collected and treated within the City’s service area. Wastewater collection and treatment within the City’s service area is provided by SVCSD. The service area for SVCSD includes both Valley of the Moon Water District and the City.

5.2.1 Wastewater Collection and Treatment

SVCSD collects and treats wastewater within its service area, which includes the unincorporated communities of Glen Ellen in the north to Schellville in the south, as shown on Figure 5-1. SVCSD operates a secondary treatment plant in the southern portion of the Sonoma Valley. The SVCSD serves approximately 16,452 equivalent single-family dwelling units with an average dry weather flow of 2.5 mgd (Sonoma County Water Agency, 2006a). SVCSD plans to upgrade the treatment facility to a tertiary treatment facility by installing a filtration system (Sonoma County Water Agency, 2006). The current and projected volume of collected wastewater and the amount that meets recycled water standards from the SVCSD service area is shown in Table 5-2. Wastewater from the City’s service area contributes a portion of these amounts.

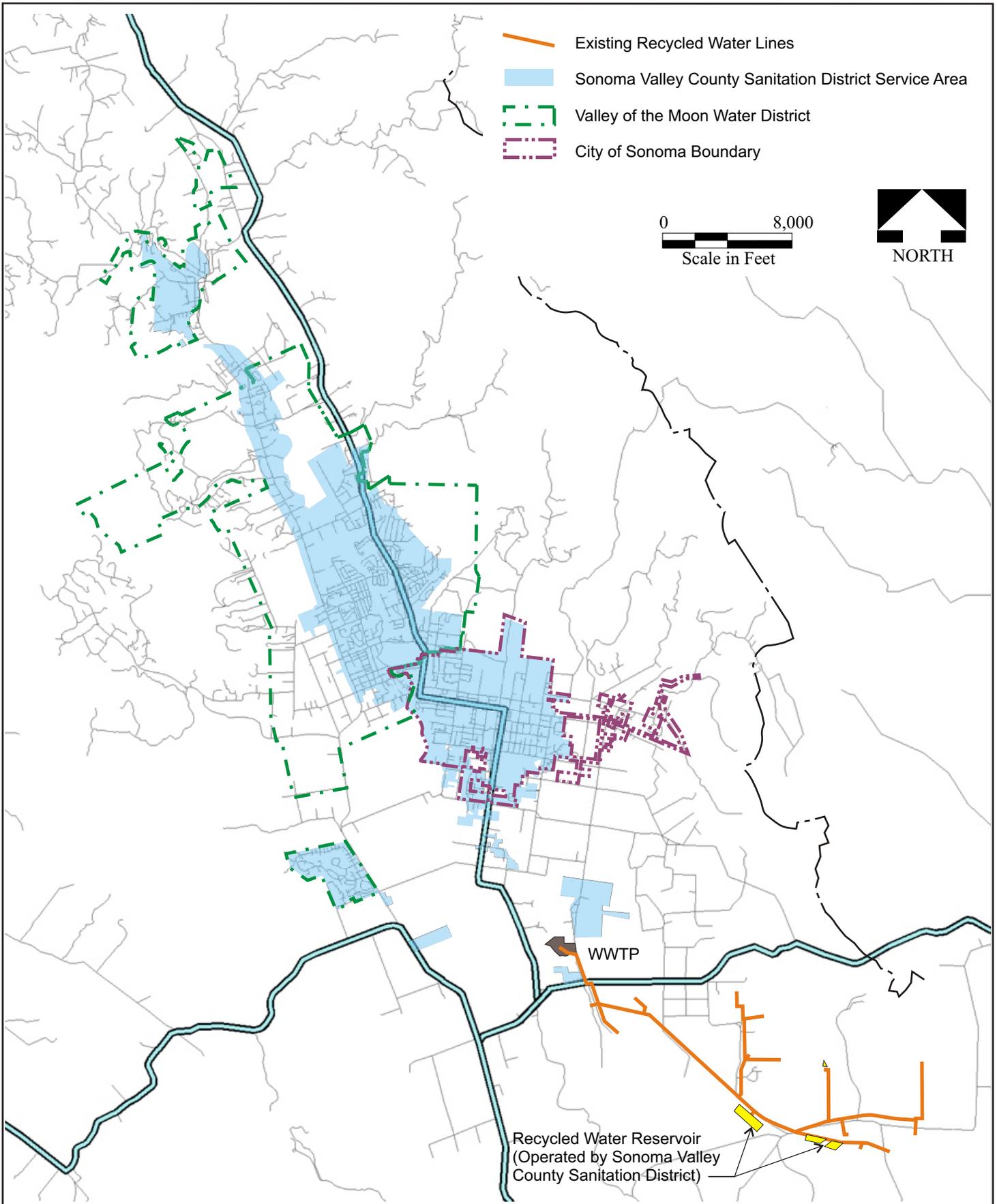
Table 5-2. (DWR Table 33) Wastewater Collection and Treatment by SVCSD – ac-ft/yr^a

Type of Wastewater	2000	2005	2010	2015	2020	2025	2030
Wastewater collected and treated in service area	4,500	4,500	4,750	5,000	5,250	5,500	5,550
Quantity that meets recycled water standard	4,500	4,500	4,750	5,000	5,250	5,500	5,550

Notes:

Source: Sonoma Valley Recycled Water Feasibility Study, 2006

^a Includes wastewater from both Valley of the Moon Water District and City of Sonoma.



Source: SCWA, Draft Sonoma Valley Recycled Water Feasibility Study, January 2005

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BROWN AND CALDWELL	PROJECT	127280-005	SITE	UWMP 2005, City of Sonoma	Figure 5-1
	DATE	8-3-07	TITLE	Sonoma Valley County Sanitation District Facilities	

5.2.2 Wastewater Disposal

The current National Pollutant Discharge Elimination System (NPDES) permit regulated by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) permits SVCSD to discharge its secondary treated wastewater effluent into Schell Slough, a tributary to San Pablo Bay, from November through April. Schell Slough is a tidal estuary which receives freshwater flow from Schell Creek during wet weather months, but is only flushed by tidal action during dry weather months. During the dry weather season of May through October, discharge into Schell Slough is not permitted, and treated wastewater is used for wetlands enhancement and irrigation of pastures and vineyards. The current and projected annual volume of disposed wastewater for the entire SVCSD service area is shown in Table 5-3.

Table 5-3. (DWR Table 34) Disposal of Wastewater (Non-Recycled) by SVCSD ac-ft/yr

Method of disposal	Treatment Level	2005	2010	2015	2020	2025	2030
Schell Slough of San Pablo Bay	Secondary	3,330	0	0	0	0	0
Schell Slough of San Pablo Bay	Tertiary	0	3,250	1,250	950	600	150
Total		3,330	3,250	1,250	950	600	150

Note:
Wastewater disposal volumes are weather dependent, dry years will produce less volume while wet years will produce higher volumes. An average year is shown in this table.

5.3 **Recycled Water Use**

This section describes existing and potential recycled water use in the City.

5.3.1 Existing Recycled Water Use

There is no current recycled water use within the City. SVCSD currently supplies approximately 1,000 to 1,200 ac-ft/yr to vineyards, dairies, pastures, and wetlands in southern Sonoma Valley. Currently the SVCSD has approximately 635 ac-ft of recycled water storage (Sonoma County Water Agency, 2006a).

Projections for the recycled water use for 2005 were not made in the 2000 Urban Water Management Plan. Therefore, a comparison to projections for 2005 and actual use cannot be made. Table 5-4 shows actual recycled water use by SVCSD in 2005.

Table 5-4. (DWR Table 37) Recycled Water Uses by SVCSD - ac-ft/yr

Type of Use	2005 Actual Use, ac-ft/yr
Agriculture ^a	1,200 ^b
Landscape	0
Wildlife Habitat	0
Wetlands	0
Industrial	0
Groundwater Recharge	0
Other (type of use)	0
Total	1,200

Notes:

No projections were made in the 2000 Urban Water Management Plan.

^a Agricultural use offsets private groundwater pumping.

^b This use is outside the City.

Recycled water use by water use category is listed in Table 5-5.

Table 5-5. (DWR Table 35a) Recycled Water Uses by SVCSD – Actual ac-ft/yr

Type of Use	Treatment Level	Water Use, 2005 ac-ft/yr
Agriculture ^a	Secondary	1,200 ^c
Urban Landscape ^b	0	0
Wildlife Habitat	0	0
Wetlands	0	0
Industrial	0	0
Groundwater Recharge	0	0
Other (type of use)	0	0
Total	Secondary	1,200

Notes:

^a Agricultural use offsets private groundwater pumping.

^b Urban landscape use offsets potable water demand.

^c This use is outside the City.

5.3.2 Potential and Projected Recycled Water Use Plan

The Sonoma Valley Recycled Water Feasibility Study provided a study of potential recycled water use alternatives for SVCSD (Sonoma County Water Agency, 2006a). The alternatives listed in the plan specific to recycled water include urban reuse, agricultural reuse, and wetland restoration.

Recycled water use for urban, agricultural, and wetland areas were investigated.

Urban Reuse

Up to 125 ac-ft/yr of recycled water could be used within the City's service area for urban reuse and potentially offset potable water use which otherwise would be supplied by either private groundwater wells or City supplied water (Sonoma County Water Agency, 2006a).

Agricultural Reuse

An additional 1,500 ac-ft/yr of water could be used for agricultural areas currently supplied by metered water and out-lying agricultural areas surrounding SVCSD service area which are currently supplied by privately-owned groundwater wells. The agricultural lands being considered for recycled water irrigation include vineyards, dairies, and pasturelands.

Wetland Restoration

The California State Coastal Conservancy (Conservancy), the U.S. Army Corps of Engineers, San Francisco District (USACE), and the California Department of Fish and Game (CDFG) propose to restore a mosaic of tidal wetland and managed pond habitat at the 9,460-acre Napa River Unit of the Napa-Sonoma Marshes Wildlife Area using recycled water. The volume of recycled water required for this wetland restoration project is estimated to be the volume currently being discharged into Schell Slough by the SVCSD. Although this use does not offset potable water uses, it does help create wildlife habitat and recreation resources while reducing the impact of discharging nutrient rich recycled water directly to Schell Slough of San Pablo Bay.

Summary

The volume of potential recycled water use, based on the projected amount available, is shown in Table 5-6. However, a major factor that determines the use of recycled water and implementation of recycled water projects is the financial feasibility of connecting users to the system. Recycled water distribution systems require additional pipelines, storage tanks, and pumps. Proximity to the production of the recycled water and the distribution system is a major factor in considering use of recycled water. In addition, recycled water users must make their own investment in constructing and operating the on-site irrigation pipelines and sprinkler systems with the necessary warning signs, backflow prevention, and associated health and safety requirements. The projected future use of recycled water within SVCDS's and the City's service areas for the next 25 years is shown in Table 5-7. An alternative projection of recycled water supply is also presented in this Plan that assumes no future recycled water supply, as presented in Table 4-6.

Table 5-6. (DWR Table 35b) Recycled Water Uses – Potential ac-ft/yr

Type of Use	Treatment Level	2010	2015	2020	2025	2030
Agriculture ^a	Tertiary	1,500	2,500	3,000	3,500	4,000
Urban Landscape ^b	Tertiary	0	85	85	85	85
Wildlife Habitat		0	0	0	0	0
Wetlands	Tertiary	0	0	0	0	0
Industrial		0	0	0	0	0
Groundwater Recharge		0	0	0	0	0
Total		1,500	2,585	3,085	3,585	4,085

Notes:

Source: Sonoma Valley Recycled Water Feasibility Study, SCWA, 2006a.

^a Agricultural use offsets private groundwater pumping. Agricultural use includes areas in and around the Valley of the Moon and City of Sonoma service areas.

^b Urban landscape use offsets potable water demand. Urban landscape use is for areas located in the City service area only. Urban landscape use offsets potable water demand.

Table 5-7. (DWR Table 36) Projected Future Use of Recycled Water in Service Area –ac-ft/yr

Type of Use	2010	2015	2020	2025	2030
Agriculture ^a	1,500	2,500	3,000	3,500	4,000
Urban Landscape ^b	0	20	30	40	50
Wildlife Habitat	0	0	0	0	0
Wetlands	0	0	0	0	0
Industrial	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0
Other (type of use)	0	0	0	0	0
Total	1,500	2,520	3,030	3,540	4,050

Notes:

Source: Sonoma Valley Recycled Water Feasibility Study, SCWA, 2006a.

^a Agricultural use offsets private groundwater pumping. Agricultural use includes areas in and around the Valley of the Moon and City of Sonoma service areas.

^b Urban landscape use offsets potable water demand. Urban landscape use is for areas located in the City of service area only. Urban landscape use offsets potable water demand.

5.3.3 Promotion of Recycled Water Use

The Agency and its contractors encourage recycled water use by collecting, as part of Agency water rates, funds to be held in a special reserve for recycled water projects carried out by its water contractors and other Agency customers. A total of \$4,187,464 has been disbursed between the program's inception on July 1, 2000 and June 30, 2005. It is anticipated another \$8,812,536 will be disbursed in the next five years of program operation. Methods to encourage recycled water use and the projected amount of resulting recycled water use are listed in Table 5-8.

Table 5-8. (DWR Table 38) Methods to Encourage Recycled Water Use – ac-ft/yr

Actions	Ac-ft of use projected to result from this action				
	2010	2015	2020	2025	2030
Financial Incentives	0	20	30	40	50
Total	0	20	30	40	50

SECTION 6

WATER CONSERVATION

This section provides a description of the City's water conservation program and its best management practices (BMPs) or water demand management measures. The City utilizes water conservation BMPs as a method to reduce water demands, thereby reducing water supply need for the City. This section also describes the water conservation assumptions used to develop the water demand projections that are presented in Section 3.

6.1 BMP Implementation

The City is a member of the California Urban Water Conservation Council (CUWCC). The CUWCC was created to assist in increasing water conservation statewide, under a Memorandum of Understanding (MOU). As signatory to the MOU, the City has pledged their good faith effort towards implementing BMPs identified in the CUWCC MOU Regarding Urban Water Conservation. The two primary purposes of the MOU are as follows:

- a. to expedite implementation of reasonable water conservation measures in urban areas, and
- b. to establish assumptions for use in calculating estimates of reliable future water conservation savings resulting from proven and reasonable conservation measures. Estimates of reliable savings are the water conservation savings that can be achieved with a high degree of confidence in a given service area.

The Agency is the only wholesale water agency in the state to have all its water contractors signatory to the CUWCC MOU. The City signed the CUWCC MOU on January 18, 2002, and submits annual BMP reports to the CUWCC in accordance with the MOU. The MOU requires that a water utility implement only the BMPs that are economically feasible. If a BMP is not economically feasible, the utility may request an economic exemption for that BMP. The City has not requested economic exemption from any of the BMPs at this time.

Table 6-1 identifies the CUWCC's 14 BMPs along with information on the BMPs performed by the City and the BMPs that are performed with assistance from the Agency.

Table 6-1. California Urban Water Conservation Council Best Management Practices

Best Management Practices, BMP	City of Sonoma	Sonoma County Water Agency ^a
BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers	✓	✓
BMP 02: Residential Plumbing Retrofit	✓	
BMP 03: System Water Audits, Leak Detection, and Repair	✓	
BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing	✓	
BMP 05: Large Landscape Conservation Programs and Incentives	✓	✓
BMP 06: High-Efficiency Washing Machine Rebate Programs	✓	✓
BMP 07: Public Education Programs	✓	✓
BMP 08: School Education Programs	✓	✓
BMP 09: Conservation Programs for Commercial, Industrial, and Institutional Accounts	✓	✓
BMP 10: Wholesale Agency Assistance Programs	NA	✓
BMP 11: Conservation Pricing	✓	
BMP 12: Conservation Coordinator	✓	✓
BMP 13: Water Waste Prohibition	✓	
BMP 14: Residential ULFT Replacement Programs	✓	b

Notes:

NA – Not available.

^a These programs are being run in part by Sonoma County Water Agency.

^b Sonoma Valley County Sanitation District operates a program in the Valley of the Moon Water District and City of Sonoma service areas.

Urban water suppliers that are members of the CUWCC may submit their most recent BMP Annual Report for reporting years 2003-04 to meet the requirements of DWR Water Code Section 10631 (f). It is also recommended that urban water suppliers include the Coverage Reports identifying the water supplier’s progress on meeting the coverage requirement for quantifiable BMPs. The City’s BMP Annual Reports for 2003-2004 and Coverage Reports are presented in Appendix C. The Water Shortage Contingency Plan can be found in Appendix D.

6.2 Water Conservation Assumptions and Modeling

The water demand projections presented in Section 3 were developed based on certain assumptions regarding the future implementation of water conservation measures or BMPs. The City has previously committed to implementing all of the CUWCC BMPs. The CUWCC BMPs are currently in various stages of completion. Water conservation measures that are not part of the CUWCC BMPs are also assumed to be implemented for this analysis. These measures are identified as Tier 2 BMPs. New development standards that focus on low water using requirements for new single family housing are also assumed. These assumed future water conservation activities were integrated with the current water use characteristics and the population growth projections using the Decision Support System (DSS) model. The analysis projects the future water demands based on four levels

of increasing conservation effort: (1) current unit water use and the projected water savings from future plumbing retrofits as required by the plumbing code, (2) Tier 1 BMP efforts to date and remaining Tier 1 BMP efforts, (3) future Tier 2 BMP efforts, and (4) adoption of new development standards. The water demand projections presented in Section 3 assume that approximately half of the water savings from Tier 2 BMPs and 100 percent of savings from the new development standards would occur. The City will use its best effort to implement these additional water conservation measures. Existing water conservation savings due to past implementation efforts are included in the baseline projection. Because the water conservation savings are projections, actual demand reduction and the manner in which the demand reduction is achieved may vary. Table 6-2 presents the Tier 2 BMPs. The analysis is presented in Appendix B.

The BMP modeling analysis and demand projections were performed using the CUWCC approved DSS model, a Microsoft® Office spreadsheet based program run from Windows XP. The DSS model has been used elsewhere in northern California, including a recent project for the San Francisco Public Utilities Commission. The DSS model has been designed to provide a detailed planning evaluation framework for water demand management programs. The DSS model performs a cost-effectiveness evaluation of each BMP using the data on market potential for each conservation measure and the assumptions for each conservation measure variable. The DSS analysis projects on an annual basis the water savings and the dollar values of the benefits and costs that would result from implementing the BMPs. The DSS model components consist of the following steps:

1. Establish customer base-year water use conditions by customer-billing category and then by end use.
2. Establish service area conditions for evaluation of conservation measures by creating a database of service area data relevant to the conservation measures to be evaluated.
3. Conduct model calibration to current water use conditions by end use fixture models.
4. Use the service area data to perform a benefit and cost evaluation of each BMP.
5. Develop water demand projections assuming the implementation of the selected BMPs.

Table 6-2. Tier 2 BMPs

No. #	Measure Title
1	Rain-sensor (shut off device) retrofit on irrigation controllers
2	Cash for Grass (turf removal program)
3	Financial Incentives for Being Below Water Budget
4	Financial Rebates for Irrigation Meters
5	Smart Irrigation Controller Rebates
6	Financial Incentives/ Rebates for Irrigation Upgrades
7	Hotel retrofit (w/financial assistance) - CII Existing
8	Offer new accounts reduced connection fees for installing efficient process equipment for selected businesses (restaurants, laundry mat, food/groceries and hospital)
9	Synthetic Turf Rebate
10	High Efficiency Toilet (HET)
11	Dishwasher New Efficient
12	CII Rebates - replace inefficient water using equipment
13	0.5 gal/flush urinals in new buildings
ND1	Rain-sensor shut off device on irrigation controllers
ND2	Smart Irrigation Controller
ND3	High Efficiency Toilet (HET)
ND4	Dishwasher New Efficient
ND5	Clothes washing machines requirement for new residential
ND6	Hot Water on Demand
ND7	High efficiency faucets and showerheads
ND8	Landscape and irrigation requirements

ND = new development

SECTION 7
WATER SUPPLY VERSUS DEMAND COMPARISON

This section provides a comparison of the projected water supply and demand for the City from 2005 through 2030. Water supply to demand comparisons are also provided for single-dry year and multiple-dry year scenarios. The water demands are developed in Section 3, water supplies are defined in Section 4, and recycled water supplies are presented in Section 5 of this report. Decreased water use resulting from water conservation is accounted for in Section 3. The overall conclusion is that the City has adequate water supply through the 2030 planning horizon of this Plan.

7.1 Normal Water Supply vs. Demand Comparison

The analysis compares the projected normal water supply and customer demands from 2010 to 2030, in five-year increments. The projected normal climate year water supply and demands are presented in Tables 7-1 and 7-2, respectively.

Table 7-1. (DWR Table 40) Projected Normal Water Supply – ac-ft/yr

(from DWR Table 4)	2010	2015	2020	2025	2030
Supply ^a	2,783	2,817	2,806	2,813	3,071
Percent of year 2005	107%	108%	108%	108%	118%

Note:
^a From Table 4-5.

Table 7-2. (DWR Table 41) Projected Normal Water Demand – ac-ft/yr

(from DWR Table 15)	2010	2015	2020	2025	2030
Demand ^a	2,783	2,817	2,806	2,813	3,071
Percent of year 2005 ^b	107%	108%	108%	108%	118%

Notes:
^a From Table 3-5.
^b Based on 2005 demand of 2,600 ac-ft/yr.

The comparison of projected water supply and demand is presented in Table 7-3. As Table 7-3 shows, there is adequate water supply in normal years to meet demands through 2030.

Table 7-3 (DWR Table 42) Projected Supply and Demand Comparison – ac-ft/yr

	2010	2015	2020	2025	2030
Supply totals	2,783	2,817	2,806	2,813	3,071
Demand totals	2,783	2,817	2,806	2,813	3,071
Difference	0	0	0	0	0
Difference as Percent of Supply	0%	0%	0%	0%	0%
Difference as Percent of Demand	0%	0%	0%	0%	0%

As described in Section 4.5, an alternative projection of future water supplies is included in this Plan that is based on the assumptions that the Agency’s water supply to the City would be fixed at a maximum of 2015 levels, groundwater pumping would be fixed at the 2002 level, and no recycled water supplies would be available. Table 7-4 presents the comparison of projected water supply and demand with the revised assumptions. As shown in Table 7-4, there would be a supply deficit of up to 594 ac-ft/yr by 2030. The City could choose to increase groundwater pumping and increase water conservation efforts to reduce or eliminate the deficit.

Table 7-4. Projected Supply and Demand Comparison with Revised Assumptions – ac-ft/yr

	2010	2015	2020	2025	2030
Supply totals ^a	2,543	2,477	2,477	2,477	2,477
Demand totals	2,783	2,817	2,806	2,813	3,071
Difference	-240	-340	-329	-336	-594
Difference as Percent of Supply	-9%	-14%	-13%	-14%	-24%
Difference as Percent of Demand	-9%	-12%	-12%	-12%	-19%

^a From Table 4-6.

7.2 Dry Year Water Supply vs. Demand Comparison

Tables 7-5 through 7-7 provide a comparison of a single-dry year water supply with projected total water use over the next 25 years, in five-year increments. As shown in Table 7-7, the City has adequate water supplies in single dry years to meet demands through 2030. Separate tables are not included for the alternative projection of water supplies because dry year increases in groundwater pumping would result in the same total water supply for both water supply projections.

Table 7-5. (DWR Table 43) Projected Single-Dry Year Water Supply – ac-ft/yr

	2010	2015	2020	2025	2030
Supply ^a	2,783 ^b	2,817 ^b	2,806 ^c	2,813 ^d	3,093 ^e
Percent of projected normal	100%	100%	100%	100%	101%

Notes:

^a The allocation of the difference in supply versus demand will be governed by Section 3.5 of the Restructured Agreement as outlined in the Water Shortage Contingency Analysis contained in Appendix D.

^b Based on normal year supplies as shown in Table 4-5.

^c Based on 2,384 ac-ft/yr supply from the Agency, 30 ac-ft/yr of recycled water, and 392 ac-ft/yr. of groundwater.

^d Based on 2,203 ac-ft/yr supply from the Agency, 40 ac-ft/yr of recycled water, and 570 ac-ft/yr. of groundwater.

^e From Table 4-7.

Table 7-6. (DWR Table 44) Projected Single-Dry Year Water Demand – ac-ft/yr

	2010	2015	2020	2025	2030
Demand	2,783	2,817	2,806	2,813	3,071
Percent of projected normal	100%	100%	100%	100%	100%

Table 7-7. (DWR Table 45) Projected Single-Dry Year Supply and Demand Comparison – ac-ft/yr

	2010	2015	2020	2025	2030
Supply totals	2,783	2,817	2,806	2,813	3,093
Demand totals	2,783	2,817	2,806	2,813	3,071
Difference	0	0	0	0	22
Difference as Percent of Supply	0%	0%	0%	0%	1%
Difference as Percent of Demand	0%	0%	0%	0%	1%

Tables 7-8 through 7-22 compare the total water supply available in multiple-dry water years with projected total water use over the next 25 years, in one-year increments. As these tables show, there is adequate water supply during multiple dry years to meet demands through 2030.

Table 7-8. (DWR Table 46) Projected Supply during Multiple-Dry Year Period Ending in 2010 – ac-ft/yr

	2006	2007	2008	2009	2010
Supply	2,783	2,783	2,783	2,783	2,783
Percent of projected normal	100%	100%	100%	100%	100%

**Table 7-9. (DWR Table 47) Projected Demand Multiple-Dry Year Period
Ending in 2010 - ac-ft/yr**

	2006	2007	2008	2009	2010
Demand	2,640	2,675	2,710	2,746	2,783
Percent of projected normal	100%	100%	100%	100%	100%

**Table 7-10. (DWR Table 48) Projected Supply and Demand Comparison during
Multiple-Dry Year Period Ending in 2010 – ac-ft/yr**

	2006	2007	2008	2009	2010
Supply totals	2,783	2,783	2,783	2,783	2,783
Demand totals	2,640	2,675	2,710	2,746	2,783
Difference	143	108	73	37	0
Difference as Percent of Supply	5%	4%	3%	1%	0%
Difference as Percent of Demand	5%	4%	3%	1%	0%

**Table 7-11. (DWR Table 49) Projected Supply during Multiple-Dry Year Ending in 2015 –
ac-ft/yr**

	2011	2012	2013	2014	2015
Supply	2,817	2,817	2,817	2,817	2,817
Percent of projected normal	100%	100%	100%	100%	100%

**Table 7-12. (DWR Table 50) Projected Demand Multiple-Dry Year Period Ending in 2015 -
ac-ft/yr**

	2011	2012	2013	2014	2015
Demand	2,790	2,797	2,803	2,810	2,817
Percent of projected normal	100%	100%	100%	100%	100%

**Table 7-13. (DWR Table 51) Projected Supply and Demand Comparison during
Multiple-Dry Year Period Ending in 2015- ac-ft/yr**

	2011	2012	2013	2014	2015
Supply totals	2,817	2,817	2,817	2,817	2,817
Demand totals	2,790	2,797	2,803	2,810	2,817
Difference	27	20	14	7	0
Difference as Percent of Supply	1%	1%	0%	0%	0%
Difference as Percent of Demand	1%	1%	0%	0%	0%

Table 7-14. (DWR Table 52) Projected Supply during Multiple-Dry Year Period Ending in 2020 – ac-ft/yr

	2016	2017	2018	2019	2020
Supply	2,806	2,806	2,806	2,806	2,806
Percent of projected normal	100%	100%	100%	100%	100%

Table 7-15. (DWR Table 53) Projected Demand Multiple-Dry Year Period Ending in 2020 – ac-ft/yr

	2016	2017	2018	2019	2020
Demand	2,815	2,813	2,810	2,808	2,806
Percent of projected normal	100%	100%	100%	100%	100%

Table 7-16. (DWR Table 54) Projected Supply and Demand Comparison during Multiple-Dry Year Period Ending in 2020 – ac-ft/yr

	2016	2017	2018	2019	2020
Supply totals	2,806	2,806	2,806	2,806	2,806
Demand totals	2,815	2,813	2,810	2,808	2,806
Difference	-9	-7	-4	-2	0
Difference as Percent of Supply	0%	0%	0%	0%	0%
Difference as Percent of Demand	0%	0%	0%	0%	0%

Table 7-17. (DWR Table 55) Projected Supply during Multiple-Dry Year Period Ending in 2025 – ac-ft/yr

	2021	2022	2023	2024	2025
Supply	2,813	2,813	2,813	2,813	2,813
Percent of projected normal	100%	100%	100%	100%	100%

Table 7-18. (DWR Table 56) Projected Multiple-Dry Year Period Ending in 2025 - ac-ft/yr

	2021	2022	2023	2024	2025
Demand	2,807	2,809	2,810	2,812	2,813
Percent of projected normal	100%	100%	100%	100%	100%

Table 7-19. (DWR Table 57) Projected Supply and Demand Comparison during Multiple-Dry Year Period Ending in 2025 – ac-ft/yr

	2021	2022	2023	2024	2025
Supply totals	2,813	2,813	2,813	2,813	2,813
Demand totals	2,807	2,809	2,810	2,812	2,813
Difference	6	4	3	1	0
Difference as Percent of Supply	0%	0%	0%	0%	0%
Difference as Percent of Demand	0%	0%	0%	0%	0%

Table 7-20. Projected Supply during Multiple-Dry Year Period Ending in 2030 – ac-ft/yr

Water Supply Sources	2026	2027	2028	2029	2030
Supply	3,071	3,071	3,071	3,071	3,071
Percent of projected normal	100%	100%	100%	100%	100%

Table 7-21. Projected Multiple-Dry Year Period Ending in 2030 – ac-ft/yr

	2026	2027	2028	2029	2030
Demand	2,863	2,913	2,965	3,017	3,071
Percent of projected normal	100%	100%	100%	100%	100%

Table 7-22. Projected Supply and Demand Comparison during Multiple-Dry Year Period Ending in 2030 – ac-ft/yr

	2026	2027	2028	2029	2030
Supply totals	3,071	3,071	3,071	3,071	3,071
Demand totals	2,863	2,913	2,965	3,017	3,071
Difference	208	157	106	53	0
Difference as Percent of Supply	7%	5%	3%	2%	0%
Difference as Percent of Demand	7%	5%	4%	2%	0%

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United States Geological Survey. 2006b. Geohydrology and Water Chemistry of the Alexander Valley, Sonoma County, California. By Loren F. Metzger, Christopher D. Farrar, Kathryn M. Koczot, and Eric G. Reichard (Scientific Investigations Report -2006-5115). In Cooperation with the Sonoma County Water Agency. July.

APPENDIX A

Urban Water Management Plan Public Hearing and Resolution

OWMP

The Sonoma Index-Tribune

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APR 07 2008

SONOMA CITY, FINANCE
DEPARTMENT *MB*

Sonoma, City Of
#1 The Plaza
Sonoma, CA 95476

Customer Code	Job/Invoice #
220	16706
Invoice Date	Purchase Order #
4/4/08	3-59

Amount Enclosed
\$ <u>117-</u>

Qty	Item	Rate	Amount
6.50	Notice of Public Hearing/ APRIL 16, 2008 Pub. / MARCH 28 , 2008	\$10	\$65.00
6.50	Notice of Public Hearing/ APRIL 16, 2008 Pub. / APRIL 4, 2008	\$8	\$52.00

4-19-08 MAB
Date Approved by

510-62001-350
Account

Terms: Net 20

Subtotal:	\$117.00
Sales Tax:	_____
Total:	\$117.00

CERTIFICATION OF PUBLICATION IN
"The Sonoma Index-Tribune"
(Published every Tuesday and Friday)
in the
SUPERIOR COURT
of the
STATE OF CALIFORNIA
In and For the County of Sonoma

"NOTICE OF PUBLIC HEARING"

COUNTY OF SONOMA
STATE OF CALIFORNIA, The undersigned does hereby certify and declare: That at all times hereinafter sworn, deposes and says: That at all times hereinafter mentioned she was a citizen of the United States, over the age of eighteen years and a resident of said county and was at all said times the principal clerk of the printer and publisher of The Sonoma Index-Tribune, a newspaper of general circulation, printed and published in the City of Sonoma, in said County of Sonoma, State of California; that The Sonoma Index-Tribune is and was at all times herein mentioned, a newspaper of general circulation as that term is defined by Section 6000 of the Government Code; its status as such newspaper of general circulation having been established by Court Decree No. 35815 of the Superior Court of the State of California, in and for the County of Sonoma, Department No. 1 thereof; and as provided by said Section 6000, is published for the dissemination of local and telegraphic news and intelligence of a general character, having a bona fide subscription list of paying subscribers, and is not devoted to the interest, or published for the entertainment or instruction of a particular class, profession, trade, calling, race or denomination, or for the entertainment and instruction of such classes, professions, trades, callings, races or denominations; that at all said times said newspaper has been established, printed and published in the said City of Sonoma, in said County and State at regular intervals for more than one year preceding the first publication of this notice herein mentioned; that said notice was set in type not smaller than non-pareil and was preceded with words printed in black face type no smaller than non-pareil, describing and expressing in general terms, the purport and character of the notice intended to be given; that the "Notice of Public Hearing" of which the annexed is a printed copy, was published in said newspaper at least two consecutive times, commencing on the 28th day of March and ending on the 4th day of April, 2008, to-wit March 28 and April 4, 2008.

* * *

I HEREBY CERTIFY AND DECLARE UNDER THE PENALTY OF perjury that the foregoing is true and correct.
EXECUTED this 4th day of April, 2008 at Sonoma, California.

Signed

Christine Missmer

Christine Missmer

Chief Clerk

**CITY OF SONOMA
NOTICE OF PUBLIC HEARING**

NOTICE IS HEREBY GIVEN that the City Council of the City of Sonoma will hold a public hearing on the following matter:

CITY OF SONOMA 2005 URBAN WATER MANAGEMENT PLAN

The public hearing will be held on April 16, 2008, at 6:00 p.m. or as soon as reasonably practical thereafter, at the Community Meeting Room located at 177 First Street West, Sonoma. The purpose of the hearing is to receive public comment and input on the City of Sonoma Draft 2005 Urban Water Management Plan.

The public is invited to attend and participate in the discussion or submit written comments prior to the hearing. Written correspondence should be directed to the City Manager, City of Sonoma, No. 1 The Plaza, Sonoma, CA 95476. If this matter is challenged in court, the persons so challenging may be limited to raising only those issues that were raised at the public hearing described in this notice, or in written correspondence delivered to the City Council at, or prior to, the public hearing.

The City of Sonoma Draft 2005 Urban Water Management Plan is available for review on the City of Sonoma website at <http://www.sonomacity.org> (click on current reports) or at City Hall, No. 1 The Plaza, Sonoma. For further information, contact the Acting Public Works Director at (707) 933-2230.

Dated: March 25, 2008
Gay Rainsbarger, City Clerk

3-59 Pub. Mar. 28 & Apr. 4, 2008

(2t)

CITY OF SONOMA

RESOLUTION NO. 13 - 2008

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SONOMA ADOPTING THE "2005 URBAN WATER MANAGEMENT PLAN"

WHEREAS, the State of California urban Water Management Planning Act requires all urban water purveyors serving over 3,000 connections or 3,000 acre-feet of water annually to prepare an Urban Water Management Plan every five years; and

WHEREAS, the purpose of the Urban Water Management Plan is to assure sound planning for and efficient management of water resources in the urban sector; and

WHEREAS, the City of Sonoma (City) staff, with the assistance of the Sonoma County Water Agency (SCWA) consultants Brown and Caldwell, Maddaus Water Management, and Webber Analytical, has prepared an Urban Water Management Plan (2005 UWMP) for the City to meet the requirements of the Urban Water Management Planning Act, in accordance with guidelines developed by the California Department of Water Resources; and

WHEREAS, City staff and consultants who prepared the 2005 UWMP have the training, experience, and expertise necessary to prepare a plan meeting the requirements of the Urban Water Management Planning Act; and

WHEREAS, the 2005 UWMP must be adopted after public review and public hearing by the City Council and must be filed with the Department of Water Resources; and

WHEREAS, the City has prepared a draft 2005 UWMP and commencing on March 25, 2008, made the draft UWMP 2005 available for public review; and

WHEREAS, the City, on August 22, 2007, and on April 16, 2008 held duly noticed public hearings before this Council and received comments; and

WHEREAS, City staff, SCWA consultants, and Council have reviewed and considered comments made on the draft 2005 UWMP, and Council has reviewed and considered the final 2005 UWMP, staff reports and the presentations of staff and the consultants; and

WHEREAS, the 2005 UWMP was prepared in accordance with, and meets the requirements of the Urban Water Management Planning Act, and the facts, assumptions, and analyses in the 2005 UWMP are reasonable and supported by substantial evidence.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Sonoma hereby finds, determines, and declares as follows:

1. All of the above recitals are true and correct.
2. The 2005 Urban Water Management Plan is hereby approved and adopted.
3. The City Manager is authorized and directed to provide a copy of the 2005 UWMP to the department of Water Resources and otherwise as required by Water Code section 10644(a).

The foregoing Resolution was duly adopted this 16th day of April 2008, by the following roll call vote:

AYES:	Cohen, Sebastiani, Brown, Barbose, Sanders
NOES:	None
ABSENT:	None


JOANNE B. SANDERS, MAYOR

ATTEST:


GAY RAINSBARGER, CITY CLERK

THE WITHIN INSTRUMENT IS A TRUE AND CORRECT COPY OF THE ORIGINAL ON FILE IN MY OFFICE.

ATTEST

CITY CLERK

APPENDIX B

Sonoma Historical Water Use and Revised Customer Water Demand Projections for the City of Sonoma

1. Weber Analytical, City of Sonoma Historical Water Use, September 6, 2005
2. Maddaus Water Management, Revised Customer Water Demand Projections City of Sonoma, Summary of Data Inputs, Assumptions and Results, November 6, 2005
3. Maddaus Water Management, Revised Tier One Conservation Measure Evaluation, Summary of Data Inputs, Assumptions and Results, May 30, 2006
4. Maddaus Water Management, Final Tier Two and New Development Conservation Measure, Evaluation Summary of Data Inputs, Assumptions and Results, November 2, 2006

Water Production Data

Water production data from the City of Sonoma was acquired, as reported in acre-feet per month. The data for the years 2001 through 2004 are listed below, converted to million gallons per day (MGD). The average value MGD is also shown.

Year	Production, MGD
	2.29
2002	2.40
2003	2.31
2004	2.22
Average	2.31

Water Billing Data

We developed five monthly water use tracking models from the historical water billing data using the monthly data provided by the City of Sonoma. We performed a regression analysis the time series of per account water use versus month that considered which weather variables best would account for variation in use due to the weather (weather normalization). Some general comments follow, and then brief comments on each billing category's model. The purpose of each model is to determine the average water use per account per day to forecast additional future water use as new accounts are added.

The data is for January 2001 through December 2004. The results are quite stable and the level of usage in the base period (normally 2002 to date) can be projected to annual water usage. We are providing a graph of the pattern of water use for each customer group with a few of our interpretive comments that can either be accepted or the City can provide a more knowledgeable interpretation. These graphs have four lines (two of them have five lines):

1. Weather normalized actual water use expressed in terms of gallons per day per account (gpd/a). The weather normalization statistically derives the impact of weather on water use and restates actual water use to the level it would be with normal weather. (Normal weather is based on long term average weather for each month.)
2. A 13 month weighted moving average is calculated that runs through the center of the data, giving an easy-to-visualize picture of the pattern of use.
3. An average of the last three years is given as a potential base point for demand projections and as a reference for viewing the stability or volatility of recent years. In two cases, more than one reference line is given.
4. A regression model forecast is given for the last two years of actual data by month and for 2005 just as a reference forecast. This forecast simply projects the pattern of the prior three years without any consideration given to any conservation or other measures that the City might take that would change the water use pattern.

Comments on Initial Results of City of Sonoma Water Use Tracking.

The City started tracking MFR as a separate customer group in 2001; consequently the data for 2000, in which Residential is a combination of SFR and MFR, cannot be used for either SFR or MFR. And there are other apparent shifts in customer classification between MFR and Irrigation customers. As a result of these inconsistencies in the data base, we did the tracking models for the years 2001 through 2004, and the results appear reasonable.

The City bills bimonthly but did not provide the number of accounts billed with the water volume billed. Only the total number of accounts was provided. Furthermore, the account data did not reflect consistent series through the whole period. Al Bandur affirms that the account data provided for 2004 is accurate (as given to DWR). Therefore, we used the 2004 data as a base and backed into the prior years by using the annual growth or change in the data that was provided (but appears to be inconsistent with the 2004 data but consistent within in series reported). This method tied in very closely with prior work that Jack Weber did in 2000 for the conservation rate structure. Note that the 2004 data and the prior work data appear consistent on the basis of active accounts. There are numerous inactive accounts in the City's customer database.

We made one additional adjustment to the data as provided. The bimonthly billing data is for two different areas of the City (different micro climates) and for a different number of accounts, that is, not 50%-50% of all accounts. Consequently, the data on a gpd/acct appears spiked up and down every other month. This is not consistent with a true seasonality or water use pattern on a gpd/a basis. We modified the base data by separating the bimonthly billings into the two months billed, first on a 50-50 basis to each month, and then iteratively by the seasonal pattern that emerges in the tracking model. This does restate the water use on a truer seasonal basis, which matches the weather by month. The regression analysis for weather normalization was highly significant for all customer groups except the Other category.

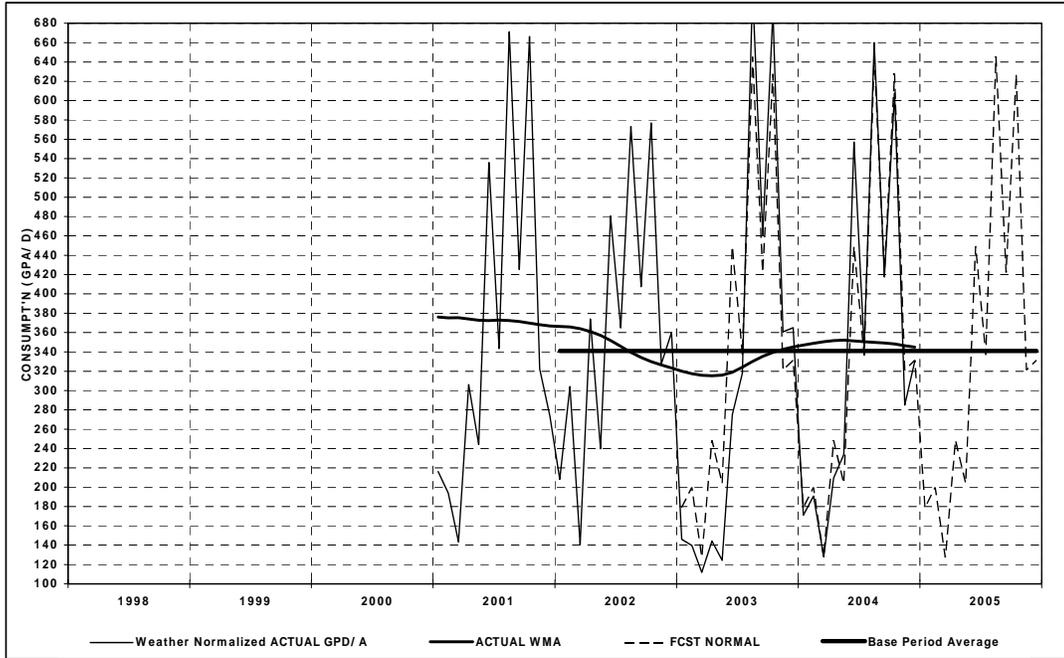
The before and after patterns of water use associated with this adjustment are shown below for the SFR category to illustrate the results. The After graph also includes weather normalization which reduces the base period average water use by 5.1 gpd/a or 1.5% from the pattern before weather adjustment.

Following are a few brief comments on the pattern of water use by customer group.

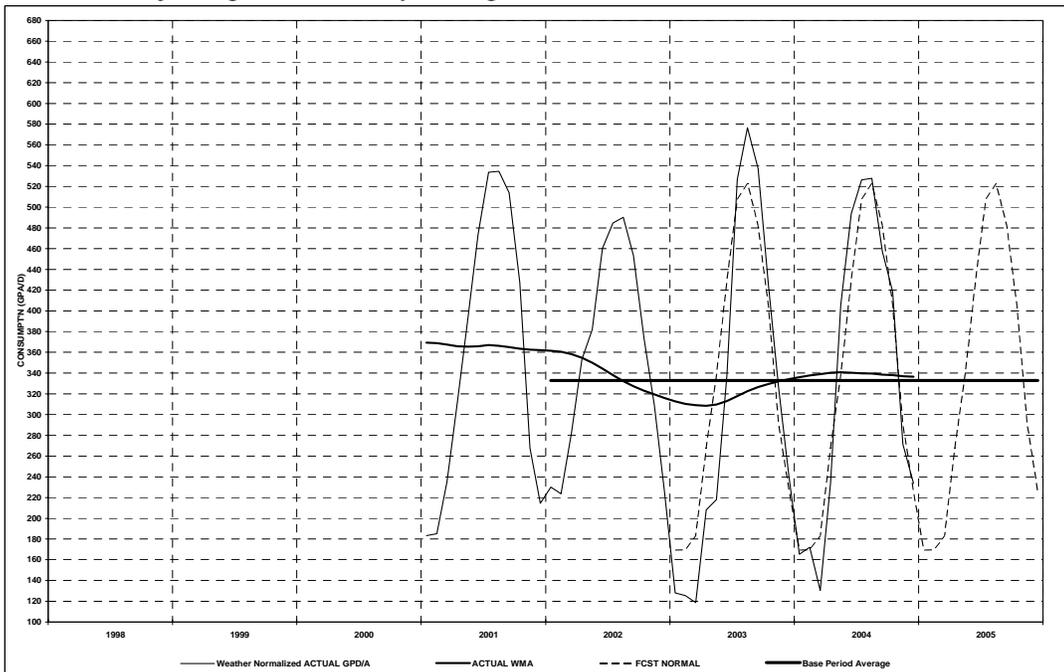
Single Family Residential (SFR): The water use moving average seems to have stabilized in 2004. The high level in 2001 could be the typical water use prior to the introduction of conservation pricing. When prior year data is available, this can be tested. Similarly, the sharp drop in water use in the winter of 2002-03 could be price induced or from the conservation measures introduced, but I have no information on what measures were taken or when to attempt to correlate with the drop. The following year did not reflect a consistent continuation of the 2002-03 winter pattern. It is our view that the water use reflected by the Base Period Average line on the graph (332 gpd/a) is an appropriate level of water use for projections.

The level of water use in winter months, especially in 2002-03 which gets down to 120 gpd/a, is lower than normal for many cities, which use about 200 gpd/a. This should be checked out with the population and occupants per dwelling unit data that must be available to this project.

SFR Before adjusting for bimonthly billings:



SFR After adjusting for bimonthly billings

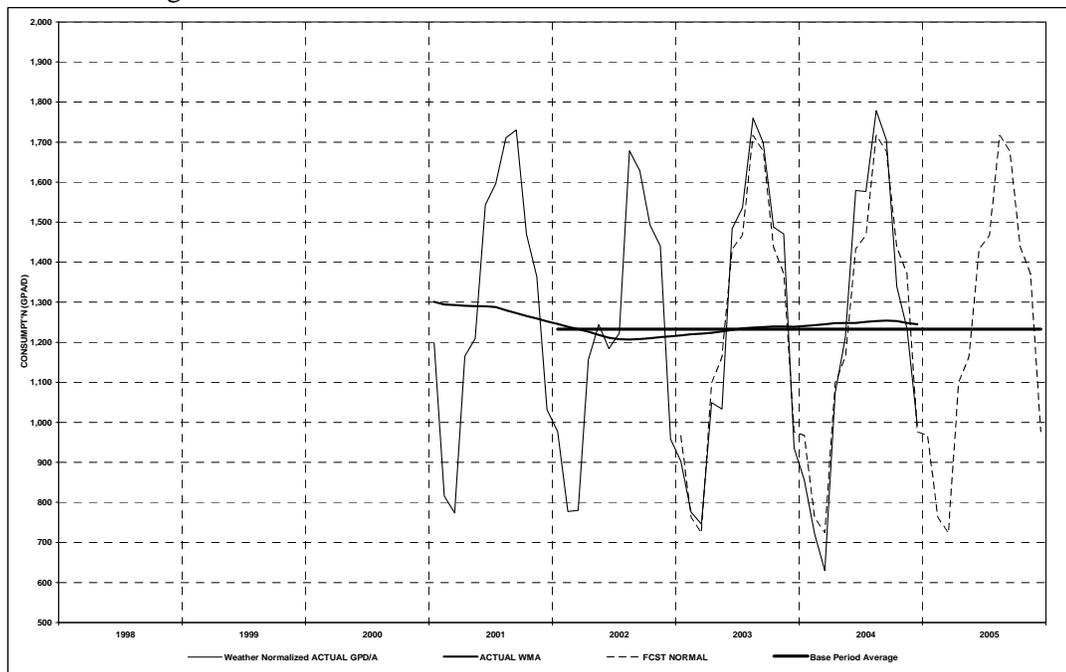


Multi-Family Residential (MFR): This customer group reflects a pattern similar to the SFR with the high level in 2001 and the drop in 2002, but the magnitude is much less. We think the Base Period Average pattern is quite stable and should be fine for projections.

The weather variable most statistically significant ($t=2.6$) was the departures from normal of Net Evaporation. It surprises me some that the weather is significant for MFR with only 4 years of data. It could be that the irrigation component is quite strong or that the short period is yielding a spurious correlation. The amount of the weather adjustment is only 8.9 gpd/a or 0.7% of average monthly volume.

I would use the average in the graph (1232.7) which reflects the last three years. We don't know what happened in 2001.

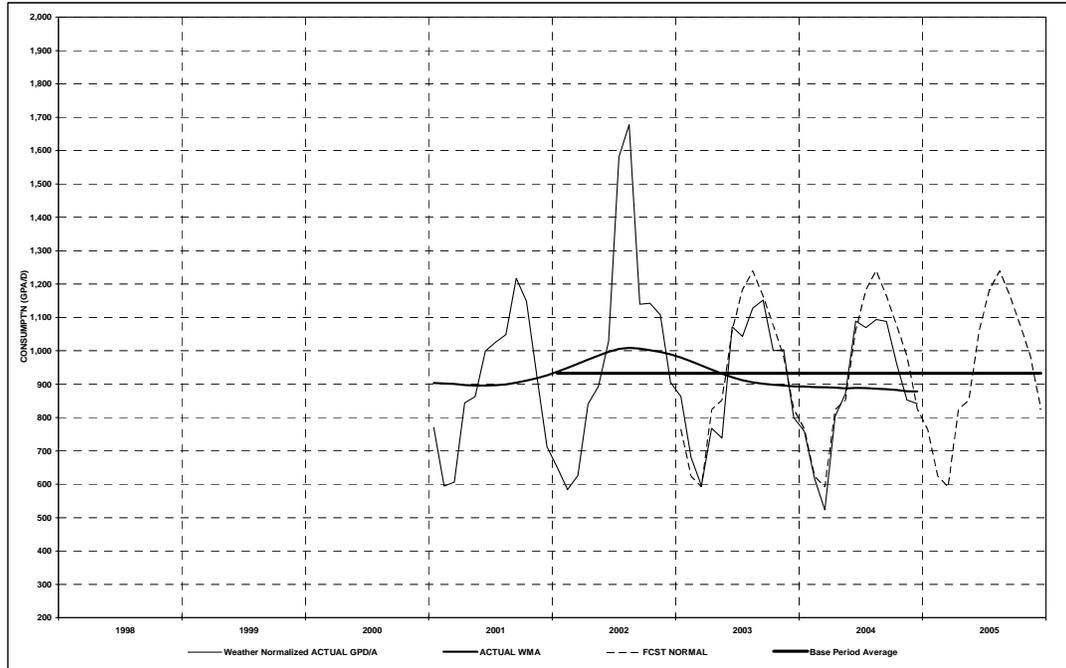
MFR Tracking Model



Commercial (COM): This group has a pattern of its own. I have no idea what caused the spike in 2002 but it seems to have settled down the last two years. I would use the average of the 2002 through 2004 period (Base Period Average) on the basis that the modest downturn in mid-2003 through 2004 will turn around with the economy recovery in Sonoma County. Weather was again statistically significant ($t = 2.1$) but the impact amounted to only 7.0 gpd/a for the period or 0.7% of average water use.

We would use the average of the last three years (932). You could rationalize using the average of just 2003-04 because of the unique seasonal pattern relative to 2002. That average is 910.

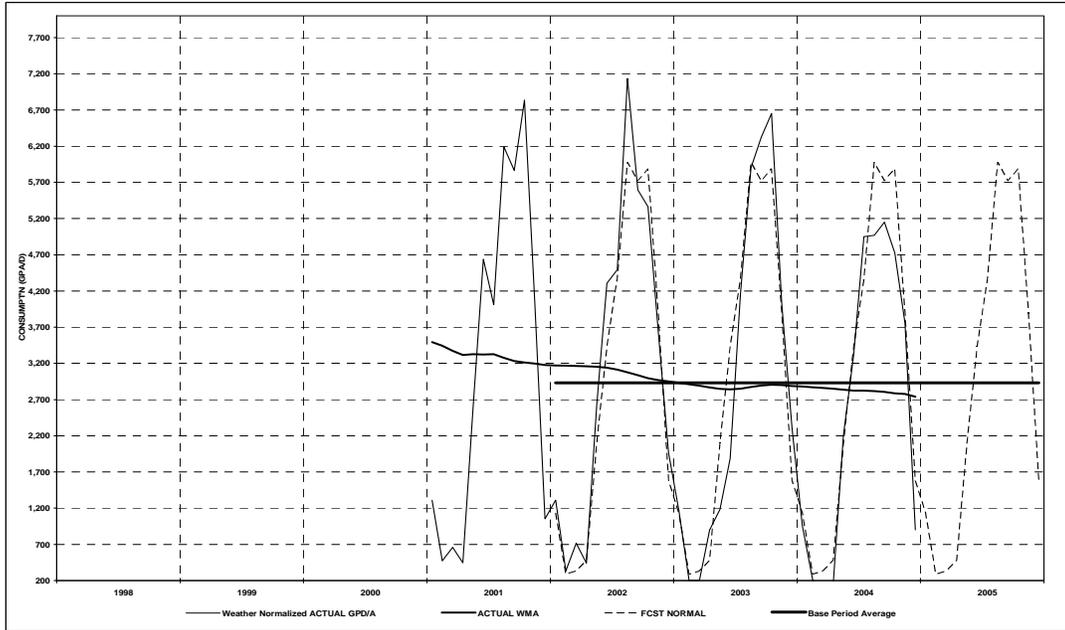
COM Tracking Model graph



Irrigation (IRR): Irrigation customer demand reflects a modest downward trend that seems to be leveling off some in 2003 and 2004. The higher level in 2001 could be attributable to the shifting of customers from MFR or Other to the Irrigation group, but we have no evidence to support that feeling. We think that the Base Period Average is a good as value to use for the projections. We intend to use the average of the three years in the graph (2933). There isn't that much volatility in this series and if the downward trend is conservation, then it should become visible in the discussions of additional measures that will be implemented.

Weather was statistically significant ($t=2.34$) and amounted to 44.1 gpd/a or 1.5% of average month volume.

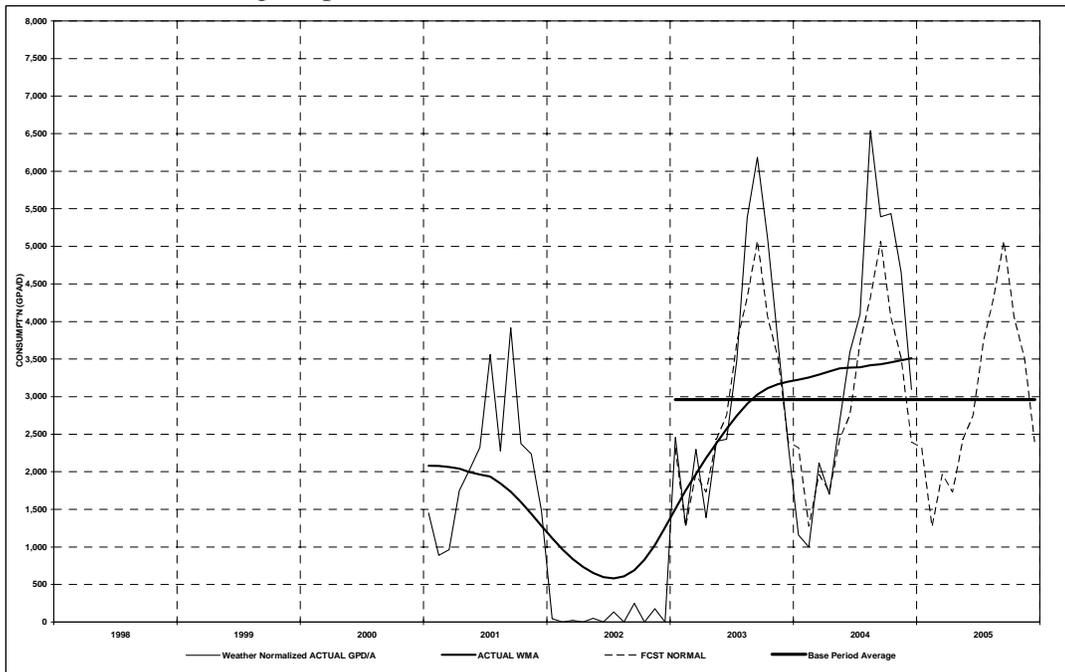
IRR Tracking Model Graph



Other: This category, which amounts to only 0.12 MGD, was quite erratic during the four years. It appears to be a totally different series in 2002 probably related to shifting customers between groups. Given its small size and volatile nature, we would just use the Base Period Average (2961) unless someone at the City can provide some knowledge about what they will be doing with this category.

Weather variables were not statistically significant as would be expected.

Other Model Tracking Graph





MEMORANDUM

Date: November 6, 2005

To: Al Bandur, City of Sonoma

From: William Maddaus, Maddaus Water Management

Subject: ***Revised Customer Water Demand Projections City of Sonoma
Summary of Data Inputs, Assumptions and Results***

LIST OF CHANGES SINCE SEPTEMBER 26, 2005 MEMO

The following changes have been made to the demand projections.

1. The commercial water use factor, in gallons/account/day was increased 8.9 percent to the 2002 value of 1,014.6 gpd/a from the prior value of 932 gpd/a which was the 2002 to 2004 average account use. A detailed explanation for these new commercial water use value is provided in MWM memo dated October 26, 2005 titled ***Commercial Water Demand Factors for Water Demand Projections***.
2. Changed the installed ultra low flush toilets as per the Tier one data compiled by the Sonoma County Water Agency for the City of Sonoma area. Then increase in this category of toilets was 7 percent. This caused the baseline future water needs to increase a small amount.
3. Increased future “Other” billing category accounts by total population rather than employment at request of City of Sonoma. Added note stating that “Other” billing category includes construction water, fire hydrant use, street sweeper, dust control, etc.
4. Added statement about average versus dry year demands on page 5.
5. Made word changes in memo for additional clarification.

As a result the demand projection for 2030 has increased 1.9 percent to 2.7 mgd (3,040 AF/year). (The new demand values are shown in Table 4-1 with the plumbing code included).

LIST OF CONTENTS

The following five pieces of information are included in this packet:

1. Future Population and Employment Projections (Attachment 1)
2. Historical Water Use and Demographic Data Inputs to the Model (Attachment 2)
3. Key Assumptions for the Model (Attachment 3)
4. Alternative Water Demand Projections (Attachment 4)
5. Demand Tables for Urban Water Management Plan (Attachment 5)

Each of these will be discussed in individual sections below. As this information has not been concurred with by local agencies, all of the provided information is subject to change.

1. FUTURE POPULATION AND EMPLOYMENT PROJECTIONS

Description of Population and Employment Forecasts (Attachment 1)

There are generally two main sources of population and employment projections that can be used in this model. More can be added in the future if desired. Below is a list of the two data sources that can be used to generate future water demands.

Available Demographic Projections

- *Local General Plan (population and employment)* – Typically these plans, depending upon when they were published, have a population and jobs forecast for 2020 and build out. The May 2004 City of Sonoma Background Report 2005 to 2020 General Plan Update includes a population and employment forecast. According to City Planner, David Goodison, the projections presented in this report are planned to be adopted in October/November 2005 for the 2005 City of Sonoma General Plan update. The projections listed in this report are ABAG 2003 for population forecast and ABAG 2002 for employment forecast.
- *ABAG (population and employment)* - ABAG recently published a report in 2005 that includes population and employment estimates for each city in the Bay Area. This ABAG report also provides projections for 2005, 2010, 2015, 2020, 2025, and 2030. Projections were also made in 2002 and 2003.

At the City of Sonoma's request the current projections in the above referenced Background Report were used as the source of population and employment forecasts. These were in turned used for the demand projections. The population in Attachment 1 is residential or household population only and excludes group quarters or institutionalized population. The residential population lives in the single family and multifamily water use accounts.

2. WATER USE AND DEMOGRAPHIC DATA INPUTS TO MODEL

Description of "Water Use Data Input Sheet" (Attachment 2)

Attachment 2 is a two-page print out of an Excel spreadsheet. The purpose of this "Water Use Data Input Sheet" is to gather and document basic information about the individual service area. The data shown on the "Water Use Data Input Sheet" can be broken into two main categories, (a) current water use data and (b) demographic data. Each area is broken out below and helps to provide some basic definitions and assumptions.

(a) Water Use Data

- *Base Year* – This is the starting year for the analysis. For this project, the recent average weather normalized data was selected as the base year for two reasons:
 1. 2004 shows less of an effect of the recession.
(The year 2002-3 shows a dip in water demand in many areas due to reduction in economic activity)

2. 2004 had relatively “normal” climate conditions – i.e. not a drought or excessively wet year, so weather adjustments were minor
- Average gal/day/acct- This is the amount of water in gallons that is used per day, per account.
 - Indoor/outdoor water use – This is the amount of water per account split into the percent that is used indoors. The corresponding remaining percent of water is used outdoors.
 - Consumption by customer class- This shows the annual amount of water used for an entire calendar year, broken down by customer class (Single Family, Multi Family, Commercial, Irrigation, etc)
 - Provision for New Single Family Account Use– For selected agencies, and upon their specific request, a new category can be created to model water use of new single family homes. This value is held constant in the baseline projection and not subject to plumbing codes. It is assumed that all new homes are built to the current plumbing code with low flow showerheads and low flush (1.6 gallon per flush) toilets. The plumbing codes continue to work on the existing accounts. City of Sonoma has made such a request and to provided historical water use data from new accounts to document the requested level of use for new homes (or commercial or other accounts). The new value is 365 gallons/day/account. All new single family account growth was placed in this new category.
 - Unaccounted for water (UFW) - The difference between the amount of water purchased and the amount of water that was billed. Data provided by the agency was used, if provided, unless UFW was less than 7 percent, in which case 7 percent was used. For the City of Sonoma averages of UFW from the 2002-2004 annual reports submitted to eh CA DWR were used to derive an estimate of UFW. The value was found to be 11.7 percent of production.
 - Water Produced– This is the total amount of potable water produced by the City of Sonoma. The water can come from multiple sources including amount purchased from SCWA, purchased from other agencies, local surface water, or obtained from groundwater. This does not include recycled water.
 - Peak day factor – The ratio of water produced on the maximum day of the year to that produced on the average day. The value used in the recent SCWA Water Master Plan for agencies was used where available; otherwise a value of 1.6 was used. The May 2004 City of Sonoma Background Report 2005 to 2020 General Plan Update referenced the following water demand projection: Brelje & Race Consulting Engineers, Addendum to 1999 Water System Improvement Study, Sonoma, California November 2002. This report provided a value of 2.0 to be used for the City of Sonoma demand forecast.

(b) Demographic Data

- Census 2000 – The 2000 Census data was used as a reference when determining population and household sizes for each individual city (and/or unincorporated area) serviced by the water agencies.
- Department of Finance 2004 Population estimate and relationship to the City of Sonoma Service Area Population Estimate- The State of California Department of Finance provides official estimates between censuses. The 2004 total population for the City of Sonoma service area was taken directly from the 2004 Department of Finance data plus the population served to accounts outside the city limits as reported on the 2004 DWR reports. The estimated population for accounts outside the city was calculated by the number of accounts times average household size. Then, to obtain household population, the Group Quarters population was subtracted from the total service area population.
- Single and multi family dwelling units - The 2004 single family dwelling units is equal to the number single family accounts for 2004. The 2004 multi family dwelling unit estimate was calculated by applying a growth factor to the 2000 data as noted on the water use data sheet in Attachment 2.
- Procedure for service areas not contiguous with city boundaries – When a service area serves outside a city boundary, estimates were generated either from census data when available for the unincorporated areas, Department of Finance data, ABAG Projections, DWR reported data, General Plan or by the agency if known. If none of the six sources were available, then the modeling team worked with the agencies to make reasonable estimates.
- Employment data (ABAG) – The employment figures were gathered from the Association of Bay Area Governments (ABAG) report dated 2005. These numbers were developed regionally, and are based on the 2000 Census.

In summary, the key features of this sheet include the existing 2004 (baseline) level of water use, 2004 baseline accounts in each customer category, and 2004 baseline forecasts for population.

3. KEY ASSUMPTIONS FOR THE MODEL

Key Assumptions for the Model (Attachment 3)

The one page table shown in Attachment 3 shows some of the key assumptions used in the model. The assumptions having the most dramatic effect on the results are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of unaccounted for water.

4. WATER DEMAND PROJECTIONS

Development of the Water Demand Projections Table and Graph (Attachment 4)

Water demand projections were developed out to the year 2034 using the Demand Side Management Least Cost Planning Decision Support System (DSS) model. This model incorporates information from the:

- “Water Use Data Sheet” and the “Key Assumptions” shown in Attachments 2 and 3
- Questions asked of agencies
- Agency provided data
- 2000 Census data
- 2000 to 2004 Department of Finance population data
- Local General Plans
- Association of Bay Area Governments Projections

Attachment 4 shows the projected demands with and without plumbing codes and appliance standards. This page includes both a table and a graph. Each will be described below.

California law requires that for new construction after January 1, 1992 only fixtures meeting the following standards can be installed in new buildings:

- Toilet – 1.6 gal/flush maximum
- Urinals – 1.0 gal/flush maximum
- Showerhead and Faucets – 2.5 gal/min at 80 psi

Replacement of fixtures in existing buildings is governed by the Federal Energy Policy Act that requires only the above can be sold after January 1, 1994 for residential use and January 1, 1997 for commercial toilets. This law governs natural replacement.

New clothes washers are required to meet increased energy efficiency standards in 2004 and 2007. It is expected that this will lead to water efficiency improvements (efficient washers use at least 33% less water) by no later than 2007. We have assumed that by 2007, 30 percent of washers purchased will be efficient, by 2010, 50 percent purchased will be efficient, by 2015, 75 percent will be efficient, and by 2020, 100 percent purchased will be efficient.

Graph of projected demands (Figure 4-1)

Figure 4 shows the projection at five-year increments. The graph shows projections through 2034.

Table of water demand projections (Table 4-1)

The table of water demands projections includes:

1. The water demand projections are based on the future population and employment projections shown and described above in Attachment 4.
2. Table 1-1 shows the population and employment projections used to prepare the demand projections.
3. Projections were made *with and without* the plumbing codes.
4. Projections are for potable water only. It does not include recycled water use. Recycled water use and projections are included in Chapter 5 of UWMP.

Dry Year Demands

The demand projections reflect average weather conditions and **do not** reflect drier, hotter, non-drought conditions.

5. WATER DEMAND PROJECTIONS – 2005 URBAN WATER MANAGEMENT PLAN (UWMP) FORMAT

Conversion of the Water Demand Projections Table and Graph to 2005 UWMP Format

(Attachment 5)

The 2005 Urban Water Management Plan Guidance Document from the California Department of Water Resources (Ca DWR) requests that future demand information be in a specific format. Provided in Attachment 5 are the five tables relating to future average day demands they requested. The demand projection shown is the “with Plumbing Code” demands and is otherwise the same as appeared in the above table and graph. The demand projections in the Urban Water Management Plan will be included in Chapter 3.

NEXT STEPS

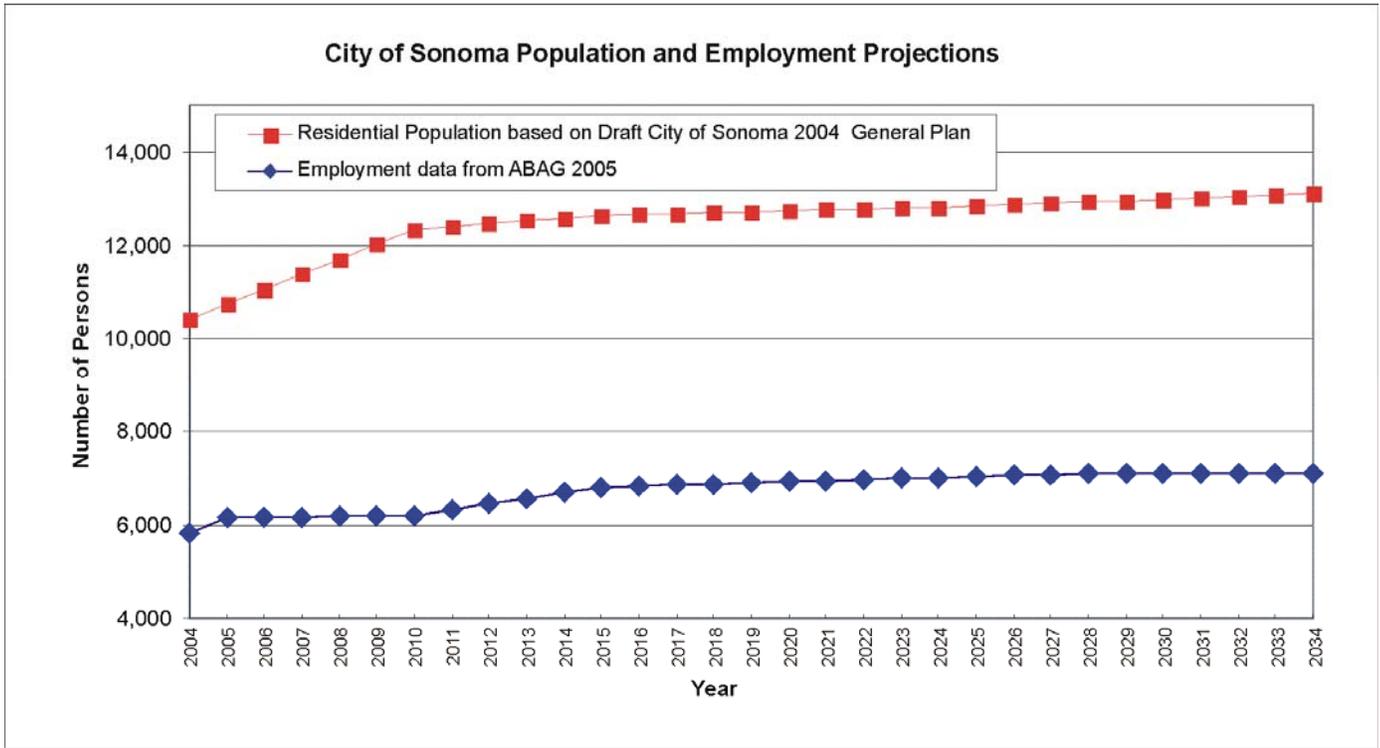
The following five steps remain to finalize the demand projections and evaluate conservation measures.

1. Contractor to concur with baseline projection
2. Evaluate Tier One conservation measures with the model
3. Develop projections with alternative levels of conservation
4. Provide information on the cost-effectiveness of water conservation
5. Identify individual agency projections with planned conservation

ATTACHMENTS

Attachment 1	Future Population and Employment Projections (Figure 1-1 and Table 1-1)
Attachment 2	Water Use Data Input Sheet
Attachment 3	Key Model Assumptions (Table 3-1)
Attachment 4	Alternative Water Demand Projections (Figure 4-1, Table 4-1)
Attachment 5	UWMP Tables for Chapter 3 (Ca DWR format)

Attachment 1 – Population and Employment Projections



**FIGURE 1-1
Population and Employment Projections for City of Sonoma**

**TABLE 1-1
Population and Employment Results for City of Sonoma**

Projection	Residential Population						
	2004	2005	2010	2015	2020	2025	2030
Residential Population	10,409	10,733	12,348	12,642	12,740	12,838	12,984
Employment	5,822	6,150	6,210	6,810	6,920	7,040	7,120

Attachment 2 – Water Use Data Input Sheet (Page 1)

Sonoma Water Service Area ¹						
DSS Input Sheet						
November 6, 2005						
Base Year Average Use and Indoor Percentages by Billing Category for DSS Model²						
Year	Single family		Multifamily		Business	
	Average, gpd/a	Indoor	Average, gpd/a	Indoor	Average, gpd/a	Indoor
2004	333	41%	1233	63%	1015	68%
Bimonthly billing		Bimonthly billing		Bimonthly billing		
Irrigation		Other		New Single Family		
Average, gpd/a		Indoor		Average, gpd/a		Indoor
2933		0%		2961		33%
Bimonthly billing		Bimonthly billing		Bimonthly billing		
Other category includes construction water, fire hydrant use, street sweeper, dust control, etc.						
Data for DSS Model - - Base Year 2004						
Category	Number of Accounts 2004 ³	Water Use 2004 gpd/a ²	Water Use, MGD 2004	Use Profile Percent	Water Use gcd	Indoor Water Use gcd
Single family	3,338	333	1.111	56.03%	150	62
Multifamily	229	1,233	0.282	14.24%	94	59
Business	302	1,015	0.306	15.46%		
Irrigation	56	2,933	0.164	8.29%		
Other	40	2,961	0.118	5.98%		
New Single Family	1	365	0.000	0.02%		
Total Billed in 2004 =	3,965	8,474	1.982	100.00%	Weather Normalized Usage for 2004	
Total Water Produced Non-Weather Normalized ⁴ =			2.22	MGD		
2002 to 2004 Average Unaccounted For Water (UFW) ⁵ =			11.7%	Percent	Based on average of 2002 to 2004 UFW from DWR annual reports	
Projected UFW for DSS Model =			11.7%	Percent	7% if actual is < 7%, otherwise = agreed upon by agency for 30 year forecast	
Water Produced for use in DSS Model for 2004 =			2.25	MGD	Add UFW % to Total Billed Water Use	
					Water Produced =	
					Billed / (1 - Projected UFW for DSS Model) = 2.25	
Peaking Factor =			2.00	Provided by Brelje & Race Consulting Engineers, Addendum to 1999 Water System Improvement Study,		
Peaking Factor for DSS Model=			2.00	Provided by Brelje & Race Consulting Engineers, Addendum to 1999 Water System Improvement Study,		
	- Blue cells are entered by modeler					
	- Yellow cells are input to DSS Model					
NOTES						
1. - Communities served (includes all or portions of) City of Sonoma and nearby unincorporated areas.						
2 - Average gpd/a is based on a 12-month moving average through December 2004. Indoor use is based on average of 2 lowest consecutive months in the winter if meters read bimonthly, or single lowest month if meters read monthly.						
3 - Number of accounts is from data provided by water agency for this project.						
4 - Total water produced provided by City of Sonoma.						
5 - Unaccounted for Water (UFW) is the percent difference between the total water produced and the total billed water use.						
6 - For reference see additional population estimates provided in population and employment estimates corresponding to service area table.						
7 - Initial estimate based on census data for renter occupied units. For reference see table with 2000 census data for corresponding water service area city or cities.						
8 - Group Quarters Population includes Institutionalized and non-Institutionalized persons and assumes their water use is in the Commercial sector.						
Definitions / Abbreviations						
ABAG	Association of Bay Area Governments	HHS	household size			
DOF	Department of Finance	NA	not available			
DSS	Decision Support System Model	MF	multi family			
du	dwelling unit	MGD	million gallons per day			
DWR	Department of Water Resources	No.	number			
FY	Fiscal Year	Pop	population			
gcd	gallons per capita / per day	Res	residential			
gpd/a	gallons per day / per account	SF	single family			
gpd	gallons per day	UFW	unaccounted for water			
Data Prepared :	June 23, 2005	By:	M. Maddaus			
Revised:	November 6, 2005	By:	W. Maddaus			

Attachment 2 – Water Use Data Input Sheet (Page 2)

Sonoma Water Service Area ¹					
Reconcile agency account billing data and census data					
Total Dwelling Units in Census 2000 for Sonoma by Census Tract					
	2000 Units	No. Buildings	Service Area Billing Accounts - Year 2000³	Difference between billing and census data	Data Sources / Notes
Single family					
1-detached	2,757	2,757			
1-attached	647	324			
Subtotal	3,404	3,080	2,955	-126	Estimate from the census exceeds Billing accounts When this happens some of the attached units and duplexes are classified by District as Multi Family
Multi family					
2-units	197	99			
3-4 units	232	66			Assumes average of 3.5 units per account
5 to 9 units	150	21			Assumes average of 7 units per account
10 to 19 units	151	10			Assumes average of 15 units per account
20 to 49 more units	254	7			Assumes average of 50 units per account
mobile homes	435	9			Assumes average of 50 mobile home units per master meter
Subtotal	1,419	212	216	4	
MF Average =	6.7	Year 2000 Census Data Avg. units/account	6.6	Year 2000 Billing data Avg units/account	This is a typical value of DUs/account
Total SF + MF units =	4,823				
2000 Group Quarters Data					
Institutionalized	77	Average household size	1.97		
Non-Institutionalized	14	Average household size of owner-occupied unit	2.25		
Total	91	Average household size of renter-occupied unit	1.88		
		Homeowner vacancy rate (percent)	1.8%		
		Rental vacancy rate (percent)	3.7%		
Population and Household Size in Census 2000 for Sonoma					
	Census + Outside Areas Service Area	DOF + Outside Areas Estimated Population	Estimated Service Area Population	2004	Data Sources / Notes
Total Population from Census Tract data ⁶ =	9,591	10,502			Estimated growth from 2000 to 2004 (ABAG Subregional Projections): 6.94%
Subtract Institutionalized =	91	92			Estimated employment growth from 2000 to 2004 (ABAG Employment Projections): 1.27%
Residential Population =	9,500	10,409			Water use for the institutionalized population is accounted for in nonresidential billing categories
Avg. HHS ⁷ =	1.97	1.97			Residential population shown corresponds to the city or cities represented by Census data
MF Pop @ MF HHS ⁷ =	2.30	2,811	3,006	3,006	28.9% Percent of Population that is MF
SF Pop =		6,688	7,403	7,403	71.1% Percent of Population that is SF
SF HHS ⁷ =		2.26	2.22		
		Total	10,409	10,409	100.0%
*2004 Service Area Population equals DOF estimate for City plus population outside City, see 2004 DWR Annual Report					
Estimate Service Area Dwelling Units for 2004					
SF Res	3,338	Equals No. single family accounts for 2004.			
MF Res	1,307	Equals No. of MF dwellings from cell M21 plus growth in accounts for four years from cell T35			
Total	4,645				
Population and Employment Estimates Corresponding to City of Novato (smaller than service area)					
	Population	Employment			
2000 Census data for jurisdiction	9,591	NA			
2000 ABAG (jurisdictional)	9,128	8,160	Based on ABAG 2005 Projections		
2005 ABAG Projection (jurisdictional)	9,500	8,290	Based on ABAG 2005 Projections		
2000 ABAG (subregional)	9,754	8,770	Based on ABAG 2005 Projections		
2005 ABAG Projection (subregional)	10,600	8,920	Based on ABAG 2005 Projections		
2000 ABAG (subregional)	9,754	5,760	Based on ABAG 2003 Projections		
2005 ABAG Projection (subregional)	11,500	6,150	Based on ABAG 2003 Projections		
2003 Department of Finance Benchmark	9,584	From State of California Department of Finance (DOF) table E-4 as of 1-1-2003. Website www.dof.ca.gov			
2004 Department of Finance Estimate	9,731	From State of California Department of Finance table E-4 as of 1-1-2004. Website www.dof.ca.gov			
2005 Department of Finance Estimate	9,834	From State of California Department of Finance table E-4 as of 1-1-2005. Website www.dof.ca.gov			
May 2004 Background Report City of Sonoma General Plan Update		5,822	Service Area Employment based on ABAG 2003 from May 2004 City of Sonoma Background Report 2005 to 2020 General Plan Update page 25 graph		
2004 Employment in Service Area (input to DSS Model) =		5,822	Service Area Employment based on ABAG 2003 from May 2004 City of Sonoma Background Report 2005 to 2020 General Plan Update page 25 graph		

Attachment 3 – Key Model Assumptions

TABLE 3-1
List of SCWA Baseline Demand Projection Assumptions for DSS Model

Parameter	Model Input Value, Assumptions, and References
Base Year	2004
Peak Day Factor	2.0
Unaccounted for Water, % of Water Production	Calculated from purchase and sales data or 7%, whichever is greater; constant over time. City of Sonoma UFW 11.7%
Population Projection, 2005 to 2034	City of Sonoma Background Report 2005 to 2020 General Plan Update dated May 2004
Employment (Jobs) Projection 2005-2034	City of Sonoma Background Report 2005 to 2020 General Plan Update dated May 2004
Number of Water Accounts for Base Year	Data submitted by customers for 2004
Distribution of Water Use Among Categories	Data submitted by customers for most recent year
Indoor/Outdoor Water Use Split by Category, % of Total	Monthly data submitted by customers for 2003-4
Residential End Uses, %	AWWARF Report "Residential End Uses of Water" 1999
Non-Residential End Uses, %	Professional judgment and AWWARF Report "Commercial and Institutional End Uses of Water" 1999
Residential Fixture Efficiency Current Installation Rates	Census 2000, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Reference "High Efficiency Plumbing Fixtures - Toilets and Urinals" Koeller & Company July 23, 2005. Reference Consortium for Efficient Energy (www.cee1.org)
Water Savings for Fixtures, gal/capita/day	AWWARF Report "Residential End Uses of Water" 1999
Non-Residential Fixture Efficiency Current Installation Rates	Census 2000, assume commercial establishments built at same rate as housing, plus natural replacement
Residential Frequency of Use Data, Toilets, Showers, Washers, Uses/user/day	Falls within ranges in AWWARF Report "Residential End Uses of Water" 1999
Non-Residential Frequency of Use Data, Toilets and Urinals, Uses/user/day	Estimated based using AWWARF Report "Commercial and Institutional End Uses of Water" 1999
Natural Replacement Rate of Fixtures	Residential Toilets 3% (newer toilets), 4% (older toilets) Commercial Toilets 4% Residential Showers 4% Residential Clothes washers 6.7% A 4% replacement rate corresponds to 25 year life of a new fixture based on data published in "High Efficiency Plumbing Fixtures - Toilets and Urinals" Koeller & Company July 23, 2005. A 4% replacement rate is also the CUWCC recommended value. A 6.67% replacement rate corresponds to 15 year washer life based on "Bern Clothes Washer Study, Final Report:, Energy Division, Oak Ridge National Laboratory, for U.S. Department of Energy, March 1998, Internet address: www.energystar.gov
Future Residential, and "Other" Account Water Use	Based on Projected Population Growth
Future Business Account Water Use	Based on Projected Employment Growth
Future Irrigation Account Water Use	Based on Projected Employment Growth

Attachment 4 –Projected Water Demands

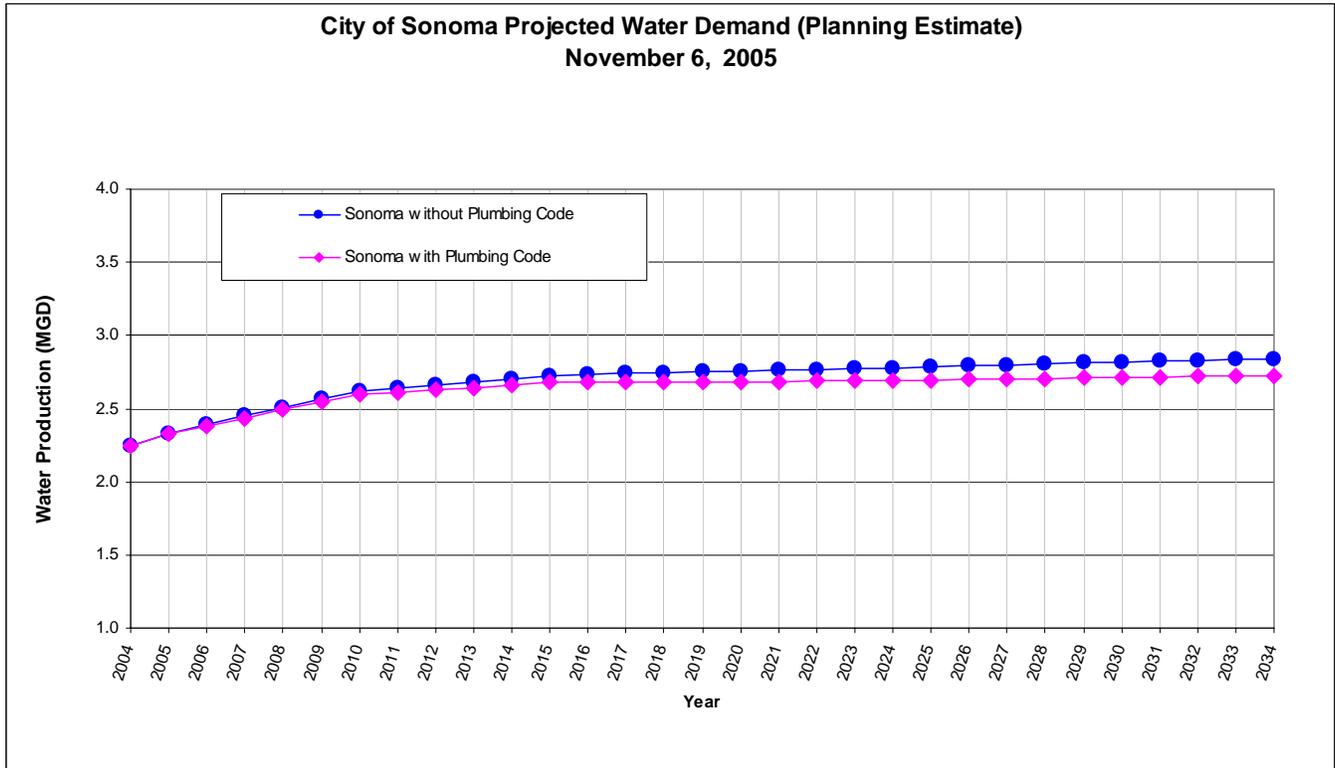


FIGURE 4-1
Baseline Water Use Projections for City of Sonoma

TABLE 4-1
Baseline Water Use Projections for City of Sonoma

Data Source for Projection		Plumbing Code	Water Production, Average Day (MGD)*						
Residential	Non-Residential		2004	2005	2010	2015	2020	2025	2030
General Plan	General Plan	Included	2.25	2.33	2.60	2.68	2.68	2.69	2.71
General Plan	General Plan	Not Included	2.25	2.33	2.62	2.73	2.76	2.78	2.82

* Weather normalized. Total Potable Use does not include recycled water use. Recycled water use and projections is in Chapter 5 of the UMWP.

Attachment 5 –Urban Water Management Plan Tables for Chapter 3 of 2005 UWMP

Table 3-1 below provides population projections for City of Sonoma service area.

Table 3-1. (DWR Table 2). Population – Current and Projected

Year	Population
2005	10,733
2010	12,348
2015	12,642
2020	12,740
2025	12,838

3.2 Past, Current, and Future Water Use

3.2.1 Water Use By Customer Type

The historical and projected number of connections and deliveries to the Agency’s water distribution system, by sector is identified below on Table 3-2.

Table 3-2. (DWR Table 12). Past, Current and Projected Water Deliveries

Year			Water Use Sectors						Total	
			Single Family	Multifamily	Business	Irrigation	Other	New Single Family		
2005	metered	# of accounts	3,338	236	319	59	41	104	0	4,097
		Deliveries AF/Y	1,242	325	360	194	137	42	0	2,301
2010	metered	# of accounts	3,338	272	322	60	47	622	0	4,661
		Deliveries AF/Y	1,233	366	359	196	157	254	0	2,565
2015	metered	# of accounts	3,338	278	353	65	49	716	0	4,799
		Deliveries AF/Y	1,221	369	388	215	161	293	0	2,647
2020	metered	# of accounts	3,338	280	359	67	49	747	0	4,840
		Deliveries AF/Y	1,210	366	391	219	162	306	0	2,654
2025	metered	# of accounts	3,338	282	365	68	49	779	0	4,881
		Deliveries AF/Y	1,200	364	395	222	164	319	0	2,664
2030	metered	# of accounts	3,338	286	369	68	50	825	0	4,937
		Deliveries AF/Y	1,192	365	398	225	165	338	0	2,683

3.2.2 Water Sales to Other Agencies

The City of Sonoma does not currently sell water to any other agency. According to City of Sonoma, all “outside sales” are local businesses and residents, and not to another agency.

Table 3-3. (DWR Table 13). Sales to Other Agencies

Water Distributed	2000	2005	2010	2015	2020	2025	2030
N/A	0	0	0	0	0	0	0

3.2.3 Unaccounted-for Water and Additional Water Use

For this project unaccounted for water is defined to be the difference between water produced and water sold to customers. Unaccounted-for water use normally includes unmetered water use such as for fire protection and training, system and street flushing, sewer cleaning, construction, system leaks, and unauthorized connections. Unaccounted-for water can also result from meter inaccuracies.

Table 3-4. (DWR Table 14). Additional Water Uses and Losses, AF/yr

Water Use	2000	2005	2010	2015	2020	2025	2030
Saline barriers	N/A						
Groundwater recharge	N/A						
Conjunctive use							
raw water	N/A						
recycled	N/A						
Unaccounted-for system losses	N/A	343	351	353	354	357	343
Total	N/A	343	351	353	354	357	343

3.2.4 Total Potable Water Use*

The total past, present and future water use for the system is shown in the table below.

Table 3-5. (DWR Table 15). Total Potable Water Use, AF/yr

Water Use	2000	2005	2010	2015	2020	2025	2030
(Total of Tables 3-2, 3-3, 3-4)	NA	2,605	2,908	2,999	3,007	3,019	3,040

*Total Potable Use does not include recycled water use. Recycled water use and projections is in Chapter 5 of the UMWP.



MEMORANDUM

Date: May 30, 2006

To: Al Bandur, City of Sonoma

From: William Maddaus, Maddaus Water Management

Subject: *Revised Tier One Conservation Measure Evaluation
Summary of Data Inputs, Assumptions and Results*

INTRODUCTION AND PURPOSE

The purpose of this memorandum is to present an overview of the conservation evaluation process which has been completed for your agency. The evaluation was performed on the Tier One measures which correspond to the California Urban Water Conservation Best Management Practices (CUWCC BMPs). The conservation measures, where quantification is possible (BMP 1, 2, 3, 5, 6, 7, 9, and 14), were analyzed using the Least Cost Planning Decision Support System (DSS) Model. The remaining BMPs (4, 8, 10, 11, 12, and 13) are either of a qualitative nature or not applicable to your agency and were not included in this analysis other than to state if your agency is meeting the coverage requirements according to the CUWCC. These conservation measures were then organized into two programs showing historical and then future activity levels and associated cost for your agency.

Changes Since February 3, 2006 Memorandum

- The changes described in our memorandum dated March 3, 2006 have been implemented. Most of the changes related to prior conservation efforts and minor improvements in the presentation of results. The items listed immediately below resulted in a significant increase in estimated water savings from future planned water conservation activities.
- The CUWCC BMP 3, System Water Audits and Leak Detection was evaluated for your agency.
- The CUWCC BMP 14 was updated to include resale rates for Sonoma County.

CONTENTS

This technical memorandum provides a general overview for the methodology, assumptions, and results for the conservation analysis

The following four pieces of information are included in this packet:

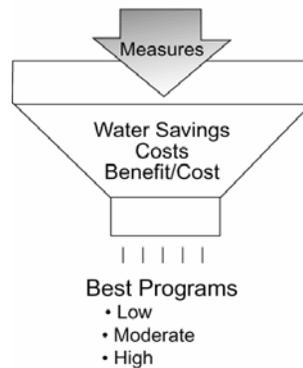
1. Overview of Evaluation Performance
2. Comparison of Individual Conservation Measures
3. Results of Tier One Conservation Analysis
4. Conclusions

Each of these will be discussed in individual sections below. As this information has not been concurred with by local agencies, all of the provided information is subject to change.

1. OVERVIEW OF EVALUATION PROCESS

During the evaluation process, water savings were estimated and costs for the measures were developed. Benefits and costs were compared in a formal present value analysis (PVA) and then conclusions were drawn about which measures produce cost-effective water savings. This process can be thought of as an economic screening process, shown in Figure 1. Packaging the best measures into alternative programs is how we are helping you to consider what level of conservation is appropriate for your agency.

Figure 1
Evaluation Process



Benefit-cost analysis has been used by many water agencies to evaluate and help select a water conservation measure best suited to local conditions. This analysis requires a locale-specific set of data, such as historical water consumption patterns by customer class, population and employment projections, age of housing stock, and prior conservation efforts.

The following eight steps were used to implement the methodology by expanding upon the same DSS model used to prepare the demand projections.

1. *Develop baseline water use projections without additional conservation.* Projections cover each key customer category and are broken down into indoor end uses and outdoor end uses. These were presented in previous memoranda. Note, the plumbing code refers to savings from the Energy Act; it is not the same as savings from BMP conservation.
2. *Identify possible water conservation measures* and screen the measures qualitatively to identify those that are applicable to the service area. Develop appropriate unit water savings and cost factors for each measure.
3. *Estimate the affected customers (or number of accounts) for each conservation measure* by dividing the measure's projected *customers* (or accounts) that implements the measure by the total service area *customers* (accounts). This factor is called the market penetration or installation rate.
4. *Estimate total annual average and peak day water savings.* The water savings are computed by multiplying unit water savings, per measure, by the market penetration or installation rate, and then multiplying by the number of units in a particular service area (such as dwelling units) targeted by a particular measure.
5. *Identify benefits to the water agency* including potential reduced water purchases (SCWA wholesale water rate for each agency).

6. *Quantify total benefits for each year* in the planning period by multiplying average water savings by the computed value of the benefits.
7. *Determine initial and annual costs to implement the measures* based upon pilot projects, local experience, and the costs of goods, services, and labor in the community. This is multiplied by the number of units participating each year and then added to overall administration and promotion costs to arrive at a total measure cost, which may be spread over a number of years.
8. *Compare benefits and costs of measures* by computing the present value of costs and benefits over the planning period.

2. COMPARISON OF INDIVIDUAL CONSERVATION MEASURES

Perspectives on Benefits and Costs

The determination of the economic feasibility of water conservation programs depends on comparing the costs of the programs to the benefits provided. The analysis was performed using the DSS model. The DSS model calculates savings at the end-use level; for example, the model determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. For this evaluation benefits are based on reduced water purchases from SCWA at the (2005) Sonoma Aqueduct rate of \$424.53 per acre-foot (\$1,303 per million gallons).

Present value analysis is used to discount costs and benefits to the base year. From this analysis benefit-cost ratios of each measure are computed. When measures are put together in programs the interactions are accounted for by multiplying water use reduction factors together at the end use level. A water use reduction factor is 1.0 minus the water savings, expressed as a decimal. This avoids double counting when more than one measure acts to reduce the same end use of water.

Benefit-cost analysis can be performed from several different perspectives, based on who is affected. For planning water conservation programs for utilities, the perspectives most commonly used for benefit-cost analyses include the utility and the community. The "utility" benefit-cost analysis is based on the benefits and costs to the water provider. The "community" benefit-cost analysis includes the utility benefit and costs together with account owner/customer benefits and costs. These include customer energy benefits and costs of implementing the measure, beyond what the utility pays.

The utility perspective offers two advantages for this analysis. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving and supplying water. Second, because revenue shifts are treated as transfer payments, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. Because it is the water provider's role in developing a conservation plan that is paramount in this study, the utility perspective was primarily used to evaluate elements of the plan.

No evaluation perspectives are without shortcomings. The principal weakness of the utility perspective is that it does not count the benefits accrued or costs incurred outside of the utility. Therefore another perspective is also used – the community perspective. The community perspective is defined to include the utility costs and benefits and the customer costs and benefits. Costs incurred by customers striving to save water while participating in conservation programs are considered, and are the benefits received in terms of reduced energy bills (from water heating costs). Other factors external to the utility, such as environmental effects, are not included in the benefit-cost analysis. Because these external factors are often difficult to quantify, they are frequently excluded from economic analyses, including this one.

Present Value Parameters

The time value of money is explicitly considered. The value of all future costs and benefits is discounted to 2004 (the base year) at the real interest rate of 3.0%. The DSS model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). Cash flows discounted in this manner are herein referred to as "Present Value" sums.

Assumptions about Costs

Costs were determined for each of the measures based on industry knowledge and past experience. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that will be used in marketing the measure. Measure costs were estimated for each year between 2005 and 2030. Costs were spread over the time period depending on the length of the implementation period for the measure.

Lost revenue due to reduced water sales is not included as a cost because the conservation measures evaluated herein generally take effect over a span of time that is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations.

Water Savings

Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to ten years after the start of implementation, depending upon the implementation schedule.

Where measures have a finite life, it was assumed that the agency would take steps to renew the measure by such actions as continuing to perform audits indefinitely so as to make the water savings permanent.

Overview of the CUWCC BMPs and Coverage Status

To begin the discussion of conservation analysis, it is important to understand the efforts that have been completed to date. *Table 1* shows the BMPs that have been either (a) completed (b) currently meeting the coverage requirements (c) not meeting coverage requirements or (d) not applicable. It is important to note that BMP 10 is not applicable for retail agencies.

Table 1
Current BMP Compliance for the City of Sonoma, as of June 30, 2005

CUWCC Best Management Practice Name	Meeting CUWCC Coverage Requirements (Compliance)	BMP Status
BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers	NO (YES AS OF AUGUST 2007)	Continue to pursue program.
BMP 02: Residential Plumbing Retrofit	COMPLETED	Have reached 75% saturation.
BMP 03: System Water Audits, Leak Detection and Repair	NO	If UFW higher than 10% BMP becomes a part of Tier One program. System audit completed in 2004
BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing	YES	No unmetred accounts.
BMP 05: Large Landscape Conservation Programs and Incentives	COMPLETED	Completed program on CII accounts in 2005.
BMP 06: High-Efficiency Washing Machine Rebate Programs	COMPLETED	Have reached coverage requirement.
BMP 07: Public Information Programs	YES	Have public information program.
BMP 08: School Education Programs	YES	Have school education program.
BMP 09: Conservation Programs for CII Accounts	COMPLETED	Completed program on CII accounts in 2005.
BMP 10: Wholesale Agency Assistance Programs	NOT APPLICABLE	Not wholesaler
BMP 11: Conservation Pricing	YES	Have uniform rate structure.
BMP 12: Conservation Coordinator	YES	Complies with this BMP
BMP 13: Water Waste Prohibition	YES	Water Conservation Ordinance complies with this BMP.
BMP 14: Residential ULFT Replacement Programs	YES	Continue to pursue program.

Conservation Measures Evaluated with the DSS Model

Table 2 is a table summarizing the 11 Tier One measures evaluated in the DSS Model. Some Tier One measures were split into components, such as indoor and outdoor savings (BMP 1) or single family and multi family (BMP 14). This was necessary to address all end uses in the model. The savings from the components of each measure are additive.

Table 2
Tier One Conservation Measures Evaluated in the DSS Model

Measure Number	CA BMP Number	Target Customer Category	Measure	Short Description
1	1	RSF, RMF	Residential Water Surveys - Indoor	This is the <u>indoor</u> component of indoor and outdoor water surveys for existing single-family and multi family residential customers. Normally those with high water use are targeted and provided customized report to homeowner.
2	1	RSF, RMF	Residential Water Surveys - Outdoor	This is the <u>outdoor</u> component of indoor and outdoor water surveys for existing single-family and multi family residential customers. Normally those with high water use are targeted and provided customized report to homeowner.
3	2	RSF, RMF	Residential Retrofit	Provide owners of pre-1992 homes with retrofit kits that contain easy-to-install low flow showerheads, faucet aerators, and toilet tank retrofit devices, until saturation reaches 75%.
4	5a	IRR	Water Budgets	90% - 100% of all irrigators of landscapes with separate irrigation accounts would receive a monthly or bi-monthly irrigation water use budget.
5	5b	BUS	Large Landscape Conservation Audits	All public and private irrigators of landscapes larger than one acre would be eligible for free landscape water audits upon request.
6	6	RSF	Clothes Washer Rebate	Homeowners would be eligible to receive a rebate on a new water efficient clothes washer.
7	7	RSF, NRSF	Public Information Program	Public education would be used to raise awareness of other conservation measures available to customers. Programs could include poster contests, speakers to community groups, radio and television time, and printed educational material such as bill inserts, etc.
8	9	BUS	Commercial Water Audits	High water use accounts would be offered a free water audit that would evaluate ways for the business to save water and money.
9	14	RSF	Single Family Residential ULF Toilet Rebate	Homeowners would be eligible to receive a rebate to replace an existing high volume toilet with a new water efficient toilet.
10	14	RMF	Multi family Residential ULF Toilet Rebate	Homeowners would be eligible to receive a rebate to replace an existing high volume toilet with a new water efficient toilet.
11	3	All	System Water Audits, Leak Detection and Repair	Water provider will undertake annual system water audits and repair leaks proactively. The budget will be \$47,000 per year for 10 years with the net results unaccounted for water will be reduced below 10%.

Notes:

RSF = Residential Single Family
BUS = Business
COM = Commercial

RMF = Residential Multi Family
INS = Institutional
IND = Industrial

NRSF = New Residential Single Family
RES IRR = Residential Irrigation
COM IRR = Commercial Irrigation

Measure Assumptions, Unit Costs, Market Penetration

Attachment 1 summarizes all the water savings and cost assumptions for each measure for your agency. Do note that the unit costs vary according to the type of account being addressed. For example, a measure might cost a different amount for a residential single family account, than a residential multi family account.

Comparison of Individual Measures

Tables 3 and 4 are tables summarizing the evaluation of Tier One conservation measures for your agency. *Table 3* presents results through-2004 and *Table 4* presents results of Tier One measure going forward from 2005 and continuing until they are completed as per compliance with the CUWCC MOU.

These tables show how much water the measures would save on a 30-year average basis, how much they would cost and what the benefit-cost ratios are *if the measures were run on a stand-alone basis, i.e. without interaction or overlap from other measures that might address the same end use(s)*. Note that measures with benefit-cost ratios less than 1.0 are defined to be “not cost-effective”. Water savings shown are averaged over the 30-year analysis period and may be higher or lower in a particular year. Other key statistics are the cost of water saved in dollars per million gallons (\$/MG), and the benefit-cost ratios. Benefits and costs are defined below:

- *Utility benefits and costs:* those benefits and costs that the utility would receive or spend.
- *Community benefits and costs:* community benefits equal utility benefits plus customer energy (cost to heat water) benefits. Community costs include utility and customer costs.
- *Water Benefits:* based on the 2005 cost of SCWA water to the agency.
- *Costs for the utility:* include measure set-up, annual administration of private contractor contracts or in-house staff, and payment of rebates or purchase of devices or services as specified in the measure design.
- *Customer costs:* include costs of implementing the measure and maintaining its effectiveness over the life of the measure. For example, customer costs for BMP 5b include retrofitting the irrigation system to achieve the water savings indicated by the landscape irrigation audit.

NOTE: Individual measure water savings are not additive in Tables 3 - 4 due to measure overlap.

From Tables 3 - 4 the following observations can be made:

- The most cost-effective Future Tier One measure is the landscape water budget program (BMP 5a), from the Utility perspective.
- For Future Tier One Conservation BMP 1a has the lowest benefit-cost ratio which is less than one, indicating it is not cost-effective.
- Toilet rebates in multi family have been more cost-effective than single family.

Table 3**Historical Tier One Conservation Measure Costs and Savings To 2004**

Tier One Conservation Measure		Water Utility Benefit-Cost Ratio	Total Community Benefit-Cost Ratio	“30-year” Average Water Savings (MGD)	Cost of Savings per Unit Volume (\$/MG)	Estimated Historic Utility Cost
1	BMP 1a - Residential Water Surveys-Indoor	NC	NC	NC	NC	NC
2	BMP 1b - Residential Water Surveys-Outdoor	NC	NC	NC	NC	NC
3	BMP 2 - Residential Retrofit	2.48	14.40	0.0297	\$352.62	\$118,602
4	BMP 5a - Landscape Water Budgets	4.00	4.00	0.0004	\$219.12	\$460
5	BMP 5b - Large Landscape Conservation Audits	0.57	0.34	0.0054	\$1,525.64	\$40,950
6	BMP 6 - Washing Machine Rebate	0.86	0.28	0.0021	\$1,030.38	\$24,668
7	BMP 7 - Public Information	0.95	2.15	0.0003	\$1,350.82	\$5,216
8	BMP 9 - Commercial Water Audits	0.82	0.61	0.0150	\$1,062.06	\$180,000
9	BMP 14 - ULF Toilet Rebate- Single Family	1.14	0.45	0.0080	\$814.42	\$73,847
10	BMP 14 - ULF Toilet Rebate- Multi family	2.08	0.83	0.0032	\$446.04	\$16,312

*NC. No Interventions completed by 2004.

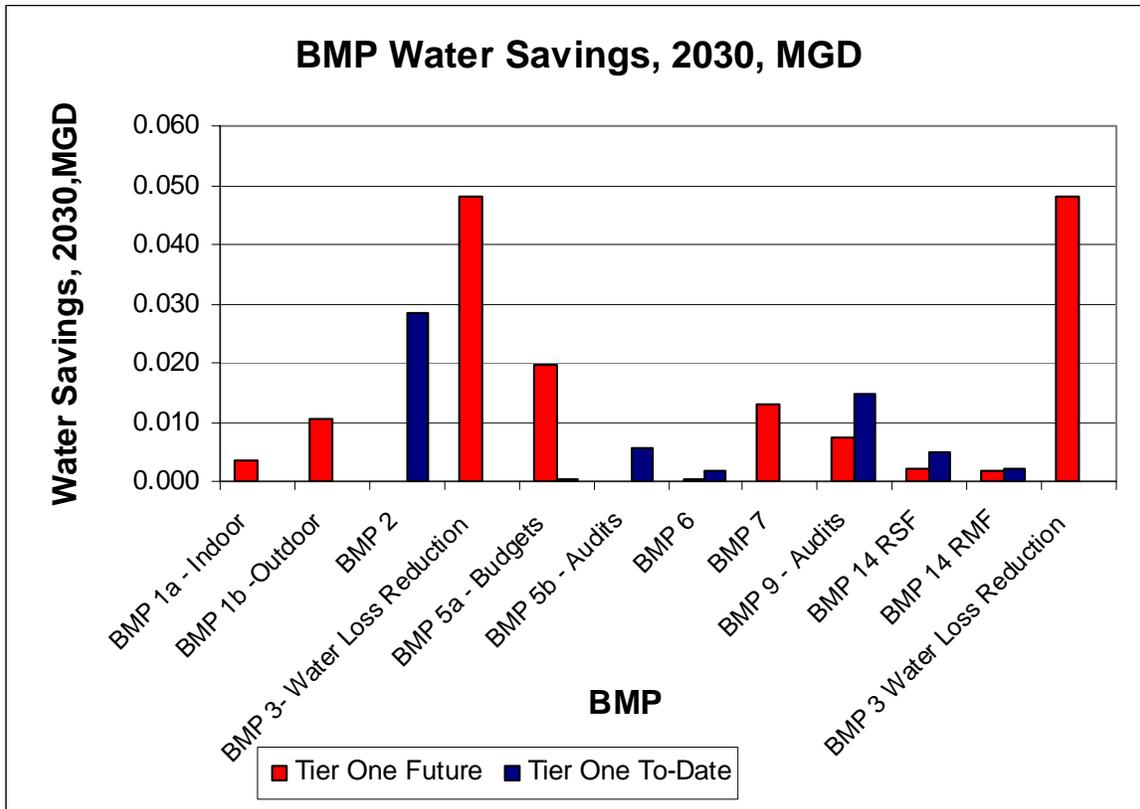
Table 4**Future Tier One Conservation Measure Costs and Savings 2005 to 2030**

Tier One Conservation Measure		Water Utility Benefit-Cost Ratio	Total Community Benefit-Cost Ratio	“30-year” Average Water Savings (MGD)	Cost of Savings per Unit Volume (\$/MG)	First Five Years of Utility Cost (2005-2009)
1	BMP 1a - Residential Water Surveys-Indoor	0.44	1.47	0.0031	\$1,875.65	\$18,450
2	BMP 1b - Residential Water Surveys-Outdoor	1.25	1.12	0.0086	\$656.58	\$17,749
3	BMP 2 - Residential Retrofit	NA	NA	NA	NA	NA
4	BMP 5a - Landscape Water Budgets	3.97	3.97	0.0189	\$212.97	\$6,728
5	BMP 5b - Large Landscape Conservation Audits	NA	NA	NA	NA	NA
6	BMP 6 - Washing Machine Rebate	0.84	0.27	0.0006	\$1,036.72	\$6,728
7	BMP 7 - Public Information	0.95	2.15	0.0106	\$921.52	\$28,506
8	BMP 9 - Commercial Water Audits	0.80	0.53	0.0072	\$1,066.95	\$90,000
9	BMP 14 - ULF Toilet Rebate- Single Family	0.98	0.39	0.0026	\$869.83	\$17,561
10	BMP 14 - ULF Toilet Rebate- Multi family	1.83	0.73	0.0021	\$466.23	\$7,363
11	BMP 3 - System Water Audits Leak Detection and Repair	0.82	0.82	0.0358	\$930.64	\$235,000

NA = Not Applicable

Figure 2 is a graphical representation of 2030 BMP water savings for each BMP to-date (through 2004) and future (2005 to 2030). 2030 savings are “individual year” savings and are different from the “30-year average” savings shown in Tables 3 and 4.

Figure 2
Tier One Conservation Measure Water Savings



3. RESULTS OF TIER ONE CONSERVATION ANALYSIS

Descriptions of Programs

For the analysis of conservation, this study divided conservation savings from the Tier One measures (CUWCC BMPs) into two separate parts. The first part is all historical savings to date. The second part is future savings. The name and description of these programs is provided below.

Program Tier One to 2004 – Historical Conservation Savings

This program is a consolidation of prior efforts through the year 2004. It includes measures that correspond to your current program. Your base demand projection already reflects these savings, as they are part of your base demand.

Program Tier One Future – Future Conservation Savings for Tier One Measures

This program was designed to be the future program with full compliance for “Tier One Measures” including all the CUWCC BMPs. Future includes actual achievements in 2005 and then participation rates starting in 2006 in accordance with those specified in the California Urban Water Conservation Council’s Memorandum Of Understanding, which may be higher (or lower) than you are currently

achieving. If you continue to implement the BMPs as planned, your future demands will be reduced by the amount of savings from Tier One future measures.

These programs are not intended to be rigid programs but rather to demonstrate the range in saving that could be generated if selected measures were run together. In this step we account for the overlap in water savings (and benefits) and estimate combined savings and benefits from programs or packages of measures.

Figure 3 shows how the Tier One prior efforts and the Tier One savings will change over time. In this representation the individual measures have been combined into overall programs that account for any measure overlap. It is noted that there is a slight decline in the prior Tier One measure savings that are affected by the plumbing codes (affecting toilets, showers, washing machines). This impact primarily affects BMPs 2, 6 and 14.

Tier One To-Date water savings are actually imbedded in the baseline 2004 water use that was arrived at in calibrating the water demand model. Therefore it is not possible to add the two curves in Figure 3. Only Tier One Future water savings should be considered as a way of meeting future water needs by 2030.

Table 5 presents key evaluation statistics compiled from the DSS model. Assuming all measures are successfully implemented, projected water savings for 2015 and 2030 in acre-feet and million gallons per day (MGD) are shown, as are the costs of achieving this reduction.

The costs are expressed three ways. Total present value over the 30-year period, the money utilities would need to budget in the first five years to get the program underway, and the cost of water saved.

The water savings are expressed as a percentage of the projected 2030 demand. Note that savings from Tier One measures slightly decline from 2015 to 2030 due to the plumbing code. For those Tier One measures that are not permanent and the savings would otherwise erode over time, additional expense is assumed to be planned to maintain the water savings constant.

The last column indicates the percentage of the new water demand for 2030 that each program could fill. In other words the amount of new water needed between 2005 and 2030 is 0.39 MGD (435 acre-feet) and Tier One Future could make up 27.5% of that need.

Figure 4 shows how the marginal returns change as more money is spent to achieve water savings. As the figure shows the cost versus savings curve is starting to decline after the completion of Tier One To-Date. This means that the added cost of going from that program to Tier One Future will save less per unit of expenditure. In other words Tier One Future is slightly less cost-effective as Tier One To-Date. This is confirmed by the lower benefit-cost ratio of Tier One Future relative to Tier One To-Date. Both programs, however, are cost-effective (Benefit-Cost Ratio greater than 1.0).

Figure 3

Tier One Conservation Measure Water Savings vs. Time

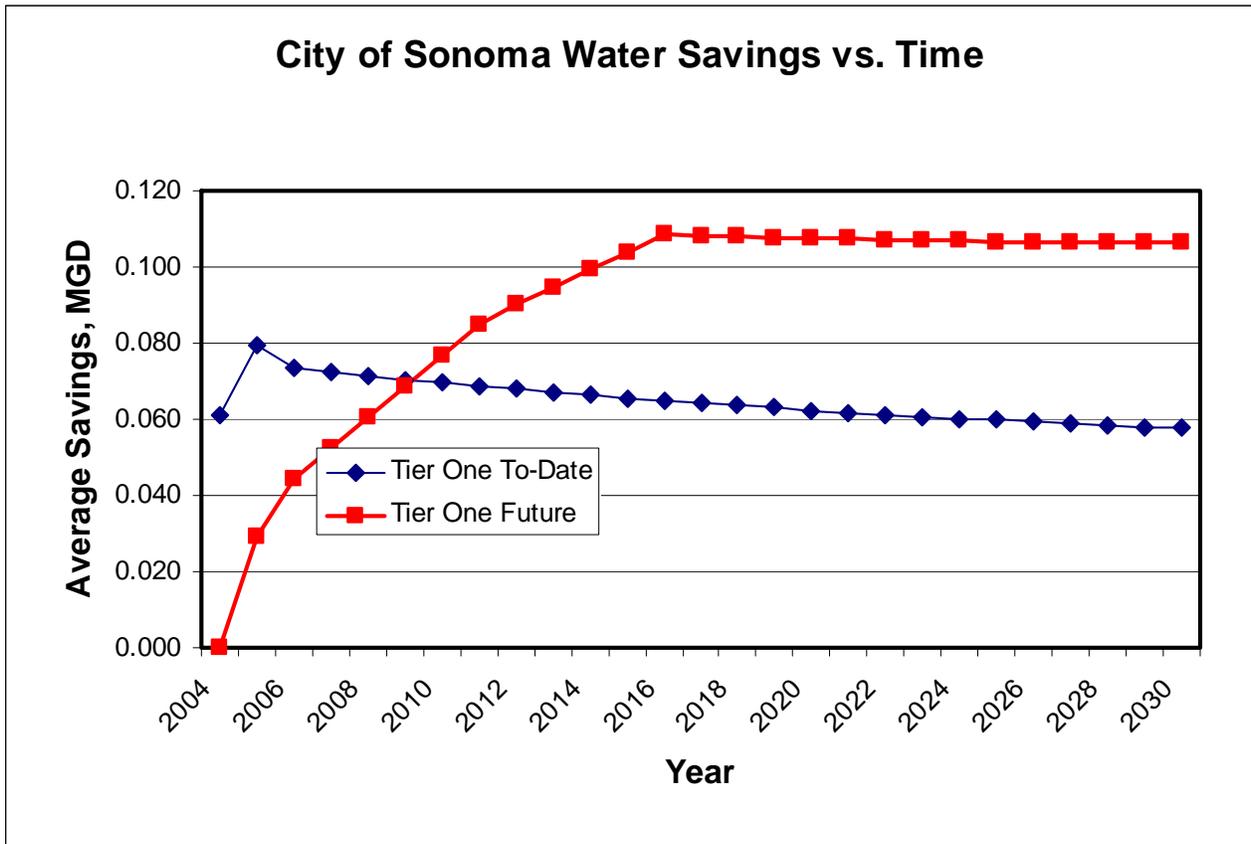


Figure 4

Present Value of Utility Cost versus Cumulative Water Saved in 2030

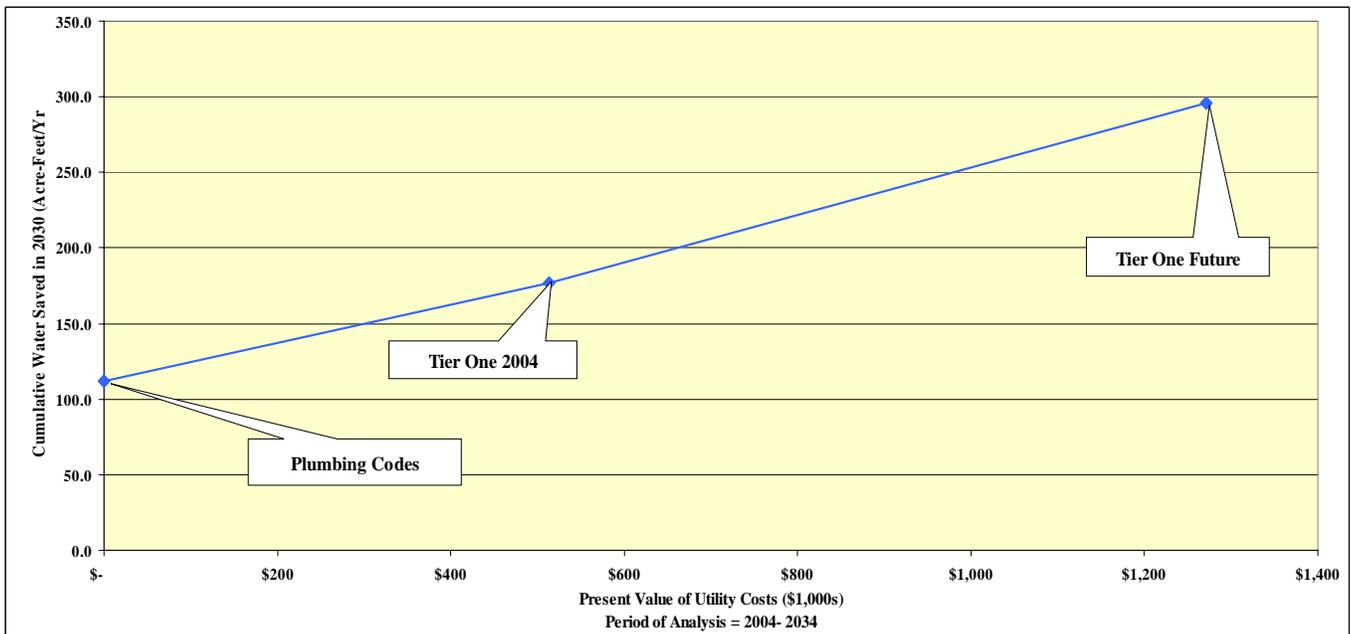


Table 5

Prior and Future Tier One Conservation Measure Programs - Costs and Savings

Conservation Program	Water Utility Benefit-Cost Ratio	2015 Water Savings (Acre-Feet/Yr)	2015 Water Savings (MGD)	2030 Water Savings (Acre-Feet/Yr)	2030 Water Savings (MGD)	2030 Indoor Water Savings (MGD)	2030 Outdoor Water Savings (MGD)	Total Water Savings as a % of Total Production in 2030	Present Value of Water Utility Costs (\$1,000s)	First Five Year Total Utility Costs (\$1,000s)	Cost of Water Saved (\$/AF)	% of New Water Needed from 2005 to 2030
Tier One To 2004	1.24	73.5	0.066	64.6	0.058	0.049	0.009	2.12%	\$ 514	\$ 460	\$ 233	NA
Tier One Future	1.09	116.4	0.104	119.2	0.106	0.019	0.039	3.91%	\$ 758	\$ 323	\$ 244	27.1%
Totals	1.15	189.9	0.170	183.7	0.164	0.068	0.048	6.03%	\$ 1,272	\$ 783	\$ 240	27.1%

Notes: Tier One measure savings are included in the baseline demand projections and are presented for information purposes only
 Present Value is determined using an interest rate of 3%
 Cost of water saved is present value of water utility cost divided by total 30-year water savings.
 First Five Year Cost for "Tier One to 2004" is 2004 to 2008
 First Five Year Cost for "Tier One Future" is 2005 to 2009

4. CONCLUSIONS

Relative Cost-Effectiveness of Programs

Sonoma's service area has relatively high per capita residential water use and a large proportion of outdoor water use. Consequently, residential conservation programs produce significant savings. Water use in the commercial sector is low, offering modest conservation potential. The CUWCC BMP 3, System Water Audits and Leak Detection produces high water savings.

Overall conclusions are:

- Total savings from Tier One conservation programs would be about 6.0 percent in 2030 (184 AF as shown on Table 5), 2.1 percent of which have already been achieved. In other words continued implementation of Tier One programs will reduce water needs in 2030 by 4 percent.
- For Future Tier One measures, 78% of the conservation potential in 2030 is in reducing indoor use; the rest is outdoor use reduction potential.
- Based on the projected growth rate in new accounts, future Tier One conservation could make up about 29 percent of the total future additional water needed by 2030, with benefit-cost ratio of 1.1 to 1.
- The average cost of water saved over 30-years is lower than the current price of SCWA water. Thus measures that are cost-effective at today's water rates will be more so if SCWA rates rise in the future.

NEXT STEPS

The following steps remain to be completed on evaluating conservation measures:

1. Review and approve, with comments, the Tier One measure evaluation for your agency.
2. Review and approve, with comments, the Tier Two measure evaluation for your agency, sent to you in a separate Technical Memorandum.

ATTACHMENTS

Attachment 1 Assumptions for the Tier One Measures (starting in 2005) Evaluated in the DSS Model

Attachment 1
Assumptions for Tier One Measures (starting in 2005) Evaluated in the DSS Model

	BMP 1a Residential Audits	BMP 1a Residential Audits	BMP 1b Residential Audits	BMP 1b Residential Audits	BMP 2 Plumbing Retrofits	BMP 3 System Audits & Leak Detection
Account Category	RSF	RMF	RSF	RMF	RSF / RMF	NA
Affected End Uses	Internal	Internal	External	External	Toilets, Faucets, Showers	NA
Percent Reduction in Water Use	5%	5%	10%	10%	5%/5%/21%	1.8%
CUWCC MOU Sign-on Year	2002	2002	2002	2002	2002	2002
Evaluation Start Year	2004	2004	2004	2004	2004	2007
Required Interventions Starting in 2005 (Accounts)	538	33	538	33	0	NA
Market Penetration by End Of Program,%	15	15	15	15	75	100%
Measure Life (years)	7	7	7	7	Permanent	Permanent
Initial Cost	\$ -	\$ -	\$ -	\$ -	\$ -	
Utility Unit Cost, per site one time cost	\$ 40.00	\$ 80.00	\$ 40.00	\$ 50.00	\$ 30.00	\$47,000/yr
Customer Unit Cost to achieve savings	\$ 10.00	\$ 30.00	\$ 5.00	\$ 20.00	\$ 0	--
Administration Cost, percent of unit cost	25%	25%	25%	25%	10%	--
Affected Units	dwelling unit	dwelling unit	dwelling unit	dwelling unit	1992 and older dwelling units	All
Comments					BMP 2 Complete	10-year program to reduce UFW below 10%

Notes:

RSF = Residential Single Family
 RMF = Residential Multi Family
 BUS/COM= Commercial
 IND = Industrial
 IRR = Dedicated irrigation meters
 INS = Institutional/Public, buildings / grounds owned by the Water Utility or City
 NRSF = New Single Family Homes
 GOV = Government
 INS = Public, buildings / grounds owned by the Water Utility or City
 NRSF = New Single Family Homes

Attachment 1
Assumptions for Tier One Measures (starting in 2005) Evaluated in the DSS Model

	BMP 5a Water Budgets	BMP 5b Water Audits	BMP 6 Washer Rebates	BMP 7 Public Education	BMP 9 CII Audits	BMP 14 Toilet Rebates
Account Category	IRR	BUS	RSF	RSF/RMF	BUS	RSF/RMF
Affected End Uses	Irrigation	Irrigation	Laundry	All	All	Internal
Percent Reduction in Water Use	15%	15%	34%	1%	12%	60%
CUWCC MOU Sign-on Year	2002	2002	2002	2002	2002	2002
Evaluation Start Year	2004	2004	2004	2004	2004	2004
Required Interventions Starting in 2005 (Accounts)	45	0	0	3584	7	180/24
Market Penetration by End Of Program, %	90	15	4.8	100	10	Match resale rate
Measure Life (years)	10	10	Permanent	2	Permanent	Permanent
Initial Cost	\$ -	\$ -	\$ -	\$ -	\$ -	NA
Utility Unit Cost, per site one time cost	\$ 400.00	\$ 1,500.00	\$ 75.00	\$ 2.50	\$ 4,000.00	\$50
Customer Unit Cost to achieve savings	\$ -	\$ 1,000.00	\$ 200.00	\$ -	\$ 2,000.00	\$75
Administration Cost, percent of unit cost	15%	30%	30%	25%	50%	included
Affected Units	Irrigation accounts	large landscape accounts	per dwelling unit	per dwelling unit	CII accounts	per toilet
Comments			BMP 6 complete			Complete in 2011

Notes:

- RSF = Residential Single Family
- RMF = Residential Multi Family
- BUS/COM= Commercial
- IND = Industrial
- IRR = Dedicated irrigation meters
- INS = Institutional/Public, buildings / grounds owned by the Water Utility or City
- NRSF = New Single Family Homes
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- INS = Public, buildings / grounds owned by the Water Utility or City
- NRSF = New Single Family Homes



MEMORANDUM

Date: November 2, 2006

To: Al Bandur, City of Sonoma

From: William Maddaus, Maddaus Water Management

Subject: *FINAL Tier Two and New Development Conservation Measure Evaluation Summary of Data Inputs, Assumptions and Results*

INTRODUCTION AND PURPOSE

This final memorandum on the conservation evaluation process for your agency has been revised to better reflect the true avoided costs of saving water. The analysis has been changed by using a future cost of water from the Sonoma County Water Agency plus a value that represents the approximate cost of distributing this water to your customers. All other measure costs and water savings remain unchanged from the draft Tier Two and New Development conservation measure evaluation memorandum.

The purpose of this memorandum is to present an overview of the conservation evaluation process which has been completed for your agency. The evaluation was performed on the Tier Two measures and potential New Development measures to make new single family homes more water efficient. The conservation measures were analyzed using the Least Cost Planning Decision Support System (DSS) Model. These conservation measures were then organized into three programs showing benefits, costs, and water savings for Tier One plus Tier Two measures, Tier One plus New Development measures, and finally Tier One plus Tier Two plus New Development measures for your agency. Each of these programs will be discussed in detail in this memorandum.

CONTENTS

This technical memorandum provides a general overview for the methodology, assumptions, and results for the conservation analysis.

The following four pieces of information are included in this packet:

1. Overview of Evaluation Process
2. Comparison of Individual Conservation Measures
3. Results of Tier Two and New Development Conservation Analysis
4. Conclusions

Each of these will be discussed in individual sections below.

1. OVERVIEW OF EVALUATION PROCESS

Selecting Conservation Measures to be Evaluated (Conservation Measure Screening):

A list of 75 potential conservation measures considered appropriate for this region was developed by Maddaus Water Management from known technology that included devices or programs (e.g., such as a new dual flush toilet) that would save water if installed by a water retailer, contractor, or customer. These measures are considered to be beyond the Tier One measures. A description of the potential conservation measure was developed that addressed the methods through which the device or program will be implemented, including the distribution method, or mechanism, that would be used to activate the device or program.

A screening process was undertaken to reduce the number of measures to a more manageable number and to eliminate those measures that are not as well suited to the Marin-Sonoma County area as other potential measures. Each potential measure was screened based on four qualitative criteria (below), scored on a scale of 1 to 5, with 5 being the most acceptable, and 20 being the maximum possible number of points for all criteria. The screening was completed by local conservation professionals, in a one day meeting in July 2005, facilitated by Maddaus Water Management.

Qualitative Criteria

The rating group used the following criteria to evaluate the measures:

- **Technology/Market Maturity** – Refers to whether the technology needed to implement the conservation measure, such as an irrigation control device, is commercially available and supported by the local service industry. A measure was scored low if the technology was not commercially available or high if the technology was widely available in the service area. A device may be screened out if it is not yet commercially available in the region.
- **Service Area Match** – Refers to whether the measure or related technology is appropriate for the area's climate, building stock, or lifestyle. For example, promoting Xeriscape gardens for multi-family or commercial sites may not be appropriate where water use analysis indicates little outdoor irrigation. Thus, a measure scored low in this category if it was not well suited for the area's characteristics and could not save water. A measure scored high in this criterion if it was well suited for the area and could save water.
- **Customer Acceptance/Equity** – Refers to whether retail customers within the wholesale customer service area would be willing to implement and accept the conservation measures. For example, would retail customers attend homeowner irrigation classes and implement lessons learned from these classes? If not, then the water savings associated with this measure would not be achieved and a measure with this characteristic would score low for this criterion. This criterion also refers to retail customer equitability (i.e., one category of retail customers receives benefit while another pays the costs without receiving benefits). Retail customer acceptance may be also based on convenience, economics, perceived fairness, or aesthetics.
- **Relative Effectiveness of Measure Available** – Refers to the selection of the most effective measure if alternate conservation measures address the same end use. If the

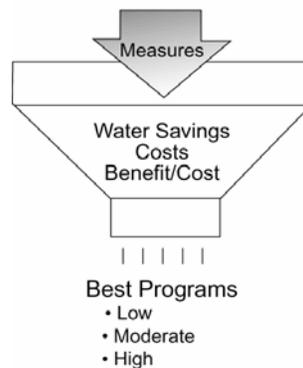
measures are equally effective the most appropriate was selected (e.g., the measure that was easier or less expensive to implement).

Measures with low scores were eliminated from further consideration, while those with high scores passed into the next evaluation phase (cost-effectiveness analysis using the DSS Model). To reduce the list to a more manageable number, normally a score of 17 or more was necessary to pass. The process reduced the measures to be evaluated further down to about 22 new measures in addition to the 10 Tier One measures. **Table 4** lists all 32 measures evaluated with the DSS Model.

Evaluation Process

During the evaluation process, water savings were estimated and costs for the measures were developed. Benefits and costs were compared in a formal present value analysis and conclusions were drawn about which measures produce cost-effective water savings. This process can be thought of as an economic screening process, shown in Figure 1. Packaging the best measures into alternative programs is how we are helping you to consider what level of conservation is appropriate for your agency.

Figure 1
Evaluation Process



Benefit-cost analysis has been used by many water agencies to evaluate and help select a water conservation measure best suited to local conditions. This analysis requires a locale-specific set of data, such as historical water consumption patterns by customer class, population and employment projections, age of housing stock, and prior conservation efforts.

The following nine steps were used to implement the methodology by expanding upon the same DSS model used to prepare the demand projections.

1. *Develop baseline water use projections without additional conservation.* Projections cover each key customer category and are broken down into indoor end uses and outdoor end uses. These were presented in previous memoranda. Note, the plumbing code refers to savings from the Energy Act; it is not the same as savings from BMP conservation.
2. *Identify possible water conservation measures* and screen the measures qualitatively to identify those that are applicable to the service area. Develop appropriate unit water savings and cost factors for each measure.
3. *Estimate the affected customers (or number of accounts) for each conservation measure* by dividing the measure's projected customers (or accounts) that implements the measure

by the total service area customers (accounts). This factor is called the market penetration or installation rate.

4. *Estimate total annual average and peak day water savings.* The water savings are computed by multiplying unit water savings, per measure, by the market penetration or installation rate, and then multiplying by the number of units in a particular service area (such as dwelling units) targeted by a particular measure.
5. *Identify benefits to the water agency* including potential reduced water purchases (SCWA wholesale water rate and delivery cost for each agency).
6. *Quantify total benefits for each year* in the planning period by multiplying average water savings for each measure by the computed value of the benefits.
7. *Determine initial and annual costs to implement the measures* based upon pilot projects, local experience, and the costs of goods, services, and labor in the community. This is multiplied by the number of units participating each year and then added to overall administration and promotion costs to arrive at a total measure cost, which may be spread over a number of years.
8. *Compare benefits and costs of measures* by computing the present value of costs and benefits over the planning period.
9. *Compile and compare packages containing various new measures.*

2. COMPARISON OF INDIVIDUAL CONSERVATION MEASURES

Perspectives on Benefits and Costs

The determination of the economic feasibility of water conservation programs depends on comparing the costs of the programs to the benefits provided. The analysis was performed using the DSS model. The DSS model calculates savings at the end-use level; for example, the model determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. For this evaluation, benefits are based on reduced water purchases from SCWA at the forecasted 2020 Sonoma Aqueduct rate of \$921.72 per acre-foot¹ plus a value of \$437.09 per acre-foot² to represent water distribution costs (\$4,172 per million gallons total avoided cost).

Present value analysis is used to discount costs and benefits to the base year. From this analysis benefit-cost ratios of each measure are computed. When measures are put together in programs the interactions are accounted for by multiplying water use reduction factors together at the end use level. A water use reduction factor is 1.0 minus the water savings, expressed as a decimal. This avoids double counting when more than one measure acts to reduce the same end use of water.

Benefit-cost analysis can be performed from several different perspectives, based on who is affected. For planning water conservation programs for utilities, the perspectives most commonly used for benefit-cost analyses include the utility and the community. The "utility" benefit-cost analysis is based on the benefits and costs to the water provider. The "community" benefit-cost analysis includes the utility benefit and costs together with account owner/customer

¹ SCWA Future Water Supply Projects Financial Plan, 2004

² Appendix J, City of Petaluma Water Supply and Demand Analysis Report, Dodson Engineers, June 2006.

benefits and costs. These include customer energy benefits and costs of implementing the measure, beyond what the utility pays.

The utility perspective offers two advantages for this analysis. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving and supplying water. Second, because revenue shifts are treated as transfer payments, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. Because it is the water provider's role in developing a conservation plan that is paramount in this study, the utility perspective was primarily used to evaluate elements of the plan.

No evaluation perspectives are without shortcomings. The principal weakness of the utility perspective is that it does not count the benefits accrued or costs incurred outside of the utility. Therefore another perspective is also used – the community perspective. The community perspective is defined to include the utility costs and benefits and the customer costs and benefits. Costs incurred by customers striving to save water while participating in conservation programs are considered, as well as the benefits received in terms of reduced energy bills (from water heating costs). Other factors external to the utility, such as environmental effects, are not included in the benefit-cost analysis. Because these external factors are often difficult to quantify, they are frequently excluded from economic analyses, including this one.

Present Value Parameters

The time value of money is explicitly considered. The value of all future costs and benefits is discounted to 2004 (the base year) at the real interest rate of 3.0%. The DSS model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). Cash flows discounted in this manner are herein referred to as "Present Value" sums.

Assumptions about Costs

Costs were determined for each of the measures based on industry knowledge and past experience. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that will be used in marketing the measure. Measure costs were estimated for each year between 2005 and 2030. Costs were spread over the time period depending on the length of the implementation period for the measure.

Lost revenue due to reduced water sales is not included as a cost because the conservation measures evaluated herein generally take effect over a span of time that is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations.

Water Savings

Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to ten years after the start of implementation, depending upon the implementation schedule.

Conservation Measures Evaluated with the DSS Model

Upon inspection of the overall list of new measures it became apparent that some measures could be combined and others could be separated into two categories as follows:

- Measures that were voluntary and incentive based
- Measures that were regulatory and applied to new development only

This division was used to create two lists of measures that could be evaluated separately. Tier Two targets various types of customers and offers a range of incentives to enhance participation. New Development measures were targeted at single family homes (including town homes and condos), as this category represents the largest category of new development with the most water savings potential.

Table 1 is a table summarizing the 13 Tier Two measures, and 8 New Development measures evaluated in the DSS Model.

Table 1
Tier Two and New Development Conservation Measures Evaluated in the DSS Model

Measure Number	Target Customer Category	Measure	Short Description
T2 - 1	Existing Customers SF	Rain-sensor (shut off device) retrofit on irrigation controllers	Agency pays for the rain sensor, homeowner pays for the optional installation (\$35).
T2 - 2	Existing Customers SF, MF, CII	Cash for Grass (turf removal program)	Provide a rebate for customers who remove irrigated turf grass and replace it with low water using plants. The rebate would require that an appropriate irrigation system be installed for the replacement landscaping. Limited to \$500 rebate at \$1.00 per square foot.
T2 - 3	All Dedicated Irrigation Meter customers, IRR	Financial Incentives for Being Below Water Budget	For dedicated irrigation customers, link a landscape water budget to a retail water agency's rate schedule so that the dedicated irrigation meter customer pays less when their water use is at or under their water budget.
T2 - 4	Existing CII Customers with mixed water use (indoor and outdoor)	Financial Rebates for Irrigation Meters	Provide financial incentives/rebates for selected permits and equipment to convert mixed use meters to a separate dedicated irrigation meter. Model implementation program after City of Santa Rosa's Service Split program. Utility will provide a water budget for the new irrigation meter.
T2 - 5	Existing Customers SF, MF, CII, IRR	Smart Irrigation Controller Rebates	Provide an up to \$450 rebate for the purchase of a SMART irrigation controller and associated signal fees (up to \$150). Assume one controller for SF and two for all other customer categories. Minimum participant requirements: at least 500 sq ft of well maintained turf irrigated with an automatic irrigation control system.

T2 - 6	Existing Customers MF, CII, IRR	Financial Incentives/ Rebates for Irrigation Upgrades	For MF, CII and IRR customers with landscape, provide rebates for selected types of irrigation equipment upgrade including rain sensors. Model program after water agencies such as EBMUD or Contra Costa Water District.
T2 - 7	Existing Customers: CII	Hotel retrofit (w/financial assistance) - CII Existing	Following a free water audit, offer the hotel a rebate for equipment identified that would save water. Provide a rebate schedule for certain efficient equipment such as air-cooled ice machines, steamers, washers, cooling towers, and spray rinse valves.
T2 - 8	New Customers: CII	Offer new accounts reduced connection fees for installing efficient process equipment for selected businesses (restaurants, laundry mat, food/groceries and hospital)	Offer reduced water and sewer connection fees to new facilities to install water efficient equipment in new facilities that goes above and beyond the building code requirements. Model program after Santa Rosa's BAT program.
T2 - 9	Existing Customers: SF (North Marin only) , IRR	Synthetic Turf Rebate	Provide a rebate for replacing existing turf with synthetic turf. Market program to all irrigation customers (and single family for North Marin only).
T2 - 10	Existing Customers: SF & MF	High Efficiency Toilet (HET)	Provide a rebate or voucher for the installation of a high efficiency toilet (HET). HET are defined as any toilet to flush 20% less than an ULFT and include dual flush technology. Rebate amounts would reflect the incremental purchase cost.
T2 - 11	Existing Customers: SF	Dishwasher New Efficient	Provide a rebate to encourage homeowners to replace old inefficient dishwashers with new efficient dishwashers (meeting certain water efficiency standards, such as gallons/load).
T2 - 12	Existing Customers: CII	CII Rebates - replace inefficient water using equipment	Provide a rebate for a standard list of water efficient equipment. Included would be x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, replace once through cooling, add conductivity meters on cooling towers, etc.
T2 - 13	New Customers: CII	0.5 gal/flush urinals in new buildings	Require that new building be fitted with 0.5 gpf urinals rather than the current standard of 1.0-gal/flush models.
ND1	New Customers: SF	Rain-sensor shut off device on irrigation controllers	Require-sensor or rain shut off devices with all new automatic irrigation system installations on new homes.
ND2	New Customers: SF	Smart Irrigation Controller	Require developers to provide the latest state of the art SMART irrigation controllers. These SMART controllers have on-site temperature sensors or rely on a signal from

			a central weather station that modifies irrigation times at least weekly.
ND3	New Customers: SF	High Efficiency Toilet (HET)	Require developers to install a high efficiency toilet (HET). HET are defined as any toilet to flush 20% less than an ULFT and include dual flush technology.
ND4	New Customers: SF	Dishwasher New Efficient	Require developers to install an efficient dishwasher (meeting certain water efficiency standards, such as gallons/load).
ND5	New Customers: SF	Clothes washing machines requirement for new residential	Building departments would be responsible to ensure that an efficient washer was installed before new home occupancy.
ND6	New Customers: SF	Hot Water on Demand	Require developers to equip new homes with a hot water on demand system or tankless hot water heaters, such as those made by Metland Systems and others. These systems use a pump placed under the sink to recycle water sitting in the hot water pipes to the water heater.
ND7	New Customers: SF	High efficiency faucets and showerheads	Require developers to install lavatory faucets that flow at no more than 1.5 gpm, kitchen faucets at 2.2 gpm, and showerheads at 2.0 gpm.
ND8	New Customers: SF	Landscape and irrigation requirements	Enforce a regulation that specifies that homes be landscaped according to Xeriscape principals, with appropriate irrigation systems. (Combines with Smart Controller listed above). Goal is overall 25% in irrigation water use (measure 2 and 9 combined).

Notes: ND = New Development
T2 = Tier Two
SF = Residential Single Family
MF = Residential Multi Family
CII = Commercial/Industrial/Institutional
IRR = Dedicated irrigation meters

Measure Assumptions, Unit Costs, Market Penetration

Attachment 1 summarizes all the water savings and cost assumptions for each measure for your agency. Do note that the unit costs vary according to the type of account being addressed. For example, a measure might cost a different amount for a residential single family account, than a residential multi family account.

Comparison of Individual Measures

Tables 2 and 3 are tables summarizing the evaluation of Tier Two and New Development conservation measures for your agency. **Table 2** presents results for Tier Two and **Table 3** presents results of New Development measures going forward from 2007.

These tables show how much water the measures would save on a 30-year average basis, how much they would cost and what the benefit-cost ratios are *if the measures were run on a stand-alone basis, i.e. without interaction or overlap from other measures that might address the same*

end use(s). Note that measures with benefit-cost ratios less than 1.0 are defined to be “not cost-effective”. Water savings shown are averaged over the 30-year analysis period and may be higher or lower in a particular year. Other key statistics are the cost of water saved in dollars per million gallons (\$/MG), and the benefit-cost ratios. Benefits and costs are defined below:

- *Utility benefits and costs:* those benefits and costs that the utility would receive or spend.
- *Community benefits and costs:* community benefits equal utility benefits plus customer energy (cost to heat water) benefits. Community costs include utility and customer costs.
- *Water Benefits:* based on the 2020 cost of SCWA water to the agency plus distribution costs.
- *Costs for the utility:* include measure set-up, annual administration, and payment of rebates or purchase of devices or services as specified in the measure design.
- *Customer costs:* include costs of implementing the measure and maintaining its effectiveness over the life of the measure.

NOTE: Individual measure water savings are not additive in **Tables 2 and 3** due to measure overlap.

The column headings in **Tables 2 and 3** are defined as follows:

- *Water Utility Benefit-Cost Ratio = NPV of Utility of Benefits (based on reduced purchase of water from SCWA and distribution costs) divided by NPV of Utility Costs (see above)*
- *Total Community Benefit-Cost Ratio = NPV of Utility Benefits plus Customer Benefits (see above) divided by NPV of Utility plus Customer Costs (see above) where NPV = 30 year present value of annual costs discounted at 3 percent*
- *30-year Average Water Savings (MGD) = sum of annual average water savings (MGD) divided by 30 where MGD = million gallons per day*
- *Cost of Savings per Unit Volume (\$/MG) = NPV of Utility Costs divided by 30-year Average Water Savings *365 where MG = million gallons*
- *Five Years of Utility Costs (2007-2011) = sum of annual costs for period shown, undiscounted*

From **Tables 2 and 3** the following observations can be made:

- The most cost-effective Tier Two measure is the Financial Incentives for Being Below Water Budget, from the Utility perspective.
- For Tier Two conservation the synthetic turf and new efficient dishwasher measures have a low benefit-cost ratios (which is less than one), indicating they are not cost-effective measures.
- The most cost-effective New Development measure is the Smart Irrigation Controller for new residential, from the Utility perspective.
- Nine out of 13 Tier Two measures are cost effective from the Utility perspective.

- All eight of the New Development measures are cost effective from the Utility perspective.
- Five of the Tier Two measures and three of the New Development measures are cost effective from the community perspective, indicating that all other measures have relatively high customer costs.

Table 2
Tier Two Conservation Measure Costs and Savings

Conservation Measure		Water Utility Benefit-Cost Ratio	Total Community Benefit-Cost Ratio	“30-year” Average Water Savings (MGD)	Cost of Savings per Unit Volume (\$/MG)	Five Years of Utility Cost 2007-2011
T2-1	Rain-sensor (shut off device) retrofit on irrigation controllers	6.72	2.80	0.0038	\$373.15	\$6,676
T2-2	Cash for Grass (turf removal program)	1.57	0.87	0.0011	\$1,592.86	\$19,639
T2-3	Financial Incentives for Being Below Water Budget	16.46	0.92	0.0171	\$137.71	\$0
T2-4	Financial Rebates for Irrigation Meters	1.05	0.58	0.0001	\$2,393.87	\$2,259
T2-5a	Smart Irrigation Controller Rebates	0.78	0.66	0.0026	\$3,012.72	\$19,527
T2-5b	Smart Irrigation Controller Rebates	1.53	1.41	0.0068	\$1,529.88	\$30,786
T2-6	Financial Incentives/ Rebates for Irrigation Upgrades	3.33	1.85	0.0023	\$701.83	\$6,385
T2-7	Hotel retrofit (w/financial assistance) - CII Existing	13.22	5.08	0.0031	\$177.05	\$2,155
T2-8	Offer new accounts reduced connection fees for installing efficient process equipment for selected businesses (restaurants, laundry mat, food/groceries and hospital)	11.84	1.32	0.0019	\$197.14	\$1,011
T2-9	Synthetic Turf Rebate	0.33	0.18	0.0011	\$7,101.41	\$29,965
T2-10	High Efficiency Toilet (HET)	0.84	0.48	0.0093	\$2,768.75	\$148,551
T2-11	Dishwasher New Efficient	0.19	0.03	0.0002	\$12,764.90	\$16,690
T2-12	CII Rebates - replace inefficient water using equipment	0.93	0.37	0.0006	\$2,509.50	\$5,602
T2-13	0.5 gal/flush urinals in new buildings	3.64	0.40	0.0004	\$650.15	\$609

Table 3
New Development Conservation Measure Costs and Savings

Conservation Measure		Water Utility Benefit-Cost Ratio	Total Community Benefit-Cost Ratio	“30-year” Average Water Savings (MGD)	Cost of Savings per Unit Volume (\$/MG)	Five Years of Utility Cost 2007-2011
ND1	Rain-sensor shut off device on irrigation controllers	22.43	4.49	0.0046	\$109.63	\$4,533
ND2	Smart Irrigation Controller	37.38	1.00	0.0077	\$65.78	\$4,533
ND3	High Efficiency Toilet (HET)	8.40	0.37	0.0040	\$279.15	\$9,973
ND4	Dishwasher New Efficient	1.83	0.06	0.0004	\$1,342.02	\$4,533
ND5	Clothes washing machines requirement for new residential	37.18	1.00	0.0077	\$66.14	\$4,533
ND6	Hot Water on Demand	25.49	0.99	0.0053	\$96.47	\$4,533
ND7	High efficiency faucets and showerheads	17.61	8.92	0.0036	\$139.63	\$4,533
ND8	Landscape and irrigation requirements	24.92	0.11	0.0051	\$98.67	\$4,533

Figures 2 to 5 are graphical representations of Tier Two and New Development water savings and costs for each measure in the future (2005 to 2030). Water savings are “individual year” savings and are different from the “30-year average” savings shown in **Tables 2 and 3**.

Important Note on Figures 2 and 3. Total water savings shown on **Figures 2 and 3** are approximate and slightly higher than will occur if all measures are run together as a program. This is due to multiple measures addressing the same end uses. Program savings (which account for the overlap) are provided in Section 3.

TIER 2 CONSERVATION WATER SAVINGS ESTIMATES - MEASURE 1 to 13

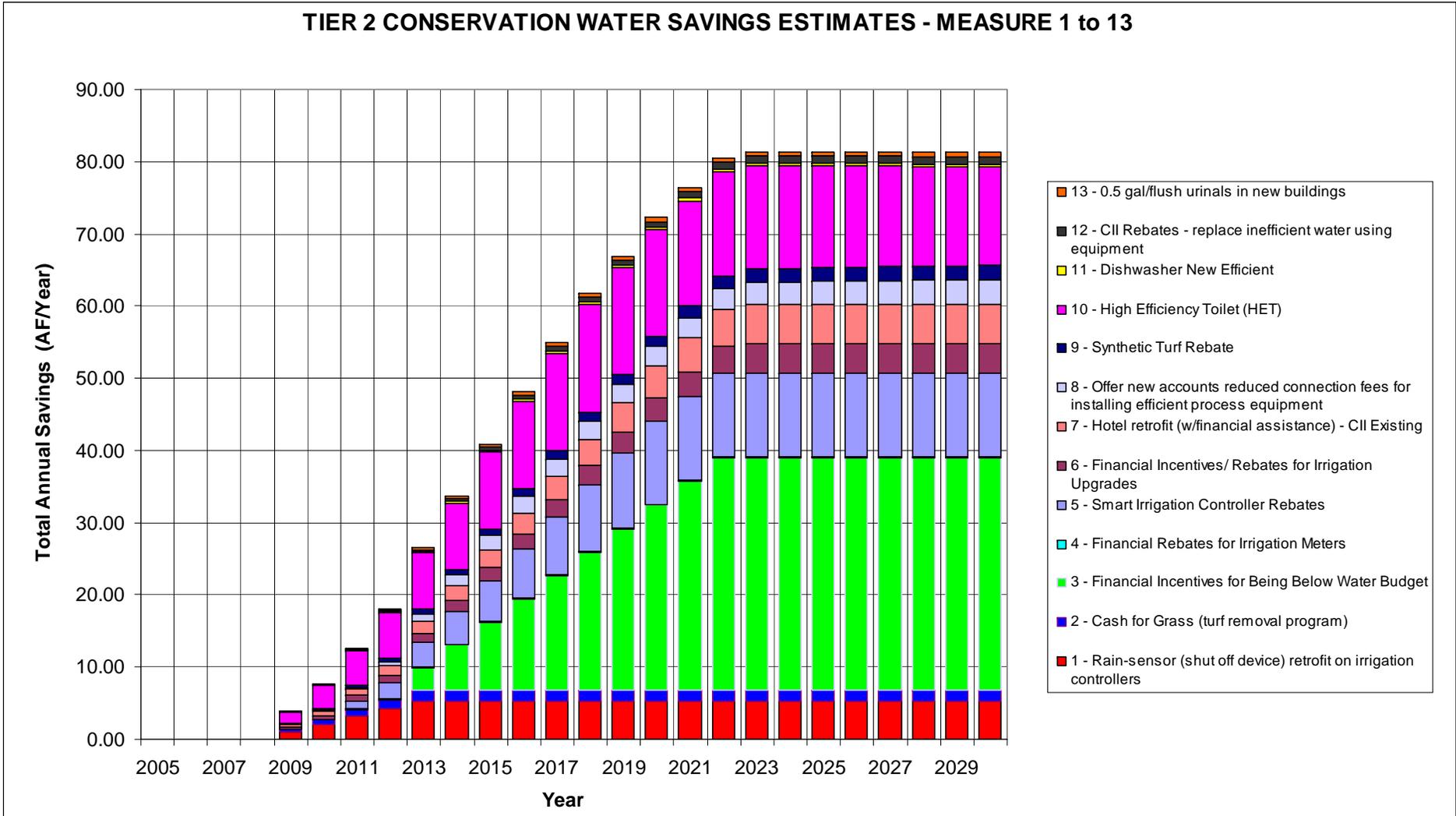


Figure 2: Conservation Savings from Tier Two Measures

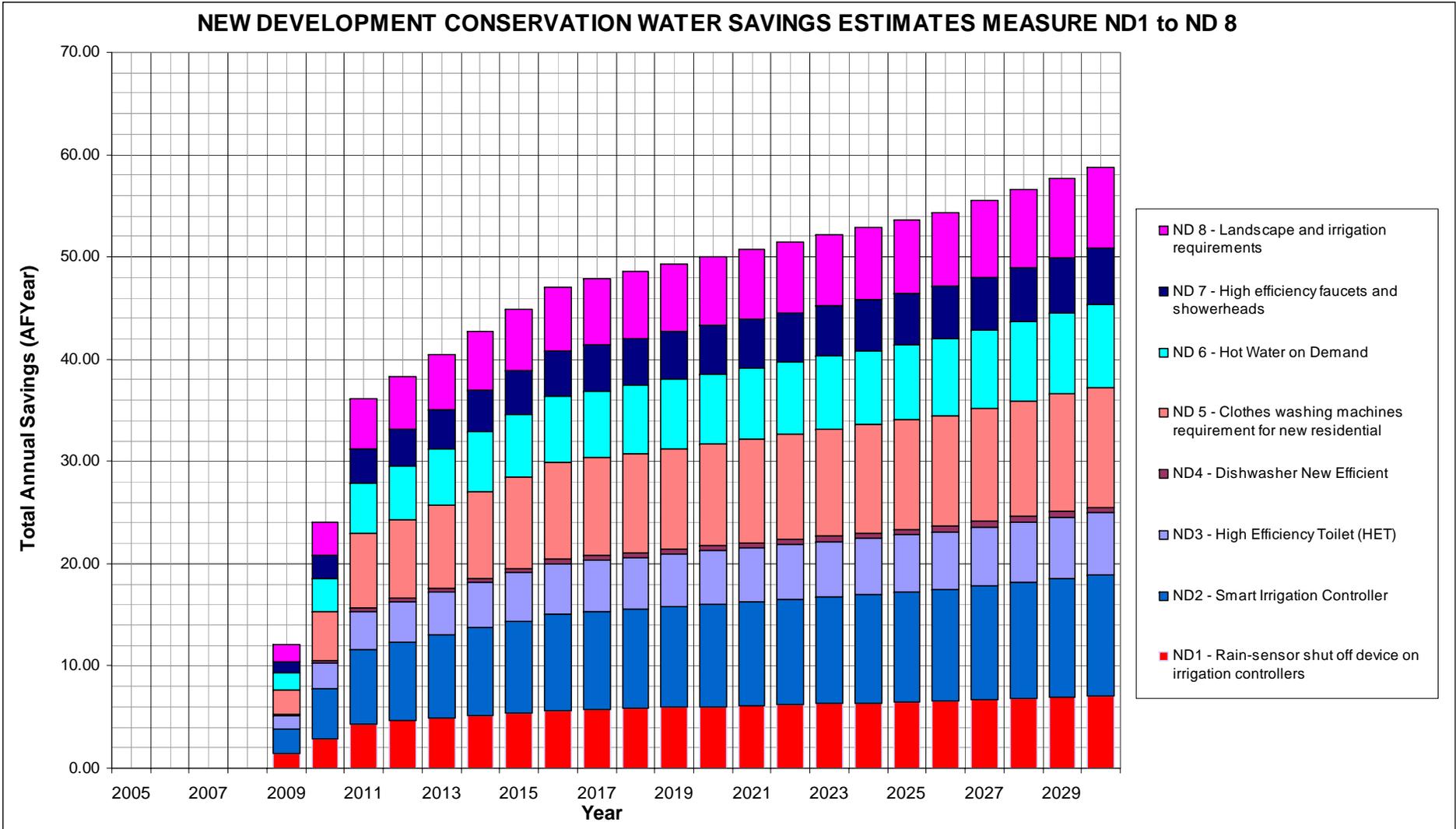


Figure 3: Conservation Savings from New Development Measures

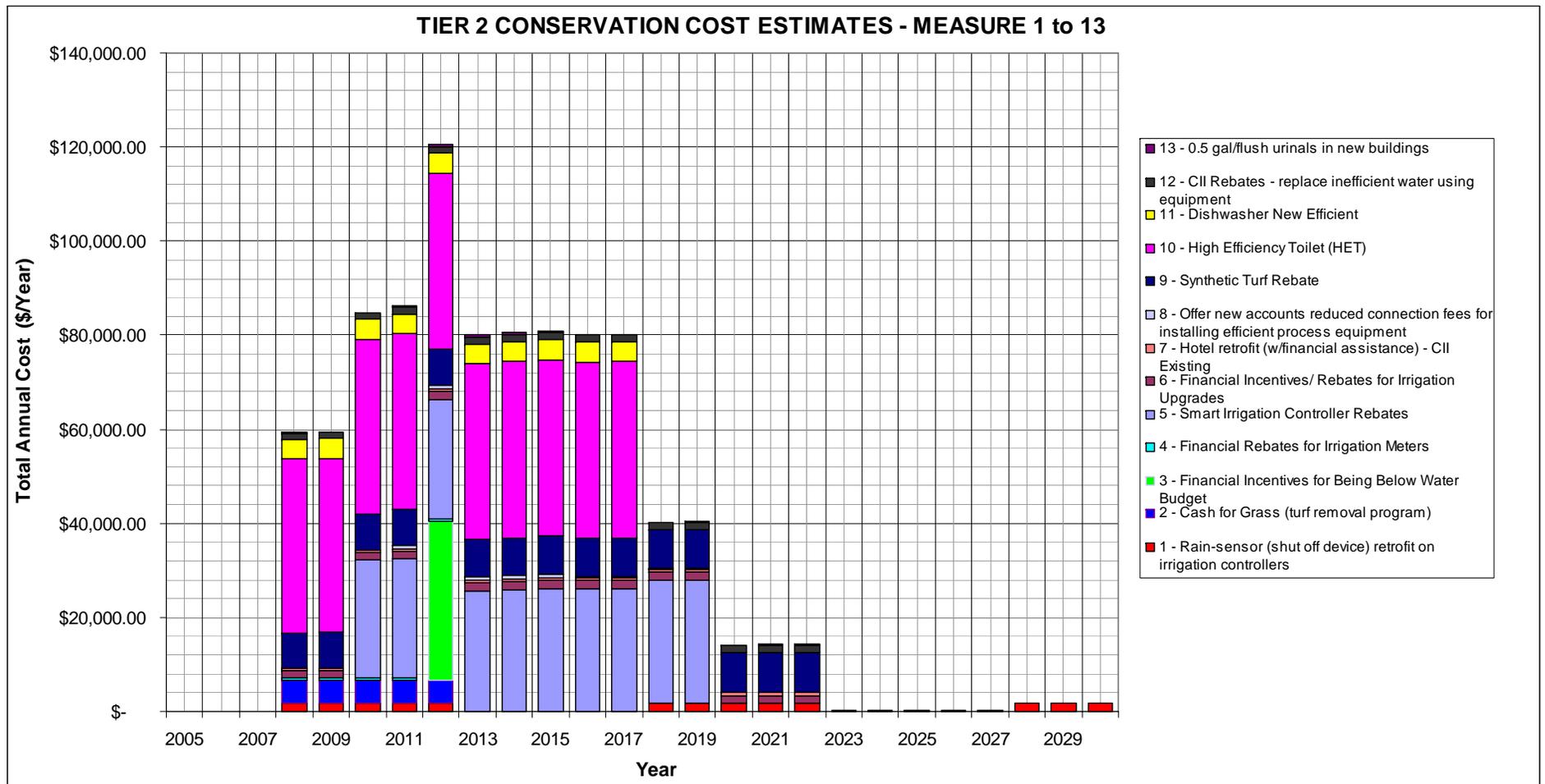
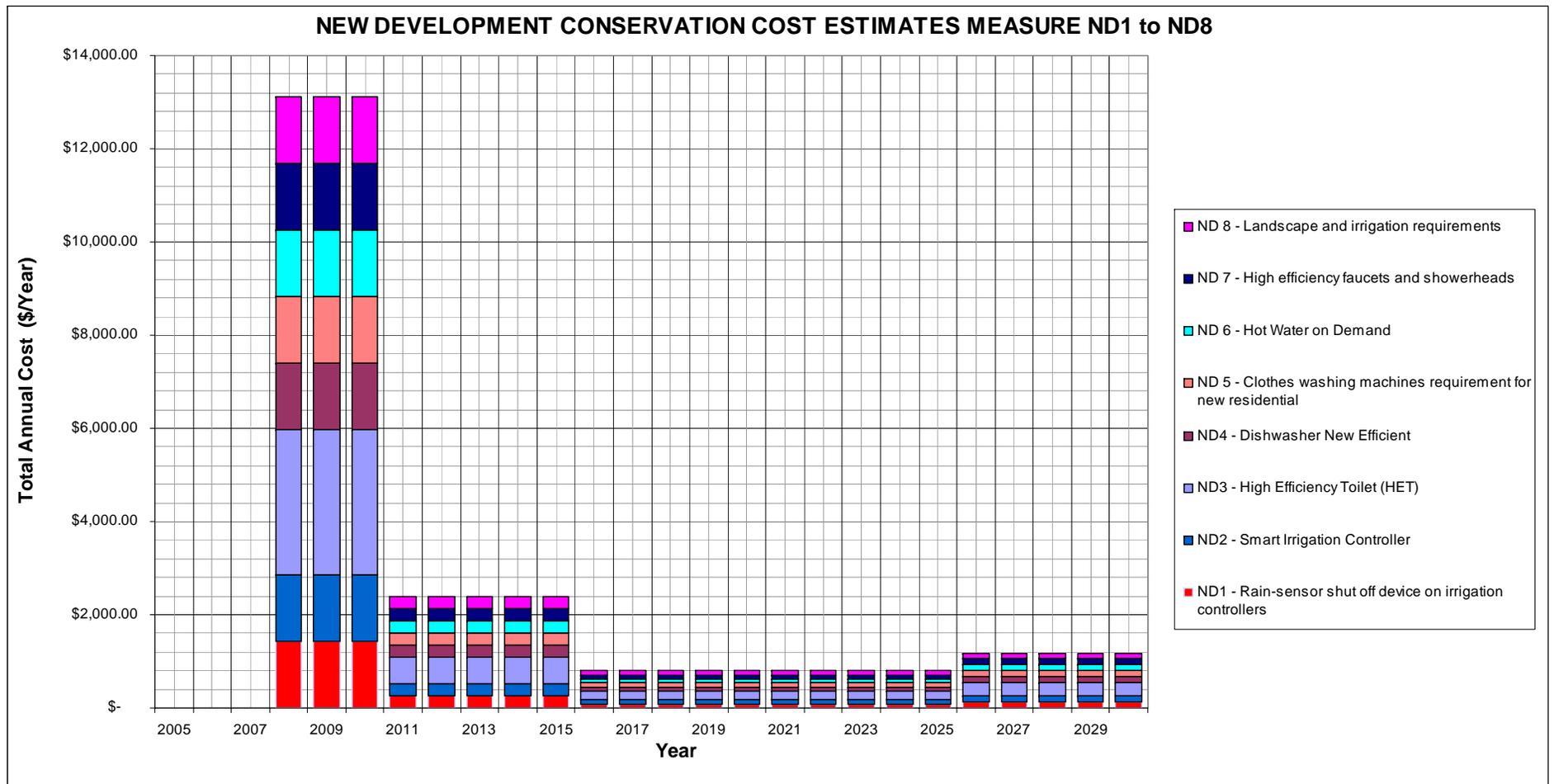


Figure 4: Conservation Costs from Tier Two Measures



Note: Utility costs depend upon the pace of new development, which depends on the projected growth in new single family accounts

Figure 5: Conservation Costs from New Development Measures

3. RESULTS OF TIER TWO AND NEW DEVELOPMENT CONSERVATION ANALYSIS

Table 4 provides a summary of which measures make up each of the three programs. The three programs are designed to illustrate an increasing level of water savings.

These programs are not intended to be rigid programs but rather to demonstrate the range in saving that could be generated if selected measures were run together. In this step we account for the overlap in water savings (and benefits) and estimate combined savings and benefits from programs or packages of measures.

A description of each program evaluated follows. Because Tier Two will commence in 2007 and some agencies will have continued to implement some Tier One measures since the base year of 2004, it is necessary to evaluate Tier Two and New Development measures in addition to the water savings generated by the completion of Tier One. The Tier One measure parameters have been updated based on comments received from agencies. Numerical changes to Tier One measures were minor with two exceptions. Both Sonoma and Valley of the Moon had an unaccounted for water reduction measure added as per the CUWCC requirements for compliance with BMP 3. For these agencies projected water savings from Tier One measures went up significantly. Other agency water savings from Tier One measures changed very little, if at all.

Program – Future Savings for Tier One + Tier Two Measures

Program Future Savings for Tier One + Tier Two Measures includes 13 additional measures beyond the CUWCC BMPs. Tier One Future was designed to be the future program with full compliance for all the CUWCC BMPs. The participation rates starting in 2004 are in accordance with those specified in the California Urban Water Conservation Council's Memorandum Of Understanding, which may be higher (or lower) than you are currently achieving. If you continue to implement these measures, your future water demands will be reduced by the amount of conservation savings. Descriptions of the Tier Two measures are in **Table 1** and cost and saving assumptions for each individual measure can be found in **Attachment 1**.

Program - Future Savings for Tier One + New Development Measures

Program Future Savings for Tier One + New Development Measures was designed to isolate the effects of the New Development measures that would be implemented as well as the completion of Tier One measures. These eight New Development measures target new single family homes only.

Program: Future Savings for All Measures Tier One, Tier Two, New Development

Program Future Savings for All Measures Tier One, Tier Two, New Development includes all 32 analyzed conservation measures. Do note that this is the theoretical maximum amount of conservation savings that are identified at this time. Also note that measures that either saved a small amount of water or were not cost-effective (Benefit-Cost ratio less than 1.0 and a high cost of water saved) were included here so as to represent the maximum water savings. Some of the Tier Two measures are small programs in that the target number of accounts is very small. So even though they appear to be relatively expensive from a measure point of view, their impact on the overall program costs and savings is relatively minor.

Table 4
Conservation Measures Selected for Programs

Description of Conservation Activity	Corresponding Measure Number	Program Tier One + New Development	Tier One + Tier Two	All Measures
BMP 1a - Residential Water Surveys-Indoor	Tier 1 - 1	X	X	X
BMP 1b - Residential Water Surveys-Outdoor	Tier 1 - 2	X	X	X
BMP 2- Plumbing Retrofits	Tier 1 - 3	X	X	X
BMP 5a - Landscape Water Budgets	Tier 1 - 4	X	X	X
BMP 5b - Large Landscape Conservation Audits	Tier 1 - 5	X	X	X
BMP 6 - Washing Machine Rebate	Tier 1 - 6	X	X	X
BMP 7 - Public Information	Tier 1 - 7	X	X	X
BMP 9 - Commercial Water Audits	Tier 1 - 8	X	X	X
BMP 14 - ULF Toilet Rebate- Single Family	Tier 1 - 9	X	X	X
BMP 14 - ULF Toilet Rebate- Multifamily	Tier 1 - 10	X	X	X
Tier 2 - 1 Rain Sensor Retrofit	Tier 2 - 1		X	X
Tier 2 - 2 Cash for Grass	Tier 2 - 2		X	X
Tier 2 - 3 Financial Incentives for Being Below Water Budget	Tier 2 - 3		X	X
Tier 2 - 4 Irrigation Meter Rebates	Tier 2 - 4		X	X
Tier 2 - 5a Smart Irrigation Controller Rebates - RSF	Tier 2 - 5a		X	X
Tier 2 - 5b Smart Irrigation Controller Rebates - RMF, CII, IRR	Tier 2 - 5b		X	X
Tier 2 - 6 Financial Incentives/Rebates for Irrigation Upgrades	Tier 2 - 6		X	X
Tier 2 - 7 Hotel Retrofit	Tier 2 - 7		X	X
Tier 2 - 8 New CII Reduced Connection Fees for Efficient Equipment	Tier 2 - 8		X	X

Description of Conservation Activity	Corresponding Measure Number	Program Tier One + New Development	Tier One + Tier Two	All Measures
Tier 2 - 9 Synthetic Turf Rebate	Tier 2 - 9		X	X
Tier 2 - 10 High Efficiency Toilets	Tier 2 - 10		X	X
Tier 2 - 11 Dishwasher New Efficient	Tier 2 - 11		X	X
Tier 2 - 12 CII Rebates - Replace Inefficient Water Using Equipment	Tier 2 - 12		X	X
Tier 2 - 13 New Commercial Urinals	Tier 2 - 13		X	X
ND1- Rain Sensor Retrofit	ND1	X		X
ND2 - Smart Irrigation Controller	ND2	X		X
ND3 - High Efficiency Toilets	ND3	X		X
ND4 - Dishwasher New Efficient	ND4	X		X
ND5 - Clothes Washing Machine Requirement	ND5	X		X
ND6 - Hot Water on Demand	ND6	X		X
ND7 - High Efficiency Faucets and Showerheads	ND7	X		X
ND8 - Landscape and Irrigation Requirements	ND8	X		X
TOTAL NUMBER OF MEASURES*		18	24	32

*Measures BMP 1a, 1b, 5a, 5b, 14, and Tier 2-5a and 5b are all counted as individual measures. These measures were split for more accurate evaluation.

Figure 6 shows annual water savings for each of these programs for the year 2005 to 2030.

Figure 6
Conservation Measure Programs - Annual Water Conservation Savings

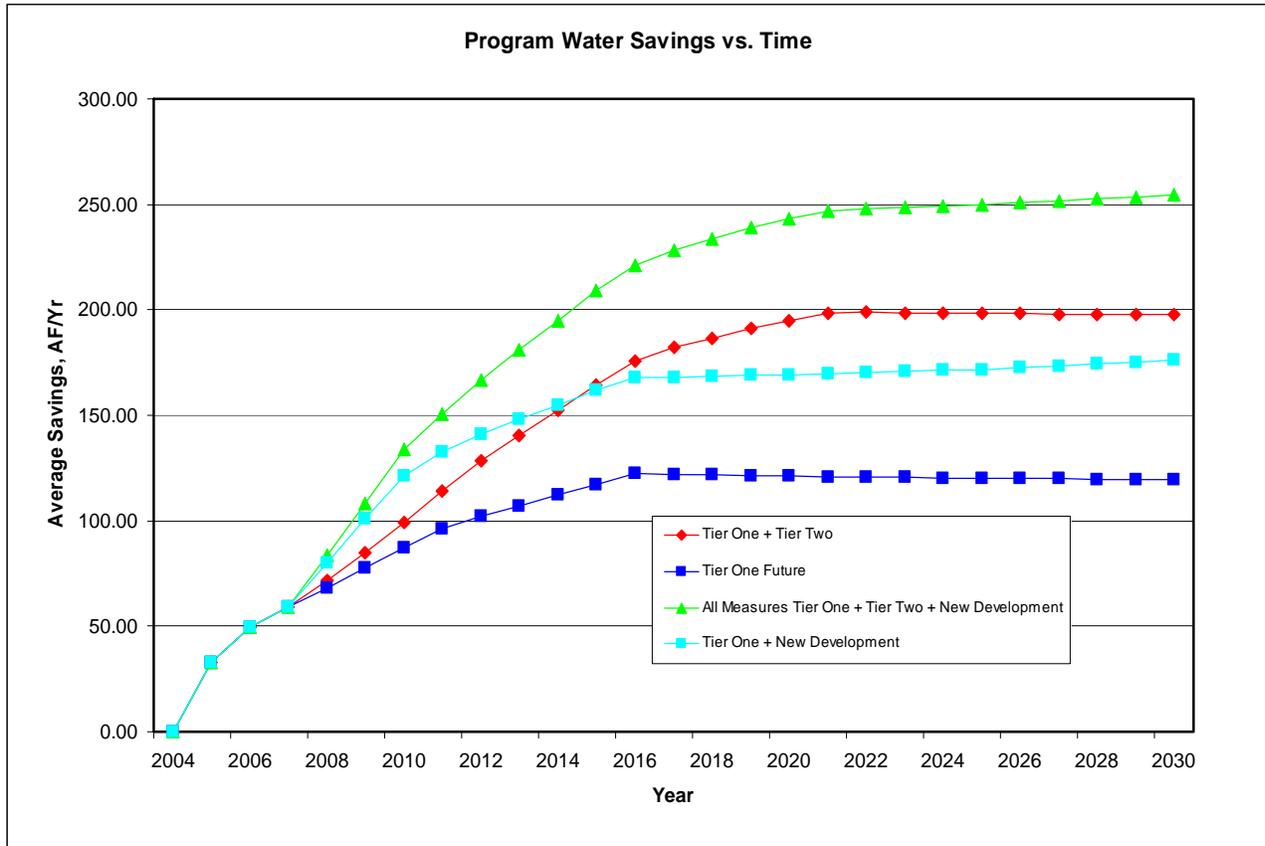


Table 5 presents key evaluation statistics compiled from the DSS model. Assuming all measures are successfully implemented, projected water savings for 2015 and 2030 in acre-feet and million gallons per day (MGD) are shown, as are the costs of achieving this reduction.

The costs are expressed three ways:

1. Total present value
2. The money utilities would need to budget in the first five years (2007-2011) to get new programs underway,
3. The cost of water saved. These costs include costs to complete Tier One measures, as needed.

The water savings are expressed as a percentage of the projected 2030 demand. The last column indicates the percentage of the new water demand for 2030 that each program could fill. That new water needed is over the next 25 years is the difference between 2005 demand with the plumbing code (2.33 MGD) and 2030 demand (2.71 MGD) with the plumbing code. The new water needed for your agency by 2030 is 0.39 MGD.

Table 5
Conservation Measure Programs - Costs and Savings

Conservation Program	Water Utility Benefit-Cost Ratio	2015 Water Savings (Acre-Feet/Yr)	2015 Water Savings (MGD)	2030 Water Savings (Acre-Feet/Yr)	2030 Water Savings (MGD)	2030 Indoor Water Savings (MGD)	2030 Outdoor Water Savings (MGD)	Total Water Savings as a % of Total Production in 2030*	Present Value of Water Utility Costs (\$1,000s)	Five Years Utility Cost 2007 to 2011 (\$1,000)	Cost of Water Saved (\$/AF)	% of New Water Needed from 2005 to 2030
Tier One Future	3.49	116.4	0.10	119.2	0.11	0.07	0.04	3.91%	\$ 758	\$ 303	\$ 244	27.1%
Tier One Future + Tier Two	2.60	162.8	0.15	196.9	0.18	0.09	0.09	6.47%	\$ 1,488	\$ 593	\$ 317	44.8%
Tier One Future + New Development	4.51	161.0	0.14	175.5	0.16	0.09	0.06	5.77%	\$ 811	\$ 345	\$ 185	39.9%
Tier One Future + Tier Two + New Development	3.16	207.4	0.19	253.3	0.23	0.11	0.11	8.32%	\$ 1,541	\$ 635	\$ 258	57.6%

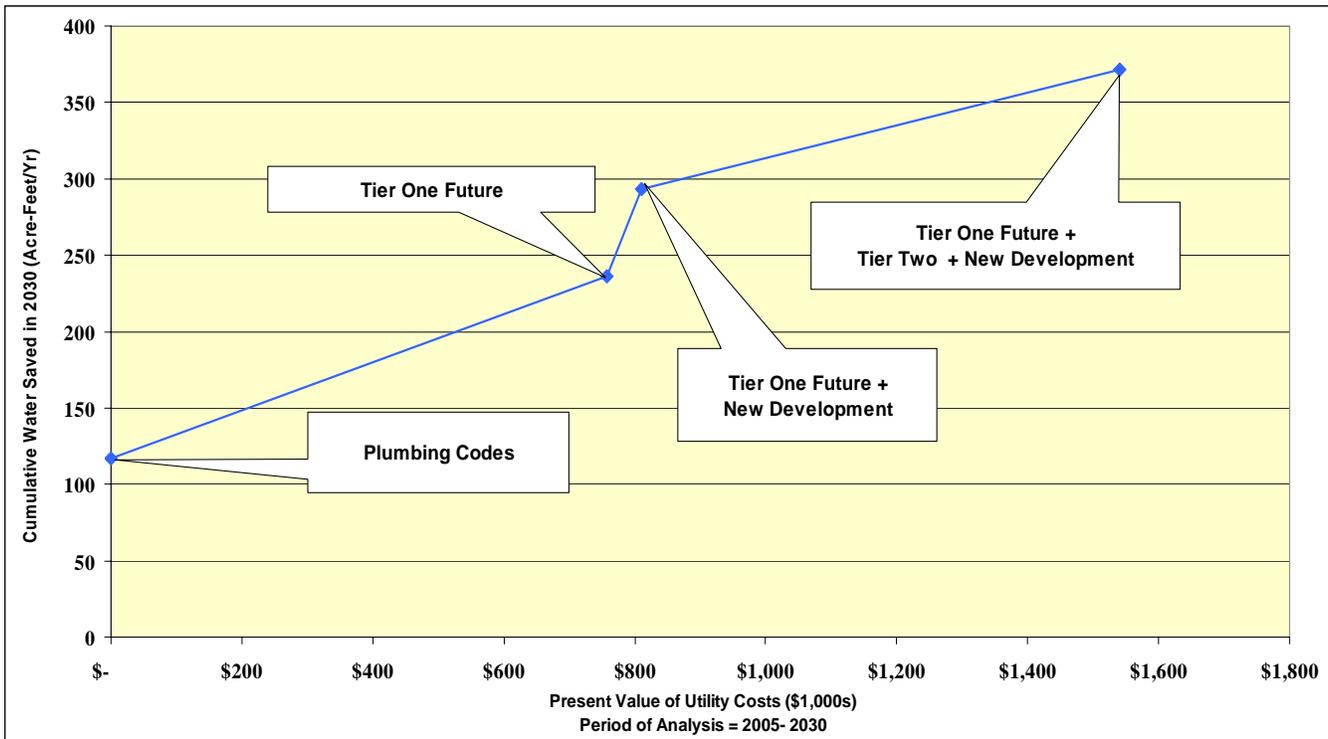
Notes:

- Present Value is determined using an interest rate of 3%
- Cost of water saved is present value of water utility cost divided by total 30-year water savings.
- Five Year Cost for all above programs is 2007 to 2011
- * % of water saved refers to the demand with the plumbing code

Figure 7 shows how marginal returns change as more money is spent to achieve savings. As the figure shows the cost versus saving curve is starting to decline after Program Tier One + New Development. This means that the added cost of going from that Program to Tier One + Tier Two will save less water per unit expenditure. In other words there are diminishing returns when the curve starts to flatten out as Tier Two measures are added to the program. It is clear that the New Development measures are more cost-effective to the utility than Tier Two measures.

Figure 7

Present Value of Utility Costs versus Cumulative Water Saved in 2030



4. CONCLUSIONS

Relative Savings and Cost-Effectiveness of Programs

Sonoma's service area has relatively high proportion of residential water use and a significant amount of outdoor water use. Consequently, residential conservation programs produce the most savings. Water use in the commercial sector is low, offering modest conservation potential. Overall conclusions are:

- Total savings from all conservation programs would be about 8.3 percent in 2030 (253.3 AF as shown on **Table 5**). Implementation of all of the programs described in this memorandum will reduce water needs in 2030 by 8.3 percent.
- Savings contributed by Tier Two measures alone are 77.2 acre-feet in 2030 or 0.07 MGD. This equates to a 2.6 percent reduction in 2030 water demand.
- Savings contributed by the New Development measures alone are 56.3 acre-feet (0.05 MGD). This equates to a 1.9 percent reduction in 2030 water demand.
- Because of the projected relatively low growth rate in new accounts, future Tier One measures plus combinations of Tier Two and New Development conservation measures could make up about 40 to 58 percent of the total future additional water needed by 2030.
- The average cost of water saved for all of the programs from the utility standpoint (as shown on **Table 5**) are lower than the forecasted 2020 SCWA price of \$922 per AF.
- The cost for the New Development measures is largely funded by the builders of the new homes, which tends to reduce the overall cost to the utility.

ATTACHMENTS

Attachment 1 Assumptions for the Tier Two and New Development Measures Evaluated in the DSS Model

Attachment 1
Assumptions for Tier Two Measures Evaluated in the DSS Model

Measure	T2 - 1	T2 - 2	T2 - 3	T2 - 4	T2 - 5a	T2 - 5b	T2 - 6
Applicable Customer Classes	SF	Existing Customers SF, MF, CII	IRR	CII	SF	Existing Customers MF, CII, IRR	Existing Customers MF, CII, IRR
Applicable End Uses	Irrigation	IRR	Irrigation	Irrigation	Irrigation	Irrigation	Irrigation
Market Penetration by End Of Program	10%	1%	100%	10%	5%	20%	10%
Water Use Reductions For Targeted End Uses	9%	23%	15%	15%	15%	15%	15%
Program Length, years	5	5	10	5	10	10	15
Measure Life, years	10	permanent	permanent	permanent	21	permanent	permanent
Utility Unit Cost for SFaccounts, \$/unit	\$ 20.00	\$ 500.00	\$ 25,000.00	\$ -	\$ 450.00	\$ -	\$ -
Utility Unit Cost for MF accounts, \$/unit	--	\$ 500.00	\$ -	\$ -	\$ -	\$ 900.00	\$ -
Utility Unit Cost for non-Res accounts, \$/unit	--	\$ 500.00	\$ -	\$ 500.00	\$ -	\$ 900.00	\$ 500.00
Customer Unit Cost. \$/unit	\$ 35.00	\$ 500.00	\$ 10,000.00	\$ 500.00	\$ 100.00	\$ 100.00	\$ 500.00
Annual Utility Admin & Marketing Cost	25%	25%	35%	25%	30%	30%	25%

Notes:

- SF = Residential Single Family
- MF = Residential Multi Family
- CII = Commercial/Industrial/Institutional
- COM = Commercial
- IRR = Dedicated irrigation meters
- INS = Public, buildings / grounds owned by the Water Utility or City
- NRSF = New Residential Single Family Homes

Attachment 1
Assumptions for Tier Two Measures Evaluated in the DSS Model

Measure	T2 - 7	T2 - 8	T2 - 9	T2 - 10	T2 - 11	T2 - 12	T2 - 13
Applicable Customer Classes	Existing Customers: CII	New Customers: CII	IRR	SF, MF	SF	CII	COM New
Applicable End Uses	Indoor uses	Indoor uses	Irrigation	Toilet end use	Diswasher end use	Process end use	COM Urinal
Market Penetration by End Of Program	20%	75%	1%	20%	10%	10%	100%
Water Use Reductions For Targeted End Uses	20%	25%	90%	45 to 55%	34%	10%	65 to 75%
Program Length, years	15	30	15	10	10	15	30
Measure Life, years	permanent	permanent	permanent	permanent	permanent	permanent	permanent
Utility Unit Cost for SFaccounts, \$/unit	\$ -	\$ -	\$ -	\$ 150.00	\$ 100.00		\$ 50.00
Utility Unit Cost for MF accounts, \$/unit	\$ -		\$ -	\$ 150.00	--		
Utility Unit Cost for non-Res accounts, \$/unit	\$ 100.00	\$ 100.00	\$ 150,000.00		--	\$ 500.00	
Customer Unit Cost. \$/unit	\$ 200.00	\$1,000.00	\$ 150,000.00	\$ 150.00	\$ 700.00	\$1,000.00	\$ 500.00
Annual Utility Admin & Marketing Cost	25%	25%	25%	35%	25%	30%	25%

Notes:

- SF = Residential Single Family
- MF = Residential Multi Family
- CII = Commercial/Industrial/Institutional
- COM = Commercial
- IRR = Dedicated irrigation meters
- INS = Public, buildings / grounds owned by the Water Utility or City
- NRSF = New Residential Single Family Homes

Attachment 1
Assumptions for New Development Measures Evaluated in the DSS Model

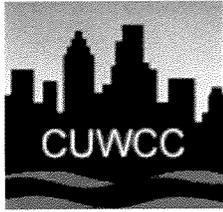
Measure	ND 1	ND 2	ND 3	ND 4	ND 5	ND 6	ND 7	ND 8
Applicable Customer Classes	NRSF	NRSF	NRSF	NRSF	NRSF	NRSF	NRSF	NRSF
Applicable End Uses	Irrigation	Irrigation	Toilet end use	Diswasher end use	Clothes Washer end use	Faucet and shower end use	Faucet and shower end use	Faucet and shower end use
Market Penetration by End Of Program	100%	100%	100%	100%	100%	100%	100%	100%
Water Use Reductions For Targeted End Uses	9%	15%	50 to 55%	34%	50%	14.2 gpd per house	15%	10%
Program Length, years	30	30	30	30	30	30	30	30
Measure Life, years	permanent	permanent	permanent	permanent	permanent	permanent	permanent	permanent
Utility Unit Cost for SFaccounts, \$/unit	\$ 12.50	\$ 12.50	\$ 12.50	\$ 12.50	\$ 12.50	\$ 12.50	\$ 12.50	\$ 12.50
Utility Unit Cost for MF accounts, \$/unit	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Utility Unit Cost for non-Res accounts, \$/unit	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Customer Unit Cost. \$/unit	\$ 55.00	\$ 500.00	\$ 300.00	\$ 400.00	\$ 500.00	\$ 700.00	\$ 50.00	\$3,000.00
Annual Utility Admin & Marketing Cost	10%	10%	10%	10%	10%	10%	10%	10%

Notes:

- SF = Residential Single Family
- MF = Residential Multi Family
- CII = Commercial/Industrial/Institutional
- COM = Commercial
- IRR = Dedicated irrigation meters
- INS = Public, buildings / grounds owned by the Water Utility or City
- NRSF = New Residential Single Family Homes
- ND = New Development

APPENDIX C

Best Management Practices Report Filing



Best Management Practices Report Filing

BMP 01 Coverage: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit:
City of Sonoma

You are viewing coverage for:

BMP 01
03-04

◀ **YRs** ▶
DN - UP

MOU Exhibit 1 Coverage Requirement

Agency indicated "at least as effective as" implementation during report period? No

◀ **BMPs** ▶
DN - UP

A Reporting Unit (RU) must meet three conditions to satisfy strict compliance for BMP 1.

Memorandum of Understanding

Condition 1: Adopt survey targeting and marketing strategy on time

Condition 2: Offer surveys to 20% of SF accounts and 20% of MF units during report period

Condition 3: Be on track to survey 15% of SF accounts and 15% of MF units within 10 years of implementation start date.

Back to Coverage Reports List

Test for Condition 1

Latest City of Sonoma to Implement Targeting/Marketing Program:	2004		
		Single-Family	Multi-Family
Year City of Sonoma Reported Implementing Targeting/Marketing Program:			
City of Sonoma Met Targeting/Marketing Coverage Requirement:		NO	NO

Test for Condition 2

		Single-Family	Multi-Family		
Latest Year Survey Program to Start:	2003				
					Residential Survey Offers (%)
Reporting Period:	03-04				
					Survey Offers ≥ 20%
		NO	NO		

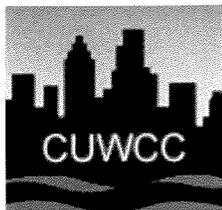
Test for Condition 3

Completed Residential Surveys

Single Multi-

	<u>Family</u>	<u>Family</u>
Total Completed Surveys through 2004		
Credit for Surveys Completed Prior to Implementation of Reporting Database		
	<hr/>	<hr/>
Total + Credit		
	<hr/>	<hr/>
Residential Accounts in Base Year	3,584	1,685
City of Sonoma Survey Coverage as % of Base Year Residential Accounts		
Coverage Requirement by Year 2 of Implementation per Exhibit 1	1.50%	1.50%
City of Sonoma on Schedule to Meet 10-Year Coverage Requirement	NO	NO

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Best Management Practices Report Filing

BMP 02 Coverage: Residential Plumbing Retrofit

Reporting Unit:
City of Sonoma

You are viewing coverage for:

BMP 02
03-04

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BMPs
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Back to Coverage Reports List

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one of three conditions to satisfy strict compliance for BMP 2.

Condition 1: The agency has demonstrated that 75% of SF accounts and 75% of MF units constructed prior to 1992 are fitted with low-flow showerheads.

Condition 2: An enforceable ordinance requiring the replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts is in place for the agency's service area.

Condition 3: The agency has distributed or directly installed low-flow showerheads and other low-flow plumbing devices to not less than 10% of single-family accounts and 10% of multi-family units constructed prior to 1992 during the reporting period.

Test for Condition 1

Report Year	Report Period	Single-Family		Multi-Family	
		Reported Saturation	Saturation > 75%?	Reported Saturation	Saturation > 75%?
1999	99-00	55.00%	NO	70.00%	NO
2000	99-00	55.00%	NO	70.00%	NO
2001	01-02	65.00%	NO	76.00%	YES
2002	01-02	82.00%	YES	78.00%	YES
2003	03-04	82.00%	YES	78.00%	YES
2004	03-04	82.00%	YES	78.00%	YES

Test for Condition 2

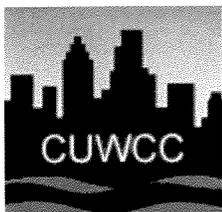
Report Year	Report Period	City of Sonoma has ordinance requiring showerhead retrofit?
1999	99-00	NO
2000	99-00	NO
2001	01-02	NO
2002	01-02	NO
2003	03-04	NO
2004	03-04	NO

Test for Condition 3

Reporting Period: 03-04

<u>1992 SF</u> Accounts	<u>Num. Showerheads Distributed to</u> SF Accounts	<u>Single-Family</u> Coverage Ratio	<u>SF Coverage</u> Ratio > 10%
3,584			NO
<u>1992 MF</u> Accounts	<u>Num. Showerheads Distributed to</u> MF Accounts	<u>Multi-Family</u> Coverage Ratio	<u>MF Coverage</u> Ratio > 10%
1,581			NO

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Best Management Practices Report Filing

BMP 03 Coverage: System Water Audits, Leak Detection and Repair

Reporting Unit:
City of Sonoma

You are viewing coverage for:

BMP 03
03-04

YRs
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MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

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An agency must meet one of two conditions to be in compliance with BMP 3:

Condition 1: Perform a prescreening audit. If the result is equal to or greater than 0.9 nothing more needs be done.

Condition 2: Perform a prescreening audit. If the result is less than 0.9, perform a full audit in accordance with AWWA's Manual of Water Supply Practices, Water Audits, and Leak Detection.

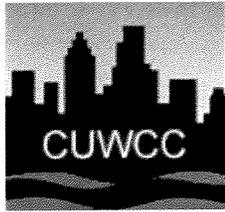
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Test for Conditions 1 and 2

<u>Report Year</u>	<u>Report Period</u>	<u>Pre-Screen Completed</u>	<u>Pre-Screen Result</u>	<u>Full Audit Indicated</u>	<u>Full Audit Completed</u>
1999	99-00				
2000	99-00				
2001	01-02				
2002	01-02	YES			NO
2003	03-04	YES	87.9%	Yes	NO
2004	03-04	YES	89.9%	Yes	YES

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Best Management Practices Report Filing

BMP 04 Coverage: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit:
City of Sonoma

You are viewing coverage for:

**BMP 04
03-04**

◀ **YRs** ▶
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MOU Exhibit 1 Coverage Requirement

Agency indicated "at least as effective as" implementation during report period? No

◀ **BMPs** ▶
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An agency must be on track to retrofit 100% of its unmetered accounts within 10 years to be in compliance with BMP 4.

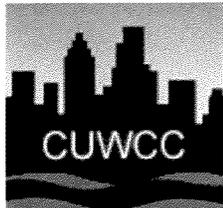
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Test for Compliance

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Total Meter Retrofits Reported through 2004	
No. of Unmetered Accounts in Base Year	
Meter Retrofit Coverage as % of Base Year Unmetered Accounts	
Coverage Requirement by Year 1 of Implementation per Exhibit 1	4.5%
RU on Schedule to meet 10 Year Coverage Requirement	YES

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Best Management Practices Report Filing

BMP 05 Coverage: Large Landscape Conservation Programs and Incentives

Reporting Unit:
City of Sonoma

You are viewing coverage for:

BMP 05
03-04

◀ **YRs** ▶
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◀ **BMPs** ▶
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MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet three conditions to comply with BMP 5.

Condition 1: Develop water budgets for 90% of its dedicated landscape meter accounts within four years of the date implementation is to start.

Condition 2: (a) Offer landscape surveys to at least 20% of its CII accounts with mixed use meters each report cycle and be on track to survey at least 15% of its CII accounts with mixed use meters within 10 years of the date implementation is to start OR (b) Implement a dedicated landscape meter retrofit program for CII accounts with mixed use meters or assign landscape budgets to mixed use meters.

Condition 3: Implement and maintain customer incentive program(s) for irrigation equipment retrofits.

Test for Condition 1

Year	Report Period	BMP 5 Implementation Year	No. of Irrigation Meter Accounts	No. of Irrigation Accounts with Budgets	Budget Coverage Ratio	90% Coverage Met by Year 4
1999	99-00	-4				NA
2000	99-00	-3				NA
2001	01-02	-2				NA
2002	01-02	-1				NA
2003	03-04		60			NA
2004	03-04	1	51	1	2.0%	NA

Test for Condition 2a (survey offers)

Select Reporting Period: 03-04

Large Landscape Survey Offers as % of Mixed Use Meter CII Accounts 6.8%

Survey Offers Equal or Exceed 20% Coverage Requirement NO

Test for Condition 2a (surveys completed)

Total Completed Landscape Surveys Reported through Credit for Surveys Completed Prior to Implementation of Reporting Database	21
Total + Credit	21

CII Accounts in Base Year	370
RU Survey Coverage as a % of Base Year CII Accounts	5.7%
Coverage Requirement by Year of Implementation per Exhibit 1	0.7%
RU on Schedule to Meet 10 Year Coverage Requirement	YES

Test for Condition 2b (mixed use budget or meter retrofit program)

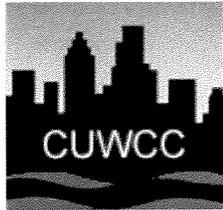
<u>Report Year</u>	<u>Report Period</u>	<u>BMP 5 Implementation Year</u>	<u>Agency has mix-use budget program</u>	<u>No. of mixed-use budgets</u>
1999	99-00	-4		
2000	99-00	-3		
2001	01-02	-2		
2002	01-02	-1	NO	
2003	03-04		NO	
2004	03-04	1	NO	

<u>Report Year</u>	<u>Report Period</u>	<u>BMP 4 Implementation Year</u>	<u>No. of mixed use CII accounts</u>	<u>No. of mixed use CII accounts fitted with irrig. meters</u>
1999	99-00	-4		
2000	99-00	-3		
2001	01-02	-2		
2002	01-02	-1		
2003	03-04		288	
2004	03-04	1	318	

Test for Condition 3

<u>Report Year</u>	<u>Report Period</u>	<u>BMP 5 Implementation Year</u>	<u>RU offers financial incentives?</u>	<u>No. of Loans</u>	<u>Total Amt. Loans</u>
1999	99-00	-4			
2000	99-00	-3			
2001	01-02	-2			
2002	01-02	-1	NO		
2003	03-04		NO		
2004	03-04	1	NO		

<u>Report Year</u>	<u>Report Period</u>	<u>No. of Grants</u>	<u>Total Amt. Grants</u>	<u>No. of rebates</u>	<u>Total Amt. Rebates</u>
1999	99-00				
2000	99-00				
2001	01-02				
2002	01-02				
2003	03-04				
2004	03-04				



Best Management Practices Report Filing

BMP 06 Coverage: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:
City of Sonoma

You are viewing coverage for:

BMP 06
03-04

YRs

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MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

BMPs

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An agency must meet one condition to comply with BMP 6.

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Condition 1: Offer a cost-effective financial incentive for high-efficiency washers if one or more energy service providers in service area offer financial incentives for high-efficiency washers.

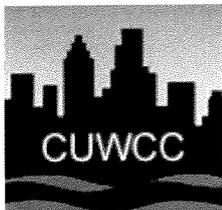
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Test for Condition 1

<u>Year</u>	<u>Report Period</u>	<u>BMP 6 Implementation Year</u>	<u>Rebate Offered by ESP?</u>	<u>Rebate Offered by RU?</u>	<u>Rebate Amount</u>
1999	99-00	-4	YES	YES	75.00
2000	99-00	-3	YES	YES	75.00
2001	01-02	-2	YES	YES	75.00
2002	01-02	-1	YES	NO	
2003	03-04		YES	YES	75.00
2004	03-04	1	NO	YES	75.00

<u>Year</u>	<u>Report Period</u>	<u>BMP 6 Implementation Year</u>	<u>No. Rebates Awarded</u>	<u>Coverage Met?</u>
1999	99-00	-4	85	YES
2000	99-00	-3	30	YES
2001	01-02	-2	41	YES
2002	01-02	-1		NO
2003	03-04		46	YES
2004	03-04	1	51	YES

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BMP 07 Coverage: Public Information Programs

Reporting Unit:
City of Sonoma

You are viewing coverage for:

BMP 07
03-04

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MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

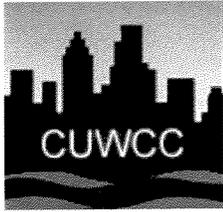
An agency must meet one condition to comply with BMP 7.

Condition 1: Implement and maintain a public information program consistent with BMP 7's definition.

Test for Condition 1

Year	Report Period	BMP 7 Implementation Year	RU Has Public Information Program?
1999	99-00	-3	
2000	99-00	-2	
2001	01-02	-1	
2002	01-02		YES
2003	03-04	1	YES
2004	03-04	2	YES

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Best Management Practices Report Filing

BMP 08 Coverage: School Education Programs
Reporting Unit: City of Sonoma

You are viewing coverage for:

BMP 08

03-04

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MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one condition to comply with BMP 8.

Condition 1: Implement and maintain a school education program consistent with BMP 8's definition.

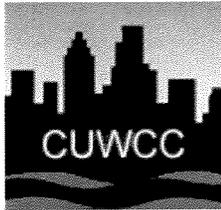
Test for Condition 1

Year	Report Period	BMP 8 Implementation Year	RU Has School Education Program?
1999	99-00	-3	
2000	99-00	-2	
2001	01-02	-1	
2002	01-02		YES
2003	03-04	1	YES
2004	03-04	2	YES

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Best Management Practices Report Filing

BMP 09 Coverage: Conservation Programs for CII Accounts

Reporting Unit:
City of Sonoma

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BMP 09
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MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet three conditions to comply with BMP 9.

Condition 1: Agency has identified and ranked by use commercial, industrial, and institutional accounts.

Condition 2(a): Agency is on track to survey 10% of commercial accounts, 10% of industrial accounts, and 10% of institutional accounts within 10 years of date implementation to commence.

OR

Condition 2(b): Agency is on track to reduce CII water use by an amount equal to 10% of baseline use within 10 years of date implementation to commence.

OR

Condition 2(c): Agency is on track to meet the combined target as described in Exhibit 1 BMP 9 documentation.

Test for Condition 1

Year	Report Period	BMP 9 Implementation Year	Ranked Com. Use	Ranked Ind. Use	Ranked Inst. Use
1999	99-00	-4			
2000	99-00	-3			
2001	01-02	-2			
2002	01-02	-1	YES	YES	YES
2003	03-04		YES	YES	YES
2004	03-04	1	YES	YES	YES

Test for Condition 2a

	Commercial	Industrial	Institutional
Total Completed Surveys Reported through 2004	24	0	6
Credit for Surveys Completed Prior to Implementation of Reporting Databases			
Total + Credit	24		6
CII Accounts in Base Year	305		65
RU Survey Coverage as % of Base Year CII Accounts	7.9%		9.2%
Coverage Requirement by Year 1 of Implementation per Exhibit 1	0.5%	0.5%	0.5%

RU on Schedule to Meet 10 Year Coverage Requirement	YES	NO	YES
---	-----	----	-----

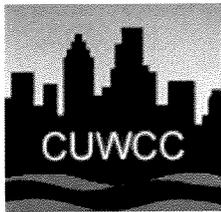
Test for Condition 2a

Year	Report Period	BMP 9 Implementation Year	Performance Target Savings (AF/yr)	Performance Target Savings Coverage	Performance Target Savings Coverage Requirement	Coverage Requirement Met
1999	99-00	-4				YES
2000	99-00	-3				YES
2001	01-02	-2				YES
2002	01-02	-1				YES
2003	03-04					YES
2004	03-04	1	1	0.2%	0.5%	NO

Test for Condition 2c

Total BMP 9 Surveys + Credit	30
BMP 9 Survey Coverage	8.1%
BMP 9 Performance Target Coverage	0.2%
BMP 9 Survey + Performance Target Coverage	8.3%
Combined Coverage Equals or Exceeds Coverage Requirement?	YES

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Best Management Practices Report Filing

BMP 11 Coverage: Conservation Pricing

Reporting Unit:
City of Sonoma

You are viewing
coverage for:

BMP 11

03-04

YRs

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DN - UP

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MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

An agency must meet one condition to comply with BMP 11.

Agency shall maintain rate structure consistent with BMP 11's definition of conservation pricing. Implementation methods shall be at least as effective as eliminating non-conserving pricing and adopting conserving pricing. For signatories supplying both water and sewer service, this BMP applies to pricing of both water and sewer service. Signatories that supply water but not sewer service shall make good faith efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.

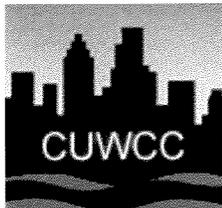
a) Non-conserving pricing provides no incentives to customers to reduce use. Such pricing is characterized by one or more of the following components: rates in which the unit price decreases as the quantity used increases (declining block rates); rates that involve charging customers a fixed amount per billing cycle regardless of the quantity used; pricing in which the typical bill is determined by high fixed charges and low commodity charges.

b) 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; and billing for water and sewer service 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 longrun marginal cost or the cost of adding the next unit of capacity to the system.

Test for Condition 1

Year	Report Period	RU Employed Non Conserving Rate Structure	RU Meets BMP 11 Coverage Requirement
1999	99-00	NO	YES
2000	99-00	NO	YES
2001	01-02	NO	YES
2002	01-02	NO	YES
2003	03-04	NO	YES
2004	03-04	NO	YES

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Best Management Practices Report Filing

BMP 12 Coverage: Conservation Coordinator
Reporting Unit: City of Sonoma

You are viewing coverage for:

BMP 12
03-04

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MOU Exhibit 1 Coverage Requirement

No exemption request filed

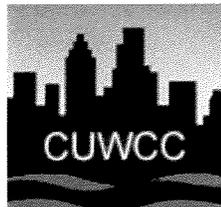
Agency indicated "at least as effective as" implementation during report period? No

Agency shall staff and maintain the position of conservation coordinator and provide support staff as necessary.

Test for Compliance

<u>Report Year</u>	<u>Report Period</u>	<u>Conservation Coordinator Position Staffed?</u>	<u>Total Staff on Team (incl. CC)</u>
1999	99-00		
2000	99-00		
2001	01-02		
2002	01-02	YES	1
2003	03-04	YES	1
2004	03-04	YES	1

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Best Management Practices Report Filing

BMP 13 Coverage: Water Waste Prohibition

Reporting Unit:

City of Sonoma

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BMP 13

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Understanding**

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MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period?

No

An agency must meet one condition to comply with BMP 13.

Implementation methods shall be enacting and enforcing measures prohibiting gutter flooding, single pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative water fountains.

Test for Condition 1

Agency or service area prohibits:

Year	Gutter Flooding	Single-Pass Cooling Systems	Single-Pass Car Wash	Single-Pass Laundry	Single-Pass Fountains	Other	RU has ordinance that meets coverage requirement
1999							
2000	no	no	no	no	no	no	NO
2001	no	no	no	no	no	no	NO
2002	yes	yes	yes	yes	yes	no	YES
2003	yes	yes	yes	yes	yes	yes	YES
2004	yes	yes	yes	yes	yes	yes	YES

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Water Supply & Reuse

Reporting Unit:
City of Sonoma

Year:
2003

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
SCWA	2543.3672	Imported
Groundwater	117	Groundwater

Total AF: 2660.3672

Reported as of 11/1

Accounts & Water Use

Reporting Unit Name:
City of Sonoma

Submitted to
CUWCC
11/30/2004

Year:
2003

A. Service Area Population Information:

1. Total service area population 9460

B. Number of Accounts and Water Deliveries (AF)

Type	Metered		Unmetered	
	No. of Accounts	Water Deliveries (AF)	No. of Accounts	Water Deliveries (AF)
1. Single-Family	3647	1128.9	0	0
2. Multi-Family	228	583.47	0	0
3. Commercial	295	316.16	0	0
4. Industrial	0	0	0	0
5. Institutional	40	51.74	0	0
6. Dedicated Irrigation	60	170.21	0	0
7. Recycled Water	0	0	0	0
8. Other	0	0	0	0
9. Unaccounted	NA	0	NA	0
Total	4270	2250.48	0	0

Metered

Unmetered

Reported as of 11/1

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit: **City of Sonoma** BMP Form Status: **100% Complete** Year: **2003**

A. Implementation

- 1. Based on your signed MOU date, 01/18/2002, your Agency STRATEGY DUE DATE is: 01/18/2004
- 2. Has your agency developed and implemented a targeting/marketing strategy for SINGLE-FAMILY residential water use surveys? no
 - a. If YES, when was it implemented?
- 3. Has your agency developed and implemented a targeting/marketing strategy for MULTI-FAMILY residential water use surveys? no
 - a. If YES, when was it implemented?

B. Water Survey Data

Survey Counts:	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	0	0
2. Number of surveys completed:	0	0

Indoor Survey:

- 3. Check for leaks, including toilets, faucets and meter checks no no
- 4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary no no
- 5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as necessary; replace leaking toilet flapper, as necessary no no

Outdoor Survey:

- 6. Check irrigation system and timers no no
- 7. Review or develop customer irrigation schedule no no
- 8. Measure landscaped area (Recommended but not required for surveys) no no
- 9. Measure total irrigable area (Recommended but not required for surveys) no no
- 10. Which measurement method is typically used (Recommended but not required for surveys) None
- 11. Were customers provided with information packets that included evaluation results and water savings recommendations? no no
- 12. Have the number of surveys offered and completed, survey results, and survey costs been tracked? no no
 - a. If yes, in what form are surveys tracked? None
 - b. Describe how your agency tracks this information.

C. Water Survey Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

The City is currently developing a program to meet this BMP. The survey program will target high end users and program marketing will begin in Spring 2004. Sonoma County Water Agency will provide funding to implement this BMP.

Reported as of 11/1

BMP 02: Residential Plumbing Retrofit

Reporting Unit:
City of Sonoma

BMP Form Status:
100% Complete

Year:
2003

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts? no
- a. If YES, list local jurisdictions in your service area and code or ordinance in each:
2. Has your agency satisfied the 75% saturation requirement for single-family housing units? No
3. Estimated percent of single-family households with low-flow showerheads: 82%
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units? No
5. Estimated percent of multi-family households with low-flow showerheads: 78%
6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.

Saturation was determined based on device distribution to program participants. Programs include CBO giveaways and over the counter distribution. Low flow devices will continue to be distributed.

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices? yes
- a. If YES, when did your agency begin implementing this strategy? 05/01/1996
- b. Describe your targeting/ marketing strategy.

Since 1996, low flow devices have been distributed at four CBO ULFT give-away events. In 2002, the City also began distributing low-flow hardware at City Hall, local fairs, and leak detection response calls.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	0	0
3. Number of toilet-displacement devices distributed:	0	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	0	0
6. Does your agency track the distribution and cost of low-flow devices?		no
a. If YES, in what format are low-flow devices tracked?		
b. If yes, describe your tracking and distribution system :		

Through the Sonoma County Water Agency, the City has ordered low-flow devices for public give-aways and distribution at City Hall. Sonoma County Water Agency has borne the cost for these devices.

C. Low-Flow Device Distribution Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Through this fiscal year the City has continued to distribute low-flow devices that had been obtained from Sonoma County Water Agency in previous fiscal years. Sonoma County Water Agency will provide funding to implement this BMP. The City's hardware distribution program is currently a challenge to track. The low-flow devices are available for any resident of Sonoma to self-install by picking up the items at City Hall.

Reported as of 11/1

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:

BMP Form Status:

Year:

City of Sonoma**100% Complete****2003****A. Implementation**

1. Has your agency completed a pre-screening system audit for this reporting year? yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:
 - a. Determine metered sales (AF) 2261.24
 - b. Determine other system verifiable uses (AF) 42
 - c. Determine total supply into the system (AF) 2619.76
 - d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. 0.88
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production? yes
4. Did your agency complete a full-scale audit during this report year? no
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit? yes
6. Does your agency operate a system leak detection program? yes
 - a. If yes, describe the leak detection program:

In the past, the leak detection program has been to fix the leak when it becomes a problem. The current program is proactive, the City is replacing all old pipes and has preformed a full system audit to find all City leaks.

B. Survey Data

1. Total number of miles of distribution system line. 48
2. Number of miles of distribution system line surveyed. 48

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	7500
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 11/1

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit:

BMP Form Status:

Year:

City of Sonoma**100% Complete****2003**

A. Implementation

- | | |
|---|-----|
| 1. Does your agency require meters for all new connections and bill by volume-of-use? | yes |
| 2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use? | no |
| a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed? | |
| b. Describe the program: | |
| 3. Number of previously unmetered accounts fitted with meters during report year. | 0 |

B. Feasibility Study

- | | |
|--|-----|
| 1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? | no |
| a. If YES, when was the feasibility study conducted?
(mm/dd/yy) | |
| b. Describe the feasibility study: | |
| 2. Number of CII accounts with mixed-use meters. | 288 |
| 3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period. | 0 |

C. Meter Retrofit Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

- | | |
|--|----|
| 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? | No |
| a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as." | |

E. Comments

The City is working towards replacing old meters for residential water customers.

Reported as of 11/1

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit: **City of Sonoma** BMP Form Status: **100% Complete** Year: **2003**

A. Water Use Budgets

- | | |
|--|----|
| 1. Number of Dedicated Irrigation Meter Accounts: | 60 |
| 2. Number of Dedicated Irrigation Meter Accounts with Water Budgets: | 0 |
| 3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF): | 0 |
| 4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF): | 0 |
| 5. Does your agency provide water use notices to accounts with budgets each billing cycle? | no |

B. Landscape Surveys

- | | |
|--|------------|
| 1. Has your agency developed a marketing / targeting strategy for landscape surveys? | yes |
| a. If YES, when did your agency begin implementing this strategy? | 07/01/2002 |
| b. Description of marketing / targeting strategy: | |

Water audits and evapotranspiration based on water budgets will be offered to non-residential customers. If funding allows, the top 35% mixed use meter customers will be targeted.

- | | |
|---|-----|
| 2. Number of Surveys Offered. | 10 |
| 3. Number of Surveys Completed. | 10 |
| 4. Indicate which of the following Landscape Elements are part of your survey: | |
| a. Irrigation System Check | yes |
| b. Distribution Uniformity Analysis | yes |
| c. Review / Develop Irrigation Schedules | yes |
| d. Measure Landscape Area | yes |
| e. Measure Total Irrigable Area | yes |
| f. Provide Customer Report / Information | yes |
| 5. Do you track survey offers and results? | yes |
| 6. Does your agency provide follow-up surveys for previously completed surveys? | yes |
| a. If YES, describe below: | |

Audits were done on City parks. Upon request, a follow-up survey will be completed to determine if targeted problems were mitigated.

C. Other BMP 5 Actions

- | | |
|--|-----|
| 1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program.
Does your agency provide mixed-use accounts with landscape budgets? | no |
| 2. Number of CII mixed-use accounts with landscape budgets. | |
| 3. Do you offer landscape irrigation training? | yes |

4. Does your agency offer financial incentives to improve landscape water use efficiency? no
- | Type of Financial Incentive: | Budget (Dollars/Year) | Number Awarded to Customers | Total Amount Awarded |
|------------------------------|-----------------------|-----------------------------|----------------------|
| a. Rebates | 0 | 0 | 0 |
| b. Loans | 0 | 0 | 0 |
| c. Grants | 0 | 0 | 0 |
5. Do you provide landscape water use efficiency information to new customers and customers changing services? yes

a. If YES, describe below:

Landscape water use efficiency information is given to residential and commercial customers through a biannual newsletter, entitled "The Water Source."

6. Do you have irrigated landscaping at your facilities? yes
- a. If yes, is it water-efficient? yes
- b. If yes, does it have dedicated irrigation metering? yes
7. Do you provide customer notices at the start of the irrigation season? no
8. Do you provide customer notices at the end of the irrigation season? no

D. Landscape Conservation Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
- a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

The Sonoma County Water Agency provided funding to implement this BMP.

Reported as of 11/1

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:

City of Sonoma

BMP Form Status:

100% Complete

Year:

2003

A. Implementation

1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? yes

a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is.

PG&E offers a \$75 rebate for high-efficiency washers installed in the City.

2. Does your agency offer rebates for high-efficiency washers? yes

3. What is the level of the rebate? 75

4. Number of rebates awarded. 46

B. Rebate Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The Sonoma County Water Agency implements regional programs and provides funding to implement this program.

Reported as of 11/1

BMP 07: Public Information Programs

Reporting Unit:
City of Sonoma

BMP Form Status:
100% Complete

Year:
2003

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

The program is designed to promote water conservation through 1) presentations at public community events, 2) a bi-annual newsletter, 'The Water Source', features landscape water use efficiency news for residential customers, 3)press releases on current programs, 4)low-flow hardware and literature distribution.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	1
b. Public Service Announcement	yes	3
c. Bill Inserts / Newsletters / Brochures	yes	4
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	yes	1
f. Special Events, Media Events	yes	3
g. Speaker's Bureau	yes	3
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The Sonoma County Water Agency provided funding to implement this BMP.

Reported as of 11/1

BMP 08: School Education Programs

Reporting Unit:
City of Sonoma

BMP Form Status:
100% Complete

Year:
2003

A. Implementation

1. Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	12	281	4
Grades 4th-6th	yes	0	110	4
Grades 7th-8th	yes	0	930	3
High School	yes	0	35	2

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 09/01/1988

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2002-2003 school year. Direct instruction and education materials provided.

Reported as of 11/1

BMP 09: Conservation Programs for CII AccountsReporting Unit:
City of SonomaBMP Form Status:
100% CompleteYear:
2003**A. Implementation**

- | | |
|--|-----|
| 1. Has your agency identified and ranked COMMERCIAL customers according to use? | yes |
| 2. Has your agency identified and ranked INDUSTRIAL customers according to use? | yes |
| 3. Has your agency identified and ranked INSTITUTIONAL customers according to use? | yes |

Option A: CII Water Use Survey and Customer Incentives Program

- | | |
|---|-----|
| 4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option? | yes |
|---|-----|

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	24	0	3
b. Number of New Surveys Completed	19	0	4
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	1	0	1
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	0	0	0
CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts
e. Site Visit	yes	yes	yes
f. Evaluation of all water-using apparatus and processes	yes	yes	yes
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	yes	yes	yes
Agency CII Customer Incentives	Budget (\$/Year)	No. Awarded to Customers	Total \$ Amount Awarded
h. Rebates	0	0	0
i. Loans	0	0	0
j. Grants	0	0	0
k. Others	0	0	0

Option B: CII Conservation Program Targets

- | | |
|---|------|
| 5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option? | yes |
| 6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings? | yes |
| 7. Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991. | .029 |
| 8. Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991. | 0 |

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
- a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The Sonoma Valley County Sanitation District provides funding for implementing the audit programs. The City of Sonoma also participated in the Sonoma County Water Agency's pre-rinse spray nozzle replacement program. During the installation, all water using alliances/machinery were evaluated for efficiency.

Reported as of 11/1

BMP 09a: CII ULFT Water Savings

Reporting Unit: **City of Sonoma** BMP Form Status: **100% Complete** Year: **2003**

1. Did your agency implement a CII ULFT replacement program in the reporting year? No
 If No, please explain why on Line B.10.

A. Targeting and Marketing

1. What basis does your agency use to target customers for participation in this program? Check all that apply.
 - a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

2. How does your agency advertise this program? Check all that apply.
 - a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

B. Implementation

1. Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.)
2. Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency?
3. What is the total number of customer accounts participating in the program during the last year ?

CII Subsector	Number of Toilets Replaced					Type Not Specified
	Standard Gravity Tank	Air Assisted	Valve Floor Mount	Valve Wall Mount		
4.						
a. Offices						
b. Retail / Wholesale						
c. Hotels						
d. Health						
e. Industrial						
f. Schools: K to 12						

- g. Eating
- h. Govern-
ment
- i. Churches
- j. Other

5. Program design.

6. Does your agency use outside services to implement this program?

a. If yes, check all that apply.

7. Participant tracking and follow-up.

8. Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

- a. Disruption to business
- b. Inadequate payback
- c. Inadequate ULFT performance
- d. Lack of funding
- e. American's with Disabilities Act
- f. Permitting
- g. Other. Please describe in B. 9.

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other issues affecting program implementation or effectiveness.

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

All CII ULFT savings are included in BMP 9 under the performance target option.

C. Conservation Program Expenditures for CII ULFT

1. CII ULFT Program: Annual Budget & Expenditure Data

	Budgeted	Actual Expenditure
a. Labor		
b. Materials		
c. Marketing & Advertising		
d. Administration & Overhead		
e. Outside Services		
f. Total	0	0

2. CII ULFT Program: Annual Cost Sharing

a. Wholesale agency contribution

b. State agency contribution

c. Federal agency contribution

d. Other contribution

e. Total

0

D. Comments

Reported as of 11/1

BMP 11: Conservation Pricing

Reporting Unit:
City of Sonoma

BMP Form
 Status:
100% Complete

Year:
2003

A. Implementation**Rate Structure Data Volumetric Rates for Water Service by Customer Class****1. Residential**

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	\$1241260.2
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$225166.3

2. Commercial

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	\$799333.2
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$20071.24

3. Industrial

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$0

4. Institutional / Government

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$25111.2
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$56344.6

5. Irrigation

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$534646.2
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$5237.71

6. Other

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$9971.2
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$738.1392

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Multi Family customers are included in the residential customer class. Industrial customers are included in the commercial category. Conservation Pricing Program expenditures: This program is a component of the Water Department's regular operational budget and the expenditures are not tracked seperately. The revenue figures are based on the 2002 calendar year, not the 2002/2003 ficsal year.

Reported as of 11/1

BMP 12: Conservation Coordinator

Reporting Unit:

BMP Form Status:

Year:

City of Sonoma**100% Complete****2003****A. Implementation**

1. Does your Agency have a conservation coordinator? yes
2. Is this a full-time position? no
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ? yes
4. Partner agency's name: Sonoma County Water Agency
5. If your agency supplies the conservation coordinator:
 - a. What percent is this conservation coordinator's position? 25%
 - b. Coordinator's Name Hal McCutchan
 - c. Coordinator's Title Water Conservation Specialist
 - d. Coordinator's Experience and Number of Years 10 years
 - e. Date Coordinator's position was created (mm/dd/yyyy) 11/19/2000
6. Number of conservation staff, including Conservation Coordinator. 1

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	90000	30000
2. Actual Expenditures	90000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Approximately \$45,000 in Agency staff time and Agency-provided material has been budgeted for FY00/01 and FY 01/02 Agreements.

Reported as of 11/1

BMP 13: Water Waste Prohibition

Reporting Unit:
City of Sonoma

BMP Form Status:
100% Complete

Year:
2003

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area? yes

a. If YES, describe the ordinance:

Ordinance No. 2000-6: Ordinance of the City of Sonoma Insituting Water Waste Prohibitions (7-18-01). The ordinance is to promote water conservation and efficient use of potable water eliminating intentional or unintentional water waste when a reasonable alternative is available, and by prohibiting use of equipment that is wasteful.

2. Is a copy of the most current ordinance(s) on file with CUWCC? no

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Sonoma 0 Citations

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding yes

b. Single-pass cooling systems for new connections yes

c. Non-recirculating systems in all new conveyor or car wash systems yes

d. Non-recirculating systems in all new commercial laundry systems yes

e. Non-recirculating systems in all new decorative fountains yes

f. Other, please name yes
 Washing cars, boats, trailers, or other vehicles and machinery directly without a hose shut off valve.

2. Describe measures that prohibit water uses listed above:

1) Written notification to customers and a reasonable time given to correct the violation, 2) Personal contact with the customer at the address of the violation. If personal contact is unsuccessful, a written notice of the violation, including the date the violation must be corrected, may be left on the premises, with a copy of the notice sent via certified mail to the customer. 3) City may install a flow-restricting device on the service line. 4) City may levy a water-waste fee to the customer. 5) The City may terminate water service and the charge for consumption may be billed to the customer.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models. yes

b. Develop minimum appliance efficiency standards that:
 i.) Increase the regeneration efficiency standard to

- at least 3,350 grains of hardness removed per pound of common salt used. yes
- ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced. yes
- c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply. yes
- 4. Does your agency include water softener checks in home water audit programs? no
- 5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models? no

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	2000	4000
2. Actual Expenditures	2000	

D. "At Least As Effective As"

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Water waste fee wil go to City Council on November 5, 2003 which will allow a fee to be charged for violating the water waste ordinance.

Reported as of 11/1

BMP 14: Residential ULFT Replacement Programs

Reporting Unit: **City of Sonoma** BMP Form Status: **100% Complete** Year: **2003**

A. Implementation

	Single-Family Accounts	Multi- Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	yes	yes
Number of Toilets Replaced by Agency Program During Report Year		
Replacement Method	SF Accounts	MF Units
2. Rebate	96	27
3. Direct Install	0	0
4. CBO Distribution	0	0
5. Other	0	0
<hr/>		
Total	96	27

6. Describe your agency's ULFT program for single-family residences.

The City has a rebate program for toilets that use more than 1.6 gallons per flush. The rebate is currently \$100 for each toilet replaced. To qualify for the program residents must be water customers of the City and have their own septic system. The Sonoma Valley County Sanitation District offers an identical rebate for City residents that are on the Sonoma County Valley Sanitation District system.

7. Describe your agency's ULFT program for multi-family residences.

The City has a rebate program for toilets that use more than 1.6 gallons per flush. The rebate is currently \$100 for each toilet replaced. To qualify for the program residents must be water customers of the City and have their own septic system. The Sonoma Valley County Sanitation District offers an identical rebate for City residents that are on the Sonoma Valley County Sanitation District system.

8. Is a toilet retrofit on resale ordinance in effect for your service area? no

9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

B. Residential ULFT Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Sonoma County Water Agency and Sonoma Valley County Sanitation District provide funding to implement this BMP.

Reported as of 11/1

Water Supply & Reuse

Reporting Unit:
City of Sonoma

Year:
2004

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
SCWA	2610.7346	Imported
Groundwater	86	Groundwater

Total AF: 2696.7346

Reported as of 11/1

Accounts & Water Use

Reporting Unit Name:
City of Sonoma

Submitted to
CUWCC
11/30/2004

Year:
2004

A. Service Area Population Information:

1. Total service area population 10252

B. Number of Accounts and Water Deliveries (AF)

Type	Metered		Unmetered	
	No. of Accounts	Water Deliveries (AF)	No. of Accounts	Water Deliveries (AF)
1. Single-Family	3680	1390.1	0	0
2. Multi-Family	243	316.6	0	0
3. Commercial	305	308.1	0	0
4. Industrial	51	41.6	0	0
5. Institutional	0	0	0	0
6. Dedicated Irrigation	60	198.22	0	0
7. Recycled Water	0	0	0	0
8. Other	9	141.2	0	0
9. Unaccounted	NA	332.2	NA	0
Total	4348	2728.02	0	0

Metered

Unmetered

Reported as of 11/1

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit: **City of Sonoma** BMP Form Status: **100% Complete** Year: **2004**

A. Implementation

- | | |
|--|------------|
| 1. Based on your signed MOU date, 01/18/2002, your Agency STRATEGY DUE DATE is: | 01/18/2004 |
| 2. Has your agency developed and implemented a targeting/marketing strategy for SINGLE-FAMILY residential water use surveys? | yes |
| a. If YES, when was it implemented? | 10/14/2003 |
| 3. Has your agency developed and implemented a targeting/marketing strategy for MULTI-FAMILY residential water use surveys? | yes |
| a. If YES, when was it implemented? | 10/14/2003 |

B. Water Survey Data

Survey Counts:	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	0	0
2. Number of surveys completed:	0	0

Indoor Survey:

- | | | |
|---|----|----|
| 3. Check for leaks, including toilets, faucets and meter checks | no | no |
| 4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary | no | no |
| 5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as necessary; replace leaking toilet flapper, as necessary | no | no |

Outdoor Survey:

- | | | |
|--|----|------|
| 6. Check irrigation system and timers | no | no |
| 7. Review or develop customer irrigation schedule | no | no |
| 8. Measure landscaped area (Recommended but not required for surveys) | no | no |
| 9. Measure total irrigable area (Recommended but not required for surveys) | no | no |
| 10. Which measurement method is typically used (Recommended but not required for surveys) | | None |
| 11. Were customers provided with information packets that included evaluation results and water savings recommendations? | no | no |
| 12. Have the number of surveys offered and completed, survey results, and survey costs been tracked? | no | no |
| a. If yes, in what form are surveys tracked? | | None |
| b. Describe how your agency tracks this information. | | |

C. Water Survey Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Sonoma has hired a consultant to conduct the residential wate audits. The program will target high end users. Sonoma County Water Agency will provide funding to implement this BMP.

Reported as of 11/1

BMP 02: Residential Plumbing Retrofit

Reporting Unit:
City of Sonoma

BMP Form Status:
100% Complete

Year:
2004

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts? no
 - a. If YES, list local jurisdictions in your service area and code or ordinance in each:

2. Has your agency satisfied the 75% saturation requirement for single-family housing units? yes
3. Estimated percent of single-family households with low-flow showerheads: 75%
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units? yes
5. Estimated percent of multi-family households with low-flow showerheads: 75%
6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.

Saturation was determined based on device distribution to program participants. Programs include CBO giveaways and over the counter distribution. Low flow devices will continue to be distributed.

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices? yes
 - a. If YES, when did your agency begin implementing this strategy? 5/1/1996
 - b. Describe your targeting/ marketing strategy.

Since 1996, low flow devices have been distributed at four CBO ULFT give-away events. In 2002, the City also began distributing low-flow hardware at City Hall, local fairs, and leak detection response calls.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	0	0
3. Number of toilet-displacement devices distributed:	0	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	0	0
6. Does your agency track the distribution and cost of low-flow devices?		no
<ol style="list-style-type: none"> a. If YES, in what format are low-flow devices tracked? b. If yes, describe your tracking and distribution system : 		

Through the Sonoma County Water Agency, the City has ordered low-flow devices for public give-aways and distribution at City Hall.

C. Low-Flow Device Distribution Expenditures

This Year Next Year

1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

The City's hardware distribution program is currently a challenge to track. The low-flow devices are available for any resident of Sonoma to self-install by picking up the items at City Hall. Sonoma County Water Agency will provide funding to implement this BMP. Sonoma County Water Agency will provide funding to implement this BMP.

Reported as of 11/1

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:

BMP Form Status:

Year:

City of Sonoma**100% Complete****2004****A. Implementation**

1. Has your agency completed a pre-screening system audit for this reporting year? yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:
 - a. Determine metered sales (AF) 2395.84
 - b. Determine other system verifiable uses (AF) 57.67
 - c. Determine total supply into the system (AF) 2728.026
 - d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. 0.90
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production? yes
4. Did your agency complete a full-scale audit during this report year? yes
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit? yes
6. Does your agency operate a system leak detection program? yes
 - a. If yes, describe the leak detection program:

The City is replacing all old pipes and has preformed a full system audit to find all City leaks.

B. Survey Data

1. Total number of miles of distribution system line. 48
2. Number of miles of distribution system line surveyed. 42

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	7500	0
2. Actual Expenditures	7500	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 11/1

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit:

BMP Form Status:

Year:

City of Sonoma**100% Complete****2004**

A. Implementation

- | | |
|---|-----|
| 1. Does your agency require meters for all new connections and bill by volume-of-use? | yes |
| 2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use? | no |
| a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed? | |
| b. Describe the program: | |
| 3. Number of previously unmetered accounts fitted with meters during report year. | 0 |

B. Feasibility Study

- | | |
|--|-----|
| 1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? | no |
| a. If YES, when was the feasibility study conducted?
(mm/dd/yy) | |
| b. Describe the feasibility study: | |
| 2. Number of CII accounts with mixed-use meters. | 318 |
| 3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period. | 0 |

C. Meter Retrofit Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

- | | |
|--|----|
| 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? | No |
| a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as." | |

E. Comments

The expenditures are for the Water Meter and related supplies budget. The City is working towards replacing old meters for residential water customers.

Reported as of 11/1

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit: **City of Sonoma** BMP Form Status: **100% Complete** Year: **2004**

A. Water Use Budgets

- | | |
|--|----|
| 1. Number of Dedicated Irrigation Meter Accounts: | 51 |
| 2. Number of Dedicated Irrigation Meter Accounts with Water Budgets: | 1 |
| 3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF): | 3 |
| 4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF): | 4 |
| 5. Does your agency provide water use notices to accounts with budgets each billing cycle? | no |

B. Landscape Surveys

- | | |
|--|----------|
| 1. Has your agency developed a marketing / targeting strategy for landscape surveys? | yes |
| a. If YES, when did your agency begin implementing this strategy? | 7/1/2002 |
| b. Description of marketing / targeting strategy: | |

Water audits and evapotranspiration based on water budgets are being offered to non-residential customers.

- | | |
|---|-----|
| 2. Number of Surveys Offered. | 15 |
| 3. Number of Surveys Completed. | 11 |
| 4. Indicate which of the following Landscape Elements are part of your survey: | |
| a. Irrigation System Check | yes |
| b. Distribution Uniformity Analysis | yes |
| c. Review / Develop Irrigation Schedules | yes |
| d. Measure Landscape Area | yes |
| e. Measure Total Irrigable Area | yes |
| f. Provide Customer Report / Information | yes |
| 5. Do you track survey offers and results? | yes |
| 6. Does your agency provide follow-up surveys for previously completed surveys? | yes |
| a. If YES, describe below: | |

Audits were done on City parks. Upon request, a follow-up survey will be completed to determine if targeted problems were mitigated.

C. Other BMP 5 Actions

- | | |
|---|-----|
| 1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program. Does your agency provide mixed-use accounts with landscape budgets? | no |
| 2. Number of CII mixed-use accounts with landscape budgets. | |
| 3. Do you offer landscape irrigation training? | yes |
| 4. Does your agency offer financial incentives to improve landscape water use efficiency? | no |

Type of Financial Incentive:	Budget (Dollars/Year)	Number Awarded to Customers	Total Amount Awarded
a. Rebates	0	0	0
b. Loans	0	0	0
c. Grants	0	0	0

5. Do you provide landscape water use efficiency information to new customers and customers changing services? yes

a. If YES, describe below:

Landscape water use efficiency information is given to residential and commercial customers through a biannual newsletter, entitled "The Water Source."

6. Do you have irrigated landscaping at your facilities? yes

a. If yes, is it water-efficient? yes

b. If yes, does it have dedicated irrigation metering? yes

7. Do you provide customer notices at the start of the irrigation season? yes

8. Do you provide customer notices at the end of the irrigation season? yes

D. Landscape Conservation Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

The Sonoma County Water Agency provided funding to implement this BMP.

Reported as of 11/1

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:

City of Sonoma

BMP Form Status:

100% Complete

Year:

2004

A. Implementation

- | | |
|---|-----|
| 1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? | no |
| a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is. | |
| 2. Does your agency offer rebates for high-efficiency washers? | yes |
| 3. What is the level of the rebate? | 75 |
| 4. Number of rebates awarded. | 51 |

B. Rebate Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

- | | |
|--|----|
| 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? | no |
| a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as." | |

D. Comments

The Sonoma County Water Agency implements regional programs and provides funding to implement this program.

Reported as of 11/1

BMP 07: Public Information Programs

Reporting Unit:
City of Sonoma

BMP Form Status:
100% Complete

Year:
2004

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

The program is designed to promote water conservation through 1) presentations at public community events, 2) a bi-annual newsletter, 'The Water Source', features landscape water use efficiency news for residential customers, 3) press releases on current programs, 4) low-flow hardware and literature distribution.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	1
b. Public Service Announcement	yes	3
c. Bill Inserts / Newsletters / Brochures	yes	1
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	yes	1
f. Special Events, Media Events	yes	4
g. Speaker's Bureau	yes	2
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The Sonoma County Water Agency provided funding to implement this BMP.

Reported as of 11/1

BMP 08: School Education Programs

Reporting Unit:
City of Sonoma

BMP Form Status:
100% Complete

Year:
2004

A. Implementation

1. Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	10	408	6
Grades 4th-6th	yes	4	464	6
Grades 7th-8th	yes	0	214	4
High School	yes	0	0	4

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 9/1/1988

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2003-2004 school year. Direct instruction and education materials provided.

Reported as of 11/1

BMP 09: Conservation Programs for CII AccountsReporting Unit:
City of SonomaBMP Form Status:
100% CompleteYear:
2004**A. Implementation**

- | | |
|--|-----|
| 1. Has your agency identified and ranked COMMERCIAL customers according to use? | yes |
| 2. Has your agency identified and ranked INDUSTRIAL customers according to use? | yes |
| 3. Has your agency identified and ranked INSTITUTIONAL customers according to use? | yes |

Option A: CII Water Use Survey and Customer Incentives Program

- | | |
|---|-----|
| 4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option? | yes |
|---|-----|

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	10	0	3
b. Number of New Surveys Completed	3	0	2
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	1
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	6	0	1
CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts
e. Site Visit	yes	yes	yes
f. Evaluation of all water-using apparatus and processes	yes	yes	yes
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	yes	yes	yes
Agency CII Customer Incentives	Budget (\$/Year)	No. Awarded to Customers	Total \$ Amount Awarded
h. Rebates	0	0	0
i. Loans	0	0	0
j. Grants	0	0	0
k. Others	0	0	0

Option B: CII Conservation Program Targets

- 5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option? yes
- 6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings? yes
- 7. Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991. .7
- 8. Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991. 0

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The Sonoma Valley County Sanitation District and SCWA provide funding for implementing the audit programs.

Reported as of 11/1

BMP 09a: CII ULFT Water Savings

Reporting Unit: **City of Sonoma** BMP Form Status: **100% Complete** Year: **2004**

1. Did your agency implement a CII ULFT replacement program in the reporting year? No
 If No, please explain why on Line B.10.

A. Targeting and Marketing

1. What basis does your agency use to target customers for participation in this program? Check all that apply.
 - a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

2. How does your agency advertise this program? Check all that apply.
 - a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

B. Implementation

1. Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.)
2. Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency?
3. What is the total number of customer accounts participating in the program during the last year ?

CII Subsector	Number of Toilets Replaced					Type Not Specified
	Standard Gravity Tank	Air Assisted	Valve Floor Mount	Valve Wall Mount		
4.						
a. Offices						
b. Retail / Wholesale						
c. Hotels						
d. Health						
e. Industrial						
f. Schools: K to 12						

- g. Eating
- h. Govern-
ment
- i. Churches
- j. Other

5. Program design.

6. Does your agency use outside services to implement this program?

a. If yes, check all that apply.

7. Participant tracking and follow-up.

8. Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

- a. Disruption to business
- b. Inadequate payback
- c. Inadequate ULFT performance
- d. Lack of funding
- e. American's with Disabilities Act
- f. Permitting
- g. Other. Please describe in B. 9.

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other issues affecting program implementation or effectiveness.

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

All CII ULFT savings are included in BMP 9 under the performance target option.

C. Conservation Program Expenditures for CII ULFT

1. CII ULFT Program: Annual Budget & Expenditure Data

	Budgeted	Actual Expenditure
a. Labor		
b. Materials		
c. Marketing & Advertising		
d. Administration & Overhead		
e. Outside Services		
f. Total	0	0

2. CII ULFT Program: Annual Cost Sharing

a. Wholesale agency contribution

b. State agency contribution

c. Federal agency contribution

d. Other contribution

e. Total

0

D. Comments

Reported as of 11/1

BMP 11: Conservation Pricing

Reporting Unit:
City of Sonoma

BMP Form
 Status:
100% Complete

Year:
2004

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential

a. Water Rate Structure	Increasing Block
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	\$1430907
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$167592

2. Commercial

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	\$921438
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$14939

3. Industrial

a. Water Rate Structure	Service Not Provided
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$0
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$0

4. Institutional / Government

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	\$28889
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$41937

5. Irrigation

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	\$616298
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$3898

6. Other

a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Uniform
c. Total Revenue from Volumetric Rates	\$11736
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	\$549.4

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The 'Other' customer class is fire hydrant charges. Multi-family meter connections are included in the residential customer class. Industrial customers are included in the commercial category. Conservation Pricing Program expenditures: This program is a component of the Water Department's regular operational budget and the expenditures are not tracked seperately.

Reported as of 11/1

BMP 12: Conservation Coordinator

Reporting Unit:

BMP Form Status:

Year:

City of Sonoma**100% Complete****2004****A. Implementation**

- | | |
|---|-------------------------------|
| 1. Does your Agency have a conservation coordinator? | yes |
| 2. Is this a full-time position? | no |
| 3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ? | yes |
| 4. Partner agency's name: | Sonoma County Water Agency |
| 5. If your agency supplies the conservation coordinator: | |
| a. What percent is this conservation coordinator's position? | 25% |
| b. Coordinator's Name | Carrie Pollard |
| c. Coordinator's Title | Water Conservation Specialist |
| d. Coordinator's Experience and Number of Years | 4 years |
| e. Date Coordinator's position was created (mm/dd/yyyy) | 11/19/2000 |
| 6. Number of conservation staff, including Conservation Coordinator. | 1 |

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

- | | |
|--|----|
| 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? | no |
| a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as." | |

D. Comments

Reported as of 11/1

BMP 13: Water Waste Prohibition

Reporting Unit:

BMP Form Status:

Year:

City of Sonoma**100% Complete****2004****A. Requirements for Documenting BMP Implementation**

1. Is a water waste prohibition ordinance in effect in your service area? yes

a. If YES, describe the ordinance:

Ordinance No. 2000-6: Ordinance of the City of Sonoma Insituting Water Waste Prohibitions (7-18-01). The ordinance is to promote water conservation and efficient use of potable water eliminating intentional or unintentional water waste when a reasonable alternative is available, and by prohibiting use of equipment that is wasteful.

2. Is a copy of the most current ordinance(s) on file with CUWCC? no

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Sonoma 0 citations

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding yes

b. Single-pass cooling systems for new connections yes

c. Non-recirculating systems in all new conveyor or car wash systems yes

d. Non-recirculating systems in all new commercial laundry systems yes

e. Non-recirculating systems in all new decorative fountains yes

f. Other, please name yes
Washing cars, boats, trailers, or other vehicles and machinery directly without a hose shut off valve.

2. Describe measures that prohibit water uses listed above:

1) Written notification to customers and a reasonable time given to correct the violation, 2) Personal contact with the customer at the address of the violation. If personal contact is unsuccessful, a written notice of the violation, including the date the violation must be corrected, may be left on the premises, with a copy of the notice sent via certified mail to the customer. 3) City may install a flow-restricting device on the service line. 4) City may levy a water-waste fee to the customer. 5) The City may terminate water service and the charge for consumption may be billed to the customer.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models. yes

b. Develop minimum appliance efficiency standards that:

i.) Increase the regeneration efficiency standard to

- at least 3,350 grains of hardness removed per pound of common salt used. yes
- ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced. yes
- c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply. yes
- 4. Does your agency include water softener checks in home water audit programs? no
- 5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models? no

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	4000	4000
2. Actual Expenditures	4000	

D. "At Least As Effective As"

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
 - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 11/1

BMP 14: Residential ULFT Replacement Programs

Reporting Unit: **City of Sonoma** BMP Form Status: **100% Complete** Year: **2004**

A. Implementation

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	yes	yes
Number of Toilets Replaced by Agency Program During Report Year		
Replacement Method	SF Accounts	MF Units
2. Rebate	76	33
3. Direct Install	0	0
4. CBO Distribution	0	0
5. Other	0	0
Total	76	33

6. Describe your agency's ULFT program for single-family residences.

The City has a rebate program for toilets that use more than 1.6 gallons per flush. The rebate is currently \$100 for each toilet replaced. To qualify for the program residents must be water customers of the City and have their own septic system. The Sonoma Valley County Sanitation District offers an identical rebate for City residents that are on the Sonoma County Valley Sanitation District system.

7. Describe your agency's ULFT program for multi-family residences.

The City has a rebate program for toilets that use more than 1.6 gallons per flush. The rebate is currently \$100 for each toilet replaced. To qualify for the program residents must be water customers of the City and have their own septic system. The Sonoma Valley County Sanitation District offers an identical rebate for City residents that are on the Sonoma Valley County Sanitation District system.

8. Is a toilet retrofit on resale ordinance in effect for your service area? no

9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

B. Residential ULFT Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

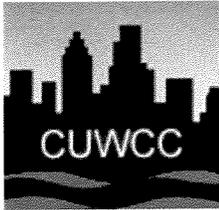
1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Sonoma County Water Agency and Sonoma Valley County Sanitation District provide funding to implement this BMP.

Reported as of 11/1



Best Management Practices Report Filing

Base Year Data

Reporting Unit:
City of Sonoma

Form Status:
**CUWCC
Reviewed**

Memorandum of
Understanding

Back to
BMP Reports
List

1. Your BASE YEAR is 2002.

NOTE: Many calculations in determining credit history and coverage requirements are contingent on your BASE YEAR, which is calculated based on the following criteria. If a Signatory signed the MOU in 1997 or earlier, then the Base Year is 1997. If a Signatory signed the MOU after 1997, then the Base Year is the year the MOU was signed. The same holds true for USBR Contractors, except the date their Base Year is calculated from is the date that their Plan was noticed in the Federal Register.

BMP 1

2. Number of single-family customers in 2002	3584
--	------

3. Number of multi-family units in 2002	1685
---	------

BMPs 2 and 14

4. Number of single-family housing units constructed prior to 1992	3584
--	------

5. Number of multi-family units prior to 1992	1581
---	------

BMP 4

6. Number of unmetered accounts in 2002	0
---	---

BMPs 5 and 9

7. Number of commercial accounts in 2002	305
--	-----

8. Number of industrial accounts in 2002	0
--	---

9. Number of institutional accounts in 2002	65
---	----

10. Total water use (AF) by commercial, industrial and institutional accounts in 2002	397
---	-----

BMP 14

11. Average number of toilets per single-family household	2
---	---

12. Average number of toilets per multi-family household	2
--	---

13. Five-year average resale rate of single-family households	4.8
---	-----

14. Five-year average resale rate of multi-family households	7.6
--	-----

15. Average persons per single-family household	2.04
---	------

16. Average persons per multi-family household	3
--	---



Best Management Practices Report Filing

BMP Activity History: Multiple-Year Overview

Reporting Unit:
City of Sonoma

Memorandum of
Understanding

INSTRUCTIONS: Exhibit 1 allows Signatories to credit BMP activity completed prior to 1998 against BMP coverage requirements. To obtain credit for this past activity you must complete the information summarized below. Choose a year and click "Go" to ADD or EDIT BMP activity data for that specific year. If you do not enter previous BMP activity, the system will have no way to calculate credit toward coverage requirements for this activity.

A. Number of RESIDENTIAL Water Use Surveys by Year						
Year	No. Single-Family Surveys		No. Multi-Family Surveys			
1991						
1992		0		0		
1993						
1994						
1995		0		0		
1996		0		0		
1997		0		0		
1998		0		0		
Total		0		0		

B. Number of LANDSCAPE Surveys Completed by Year						
Year	Surveys Receiving Follow-up		Surveys Not Receiving Follow-up			
1991						
1992		0		0		
1993						
1994						
1995		0		0		
1996		0		0		
1997		0		0		
1998		0		0		
Total		0		0		

C. Number of CII Surveys Completed by Year						
Year	Commercial		Industrial		Institutional	
	Follow-Up	No Follow-Up	Follow-Up	No Follow-Up	Follow-Up	No Follow-Up
1991						
1992	0	0	0	0	0	0
1993						
1994						
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	0	0	0	0	0	0

Total	0	0	0	0	0	0	0
D. Estimated WATER SAVINGS (AF/Yr) from CII Programs by Year							
Year	Site Verified			Site Not Verified			
1991							
1992	0			0			
1993							
1994							
1995	0			0			
1996	.029			0			
1997	.204			0			
1998	0			0			
Total	0			0			
E. (Part I) Historical CII Ultra-Low-Flush Toilet Installations by CII Sector by Year							
Year	Auto	Food	Health	Hotel	Manuf'g	Membership	Multi-Use
1991							
1992	0	0	0	0	0	0	0
1993							
1994							
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
E. (Part II) Historical CII Ultra-Low-Flush Toilet Installations by CII Sector by Year							
Year	Office	Religious	Restaurant	Retail	School	Wholesale	Unknown
1991							
1992	0	0	0	0	0	0	0
1993							
1994							
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0
F. Number of Residential ULFT Rebates / Installations by Year:							
Year	Single-Family			Multi-Family			
1991							
1992	0			0			
1993							
1994							
1995	0			0			
1996	325			59			
1997	178			34			
1998	160			0			

Total	663	93
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APPENDIX D

Water Shortage Contingency Plan

WATER SHORTAGE CONTINGENCY PLAN

November 2006

Section 10632 of the California Water Code states that the Urban Water Management Plan shall provide an urban water shortage contingency analysis that includes information on the estimated three-year minimum water supply, actions in the event of a water shortage, water waste prohibitions, non-essential water uses during a water shortage, mechanisms for determining water use reductions, revenue and expenditure impacts, and the emergency preparedness and plans for catastrophic events. The City of Sonoma (City) draft water shortage contingency resolutions and ordinance to be enacted during a water shortage are provided in Attachment 1.

Estimate of Minimum Water Supply for Next Three Years (Water Code §10632(b))

The minimum water supply available during the next few years during a multiple dry year drought is presented in Section 7 of the City's 2005 Urban Water Management Plan. No supply reduction is projected under this scenario. Therefore DWR Table 24 is not included.

Stages of Action to be Taken in Response to Water Supply Shortages (Water Code §10632(a))

Following declaration of a water shortage emergency by the Board of Directors of the Sonoma County Water Agency, it is the responsibility of the City Council or its designee to declare a water shortage for the City of Sonoma. The specific stages and triggers to activate each stage based on a percentage reduction in water supply will be determined in cooperation with the Sonoma County Water Agency and the other water contractors served by the Russian River aqueduct system. Table 1 summarizes the triggers and degree of water shortage for each stage of action. A description of the model that is used to calculate the allocation of water from Sonoma County Water Agency to the City as well as the model results are provided in Attachment 2.

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Table 1. (DWR Table 23) Water Supply Shortage Stages and Conditions

Rationing stages		
Stage No.	Water supply conditions	% Shortage
1	Disruptions to the City's water delivery system or shortages in the amount of water available for delivery by Sonoma County Water Agency.	15
2	Disruptions to the City's water delivery system or shortages in the amount of water available for delivery by Sonoma County Water Agency.	25
3	Disruptions to the City's water delivery system or shortages in the amount of water available for delivery by Sonoma County Water Agency.	50

Stage 1 – Introductory Stage - Voluntary Restrictions

Stage 1 implementation shall consist of requesting consumers to conserve water on a voluntary basis. The list of voluntary restrictions is provided in Exhibit B for a sample Stage 1 resolution (Attachment 1) and summarized in Table 3.

Stage 2 – Mandatory Restrictions

In the event that further water conservation is necessary the City will ask customers to reduce their water consumption by 25 percent. The City shall inform its customers that water shortage conditions have reached a magnitude that requires the implementation of mandatory restrictions on the uses of water. The list of restrictions on water use are defined as non-essential uses in the City’s draft resolution (Attachment 1) and summarized in Tables 3 and 4.

Stage 3 – Mandatory Restrictions of Both the Uses of Water and the Amounts of Water Used

If it is determined that further water consumption reductions are necessary Stage 3 mandatory restrictions of both the use of water and the amount of water use will be enacted. The necessary water consumption reduction will be 50 percent. In addition to the non-essential uses set forth in Stage 2, additional non-essential uses defined include use of water in excess of usage allotments for customers. The list of additional non-essential uses for Stage 3 are defined in the City’s draft resolution (Attachment 1) and summarized in Tables 3 and 4.

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Catastrophic Supply Interruption Plan (Water Code §10632(c))

The City’s preparation actions for a catastrophe are shown in Table 2.

Table 2. (DWR Table 25) Preparation Actions for a Catastrophe

Possible Catastrophe	Summary of Actions
Earthquake	Shut-off isolation valves and above ground use of flexible piping for ruptured mains
Toxic Spill	Use of groundwater wells
Fire	Storage supplies for fire flows
Power outage or grid failure	Portable and emergency generators available for all Agency facilities
Severe Winter Storm	Portable and emergency generators available for all Agency facilities
Hot Weather	Portable and emergency generators available for all Agency facilities

Prohibitions, Penalties, and Consumption Reduction (Water Code §10632(d)-(f))

Table 3 lists the suggested non-essential water uses and water waste prohibitions. For exceptions to prohibitions or non-essential water uses see the City’s draft resolutions (Attachment 1). In summary, any water withdrawn from the potable water system not put to beneficial use should be prohibited. Non-essential water use prohibitions in a subsequent stage include the prohibitions from the previous stage.

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Table 3. (DWR Table 26) Voluntary Restrictions and Mandatory Prohibitions

Prohibitions	Stage when prohibition becomes mandatory
No washing of sidewalks, driveways, patios, or other hard surfaces	Stage 2
No use of potable water for filling decorative lakes, ponds, or fountains	Stage 2
No washing of cars, boats, or other vehicles without a shutoff nozzle on the hose	Stage 2
No runoff or excessive pooling	Stage 2
No use of water from hydrants, other than for firefighting	Stage 2
No use of water from a meter when leaks have not been repaired as directed	Stage 2
No use of water by car wash or laundry in excess of prior water uses for similar period	Stage 2
No irrigation-grass, lawns, ground cover, shrubbery, vegetable gardens, trees, or other outdoor vegetation	Stage 2
No use of water for construction	Stage 2
No filling/refilling swimming pools	Stage 2
Usage allotments	Stage 3
No hand watering	Stage 3

The actual percent reductions and the stage of action depend on the total water requirement necessary, available supply, and alternative sustainable local supplies. Consumption reduction methods are listed in Table 4.

Table 4. (DWR Table 27) Consumption Reduction Methods

Consumption reduction methods	Stage when method takes effect	Projected reduction (%)
Water waste prohibitions	At all times	
Prohibit non-essential water use	Stage 1	15
Education and outreach program	Stage 1	15
Voluntary rationing	Stage 1	15
Restrict use for irrigation	Stage 1	15 to 50
Water shortage pricing, rate adjustments	Stage 2	25 to 50
Restrict new water connections	Stage 2	25 to 50
Mandatory rationing	Stage 3	50
Per connection allotment by customer type	Stage 3	50

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Table 5 summarizes suggested penalties when the violation has not been remedied or is repeated.

Table 5. (DWR Table 28) Penalties and Charges

Penalties or charges	Stage when penalty takes effect
Penalty for not reducing consumption	Stage 2
Termination of service	Stage 2
Flow restriction	Stage 2
Reconnection Fee	Stage 2
Meter Tampering Fee	Stage 2
Excessive use charge	Stage 3
Charge per unit over allotment	Stage 3

Analysis of Revenue Impacts of Reduced Sales During Shortages (Water Code §10632(g))

Due to reduction in water sales the revenue obtained from water sales will be reduced, however much of the operations and maintenance expenses for the City will remain the same. The City may experience increased expenditures for public information and outreach campaigns and staffing. A “Revenue Impact Model – Step by Step Instructions” (Attachment 3) was supplied to the City by Sonoma County Water Agency to assist the City in analyzing the financial impacts during a water shortage and make decisions on actions to be taken. In the event of a water shortage, the City would evaluate the financial impact for the needed percent water consumption reduction. Tables 6 and 7 list suggestions to overcome the revenue and expenditure impacts.

Table 6. (DWR Table 29) Proposed Measures to Overcome Revenue Impacts

Names of measures	Summary of effects
Rate adjustment	Offset loss in revenue
Use of financial reserves	Offset loss in revenue

Table 7. (DWR Table 30) Proposed Measures to Overcome Expenditure Impacts

Names of measures	Summary of effects
Reconnection fees	Support water conservation programs
Excessive use charges	Support water conservation programs
Construction offset programs	Support water conservation programs

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Water Shortage Contingency Draft Ordinance and Use Monitoring Procedure (Water Code §10632(h) and (i))

As noted above, the Sonoma County Water Agency Board has approved an allocation methodology for use by the City in the event of a water supply shortage. The City’s draft water shortage contingency resolutions and ordinance and allocation methodology are provided as Attachments 1 and 3, respectively. It is recommend by Sonoma County Water Agency that the City utilize a chart depicting actual community water use compared to overall rationing goal and provide this information to the media and the public to encourage water conservation. Sonoma County Water Agency developed recommendations for the City to monitor water use reductions as shown in Table 8.

Table 8. (DWR Table 31) Water Use Monitoring Mechanisms

Mechanisms for determining actual reductions	Data expected
Continuous system data collection	Normal water usage
Review of water use data	Percent reduction based on previous year water usage
Review of production data	Percent reduction based on previous year production
Increased meter reading (Stage 3)	Regular water usage information during shortage
Agency supply meters	Quantity of delivered water

Attachments

- Attachment 1 Water Shortage Contingency Resolutions
- Attachment 2 Water Supply Allocation Model
- Attachment 3 Revenue Impacts of the Model Ordinance

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ATTACHMENT 1

Water Shortage Contingency Resolutions

7
Water Shortage Emergency Declaration
CITY OF SONOMA
RESOLUTION NO.

RESOLUTION OF THE CITY COUNCIL OF THE CITY
OF SONOMA DECLARING THAT A WATER SHORTAGE
EMERGENCY CONDITION PREVAILS WITHIN THE
AREA SERVED BY THE CITY OF SONOMA WATER
SYSTEM

WHEREAS, the Board of Directors of the Sonoma County Water Agency has declared a water shortage emergency in Russian River water supply due to drought conditions and abnormally low water storage levels in Lake Mendocino, Lake Pillsbury and Lake Sonoma; and,

WHEREAS, due to drought conditions, the City of Sonoma cannot depend on continued deliveries of water by the Sonoma County Water Agency in sufficient amounts to meet the ordinary demands and requirements of the City's water consumers; and,

WHEREAS, other sources of water available to the City of Sonoma are not sufficient to make up the difference between the amount of water available from the Sonoma County Water Agency under the current drought conditions and the historical dry weather demand on the City of Sonoma's water supply; and,

WHEREAS, this Council has held a public hearing on _____, 19__ at which consumers of the City of Sonoma's water supply were given opportunity to be heard to protest and to present their respective needs to this Council,

NOW, THEREFORE, BE IT RESOLVED that this Council hereby finds and determines that under current drought conditions, the ordinary demands and requirements of water consumers served by the City of Sonoma's water system cannot be satisfied without depleting the water supply of the City of Sonoma to the extent that there would be insufficient water for human consumption, sanitation and fire protection.

BE IT FURTHER RESOLVED that this Council hereby declares that a water shortage emergency condition prevails within the area served by the City of Sonoma.

CITY OF SONOMA
RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SONOMA REQUESTING EACH AND EVERY CUSTOMER FURNISHED WATER BY THE CITY TO MAKE A CONSCIOUS EFFORT TO CONSERVE WATER

WHEREAS, rainfall and hence water accumulated in Lake Mendocino, Lake Pillsbury and Lake Sonoma (key reservoirs supplying water to the Russian River aqueduct system) has been below normal; and,

WHEREAS, carryover storage in said reservoirs is dangerously low, being down to _____ acre feet, and is insufficient to meet all downstream demands without increased water conservation and/or rationing of water use by consumers,

NOW THEREFORE BE IT RESOLVED that the Sonoma City Council does hereby request and implore that:

1. Each and every person, firm, partnership, corporation, and political entity consciously and with commitment voluntarily reduce water use.
2. Waste of water be avoided.
3. Governmental agencies and institutions demonstrate leadership and implement restrictive water use programs.
4. All consumers take advantage of and install water saving devices distributed and made available by the City.
5. All plans for planting lawns or expanding landscaping or otherwise expanding irrigation demand be deferred.
6. Cars and other vehicles be washed only from bucket including a quick rinse from a hose provided the hose is equipped with a shut-off nozzle.
7. All consumers irrigate only with a hand held hose or drip system irrigation.
8. Contractors use treated wastewater for dust control, etc. on construction projects.

CITY OF SONOMA
ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF SONOMA PROHIBITING NEW WATER SERVICE CONNECTIONS, PROHIBITING NONESSENTIAL USES OF WATER, ALLOCATING AVAILABLE WATER RESOURCES, ADJUSTING WATER RATES, AND PROVIDING PENALTIES FOR VIOLATIONS THEREOF

The City Council of the City of Sonoma does ordain as follows:

Section 1. The City Council of the City of Sonoma has by Resolution No. _____ dated _____, found and determined that the ordinary demands and requirements for water consumers of the City of Sonoma's water system cannot be satisfied without depleting the water supply to the extent that there would be insufficient water for human consumption, sanitation, and fire protection. This ordinance is intended to prohibit any additional demands on the existing water supply, to prohibit all nonessential uses as defined herein and to allocate consistently with the City's ability to administer and enforce, the available water supply during a water shortage emergency to the end that sufficient water will be and remain available for human consumption, sanitation and fire protection.

Section 2. Definitions

For the purpose of this ordinance, the following terms phrases, words and their derivations shall have the meaning given herein. The word "shall" is always mandatory and never directory.

- (a) City. The City of Sonoma
- (b) Person. Any person, firm, partnership, association, corporation, company or organization of any kind.
- (c) Customer or Consumer. The person using water supplied by the City of Sonoma.
- (d) Director. The Director of Public Works of the City of Sonoma or his designated representative.
- (e) Department. The Department of Public Works
- (f) Hand-Watering. Water used by a customer for exterior purposes by means of a handheld hose connected to the customer's piping system.
- (g) Irrigate. To water land, whether by channels, by flooding, by sprinkling or any other means whatsoever, except hand-watering and drip irrigation.
- (h) Water. Only water supplied by the City of Sonoma unless expressly provided otherwise or required by the context.
- (i) Stage 2 and Stage 3. Stages of a water shortage emergency as declared by the City Council in accordance with the City's Water Shortage Contingency Plan.

Section 3. Prohibition on New Water Service Facilities and Expansion of Use.

No addition or further expanded use or any change in use shall be made on any non-residential property after _____, if it would result in increased water usage from the City's water system unless a water service application for such additional, expanded or changed use has been approved on or prior to said date. In the case of any other such additional expanded or changed use after said date, the water allocations under Section 6, of this ordinance will be based on actual previous water use on said property.

new, additional, further expanded, or increased-in-size water service connections, meters, service lines, pipe line extensions, mains or other water service facilities of any kind shall be prohibited, allowed, approved installed or accepted by the City of Sonoma after _____ as follows:

- (a) Services to facilities for which a valid building permit has been issued or for which application has been made including submittal of all necessary plans and other documents and payment of all required fees prior to _____.

- (b) Construction of water mains by City which would improve circulation within the existing water distribution system.
- (c) Any person depending on a private well for domestic use shall, if such private well should go dry or otherwise produce non-potable water, be allowed to connect to the City water system under the same conditions which would apply if this ordinance were not in effect except that required water main extensions shall be deferred until after the current water shortage emergency. The person requesting service shall provide a bond or deposit as required by the Director to guarantee future construction. Connections under this section shall not be allowed to any property which would be denied a connection under the conditions of the City Council policy establishing a moratorium on water service connections outside the City limits as adopted by the City Council on November 22, 1976.

Section 4. Prohibition of Nonessential Water Use.

It is unlawful for any person to use water for any nonessential use as hereinafter defined.

Section 5. Nonessential Uses Defined.

Upon adoption of a resolution by the City Council declaring that a Stage 2 water shortage condition exists, the following uses of water shall be nonessential:

- (a) Uses of water from public hydrants for any purpose other than firefighting.
- (b) Use of water through any meter when the customer has been given ten days' notice to repair one or more leaks and has failed to complete such repairs.
- (c) Use of water by any car wash or laundry in excess of 100 percent of the prior water use for a similar period as determined by the Department from its records. Where no such records exist, prior water use shall be deemed to be average prior water use of similar existing services as shall be determined by the Department from its records.
- (d) Use of water to irrigate grass, lawns, ground cover, shrubbery, vegetable gardens, trees, or other outdoor vegetation.
- (e) Use of water for the construction of any structure or other project including such use in dust control except for construction of water mains permitted under Section 3(b) hereof.
- (f) Use of water to wash any sidewalk, walkway, driveway, street, parking lot, tennis court, other hard surfaced area or the outside surface of any building or other structure by hosing or otherwise by direct connection to faucets or other outlets.
- (g) Use of water to wash any motor vehicle, camper, trailer, airplane, boat or other equipment by hosing or otherwise by direct connection to a faucet or other outlet.
- (h) Use of water to fill or refill any swimming pool.
- (i) Excessive use of water for any purpose resulting in water running to waste in any gutter or otherwise.

Section 6. Further Nonessential Uses Defined.

In addition to the nonessential uses set forth in Section 5, the following additional uses shall be nonessential upon adoption of a resolution by the City Council that a Stage 3 water shortage condition exists:

(a) Use of water in excess of the usage allotments hereinafter set forth:

(1) Residential Uses

Fifty (50) gallons per day per permanent resident.

(2) Non-residential Uses

Fifty (50) percent of the prior water use for a similar period as determined by the Department from its records. Where no such records exist, prior water use shall be deemed to be the average prior water use of similar existing services as shall be determined by the Department from its records or shall be determined in accordance with evidence and information satisfactory to the Director.

(b) Use of water for hand watering.

(c) Use of water to wash any sidewalk, walkway, driveway, street, parking lot, tennis court, other hard surfaced area, or the outside surface of any building or other structure.

(d) Use of water to wash any motor vehicle, camper, trailer, airplane, boat or other equipment.

Section 7. Number of Permanent Residents

Each customer in whose name water is supplied to a residence shall upon request of the Director advise him under penalty of perjury the number of permanent residents using water supplied to that residence. If such a residential customer shall fail to so advise the Director, his residence shall be permitted the water allocation herein provided for one permanent resident.

Section 8. Tampering with Water Meters Prohibited.

It is unlawful for any person to remove, replace, alter, damage or otherwise tamper with water meter or components thereof, including but not limited to the meter face, dials, or other water usage indicators, and any flow restricting device installed thereon.

Section 9. Replacement and Repair of Existing Facilities

Notwithstanding any other provisions of this ordinance, no restriction or prohibition is imposed upon the repair or replacement of existing water service facilities in a manner which the Director determines will not materially increase the consumption of water.

Section 10. Continued Processing of Applications.

Notwithstanding any other provisions of this ordinance, City staff may continue to process applications which would otherwise involve water usage for any applicant who has acknowledged in writing that no act of the City in processing said application will constitute an acceptance or approval of any water service facility, and that the applicant acts at his own cost, expense, risk of loss and agrees to and does waive and release any claim or demand against the City of Sonoma, its officers, employees, and agents for any such cost, expense, loss, or damage by reason of such processing.

Section 11. Water Rates

In order to provide adequate revenues for operation and maintenance of the City water system, the water rates per 1,000 gallons of water which would otherwise be charged the City's water customers if this ordinance were not in effect shall be increased by the following percentages during the periods indicated:

- (a) During a Stage 2 water shortage emergency..... _____ %.
- (b) During a Stage 3 water shortage emergency..... _____ %.

Section 12. Right to Inspect Private Wells

Any person who operates a private well on any property also serviced by a City water service shall permit employees of the City to enter upon the property and inspect the operation of the well in order that it may be determined whether or not City water is being used in violation of this ordinance.

Section 13. Variances

The Director may, in writing:

- (1) Grant temporary variances for prospective uses of water otherwise prohibited; or
- (2) Adjust temporarily any consumer's allotment if he finds and determines that due to unusual circumstances to fail to grant such a variance would cause an emergency condition affecting health, sanitation, or fire protection of the applicant or the public; further, he may grant such adjustment in the case of a mixed residential/nonresidential use if he finds that such adjustment is necessary to place an equivalent allotment burden on said applicant. The City Council shall ratify or revoke any such variance or adjustment at its next scheduled meeting.

No such variance or adjustment shall be retroactive or otherwise justify any violation of this ordinance occurring prior to issuance of said temporary variance or adjustment.

Section 14. Violation of Water Use Restrictions, Punishment.

It is a misdemeanor, punishable as provided in Chapter 1.12 of the Sonoma Municipal Code for any person to use or apply water received from the City of Sonoma contrary to or in violation of any restriction or prohibition specified in this ordinance, or to otherwise violate any provision of this ordinance, except both the first and second violations of this ordinance within any one year period shall be infractions, punishable as such, the fine for which shall not exceed \$500.00. Said punishment may be in lieu of or in addition to any other penalty or method of enforcement provided by law. Any violation of this ordinance permitted to continue after notice, shall be a separate offense and shall be punishable as such hereunder; further, each day such violation continues shall be considered a separate offense.

Section 15. Purpose and Intent; Statutory Construction.

It is the purpose and intent of this ordinance to prohibit an increase in water demand on the City of Sonoma's available water supply, to eliminate all nonessential water usage, and to provide for allocation of existing water resources to insure sufficient water for human consumption, sanitation, and fire protection. This ordinance shall be liberally construed to effectuate such purpose and intent.

Section 16. Ordinance Controlling

The provisions of this ordinance shall prevail and control in the event of any inconsistency between this ordinance and any other rule, regulation, resolution, ordinance, or code of the City of Sonoma.

Section 17. Water Service to be Disconnected

Water may be shut off by the Department without notice whenever the Director determines there has been a failure to comply with the provisions of this ordinance. Payment of a \$_____ charge for reconnection or restoration of service which has been terminated pursuant to this section shall be paid by the customer prior to such reconnection or restoration. The Director may have a flow-restricting device installed in the service line prior to such reconnection or restoration of service.

Section 18. Enforcement; Designated Persons

- (a) Each police officer of the City shall in connection with his duties imposed by law diligently enforce the provisions of this ordinance.

- (b) The Fire Chief and all other full-time uniformed personnel of the Fire Department of the City shall have the duty and are hereby authorized to enforce the provisions of this ordinance and shall have all the powers and authority permitted under California Penal Code Section 836.5, including the power to issue written notice to appear.

Section 19 Severability Clause

If any section, subsection, sentence, clause, or phrase of this ordinance is for any reason held to be unconstitutional, such decision shall not affect the remaining portions of this ordinance. The City Council declares that it would have passed this ordinance and each section, subsection, sentence, clause, and phrase thereof irrespective of the fact that any one or more such provisions be declared unconstitutional.

Section 20. Urgency Ordinance

This ordinance is hereby declared to be necessary for the immediate preservation of the public peace, health, and safety and will take effect and be in force upon its adoption by a four-fifths vote of the members of the Sonoma City Council. Due to severe drought conditions existing in the area from which the City of Sonoma draws its water supply, it is imperative that this ordinance become effective immediately to protect existing water supplies for human consumption, sanitation, and fire protection. The City Council of the City of Sonoma further declares that if normal water usage were permitted to continue, the available water supply would be depleted below the safe level for human consumption, sanitation and fire protection. The City Clerk shall cause this ordinance to be published in accordance with law within ten days after its adoption.

EXHIBIT D - Resolution Adopting the Water Shortage Contingency Plan

CITY OF SONOMA
RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SONOMA
ADOPTING THE WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, the California Legislature enacted Assembly Bill 11X during the 1991 Extraordinary Session of the California Legislature (an act to amend California Water Code Sections 10620, 10621, 10631, and 10652, and to add Section 10656 to the California Water Code, relating to water); and,

WHEREAS, AB 11X mandates that every urban water supplier providing municipal water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre feet of water annually develop a Water Shortage Contingency Plan; and,

WHEREAS, AB 11X mandates that said Plan be incorporated in the Urban Water Management Plan filed with the California Department of Water Resources; and,

WHEREAS, the Sonoma County Water Agency must file its new Urban Water Management Plan with the California Department of Water Resources by April 1, 1996 or as soon as possible thereafter; and,

WHEREAS, the City of Sonoma is an urban supplier of water providing water to more than 3,000 customers, and has therefore, prepared a Water Shortage Contingency Plan in compliance with the requirements of AB 11X,

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Sonoma that:

1. The City of Sonoma Water Shortage Contingency Plan dated April 3, 1996 and attached hereto is hereby adopted;
2. The Director of Public Works is hereby authorized and directed to provide a copy of this Plan to the Sonoma County Water Agency for incorporation in the Urban Water Management Plan which will then be filed with the California Department of Water Resources in accordance with Section 10621 of the Water Code;
3. The Director of Public Works shall recommend to the City Council regarding additional procedures, rules and regulations to carry out effective and equitable allocation of water resources during a water shortage.

The foregoing resolution was adopted this 3rd day of April, 1996 by the following roll call vote:

CITY OF SONOMA

RESOLUTION NO. 21 - 2007

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SONOMA DECLARING THE EXISTENCE OF A TEMPORARY SUMMER-TIME IMPAIRMENT OF WATER SUPPLY AND REQUIRING CUSTOMERS TO REDUCE WATER CONSUMPTION BY 15%

WHEREAS, the State of California Water Resources Control Board, by Order WR 2007-0022, directed the Sonoma County Water Agency to reduce diversions from the Russian River by 15 percent from July 1, 2007 through October 28, 2007; and

WHEREAS, the Sonoma County Water Agency, which supplies a significant portion of the City of Sonoma's potable water supply, is asking its water contractors, customers, business and agricultural communities to implement mandatory water conservation measures effective July 1, 2007 through October 28, 2007 in order to implement the above referenced order; and

WHEREAS, it is reasonable and prudent to curtail summer usage to preserve sufficient water for essential uses including water for fire protection.

NOW THEREFORE, BE IT RESOLVED, by the City Council of the City of Sonoma as follows:

Section 1. The City Council hereby declares the existence of a water conservation condition pursuant to Section 13.04.024 B of the Municipal Code.

Section 2. During the summer months of June, July, August, September and October, or until such time as the City Council determines that the condition for conservation no longer exists, all potable water customers of the City of Sonoma are directed to:

- A. Use water efficiently and reduce less essential uses of water with the goal of achieving an overall system-wide reduction of 15%.
- B. Apply irrigation water only during the evening and early morning hours to reduce evaporation losses; after sunset and before sunrise.
- C. Before June 1st, inspect all irrigation systems, repair leaks, and adjust spray heads to provide optimum coverage and eliminate avoidable over-spray.
- D. For irrigation valves controlling water applied to lawns, vary the minutes of run-time consistent with fluctuations in weather.
- E. Reduce minutes of run-time for each irrigation cycle if water begins to run-off to gutters and ditches before the irrigation cycle is completed.
- F. Become conversant with and strictly adhere to the City of Sonoma's Water Waste Prohibition Ordinance.
- G. Utilize water conservation incentive, rebate and give-a-way programs to replace water guzzling plumbing fixtures and appliances with water efficient models.
- H. Take advantage of the free information available from the City of Sonoma on how to use water efficiently, read your water meter, repair ordinary leaks, how to make your landscape a water efficient landscape, etc.
- I. Use a broom, not a hose and water, to clean sidewalk, driveway, deck or patio.

- J. Use a hose with an automatic shut-off nozzle when washing vehicles, or take vehicle to a carwash that recycles water.

Section 3. Resolution No. 48-2006 is hereby rescinded.

The foregoing Resolution was duly adopted this 20th day of June 2007, by the following vote:

AYES:	Sanders, Sebastiani, Brown, Barbose, Cohen
NOES:	None
ABSENT:	None

STANLEY COHEN, MAYOR

ATTEST:

GAY RAINSBARGER, CITY CLERK

ORDINANCE NO. 2000-6

**AN ORDINANCE OF THE CITY OF SONOMA INSTITUTING
WATER WASTE PROHIBITIONS**

The City Council of the City of Sonoma does hereby ordain as follows:

SECTION 1.

Section 13.04.024 "Water Waste Prohibitions" is hereby added to Chapter 13.04 "City Water System" of the Sonoma Municipal Code to read as follows:

Section 13.04.024 - Water Waste Prohibitions

A. Purpose. The purpose of this Section is to promote water conservation and the efficient use of potable water furnished by the City of Sonoma by eliminating intentional or unintentional water waste when a reasonable alternative solution is available, and by prohibiting use of equipment which is wasteful.

B. Nonessential Uses. During such period of time when the Sonoma County Water Agency has declared a stage 2 or stage 3 water conservation condition, or whenever the City Council of the City of Sonoma shall declare the existence of a water conservation condition, no customer of the City of Sonoma shall use or permit the use of potable water from the City of Sonoma for residential, commercial, institutional, industrial, agricultural, or other purpose for the following nonessential uses:

1. The washing of sidewalks, walkways, driveways, parking lots and other hard-surfaced areas by direct hosing, except as may be necessary to properly dispose of or wash away spills that present a trip and fall hazard, or to prevent or eliminate materials dangerous to the public health and safety;
2. The escape of water through breaks or leaks within the customers plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of seventy-two (72) hours after the customer discovers such a break or leak or receives notice from the City of Sonoma, is a reasonable time within which to correct such break or leak or, as a minimum, to stop the flow of water from such break or leak;
3. Irrigation in a manner or to an extent which allows excessive run off of water or unreasonable over-spray of the areas being watered. Every customer is deemed to have his water system under control at all times, to know the manner and extent of his water use and any run off, and to employ available alternatives to apply irrigation water in a reasonably efficient manner;

4. Washing cars, boats, trailers or other vehicles and machinery directly with a hose not equipped with a shutoff nozzle;
5. Water for non-recycling decorative water fountains;
6. Water for single pass evaporative cooling systems for air conditioning in all connections installed after April 5, 2000 unless required for health or safety reasons;
7. Water for new non-recirculating conveyor car wash systems; and
8. Water for new non-recirculating industrial clothes wash systems.

C. Exempt Water Uses. All water use associated with the operation and maintenance of fire suppression equipment or employed by the City of Sonoma for water quality flushing and sanitation purposes shall be exempt from the provisions of this section. Use of water supplied by a private well or from a reclaimed waste water, gray water or rainwater utilization system is also exempt.

D. Variances. Any customer of the City of Sonoma may make written application for a variance. Said application shall describe in detail why applicant believes a variance is justified.

1. The City Manager or his or her designee may grant variances for use of water otherwise prohibited by this section upon finding and determining that failure to do so would cause an emergency condition affecting the health, sanitation, fire protection or safety of the applicant or public; or, cause an unnecessary and undue hardship on applicant or public, including but not limited to, adverse economic impacts, such as loss of production or jobs.
2. The decision of the City Manager or his or her designee may be appealed to the City Council by submitting a written appeal to the City Clerk within fifteen (15) calendar days of the date of the decision. Upon granting any appeal, the City Council may impose any conditions it determines to be just and proper. Variances granted by the City Council shall be prepared in writing and the City Council may require the variance be recorded at applicant's expense.

E. Enforcement and Fees. Depending on the extent of the water waste the City of Sonoma may, after written notification to customer and a reasonable time to correct the violation as solely determined by the City of Sonoma, take some or all of the following actions. Penalties, fees and charges noted below shall be established by resolution of the City of Sonoma. The City shall not be obligated to take any of the actions set forth below in any certain order, nor is the City prevented from selecting any one or all of the items listed below as the means to enforce this ordinance in any given situation. The methods of enforcement set forth below are not mutually

exclusive, and the use of one form of enforcement shall not prevent the subsequent use of another form of enforcement.

1. Written notice to the customer of the water waste violation including a specified period of time to correct the violation.
2. Personal contact with the customer at the address of the water service. If personal contact is unsuccessful, written notice of the violation including a date that the violation is to be corrected may be left on the premises, with a copy of the notice sent by certified mail to the customer.
3. The City of Sonoma may install a flow-restricting device on the service line.
4. The City of Sonoma may levy a water waste fee to the customer.
5. The City of Sonoma may cause termination of water service and the charge for same shall be billed to the customer. Except in cases of extreme emergency as solely determined by the City Manager or his or her designee, service shall not be reinstated until verified by the City of Sonoma that the violation has been corrected and all charges and fees have been paid.

SECTION II. SEVERABILITY

If any section, subsection, sentence, clause, phrase, or word of this ordinance is for any reason held to be invalid, the validity of the remaining portion of this ordinance shall not be affected.

SECTION III. ENVIRONMENTAL DETERMINATION

The City of Sonoma determines that this ordinance is a Class 7 categorical exemption under section 15307 of the California Environmental Quality Act, which exempts actions by regulatory agencies for protection of natural resources.

SECTION IV. EFFECTIVE DATE

This ordinance shall take effect thirty (30) days from the date of its passage. Before expiration of fifteen (15) days after its passage, this ordinance or summary thereof, as provided in California Government Code Section 39633, shall be published at least once in a newspaper of general circulation published and circulated in the City of Sonoma.

Adopted and approved this ____ day of May, 2000.

AYES: _____
NOES: _____
ABSTAIN: _____

ABSENT: _____

MAYOR

ATTEST:

CITY CLERK

ATTACHMENT 2

Water Supply Allocation Model

**Description of Model that Calculates the
Allocation of Water Available to Sonoma County Water Agency for its Customers*
During a Water Supply Deficiency Taking Demand Hardening into Account**

April 4, 2006 Version

This EXCEL workbook (040406 Allocation Model.xls) presents two models that calculate allocations to Sonoma County Water Agency (SCWA) Customers during a shortage of water supply in the Russian River. The calculations meet all of the requirements of the Restructured Agreement for Water Supply (Agreement). See **Contents** sheet for layout of sheets in the workbook. Another EXCEL workbook (040406 Customer Water Use.xls) supports this workbook and contains data compiled for the 2005 Urban Water Management Plan.

* "SCWA Customers" or "Customer" is defined as any of the following:

Regular Customers

Water Contractors (sometimes referred to as "Primes"): Cotati, Petaluma, Rohnert Park, Santa Rosa, Sonoma, Windsor (Airport Service Area), North Marin Water District, Valley of the Moon Water District

Other Agency Customers: SCWA, County of Sonoma, Larkfield Water District, Forestville Water District, Lawndale Mutual Water Co., Kenwood Village Water Co., Penngrove Water Co., City of Sebastopol, State of California, and Santa Rosa Jr. College)

Marin Municipal Water District (MMWD)

Russian River Customers (Customers of SCWA that divert water directly from the Russian River or via wells adjacent to the River).

Where to Find Results:

Results for allocating water during a shortage given varying assumed amounts of water available to SCWA in the Russian River are modeled for two cases.

- The **Current Model** is to be employed during a real drought. Inputs to this model must be updated to then current conditions. For current conditions, results are shown on the **Current Recap** sheet.
- The **Future Model** is a "planning" model whose purpose is to predict allocations for various levels of deficiency in the future when all Customers are assumed to have reached their entitlement limits – generally about 20 years from now for most Customers. (Note: This was the type of model prepared by West, Yost & Associates for the City of Santa Rosa and is also the type prepared by Petaluma.) Results are shown on the **Future Recap** sheet.

Required Allocation Methodology:

Section 3.5(a)(3) of the Agreement provides for allocation of water in the event of a water supply deficiency as follows:

- **"First"**, Allocation of quantities of water required by each Customer* for human consumption, sanitation and fire protection (HC, S & FP) after taking into consideration all other sources of potable water then available to said customer. (Section 3.5(a)(3)(i)) (Often referred to as Tier 1.)
- **"Second"**, Allocation of any additional water available to the SCWA proportionately to its Customers* as follows (Section 3.5(a)(3)(ii)) (Often referred to as Tier 2 allocation.):

Regular Customers (Water Contractors and Other Agency Customers): Deliveries from aqueduct based on respective average daily rate of flow during any month entitlements. These entitlements are set forth as million gallon per day (mgd) rates in Sections 3.1(a) and 3.2 of the Agreement.

Russian River Customers: Authorized diversions or rediversions of water based on delivery limits set forth in agreements with the SCWA.

Marin Municipal Water District (MMWD): Deliveries based on Third Amended Offpeak Agreement and Agreement for Sale of Water (as amended on Jan 25, 1996), and amendments or subsequent agreements between the SCWA and MMWD that have been approved by the Water Advisory Committee.

- **Sum of Two:** The Agreement further requires that the sum of the "First" plus "Second" allocation for a given SCWA Customer not exceed the Reasonable Requirement or entitlement limit/contracted amount, whichever is less (Section 3.5(a)(3)(iii)).

"Human Consumption, Sanitation and Fire Protection" Definition:

In determining HC, S & FP amounts, the Agreement provides that SCWA shall take into account the level of water conservation achieved by the Customer and the resulting decrease in end user ability to reduce water use (the hardening of demand) resulting from such conservation. The allocation shall be determined using a methodology which rewards and encourages water conservation; avoids cutbacks based upon a percentage of historic consumption, and, among other things, bases the amounts necessary for HC, S & FP upon no greater than average indoor per capita water use determined from recent retail billing records for winter water use by all of the Water Contractors; and, if necessary or appropriate for equitable purposes, considers commercial, industrial and institutional water uses separately and determines that element of the allocation based on winter water use from recent retail billing records for commercial, industrial and institutional uses. (Section 3.5(c)(1))

"Reasonable Requirements" Definition:

The Agreement states that the fundamental purpose of the Reasonable Requirements limitation is to ensure that no Customer receives more water during a shortage than that Customer reasonably needs. In determining reasonable requirements, the SCWA may take into account the hardening of demand resulting from the level of conservation achieved by the Customer; the extent to which the Customer has developed recycled water projects and local supply projects, and the extent to which the Customer has implemented water conservation programs. The Agreement further states that it is the intention of the

parties that the SCWA make its Reasonable Requirements determinations so as to encourage Customers to implement water conservation, recycled water, and local supply projects. (Section 3.5(c)(2))

Description of Models:

Two models are presented.

- **Current Model:** The Current Allocation Model determines annual allocations based on the assumption the water supply deficiency occurs now and impacts current conditions and levels of use. This is the model that would be used in the event of an actual deficiency in water supply available from the Russian River. It employs estimates of HC, S & FP needs, Reasonable Requirements, and Local supply. In the event of a real perceived water supply deficiency, inputs to the model must be updated to then currently available data. If the shortage persists longer than one year the inputs must again be updated – particularly local supply estimates which should be updated every year of the drought. Customers relying on surface water for local supply, such as North Main Water District, and MMWD, can be expected to have reduced local supply available.
- **Future Model:** The second model is hypothetical and predicts future allocations at a point in time that assumes that all customers of the SCWA have reached their annual entitlement limits. It sets the Reasonable Requirement for each SCWA Customer to that customer’s annual entitlement limit (cap). The Future Allocation Model is useful for planning purposes to predict allocations from the SCWA for various assumed water supply deficiencies.

Model Assumptions and Inputs:

1. **Entitlements:** Entitlements (Regular Customers) and contracted amounts (MMWD and Russian River Customers) for both models are as set forth in the Agreement and existing agreements between the SCWA and MMWD and its Russian River Customers. (See **Entitlements** and **RR Cust** sheets.)
2. **Local Supplies:** The estimates of safe yield of local supplies are the same for both models and are based on estimates reported by Water Contractors to West, Yost & Associates in a September 23, 2004 Tech. Memo to the City of Santa Rosa and are generally average local supply that was available for the period 2000 through 2003. A contingency factor is applied by John Olaf Nelson Water Resources Management (JONWRM) to each local supply to account for equipment/maintenance issues or other potential problems. This factor was assumed to be 10% for each Water Contractor for lack of better data. The safe yield value for MMWD was supplied by MMWD. Local supply estimates for Other Agency Customers were not available and was assumed to be “0”. Information on Local supplies needs to be accurately determined and updated by the SCWA. (See **Local** and **TM Data** sheets.)
3. **Water for Human Consumption, Sanitation and Fire Protection:** Water needed to meet HC, S & FP needs for both models is assumed to be equal to total winter level demand of customers served by Customers of the SCWA and is based on metered water sales (billings) for calendar 2004, the base year analyzed in the 2005 Urban Water Management Plan. Winter level demands are then extrapolated to a full year to determine the annual HC, S & FP need. Water available

from local supplies is then determined and net HC, S & FP needs determined in order to calculate the “First” allocation. In determining the “First” allocation, demand hardening is accounted for using winter level per capita demand. (See **GPCD** and **Human** sheets and the footnotes on the Current Model for details.)

4. Reasonable Requirements:

- For the Current Model, Reasonable Requirements were assumed to equal average annual aqueduct deliveries to SCWA’s Regular Customers and MMWD for FY 2003-04 and FY 2004-05. For Russian River Customers, the average for Water Years 2004 and 2005 was used, as that was the format the data was available in. (Use of a three or four year average would normally be a better choice for calculating Reasonable Requirements, however, this was not done as at least one SCWA customer made a significant policy change in aqueduct usage which would not have been fairly reflected if years prior to FY 2003-04 were used. Also in subsequent analyses, the data should be normalized to common annual periods.) (See **Reasonable** sheet.) Pursuant to Section 3.5(c)(2), Reasonable Requirements were adjusted with a demand hardening factor to account for differing levels of conservation achieved by Customers. The demand hardening factor is derived from total per capita demand (residential, non-residential and unaccounted for water) as determined for the base year (cal. 2004) of the 2005 Urban Water Management Plan. (See **DH Factor** sheet.)
- In the Future Model, Reasonable Requirements are set equal to annual entitlement limits (caps) or contract limits as applicable, it being assumed that each Customer has reached its annual entitlement limit (the same approach taken in the Santa Rosa and Petaluma models). **THIS IS THE ONLY INPUT DIFFERENCE BETWEEN THE “CURRENT” AND “FUTURE” MODEL.**

Model Design and Workbook Layout:

The two model sheets are totally independent and are designed to automatically calculate water shortage allocations for any SCWA available supply bounded by a low value equal to the sum of water required for HC, S & FP and an upper value equal to the sum of Reasonable Requirements or sum of annual entitlement limits, whichever is less. Cells in both models are linked to the various supporting data sheets.

To operate a model, simply input the assumed available supply in Cell H:4 of the model you are working with. The results – the sum of the “First” (Tier 1) plus “Second” (Tier 2) allocation appear to the far right (Column 42 of the Current Model and Column 39 of the Future Model).

The Current Model sheet is followed by a sheet entitled “Current Recap” that shows the resulting allocations (both in tabular and graph form) for each Customer for various assumed levels of available supply. This recap and the graphs are automatically populated by running the Macro entitled “CurRecap”.

Likewise, following the Future Model sheet is a sheet entitled “Future Recap” which shows the tabular and graph results for the Future Model. This recap and the graphs are automatically populated by running the Macro entitled “FutRecap”.

Caution Concerning Data Collection and Maintenance:

With the allocation methodology introduced in the Agreement, it is essential that the SCWA develop and maintain a data base containing information collected from all of its Customers based on application of uniform standards, and containing data on water service area population, portion of population served by private wells (none of the models correct for private well water use by service area population), winter level water consumption, annual consumption, local supplies, unaccounted for water, conservation, recycled water use, etc. Good regional data on evapotranspiration differences may also be needed to modify the Reasonable Requirement demand hardening adjustment factor. A fair and uniform way to determine the safe yield of local supply capacity is especially important. It may be useful to categorize local supply into: (1) normally available and used capacity, and (2) strictly standby capacity that is more expensive to use than aqueduct water or has some non-threatening quality issues, i.e. taste and odor that make it undesirable to use under normal water supply conditions.

John Olaf Nelson Water Resources Management (JONWRM)
1833 Castle Dr, Petaluma, CA 94954
Ph: (707) 778-8620 Email: jonolaf@comcast.net

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Contents of this EXCEL Workbook
Water Shortage Allocation Model w. Demand Hardening Factor (a)
April 4, 2006 Version

Models (Current and Future)

Page	
1	Contents
2, 3	Current Model (To be used in case of imminent drought.)
3, 4	Current Recap (Recap of <u>Current</u> Allocation Model)
5, 6	Future Model (To be used for long range planning purposes.)
7, 8	Future Recap (Recap of <u>Future</u> Allocation Model)

Input Data for Models

9	Entitlements *
10	RR Cust (Russian River Customer demand) *
11	Human (Human Consumption, Sanitation and Fire Protection demand) *
12	Reasonable ("Reasonable Requirements" are recent (non-drought) aqueduct deliveries and Russian River diversions of SCWA Customers) **
13	Local (Local Supply expected to be available in a drought) *
14	Pop (Service Area population data) *
15	GPCD (Winter level per capita demand (b))
16	DH Factor Demand Hardening Factor - used for adjusting "Reasonable Requirements" in <u>Current</u> Model
17	TM Date Data compiled by West, Yost & Associates for Santa Rosa Planning Allocation Model

* Same data used in both Current and Future Model.

** Based on aqueduct sales and Russian River diversions in recent non-drought years. In the Future Model, reasonable requirements are set equal to annual entitlement limits (caps) or contract delivery limits as applicable in order to estimate allocations at that time in the future when demand has grown to equal the annual entitlement limits.

For questions, contact:

John Olaf Nelson Water Resources Mgt

Ph: (707) 778-8620

Email: jonolaf@comcast.net

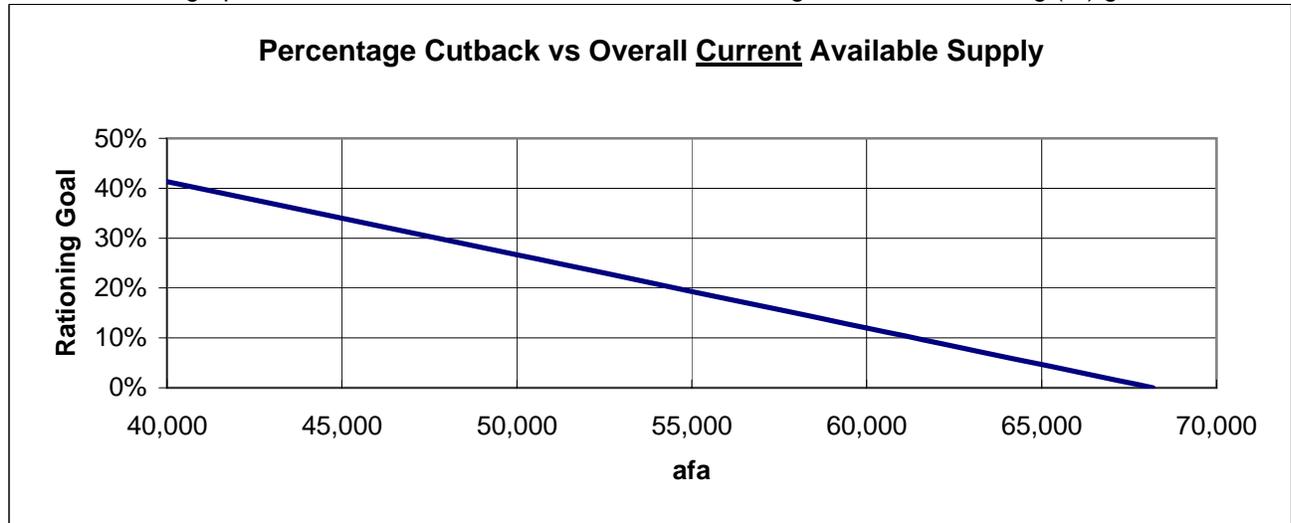
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Results for Current Allocation Model vs. Assumed Available Supply

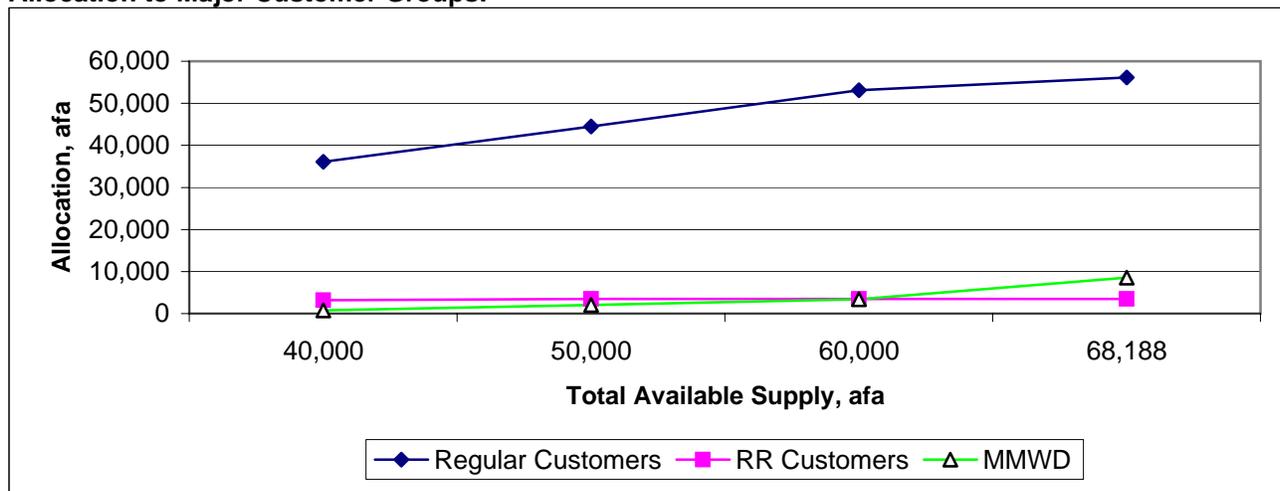
Available RR SCWA Supply, afa >	40,000	50,000	60,000	68,188 *
Equivalent Cutback in Deliveries >	41.3%	26.7%	12.0%	0.0%
Regular Customers				
Cotati	694	928	1,095	1,095
Petaluma	6,155	7,501	8,952	9,735
Rohnert Park	2,924	3,850	4,849	5,246
Sonoma	1,261	1,650	2,069	2,200
Windsor	317	409	410	410
NMWD	4,775	6,004	7,328	8,459
Santa Rosa	16,856	20,351	24,118	24,737
VOM	2,157	2,682	3,086	3,086
Other Agency	949	1,116	1,207	1,207
Sub-Total	36,088	44,491	53,114	56,173
MMWD	737	2,014	3,391	8,520
Russian River Cust's	3,175	3,495	3,495	3,495
Total	40,000	50,000	60,000	68,188

* Note: Max. Value is capped at 68,188 afa as this satisfies sum of Reasonable Requirements.

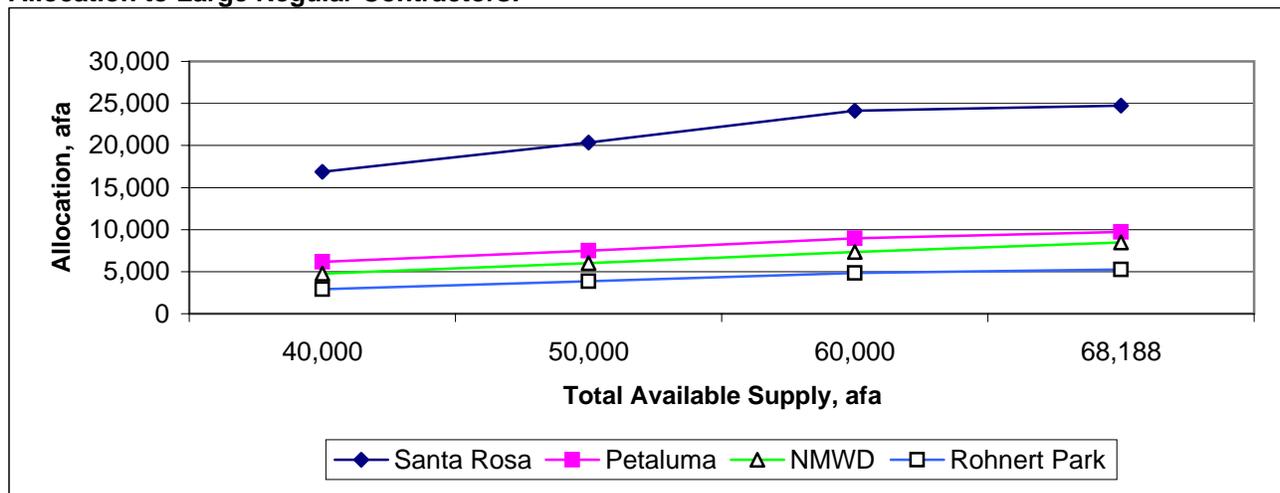
Tool: Use this graph to determine overall allocation available for a given overall rationing (%) goal.



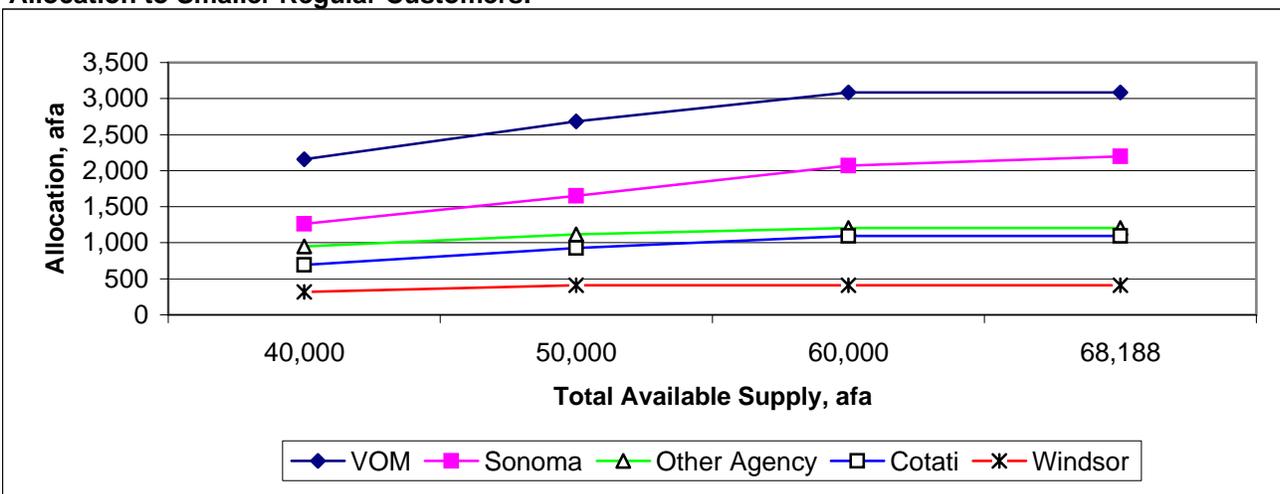
Allocation to Major Customer Groups:



Allocation to Large Regular Contractors:

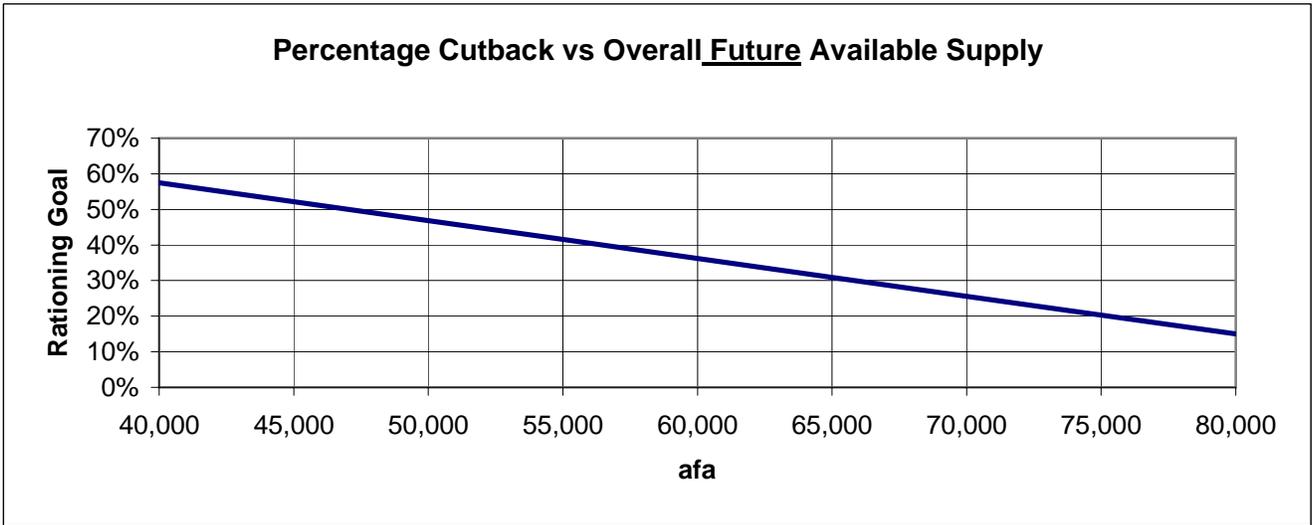


Allocation to Smaller Regular Customers:

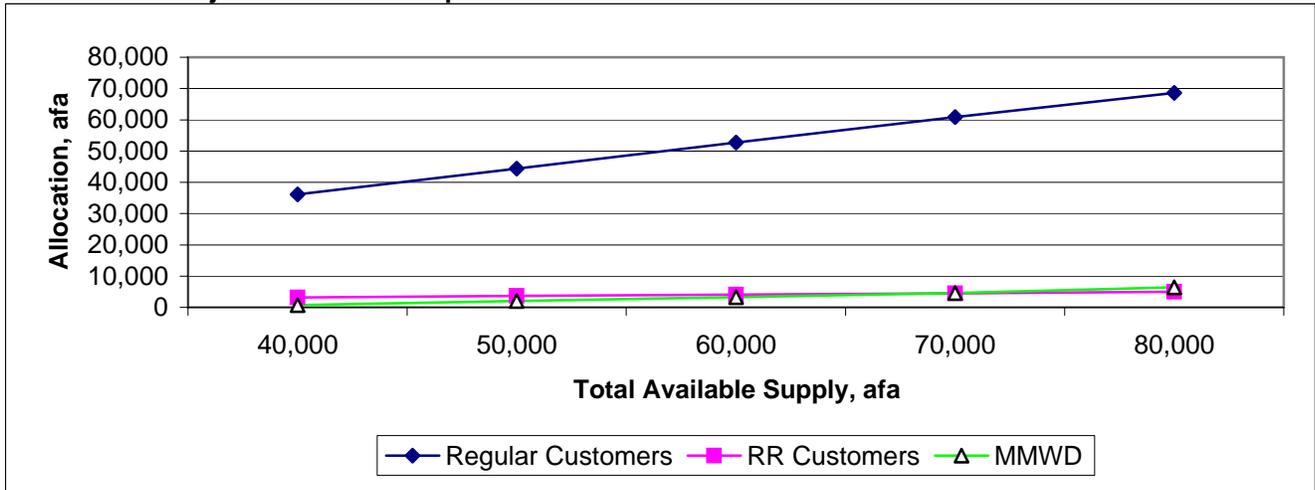


Results for Future Allocation Model vs. Assumed Available Supply

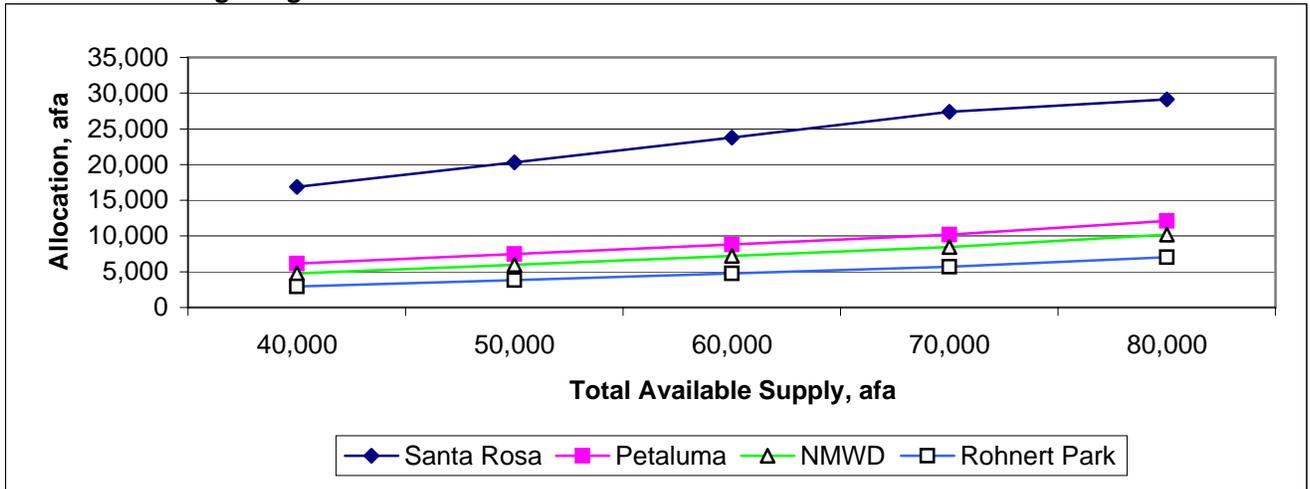
Available RR SCWA Supply, afa >	40,000	50,000	60,000	70,000	80,000
Equivalent Cutback in Deliveries >	57.5%	46.9%	36.2%	25.6%	15.0%
Regular Customers					
Cotati	694	925	1,157	1,401	1,520
Petaluma	6,155	7,484	8,813	10,214	12,118
Rohnert Park	2,924	3,838	4,753	5,716	7,027
Sonoma	1,261	1,645	2,029	2,433	2,984
Windsor	317	408	500	596	727
NMWD	4,775	5,988	7,201	8,480	10,218
Santa Rosa	16,856	20,306	23,756	27,393	29,100
VOM	2,157	2,675	3,193	3,200	3,200
Other Agency	949	1,113	1,278	1,451	1,687
Sub-Total	36,088	44,384	52,680	60,884	68,581
MMWD	737	1,998	3,259	4,587	6,394
Russian River Cust's	3,175	3,618	4,061	4,528	5,025
Total	40,000	50,000	60,000	70,000	80,000



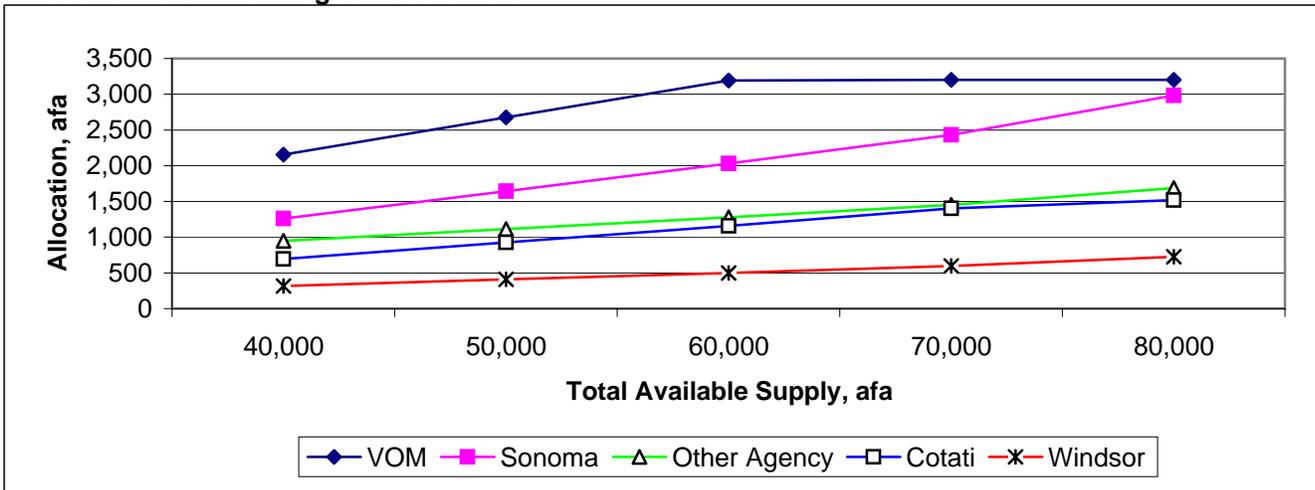
Allocation to Major Customer Groups:



Allocation to Large Regular Contractors:



Allocation to Smaller Regular Customers:



Entitlements of SCWA Customers

SCWA Customer:	Source	Entitlement mgd (any month)	Annual Limit afa
Regular Customers			
Cotati	a	3.8	1,520
Petaluma	a	21.8	13,400
Rohnert Park	a	15	7,500
Sonoma	a	6.3	3,000
Windsor (Airport Service Area)	b	1.5	900
North Marin WD	a	19.9	14,100
Santa Rosa	a	56.6	29,100
Valley of the Moon WD	a	8.5	3,200
Other Agency Cust (Includes FWD)	c	2.7	2,048
Sub-Total		136.1	74,768
Marin Muni. WD	d	0	14,300
Russian River Customers	e	0	5,025
Total		136.1	94,093

Notes:

- a Eleventh Amended WS Agree. (Proposed Restructured WS Agree is same)
- b Proposed Restructured WS Agree. Applies only to Airport Service Area served from SCWA Aqueduct. Windsor's direct diversions from the RR are covered by an Agreement with the SCWA and potentially via its pending application to the State for Water Rights
- c "mgd any month" limit is per Eleventh Amended WS Agree. (Proposed Restructured WS Agree is same). Annual limit is estimated based on avg. annual Other Agency Customer demand (as defined in Restructured Agree) for FY's 2003 and 2004 (1,356 af) projected through 2020 assuming a 2% per year increase for anticipated growth plus a 10% contingency.
- d Second Amended WS Agree and Agree for Sale of Water as Amended by The Supplemental WS Agree dated Jan 25, 1996. Note: Annual deliveries are subject to certain prior year minimum purchase provisions. Deliveries are subordinate to Regular Customer Entitlements.
- e Various Agreements between SCWA and each of its RR Customers (refer "RR Cust" sheet)

Russian River Customers of SCWA

Entitlements of RR Customers

Source: Chris Murray, SCWA, 3/3/05

Contractor	Date	Max Diversion Limit, afa	Comments
Currently Approved Points of Diversion *:			
Town of Windsor **	1/8/1991	4,725	Windsor has application pending for its own water rights
Russian River Co. WD	3/14/1991	300	
Sub-total		5,025	
No Points of Diversion Approved*			
City of Healdsburg	11/17/1992	4,440	Healdsburg holds own water rights for other points of diversion
Camp Meeker Parks & Rec. Dist.	7/9/1996	90	
Occidental CSD	4/23/2002	65	
Redwood Valley Co. WD	Pending	?	Agreement pending
Sub-total		4,595	
Potential Total		9,620	

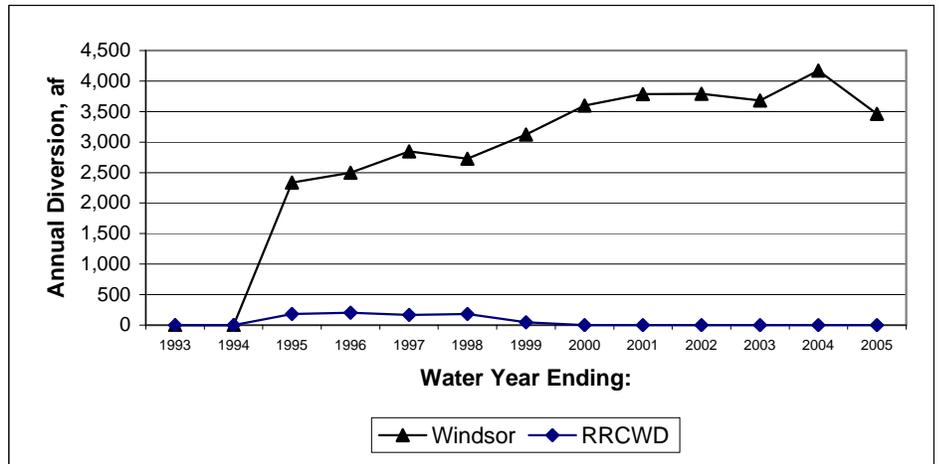
* As pertains to SCWA's water rights.

** Direct diversions via wells situated near the Russian River.

Historic Diversions from the RR, af

Source: Chris Murray, SCWA, 2/15/06 (SCWANTS.xls)

W Yr	RRCWD	Windsor	Total
1993	0	0	0
1994	0	0	0
1995	182	2,337	2,519
1996	203	2,496	2,699
1997	166	2,848	3,013
1998	183	2,728	2,911
1999	47	3,124	3,171
2000	0	3,596	3,596
2001	0	3,786	3,786
2002	0	3,789	3,789
2003	0	3,684	3,684
2004	0	4,173	4,173
2005	0	3,465	3,465



Avg of W Yr's 2004 & 05 **3,819**
 Avg of last 3 W Yrs 3,882

Note: Water Yr extends from Oct 1 through Sept 30 of subsequent yr.

Water Needed for Human Consumption, Sanitation and Fire Protection (a)

	TM Data (b)	6/15/05 Model	2005 UWMP (c)	4/4/06 Model
SCWA Customer:				
Regular Customers				
Cotati	0.62	0.62		0.64 f
Petaluma	5.83	5.83	6.15	6.15
Rohnert Park	4.23	4.23	3.74	3.74
Sonoma	1.45	1.45	0.92	0.92
Windsor (Airport Service Area)		0.13 d		0.24 g
North Marin WD	5.80	5.80	6.04	6.04
Santa Rosa	13.74	13.74	13.48	13.48
Valley of the Moon WD	2.01	2.01	2.14	2.14
Other Agency Cust (Includes FWD)		0.45 d		0.48 g
Sub-Total				
Marin Muni. WD		17.1 e		18.4 h
Russian River Customers		unknown		unknown
Total				

Notes:

- a Water needed for HC, S & FP is assumed to be equal to "inside" use for all retail customers. Inside use in turn is estimated by examining retail sales in the Winter months (generally Jan. and Feb).
- b Estimate by West/Yost contained in Allocation Table prepared for City of Santa Rosa (Sept 23 Tech Memo).
- c Total demand including UFW as determined by Maddaus for base year (Cal. 2004) of the 2005 UWMP. Indoor use is based on average of 2 lowest consecutive months in the winter if meters read bimonthly, or single lowest month if meters read monthly. Winter level use for Cotati supplied by Toni Bertolero (see Note f).
- d Avg Jan and Feb Aqueduct Sales* as

	Windsor	Other Ag Cust
Avg af/mo (2000->03, SCWA, Kiergan Pegg)	11.5	40.6
Avg mgd	0.13	0.45
- * In the case of Windsor (ASA only) and Other Agency Customers, winter level demand is unknown and is therefore estimated from Aqueduct sales, it being assumed that all Winter demand is met from the Aqueduct.
- e MMWD customer Avg per capita use in Jan and Feb for (2000 - 03), mgd, Dana Roxon,
- f Avg. Jan and Feb Aq plus Local use FY 2003 -> FY 2005, Tony Bertolero via Matthew Damos
- g Avg. Jan and Feb Aq Sales w. Billing Days for FY 2003 -> FY 2005 from Kiergan Pegg,
- h From MMWD Water Watch Reports, avg demand for period noted, mgd

Week Ending:	For same	
	For period noted to left	week one yr earlier
2/26/2006	17.6	17.6
2/19/2006	18.4	18.3
2/12/2006	18.8	19.1
2/5/2006	18.2	18.6
1/29/2006	18.4	18.5
1/22/2006	18.5	18.7
1/15/2006	17.9	18.6
1/8/2006	18.5	18.8
1/1/2006	18.1	18.5
Avg Winter	18.3	18.5
Avg for both yrs	18.4	

Reasonable Annual Need, afa (a)
(Avg. Aq. Sales or RR Diversions for FY's Indicated)

	6/15/05 Model	4/4/06 Model
		Avg for FY 03-04 and FY 04-05
Regular Customers	FY 03-04	
Cotati	1,071	1,045
Petaluma	11,294	10,636
Rohnert Park	4,710	4,835
Sonoma	2,611	2,403
Windsor (Airport Service Area)	474	448
North Marin WD	9,498	9,242
Santa Rosa	24,421	23,584
Valley of the Moon WD	3,157	3,036
Other Agency Cust (Includes FWD) (b)	1,326	1,318
Sub-Total	58,561	56,547
Marin Muni. WD	7,792	7,823
Russian River Customers (c)	3,928	3,819
Total	70,281	68,188

Notes:

- a SCWA Aqueduct Sales Records, Kiernan Pegg, SCWA. Note that Surplus sales are not included.
- b SCWA Aq. Sales Records. Excludes Windsor and includes FWD as proposed in Restructured WS Agree.
- c Average of Water Yr Diversions for 2003 and 2004 was used for 6/15/05 Model and avg. of 2004 and 2005 was used for 4/4/06 Model. (see RR Cust sheet).

Local Potable Water Supply Available to SCWA Customers, afa

	Local Supply (a)	Contingency Factor (b)	Est'd Safe Yield (c)
Regular Customers			
Cotati	240	10%	216
Petaluma	831	10%	748
Rohnert Park	2308	10%	2,077
Sonoma	80	10%	72
Windsor (Airport Service Area)	0	10%	0
North Marin WD	2000	10%	1,800
Santa Rosa	1700	10%	1,530
Valley of the Moon WD	595	10%	536
Other Agency Cust (Includes FWD) (d)	0		0
Sub-Total	7754		6,979
Marin Muni. WD Local Sys. Safe Yield (e)			20,500
Russian River Customers (d)	0		0
Total			27,479

Notes:

- a Based on 4-yr avg: 2000-2003 as reported in Sept 33, 2004 Tech. Memo to Santa Rosa
- b To account for well equipment problems/maintenance down-time, etc. Estimated by JONWRM
- c It is recognized that the quality of Local Supply varies. Presented here is the yield (safe yield) that is expected to be available in the first year of a water supply deficiency based on Local Water Supply capacities..
- d Unknown and therefore assumed to be "0" for the purposes of this model. Needs to be determined by SCWA.
- e Safe Yield of Local Supply System provided by MMWD. Source: Dana Roxon, 5/31/05.

Most Recent Service Area Population

SCWA Customer:	TM Data for Yr 2003	6/15/05 Model	2005 UWMP	4/4/06 Model
Regular Customers				
Cotati	6,825	6,825		7,337 e
Petaluma	57,050	57,050	58,057	58,057
Rohnert Park	42,300	42,300	42,329	42,329
Sonoma	10,252	10,252	10,502	10,502
Windsor (Airport Service Area)		1,338 d		2,495 f
North Marin WD	56,000	56,000	55,587	55,587
Santa Rosa	153,400	153,400	155,121	155,121
Valley of the Moon WD	23,000	23,000	22,646	22,646
Other Agency Cust (Includes FWD)	8,000 a	8,000		8,080 g
Sub-Total		358,165		362,154
Marin Muni. WD	184,999 b	184,999		189,945 h
Russian River Customers	27360 c	27,360		27,634 g
Total		570,524		579,733

Notes:

- a Estimate by West/Yost contained in Allocation Table prepared for City of Santa Rosa (Sept 23 Tech Memo).
- b Estimate provided by MMWD to West/Yost and contained in Allocation Table prepared for City of Santa Rosa (Sept 23 Tech Memo).
- c Estimate by West/Yost contained in Allocation Table prepared for City of Santa Rosa (Sept 23 Tech Memo). Includes 24,350 (2003 Department of Finance estimate for the Town of Windsor) and an estimate of 3,000 for the RRCWD service area.
- d Windsor Airport Service Area is primarily Commercial and Institutional use. An equivalent population is estimated by dividing avg Winter use by 95 gpcd, the wt'd avg. per capita use determined by West/Yost.
- e Cotati pop. per Dept of Finance data as of 1/1/2005, Cristina Goulart, Winzler & Kelly
- f Windsor Airport Service Area is primarily Commercial and Institutional use. An equivalent population is estimated by dividing avg Winter use by 94 gpcd, the wt'd avg. per capita use determined in the 2005 UWMP.
- g Population estimated for 6/15/05 Model increased by an assumed growth rate of 1%.
- h MMWD 2004 Pop., provided by Dana Roxon, MMWD, Mar. 2006.

Other Data:

From 2005 UWMP, population for 2004:	
FWD population	2,201
Windsor RR Service Area	24,899

Winter Level Per Capita Demand, gpcd

	TM Data (a)	6/15/05 Model	2005 UWMP (b)	4/4/06 Model
Regular Customers				
Cotati	89	89		88 c
Petaluma	101	101	106	106
Rohnert Park	96	96	88	88
Sonoma	136	136	88	88
Windsor (Airport Service Area)		95		94
North Marin Water Dist.	99	99	109	109
Santa Rosa	87	87	87	87
Valley of the Moon Water Dist.	87	87	94	94
Other Agency Cust (Includes FWD)		unknown		94
Sub-Total				
Marin Muni. Water Dist.		92		97 c
Russian River Customers				
Wt'd Avg	95			94 d

Notes:

- a Source: TM Data sheet by West Yost and Assoc. Winter level use is based on avg. use in Jan, and Feb. of 2000 through and including 2003.
- b Source: Bill Maddaus Tech. Memos - Includes Unaccounted For Water (UFW). Inside use is calculated from calendar 2004 retail sales records and is based on average of 2 lowest consecutive months in the winter if meters are read bimonthly, or single lowest month if meters read monthly.
- c Calc'd from Winter level demand (See Human sheet) and est'd pop. (See Pop Sheet)
- d Data for 11th Amend. Agree. Primes:

	gpcd	pop
Cotati	88	7,337
Petaluma	106	58,057
Rohnert Park	88	42,329
Sonoma	88	10,502
NMWD	109	55,587
Santa Rosa	87	155,121
VOM	94	22,646
FWD	99	2,201
Wt'd Avg. (using pop. as weighting factor)	94	

Other Data:

From 2005 UWMP, Winter Level Use, gpcd:
 FWD 99

Demand Hardening Factor - Used for Adjusting Reasonable Need in Current Allocation

	Total Demand mgd 1	Total gpcd 2	Use in 3/27/06 Model 3	Lesser of Col. 3 or Average 4	Demand Hardening Adj Factor (Avg / Col. 4) 5
Regular Customers					
Cotati	1.07 b	146 d	146	146	1.14
Petaluma	10.19 c	176 d	176	167	1.00
Rohnert Park	5.95 c	141 d	141	141	1.19
Sonoma	2.25 c	214 d	214	167	1.00
Windsor (Airport Service Area)		172 e	172	167	1.00
North Marin Water Dist.	10.58 c	190 d	190	167	1.00
Santa Rosa	22.57 c	146 d	146	146	1.15
Valley of the Moon Water Dist.	3.40 c	150 d	150	150	1.11
Other Agency Cust (Includes FWD)			167 f	167	1.00
Sub-Total					
Marin Muni. Water Dist.			140 g	140	1.19
Russian River Customers			167 f	167	1.00
Average for Water Contractors (h)		167			

Notes:

- a Sec 3.5(c)(2) provides that in determining "reasonable requirements" the SCWA may take into account hardening of demand resulting from the level of conservation achieved by a given customer of the SCWA.
- b From Toni Bertolero. Avg of RR Purchases and Ground Water Production for FY 2003->05, mgc
- c Total demand including UFW as determined by Maddaus for base year (2004) 2005 UWMP.
- d Col 1 divided by population. See Pop sheet.
- e There are no residents in Windsor ASA therefore per capita demand set equal to Windsor RR Service Area average value as determined for base year (2004) of 2005 UWMP.
- f No data available so assumed equal to average value for Water Contractors.
- g From MMWD 2005 Fact Sheet - avg demand for 10 yrs ending 2005, n 26.6 divided by population (See Pop sheet).

Other Data from 2005 UWMP for Base Yr 2004:

	mgd	gpcd
Forestville Water Dist.	0.48	219
Windsor RR Service Area	4.29	172

**SUPPORT TABLES
For Tech Memo**

Table A-1. Average Monthly Retail Sales (acre-feet) for SCWA Water Contractors in January & February^(a)

Contractor	2000	2001	2002	2003	4-Year Average ^(b)
Santa Rosa	1,263	1,316	1,265	1,154	1,249
Petaluma	553	538	515	514	530
North Marin	563	554	525	468	528
City of Rohnert Park	406	406	356	373	385
Cotati	45	73	58	50	57
Forestville ^(c)	22	23	24	21	22
City of Sonoma	136	135	133	122	131
Valley of the Moon	182	189	187	174	183

Table A-2. Historical Population^(d)

Contractor	2000	2001	2002	2003
Santa Rosa	147,595	149,300	151,700	153,400
Petaluma	53,710	54,510	55,850	57,050
North Marin	55,000	56,000	56,000	56,000
Rohnert Park	42,236	42,200	42,150	42,300
Cotati	6,471	6,600	6,861	6,825
Forestville ^(e)	1,973	Not Available	Not Available	Not Available
Sonoma	10,091	10,131	10,172	10,252
Valley of the Moon	20,512	21,996	22,923	23,000

Table A-3. Per Capita Demand (gpcd) for SCWA Water Prime Contractor in Winter (January & February)^(a,f)

Contractor	2000	2001	2002	2003	4-Year Average ^(b)
Santa Rosa	90	93	88	79	87
Petaluma	108	104	97	95	101
North Marin	108	104	99	88	99
Rohnert Park	101	101	89	93	96
Cotati ^(g)	72	116	89	78	89
Forestville	115	123	126	113	119
Sonoma	142	140	138	125	136
Valley of the Moon	93	90	86	80	87
Simple Average ^(h)	104	109	101	94	102
Weighted Average ⁽ⁱ⁾	99	100	93	87	95

^(a) Data obtained from water sales data from the Prime Contractor

^(b) Simple average of the last 4 years. Using Santa Rosa in Table A-1: $(1,263+...+1,154)/4 = 1,249$ acre-feet

^(c) Data for Forestville obtained from the SCWA

^(d) Data obtained from the Prime Contractor, California Department of Finance Website, or the 2000 UWMP for Sonoma County unless specified otherwise

^(e) Population for Forestville obtained from the 2000 SCWA UWMP

^(f) Based on populations from Table A-2, if population for particular year was not available, then population for year 2000 was used

^(g) For 2001 & 2002, based on Dec/Jan instead of Jan/Feb because Cotati did not provide Feb; 2003 is based on Jan/Feb

^(h) Simple average of the eight individual gpcds. Using 2000 of Table A-3: $(90+...+93)/8 = 102$ gpcd

⁽ⁱ⁾ Weighted average for population. Using 2000 of Table A-3: $(90*147,595+...+93*20,512)/(147,595+...+20,512) = 98$ gpcd

Current Allocation Model

Allocation of Water During a Period of Deficiency Pursuant to Sec. 3.5 (a) of the Restructured Agreement for Water Supply

Based on **CURRENT** Level Demands and Water Available from the SCWA of **60,000** afa

This equates to an overall cutback in Russian River water supply of: **12.0%**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	23	41	42	43
	Entitlement Limits		Minimum Needs		Reasonable Requirement					Local Supply		HC, S & FP Per Capita Demand				First Allocation & Test		Second Allocation		Results			
	Assumed Available Supply afa	Entitlement Daily Rate	Annual Entitlement Limit (Cap) afa	Water Needed for Human Consumption, Sanitation and Fire Protection **** afa	Apparent Reasonable Requirement afa	Demand Hardening (DH) Adjust. Factor	Adjust'd Reason. Req't	Final Reason. Req't	Lesser of Reason. Req't vs Cap afa	Safe Yield of Local Supply afa	Pop. persons	Avg. Winter Level Per Capita Demand gpcd	Weighted Avg Per Capita Demand of Water Contractors gpcd	Portion of Per Capita Demand that can be served by Local Supply gpcd	Per Capita Demand that is not met by ("First" Allocation Parameter) gpcd	"First" Allocation (Water req'd for HC, S & FP) afa	TEST Less Than Annual Entitlement Limit?	Normalized ("Second" Allocation Parameter) %	"Second" Allocation afa	"First" plus "Second" Allocations afa	TEST Less Than Reasonable Req't ?		
SCWA Customers																							
Regular Customers																							
Cotati*			3.8	1,520	0.64	720	1,045	1.14	1,196	1,095	216	7,337	88	94	26	68	558	Yes	2%	536	1,095	Yes	
Petaluma*			21.8	13,400	6.15	6,893	10,636	1.00	10,636	9,735	748	58,057	106	94	11	83	5,379	Yes	13%	3,574	8,952	Yes	
Rohnert Park*			15	7,500	3.74	4,186	4,835	1.19	5,731	5,246	2,077	42,329	88	94	44	50	2,390	Yes	9%	2,459	4,849	Yes	
Sonoma*			6.3	3,000	0.92	1,029	2,403	1.00	2,403	2,200	72	10,502	88	94	6	88	1,036	Yes	4%	1,033	2,069	Yes	
Windsor (Airport Service Area) (ASA)*			1.5	900	0.24	263	448	1.00	448	410	0	2,495	94	94	-	94	263	Yes	1%	146	410	Yes	
North Marin Water Dist. (NMWD)*			19.9	14,100	6.04	6,767	9,242	1.00	9,242	8,459	1,800	55,587	109	94	29	65	4,066	Yes	12%	3,262	7,328	Yes	
Santa Rosa*			56.6	29,100	13.48	15,094	23,584	1.15	27,027	24,737	1,530	155,121	87	94	9	85	14,840	Yes	35%	9,279	24,118	Yes	
Valley of the Moon Water Dist.*			8.5	3,200	2.14	2,397	3,036	1.11	3,372	3,086	536	22,646	94	94	21	73	1,854	Yes	5%	1,232	3,086	Yes	
Other Agency Cust (Includes FWD)			2.7	2,048	0.48	534	1,318	1.00	1,318	1,207	-	8,080	94	94	-	94	853	Yes	2%	354	1,207	Yes	
Sub-Total			136.1	74,768	33.82	37,884	56,547		61,374	56,173	6,979	362,154					31,239				53,114		
Marin Muni. Water Dist.			0	14,300	18.39	20,605	7,823	1.19	9,309	8,520	8,520	20,500	189,945	97	94	96	0	0	Yes	13%	3,391	3,391	Yes
Russian River Customers***			0	5,025	unknown	2,916	3,819	1.00	3,819	3,495	-	27,634	unknown	94	-	94	2,916	Yes	4%	579	3,495	Yes	
Total			136.1	94,093		61,404	68,188		74,501	68,188	68,188	27,479	579,733				34,155		100%	25,845	60,000		
Reasonable Need Remaining Unmet Water Available for Allocation			60,000														25,845						

Definitions:

* Defined in Restructured Water Supply Agreement as "Water Contractors"

** FWD = Forestville Water Dist.

*** SCWA Russian River Contractors whose direct diversions and points of diversion have been approved and come under the auspices of the SCWA's Water Rights (Town of Windsor and Russian River County Water Dist.)

**** HC, S & FP = Human Consumption, Sanitation and Fire Protection

TM Data = information set forth in Tech Memo prepared by West, Yost & Associates (West/Yost) dated Sept 23, 2004, "Methodology for Implementation of Water Shortage Provisions in Eleventh Amended Agreement for Water Supply"

UWMP = Urban Water Management Plan

UFW = unaccounted for water (ie water due to losses, leakage, theft and unmetered deliveries, meter inaccuracies, fire hydrant flows, pipeline flushing, etc.)

af = ac-ft mgd = millions of gallons per day

afa = ac-ft per annum (year) gpcd = gallons per capita per day

Column Explanations:

1 All Customers of the SCWA except customers served Surplus Water. Surplus Water users are not allowed an allocation during periods of water deficiency.

2 Water supply assumed to be available to SCWA for delivery to or diversion by its Customers. In the event of a real drought, this value is predicted by SCWA using its Russian River models and including estimated yield from the SCWA's wells and deducting losses from the Aqueduct

3 & 4 Entitlement limits pursuant to Restructured Agreement. Note that agreement does not specify an Annual Entitlement Limit (cap) for Other Agency Customers so this have been estimated by escalating the avg of FY 2003 and FY 2004 demand by 2% per year growth and then adding a 10% contingency. MMWD "annual entitlements" are set forth in agreements between SCWA and MMWD. Russian River Customers entitlements are based on agreements the SCWA has with these respective customers taking into account points of diversion authorized to be covered under SCWA's water rights. See Entitlement sheet and RR Cust sheet for details.

5 Water for HC, S & FP is assumed to be fairly represented by "inside demand" for all metered uses and including an adjustment factor for UFW. Inside demand is in turn estimated by examining winter level demand, a requirement of the Restructured Agreement. Values used in this model are from the base year (cal. yr 2004) compiled for the 2005 UWMP. See "Human" sheet for details.

6 Prior column extended over the entire year and converted to afa.

7 Reasonable Requirement is assumed to be equal to annual deliveries made to Customers in a recent non-drought year. For the purposes of this analysis, The avg. for FY 2003-04 and 2004-05 deliveries were used. In future analyses, an average of the immediate past 3 years is recommended. In the case of this analysis, going back further in time was not done due to significant changes in aqueduct demand by the City of Rohnert Park.

- 8 Sec 3.5(c)(2) provides that in determining "reasonable requirements" the SCWA may take into account hardening of demand resulting from the level of conservation achieved by a given customer of the SCWA. This column contains a Demand Hardening adjustment factor derived from annual per capita demand taking into account all uses and including UFW. Information compiled for the base year (2004) for the 2005 UWMP was used. See DH Factor sheet for details.
- 9 Col 8 x Col 7.
- 10 Col 10 "normalizes" Col 9 such that sum of all adjusted reasonable requirements is equal to original sum of Reasonable Requirements. $Col\ 9 \times (sum\ of\ Col\ 7 / sum\ of\ Col\ 9)$. This column is then used to define the "Reasonable Requirement" that is referred to in Sec. 3.5(a)(3)(iii) of the Restructured Agreement.
- 11 Lesser value comparing Reasonable Requirement to Annual Entitlement Limit as stipulated in Section 3.5 (2) (3) (iii). This is the value used for testing to see that the total of the "First" and "Second" allocation of water to a given customer is reasonable.
- 12 Local supplies are based on an estimate by JONWRM of "safe yield" of same. For Water Contractors, the data reported to West/Yost is the basis for the estimate. See Local sheet for details. The "safe yield" used for MMWD was provided by MMWD. It is noted that data is missing for Other Agency Customers and Russian River Customers. It is important that SCWA develop an on-going data collection system to at all times know potential local supply yield in order to achieve accuracy necessary for the allocation calculation.
- 13 Detailed population estimates from Census tract data compiled by Maddaus for the base year (cal. 2004) used in the 2005 UWMP. See Pop sheet for details and explanation of exceptions.
- 14 Winter level per capita demand determined by Maddaus for the base year (cal. 2004) used in the 2005 UWMP. See GPCD sheet for detailed explanation.
- 15 Weighted avg. of per capita winter level demand for existing Prime contractors. See GPCD sheet.
- 16 Safe yield of Local Supply expressed as a per capita value using population data shown i.e. $Col\ 12 * 7.48 * 43,560 / (365 * Col\ 13)$.
- 17 HC, S & FP demand not met by Local Supplies and calculated as follows: If Wt'd average per capita demand (Col 15) is greater than the portion of per capita demand met by Local Supply (Col 16), the difference of the two is entered in this column, if not, "0" is entered.
- 18 "First" allocation calculated as follows: If Local Supply safe yield (Col 12) is greater than Winter level demand extrapolated for the full year (Col 6), then "0" is allotted, if not the portion of per capita demand not met by Local Supply (Col 17) is calculated for the year for the entire population, expressed in ac-ft and entered here. In the case of consecutive drought years, it is important that Col 12 values (safe yield of local supplies) be updated in order for this calculation to be accurate. This is especially true for contractors relying on surface water supplies such as NMWD and MMWD whose surface supplies drop sharply when faced with consecutive drought years.
- 19 Test to see that "First" allocation does not exceed respective Entitlement Limits as required by Section 3.5 (a)(3)(i).
- 20-22 These three columns combine the entitlements of the Regular Customers (which pursuant to Sec. 3.5(a)(3)(ii) must be derived from the avg. daily rate during any month - mgd values contained in Sec. 3.1) and the contractual entitlements of MMWD and RR Customers which are expressed in ac-ft per year values contained in their contracts. These relative entitlements are first converted to %'s, then added together.
- 24 This column "normalizes" the combined entitlement shares such that the sum of all entitlement shares adds to 100%. The resulting %'s are then used to distribute the "Second" allocation of water called for by Sec. 3.5(a)(3)(ii).
- 25-40 These cells contain the iterative trials necessary to arrive at the "Second" allocation of water. The process is iterative as the Test of whether the "Second" allocation is valid or not is set forth in Section 3.5 (b) (3) (iii) and requires that (in addition to not exceeding the Entitlement Limit) the sum of the "First" allocation (Col 18) and the "Second" allocation not exceed the "Reasonable Requirement" (Col 10)

Future Allocation Model

Allocation of Water During a Period of Deficiency Pursuant to Sec. 3.5 (a) of the Restructured Agreement for Water Supply

Based on **FUTURE** Level Demands and Water Available from the SCWA of **60,000** afa

This equates to an overall cutback in Russian River water supply of:

36.2%

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20	38	39	40	41
	Entitlement Limits		Minimum Needs		Reasonable Requirement		Local Supply		HC, S & FP Per Capita Demand				First Allocation & Test		Second Allocation		Results				
SCWA Customers	Assumed Available Supply afa	Entitlement Daily Rate of Flow During any Month mgd	Annual Entitlement Limit (Cap) afa	Water Needed for Human Consumption, Sanitation and Fire Protection **** mgd afa	Reasonable Requirement afa	Lesser of Reasonable Requirement vs Annual Cap afa	Safe Yield of Local Supply afa	Pop. persons	Avg. Winter Level Per Capita Demand gpcd	Weighted Avg Per Capita Demand of Contractors gpcd	Portion of Per Capita Demand that can be served by Local Supply gpcd	Per Capita Demand that is not met by Local Supply ("First" Allocation Parameter) gpcd	"First" Allocation (Water req'd for HC, S & FP) afa	TEST Less Than Annual Entitlement Limit?	Normalized Entitlements ("Second" Allocation Parameter) %	"Second" Allocation afa	"First" plus "Second" Allocations afa	TEST Less Than Reasonable Req't ?	Amount Falling Short (-) of Reasonable Req't afa		
Regular Customers																					
Cotati*		3.8	1,520	0.64 720	1,520	1,520	216 7,337	88	94	26	68	558	Yes	2%	599	1,157	Yes	-363			
Petaluma*		21.8	13,400	6.15 6,893	13,400	13,400	748 58,057	106	94	11	83	5,379	Yes	13%	3,434	8,813	Yes	-4,587			
Rohnert Park*		15	7,500	3.74 4,186	7,500	7,500	2,077 42,329	88	94	44	50	2,390	Yes	9%	2,363	4,753	Yes	-2,747			
Sonoma*		6.3	3,000	0.92 1,029	3,000	3,000	72 10,502	88	94	6	88	1,036	Yes	4%	992	2,029	Yes	-971			
Windsor (Airport Service Area) (ASA)*		1.5	900	0.24 263	900	900	0 2,495	94	94	-	94	263	Yes	1%	236	500	Yes	-400			
North Marin Water Dist. (MMWD)*		19.9	14,100	6.04 6,767	14,100	14,100	1,800 55,587	109	94	29	65	4,066	Yes	12%	3,135	7,201	Yes	-6,899			
Santa Rosa*		56.6	29,100	13.48 15,094	29,100	29,100	1,530 155,121	87	94	9	85	14,840	Yes	35%	8,917	23,756	Yes	-5,344			
Valley of the Moon Water Dist.*		8.5	3,200	2.14 2,397	3,200	3,200	536 22,646	94	94	21	73	1,854	Yes	5%	1,339	3,193	Yes	-7			
Other Agency Cust (Includes FWD)**		2.7	2,048	0.48 534	2,048	2,048	- 8,080	94	94	-	94	853	Yes	2%	425	1,278	Yes	-770			
Sub-Total		136.1	74,768	33.82 37,884	74,768	74,768	6,979 362,154					31,239					52,680		-22,087		
Marin Muni. Water Dist.		0	14,300	18.39 20,605	14,300	14,300	20,500 189,945	97	94	96	0	0	Yes	13%	3,259	3,259	Yes	-11,041			
Russian River Customers***		0	5,025	unknown 2,916	5,025	5,025	- 27,634	unknown	94	-	94	2,916	Yes	4%	1,145	4,061	Yes	-964			
Total		136.1	94,093	61,404	94,093	94,093	27,479 579,733					34,155			100%	25,845	60,000		-34,093		
Reasonable Need Remaining Unmet Water Available for Allocation		60,000																			

Definitions:

* Defined in Restructured Water Supply Agreement as "Water Contractors" and often referred to as "Primes"

** FWD = Forestville Water Dist.

*** SCWA Russian River Contractors whose direct diversions and points of diversion have been approved and come under the auspices of the SCWA's Water Rights (Town of Windsor and Russian River County Water Dist.)

**** HC, S & FP = Human Consumption, Sanitation and Fire Protection

TM Data = information set forth in Tech Memo prepared by West, Yost & Associates (West/Yost) dated Sept 23, 2004, "Methodology for Implementation of Water Shortage Provisions in Eleventh Amended Agreement for Water Supply"

UWMP = Urban Water Management Plan

UFW = unaccounted for water (ie water due to losses, leakage, theft and unmetered deliveries, meter inaccuracies, fire hydrant flows, pipeline flushing, etc.)

af = ac-ft mgd = millions of gallons per day

afa = ac-ft per annum (year) gpcd = gallons per capita per day

Column Explanations:

All are same as shown on Current Model sheet except for below:

7 Reasonable Requirement is set equal to the Annual Entitlement limit (cap) in order to estimate the allocation in the future when SCWA Customers reach (or exceed) their Annual Entitlement (or contract) Limits.

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ATTACHMENT 3

Revenue Impacts of the Model Ordinance

Revenue Impact Model - Step by Step Instructions (9/12/00)

Purpose: Determine revenue loss due to rationing and calculated rate surcharge to offset same.

Step	Instructions*
Table 1	
Step 1	Footnote c: Collect monthly production records and enter total production (Aqueduct deliveries and local sources) for base period in Col 1 in units of millions of gallons.
Step 2	Footnote d: Enter appropriate value for estimated unaccounted for water in the box.
Step 3	Footnote e: Enter uniform commodity rate in box. If utilize a tiered rate, divide total commodity rate revenue by sales (1,000's of gallons) for prior year to calculate weighted average rate and enter this value in box.
Step 4	Footnote g: Enter percentage representing share of total revenue requirement (capital + O&M) that is spent on energy and chemical purchases.
Step 5	Footnote 6: Obtain average single family per capita use value for your service area from Table 4 and enter in footnote box.
Table 2	
Step 7	Read all assumptions and alter as appropriate.
Step 8	Footnote a: Enter balance existing in your Water Shortage Contingency Fund in box on Line 1. If none, enter "0".
Step 9	Footnote b: Follow footnote instructions and enter appropriate rationing requirement for each month in Col 1.
Step 10	Footnote c: From Table 1 obtain corresponding monthly revenue loss values (intersection of month and rationing requirement) and enter in Col 2.
Step 11	As a first approximation of correct Rate Surcharge required to mitigate revenue loss, obtain rate from Table 1 corresponding to the most prevalent Overall Rationing Requirement appearing in Col 1 of Table 2 and enter in the box on Line 20 of Table 2.
Step 12	If the value in the box on Line 19 is negative, increase the Rate Surcharge a cent at a time until a positive value is obtained. Increase the Rate Surcharge even more if a residual Water Shortage Contingency Fund balance is desired.

* In the case of a actual shortage event, the base period and mandatory rationing level for Stage 2 (Stage 3 is the same) need to be determined before using this model.

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Table 1 - Monthly Values of Revenue Loss

Col > Overall Rationing Requirement, % (a) >	1		3	Estimate of Lost Sales, \$ (f)											
	Production in Base Year, mg (b)	Adjusted (d)		Estimated Sales Base Year, \$ (e)	4	5	6	7	8	9	10	11	12	13	
Month	Total (c)			15%	25%	30%	35%	40%	45%	50%	55%	60%	65%		
Jan	179	166	239,642	35,946	59,910	71,893	83,875	95,857	107,839	119,821	131,803	143,785	155,767		
Feb	157	146	210,583	31,587	52,646	63,175	73,704	84,233	94,762	105,291	115,820	126,350	136,879		
Mar	179	167	239,911	35,987	59,978	71,973	83,969	95,964	107,960	119,955	131,951	143,947	155,942		
Apr	223	208	299,294	44,894	74,823	89,788	104,753	119,718	134,682	149,647	164,612	179,576	194,541		
May	372	346	498,746	74,812	124,687	149,624	174,561	199,498	224,436	249,373	274,310	299,248	324,185		
Jun	417	388	558,891	83,834	139,723	167,667	195,612	223,556	251,501	279,446	307,390	335,335	363,279		
Jul	466	433	623,783	93,567	155,946	187,135	218,324	249,513	280,702	311,892	343,081	374,270	405,459		
Aug	442	411	592,007	88,801	148,002	177,602	207,202	236,803	266,403	296,003	325,604	355,204	384,804		
Sep	402	374	537,895	80,684	134,474	161,369	188,263	215,158	242,053	268,948	295,842	322,737	349,632		
Oct	350	326	469,027	70,354	117,257	140,708	164,159	187,611	211,062	234,513	257,965	281,416	304,867		
Nov	198	184	265,016	39,752	66,254	79,505	92,755	106,006	119,257	132,508	145,759	159,009	172,260		
Dec	215	200	288,286	43,243	72,071	86,486	100,900	115,314	129,729	144,143	158,557	172,971	187,386		
Total	3,601	3,349	\$4,823,079	\$723,462	\$1,205,770	\$1,446,924	\$1,688,078	\$1,929,232	\$2,170,386	\$2,411,540	\$2,652,694	\$2,893,848	\$3,135,002		
Approximate Rate Surcharge required to Offset Revenue Loss (g)				\$0.22	\$0.41	\$0.52	\$0.66	\$0.82	\$1.00	\$1.22	\$1.50	\$1.84	\$2.27		

Definitions:

mg = million gallons

[] = cells for which data unique to water utility must be entered

Notes to Table 1:

- a This is "X1" in the Rationing Ordinance, except for 15% value which is applicable during Stage 1.
- b For the purposes of this calculation, production records are used to estimate lost sales as they are readily available. The Base Period is the same period selected for the Rationing Ordinance (usually the same period one year earlier).
- c Enter total monthly production in the Base Year in this Col 1 (Aqueduct deliveries plus sum of water produced from local sources).
- d Enter estimated unaccounted for water percentage) in the box [7.0%] Col. 1 values x (1 - Unaccounted %) yield Col. 2 values (Adjusted Production) which are a fair approximation of water sales in the Base Period.
- e If your utility utilizes a uniform commodity rate for all sales, enter it in box as \$/1000 gal [\$1.44] The model multiplies this value times the values in Col. 2 times 1,000 to obtain Sales Income in Base Period (Col 3 values). If your utility has a tiered rate, divide total revenue from commodity rates by total sales, express in \$/1000 gallons and enter in the box.
- f In Col 4 through Col 13, the Model automatically calculates lost monthly sales as a function of overall rationing requirement.
- g The model reduces the rate surcharge by costs that are avoided. It assumes avoided costs are limited to out of pocket cost of energy + chemicals. The portion of the total annual revenue requirement (capital + O&M + purchases) that is due to the purchase of energy and chemicals is assumed to be: [15%]

Table 2 - Cash Flow Analysis & Mitigation

Line\Column	1	2	3	4	5
1	WSCF Starting Balance (a)				\$500,000
	Rationing Level (b)	Revenue Loss (c)	Revenue Surcharge Offset (e)	Contribution from WSCF	WSCF Remaining Balance
2	Jan	0%	0	0	500,000
3	Feb	15%	31,587	0	468,413
4	Mar	40%	95,964	92,966	465,414
5	Apr	40%	119,718	115,976	461,673
6	May	40%	199,498	193,264	455,438
7	Jun	40%	223,556	216,570	448,452
8	Jul	40%	249,513	241,716	440,655
9	Aug	40%	236,803	229,403	433,255
10	Sep	40%	215,158	208,434	426,531
11	Oct	40%	187,611	181,748	420,668
12	Nov	40%	106,006	102,694	417,356
13	Dec	40%	115,314	111,711	413,752
14	Jan	40%	95,857	92,861	410,756
15	Feb	40%	84,233	81,601	408,124
16	Mar	40%	95,964	92,966	405,125
17	Apr	35%	104,753	0	300,372
18	May	30%	149,624	0	150,749
19	Jun	25%	139,723	0	11,026

21 Rate Surcharge required (d) \$0.93 per 1,000 gallons << Mitigation

Check:

Sum of Revenue Losses 2,450,883
 Sum of Revenue Surcharge Income plus depletions of WSCF 2,450,883

Definitions:

WSCF = Water Shortage Contingency Fund (funds saved and designated for use to mitigate rate impact during water shortages.

Rate Surcharge is the amount the uniform commodity rate needs to be raised to offset revenue losses.

In the case of a tiered rate structure, this value represents the weighted average rate.

= cells for which data unique to water utility must be entered

Assumptions for this Example Water Shortage shown in this table:

- 1 Shortage is due to lack of rainfall and hence runoff SCWA reservoirs.
- 2 Shortage is recognized in January. Rationing Ordinance is adopted with Stage 1 effective Feb 1st and Stage 2 effective March 1st. At this point in time it is assumed the shortage will be over at the close of the following winter. Thus the rationing period is assumed to terminate on April 1 of the next year.
- 3 Uniform Commodity Surcharge is approved and applied to all readings and bills rendered after March 1.
- 4 By April 1st of the next year, rains have come and stream flow models predict sufficient storage will exist at the end of the runoff season to permit termination of rationing as of April 1st.
- 5 Water use rebounds at the rate of 5% per month after April 1st.
- 6 Recovery of lost revenue due to rebound revenue losses outside of the second fiscal year period are ignored and hence are not recovered.
- 7 WSCF available = \$500,000 and fund is exhausted by June 30 of the second fiscal year of the event.

Notes for Table 2:

- a Enter amount of WSCF in box on Line 1. If no reserves are available for water shortage mitigation, enter "0".
- b Enter Stage 1 and Stage 2 rationing requirements in Col 1 opposite each month of the assumed rationing period duration. Enter rebound percentages per assumption No. 5.
- c From Table 1 obtain corresponding monthly revenue loss values (intersection of month and rationing requirement percentage) and enter in Col 2.
- d As a first approximation of correct Rate Surcharge required to mitigate revenue loss, obtain rate from Table 1 corresponding to the most prevalent Overall Rationing Requirement appearing in Col 1 and enter in the box on Line 20 of Table 2 (\$0.82 for this example). If the value in the box on Line 19 is negative, increase the Rate Surcharge a cent at a time until a positive value is obtained in the box on Line 19. (In this example, the Rate Surcharge required to just achieve a positive value is \$0.93.) Should you want to maintain the WSCF at some higher level, fearing that the shortage event may last more than one year, increase the Rate Surcharge accordingly.

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