CITY of VALLEJO

UTILITIES DEPARTMENT, WATER DIVISION
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LETTER OF TRANSMITTAL

DATE 7/25/14 FILE NO.

ATTENTION

RE:

TO:
Mr. Peter Brostrom
Water Use and Efficiency Branch
Div of Statewide Integrated Water Management
California Dept of Water Resources
P.O. Box 942836
Sacramento, CA 94236

WE ARE SENDING YOU THE ATTACHED - VIA,

☐ Picked up ☒ U. S. Mail ☐ FAX _____ ☐ OTHER _____

THE FOLLOWING ITEMS:

☐ Shop drawings ☐ Check Prints ☐ Plans/Prints ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Report/Study ☐ Agreement ☐ Change order ☐ Catalog cuts

☒ Draft UWMP

COPIES	DATE	NO.	DESCRIPTION
1			Admin Draft 2010 UWMP

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval/review

☒ For your ~~use~~ info ☐ Approved as noted ☐ Submit _____ copies (Blue line)

☐ As requested ☐ Returned for corrections ☐ Submit _____ copies (Mylar)

☐ Return _____ copies of agreement signed and notarized. ☐ For review and comment ☐ _____

☐ Return _____ corrected prints ☐ Return City's check print(s) with your resubmittal,

Remarks I am sending you our Admin Draft 2010 UWMP so that you are aware it is in process. It is not ready for public release. We're working with our consultant to finish it. It references the Water Shortage Contingency Plan Ordinance that we included in our adopted 2005 UWMP. We are taking the Ord to Council in August.

COPY TO _____ SIGNED Pamela Sahin
W.C. Coordinator

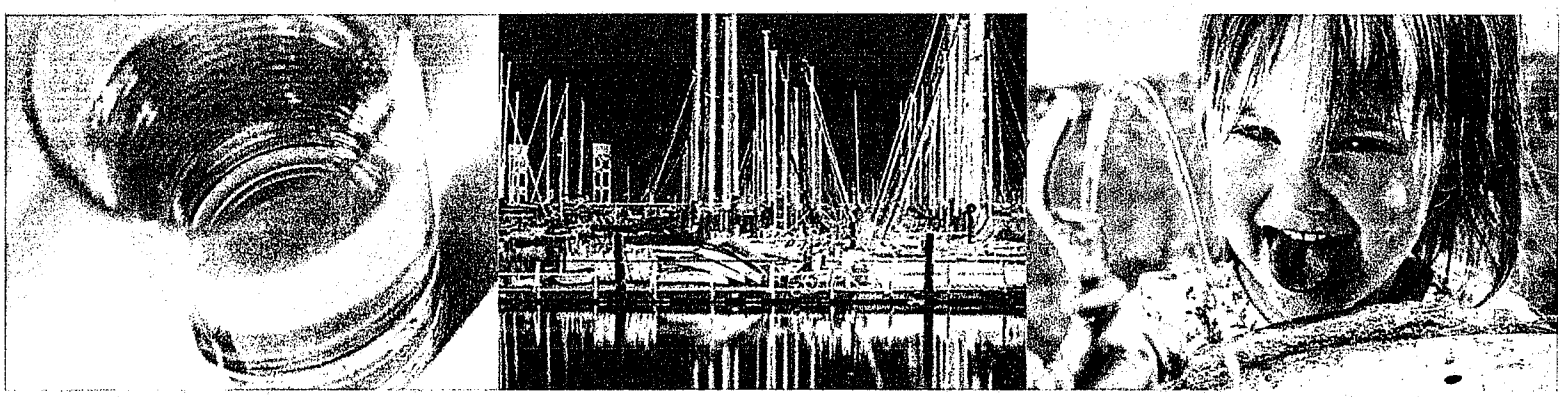
L:/EFJ98115.DOC

Prepared for:
City of Vallejo

ADMINISTRATIVE DRAFT

Urban Water Management Plan

2010



Prepared by:

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9/23/2013

April 2012

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KEY ACRONYMS AND ABBREVIATIONS

ABAG	Association of Bay Area Governments
Act	Urban Water Management Planning Act
AFY	Acre-feet per year
BMP	Best Management Practice
BO	Biological Opinion
Calistoga	City of Calistoga
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CII	Commercial, Industrial and Institutional
City	City of American Canyon
CUWCC	California Urban Water Conservation Council
District	Napa County Flood Control and Water Conservation District
DMM	Demand Management Measure
DWR	California Department of Water Resources
ERP	Emergency Response Plan
ETo	Evapo-transpiration of common turf grass
FWS	U.S. Fish and Wildlife Service
gpad	Gallons per acre per day
gpcd	Gallons per capita per day
gpd	Gallons per day
Gpf	Gallons per flush
gpm	Gallons per minute
HE	High Efficiency
LAFCO	Local Agency Formation Commission
mgd	Million gallons per day
MBR	Membrane Bioreactor
MOU	Memorandum of Understanding
Napa	City of Napa
NBA	North Bay Aqueduct
NBWRP	North Bay Water Recycling Program
NMFS	National Marine Fisheries Service
NSD	Napa Sanitation District
SBx7-7	Water Conservation Act of 2009
SWP	State Water Project
SWRF	Soscol Water Recycling Facility
TOC	Total Organic Carbon
UWMP	Urban Water Management Plan
Vallejo	City of Vallejo
WTP	Water Treatment Plant
WWTP	Wastewater treatment plant
ZWF	Zero Water Footprint

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SECTION 1
PLAN PREPARATION

1.1 INTRODUCTION

The State Legislature has declared that "every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years." This Urban Water Management Plan (UWMP) was prepared by the City of Vallejo (City) to meet the requirements of the Urban Water Management Planning Act as envisioned by the Legislature.

1.1.1 Purpose

The purpose of developing a UWMP is to evaluate whether a water supplier can meet the water demands of its water customers as projected over a 20- or 25-year planning horizon. This UWMP will assist the City coordinate its water supply plans with other multi-year plans, especially land use plans. This evaluation is for a 25-year planning horizon and is accomplished through analysis of current and projected water supply and demand for normal, single-dry or multiple-dry water year conditions. Additionally, the purpose of the UWMP is to:

- Identify measures to be implemented or projects to be undertaken to reduce water demands and address water supply shortfalls;
- Identify stages of action to address up to 50 percent reduction in water supplies during dry water years;
- Identify actions to be implemented in the event of a catastrophic interruption in water supplies;
- Assess the reliability of the sources during normal, single-dry and multiple-dry water years; and
- Identify when, how and what measures the City could undertake in order to meet the State Legislature's call for a 20 percent per capita reduction in urban water use statewide by 2020.

The City supplies raw and potable water to a service area population of approximately 119,000 people. In addition, the City sells water to Travis Air Force Base (located in Fairfield, California), the City of American Canyon and the City of Benicia. The City's supply sources are:

- State Water Project (SWP);
- Solano Project (SP), stored in Lake Berryessa;
- Vallejo Permit water; and
- Vallejo Lakes, stored in Lake Frey, Lake Madigan and Lake Curry.

1.1.2 Law

The State of California Urban Water Management Planning Act (Act) requires each urban water supplier with 3,000 or more connections, or which supplies at least 3,000 acre-feet per year (AFY) of water, to submit a UWMP to the California Department of Water Resources (DWR) every five years. The City has connections in the city limits, in the "unincorporated Vallejo proper" (pocket infill areas in the city proper but unincorporated) and connections outside the city limits. The total number of connections in the City's water service area is well over the 3,000-connection threshold for this State requirement.

For the current 2010 UWMP, a new requirement, the Water Conservation Act of 2009 (also referred to as SBx7-7), was passed by the California legislature and approved by the Governor in November of 2009. SBx7-7 amended the UWMP Act to require a 20 percent statewide reduction in urban potable water use by the year 2020. The water use reduction required by each water supplier varies by region and includes water use targets measured in daily per capita use to be met by 2020 as well as an interim water use target to be met by 2015. Each water supplier's 2010 UWMP will establish the baseline use from which targeted reductions are made, making the 2010 UWMP a particularly important document. Because of the new SBx7-7 requirements, DWR extended the date for a water purveyor to adopt its UWMP to July 1, 2011. The City then has 30 days to submit the adopted plan to DWR.

Due to staffing shortages and changes to the City's water division management staffing, the City was not able to begin its UWMP preparation until October 2011.

1.1.3 Structure of the Plan

The outline of this UWMP generally follows the *Guidebook to Assist Water Suppliers to Prepare a 2010 Urban Water Management Plan* developed by DWR. The guidelines can be found at the following website link: *http://www.water.ca.gov/urbanwatermanagement/guidebook/*.

Some sections of the outline presented in the guidelines have been combined or arranged in a different order than the guidelines, but all the information requested in the UWMP guidelines and Act is provided within this document. This document is organized in six sections and appendices as shown on the Table 1.1. The table also includes a description of the key elements in the sections.

Table 1.1
Structure of the Plan

Section	Title	Key Elements
1	Plan Preparation	Introduction
		Coordination
		Plan Adoption, Submittal and Implementation
2	System Description	Service Area Physical Description
		Service Area Population
3	System Demands	Baselines and Targets
		Water Demands
		Water Use Reduction Plan
4	System Supplies	Water Sources
		Groundwater
		Transfer Opportunities
		Desalinated Water Opportunities
		Recycled Water Opportunities
		Future Water Supply Projects
5	Water Supply Reliability and Water Shortage Contingency Planning	Water Supply Reliability
		Water Shortage Contingency Planning
		Drought Planning
		Water Quality
		Climate Change
6	Demand Management Measures (DMMs)	Description of DMMs
		Implementation of DMMs

1.1.4 Level of Planning

The Act specifies the required content of each UWMP and allows for the level of detail provided in each UWMP to reflect the size and complexity of the water supplier. The Act requires projections in five-year increments for a minimum of 20 years. This UWMP considers a 25-year planning horizon through year 2035.

The Act does not require that a UWMP contain the level of system-specific detail that would be included in a water system master plan. The Act specifically exempts UWMPs from review under the California Environmental Quality Act (CEQA)[1]. Additionally, Water Supply Assessments (Water Code Section 10631) and Water Supply Verifications (Water Code Section 66473.7) may rely on the UWMP as a foundational document for findings required in these documents.

1.1.5 Assumptions

The evaluation and projections in this document are based on the City's current understanding of its water supply contracts with other agencies and its planned (future) water supply projects. This document is a "living" document (i.e., intended to be updated every five years) and as the City's water supply picture changes, the updated UWMP will incorporate those changes accordingly. The City, therefore, has the ability to amend this UWMP at any time as permitted in Water Code Section 10612(c).

1.2 COORDINATION

This section describes the various agencies and stakeholders that were involved in the UWMP preparation and the agencies that the City communicated with to obtain input and information in preparing this UWMP.

1.2.1 Agency Coordination

The City meets regularly with other water purveyors. In particular, the City meets at least monthly with its water wholesaler, the Solano County Water Agency (SCWA) and with other State Water Project (SWP) member units who purchase water from SCWA. Member units include the cities of Benicia, Fairfield, Suisun City, Vacaville, Rio Vista and Dixon. This monthly coordination has been instrumental in coordinating water supply and demand analyses for the preparation of this document. The City also meets with the City of American Canyon and Travis Air Force Base for the sale of Vallejo treated water and raw water and Travis WTP operations.

Table 1.2 (DWR Table 1) identifies the various agencies that the City is coordinating with during the UWMP preparation process. The City notified these agencies directly of its intent to review and update the 2005 UWMP. A copy of this letter is presented in Appendix A.

[1] Water Code Section 10652

Table 1.2 (DWR Table 1)
Coordination with Appropriate Agencies

Coordinating Agencies	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
Solano County Water Agency	✓						
City of Benicia	✓						
City of Fairfield	✓						
City of Suisun City	✓						
City of Vacaville	✓						
City of Rio Vista	✓						
City of Dixon	✓						
County of Solano	✓						
Solano Irrigation District	✓						
Suisun Solano Water Authority	✓						
City of American Canyon	✓						
Travis Air Force Base	✓						
Vallejo Sanitation and Flood Control District	✓						

1.2.2 Public Participation

Urban water suppliers are required by the Act to encourage active involvement of the community within the service area prior to and during the preparation of its UWMP. The Act also requires urban water suppliers to make a draft of the UWMP available for public review and to hold a public hearing regarding the findings of the UWMP prior to its adoption. The City posted a public notice in the local newspaper notifying the public of the City's intent to prepare its UWMP notifying its customers of the City's UWMP preparation. The notices asked for public input during the preparation of the UWMP. Copies of these public notices are presented in Appendix A.

Table 1.3 identifies the public outreach activities and their participants.

Table 1.3
Public Participation and Outreach

Date	Description	Participants
[insert date]	Newspaper article re. UWMP	Vallejo Times-Herald readers
[insert date]	Letter re. plan preparation	Stakeholders (see Table 1.2)
[insert date]	Public notice of UWMP preparation	Vallejo Times-Herald readers
[insert date]	Draft UWMP 2010 released	City, General Public
[insert date]	Newspaper ad: Public Hearing Notice	[Vallejo Times-Herald]
[insert date]	Draft UWMP Public Hearing	City, General Public

The findings of the Draft UWMP will be presented before the City Council on May xx_____, 2012. The meeting will be publicly noticed and the public given the opportunity to offer comments on the UWMP and to ask questions regarding the findings. A copy of the public notices and the resolution of adoption are included in Appendix A.

1.3 Plan Adoption, Submittal, and Implementation

The Plan will be considered for adoption on _____, 2012. The Final UWMP incorporates comments made by the City Council and the public. The Final UWMP is available for public viewing at the following website link: *http://www.ci.vallejo.ca.us* and at the Office of the City Clerk in City Hall, 555 Santa Clara Avenue, during normal business hours. A copy of the Final UWMP will be submitted to DWR and the California State Library no later than 30 days after adoption by the City Council. Comments to the Final UWMP made by DWR and the City's responses to the comments will be added to the website for the public's information.

Implementation of the 2010 Final UWMP will be the responsibility of the Water Superintendent and generally consists of the activities shown on the table that follows.

Table 1.4
Plan Implementation

Description	Guidance Document(s)	Activity	Timeframe
Mandatory water conservation policies	Ordinance of the City of Vallejo establishing a Water Conservation Plan effective during drought conditions, water supply shortages, or limitation of water delivery conditions.	Develop and implement water conservation ordinance	Within 2-3 years of adoption of UWMP
Water conservation program	Although City is not a signatory, implement CUWCC Best Management Practices	Prioritize BMPs and implement (ongoing) and report status of program internally	Ongoing
Water demand reduction targets	Sbx7-7, Final UWMP, Water Conservation Program	Ongoing tracking of PGCD and modifying Water Use Reduction Plan as needed	15% reduction by 2015; 20% reduction by 2020
Water supply reliability	Final UWMP, Updated Water Master Plan (WMP)	Continued coordination and collaboration with SCWA and member units for water supply planning; update the City's WMP	Ongoing; WMP will be updated within 2-3 years of adoption of UWMP

SECTION 2
SYSTEM DESCRIPTION

This section describes the physical characteristics of the City's water service area as well as current and projected population for the service area.

2.1 PHYSICAL AND POLITICAL ATTRIBUTES

The City is located approximately 30 miles northeast of San Francisco at the southern end of Solano County. The City's water service area encompasses the city limits, unincorporated "Vallejo proper" (i.e., Home Acres, Sandy Beach, etc.) as well as an area in the adjacent unincorporated western part of Solano County known as "Vallejo Lakes" (Figure 2.1). The City also serves a small number of customers in unincorporated Napa County. The service area is approximately 31 square miles of land area and includes predominantly residential and commercial users. Elevations in the existing service area range from approximately 0 feet above mean sea level to approximately 630 feet above mean sea level.

The water system is owned and operated by the City and governed by a 7-member City Council. The water system is operated and maintained by the Water Division of the Public Works Department. City management staff for the water system consists of a City Manager, Public Works Director, and Water Superintendent.

The Vallejo Water system consists of two water treatment plants (WTPs): Fleming Hill WTP and Green Valley WTP. Both the Fleming Hill WTP and Green Valley WTP currently treat water supplied from the Sacramento River Delta and delivered through the North Bay Aqueduct (NBA) and Lake Berryessa (Solano Project). The Fleming Hill WTP is a conventional 42 mgd plant with pre-ozonation. The Green Valley WTP was completed in 1998 and is a conventional 1.0 mgd plant.

Treated water is delivered to city customers from the Fleming Hill WTP. Treated water is delivered to the Vallejo Lakes customers from the Green Valley WTP.

Although not part of the City's water service area, by agreement, the City operates the Travis WTP on behalf of the Travis Air Force Base. The Travis WTP is a conventional 7.5 mgd plant with pre-ozonation.

The City water distribution system contains multiple pressure zones. The principal water mains in the distribution system range in size from 14 to 24 inches. Most of the distribution grid piping in the older sections of the City range in size from 4 to 8 inches, while the newer areas are served by pipes 8 to 12 inches in diameter.

2.2 CLIMATE

The City's climate is typical of other areas in the northern part of the San Francisco Bay. The climate is characterized by summers that are dry and warm, and winters that are relatively mild with the majority of rainfall occurring during this season. The regional averages of the rate of evapo-transpiration of common turf grass (ETo), rainfall, and temperature are summarized in Table 2.1.

Table 2.1
Climate

	Standard Average Eto[1], in	Average Rainfall [2], in	Average Temp [1], °F
January	0.74	4.63	45
February	1.52	2.63	52
March	3.08	2.50	56
April	4.27	1.40	56
May	5.44	0.11	63
June	6.82	0.20	65
July	7.82	0.06	71
August	6.91	0.04	69
September	4.9	0.15	65
October	3.52	1.53	62
November	2.03	3.27	55
December	0.83	3.24	47
Annual	47.88	19.76	59

Notes:

1 Data was obtained from CIMIS website, Station 123, Suisun Valley weather stationm 12/2004-11/2005.

2 Data obtained from NOAA website, Mare Island

The average annual rainfall and annual ETo for the region are approximately 20 and 48 inches per year, respectively. ETo is a measurement of water evaporation combined with plant transpiration and is expressed in the form of a rate, typically inches per time period. In other words, ETo is the amount of water needed for common turf to grow in a specific region.

The average annual ETo for the region is approximately 28 inches more than the average annual precipitation. Because of this difference, and because 90 percent of the annual precipitation occurs between the months of November and April, growing turf in this region requires a significant amount of irrigation during the dry season.

2.3 Service Area Population

From 2000 to 2010, the City's population dropped from 116,760 to 115,942, according to the 2010 Census. The City also serves customers outside the city limits. The majority of the customers in the City's service area are residential. According to the Vallejo 2005 UWMP, the Lakes water customers numbered approximately 800 accounts in 2000 and 825 in 2005. Based on these figures, there is approximately a 0.63 percent growth per year during this period of time. For this UWMP, it is estimated that between 1996 through 2005, there is a 0.63 percent per year growth in the number of accounts in Lakes customers. Vallejo Lakes accounts are mostly single-family residential customers, and a small number that are multi-family accounts.

The unincorporated Vallejo proper area includes infill development such as Home Acres, Sandy Beach, Trailer City Mobile Home Park and Starr Subdivision. It is estimated that there are 200 residential units in this area.

A summary of the service area population is shown in Table 2.2.

Table 2.2
Estimated Service Area Population

Calendar Year	City [1]	Vallejo Lakes [2]	Unincorporated Vallejo Proper [3]	Total Population
1996	110,711	2,246	576	113,534
1997	112,223	2,261	576	115,060
1998	113,736	2,275	576	116,587
1999	115,248	2,289	576	118,113
2000	116,760	2,304	576	119,640
2001	116,678	2,318	576	119,573
2002	116,596	2,333	576	119,505
2003	116,515	2,347	576	119,438
2004	116,433	2,362	576	119,370
2005	116,351	2,376	576	119,303
2006	116,269	2,376	576	119,221
2007	116,187	2,376	576	119,139
2008	116,106	2,376	576	119,058
2009	116,024	2,376	576	118,976
2010	115,942	2,376	576	118,894

Footnotes:

1 1996 through 1999 population from CDOF website 4/1/11; 2000 and 2010 population from Census data; population is linearly interpolated between 2000 and 2010.

2 Vallejo Lakes population is number of accounts x 2.88 persons per household; 800 accounts in 2000 and 825 in 2005 (source 2005 Vallejo UWMP); assume linear growth between 1995 through 2005 assume no change in number of customers 2005-2035.

3 Population estimated by Vallejo Water Division at 200 residential dwelling units x 2.88 persons per household.

The 2005 UWMP used the Association of Bay Area Governments (ABAG) projections. However, the current 2009 ABAG projections appear to assume too high a growth rate for population within the city limits and not reflective of information from the 2010 Census as well as current economic conditions. For this reason, this UWMP uses the City's Draft Housing Element Update that was certified by the State in September 2011. In developing estimates for future water demands, the Draft 2009-2014 Housing Element Update was used. The projections in the update are estimated through 2015. For purposes of this UWMP, it is assumed that in-fill development and population in Vallejo will remain "flat" after 2015.

While the ABAG population projections do not accurately reflect 2010 Census information, the City has been coordinating housing projections for its Priority Development Area (PDA) with ABAG's projections. PDA's are transit-oriented development areas. The population projections for the City are presented in Table 2.3. The population projections for the City's water service area are presented in Table 2.4 (DWR Table 2). These projections include a modest allowance for growth in the Lakes System connections.

For population projections outside the city limits in the Lakes System area, the estimated additional population was determined by multiplying 2.88 persons per household by the number of expected new water connections for residential units. The figure of 2.88 persons per household was obtained from the 2010 National Census for Solano County. The 2010 Census uses an average for the number of persons per single-family and multi-family units and does not separate by type. For purposes of this UWMP, the average of 2.88 persons per household was used for projecting population for either single or multi-family units. For the 2010 Census, see:
http://www.dof.ca.gov/research/demographic/state_census_data_center/census_2010/view.php

According to 2009 ABAG projections, Vallejo will see a modest increase in jobs through 2035 (less than 2 percent per year). However, the Vallejo Downtown and the Waterfront PDA is projected to have an increase in jobs of over 11 percent per year.

Table 2.3
Population – Current and Projected, In-City

	2010	2015	2020	2025	2030	2035	Data Source
Population [1]	115,642	120,152	120,152	120,152	120,152	120,152	Draft 2009-2014 Housing Element
Downtown & Waterfront PDA [2]	NA	4,165	5,887	7,609	9331	11,053	ABAG 2009 Projections
Total In-City Population	115,642	124,317	126,039	127,761	129,483	131,205	

Footnotes:

1 Projections for in-fill residential development based on the City's Housing Element and assumes 1.3% annual growth rate from 2010 through 2015 and population is "flat" from 2015-2035.

2 The projections for the PDA is based on a 17,465 population increase from 2010 to 2035; assume linear increase between 2010 and 2035. For 2010, PDA population of 2,165 estimated in ABAG 2009 is included in the 2010 Census data.

Table 2.4 (DWR Table 2)
Population – Current and Projected

	2010	2015	2020	2025	2030	2035	Data Source
Population - In City	115,642	124,317	126,039	127,761	129,483	131,205	See Table 2.3
Population - Outside City [1]	2,952	2,952	2,952	2,952	2,952	2,952	See Table 2.2
Total Service Area Population	118,594	127,269	128,991	130,713	132,435	134,157	

Footnotes:

1 Outside City population projection assumes no new connections for Lakes and unincorporated Vallejo proper customers.

A worksheet used to project population is presented in Appendix B.

Potential development projects in the City's service area are identified below.

- Priority Development Area (PDA). This area, specifically known as the Vallejo Downtown and Waterfront PDA, is located in the City's old downtown area and along the City's waterfront (see

Figure 2.1). The PDA population projection shown in Table 2.3 was developed by ABAG and is described in the document entitled *"2010 Solano County Transportation Plan."* The PDA consists of residential and commercial development in the downtown and waterfront areas. Population projections are shown in the 2009 ABAG projections. For this UWMP, the projected population for all other years between 2010 and 2035 is projected to occur linearly.

- Solano 360. This potential project consists of approximately 150 acres of (conceptualized) entertainment and mixed-use commercial development compatible with the adjacent Six Flags Discovery Kingdom. The land is owned by Solano County and is currently used for the Solano County Fairgrounds (see Figure 2.1). More information regarding this proposed development can be found in the *"Solano 360 Specific Plan"* currently being prepared by Solano County. Because the Specific Plan and the EIR for this project just started at the time of the writing of this document, population projections and water demand estimates are not included. It is presumed that this information could be provided when the next UWMP update is conducted in 2015.

There will be other developments approved between now and 2035 which have not yet been submitted for consideration. For these developments, the UWMP assumes development consistent with the General Plan. For the City's General Plan and current Housing Element, see: *http://www.ci.vallejo.ca.us*.

SECTION 3
SYSTEM DEMANDS

This section describes the City's urban water system demands. It presents the calculations for the City's baseline (base daily per capita) water use and interim and final water use targets, including a detailed description of how the baseline and targets were calculated. The calculations follow the guidance provided in DWR's publication *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use For the Consistent Implementation of the Water Conservation Bill of 2009*. Background information and the approach used to develop baselines and targets are also included.

This section quantifies the current water system demands by category and projects them over the planning horizon of the UWMP. These projections include water sales to other agencies, system water losses, and water use target compliance. The future water demands are based on the assumed reduction in per capita daily use determined from planning for and implementing actions associated with the Water Conservation Bill of 2009 ("SBx7-7").

3.1 BASELINES AND TARGETS

Among the new requirements for completing a 2010 UWMP under SBx7-7, is the requirement for each urban water supplier to develop a baseline daily per capita water use, a per capita water use target for 2020, and an interim water use target for 2015. In order to calculate baselines and targets, gross water use from various sources entering into the City's distribution system is first determined.

Table 3.1 shows gross water produced from 1996 through 2010at the Fleming Hill WTP and the Green Valley WTP which then is delivered to customers. Raw water customers constitute approximately 3 percent of total water use and take delivery of their water upstream of the Fleming Hill WTP. Raw water delivery is not included in the table.

Water produced from the Fleming Hill WTP is delivered to all in-city water customers, unincorporated Vallejo proper and City of American Canyon treated water sales. The Fleming Hill WTP volumes shown in Table 3.1 include treated water sales to American Canyon. Water produced from the Green Valley WTP is delivered to the Lakes water customers. Gross water delivery to city service area customers for the calculation of baselines do not include City of American water sales. Table 3.1 "total" volumes therefore, subtract the American Canyon sales since the City is a wholesale supplier to American Canyon.

Table 3.1
Gross Water Into Delivery System

Year	Fleming Hill WTP [1]	Wholesale Deliveries [2]	Green Valley WTP [3]	Total [4]	Total [4]
	MG	MG	MG	MG	ac-ft
1994	5,869	-	N/A	N/A	N/A
1995	6,438	-	N/A	N/A	N/A
1996	6,076	-	N/A	N/A	
1997	6,616	-	134	6,750	20,716
1998	6,224	-	129	6,353	19,497
1999	6,664	-	173	6,837	20,983
2000	6,784	-	175	6,959	21,358
2001	6,446	-	162	6,608	20,282
2002	6,730	-	168	6,898	21,170
2003	6,757	27	154	6,883	21,125
2004	6,567	17	165	6,715	20,608
2005	6,799	22	161	6,938	21,293
2006	6,576	32	166	6,710	20,594
2007	6,627	47	183	6,764	20,759
2008	6,462	56	178	6,584	20,207
2009	5,992	60	166	6,099	18,719
2010	5,644	41	139	5,742	17,623

Footnotes:

1 Source data for 2007 is DWR Public Water System Statistics report. All other years from Fleming Hill WTP production records; volume shown includes City of American Canyon treated water sales.

2 City of Vallejo is wholesale provider to American Canyon, Benicia and Travis AFB.

3 Source data is Green Valley WTP production records. Delivery includes water purchased from City of Fairfield from 1997-1999 during plant construction.

4 Excludes wholesale delivery to City of American Canyon.

3.1.1 Base Daily Per Capita Water Use

The base daily per capita use is the water supplier's average gross daily per capita use in gallons ("baseline"). The baseline includes all water entering the delivery system, including water losses. The baseline does not include recycled water delivered within the supplier's service area, water placed into long-term storage or water conveyed to another urban water supplier.

The City has a multi-faceted water delivery system. It delivers water primarily to urban customers. Its current water customers included in the baseline are residential and commercial users in the city limits, in pocket areas that are not in the city limits but within "unincorporated Vallejo proper" (such as Sandy Beach, Starr Subdivision); and in the Green Valley area located in northern Solano County and the Gordon Valley area located in southern Napa County (both areas in the City's service area constitute the Lakes customers). The City is a wholesale supplier to Travis Air Force Base and to the City of American Canyon. The wholesale supplies are not included in the City's baseline.

The purpose of developing a base daily per capita water use is to have a baseline from which to derive the water use target for 2020 and the interim target for 2015. The baseline is developed for each water supplier based on a 10-year average beginning no earlier than 1994 and ending no later than 2010. If in 2008 more

than 10 percent of an urban water supplier's deliveries were recycled water, a 15-year average may be used. The City does not have recycled water so the 15-year average does not apply.

Average water use over a 5-year period beginning no earlier than 2003 and ending no later than 2010 is also calculated to confirm whether the proposed 2020 per capita water use target meets the legislation's minimum water use reduction requirement of at least 5 percent. In other words, if the calculated 2020 water use reduction target does not represent at least a 5 percent reduction, the urban water supplier must lower that 2020 target to meet the 5 percent minimum reduction requirement.

The City's baseline is calculated using a 10-year average because its recycled water supply was less than 10 percent of the total water supply (in fact, it was zero). In addition, the that City has selected its baseline over the 10-year period to be 1999 to 2008 and its 5-year averaging period (used to calculate compliance with the 5 percent minimum reduction requirement) to be 2003 to 2007. This information is summarized in Table 3.2 (DWR Table 13).

Table 3.2 (DWR Table 13)
Baseline Period Ranges

Base	Parameter	Value	Units
10- to 15-Year Base Period	2008 total water deliveries [1]	6,584	MG
	2008 total volume of delivered recycled water	-	MG
	2008 recycled water as a percent of total deliveries	0.00	percent
	Number of years in base period [2]	10	years
	Year beginning base period range	1999	MG
	Year ending base period range [3]	2008	MG
5-Year Base Period	Number of years in base period	5	years
	Year beginning base period range	2003	MG
	Year ending base period range [4]	2007	MG

Footnotes:

1 This does not include water sold wholesale (see Table 3.1).

2 If the 2008 recycled water percent is less than 10 percent of total water deliveries, then the base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the base period is a continuous 10- to 15-year period.

3 The ending year must be between December 31, 2004 and December 31, 2010.

4 The ending year must be between December 31, 2007 and December 31, 2010.

Table 3.3 (DWR Table 14) illustrates the City's baseline and is calculated at 156 gallons per capita per day (gpcd). The baseline was developed using the total service area population shown in Table 2.2 and is the average per capita usage over the 10-year period selected.

Table 3.3 (DWR Table 14)
Base Daily Per Capita Water Use — 10-Year Range

Base Period Year		Distribution System Population [1]	Daily System Gross Water Use (mgd) [2]	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	1999	118,113	18.7	159
Year 2	2000	119,640	19.1	159
Year 3	2001	119,573	18.1	151
Year 4	2002	119,505	18.9	158
Year 5	2003	119,438	18.9	158
Year 6	2004	119,370	18.4	154
Year 7	2005	119,303	19.0	159
Year 8	2006	119,221	18.4	154
Year 9	2007	119,139	18.5	156
Year 10	2008	119,058	18.0	152
Base Daily Per Capita Water Use				156

Footnotes:
1 Population from Table 2.2.
2 Gross water use from Table 3.1 divided by 365 days.

Each urban water supplier must calculate a 5-year baseline for a period between 2003 and 2010 and adopt a target that results in at least a 5 percent reduction from that 5-year baseline. As illustrated below in Table 3.4 (DWR Table 15), the City's 5-year base daily per capita water use is 156 gpcd.

Table 3.4 (DWR Table 15)
Base Daily Per Capita Water Use — 5-Year Range

Base Period Year [1]		Distribution System Population [2]	Daily System Gross Water Use (mgd) [3]	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Calendar Year			
Year 1	2003	119,438	18.1	152
Year 2	2004	119,370	18.9	158
Year 3	2005	119,303	19.0	159
Year 4	2006	119,221	18.4	154
Year 5	2007	119,139	18.5	156
Base Daily Per Capita Water Use				156

Footnotes:
1 For base period year, see Table 3.1.
2 For population, see Table 2.2.
3 for gross water use, see Table 3.3.

As previously stated, SBx7-7 requires that the City's 2020 target must be at least 95 percent of the 5-year average of 156 gpcd, or 149 gpcd. This calculation shows that the City's 2020 per capita water use target cannot exceed 149 gpcd.

3.1.2 Water Use Targets (2015, 2020)

SBx7-7 established requirements to reduce the statewide urban per capita water use by 20 percent by the year 2020. An interim target is set for 2015 which is a water use that is numerically halfway between the baseline and the 2020 target. Each individual urban water supplier must develop a water use target for the year 2020 as well as an interim water use target for the year 2015. Depending on an agency's baseline, the resulting targets may result in something more or less than 20 percent reduction compared to current use.

Agencies not in compliance with SBx7-7 by July 1, 2016, with some exceptions, will not be eligible for state water grants or loans.

There are four methods that an urban water supplier may use to develop its 2015 and 2020 water use targets. Three methods were provided in SBx7-7 and the fourth was subsequently established by DWR. The four methods are generally described below. A more complete description can be found in DWR's *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan* dated March 2011.

- Method 1 : 80 percent of Base Daily Per Capita Use;
- Method 2: Performance standards based on actual water use data for indoor residential water use, landscaped area, and commercial, industrial and institutional (CII) water use;
- Method 3: 95 percent of the San Francisco Bay hydrologic region's target ; and
- Method 4: Water Use Targets are based on residential performance standards and specific savings goals for CII and Landscape use and for water losses. Actual savings can be obtained from any sector.

Methods 1 and 3 were applied in this analysis. Methods 2 and 4 require data specificity that is not currently available to the City, such as parcel-specific landscaped area for all property (Method 2). Method 4 requires the development of a 10-year average of the gpcd of CII use. The City's CII sector water billing data is unreliable for the first two years of its selected 10-year range. Therefore, the fourth method was not used by the City to calculate water use targets. If this data becomes available, the target can be re-evaluated using Method 2 in the 2015 UMWP.

Urban Water Use Target Method 1 Evaluation: 80 Percent of Base Daily per Capita Water Use
The City's gross baseline, as illustrated in Table 3.2 (DWR Table 14) is 157 gpcd, calculated over the period from 1999 through 2008.

- Based on a 20 percent reduction of the base daily per capita water use of 156 gpcd, the 2020 target is 125 gpcd; and
- Based on the midpoint between the base daily per capita water use of 156 gpcd and the 2020 target of 125 gpcd, the 2015 interim target is 141 gpcd.

Urban Water Use Target Method 3 Evaluation: 95 Percent of the Hydrologic Region Target
The third method allows the water supplier to select 95 percent of the hydrologic region's 2020 target as its target. The applicable hydrologic region for the City is Region 2 – San Francisco Bay, with a regional target of 131 gpcd. This is illustrated on Figure 3.1.

- Based on 95 percent of the hydrologic region's target of 131 gpcd, the 2020 target is 131 gpcd; and
- Based on the midpoint between the base daily per capita water use of 156 gpcd and the 2020 target of 131 gpcd, the 2015 interim target is 144 gpcd.

Because the 2020 target calculated under both Methods 1 and 3 are below the 5-year baseline, 5 percent target of 149 gpcd, the final selected target does not need to be adjusted.

At its May XX, 2012 meeting the City adopted a baseline of 156 gpcd. The City adopted the Method 3 targets calculated at 131 gpcd for 2015 and 144 gpcd for 2020.

Table 3.5 summarizes the City's 2015 and 2020 water use targets. Based on the City's water use projections discussed in the next section (Section 3.2), the City will meet its water use target in 2015 but will not meet the 2020 target.

Table 3.5
Water Use Targets for the City of Vallejo

Year	Projected Water Use, ac-ft/yr [1]	Population [2]	Projected Per Capita Water Use, gpcd	Water Use Target, gpcd	Meets Target?
2015	20,375	127,269	143	144	yes
2020	20,018	128,991	139	131	no

Footnotes:

1 Total potable water deliveries (i.e., excludes raw water delivery to golf course and sales to other water agencies) for 2015 and 2020; refer to Table 3.13.

2 Population projections are from Table 2.4.

3.2 WATER DEMANDS

Water demands were calculated from billing and water supply metering data provided by the City. The City's billing data is sorted by water use sector classification. The water use classifications are generally defined below.

- Single-family accounts serve single-family homes with one dedicated water service line and meter, and serve one legal dwelling unit.
- Multi-family accounts serve premises that are residential in nature and consist of more than one dwelling unit, including mobile home parks. Service is provided through a single metered water connection. Because a single multi-family account serves more than one dwelling unit, there is no direct correlation between the number of residential accounts in the City's billing system and the population of the City. In some cases, a premise may have more than one meter and serves a "cluster" of residential units. The premise typically includes a dedicated irrigation meter.
- Commercial/Industrial accounts serve nonresidential premises classified as retail stores, restaurants, office buildings, laundries and other non-residential establishments which cannot be classified as a large industrial, raw water, landscape service, or residential.
- Institutional/Governmental accounts serve churches, lodges, and government or public buildings and are combined with the commercial accounts category.
- Landscape accounts are metered accounts used exclusively for irrigation purposes. Landscape accounts can be served by either potable or raw water.
- Raw water accounts are metered accounts used exclusively for irrigation purposes. Currently, Hiddenbrooke Golf Course is the one raw water retail customer the city has in this category.
- "Other" accounts reflect fire services, temporary metered connections, and connections that cannot be classified as residential, commercial, or landscape. It also includes raw water customers.

As described earlier, wholesale water supplies to Travis Air force Base, the City of Benicia and the City of American Canyon are not included in the water demand calculations.

3.2.1 2005 and 2010 Water Deliveries

Tables 3.6 (DWR Table 3) and 3.7 (DWR Table 4) summarize the City's total water deliveries in 2005 and 2010. The total volumes delivered in 2005 and 2010 as presented in Table 3.6 and Table 3.7, respectively, are based on actual water deliveries. As with most water suppliers in the state, water deliveries declined between 2005 and 2010 due to the economic downturn experienced in many communities throughout the state.

Table 3.6 (DWR Table 3)
2005 Water Deliveries — Actual (ac-ft/yr)

	2005				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	32,331	9,478	0	0	9,478
Multi-family	2,169	2,586	0	0	2,586
Commercial/Institutional	1,912	2,491	0	0	2,491
Irrigation Potable [1]	503	1,742	0	0	1,742
Irrigation Raw [2]	1	248	0	0	248
Other [3]	746	93	0	0	93
Total	37,662	16,639	0	0	16,639

Footnotes:
1 Dedicated irrigation meters for large landscapes.
2 Dedicated raw water irrigation for golf course at Hiddenbrooke subidivision.
3 Water for fire systems and construction (from hydrants).

Table 3.7 (DWR Table 4)
2010 Water Deliveries — Actual (ac-ft/yr)

	2010				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	31,319	8,168	0	0	8,168
Multi-family	2,053	1,969	0	0	1,969
Commercial/Institutional	1,807	3,040	0	0	3,040
Irrigation Potable [1]	510	1,529	0	0	1,529
Irrigation Raw [2]	1	224	0	0	224
Other [3]	395	285	0	0	285
Total	36,085	15,215	0	0	15,215

Footnotes:
1 Dedicated irrigation meters for large landscapes.
2 Dedicated raw water irrigation for golf course at Hiddenbrooke subidivision.
3 Water for fire systems, construction water (from hyrants) and raw water customers other

3.2.2 Projected Water Deliveries

The land use and population assumptions for water use projections are based on proposed developments, average persons per household within the City and other assumptions described in Section 2.3. The projected water demands for 2015 are summarized in Table 3.8 (DWR Table 5) below.

In developing water demand projections, 2005 was selected as the basis for future projections. 2005 was selected for basis for projections because this year was considered to be a "normal" water year and customer water use was not impacted by the economic downturn that occurred in subsequent years. The only exception was for "other" water use sector. For this category of users, projections used 2010 as the basis year because the 2005 data for this category appeared to be an anomaly.

Tables 3.8 (DWR Table 5) through 3.10 (DWR Table 7) below illustrate the number of accounts and volume of potable water use projected in 5-year increments through 2035. See Appendix X for calculations and methodology for water demand projections used in this report.

Table 3.8 (DWR Table 5)
Water Deliveries — Projected, 2015 (ac-ft/yr)

	2015				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	34,490	10,111	0	0	10,111
Multi-family	2,314	2,759	0	0	2,759
Commercial/ institutional	2,040	2,657	0	0	2,657
Irrigation Potable	537	1,858	0	0	1,858
Irrigation Raw [1]	1	265	0	0	265
Other [2]	424	306	0	0	306
Total	39,806	17,956	0	0	17,956

Footnotes:
1 Dedicated raw water irrigation for golf course at Hiddenbrooke subdivision.
2 Water for fire systems and construction (from hydrants).

Table 3.9 (DWR Table 6)
Water Deliveries — Projected, 2020 (ac-ft/yr)

	2020				
	Metered		Not Metered		Total
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	Volume
Single family	34,956	10,248	0	0	10,248
Multi-family	2,345	2,796	0	0	2,796
Commercial/Institutional	2,067	2,693	0	0	2,693
Irrigation Potable	544	1,883	0	0	1,883
Irrigation Raw [1]	1	268	0	0	268
Other [2]	430	310	0	0	310
Total	40,343	18,198	0	0	18,198

Footnotes:
1 Dedicated raw water irrigation for golf course at Hiddenbrooke subdivision.
2 Water for fire systems and construction (from hydrants).

Table 3.10 (DWR Table 7)
Water Deliveries — Projected, 2025, 2030, and 2035 (ac-ft/yr)

	2025		2030		2035	
	Metered		Metered		Metered	
Water Use Sectors	# of Accounts	Volume	# of Accounts	Volume	# of Accounts	Volume
Single family	35,423	10,384	35,890	10,521	36,356	10,658
Multi-family	2,376	2,833	2,408	2,871	2,439	2,908
Commercial/ Institutional	2,095	2,729	2,122	2,765	2,150	2,801
Irrigation Potable	551	1,909	558	1,934	566	1,959
Irrigation Raw [1]	1	272	1	275	1	279
Other [2]	435	314	441	318	447	322
Total	40,881	18,441	41,420	18,684	41,959	18,927

Footnotes:
1 Dedicated raw water irrigation for golf course at Hiddenbrooke subdivision.
2 Water for fire systems and construction (from hydrants).

3.2.3 Water Sold to Other Agencies

The City sells water on a wholesale basis to the City of American Canyon, the City of Benicia and to Travis Air Force Base. Projected sales to Benicia and American Canyon are based on data from those cities' 2010 UWMP. Projected sale to Travis Air Force Base is based on their 2005 Water Supply Master Plan which projected a supply based on 2.9 mgd average day demand with a 15 percent contingency. Table 3.11 (DWR Table 9) presents this information in DWR's required format.

Table 3.11 (DWR Table 9)
Sales to Other Water Agencies (ac-ft/yr)

Water Distributed	2005	2010	2015	2020	2025	2030	2035
City of Benicia [1]	1,852	841	1,100	1,100	1,100	1,100	1,100
City of American Canyon [2]	567	688	3,075	3,641	4,207	4,207	4,207
Travis Air Force Base [3]	2,764	2,030	3,736	3,736	3,736	3,736	3,736
Total	5,183	3,559	7,911	8,477	9,043	9,043	9,043

Footnotes:
1 2005, 2010 based on actual sales. Future sales to Benicia assumed at maximum contract amount of SWP delivery from Vallejo. The City of Benicia exceeded its contracted amount in 2005 by agreement with the City of Vallejo.
2 2005, 2010 based on actual sales. Future sales based on figures from American Canyon UWMP 2010 for raw and treated water delivery from Vallejo.
3 2005 and 2010 data based on actual delivery to Travis AFB. Data obtained from SCWA delivery summary for SWP water to Travis Air Force Base. Future year estimates from Travis AFB Master Plan.

3.2.4 Actual and Projected "Other" Water Demands

Table 3.12 (DWR Table 10) shows unaccounted-for water, which is defined to be the difference between water produced and water sold to customers. In Table 3.12, there are two categories of unaccounted-for water: water loss from the NBA system (i.e., difference in water purchased and water delivered to the City's treatment plants); and loss from the City system (i.e., difference in gross water delivered to the treatment plants and water delivered to its customers).

Unaccounted-for water equaled approximately 22 percent in 2005. In 2010, unaccounted water was at approximately 16.9 percent. A portion of this unaccounted water is from system flushing and other system

uses which are not metered or tracked. For future years, it is estimated that given the City's commitment to tracking and reducing system losses, the loss rate will be reduced each year until a maximum system loss of 10 percent goal is reached by year 2020.

Table 3.12 (DWR Table 10) identifies additional water uses and losses.

Table 3.12 (DWR Table 10)
Additional Water Uses and Losses (ac-ft/yr)

Water Use	2005	2010	2015	2020	2025	2030	2035
Saline Barriers	0	0	0	0	0	0	0
Groundwater Recharge	0	0	0	0	0	0	0
Conjunctive Use	0	0	0	0	0	0	0
Unaccounted-for NBA System Losses [1]	0	353	0	0	0	0	0
Unaccounted-for City System Losses [2]	4,654	2,632	2,684	2,088	2,116	2,143	2,172
Total	4,654	2,985	2,684	2,088	2,116	2,143	2,172

Footnotes:
1 Unaccounted-for water within the NBA system (i.e., prior to Fleming Hill or Green Valley WTP); i.e., leaks within the NBA conveyance system; 2015 through 2035 projections included in City system loss.
2 Unaccounted-for water includes water that is not metered or tracked; for 2005 and 2010, equals gross water delivery (Table 3.1) minus water deliveries (Tables 3.6 and 3.7) minus raw water irrigation to Hiddenbrooke.

3.2.5 Summary of Total Water Use

Table 3.13 (DWR Table 11) summarizes total water deliveries to potable water customers as well as other uses and losses.

Table 3.13 (DWR Table 11)
Total Water Use (ac-ft/yr)

Water Use	2005	2010	2015	2020	2025	2030	2035
Total Water Deliveries [1]	16,639	15,215	17,956	18,198	18,441	18,684	18,927
Sales to Other Water Agencies [2]	5,183	3,559	7,911	8,477	9,043	9,043	9,043
Additional Water Uses [3] and Losses	4,654	2,985	2,684	2,088	2,116	2,143	2,172
Total	26,476	21,759	28,551	28,763	29,600	29,870	30,142

Footnotes:
1 For total water deliveries, see Tables 3.6 to 3.10.
2 For sales, see Table 3.11.
3 For additional water uses and losses, see Table 3.12.

3.2.6 Lower Income Water Use Projections

SBx7-7 includes a new requirement for identifying water use projections for lower income households. Under the statute, a lower income household is as defined under the California Health and Safety Code and is established to be 80 percent of the median income, adjusted for family size. Based on data from the *U.S Census Bureau 2010*, the percentage of households at 80 percent or less of the median income is 45 percent of the total households. Table 3.14 (DWR Table 8) shows the projected water demands for lower income households and is based on 45 percent of single family and multi-family residential projected water use. Table 3.14 contains a projection of residential demand that will be needed for lower income housing.

Table 3.14 (DWR Table 8)
Lower-Income Projected Water Demands (ac-ft/yr)

	2015	2020	2025	2030	2035
Single-family residential	4,550	4,612	4,673	4,734	4,796
Multi-family residential	1,242	1,258	1,275	1,292	1,309
Total	5,792	5,870	5,948	6,026	6,105

3.3 WATER DEMAND PROJECTIONS FOR RETAILERS

The City purchases water primarily from the Solano County Water Agency, the agency that administers the State Water Project water, Permit water and Solano Project water deliveries for member agencies in Solano County. Table 3.15 (DWR Table 12) illustrates the City's total water demand projections.

While the City's projected demands are below its total contracted water volumes, Section 5 discusses the factors that can impact the reliability of the City's supply and reasons that the entire contracted volume may not be available under all hydrologic conditions.

Table 3.15 (DWR Table 12)
Retail Agency Demand Projections Provided to Wholesale Suppliers (ac-ft/yr)

Wholesaler [3]	Contracted Volume	2010 [1]	2015	2020	2025	2030	2035
State Water Project (SCWA)	5,600	4,394	5,600	5,600	5,600	5,600	5,600
Permit Water (SCWA)	22,800	2,693	17,287	17,287	17,287	17,287	17,287
Solano Project (SCWA)[2]	14,600	14,672	14,600	14,600	14,600	14,600	14,600
Total	43,000	21,759	37,487	37,487	37,487	37,487	37,487

Footnotes:

1 Based on actual water purchases.

2 In 2010, Vallejo was able to purchase more Solano Project water than its allocation by purchasing excess from Solano Irrigation District.

3 Vallejo's water purchases and deliveries, in order of preference, are Solano Project, Permit Water and State Water Project.

3.4 WATER USE REDUCTION PLAN

Projections for future use indicate that based on current development plans, the City's water use in 2015 will be below its water use target but the 2020 water use target will not be met. The City's 2010 per capita water use was 132 gpcd, which is nearly the 2015 target of 131 gpcd. The City is on track to meet its 2015 target and will work towards meeting its 2020 water use target by continuing to implement its current water conservation programs as described in Section 6.

In order to meet its 2020 target, the City will be expanding its water conservation efforts. This is made fiscally possible by the City's participation in the Proposition 84 water grant. Much of the expanded effort will be in providing incentives for residents to upgrade to higher efficiency model toilets and clothes washers. These upgrades will have measurable water savings.

As described in Section 6.0, the City has in place a water waste prohibition ordinance, which is in effect at all times, regardless of water shortage conditions. The City will continue to enforce that ordinance. In

addition, in case of a water shortage, the City Council will finalize the draft water shortage contingency ordinance. This ordinance contains water use prohibitions for various stages of water supply shortages.

The City will monitor its water use and population growth in the coming years to better gauge if per capita water use will continue to be low as it has been the past two to three years. As per capita water use increases, the City will adjust its water conservation activities accordingly to be positioned to meet its 2020 water use target.

3.4.1 Current Plan and Economic Impacts

Along with most communities in California, the City has been struggling with fiscal shortages during the last few years of economic recession. Despite those fiscal realities, the City continues to implement water conservation programs, as described in Section 6. The overall budget for those activities, as provided by the City, is expected to remain generally the same over the next two budgeting years as it has been in previous years. The annual water conservation budget has been approximately $120,000. The Solano County Water Agency's activities augment that indirectly. This included water conservation staff salaries as well as educational materials and rebates.

The Proposition 84 grant will provide a 75 percent match to the City's efforts. Therefore, although the City's water conservation efforts are planned to be greatly expanded over the next two years, the cost of the additional rebates and other water conservation activities will be offset by the grant.

SECTION 4
SYSTEM SUPPLIES

This section describes the various water supply sources that the City currently uses and proposes to use during the planning horizon of this UWMP, and planned water supply projects. See Figure 4.1 for an illustration of the City's system supply sources.

4.1 WATER SOURCES

The City of Vallejo water systems currently uses surface water as its sole source of supply. No groundwater sources are used and no recycled water is used. The City brings surface water from four different sources into three treatment plants in order to serve customers in two different counties (Solano and Napa) and on an active military base (Travis Air Force Base). The four sources of surface water are:

- Solano Project Water (Lake Berryessa);
- State Water Project (SWP)/ Vallejo Permit Water (California Bay Delta);
- Lakes Frey and Madigan; and
- Lake Curry.

Table 4.1 summarizes these surface water supplies including the capacity, or "yield" of each surface water source, in units of acre-feet per year. For purposes of this UWMP, the yield is defined as the rate of surface water diversion from the supply source for consumptive use over a period of time that can be firmly sustained over the planning horizon. The majority of the City's water supply is from the SWP or Vallejo Permit water sources, both of which are transported via the North Bay Aqueduct (NBA).

Table 4.1
Surface Water Sources (ac-ft/yr)

Supply	Entitlements	Ultimate Yield	Remarks
State Water Project (SWP)	5,600	5,600	Purchased through SCWA
Vallejo Permit Water [1]	17,200 (through 2013) 22,800 (2014 and beyond)	22,800	Water rights and conveyance control through SCWA
Solano Project	14,600	14,600	Annual entitlement from USBR through SCWA
Lakes Frey and Madigan	400	400	City water rights
Lake Curry [2]	1,500 (through 2009); 3,750 (2010 and beyond)	3,750	City water rights
Total	39,300 (through 2013); 47,150 (2014 and beyond)	47,150	

Notes:
1 Supply should increase from 17,200 ac-ft/yr to 22,800 ac-ft/yr after 2014 when agreements required to allow Vallejo's full conveyance of the 22,800 ac-ft/yr through the NBA system should be in place.
2 Previously, 1,500 ac-ft/yr of entitlement and maximum yield from Lake Curry was used for in-stream flow; as of 2010, the full Lake Curry supply of 3,750 ac-ft/yr maximum yield is available.

Table 4.1 identifies the City's current and projected sources of water and their full contractual limits, assuming no curtailment or shortages. Table 4.1 is provided as a summary reference of the various water supply agreements and sources and reflects the maximum potential water supply amounts in those agreements and sources. Although SWP supply shows a yield of 5,600 acre-feet per year, this amount is typically only available when there are no environmental constraints on Delta pumping and is typically only available at the maximum amount during wet years with high snow pack levels.

Table 4.2 (DWR Table 16) identifies the City's current and projected sources of water, which are discussed in detail in this section. The water supply amounts shown for 2010 are actual figures. Future water supply amounts in Table 4.2 (2015 through 2035) reflect the supplies necessary to meet the total water use from Table 3.13 (DWR Table 11). In other words, Table 4.2 is based on the projected water supply sources that will be used and how much. The supply amounts in Table 4.2 do not reflect the maximum supply available to the City. Rather they reflect the supply mix that the City anticipates using to meet demands.

Table 4.2
Water Supply Mix – Current and Projected (ac-ft/yr)

Water Supply Sources	User	(Actual) 2010		2015		2020		2025		2030		2035	
Permit Water [1]	Vallejo	1,508	2,693	7,286	10,513	6,932	10,725	7,203	11,562	7,473	11,832	7,745	12,104
	Travis AFB	552		152		152		152		152		152	
	American Canyon	633		3,075		3,641		4,207		4,207		4,207	
State Water Project [2]	Vallejo	2,861	4,394	0	3,584	0	3,584	0	3,584	0	3,584	0	3,584
	Travis AFB	1,478		3,584		3,584		3,584		3,584		3,584	
	American Canyon	55		0		0							
Solano Project [3]	Vallejo	13,831	14,672	13,354	14,454	13,354	14,454	13,354	14,454	13,354	14,454	13,354	14,454
	Benicia	841		1,100		1,100		1,100		1,100		1,100	
Lakes Frey and Madigan [4]	Vallejo	0	0	0	0	0	0	0	0	0	0	0	0
Lake Curry [5]	Vallejo	0	0	0	0	0	0	0	0	0	0	0	0
Total [6]			21,759		28,551		28,763		29,600		29,870		30,142

Footnotes:

1 Permit water generally used after State Water Project allocation.

2 Includes Table A allotment, Title 21 and carryover water; for water supply planning purposes, use 64% allocation, based on normal year conditions or 3,584 ac-ft/yr for 2015-2035.

3 Preferred water source for Vallejo due to lower cost of treatment as compared with City's other sources; in 2010, Vallejo was able to purchase more Solano project water than its allocation by purchasing excess from Solano Irrigation District; use 98% allocation based on normal water year conditions, or for 2015-2035.

4 Used by City for supplemental and emergency purposes.

5 Used by City for supplemental and emergency purposes.

6 Totals are the same as for Table 3.13 (DWR Table 11).

Table 4.3 (DWR Table 16) has the same water supply information as Table 4.2 but in less detail and in the format required by DWR.

Table 4.3 (DWR Table 16)
Water Supplies – Current and Projected (ac-ft/yr)

Water Supply Sources (Refer to Table 4.2)	Wholesaler Supplied Volume (Y/N)	(Actual) 2010	2015	2020	2025	2030	2035
State Water Project	Yes	4,394	3,584	3,584	3,584	3,584	3,584
Permit Water	Yes	2,693	10,513	10,725	11,562	11,832	12,104
Solano Project	Yes	14,672	14,454	14,454	14,454	14,454	14,454
Supplier-produced surface water: Lakes Frey, Madigan		0	0	0	0	0	0
Supplier-produced surface water: Lake Curry		0	0	0	0	0	0
Tranfers In							
Exchanges In		0	0	0	0	0	0
VSFCD-produced Recycled Water		0	0	0	0	0	0
Desalinated Water		0	0	0	0	0	0
Total (Refer to Table 3.13)		21,759	28,551	28,763	29,600	29,870	30,142

4.2 WATER SUPPLY CONTRACTS, PERMITS AND LICENSES

This section describes the various water supply contracts, agreements, permits and licenses pertaining to the purchase or sale of water.

4.2.1 State Water Project

State Water Project (SWP) water is diverted from the Sacramento/San Joaquin Delta at the Barker Slough Pumping Plant and conveyed through the North Bay Aqueduct (NBA) system approximately 21 miles to the (DWR) Cordelia Forebay. SWP water may be diverted to supply Travis Air Force Base before reaching the Cordelia Forebay. From the Cordelia Forebay, the water is pumped via the City's Cordelia pumping station and the City's transmission system to the Fleming Hill Water Treatment Plant (WTP).

4.2.1.1 Table A Allotment

The Solano County Water Agency (SCWA) executed a *Water Supply Contract* with the State of California, Department of Water Resources (DWR) for SWP water on November 12, 2003. SCWA subcontracts to member units throughout the Napa County, including the City. The SWP contract between the State and SCWA can be found at the following website link:
http://www.water.ca.gov/swpao/docs/wsc/SCWA_C_C.pdf

The City executed a *Water Contract for Water Supply from North Bay Aqueduct* with the SCWA. In the agreement, the City is allocated annual allotments of SWP water commonly referred to as "Table A allotment". The City's Table A allotment was accelerated in 2009 to its ultimate amount of 5,600 acre-feet per year starting in 2010. The City's current water contract with SCWA runs through 2035 with provisions for extensions. All member units to the SWP contract share in the same curtailment percentage as declared by the State of California for that water year.

4.2.1.2 Dry-Year Water Bank

SCWA, along with a consortium of State water contractors, entered into an agreement with DWR. The agreement, entitled *2009 Drought Water Bank Agreement*, is for emergency water potentially available

when there is a curtailment of SWP water and if rice farmers in the Sacramento Valley are willing to make their SWP water supply available to urban users of SWP water. This supply (commonly referred to as "dry-year water bank") is neither guaranteed nor reliable. This potential dry-year supply does not reduce available SWP Table A allotment.

4.2.1.3 Turn-Back Water Pool Program

DWR has a program for interested SWP contractors called the Turn-back Water Pool Program. SWP contractors may choose to sell Table A water it will not use or purchase turn-back pool water that is available through the program. For purposes of this UWMP, water from this pool program is not included in the reliability assessment or the various water supply tables because this program operates on an as-available basis. The amount of pool water that would be available to the City is not a significant amount.

4.2.2 Vallejo Permit Water

Vallejo has a water right for Sacramento Bay-Delta water under License 997848 from the State Water Resources Control Board (SWRCB) pre-dating the construction of the SWP. This water supply is commonly referred to by the City as "permit water." Permit water is pumped from Lindsey Slough and delivered through the NBA and is separate from the City's SWP Table A allotment.

4.2.3 Solano Project Water

The Solano Project is a federal project under the U.S. Bureau of Reclamation (Bureau) that stores water in Lake Berryessa for various agencies and users in the area, including the City of Vallejo. Solano Project water is delivered from Lake Berryessa via the Putah South Canal to the Bureau's Terminal Reservoir in Cordelia. Approximately 95 percent of the Solano Project water is pumped via the City's Cordelia pumping station primarily to the Fleming Hill WTP. Approximately 5 percent of the Solano Project water is conveyed via Solano Irrigation District's distribution facilities to the Green Valley WTP. The City has a water entitlement of 14,600 acre-feet per year of Solano Project water.

4.2.4 Vallejo Lakes

The Vallejo Lakes source comprises of Lakes Frey, Madigan and Curry. This source is a supplemental water supply for the outside-City customers referred to as the Vallejo Lakes customers (see Figure 2.1).

4.2.4.1 Lakes Frey and Madigan

Lakes Frey and Madigan are located in northern Solano County. The City owns both lakes and the surrounding land. Water flows from Lake Madigan into Lake Frey, then flows into the Diversion Dam, and then continues to flow via a City gravity pipe system to the Green Valley WTP, located at the end of Green Valley Road.

4.2.4.2 Lake Curry

Lake Curry is the largest lake in the Vallejo Lakes System and is located in southern Napa County. It is a standby source for the City. The City owns the lake and surrounding land. Lake Curry has a storage capacity of 10,700 acre-feet and, commencing 2010, yields approximately 3,750 acre-feet per year. The lake is not currently in use as a drinking water source, although lake water is being used for in-stream flow into Suisun Creek.

4.2.5 American Canyon Water Agreement

The Cities of Vallejo and American Canyon entered into an agreement to provide for the sale of water from the City of Vallejo to the City of American Canyon. Permanent water sold to American Canyon is included in Table 3.11 (DWR Table 9).

4.2.5.1 Treated Water Supply to City of American Canyon

The Vallejo Water Agreement provided for American Canyon's purchase of 629 acre-feet per year of treated Vallejo water supply in 1996. Under the terms of the agreement, American Canyon also has or had an option to purchase treated water supply during 5-year periods of time from 2001 through 2021. If the option for any of the years is not exercised by the dates established in the agreement, the option expires for that block of water supply.

Based on American Canyon's 2010 UWMP, the year of the options to purchase blocks of treated water and the volumes are summarized below:

1996	629 acre-feet per year	purchased (original agreement)
2001	723 acre-feet per year	not purchased (option 1)
2006	723 acre-feet per year	purchased (option 2)
2011	723 acre-feet per year	purchased (option 3)
2016	566 acre-feet per year	(option 4)
2021	566 acre-feet per year	(option 5, final)
	3,207 acre-feet per year	(ultimate total, excluding option 1)

4.2.5.2 Permit Water Supply to City of American Canyon

The City sells permit water to the City of American Canyon. On June 4, 1998, the American Canyon Water Agreement was amended (Addendum 2) to provide for a 3-party agreement for the "wheeling" of 500 acre-feet per year of permit water to the City of Calistoga (Calistoga). For Calistoga to receive the 500 acre-feet per year water supply, the City of American Canyon permanently transferred 500 acre-feet per year of American Canyon's SWP Table A allotment to Calistoga, and in turn, the City provided 500 acre-feet per year of permit water to American Canyon.

4.2.5.3 Emergency Water for City of American Canyon

The Vallejo Water Agreement was amended (Addendum 1) on July 18, 1996 to provide for American Canyon's purchase of up to 500 acre-feet per year (untreated water) for *emergency* purposes. Under the addendum, an emergency is defined as a condition whereby American Canyon's SWP allotment is reduced due to environmental or other constraints. When the City's Table A allotment is not curtailed, emergency water is not available for purchase. In the reliability assessment presented in Section 5, Vallejo emergency water is included as a sale to American Canyon since the State has indicated that there would be a curtailment under normal, single-dry and multiple-dry year conditions due to environmental constraints (see Appendix XX for a summary of the SWP reliability report). The environmental constraints cited by the State are: i) restrictions on the SWP pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (June 2009) and National Marine Fisheries Service (December 2008), and ii) climate change, which is altering the hydrologic conditions in the State.

4.2.6 City of Benicia Water Agreement

The March 5, 1992 agreement providing the City of Benicia the opportunity to purchase up to 4,400 acre-feet of water from the City of Vallejo was terminated by Benicia Council action in February 2004, thereby reverting the 4,400 acre-feet per year entitlement to Vallejo control.

Under Amendment No. 2 to the 1962 Vallejo / Benicia Water Agreement, dated April 28, 1989, Vallejo is to deliver 1,100 acre-feet per year. A service charge applies for usage exceeding 50 days per year. Treated water is sold to Benicia at Vallejo's outside-City-limit rate.

4.2.7 City of Fairfield

An agreement exists for temporary potable water service between the City of Fairfield and the City of Vallejo, dated March 20, 1992. This agreement provides for Fairfield to serve potable water to Vallejo's Lake System. Vallejo provides the raw water supply and pays for the cost of service (lease payment and user charge). Demand is not to exceed 1,120 acre-feet in 12 months. This agreement is now expired.

A subsequent agreement dated May 4, 1993 with the City of Fairfield provides for mutual water exchange or sale between the Fairfield and Vallejo. In the agreement, Vallejo will provide surplus permit water to Fairfield at either an exchange rate of 2:1 for Solano Project water or at a price of $50 per acre-feet (initially). In exchange, Fairfield will serve potable water into the Vallejo Lakes system and provide raw water that will be added to Vallejo's Solano Project allotment. Vallejo will be charged for water service at Fairfield's in-city general service rate.

Amendment No. 1 dated August 4, 1993, provides for a second water connection ("intertie") that was added through which Fairfield can serve potable water into the Vallejo Lakes system. Vallejo pays Fairfield a user charge if the connections are activated.

4.2.8 Wholesale Water Supplier(s)

Table 4.4 (DWR Table 17) illustrates the volume of water the City expects to receive from each of the City's wholesale supplier.

Table 4.4 (DWR Table 17)
Wholesale Supplies – Existing and Planned Sources of Water (ac-ft/yr)

Wholesale Sources	Contracted Volume	2015	2020	2025	2030	2035
State Water Project[1]	5,600	5,600	5,600	5,600	5,600	5,600
Permit Water[2]	22,800	22,800	22,800	22,800	22,800	22,800
Solano Project Water	14,600	14,600	14,600	14,600	14,600	14,600
Recycled Water (VSFCD)	0	0	0	0	0	0

Footnotes:

1 Maximum "Table A" allotment (no curtailment).

2 Permit water is 17,200 ac-ft/yr through 2013; 22,800 ac-ft/yr 2014 and beyond.

4.3 GROUNDWATER

The City does not have any groundwater supply sources. At this time, the City has no intention to seek or investigate groundwater supply.

The following tables are presented in order to meet DWR's required tables for groundwater pumping (even though the City has not pumped groundwater in the past and does not project pumping groundwater during this planning horizon). Table 4.5 (DWR Table 18) shows the amount of groundwater pumped in the past five years (2006-2010). Table 4.6 (DWR Table 19) shows the projected groundwater amounts.

Table 4.5 (DWR Table 18)
Groundwater – Volume Pumped (ac-ft/yr)

Basin Name(s)	Metered or Unmetered	2006	2007	2008	2009	2010
No groundwater supply used						
Total groundwater pumped		0	0	0	0	0
Groundwater as a percent of total water supply		0	0	0	0	0

Table 4.6 (DWR Table 19)
Groundwater – Volume Pumped (ac-ft/yr)

Basin Name(s)	2015	2020	2025	2030	2035
No groundwater supply projected					
Total groundwater pumped	0	0	0	0	0
Percent of total water supply	0	0	0	0	0

There is no groundwater management plan for the Vallejo area. However, as required under AB 3030, local agencies within the northeastern area of Solano County have developed a groundwater management plan.

4.4 TRANSFER AND EXCHANGE OPPORTUNITIES

As described in Section 4.2.5.3, the City has an existing water transfer agreement with the City of American Canyon. Under Addendum 1 of the Vallejo Water Agreement, an emergency is defined as a condition whereby the American Canyon's SWP Table A allotment is reduced due to environmental or other constraints. Under normal years where American Canyon's Table A allotment is not curtailed, emergency water is not available for purchase. The amount of emergency water American Canyon can purchase from the City is 500 acre-feet per year.

As described in Section 4.2.7, the City has an existing water agreement with the City of Fairfield for mutual water exchange or sale and temporary standby water service. This agreement provides for an exchange or sale of water from Fairfield.

The City has a service exchange agreement with Solano Irrigation District (SID). Under this agreement the City provides raw water to Tolenas, in SID's service area, and in exchange SID delivers an equal amount of raw water to the City's Green Valley WTP. Consequently, the City supplies Tolenas' water demand from the City's permit water and/or SWP water supplies (through the NBA system) and in exchange, SID augments the City with Solano Project water. The demands of both areas are typically not equal and SID usually owes the City a balance of Solano Project water at the end of each year.

Table 4.7 (DWR Table 20) presents transfer and exchange opportunities. Other water supply "transfers" are permanent sales to other agencies (City of Benicia, City of American Canyon) and are accounted for under Table 3.11 (DWR Table 9), "Sales to Other Water Agencies."

Table 4.7 (DWR Table 20) Transfer and Exchange Opportunities (ac-ft/yr)			
Transfer Agency	Transfer or Exchange	Short Term or Long Term	Proposed Volume
Emergency Water (American Canyon)	Transfer	Short and Long Term	500
Temporary Water Exchange (Fairfield)	Exchange	Short and Long Term	Varies
Service Agreement (SID)	Exchange	n/a	--
		Total	500

4.5 Desalinated Water Opportunities

SCWA's Integrated Regional Water Management Plan identifies desalinating Carquinez Strait water as an available long-term action to develop new permanent water supply for Solano County. Potential locations include offshore of Benicia and Vallejo. Currently, there are no planned desalination projects in Solano County. Such projects could be pursued by SCWA if grant funding becomes available or other actions are taken to improve the economics of such projects. However, feasibility studies would be needed to evaluate its cost-effectiveness relative to other sources.

Desalination facilities are costly to construct and operate relative to the City's current supply sources. According to the California Department of Water Resource's report, "Water Desalination – Findings and Recommendations" (October, 2003), the cost to construct and operate new seawater and estuarine water desalination plants will range from $700 to $1,200 per acre-foot, depending on energy costs. To distribute the desalinated water would cost another $100 to $300 per acre-foot. The costs stated in this paragraph are 2003 costs and have not been updated to reflect current dollars.

There are also significant environmental and permitting issues associated with disposal of brine from the treatment process. Alternatives would need to be investigated for discharging brine into the Bay that would not have adverse environmental effects.

The City's water supply needs can be met without the development of a local desalination supply. Desalination could conceivably be considered as a potential, future, local emergency supply source. The development of such a supply would be a long-term project requiring study and evaluation to determine its feasibility and cost effectiveness.

4.6 Recycled Water Opportunities

The City currently does not have recycled water use in its service area. This section describes the wastewater characteristics, flows, and treatment facilities that are in close proximity to the City's water service area. The UWMP Act requires the following discussion regarding recycled water:

- Information on the recycled water supply including coordination with dischargers;
- Description of the wastewater collection and treatment systems in the service area;

- Quantity of treated wastewater that meets recycled water standards;
- Recycled water currently being used in the service area;
- Potential for recycled water use in the service area;
- Actions to encourage recycled water use; and
- A plan for optimizing recycled water use.

The City meets the water supply needs of its customers by importing water in the City's service area from surface water supplies described in Section 4.1. However, in order to further supplement and enhance the City's water supply sources, the City has had ongoing discussions with the Vallejo Flood Control and Sanitation District (VSFCD).

4.6.1 Existing Wastewater Collection, Treatment and Reuse Systems

VSFCD provides all wastewater collection, treatment, disposal and reuse within its wastewater service area which includes the City of Vallejo and the unincorporated area in the greater Vallejo area (see Figure 4.2). This includes the areas of Mare Island, Glen Cove, Home Acres, and Hiddenbrooke. The wastewater system consists of collection pipes that deliver wastewater to the Vallejo Wastewater Treatment Plant (WWTP). The WWTP is located at 450 Ryder Street in Vallejo that treats an average flow of 11.44 million gallons per day (mgd). The Vallejo WWTP has a dry weather capacity of 15.5 mgd and a wet weather capacity of 60 mgd. VSFCD's current dry weather flow is 9 mgd and has been decreasing due to low flow fixtures and a reduction of inflow and infiltration into the collection system. The treatment consists of conventional secondary treatment with trickling filters, short-term aeration, chlorination and dechlorination before being discharged to Carquinez Strait.

VSFCD's future recycled water program is described in the document entitled *Reclaimed Water Study*, RMC, August 2003. The program includes a tertiary treatment facility at the existing WWTP. The most cost-effective uses for an initial phase is to provide a distribution system to connect to an existing raw water pipeline from that, serve sites located in the northwest portion of Vallejo, near the Highway 35/I-80 interchange and along Columbus Parkway in Vallejo. Besides these major markets, other potential sites include several parks and school playing field north of Highway 37 between I-80 and Highway 29. In addition, there is a potential for recycled water use associated with the redevelopment plans for the Solano 360 project located at the Solano County Fairgrounds in the southwest corner of the Highway 37/I-80 interchange. The site is 152 acres and is proposed for commercial and entertainment uses.

Table 4.8 (DWR Table 21) summarizes the current and projected quantity of wastewater collected and treated to Title 22 standards. Table 4.9 (DWR Table 22) summarizes the existing and planned disposal methods.

Table 4.8 (DWR Table 21)
Recycled Water – Wastewater Collection and Treatment

Type of Wastewater	2005	2010	2015	2020	2025	2030	2035
Wastewater collected & treated in service area, mgd [1,2]	10.4	11.5	12.0	12.5	12.5	13.0	13.5
Wastewater collected & treated in service area, AFY	11,650	12,883	13,443	14,003	14,003	14,563	15,123
Volume that meets recycled water standard	0	0	0	0	0	0	0

Notes:
1. From Draft Report of Waste Discharge, March 22, 2011, VSFCD, annual average daily flow rate.
2. From 2005 UWMP Table 5-3, communication from Rolf Ohlemutz, VSFCD; amounts for 2015-2020, 2030 and 2035 based on same annual growth from 2005-2025 (0.105 mgd/yr).

Table 4.9 (DWR Table 22)
Recycled Water – Non-Recycled Wastewater Disposal

Method of Disposal	Treatment Level	2010	2015	2020	2025	2030	2035
Carquinez Strait, mgd [1]	Secondary	11.5	12.0	12.5	12.5	13.0	13.5
Carquinez Strait, AFY [1]	Secondary	11,650	12,883	14,003	14,003	14,563	15,123

Notes:
1. See Table 4.7; assumed effluent discharge is the same as wastewater flow rate.

4.6.2 Potential and Projected Uses of Recycled Water

VSFCD commissioned a report entitled *Reclaimed Water Study*, RMC, August 2003 ("2003 study"). The study showed that there is a potential annual recycled water demand of approximately 635 million gallons (1,948 acre-feet). The recycled water demand would primarily serve irrigation demands for golf courses, parks, schools and other large landscape irrigation customers within the city limits. Although not identified in the 2003 study due to timing of the report, the 152-acre Solano 360 project could also be another potential recycled water demand. Table 4.10 identifies the various potential market demands, by groups. The groups are based on physical location in the city and are established in the 2003 study.

Table 4.10
Recycled Water Demands by Group– Potential Market Demand

User Type [1]	Description	Unit Cost [2] $/AF	Potential Demand AFY
Group 1 Northeast Vallejo	Parks	$920	247
	Golf Courses		569
	Schools		118
	Total, Group 1		934
Group 2 Hiddenbrooke Area	Golf Courses	$1,430	307
	Total, Group 2		307
Group 3 Central Vallejo	Parks	$1,380	76
	Schools		46
	Total Group 3		122
Group 4 Southeast Vallejo	Cemeteries	$1,600	66
	Parks		8
	Schools		9
	Total, Group 4		83
Group 5 Southwest Vallejo	Cemeteries	$1,600	48
	Parks		57
	Schools		10
	Hotel complex		1
	Total, Group 5		116
Group 6 Mare Island	Parks	$1,260	146
	Golf Courses		250
	Total, Group 6		396
	Total		**1,958**

Notes:
1. Group designations as identified in *Reclaimed Water Study*, RMC, August 2003.
2. Costs from Table 1-1, *Reclaimed Water Study*, RMC, 2003.

Recycled water delivery would require adding tertiary treatment processes to its secondary WWTP as well as recycled water distribution pipelines from the tertiary WWTP. The lack of a tertiary WWTP and "backbone" infrastructure system for recycled water causes a significant financial limitation to the use of recycled water in the City's service area.

Table 4.11 (DWR Table 23), identifies the various potential future recycled water users by type. As discussed in the 2003 study, recycled water rates would not be competitive with in-city water rates. Recycled water rates may be competitive for outside-city water rates, however, there is not a potential recycled water demand in those areas. As stated in the 2003 study, a recycled water program could only likely occur when one of the following conditions occur:

- Implementation of more stringent wastewater discharge requirements;
- Increased water demand due to development;
- Increased vulnerability of the water supply due to drought; or
- Public opinion to implement recycled water as an environmental enhancement.

For this reason, Table 4.11 (DWR Table 23) does not identify potential future uses because recycled water use is not feasible in the foreseeable future.

Table 4.11 (DWR Table 23)
Recycled Water – Potential Future Use (AFY)

User Type	Description	Feasibility [1]	2015	2020	2025	2030	2035 [2]
Agricultural Irrigation (City)	No agricultural customers in city limits.	N/A					
Landscape Irrigation	Large landscape customers, including parks and schools	Economic constraints					
Commercial & Industrial	Arena facility, hotels and retail complexes	Economic constraints					
Golf course irrigation	City serves one golf course with raw water.	Economic constraints					
Wildlife habitat		N/A					
Wetlands		N/A					
Industrial reuse		N/A					
Groundwater recharge		N/A					
Seawater barrier		N/A					
Geothermal/Energy		N/A					
Indirect potable reuse		N/A					
Other (type of use)	Commercial users	Economic constraints					
Total			0	0	0	0	0

Notes:

1. Feasibility discussed in *Reclaimed Water Study*, RMC, August 2003.

2. Potential market demands are found in Table 4.8. Due to fiscal constraints and economic infeasibility, potential future use is deemed zero.

4.6.3 Technical and Feasibility of Projected Use

As discussed in Section 4.6.2, implementation of a recycled water program is not likely to occur in the foreseeable future due to economic infeasibility and the lack of a need for recycled water supply. The City currently has sufficient water supply and until that situation changes, there will not be a need for recycled water.

4.6.4 Comparison of Previously Projected Use and Actual Use

There is no difference in projected recycled water use from its 2005 UWMP. Both the 2005 UWMP and this UWMP assumes no projected recycled water use.

Table 4.12 (DWR Table 24) presents the comparison between the 2005 projections and 2010 actual use in DWR's required format.

Table 4.12 (DWR Table 24)
Recycled Water — 2005 UWMP Use Projection Compared to 2010 Actual (AFY)

User Type	2010 Actual Use	2005 Projection for 2010
Agricultural irrigation	--	--
Landscape irrigation	--	--
Commercial irrigation	--	--
Golf course irrigation	--	--
Wildlife habitat	--	--
Wetlands	--	--
Industrial reuse	--	--
Groundwater recharge	--	--
Seawater barrier	--	--
Geothermal/Energy	--	--
Indirect potable reuse	--	--
Other (type of use)	--	--
Total	0	0

4.6.5 Promoting Recycled Water Use

Currently, the City does not have established ordinances and policies requiring the installation of purple pipe for new development nor does it require the installation of separate irrigation meters for all non-residential landscapes. These types of policies could facilitate the installation of recycled water infrastructure and incremental conversion to recycled water. Table 4.13 (DWR Table 25) presents this information in DWR's required format.

Table 4.13 (DWR Table 25)
Methods to Encourage Recycled Water Use (AFY)

Actions	Projected Results					
	2010	2015	2020	2025	2030	2035
Require the installation of "purple pipe" with new construction						X
Prohibit the use of potable water when recycled water is available						X
Continue cooperation with VSFCD to facilitate future recycled water use in the City's wastewater service area and in the City's water service area	X	X	X	X	X	X
Provide on-going technical assistance to users						X
Be proactive in public education				X	X	X

4.7 Future Water Projects

This section describes the various water supply projects that the City may undertake to meet total projected water use or to provide additional reliability to its water supply sources. Currently, the City has no future water supply projects.

However, in 1994, the City commissioned a study to investigate the feasibility of constructing a reservoir approximately one mile south of the American Canyon WTP. At the time, three cities participated in the

study: Vallejo, American Canyon and Napa. At the conclusion of the 1994 study, Vallejo chose not to pursue this project any further because the hydraulics of the reservoir did not work for Vallejo's water system.

4.7.1 Amount of Supply Increase

As shown in Table 4.14 (DWR Table 26), because the City has no water supply projects at this time, there is no projected supply increase.

Table 4.14 (DWR Table 26)
Future Water Supply Projects (AFY)

Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Normal Year Supply	Single-Dry Year Supply	Multiple-Dry Year		
						Year 1	Year 2	Year 3
Water Supply project	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Total				0	0	0	0	0

SECTION 5
WATER SUPPLY RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING

This section compares the water demand information developed in Section 3 and the water supply information developed in Section 4. Comparisons are provided under DWR's required range of hydrologic conditions including the Normal, Single Dry Year and Multiple Dry Year scenarios. This section also describes the City's water shortage contingency and drought planning as required by Water Code Section 10632.

5.1 Summary of Factors Affecting Supply

The City has four sources of water supply: surface water supplies from the State Water Project (SWP), Permit Water, Solano Project Water and Lakes Frey, Madigan and Curry. As illustrated in Table 4.2, the City's supply projections indicate that its 2035 water supply portfolio is composed of the following water supply sources under normal year conditions:

- 51 percent Solano Project water;
- 37 percent Permit water; and
- 12 percent State Water Project.

Lakes Frey, Madigan and Curry are available sources for supplemental and emergency supply purposes.

Table 5.1 (DWR Table 29) summarizes the various factors that affect the City's supplies. This table does not include the City's emergency water supplies as those supplies are mainly used for operational flexibility and during catastrophic emergencies.

Table 5.1 (DWR Table 29)
Factors Resulting in Inconsistency of Supply

Water Supply Sources	State Water Project (SWP)	Permit Water	Solano Project Water	Lakes Frey, Madigan and Curry
Specific Sources Name (if any)	Bay-Delta surface water via Barker Slough (SCWA, wholesale supplier)	Bay-Delta surface water via Barker Slough (SWRCB, wholesale supplier)	Lake Berryessa (SCWA, wholesale supplier)	Lakes Frey, Madigan and Curry
Limitation Quantification (Year 2035)	5,600 ac-ft/yr (Table A allotment)	22,800 ac-ft/yr	14.600 ac-ft/yr	Frey & Madigan, 400 ac-ft/yr; Curry, 3,750 ac-ft/yr
Legal	Agreement expires 2038; will need to extend	Pre-1914 appropriative rights under License 997848; no expiration date	Water delivery contract through SCWA for water from USBR federal project; No expiration date	Water delivery contract through SCWA for water from USBR federal project; No expiration date
Environmental	Biological Opinions from FWS and NMFS issued in 2008 and 2009 affect water exports from the Delta through the SWP system.	Same as SWP since this water comes from the same source and delivered through the North Bay Aqueduct system.	None.	None.
Water Quality	Barker Slough water quality issues mainly pertaining to TOC and turbidity affect the cost of treatment at the City's plant.	Same as SWP since this water comes from the same source and delivered through the North Bay Aqueduct system.	Generally good water quality; after storms, high turbidity occurs.	Generally good water quality; after storms, high turbidity occurs.
Climatic	Vulnerable to climatic conditions as this directly affects the SWP system and hence, deliveries from the SWP system.	Appropriative rights make this supply more reliable than SWP and has not been curtailed in the past.	Vulnerable to climatic conditions as this source is surface water from runoff; however, not as vulnerable as Bay-Delta source.	Vulnerable to climatic conditions as this source is surface water from runoff; however, not as vulnerable as Bay-Delta source.
Additional Information	As SWP water is curtailed, Dry-Year water bank water may become available.		Can acquire additional amount beyond entitlement as available	Used as supplementary and emergency sources

5.2 HYDROLOGIC RELIABILITY

The City's sources primarily consist of Bay-Delta surface water (for SWP and Permit Water) and Lake Berryessa (Solano Project Water). The hydrologic basis years for each source are summarized in Table 5.2 (DWR Table 27). Basis for the City's supply for Lakes Frey, Madigan and Curry are not included since those sources are considered supplemental and emergency supplies.

The information for the basis of water years is taken from the water supply reliability section of the 2010 Urban Water Management Plan for the Solano County Water Agency (SCWA). SCWA is the managing supplier of these sources of water for the City. A copy of the SCWA report can be found at the following website link: http://www.scwa2.com/Documents/UWMP/2010%20UWMP%20final%20draft.pdf

Although the source for Permit Water is the same as for the SWP, Permit Water is a much more robust source for the City. Permit Water is not subject to the same curtailments as SWP because it does not have the same environmental constraints and therefore the City's license for receiving this water is more

reliable. Although the City has not had contractual curtailments of its Permit Water, from a planning standpoint, the City is assuming a 95 percent reliability during single and multiple-dry water years.

Table 5.2 (DWR Table 27)
Basis of Water Year Data

Source	Water Year Type	Base Year(s)
Bay-Delta [1]	Average Water Year	Avg. of 1922 - 2004
	Single-Dry Water Year	1977
	Multiple-Dry Water Years	1990-1992
Lake Berryessa [2]	Average Water Year	Avg. of 1906 - 2007
	Single-Dry Water Year	1934
	Multiple-Dry Water Years	1990-1994

Footnotes:
1 Source for the City's SWP and Permit water supplies.
2 Source for the City's Solano Project water supply.

The reliability analysis used in this UWMP is based on the analysis provided by the managing wholesaler (SCWA). The percent allocation for each supply is summarized in Table 5.3.

Table 5.3
Supply Reliability - Percent Allocation

Supply	Water Year Type	Percent (2010)	Percent (Ultimate)
State Water Project (SWP)	Average Water Year	64%	64%
	Single-Dry Water Year	63%	46%
	Multiple-Dry Water Years	33%	31%
Permit Water	Average Water Year	100%	100%
	Single-Dry Water Year	95%	95%
	Multiple-Dry Water Years	95%	95%
Solano Project	Average Water Year	99%	99%
	Single-Dry Water Year	98%	98%
	Multiple-Dry Water Years	89%	89%

Table 5.4 (DWR Table 28) represents 2015 water supply and matches the projected amount in Table 4.3 (DWR Table 16) for 2015 assuming normal water year conditions.

Table 5.4 (DWR Table 28)
Supply Reliability – Historical Conditions (ac-ft/yr)

Water Supply Sources [1]	Average/Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project	3,584	2,576	2,576	1,736	1,736
Permit Water (amount for normal year conditions)	10,513	9,987	9,987	9,987	9,987
Solano Project	14,454	14,308	14,308	12,994	12,994
Permit Water (as-needed up to 21,660 ac-ft/yr to meet demands)	0	1,680	1,680	3,834	3,834
Total	28,551	28,551	28,551	28,551	28,551
Percent of Average/Normal Year		100%	100%	100%	100%

Footnotes:
1 This table represents 2015 water supply (see Table 4.3 (DWR Table 6) for 2015 projected supply for each source); refer to Table 5.3 for percent allocations (use current, 2010 reliability).

The tables that follow are supply reliability estimates for years 2020 through 2035. The supply reliability for 2015 is shown on Table 5.3 (DWR Table 28).

Table 5.5
2020 Supply Reliability (ac-ft/yr)

Water Supply Sources[1]	Average/Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project	3,584	2,576	2,576	1,736	1,736
Permit Water (amount for normal year conditions)	10,725	10,189	10,189	10,189	10,189
Solano Project	14,454	14,308	14,308	12,994	12,994
Permit Water (as-needed up to 21,660 ac-ft/yr to meet demands)	0	1,690	1,690	3,844	3,844
Total	28,763	28,763	28,763	28,763	28,763
Percent of Average/Normal Year		100%	100%	100%	100%

Footnotes:

1 Refer to Table 4.3 (DWR Table 16) for 2020 supplies; refer to Table 5.3 for percent allocations (use "ultimate" reliability).

Table 5.6
2025 Supply Reliability (ac-ft/yr)

Water Supply Sources[1]	Average/Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project	3,584	2,576	1,649	1,736	1,736
Permit Water (amount for normal year conditions)	11,562	10,984	10,984	10,984	10,984
Solano Project	14,454	14,165	14,165	12,994	12,994
Permit Water (as-needed up to 21,660 ac-ft/yr to meet demands)	0	1,875	2,803	3,886	3,886
Total	29,600	29,600	29,600	29,600	29,600
Percent of Average/Normal Year		100%	100%	100%	100%

Footnotes:

1 Refer to Table 4.3 (DWR Table 16) for 2025 supplies; refer to Table 5.3 for percent allocations (use "ultimate" reliability).

Table 5.7
2030 Supply Reliability (ac-ft/yr)

Water Supply Sources[1]	Average/Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project	3,584	2,576	2,576	1,736	1,736
Permit Water (amount for normal year conditions)	11,832	11,241	11,241	11,241	11,241
Solano Project	14,454	14,308	14,308	12,994	12,994
Permit Water (as-needed up to 21,660 ac-ft/yr to meet demands)	0	1,746	1,746	3,900	3,900
Total	29,870	29,870	29,870	29,870	29,870
Percent of Average/Normal Year		100%	100%	100%	100%

Footnotes:

1 Refer to Table 4.3 (DWR Table 16) for 2030 supplies; refer to Table 5.3 for percent allocations (use "ultimate" reliability).

Table 5.8
2035 Supply Reliability (ac-ft/yr)

Water Supply Sources[1]	Average/Normal Water Year	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
State Water Project	3,584	1,649	1,649	1,111	1,111
Permit Water (amount for normal year conditions)	12,104	11,499	11,499	11,499	11,499
Solano Project	14,454	14,165	14,165	12,864	12,864
Permit Water (as-needed up to 21,660 ac-ft/yr to meet demands)	0	2,830	2,830	4,668	4,668
Total	30,142	30,142	30,142	30,142	30,142
Percent of Average/Normal Year		100%	100%	100%	100%

Footnotes:

1 Refer to Table 4.3 (DWR Table 16) for 2035 supplies; refer to Table 5.3 for percent allocations (use "ultimate" reliability).

5.3 Legal & Environmental Constraints

There are factors that cause or have the potential to cause inconsistent supply to meet demands and are due to legal, environmental, water quality or climatic issues. These factors that affect the reliability of the City's water supply are described in this section.

5.3.1 State Water Project Supply Reliability

The large majority of water that the City receives is from the SWP. DWR issued a 2009 Delivery Reliability Report and the reliability analysis is based on this report. A copy of the Executive Summary of the 2009 Delivery Reliability Report is included in Appendix X.

The DWR reliability report is based on a model of what SWP deliveries could be based on a percentage of SWP full allocations. The analysis is based on several environmental factors including the Biological Opinions (BO) of U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS). The BO for FWS was issued in December 2008 and the BO for NMFS was issued in June 2009. The BO affects SWP pumping operations and SWP exports from the Delta. The report concludes that projected long-term average delivery amounts of Table A allotments have decreased from previous estimates.

The single-dry water year reliability stated in the 2009 report is 11 percent, based on the driest year on record (1977). However, there have been some improvements to the operating criteria for the SWP through Decision 1641. Based on these new operating criteria, SWP delivery has been estimated by the managing wholesaler, SCWA, in their 2010 UWMP.

Reliability for this source is shown in Table 5.3 and for future years, is 64 percent under normal water year conditions, 46 percent for single-dry water year conditions, and 31 percent for multiple-dry water year conditions.

5.3.2 Permit Water Supply Reliability

Permit water, although conveyed via the North Bay Aqueduct (NBA) system, is not the same as SWP water. Permit water is an appropriative water right that Vallejo has under a license with SWRCB. Permit water is not subject to the same curtailment conditions as the SWP. Historically, the City has not experienced a curtailment of its permit water allocation, even under severe drought conditions. Nevertheless, from a water supply planning standpoint, the City has assumed a reliability of 95 percent for dry year conditions.

5.3.3 Solano Project Water Supply Reliability

The reliability of this water supply is discussed in the SCWA 2010 UWMP as previously referenced. In general, this source is reliable but can experience significant drawdown during long periods of drought.

Reliability for this source is shown in Table 5.3 and for future years, is 99 percent under normal water year conditions, 98 percent for single-dry water year conditions, and 89 percent for multiple-dry water year conditions.

5.3.4 Lakes Frey, Madigan and Curry Water Supply Reliability

A reliability analysis was not conducted for the Lakes because the City considers this supply as a supplementary or emergency water supply source.

5.4 WATER QUALITY CONSTRAINTS

The main source of water that the City receives is from the SWP and this water is from the Barker Slough watershed. This watershed is located in the larger Sacramento River watershed, and drains an area approximately 14.5 square miles in Solano County. The source water is conveyed to the City's treatment plants via a separate pipeline from the Cordelia Forebay.

In addition to the Barker Slough watershed, a portion of the City receives water from the Solano Project, which is water stored in Lake Berryessa. This water supply source generally has very good water quality except after significant storms where the turbidity in the source water can be challenging to treat.

The City consistently meets all drinking water standards, though, as previously mentioned, the source water occasionally poses treatment challenges during storm events when elevated levels of turbidity and total organic carbon (TOC) occur. Low pumping rates at Barker Slough during the winter results in extended period of turbidity and TOC into the NBA. In order to reduce the significance of the potential contaminations sources, the cities and districts receiving NBA water have been working with the Solano County Water Agency to evaluate watershed management practices that could improve water quality.

All California Department of Health Services (CDPH) standards are consistently met. For this reason, the use of these water supplies due to water quality issues is considered to be unlikely. However, the cost of treatment is an ongoing concern and the Solano County water customers need to continuously collaborate to work towards the implementation of watershed best management practices (BMPs) within the areas that drain into Barker Slough.

Table 5.9 (DWR Table 30)
Water Quality – Current and Projected Water Supply Impacts

Water source	Description of Condition	2010	2015	2020	2025	2030	2035
State Water Project	No impacts to supply	--	--	--	--	--	--
Permit Water	No impacts to supply	--	--	--	--	--	--
Solano Project	No impacts to supply	--	--	--	--	--	--

5.5 SUPPLY AND DEMAND COMPARISONS

The projected three-year supplies available to the City are presented in Table 5.9 (DWR Table 31). Under a multiple-dry year condition, the City does have additional Permit Water available up to supplement any dry water year condition.

Table 5.10 (DWR Table 31)
Supply Reliability – Current Water Sources (ac-ft/yr)

Water Supply Sources[1]	Average/Normal Water Year Supply	Multiple-Dry Water Year Supply		
		Year 1	Year 2	Year 3
State Water Project	3,584	2,576	1,736	1,736
Permit Water (amount for normal year conditions)	10,513	9,987	9,987	9,987
Solano Project	14,454	14,308	12,994	12,994
Permit Water (as-needed up to 21,660 ac-ft/yr to meet demands)	0	1,680	3,834	3,834
Total	28,551	28,551	28,551	28,551
Percent of Normal Year		100%	100%	100%

Footnotes:
1 Basis year is 2015 (refer to Table 5.3).

The analysis that follows compares the projected Normal Year water supply available to the City and projected customer demands from 2010 to 2030, in five-year increments, and shown in Table 3.13 (DWR Table 11). Comparisons of supply and demand under Normal, Single Dry and Multiple Dry Years are included in Tables 5.11 (DWR Table 32) through 5.13 (DWR Table 34).

Table 5.11 (DWR Table 32)
Supply and Demand Comparison – Normal Year (ac-ft/yr)

	2015	2020	2025	2030	2035
Supply Totals (from Tables 5.4 through 5.8)	28,551	28,763	29,600	29,870	30,142
Demand Totals (from Table 3.13)	28,551	28,763	29,600	29,870	30,142
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

Table 5.12 (DWR Table 33)
Supply and Demand Comparison – Single Dry Year (ac-ft/yr)

	2015	2020	2025	2030	2035
Supply Totals (from Tables 5.4 through 5.8)	28,551	28,763	29,600	29,870	30,142
Demand Totals (from Table 3.13)	28,551	28,763	29,600	29,870	30,142
Difference (supply minus demand)	0	0	0	0	0
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

Table 5.13 (DWR Table 34)
Projected Supply & Demand Comparison during Multiple Dry Year Period (ac-ft/yr)

		2015	2020	2025	2030	2035
Multiple Dry Year - First Year Supply	Supply Totals (Tables 5.4 through 5.8)	28,551	28,763	29,600	29,870	30,142
	Demand Totals (from Table 3.10)	28,551	28,763	29,600	29,870	30,142
	Difference (supply minus demand)	0	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%	0%
Multiple Dry Year - Second Year Supply	Supply Totals (Tables 5.4 through 5.8)	28,551	28,763	29,600	29,870	30,142
	Demand Totals (from Table 3.19)	28,551	28,763	29,600	29,870	30,142
	Difference (supply minus demand)	0	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%	0%
Multiple Dry Year - Third Year Supply	Supply Totals (Tables 5.4 through 5.8)	28,551	28,763	29,600	29,870	30,142
	Demand Totals (from Table 3.19)	28,551	28,763	29,600	29,870	30,142
	Difference (supply minus demand)	0	0	0	0	0
	Difference as % of Supply	0%	0%	0%	0%	0%
	Difference as % of Demand	0%	0%	0%	0%	0%

5.6 SUMMARY OF SUPPLY AND DEMAND ANALYSIS

What Tables 5.10 through 5.13 show is that the City does have sufficient Permit Water available up to a maximum entitlement of 22,600 acre-feet per year to make up the difference in shortfall from other supply sources (i.e., SWP and Solano Project water) that are subject to curtailment. Under dry water year conditions, it is assumed that a 95 percent curtailment of Permit Water could be experienced, giving the City a maximum dry water year supply of 21,660 acre-feet per year to make up the difference in allocations from SWP water and Solano Project water. Under the worst case scenario (year 2035, year 3 in a multiple-dry year water condition), Permit Water is projected at 11, 499 acre-feet per year. However, with a 21,660 acre-feet per year of entitlements, the City still has a balance of over 10,000 acre-feet available during the worst-case scenario evaluated in this report. Even with a 50 percent reduction in SWP and Solano Project water supply,

In summary, the City's combined projected water supplies are sufficient to meet projected demands during normal, single-dry and multiple-dry water year conditions.

5.7 WATER SHORTAGE CONTINGENCY AND DROUGHT PLANNING

This section provides information required by Water Code Section 10632. The City has adopted a Water Shortage Emergency Plan within Section 13.14 of its Municipal Code, which is included as Appendix F of this UWMP.

5.7.1 Actions in Response to Water Supply Shortages (Water Code 10632(a))

Water Code Section 10632(a) requires a description of the actions to be undertaken by the urban water supplier in response to water supply shortages of up to 50 percent. This section also requires the water supplier to outline the specific water supply conditions that are applicable at each stage of action.

The City Council also has the authority to declare a water shortage emergency. This authority is contained in Section _____ of the Municipal Code. Emergencies are declared in four stages with specific reduction methods used for each stage. Table 5.14 (DWR Table 35) summarizes the consumption reduction methods that the City has the authority to use.

Table 5.14 (DWR Table 35)
Water Shortage Contingency – Rationing Stages to Address Water Supply Shortages

Stage No.	Water Supply Conditions	% Shortage
1 Voluntary Conservation	Irrigation morning and evening only	10%
	Inspection/repair/adjustment of irrigation systems	
	Reduction in irrigation run times for weather	
	Reduction of irrigation run time if runoff occurs	
	Utilization of incentives/rebates/giveaways to replace fixtures and appliances	
	Utilization of city information on water use efficiency, meter reading, leak repair	
2 Mandatory Water Alert	Restriction of irrigation hours	20%
	Restriction on hours for vehicle washing	
	Prohibition on filling or refilling swimming pools	
	Prohibiton on the use of non-recycling ornamental fountains	
	Prohibition on use of fire hydrants for other than fire fighting	
	Prohibition on runoff, failure to repair leaks and washing hard surfaces	
	Water upon request in restaurants	
	Prohibition against use of water for construction dust control	
	20% reductions for vehicle washing facilities	
3 Mandatory Water Emergency	All Stage 2 Prohibitions	30%
	Prohibition agains lawn irrigation with potable water	
	Prohibition agains new landscapes unless they meet drought resistant criteria	
	Prohibition against watering unless a handheld nozzle or drip system for established plantings is used	
	Prohibition against new plantings	
4 Mandatory Severe Water Emergency	All Stage 1,2,3 Prohibitions	50%
	Mandatory water rationing based on established water banks in effect	

5.7.2 Minimum Water Supply during the Next Three Years (Water Code 10632(b))

The minimum water supply available during the next three years during a multiple year drought is shown in Table 5.10 (DWR Table 31.

5.7.3 Catastrophic Supply Interruption Plan (Water Code 10632(c))

The City has completed a Water System Emergency Response Plan (ERP) in accordance with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. The ERP was created for events caused by human intervention including terrorist attacks and natural disasters. The City's ERP identifies the City's standardized response and recovery protocols to prevent, minimize, and mitigate injury and damage resulting from emergencies or natural disasters. The goals of the ERP include:

- Rapidly restoring water service after an emergency;
- Ensuring adequate water supply for fire suppression;
- Minimizing water system damage;
- Minimizing impact and loss to customers;
- Minimizing negative impacts on public health and employee safety; and
- Providing emergency public information concerning customer service.

The ERP includes emergency planning and water system information, including mutual aid agreements, emergency resources, emergency water supply calculations, and information on alternate water supplies.

The ERP also contains emergency response chain-of-command information, concepts of operation, notification procedures, water quality sampling procedures, emergency response training, and action plans.

Although these documents provide the response procedures that the City will employ should such disasters be realized, they are summarized, rather than included in their entirety, in the UWMP due to the confidential nature of the information they contain.

The City's ERP contains specific action plans that have been developed to address major events that could cause a catastrophic interruption of the City's water supply. The threats considered include:

- Earthquake
- Floods
- Winter Storm
- Power Outage
- Contamination to Water System
- Structural Damage from Explosive Device
- Vandalism
- SCADA System Intrusion
- IT System Intrusion
- Chemical Release
- Water Supply Interruption
- Bomb Threat

In regard to natural disasters, the City is most vulnerable to an earthquake. The City is located in a seismically active zone, and its main water transmission main located less than half of a mile from the West Napa Fault Zone. A seismic event of sufficient magnitude could cause numerous breaks in the water distribution system. The overall extent of damage to the water system would be dependent on the magnitude, proximity, and associated acceleration of the seismic event.

The City has adequate capabilities to respond to emergencies associated with minor damage and common malfunctions of the water system. An adequate supply of spare parts is stocked and readily available. However, the degree of damage capable from seismic activity and other major events could make stocking adequate spare parts and other supplies impractical for City employees and on-site resources. As a result, recovery time would be dependent upon response time of off-site suppliers and contractors.

If a regional power outage were to occur, the City could continue to supply water to its customers, but at a reduced rate. The NBA provides gravity flow from two 5-million gallon welded steel reservoirs to the City's treatment plants. There is a permanent emergency generator that operates the treatment plants to ensure that the plants would remain operational. The City also has connections to hook up a portable emergency generator at booster pump stations.

In regard to potential terrorist events, the City has evaluated the existing security measures in place at each component of the water system. Based on the evaluation, the City has identified actions that can be undertaken to decrease the vulnerability of the system. Table 5.15 below summarizes these actions.

Table 5.15
Preparation Actions for Catastrophes

Decision Stage Process	Actions Taken	ERP Activation Level
Stage 1 Possible Threat	- Evaluate available information - Determine if a threat is possible	- Implement precautionary response actions
Stage 2 Credible Threat	- Determine that threat is credible by establishing corroborating information: - Highly credible source - Health Department/customer reports - Unusual monitoring results	- Activate portions of ERP - Initiate internal and external notifications - Issue public health advisory - Initiate water sampling and analysis - Consider partial or full activation of EOC
Stage 3 Confirmed Major Event	- Confirm threat by verifying definitive evidence and information that establishes the major event - Perform water sampling and analysis	- Fully implement ERP - Immediately initiate appropriate action plans - Fully Activate EOC

5.7.4 Prohibitions, Penalties, and Consumption Reduction (Water Code 10632(d)-(f))

Section _____ of the Municipal Code specifies prohibited water uses. Table 5.16 presents this information in DWR's required format.

Table 5.16 (DWR Table 36)
Water Shortage Contingency – Mandatory Prohibitions

Examples of Prohibitions	Stage When Prohibition Becomes Mandatory
Escape of water through breaks or leaks in customers plumbing	Permanent Prohibition
Irrigation in a manner or to an extent which allows excessive runoff	Permanent Prohibition
Washing cars, boats, trailers or other vehicles with a hose not equipped with a shutoff nozzle	Permanent Prohibition
Water for non-recycling decorative fountains	Permanent Prohibition
Water for single pass evaporative cooling systems for air conditioning	Permanent Prohibition
Water for new non-recirculating conveyor car wash systems	Permanent Prohibition
Water for new non-recirculating industrial clothes washing systems	Permanent Prohibition
Use of potable water when recycled water of adequate quality is available	Permanent Prohibition

The consumption reduction methods that the City can use in various water shortage emergencies were previously presented in Table 5.14 (DWR Table 35).

The City's Water Shortage Contingency Plan outlines the City's enforcement process which is presented in Table 5.17 (DWR Table 38) below. In addition to enforcement mechanisms, the City has the authority to enact drought surcharges under the authority of Section _____of the Municipal Code.

Table 5.17 (DWR Table 38)
Water Shortage Contingency – Penalties and Charges

Penalty or Charge	Stage When Penalty Takes Effect
Imposition of drought surcharges	Any Stage
Personal contact with the customer	Any Stage
Delivery of written notice	Any Stage
Installation of a flow restricting device	Any Stage
Imposition of water waste fees	Any Stage

5.7.5 Effect on Revenues and Expenditures (Water Code 10632 (g))

In order to understand the potential impacts of supply reduction on revenues and expenditures, the City has analyzed the effects of 20%, 30% and 50% reductions in water delivered. For the purpose of this analysis, FY 2010-2011 budget data was used.

The City's water rates include a monthly meter charge and a volume charge for all classes of customers. However the monthly meter charge varies by the size of the meter. The volume charge is set at $3.22 per unit[1] for multi-family and non-residential use and is tiered for single family residential units. The City estimates that the "average" single family unit will have a water bill of $40.42 per month consisting of the $14.35 per month service charge and the balance in volume charges based on using 11 units of water. This estimate indicates that approximately 64 percent of the City's water revenue is derived from volume charges and these are the charges that will be reduced if consumption is curtailed. Table 5.18 below illustrates the effects of a 20%, 30% and 50% reduction on water sales revenue assuming that consumption based revenue makes up 64 percent of the total revenue.

Table 5.18
Water Shortage Contingency – Effect of Reduced Water Sales on Total Revenue

Percent Consumption Reduction	Percent of Revenue Generated from Consumption Charge	Percent Reduction in Revenue
(a)	(b)	(a)*(b)
20%	64%	13%
30%	64%	19%
50%	64%	32%

The effect of potential revenue reductions on overall expenditures and reserve balances is illustrated in Table 5.19 below. The calculations assume that the City experiences some modest savings in its water treatment plant costs as a result of producing less water.

The table illustrates that the City is able to manage even a 50% reduction in supplies with funding available from its current reserves. The City also has the ability to assess drought surcharges, which are not accounted for in these calculations. However, as demands grow in the future, the City will need to take more actions to manage supply reductions and the revenue impacts will be more severe. The City will continue to monitor its reserves in order to assure that reserve funding remains available to manage unanticipated reductions in demand.

[1] A "unit" is 748 gallons

Table 5.19
Water Shortage Contingency – Effect of Reduced Supply on Revenues & Expenditures

	Normal	20% Reduction in Supply [1]	30% Reduction in Supply[2]	50% Reduction in Supply[3]
Revenues				
Water Service Charges	$0	$0	$0	$0
Recovered Water Charges	$0	$0	$0	$0
Service Applicaiotn Fees	$0	$0	$0	$0
Reconnect Fees	$0	$0	$0	$0
Meter Installation Fees	$0	$0	$0	$0
Water Penalties	$0	$0	$0	$0
Other Fees & Charges	$0	$0	$0	$0
Recycled Water Charge	$0	$0	$0	$0
Interest Earnings	$0	$0	$0	$0
Miscellaneous Revenue	$0	$0	$0	$0
Sales of Surplus Equipment	$0	$0	$0	$0
Make Whole Agreement[4]	$0	$0	$0	$0
Totals	$0	$0	$0	$0
Expenditures				
Treatment Plant	$0	$0	$0	$0
Water Distribution	$0	$0	$0	$0
Non Departmental	$0	$0	$0	$0
Debt Service	$0	$0	$0	$0
Capital Projects	$0	$0	$0	$0
Totals	$0	$0	$0	$0
Surplus (Deficit)	$0	$0	$0	$0
Reserves				
Available Balance	$0	$0	$0	$0
Used to Cover Operations		$0	$0	$0
Ending Balance	$0	$0	$0	$0

Footnotes:

1 A 20% reduction in supply does not require a reduction in demand due to City's total supplyies available.
2 A 30% reduction in supply does not require a reduction in demand due to City's total supplyies available.
3 A 50% reduction in supply will require a 19% reduction in demand and results in impacts to revenues.

5.7.6 Water Shortage Contingency Ordinance (Water Code 10632(h))

As noted above, the City has adopted a Water Shortage Emergency Plan which was codified by Ordinance in Section _____of the Municipal Code. This Ordinance has recently been updated and the update is attached.

5.7.7 Mechanisms for Determining Actual Reductions (Water Code 10632(i))

The City's supply turnouts are all equipped with water meters. In addition, each potable and raw water customer is metered. Non-residential landscape irrigation is metered separately from indoor use at most non-residential sites. The City reads meters on a monthly basis and is able to document both demand reductions and a typically high water use customer. The City contacts individual customers to resolve issues related to a typically high water use customer.

SECTION 6
DEMAND MANAGEMENT MEASURES

Demand management measures (DMMs) are water conservation measures. The DMMs listed in the UWMP Act correlate to the California Urban Water Conservation Council's (CUWCC) original Best Management Practices (BMPs) for water conservation. The 2010 UWMP Guidebook uses the terms DMMs and BMPs interchangeably. The CUWCC revised and updated its BMP program in December of 2008 and its BMPs no longer correlate identically to the DMMs described in the 2010 UWMP Guidebook.

The purpose of this section is to provide a description of the City's currently implemented and planned water conservation programs. This section is also meant to correlate these programs to the "water use reduction plan" meant to achieve the 2015 and 2020 water use targets required to be set by the Water Conservation Act of 2009 and to document voluntary compliance with the CUWCC's Memorandum of Understanding.

The City of Vallejo is not a signatory to the voluntary California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding. As a participating member of the Solano Project, the City is required by the United States Bureau of Reclamation to utilize on-line BMP (or DMM) reporting and available water savings calculation tools on the CUWCC website. The City of Vallejo has begun to file annual program updates for the U.S. Bureau of Reclamation by filling in the information for urban BMPs on the CUWCC website, via the CUWCC's BMP Reporting Database located on their web site at http://www.cuwcc.org/.

DEMAND MANAGEMENT MEASURES / BEST MANAGEMENT PRACTICES

Water conservation, or demand management, is a method available to reduce water demands, thereby reducing water supply needs for the City. This section describes the conservation program proposed for fiscal years 2010/2011 through 2014/2015 through implementation of demand management measures (DMMs), including methods to evaluate effectiveness, estimate water savings, and proposed budgets. The success of some of the practices depends on cooperative work with other entities. To the maximum extent possible the City will design programs in coordination with other agencies to leverage agency resources, reduce program costs, and improve cost-effectiveness. The City has participated in regional grants through the Solano County Water Agency – Urban Water Conservation Committee.

The City is only required to implement those measures that are found to be cost-effective (those with a benefit-cost ratio greater than 1.0). The measures that are not fully implemented are not cost effective. In some cases, the City has partially implemented measures, even though they are not cost-effective, in order to provide information to customers or to provide customer service.

The City of Vallejo will seek additional funding in the form of grants and cost-sharing with other agencies. The Vallejo Sanitation and Flood Control District has financially supported the program in the past and may be available to partner with the City on specific projects in the future.

The City of Vallejo is not a signatory to the voluntary California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding. However, as a participating member of the Solano Project, the City is required by the USBR to utilize on-line BMP (or DMM) reporting and available water savings calculation tools on the CUWCC website. BMP reports for 2009 and 2010 are presented in Appendix X.

In May 2005, Maddaus Water Management prepared cost-benefit calculations, more specifically benefit-to-cost ratios, for most of the DMMs. The results showed that the programs would cost more than the value of the City's avoided water procurement and operational costs associated with the water savings. From the agency perspective, many of the DMMs are not cost-effective. This is primarily due to the pricing structure of the City's relatively inexpensive water supplies, with large flat costs irrespective of actual usage. Conditions have not substantially changed in the years since then, however, the City does incur significant pumping costs to convey raw water into the City and distribute treated water. The rising cost of electricity and natural gas could eventually tip the scale.

6.1.1 Residential Water Survey Program

Description of Program

Residential water use surveys in Vallejo are conducted of single family homes and multi-family homes with no more than four units by a program jointly operated and funded by the Solano County Water Agency and the Water Agency's retail agencies' urban water conservation committee. The City of Vallejo began participating in the regional program in fiscal year 08/09.

The Solano County Water Agency tracks the number of surveys offered as well as the number of surveys performed. The surveys include:

- An interview with the homeowner;
- An irrigation system check for malfunctioning heads or other system parts;
- A review of irrigation scheduling and recommendations;
- Leak checks;
- Providing homeowners with information about rebate programs offered including turf replacement, high-efficiency toilets, high efficiency clothes washers, and weather-based irrigation controllers; and
- Providing high-efficiency showerheads and faucet aerators.

The program focuses on the highest residential water users by sending letters to the top 20% of water users each season. The surveys are also provided as a customer service to homeowners requesting it.

Methods for Effectiveness Evaluation, if any
The Solano County Water Agency has conducted small scale reviews of water use before and after receiving a water use survey. These studies have indicated that the program is effective at reducing water use in those homes selected from the top 20% water users.

Estimate of existing conservation savings, if any
The City does not currently have any estimates of water savings obtained from this program.

Table 6.1
Audits Performed

Audits performed	2006 (06/07)	2007 (07/08)	2008 (08/09)	2009 (09/10)	2010 (10/11)
Single-family	0	0	9	65	473
Multi-family	0	0	0	0	0
Actual water savings	Unknown	Unknown	Unknown	Unknown	Unknown

Table 6.2
Audits Projected to be Performed

Audits performed	2011	2012	2013	2014	2015
Single-family	228	250	250	250	250
Multi-family	0	0	0	0	0
Actual water savings	Unknown	Unknown	Unknown	Unknown	Unknown

6.1.2 Residential Plumbing Retrofit Program

Description of Program

As calculated by Maddaus Water Management, the benefit-cost ratio for this DMM is only 0.41 from the agency perspective. Therefore, the City is exempt from full CUWCC BMP implementation but offers the listed measures to assist its residential water customers.

- As described above, residents participating in the residential survey program receive high efficiency showerheads and aerators at the time of their surveys.
- The City provides high-efficiency showerheads and aerators to water customers upon request and at community events.

Table 6.3
Plumbing Devices Distributed

	2006	2007	2008	2009	2010
Single-family Devices	0	0	762	1,394	833
Multi-family Devices	0	0	326	65	0
Actual water savings	Unknown	Unknown	Unknown	Unknown	Unknown
Total Devices	0	0	1,088	1,459	833

Table 6.4
Plumbing Devices Projected to be Distributed

Devices Installed or Distributed	2011	2012	2013	2014	2015
Single-family	800	800	800	800	800
Multi-family	40	40	40	40	40
Actual water savings	Unknown	Unknown	Unknown	Unknown	Unknown
Total	840	840	840	840	840

6.1.3 System Water Audits, Leak Detection and Repair

Description of Program

The City reviews its water system statistics and has made progress in this area. Leak detection equipment with "dataloggers" has been purchased and training offered to staff. Water main repairs are ongoing.

The City's program consists of the following actions:

a) Annually complete a prescreening system audit to determine the need for a full-scale system audit. The prescreening system audit is calculated as follows:

   i) Determine metered sales.
   ii) Determine other system verifiable uses.
   iii) Determine total supply into system.
   iv) Divide metered sales plus other verifiable uses by total supply into the system. If this quantity is less than 0.9, a full-scale system audit is indicated.

b) When indicated, the City will complete a water audit of its distribution system using methodology consistent with that described in AWWA's "Water Audit and Leak Detection Guidebook."

c) The City also: advises customers whenever it appears possible that leaks exist on the customer's side of the meter; performs distribution system leak detection when warranted and cost-effective; and repairs leaks when found.

Methods for Effectiveness Evaluation, if any
Effectiveness is measured by monitoring the percent of unaccounted water for the system. Between the years 2005 and 2010, unaccounted water was reduced from 22% to 14% of gross water use.

Estimate of existing conservation savings, if any
Between the years 2005 and 2010, unaccounted water was reduced from 22% to 14% of gross water use. This is equivalent to a reduction of 2,246 acre-feet per year.

6.1.4 Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

There are no unmetered accounts in the City of Vallejo's distribution system. All accounts are billed by volume of use.

6.1.5 Large Landscape Conservation Programs and Incentives

Description of Program
The City financially supported a regional pilot program in FY99/00 to establish and implement an effective landscape water audit program design or to develop the data for exemption.

In FY01/02 and FY02/03 the City participated in a successful regional Prop 13 grant request for centralized ET-based irrigation controller installation at selected sites (Jesse Bethel High School in Vallejo). In addition to the controller, computer control and a weather station were also installed (Jesse Bethel High). This project was coordinated with the Vallejo Unified School District and City landscape staff.

Follow-up reviews of the schools water consumption indicated that irrigation water consumption dropped dramatically in the three years after the installation, by nearly 30% overall. After the third year, consumption began to increase, and eventually reached the level of irrigation water consumption

previously recorded prior to the installation of the weather-based irrigation system. It was discovered that the staff who had been trained to use the system were no longer with the District, and the system controller had since been disengaged by other staff. School District staff are currently making efforts to reinstall the system.

Benefit-cost ratios for the two primary types of landscape water management programs were derived: 1) the ratio for preparation of water budgets was 0.66 from the agency perspective; and 2) the ratio for providing water use surveys of landscaped sites was 0.80 from the agency perspective. Therefore, the City exempts from full CUWCC BMP (DMM) implementation but offers the listed measures to assist its large landscape water customers.

Landscape audits will be offered to a small percentage of dedicated irrigation accounts through the Solano County Water Agency's regional landscape audit program. The audit consists of the following:

- Evaluation of the efficiency and distribution uniformity of the irrigation system,
- Evaluation of the condition of the system components: pressure: broken, tilted or obstructed heads; over-spray,
- Development of a water budget based on square footage of various hydrozones and average ETo,
- Evaluate the irrigation scheduling and volume applied,
- Recommend improvements in irrigation practices, and
- A written report provided to the City as well as to the water customer.

Over the next 5-year timeframe, the City will focus its efforts on conducting surveys at large sites with the greatest potential for obtaining water savings.

Methods for Effectiveness Evaluation, if any

The water use records for a time period before and after a water audit is completed are compared to evaluate whether water savings are realized from the water audits.

Estimate of existing conservation savings, if any

Roger – please insert the water savings data you gathered for the HOA and any other sites reviewed other than Bethel High.

Table 6.5
Surveys Performed

	2006	2007	2008	2009	2010
Number of dedicated irrigation meters	?	?	508	527	524
Surveys completed	0	2	3	6	3
Number of Water Budgets	0	0	0	0	49
Accounts 20% over-budget	unknown	unknown	unknown	unknown	19
Accounts 20% over-budget offered technical assistance	unknown	unknown	unknown	unknown	4
Accounts 20% over-budget accepted technical assistance	unknown	unknown	unknown	unknown	3

Table 6.5
Surveys Performed

	2006	2007	2008	2009	2010
Water savings incentives provided	0	0	0	0	1 @ $10,000
Number of follow up visits	0	0	0	0	0
Number of follow up calls	0	0	1	3	2
Actual Water Savings	unknown	unknown	unknown	unknown	unknown

Table 6.6
Number of Surveys Projected

	2011	2012	2013	2014	2015
Surveys completed	2	3	3	3	3
Budgets Developed	100	200	300	400	525
Number of follow up visits	0	1	1	1	1
Projected Water Savings	unknown	unknown	unknown	unknown	unknown

6.1.6 High Efficiency Clothes Washer Rebates

Description of Program

The City participates in a clothes washer rebate program through its wholesaler, the Solano County Water Agency. The program provides a $100 rebate for clothes washers purchased within the service are receiving water supplied by the Solano County Water Agency. The new clothes washers must meet specified efficiency standards to qualify.

It is estimated that the number of rebates will increase in the years 2012 and 2013 due to the City's participation in the Integrated Regional Water Management Plan (IRWMP) water conservation program. This is a two-year program funded by a Proposition 84 grant.

Methods for Effectiveness Evaluation, if any

Currently, effectiveness of the program is based on the level of participation. Effectiveness is measured by participation. The clothes washer rebate program continues to gain in popularity and the level of participation has steadily increased since the year 2007.

Estimate of existing conservation savings, if any

Estimates of water savings are based on national averages of number of loads of laundry washed per person per day as well as the standard size of a load of laundry. Estimated savings are presented below.

Table 6.7
Rebates Paid

Actual	2006	2007	2008	2009	2010
$ per rebate	$0	$100	$100	$100	$100
Number of Rebates Paid	0	34	169	477	775
Actual / Estimated Water Savings (AFY)	0	.53	2.6	7.4	12

Notes:

1 savings not cumulative
2 savings based on 2.88 persons per household, .37 loads of laundry per day, standard 8 pound load
3 assumed 13 gallons per load savings = 5,056 gallons saved per year per household by upgrading to an efficiency washer
4 data source: *Handbook of Water Use and Conservation* by Amy Vickers

Table 6.8
Rebates Projected to be Paid

Planned	2011	2012	2013	2014	2015
$ per rebate	$100	$100	$100	$100	$100
Number of Rebates Paid	700	800	800	700	700
Actual Water Savings	10.9	12.4	12.4	12.4	12.4

6.1.7 Public Information Programs

Description of Program

The City has implemented a water conservation public information program since 1993 when a water conservation position was created and filled. The city has been active in this area, purchasing and providing educational materials, newspaper display ads and public information notices in Spring Home and Garden newspaper inserts, and TV-based water savings tips at Earth Day, during Water Awareness Month at offices and library displays (adult and child), and other events, such as Kaiser Hospital's Earth Day, and Public Works' Week. Financial support is provided annually for the Vallejo Downtown Earth Day event and the California Water Awareness Campaign.

Additional public outreach activities included:

- Distribution of Sunset Magazine's "Water & Energy Savings in the West," "How to Water Your Garden" and "Water-Wise Gardening for California" through utility offices, at community events and upon request.
- Water staff (administrative, billing, meter, maintenance) answered customers' questions on leaks and reducing water use.
- The City annually sponsors workshops, in partnership with the City of Benicia, on WaterWise Gardening. Each year since 2006, a series of four workshops have been offered two separate times. One series is offered in the City of Vallejo and the other in the City of Benicia. They are taught by educational consultants and Master Gardeners.
- Vallejowater.org – water conservation web page
- Two Project Wet teacher training workshops
- Partnerships with Loma Vista Farm, Vallejo Sanitation and Flood District, Valcore Recycling, East Bay Municipal District, City of Benicia, and PG&E

The City also participates in a regional public information program through the Solano County Water Agency's urban water conservation committee.

- Climate appropriate demonstration garden at Six Flags amusement park in Vallejo
- Water Conservation website solanosaveswater.org
- Advertising placed in local newspapers for waterwise gardening workshops

The tables below summarize the City's activities. The Solano County Water Agency's regional outreach efforts are summarized in the Solano County Water Agency UWMP.

Table 6.9
Public Information Activities

	2006 [2]	2007	2008	2009	2010
Media campaign (contacts)		-	-	153,069	141,391
Paid advertisements		4	6	-	-
Flyers, brochures or bill inserts distributed		0	32,290 [1]	1,000	1,000
General water conservation brochures		0	?	2,656	3,846
Website hits		?	?	730	630
Newspaper contacts		0	0	5	4
Articles resulting from outreach		0	0	0	1
News releases		0	2	0	0
Water Wise Gardening Workshop (attendees)		0	0	169	130
Speaker's bureau		3	5	0	0
Teacher Workshops (attendees)		?	?	7	49
Actual Water Savings	NQ	NQ	NQ	NQ	NQ

Footnotes:

NQ – Not quantifiable

1 Bill inserts were sent to all residential customers

2 The City did not track its public information activities in 2006.

Table 6.10
Public Information Activities

Planned	**2011**	**2012**	**2013**	**2014**	**2015**
Media campaign (contacts)	141,391	141,391	141,391	141,391	141,391
Flyers and brochures given	1,000	1,000	1,000	1,000	1,000
General water conservation	3,846	32,300	32,300	32,300	32,300
Website hits	750	750	750	750	750
Newspaper contacts	0	0	0	0	0
Articles resulting from outreach	0	0	0	0	0
News releases	1	1	1	1	1
Water Wise Gardening Workshop (attendees)	?	150	150	150	150
Speaker's bureau [1]	0	1	1	1	1
Teacher Workshops (attendees)	130	130	130	130	130
Actual Water Savings	NQ	NQ	NQ	NQ	NQ

Footnotes:

NQ – Not quantifiable

1 The City sends staff for speaking engagements upon request.

Methods for Effectiveness Evaluation, if any

6.1.8 School Education Programs

Description of Program

The City of Vallejo has its own school education and outreach program as well as participating in a regional program through the Solano County Water Agency's regional school education and outreach program. The City's program consists of in-classroom presentations, field trips, sponsoring teacher training workshops (outlined in the public information section, Section 6.1.7) and provision of educational materials.

The City participates in the implementation and planning of the regional program through the Solano County Urban Water Conservation Committee.

The regional program consists of:

- in-classroom presentations,
- a high school video contest,
- a bookmark art contest,
- assembly programs by professional presenters such as ZunZun, and
- provision of educational materials.

Methods for Effectiveness Evaluation, if any

Quizzes, tests, etc. for evaluation of whether the students are learning?

Table 6.11
School Materials and Programs Provided

	2006	2007 [1]	2008	2009	2010
Educational materials K-6	Yes	Yes	3,313	992	857
Educational materials 7-12	Yes	Yes	478	82	1,223
Classroom presentations	Yes	Yes	26	47	40
Students attended	unknown	unknown	3,791	1,074	919
School assemblies	0	0	?	23	0
Attendees at assemblies	0	0	?	4,060	0
Booth staffing at school events	0	0	0	2	1
Attendees	0	0	0	1,250	1,900
Field trips	0	0	0	0	10
Attendees on field trips	0	0	0	0	584
Actual Water Savings	NQ	NQ	NQ	NQ	NQ

Footnotes:

NQ – Not quantifiable

1 The City had a school program in 2006 and 2007 however, the number of students reached and items distributed were not tracked.

Table 6.12
School Materials and Programs Projected to be Provided

	2011	2012	2013	2014	2015
Educational materials K-6	900	900	900	900	900
Educational materials 7-12	1,200	1,200	1,200	1,200	1,200
Classroom presentations	40	40	40	40	40
Students attended	900	900	900	900	900
Booth staffing at school events	1	1	1	1	1
Attendees	500	500	500	500	500
Field trips	10	10	10	10	10

Table 6.12
School Materials and Programs Projected to be Provided

	2011	2012	2013	2014	2015
Attendees on field trips	1,900	1,900	1,900	1,900	1,900
Actual Water Savings	NQ	NQ	NQ	NQ	NQ

Notes:
NQ – Not quantifiable

6.1.9 Conservation Programs for Commercial, Industrial and Institutional Customers

Description of Program

Previously, this DMM required a variety of water conservation activities, but focused on conducting water audits (surveys) of a specific percentage of CII customer sites. Cost effectiveness studies conducted by Maddaus Water Management indicated that full implementation of the DMM was not justified, with a calculated benefit-cost ratio of 0.44 from the City's perspective. Therefore the City exempted itself from full implementation.

The City has participated in regional programs through the Solano County Water Agency.

- In FY2004/2005 and early FY2005/2006 the City participated in the Pre-Rinse Spray Valve Installation program through SCWA and the CUWCC. The program provided direct site visit and installation at participating restaurants.

The City joined with the regional Solano County Water Agency CII survey program which began in 2007. This program offered CII accounts a free water survey to determine the efficiency of their existing facility. Typically, the audits included irrigation system audits as well as audits of indoor water fixtures and appliances. (The number of irrigation surveys is tracked above under the landscape DMM section.

During the surveys, surveyors install faucet aerators and high efficiency showerheads, ensuring immediate water savings. Initially, pre-rinse spray valves were installed as well, however, because of the previous efforts by PG&E and other local programs, it was found that most restaurants had already had their pre-rinse spray valves retrofitted to efficiency models. After each survey was completed, a report was generated and provided to the customer, which included an inventory of water using fixtures and appliances, recommendations for improving water efficiency at the site, and estimated water savings to be realized from implementing those recommendations.

Those sites which were found to have pre-1992 toilets were then offered participation in the direct installation program of high-efficiency toilets and high-efficiency urinals.

The CUWCC revised its BMP requirements in 2008. The CII BMP requirements shifted from an emphasis on conducting surveys, to an emphasis on implementing water savings measures as is appropriate for each agency.

The Solano County urban water conservation committee developed a "Water Savings Incentive Program." This is a program designed to assist CII customers with assistance in upgrading fixtures, appliances, and irrigation systems for greater efficiency. The assistance comes in the form of rebates for equipment and appliances. This program is an addition to the HET, HEU, and weather-based irrigation controller rebate programs. The key element of the Water Savings Incentive Program is flexibility. Rather than being limited

to the specific items typically rebated, such as toilets, urinals, or irrigation controllers, a water customer can apply for rebates for equipment based on specific site conditions. Copies of the "Water Savings Incentive Program" terms and conditions and application are presented in Appendix x.

At the outset of the program, the committee chose to focus its outreach efforts on schools, parks and other public properties, though commercial accounts could also participate.

Challenges

The challenge facing the implementation of the program is that, given that the rebates apply to parts and equipment only, and not to labor, participation has been limited. Though outreach has been conducted to schools and other public facilities in the City's service area, the requirement that the participating water customer provide or pay for the involved labor has been a limiting factor.

Meanwhile, the survey program continues. A summary of number of surveys and water savings devices installed is presented in table 6.13 below.

Table 6.13
CII Surveys Completed

Planned	2006	2007	2008	2009	2010
No. of surveys completed	0	22	12	4	3
Aerators installed	0	54	51	84	87
Showerheads installed	0	0	0	7	50
HETs (direct installation)	0	?	18	206	79
Rebates through water savings incentive program	-	-	0	0	0
Follow-up surveys completed	3	0	0	0	0
Follow up calls	0	0	1	0	10
Actual water savings	unknown	unknown	unknown	unknown	unknown

Note: Landscape surveys completed at CII facilities are reported above in Section x.x.
In 2008, two pre-rinse spray valves were installed during a survey.

Table 6.14
CII Surveys Projected to be Completed

Planned	2011	2012	2013	2014	2015
No. of surveys completed	1	4	4	4	4
Aerators installed	22	85	85	85	85
Showerheads installed	7	40	40	40	40
HETs	?	100	100	100	100
Rebates through water savings incentive program	0	1	1	1	1
Follow-up surveys completed	0	1	1	1	1
Follow-up calls completed	1	4	4	4	4
Projected Water Savings	unknown	unknown	unknown	unknown	unknown

6.1.10 Wholesale Agency Programs

Description of Program

The City of Vallejo is a wholesale water supplier to the Cities of American Canyon and Benicia, but does not provide a Wholesale Agency Assistance Program since each of the cities has prepared an Urban Water Management Plan and is running its own water conservation program. In addition, the City operates the

Travis (Air Force Base) Water Treatment Plant on behalf of the U.S. Air Force, but has no responsibility for the distribution system and no influence over end users on the base. However, if there is interest on the part of base personnel, City staff is willing to work with them to acquire public information materials.

Staff also works with the Solano County Water Agency, the regional wholesaler. The City contributes funds for SCWA, and reimburses some of the joint program expenditures on a proportional basis.

6.1.11 Conservation Pricing

Description of Program

This DMM is complete. The City undertook a rate study in 1999 which considered uniform, inclining block, and seasonal rates. The current rate structure, effective May 1, 2000, has an inclining block rate structure for single-family residential water usage and a uniform water rate per hundred cubic foot for multi-family residential and non-residential usage. All customers pay a fixed fee service charge. Fixed portion of bills dropped and variable water use charges were increased, providing more incentive to save.

An inclining block rate structure is considered a conserving rate providing a negative pricing signal since each unit of water consumed beyond the first tier rate allotment carries an additional incremental cost.

Methods for Effectiveness Evaluation, if any

Estimate of existing conservation savings, if any

Table 6.15
Inclining Block Rate Structure

SECTION 7 Rate Structure	
SECTION 8 Residential	SECTION 9 Increasing block
SECTION 10 Commercial	SECTION 11 Uniform
SECTION 12 Industrial	SECTION 13 Uniform
SECTION 14 Institutional/ Government	SECTION 15 Uniform
SECTION 14 Irrigation	SECTION 15 Uniform

6.1.12 Water Conservation Coordinator

Description of Program

Vallejo has a water conservation coordinator who spends an average of 30% - 40% time on water conservation. This position was opened in 1993. An analyst position, which provides staff support to the Water Conservation Coordinator in addition to other duties, was filled for at the end of 2005 and continues to be filled full-time. A student intern is periodically assigned to the water conservation program to assist with various program duties. The student intern position is funded by the Solano County Water Agency.

The Water Conservation Coordinator, Pamela Sahin, can be reached at (707) 648-4479 (telephone), (707) 648-4060 (fax), or E-mail waterinfo@ci.vallejo.ca.us.

The coordinator develops and manages the conservation program and DMM implementation. The coordinator is also responsible for preparing and submitting an annual implementation status report to the U.S. Bureau of Reclamation. Other duties of the coordinator include: communication and promoting water conservation issues; coordinating City conservation programs with other City divisions; preparing annual and multi-year water conservation budgets; monitoring program impacts and recommending

improvements. The Conservation Coordinator is responsible for training support staff and managing the efforts of any consultants/contractors engaged to implement conservation measures.

The position also coordinates preparation of UWMP and WMP updates for adoption by the City Council and submittal to the California Department of Water Resources and the U.S. Bureau of Reclamation, respectively.

A generalized budget allocation for the WC Coordinator will allow for the use of consultants to help plan and implement specialized activities and measures.

The City plans to maintain the current level of water conservation coordinator staffing into the next five-year time period.

16.1.13 Water Waste Prohibition

Description of Program

The City's City Council adopted a water waste prohibition ordinance on March 7, 2006. A copy of the water waste prohibition ordinance [Ord. No. 1567 N.C. (2d)] is presented is included in Appendix ? The water waste prohibition ordinance was developed according to the guidelines of DMM #13. The ordinance allows for City staff to respond to complaints of water waste, or to observed water waste, by contacting the customer. In response to observed water waste, City staff may call, visit, or call water wasting customers to inform them of their wasteful activity and request that the activity be corrected. City staff maintains a log of advisories and actions taken. This ordinance is enforced at all times, rather than only during water shortages.

Prohibitions include:

- Gutter flooding
- Single-pass cooling systems for new connections
- Non-recirculating systems in all new conveyor or car wash systems
- Use of hose for washing without a nozzle

Methods for Effectiveness Evaluation, if any

Follow-up visits are made to assess whether the water wasting activity has ceased. Notices are tracked for repeat "offenders."

Estimate of existing conservation savings, if any

Any water savings measured?

Table 6.16
Water Waste Prohibition Activity 2006-2010

Actual	2006	2007	2008	2009	2010
Waste Ordinance in effect?	yes	yes	yes	yes	yes
No. of contacts	?	?	?	3	8
High water use doorhangers placed	?	?	?		50
Water savings in AFY	unknown	unknown	unknown	unknown	unknown

Table 6.17
Water Waste Prohibition Activity 2011-2015

Planned	2011	2012	2013	2014	2015
Waste Ordinance in effect?	yes	yes	yes	yes	yes
No. of contacts	As needed	As needed	As needed	As needed	As needed
High water use doorhangers placed	As needed	As needed	As needed	As needed	As needed
Water savings in AFY	unknown	unknown	unknown	unknown	unknown

6.1.14 Residential Ultra-low-flush Toilet Programs

Description of Program

A cost-benefit analysis done in 2005 demonstrated that an ultra low flow toilet rebate program would not be cost-effective for Vallejo. However, the City is participating in a regional high-efficiency toilet retrofit program. This HET program is managed by the Solano County Water Agency.

Methods for Effectiveness Evaluation, if any

The City tracks the number of toilets rebated in its service area. No other effectiveness evaluations have been conducted at this time.

Estimate of existing conservation savings, if any

It is estimated that the number of rebates will increase in the years 2012 and 2013 due to the City's participation in the Integrated Regional Water Management Plan (IRWMP) water conservation program. This is a two-year program funded by a Proposition 84 grant.

Water savings estimates included in the table below assume a 10.1 gpcd savings per toilet replaced in a single-family home. This is based on findings of the EBMUD July 2003 "Residential Indoor Water Conservation Study."

Table 6.18
Residential Toilet Program Summary 2006-2010

Actual	2006	2007	2008	2009	2010
No. of ULFT / HET rebates	0	1	31	34	89
Amount of Rebates	0	$125	$125	$125	$125
Estimated water savings -AFY	0	.03	1	1.1	2.9

Table 6.19
Residential Toilet Program Summary 2011-2015

Planned	Rebates Planned				
	2011	2012	2013	2014	2015
No. of ULFT / HET rebates	90	120	120	90	90
Amount of Rebates	$125	$125	$125	$125	$125
Estimated water savings -AFY	2.9	3.9	3.9	2.9	2.9

6.2 Estimated Water Savings

The City has conducted limited water conservation savings evaluations. Periodically, the City will select water accounts having received rebates and/ or site surveys and review their water use for at least a year before and after participation in the water conservation program.

The City anticipates that tracking the gpcd usage, particularly of the residential sector, will be a useful measure of the effectiveness of the City's and the region's water conservation programs.

6.3 Demand Management Measures not Implemented

Evaluation: see the Guidebook for details

Cost benefit analysis of total costs and total benefits

The City is only required to implement those measures that are found to be cost-effective (those with a benefit-cost ratio greater than 1.0). The measures that are not fully implemented are not cost effective. However, all of the DMMs are implemented at least in part, whether directly by the City or as a member of a regional water conservation program.

In May 2005, Maddaus Water Management prepared cost-benefit calculations, more specifically benefit-to-cost ratios, for most of the DMMs. The results showed that the programs would cost more than the value of the City's avoided water procurement and operational costs associated with the water savings. From the agency perspective, many of the DMMs are not cost-effective. This is primarily due to the pricing structure of the City's relatively inexpensive water supplies, with large flat costs irrespective of actual usage. Those conditions have not significantly changed since that time. However, the City does incur significant pumping costs to convey raw water into the City and distribute treated water. The rising cost of electricity and natural gas could eventually tip the scale.

Appendix A
Public Involvement Documents

Appendix A.1
60-Day Notice to Agencies

CITY OF VALLEJO

Water Division

202 FLEMING HILL ROAD • VALLEJO • CALIFORNIA • 94589-2337 • (707) 648-4307
website: www.ci.vallejo.ca.us FAX (707) 648-4060

December 28, 2011

Re: 60-Day Notice of Review and Update to the 2005 Urban Water Management Plan

The City of Vallejo is currently reviewing and updating its Urban Water Management Plan (UWMP), as required by law. The UWMP will provide and analysis of projected water demand and supply over the next 25 years, as well as an updated water conservation plan. It is anticipated that the Draft UWMP will be released in February 2012.

If you are interested in providing input during the preparation of the UWMP, please contact me at (707) 648-4479 or by email to waterinfo@ci.vallejo.ca.us.

Sincerely,

Pamela Sahin

Pamela Sahin
Water Conservation Coordinator

Printed on Recycled Paper

Distribution list

Agency/Company	Contact Name	Address
Solano County Water Agency	David Okita, General Manager	dokita@scwa2.com
City of Benicia	Charlie Knox, Public Works and Community Development Dir.	cknox@ci.benicia.ca.us
City of Fairfield	Felix Riesenberg, Asst. Public Works Director/Utilities	friesenberg@fairfield.ca.gov
City of Vacaville	Rod Moresco, Public Works Director	rmoresco@cityofvacaville.com
City of Rio Vista	Dave Melilli, Public Works Director	One Main Street Rio Vista, CA 94571
City of Dixon	Morris Barr, Interim Public Works Director	mbarr@ci.dixon.ca.us
County of Solano	Planning Services Division	675 Texas Street, Suite 5500 Fairfield, CA 94533; mwalsh@solanocounty.com Solano360@solanocounty.com
Solano Irrigation District	District Office	810 Vaca Valley Parkway, Suite 201 Vacaville, CA 95688 dmansfield@SIDwater.org
Suisun Solano Water Authority	Dan Kasperson, Building and Public Works Director	publicworks@suisun.com
City of American Canyon	Michael Throne, Public Works Director	mthrone@cityofamerican.org
Travis Air Force Base	James Christensen	James.Christensen.5@us.af.mil
County of Napa	Don Ridenhour Phillip Miller	don.ridenhour@countyofnapa.org phillip.miller@countyofnapa.org
Vallejo Sanitation and Flood Control District	Ron Matheson, District Manager	rmatheson@vsfcd.com
Greater Vallejo Recreation District	Shane McAffee, General Manager	smcaffee@gvrd.org

Appendix A.2

Public Notice - Newspaper Advertisements

To: Vallejo Times-Herald

Re: 60-Day Notice of Review and Update to the 2005 Urban Water Management Plan

The City of Vallejo is currently reviewing and updating its Urban Water Management Plan (UWMP), as required by law. The UWMP will provide and analysis of projected water demand and supply over the next 25 years, as well as an updated water conservation plan. It is anticipated that the Draft UWMP will be released in February 2012. If you are interested in providing input during the preparation of the UWMP, please contact me at (707) 648-4479 or by email to waterinfo@ci.vallejo.ca.us.

Advertisement Date: 11-10-2011

Appendix A.3
Public Hearing Notices

To be provided with Draft UWMP

Appendix A.4

Notice of Draft UWMP Availability

To be provided with Draft UWMP

Appendix A.5
Resolution of Adoption

To be provided with Draft UWMP

Appendix A.6

Transmittal Letter for Final UWMP

To be provided with Draft UWMP

Appendix B
Population Projections Worksheet

Projections for Vallejo Water Service Area

Rev. 2/21/12

Existing and Projected Population for City of Vallejo (GP/ABAG)

	2000 [1]	2005 [2]	2010	2015	2020	2025	2030	2035
Population (Census) [3]	116,760	116,351	115,642	115,642	115,642	115,642	115,642	115,642
Housing Element [6]				4,510	4,510	4,510	4,510	4,510
Jobs								
Vallejo Downtown & Waterfront PDA [4]				4,165	4,165	4,165	4,165	4,165
Solano 360 [5]					0	0	0	0
Population (City)	116,760	116,351	115,642	124,317	124,317	124,317	124,317	124,317

Notes:

1. DOF data.
2. ABAG is Association of Bay Area Governments, Projections 2009.
3. Census is Department of Finance, 2010.
4. Downtown & Waterfront PDA poopulation projections from ABAG 2009, pushed forward 5 years due to current economic climate.
5. Due to uncertanties in the EIR process, will consider this to be zero for now. Pam Sahin agreed.
6. Estimate is 1.3% annual growth from 2011-2014 (3 years of growth); assume "flat" after 2014.

Existing and Projected Population for Outside-City Area

Lakes Customers:	2000 [1]	2005 [2]	2010 [2]	2015 [5]	2020	2025	2030	2035
Single Family accounts	800	825	825	825	825	825	825	825
PPHH (SF and MF) [3]	2.88	2.88	2.88	2.88	2.88	2.88	2.88	2.88
Jobs [4]	0	0	0	0	0	0	0	0
Population (Lakes)	2,304	2,376	2,376	2,376	2,376	2,376	2,376	2,376

Notes:

1. Data for 2000 from 2005 UWMP, Table 2-3. Assume number of single family units means total single and multi-family units (based on number of billing accounts for both SF and MF accounts).
2. Data for 2005 from 2005 UWMP, Table 2-3. Assume buildout in Lakes System from 2005 through 2035.
3. U.S. Census "Quickfacts" for Solano County; this is average for residential (use for both SF and MF); small portion in Napa County but use Solano County figure for all customers.
4. All residential customers; no commercial or industrial.
5. Full buildout; assume no change in population 2015 through 2035.

Existing and Projected Population for Vallejo Water Service Area

	2000	2005	2010	2015	2020	2025	2030	2035
City limits	116,760	116,351	115,642	124,317	124,317	124,317	124,317	124,317
Vallejo Unincorporated [1]	576	576	576	576	576	576	576	576
Lakes Customers	2,304	2,376	2,376	2,376	2,376	2,376	2,376	2,376
Population - Total	119,640	119,303	118,594	127,269	127,269	127,269	127,269	127,269

Notes:

1. Includes unincorporated infill: Home Acres, Sandy Beach, Trailer City MHP, Starr Subdivision. Population estimated at 200 residential customers @2.88 PPHH; assumes no growth in customers since all built out.

Appendix C
Demand Projections Methodology

Vallejo 2010 UWMP
Methodology for Water Demand Projections

Water Demand Projections (ac-ft/yr)

Water use sectors	2005 (actual)	2010	2015	2020	2025	2030	2035
Single Family	9,478	9,422	10,111	10,248	10,384	10,521	10,658
Multi-family	2,586	2,571	2,759	2,796	2,833	2,871	2,908
Commercial/Inst	2,491	2,476	2,657	2,693	2,729	2,765	2,801
Irrigation potable	1,742	1,732	1,858	1,883	1,909	1,934	1,959
Irrigation raw	248	247	265	268	272	275	279
Other	93	285	306	310	314	318	322
Total	16,638	16,732	17,956	18,199	18,441	18,684	18,927

Table Notes:

1. Use actual water deliveries for 2005 as basis for future years' projections except for "other" water use sector. Future years projections are calculated based on growth rate increases.

2. For "other" water for fire systems and construction water; use 2010 actual delivery for basis for future years for this sector only; all other water sectors use 2005 basis (see Note 1 above).

Projected Number of Accounts

Water use sectors	2005 (actual)	2010	2015	2020	2025	2030	2035
Single Family	32,331	32,139	34,490	34,956	35,423	35,890	36,356
Multi-family	2,169	2,156	2,314	2,345	2,376	2,408	2,439
Commercial/Inst	1,912	1,901	2,040	2,067	2,095	2,122	2,150
Irrigation potable	503	500	537	544	551	558	566
Irrigation raw	1	1	1	1	1	1	1
Other	746	395	424	430	435	441	447
Total	37,662	37,092	39,805	40,343	40,882	41,421	41,959

Table Notes:

1. Use actual number of accounts for 2005 as basis for future years' projections except for "other" water use sector. Future years projected number of accounts are calculated based on growth rate increases.

2. For "other" water for fire systems and construction water; use 2010 actual number of accounts for basis for future years for this sector only; all other water sectors use 2005 basis (see Note 1 above).

Service Area Population

	2005 (actual)	2010 (actual)	2015	2020	2025	2030	2035
Service Area Population	119,303	118,594	127,269	128,991	130,713	132,435	134,157
5-yr Growth Rate		-0.59%	7.31%	1.35%	1.33%	1.32%	1.30%

Table Notes:

1. See Table 2.2 for 2005 population.

2. See Table 2.4 (DWR Table 2) for 2010-2035 populations.

General Notes:

1. Methodology is generally described as follows:
For future water demands, use 2005 basis for future projections by multiplying growth rate to each sector (except for "other" sector). For projected number of accounts, use 2005 basis and multiply by growth rate to obtain projected number of accounts (except for "other" sector).

2. 2005 was year selected for basis for projections because this year is considered "normal" water year and not subject to water use fluctuations due to the economic downturn.

3. "Other" water sector figures for 2005 deliveries and number of accounts was not used for basis (2010 basis for this sector used in projections) because the 2005 data appeared to be an anomaly.

Appendix D
SCWA Memorandum Pertaining to Reliability Data

SOLANO COUNTY WATER AGENCY

MEMORANDUM

TO: City/District Urban Agencies

FROM: David B. Okita, General Manager

DATE: August 10, 2010

SUBJECT: UWMP Reliability Data(Revised for SWP-prior memo is dated 6/10/10 – Solano Project data unchanged)

Attached are new tables that SCWA will be using in our 2011UWMP for SWP and Solano Project supplies. Note that the SWP Reliability Report is in draft form and could be revised – so my SWP table may change.

DWR guidelines are not out yet, but last time, UWMP's require data for Normal Year, Single Dry Year and Multiple Dry Years. These terms are not defined in the law and are subject to local interpretation. In 2005 we discussed using common assumptions, but not every agency wanted to conform – and there was no requirement to do so. Note that for single dry year, DWR has recommended using the driest of years – like 1977. We disagree with that interpretation and thus use the average of single dry years and the first year or multiple dry years. We also define multiple dry years as three or more consecutive dry years. I think we all understand that the requirements in State law for UWMP are not necessarily the data we would use to analyze our local water supply reliability. The requirements probably originated by a legislative staffer who has little understanding about local water supply planning. Nevertheless, these are the requirements we must live with. The method SCWA plans to use for our UWMP is the same we used in 2005.

Note that the averages may not be what you intuitively would expect. In the big scheme of things, there is really a short history of data to rely upon. This can skew the averages.

State Water Project

For SWP we identify the year type (Normal and Dry) based on the Sacramento Valley Index (SVI). SVI uses terms Above Normal and Below Normal. I combine them to be Normal. I also combine Dry and Critically Dry to be Dry. Wet is Wet. The Draft 2009 SWP Reliability Report is the basis for water supply numbers. This year they did an analysis customized for each contractor –

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Elmira, California 95625-0349
Phone (707) 451-6090 • FAX (707) 451-6099
www.scwa2.com

SOLANO WATER
WASTE NOT WANT NOT

accessible on their web page – not in the printed report. The individual contractor data, this year, are based on a model that makes some assumption of carryover supplies. Carryover from prior years is added to the current year supply for annual allocations of Table A. Also DWR has provided data on Article 21 water for NBA contractors. Carryover and Article 21 supplies need to be explained help understand how these supplies may be incorporated in a water supply analysis in Solano County.

There are also other significant changes from the data provided for the 2005 UWMP's. The 2009 model includes South Delta pumping restrictions based on the Biological Opinions for Delta smelt and salmon. Some of these restrictions have been reduced since the publishing of the draft Reliability Report, but the future is uncertain as to how the restriction may change in the future. The 2009 data also includes different climate change impacts for the 2029 scenario that reduce supplies.

The addition of carryover supplies from prior years has a major impact on NBA supplies. Attached is the data for SCWA provided by DWR. In many years carryover makes a large amount of the overall supply. Note that the 2029 scenario assumes no carryover because they assume that demand will increase such that all Table A is used each year – that may or may not be the case for us. To determine carryover amounts, DWR first calculated carryover demand then calculated carryover supply. If there is carryover demand and there is carryover supply then carryover is allocated. Carryover demand is based on our annual schedules that we submit to DWR – they used 2004-2007 data. Our schedules show requests based on 100%, 50% and 30% allocation. For a 100% allocation DWR assumes our carryover demand is 23,700 AF/YR. For a 50% and 30% allocation DWR assumes our carryover demand is 8,400 AF/YR. For carryover supply they assumed that for different levels of final Table A allocation, a percentage of carryover demand is the carryover supply. For allocation less than 45% carryover supply is 30% carryover demand. For allocation between 45%-65% carryover supply is 50% carryover demand. For allocation greater than 65% carryover supply is 100% carryover demand. This is hard to figure out, but I think the logic behind this goes something like this: If the allocation for the year is low, that means that the prior year allocation was also probably low, so that the carryover supply is lower too. The weakness of this approach is that the carryover demand is based on our 2004-2007 schedules. We are currently in a mode where we carryover a relatively large amount of Table A, thus the DWR model assumes a relatively large carryover demand that results in a relatively large carryover supply. A potential problem is that if there is a large carryover supply assumed, this requires Table A deliveries to be depressed because carryover is generated from prior year reduced Table A. The bottom line is that over the 1922-2003 analysis period, the average total SWP deliveries may be OK, but when you analyze a single year or short groups of years, the supply may be skewed due to the carryover assumptions that, for example, may mask a short supply year.

Article 21 water for the NBA is not included in these figures. This is a major omission as this is a big part of our SWP supply. Currently we can get Article 21 whenever the Delta is in excess conditions, but our use of Article 21 water is highly variable and dependent on a number of factors that would be virtually impossible to model. New for the 2009 study, DWR has modeled NBA Article 21 separately from other contractors. They have modeled the availability of Article 21 when the Delta is in excess conditions and assumed that the maximum SCWA Article 21 delivery is 1,000 AF/month. I have the monthly data they used, but it does not reflect reality, so I do not think it is of much use. Our UWMPs will need to qualitatively describe Article 21 water, as well as other supplies we get through the NBA.

Solano Project

For Solano Project we have used allocation numbers from the 2009 update of the reliability study we sent to Solano Project users in 2009 – memo from me dated November 23, 2009. In the 2005 data we used the SVI as our year type designation. For the 2009 study we used Lake Berryessa inflow data to develop our own index. The development of Dry and Normal year designations are somewhat arbitrary. We used the 66th and 35th percentile to make the designations to conform to the SVI designations. There is not much of a change for the Solano Project reliability from the 2005 to the 2009 data.

If you have any questions please contact me at 455-1103 or by e-mail at dokita@scwa2.com.

A-2 UWMP.mem

File A-2; S-17; N-16C

Appendix B State Water Project Reliability

DWR Study 2009 data - SCWA Specific

Sacramento Valley Index

Value	Year Type
W	Wet
N	Below Normal
N	Above Normal
D	Dry
D	Critically Dry

Year	Sacramento Valley Index	% Full Table A	% Full Table A for Normal Year (N)	% Full Table A for Single Dry Year (D) *	% Full Table A for Multiple Dry Year (3 or more Dry years)
1922	N	0.37	0.37		
1923	N	0.84	0.84		
1924	D	0.26		0.26	0.26
1925	D	0.39			0.39
1926	D	0.49			0.49
1927	W	0.46			
1928	N	0.86	0.86		
1929	D	0.31		0.31	0.31
1930	D	0.36			0.36
1931	D	0.22			0.22
1932	D	0.35			0.35
1933	D	0.35			0.35
1934	D	0.24			0.24
1935	N	0.43	0.43		
1936	N	0.71	0.71		
1937	N	0.66	0.66		
1938	W	0.77			
1939	D	0.96		0.96	
1940	N	0.60	0.60		
1941	W	0.59			
1942	W	0.83			
1943	W	0.77			
1944	D	0.75		0.75	
1945	N	0.44	0.44		
1946	N	0.74	0.74		
1947	D	0.74		0.74	
1948	N	0.65	0.65		
1949	D	0.58		0.58	
1950	N	0.50	0.50		
1951	N	0.43	0.43		
1952	W	0.86			
1953	W	0.89			
1954	N	0.69	0.69		
1955	D	0.51		0.51	
1956	W	0.48			

1957	N	0.82	0.82		
1958	W	0.58			
1959	N	0.83	0.83		
1960	D	0.52		0.52	
1961	D	0.49			
1962	N	0.70	0.70		
1963	W	0.46			
1964	D	0.81		0.81	
1965	W	0.54			
1966	N	0.83	0.83		
1967	W	0.55			
1968	N	0.83	0.83		
1969	W	0.66			
1970	W	0.58			
1971	W	0.83			
1972	N	0.58	0.58		
1973	N	0.45	0.45		
1974	W	0.78			
1975	W	0.79			
1976	D	0.81		0.81	
1977	D	0.14			
1978	N	0.45	0.45		
1979	N	0.65	0.65		
1980	N	0.60	0.60		
1981	D	0.84		0.84	
1982	W	0.57			
1983	W	0.64			
1984	W	0.53			
1985	D	0.77		0.77	
1986	W	0.67			
1987	D	0.55		0.55	0.55
1988	D	0.24			0.24
1989	D	0.38			0.38
1990	D	0.42			0.42
1991	D	0.20			0.20
1992	D	0.20			0.20
1993	N	0.43	0.43		
1994	D	0.67		0.67	
1995	W	0.54			
1996	W	0.85			
1997	W	0.75			
1998	W	0.91			
1999	W	0.60			
2000	W	0.86			
2001	D	0.37		0.37	
2002	D	0.42			
2003	N	0.79	0.79		
	Average	0.59	0.64	0.63	0.33

*Includes first year of consecutive dry years

Appendix B State Water Project Reliability

DWR Study 2029 data - SCWA Specific

Sacramento Valley Index

Value	Year Type
W	Wet
N	Below Normal
N	Above Normal
D	Dry
D	Critically Dry

Year	Sacramento Valley Index	% Full Table A	% Full Table A for Normal Year (N)	% Full Table A for Single Dry Year (D) *	% Full Table A for Multiple Dry Year (3 or more Dry years)
1922	N	0.64	0.64		
1923	N	0.61	0.61		
1924	D	0.20		0.20	0.20
1925	D	0.42			0.42
1926	D	0.52			0.52
1927	W	0.72			
1928	N	0.64	0.64		
1929	D	0.28		0.28	0.28
1930	D	0.41			0.41
1931	D	0.15			0.15
1932	D	0.39			0.39
1933	D	0.39			0.39
1934	D	0.27			0.27
1935	N	0.57	0.57		
1936	N	0.66	0.66		
1937	N	0.81	0.81		
1938	W	1.00			
1939	D	0.43		0.43	
1940	N	0.63	0.63		
1941	W	0.75			
1942	W	0.64			
1943	W	0.74			
1944	D	0.47		0.47	
1945	N	0.75	0.75		
1946	N	0.59	0.59		
1947	D	0.48		0.48	
1948	N	0.58	0.58		
1949	D	0.56		0.56	
1950	N	0.59	0.59		
1951	N	0.74	0.74		
1952	W	0.82			
1953	W	0.57			
1954	N	0.58	0.58		

1955	D	0.43		0.43	
1956	W	0.82			
1957	N	0.54	0.54		
1958	W	0.92			
1959	N	0.44	0.44		
1960	D	0.47		0.47	
1961	D	0.46			
1962	N	0.66	0.66		
1963	W	0.58			
1964	D	0.64		0.64	
1965	W	0.67			
1966	N	0.62	0.62		
1967	W	0.81			
1968	N	0.55	0.55		
1969	W	1.00			
1970	W	0.69			
1971	W	0.59			
1972	N	0.57	0.57		
1973	N	0.66	0.66		
1974	W	0.74			
1975	W	0.69			
1976	D	0.62		0.62	
1977	D	0.09			
1978	N	0.78	0.78		
1979	N	0.68	0.68		
1980	N	0.83	0.83		
1981	D	0.57		0.57	
1982	W	0.95			
1983	W	1.00			
1984	W	0.77			
1985	D	0.68		0.68	
1986	W	0.79			
1987	D	0.23		0.23	0.23
1988	D	0.30			0.30
1989	D	0.49			0.49
1990	D	0.19			0.19
1991	D	0.22			0.22
1992	D	0.18			0.18
1993	N	0.66	0.66		
1994	D	0.57		0.57	
1995	W	0.85			
1996	W	0.66			
1997	W	0.81			
1998	W	0.83			
1999	W	0.71			
2000	W	0.65			
2001	D	0.30		0.30	
2002	D	0.67			
2003	N	0.58	0.58		
	Average	0.60	0.64	0.46	0.31

*Includes first year of consecutive dry years

Solano County WA

SWP Table A Deliveries for 2009 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1922	17.5	0.0	17.5	37%	1939	45.8	0%	96%
1923	22.9	17.4	40.3	84%	1998	43.4	1%	91%
1924	7.2	5.4	12.6	26%	1953	42.4	2%	89%
1925	18.0	0.7	18.7	39%	1928	41.0	4%	86%
1926	19.7	3.8	23.5	49%	1952	40.9	5%	86%
1927	18.2	3.6	21.8	46%	2000	40.9	6%	86%
1928	22.8	18.1	41.0	86%	1996	40.8	7%	85%
1929	9.9	4.9	14.9	31%	1923	40.3	9%	84%
1930	15.0	2.1	17.0	36%	1981	40.1	10%	84%
1931	7.4	3.0	10.5	22%	1971	39.9	11%	83%
1932	14.8	2.1	16.9	35%	1942	39.7	12%	83%
1933	15.1	1.4	16.5	35%	1968	39.7	14%	83%
1934	8.2	3.0	11.3	24%	1966	39.4	15%	83%
1935	18.3	2.2	20.5	43%	1959	39.4	16%	83%
1936	20.2	13.6	33.8	71%	1957	39.3	17%	82%
1937	21.1	10.3	31.3	66%	1964	38.8	19%	81%
1938	23.7	13.2	36.9	77%	1976	38.7	20%	81%
1939	22.1	23.7	45.8	96%	2003	37.9	21%	79%
1940	21.9	7.0	28.9	60%	1975	37.6	22%	79%
1941	20.8	7.3	28.1	59%	1974	37.2	23%	78%
1942	19.0	20.8	39.7	83%	1985	36.9	25%	77%
1943	18.9	17.9	36.7	77%	1938	36.9	26%	77%
1944	18.5	17.5	36.0	75%	1943	36.7	27%	77%
1945	17.7	3.4	21.1	44%	1944	36.0	28%	75%
1946	17.7	17.7	35.4	74%	1997	35.8	30%	75%
1947	20.9	14.6	35.4	74%	1947	35.4	31%	74%
1948	21.6	9.2	30.8	65%	1946	35.4	32%	74%
1949	22.9	4.7	27.6	58%	1936	33.8	33%	71%
1950	20.8	5.5	26.3	55%	1962	33.5	35%	70%
1951	18.3	2.0	20.3	43%	1954	33.2	36%	69%
1952	22.7	18.3	40.9	86%	1986	31.9	37%	67%
1953	19.8	22.6	42.4	89%	1994	31.8	38%	67%
1954	22.1	11.1	33.2	69%	1969	31.7	40%	66%
1955	19.7	4.8	24.5	51%	1937	31.3	41%	66%
1956	20.8	1.9	22.7	48%	1979	31.0	42%	65%
1957	18.6	20.7	39.3	82%	1948	30.8	43%	65%
1958	23.7	3.9	27.7	58%	1983	30.7	44%	64%
1959	18.9	20.5	39.4	83%	1940	28.9	46%	60%

Solano County WA

SWP Table A Deliveries for 2009 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1960	21.0	4.0	25.0	52%	1999	28.7	47%	60%
1961	19.1	4.5	23.6	49%	1980	28.4	48%	60%
1962	21.3	12.2	33.5	70%	1941	28.1	49%	59%
1963	17.3	4.6	21.9	46%	1970	27.9	51%	58%
1964	21.5	17.3	38.8	81%	1958	27.7	52%	58%
1965	17.7	8.1	25.8	54%	1949	27.6	53%	58%
1966	21.8	17.7	39.4	83%	1972	27.5	54%	58%
1967	18.9	7.6	26.5	55%	1982	27.2	56%	57%
1968	20.8	18.9	39.7	83%	1967	26.5	57%	55%
1969	23.7	7.9	31.7	66%	1987	26.3	58%	55%
1970	18.3	9.5	27.9	58%	1950	26.3	59%	55%
1971	21.6	18.3	39.9	83%	1965	25.8	60%	54%
1972	22.9	4.7	27.5	58%	1995	25.8	62%	54%
1973	16.6	4.9	21.6	45%	1984	25.3	63%	53%
1974	20.6	16.6	37.2	78%	1960	25.0	64%	52%
1975	17.0	20.6	37.6	79%	1955	24.5	65%	51%
1976	21.7	17.0	38.7	81%	1961	23.6	67%	49%
1977	2.1	4.7	6.8	14%	1926	23.5	68%	49%
1978	21.0	0.5	21.5	45%	1956	22.7	69%	48%
1979	18.3	12.7	31.0	65%	1963	21.9	70%	46%
1980	21.7	6.7	28.4	60%	1927	21.8	72%	46%
1981	19.0	21.1	40.1	84%	1973	21.6	73%	45%
1982	23.7	3.5	27.2	57%	1978	21.5	74%	45%
1983	23.7	7.0	30.7	64%	1945	21.1	75%	44%
1984	18.4	6.9	25.3	53%	1993	20.7	77%	43%
1985	18.6	18.3	36.9	77%	1935	20.5	78%	43%
1986	20.6	11.3	31.9	67%	1951	20.3	79%	43%
1987	14.7	11.6	26.3	55%	2002	20.2	80%	42%
1988	8.4	3.0	11.3	24%	1990	20.0	81%	42%
1989	16.5	1.6	18.2	38%	1925	18.7	83%	39%
1990	8.1	11.9	20.0	42%	1989	18.2	84%	38%
1991	8.4	1.4	9.8	20%	2001	17.6	85%	37%
1992	7.8	2.0	9.8	20%	1922	17.5	86%	37%
1993	18.9	1.9	20.7	43%	1930	17.0	88%	36%
1994	18.2	13.6	31.8	67%	1932	16.9	89%	35%
1995	21.8	3.9	25.8	54%	1933	16.5	90%	35%
1996	19.0	21.8	40.8	85%	1929	14.9	91%	31%
1997	20.6	15.2	35.8	75%	1924	12.6	93%	26%

Solano County WA

SWP Table A Deliveries for 2009 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1998	22.9	20.6	43.4	91%	1988	11.3	94%	24%
1999	18.2	10.5	28.7	60%	1934	11.3	95%	24%
2000	23.0	17.9	40.9	86%	1931	10.5	96%	22%
2001	12.7	5.0	17.6	37%	1992	9.8	98%	20%
2002	17.7	2.5	20.2	42%	1991	9.8	99%	20%
2003	23.5	14.4	37.9	79%	1977	6.8	100%	14%
Average	18.5	9.8	28.3	59%		28.3		59%
Maximum	23.7	23.7	45.8	96%		45.8		96%
Minimum	2.1	0.0	6.8	14%		6.8		14%

Solano County WA

SWP Table A Deliveries for 2029 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1922	30.6	0.0	30.6	64%	1983	47.8	0%	100%
1923	29.3	0.0	29.3	61%	1938	47.8	1%	100%
1924	9.5	0.0	9.5	20%	1969	47.8	2%	100%
1925	19.9	0.0	19.9	42%	1982	45.6	4%	95%
1926	24.7	0.0	24.7	52%	1958	44.0	5%	92%
1927	34.4	0.0	34.4	72%	1995	40.5	6%	85%
1928	30.6	0.0	30.6	64%	1980	39.8	7%	83%
1929	13.5	0.0	13.5	28%	1998	39.4	9%	83%
1930	19.8	0.0	19.8	41%	1956	39.1	10%	82%
1931	7.1	0.0	7.1	15%	1952	39.1	11%	82%
1932	18.4	0.0	18.4	39%	1967	38.9	12%	81%
1933	18.5	0.0	18.5	39%	1997	38.6	14%	81%
1934	12.8	0.0	12.8	27%	1937	38.6	15%	81%
1935	27.0	0.0	27.0	57%	1986	37.6	16%	79%
1936	31.3	0.0	31.3	66%	1978	37.1	17%	78%
1937	38.6	0.0	38.6	81%	1984	36.8	19%	77%
1938	47.8	0.0	47.8	100%	1941	35.7	20%	75%
1939	20.4	0.0	20.4	43%	1945	35.7	21%	75%
1940	30.3	0.0	30.3	63%	1974	35.4	22%	74%
1941	35.7	0.0	35.7	75%	1943	35.3	23%	74%
1942	30.5	0.0	30.5	64%	1951	35.3	25%	74%
1943	35.3	0.0	35.3	74%	1927	34.4	26%	72%
1944	22.6	0.0	22.6	47%	1999	34.1	27%	71%
1945	35.7	0.0	35.7	75%	1975	33.1	28%	69%
1946	28.3	0.0	28.3	59%	1970	32.9	30%	69%
1947	22.9	0.0	22.9	48%	1979	32.4	31%	68%
1948	27.9	0.0	27.9	58%	1985	32.3	32%	68%
1949	26.5	0.0	26.5	56%	1965	32.1	33%	67%
1950	28.3	0.0	28.3	59%	2002	32.0	35%	67%
1951	35.3	0.0	35.3	74%	1962	31.7	36%	66%
1952	39.1	0.0	39.1	82%	1973	31.6	37%	66%
1953	27.4	0.0	27.4	57%	1993	31.5	38%	66%
1954	27.8	0.0	27.8	58%	1996	31.4	40%	66%
1955	20.5	0.0	20.5	43%	1936	31.3	41%	66%
1956	39.1	0.0	39.1	82%	2000	31.1	42%	65%
1957	25.6	0.0	25.6	54%	1964	30.7	43%	64%
1958	44.0	0.0	44.0	92%	1928	30.6	44%	64%
1959	21.0	0.0	21.0	44%	1922	30.6	46%	64%

Solano County WA

SWP Table A Deliveries for 2029 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1960	22.4	0.0	22.4	47%	1942	30.5	47%	64%
1961	22.0	0.0	22.0	46%	1940	30.3	48%	63%
1962	31.7	0.0	31.7	66%	1976	29.7	49%	62%
1963	27.6	0.0	27.6	58%	1966	29.6	51%	62%
1964	30.7	0.0	30.7	64%	1923	29.3	52%	61%
1965	32.1	0.0	32.1	67%	1950	28.3	53%	59%
1966	29.6	0.0	29.6	62%	1946	28.3	54%	59%
1967	38.9	0.0	38.9	81%	1971	28.0	56%	59%
1968	26.5	0.0	26.5	55%	1948	27.9	57%	58%
1969	47.8	0.0	47.8	100%	1954	27.8	58%	58%
1970	32.9	0.0	32.9	69%	2003	27.7	59%	58%
1971	28.0	0.0	28.0	59%	1963	27.6	60%	58%
1972	27.5	0.0	27.5	57%	1972	27.5	62%	57%
1973	31.6	0.0	31.6	66%	1981	27.4	63%	57%
1974	35.4	0.0	35.4	74%	1994	27.4	64%	57%
1975	33.1	0.0	33.1	69%	1953	27.4	65%	57%
1976	29.7	0.0	29.7	62%	1935	27.0	67%	57%
1977	4.5	0.0	4.5	9%	1949	26.5	68%	56%
1978	37.1	0.0	37.1	78%	1968	26.5	69%	55%
1979	32.4	0.0	32.4	68%	1957	25.6	70%	54%
1980	39.8	0.0	39.8	83%	1926	24.7	72%	52%
1981	27.4	0.0	27.4	57%	1989	23.4	73%	49%
1982	45.6	0.0	45.6	95%	1947	22.9	74%	48%
1983	47.8	0.0	47.8	100%	1944	22.6	75%	47%
1984	36.8	0.0	36.8	77%	1960	22.4	77%	47%
1985	32.3	0.0	32.3	68%	1961	22.0	78%	46%
1986	37.6	0.0	37.6	79%	1959	21.0	79%	44%
1987	10.8	0.0	10.8	23%	1955	20.5	80%	43%
1988	14.1	0.0	14.1	30%	1939	20.4	81%	43%
1989	23.4	0.0	23.4	49%	1925	19.9	83%	42%
1990	9.3	0.0	9.3	19%	1930	19.8	84%	41%
1991	10.4	0.0	10.4	22%	1933	18.5	85%	39%
1992	8.4	0.0	8.4	18%	1932	18.4	86%	39%
1993	31.5	0.0	31.5	66%	2001	14.5	88%	30%
1994	27.4	0.0	27.4	57%	1988	14.1	89%	30%
1995	40.5	0.0	40.5	85%	1929	13.5	90%	28%
1996	31.4	0.0	31.4	66%	1934	12.8	91%	27%
1997	38.6	0.0	38.6	81%	1987	10.8	93%	23%

Solano County WA

SWP Table A Deliveries for 2029 Study					Probability Curve			
Year	Delivery w/o Article 56 Carryover (taf)	Article 56 Carryover (taf)	Total Table A Delivery (taf)	Percent of Maximum Table A (47.8 taf)	Year	SWP Total Table A Delivery (taf)	Exceedence Frequency (%)	Percent of Maximum Table A (47.8 taf)
1998	39.4	0.0	39.4	83%	1991	10.4	94%	22%
1999	34.1	0.0	34.1	71%	1924	9.5	95%	20%
2000	31.1	0.0	31.1	65%	1990	9.3	96%	19%
2001	14.5	0.0	14.5	30%	1992	8.4	98%	18%
2002	32.0	0.0	32.0	67%	1931	7.1	99%	15%
2003	27.7	0.0	27.7	58%	1977	4.5	100%	9%
Average	28.4	0.0	28.4	60%		28.4		60%
Maximum	47.8	0.0	47.8	100%		47.8		100%
Minimum	4.5	0.0	4.5	9%		4.5		9%

Appendix C Solano Project Reliability

Ultimate level of development-of Lake Berryessa watershed @ 30,000 AF/yr - 2009 Study

Lake Berryessa Index

Value	Year Type
W	Wet
N	Below Normal
N	Above Normal
D	Dry
D	Critically Dry

Year	Index Value	% Full Alloc	% Full Alloc for Normal Year (N)	% Full Alloc for Single Dry Year (D) *	% Full Alloc for Multiple Dry Years (3 or more Dry years)
1906	W	100%			
1907	W	100%			
1908	D	100%		100%	
1909	W	100%			
1910	N	100%	100%		
1911	W	100%			
1912	D	100%		100%	
1913	D	100%			
1914	W	100%			
1915	W	100%			
1916	W	100%			
1917	N	100%	100%		
1918	D	100%		100%	
1919	N	100%	100%		
1920	D	100%		100%	
1921	N	100%	100%		
1922	N	100%	100%		
1923	N	100%	100%		
1924	D	95%		95%	
1925	N	95%	95%		
1926	N	95%	95%		
1927	W	95%			
1928	N	100%	100%		
1929	D	95%		95%	
1930	N	95%	95%		
1931	D	100%		100%	100%
1932	D	100%			100%
1933	D	45%			45%
1934	D	45%			45%
1935	N	100%	100%		
1936	N	100%	100%		
1937	N	100%	100%		
1938	W	100%			
1939	D	95%		95%	

1940	W	100%			
1941	W	100%			
1942	W	100%			
1943	N	100%	100%		
1944	D	100%		100%	
1945	N	100%	100%		
1946	N	100%	100%		
1947	D	100%		100%	100%
1948	D	95%			95%
1949	D	95%			95%
1950	D	95%			95%
1951	N	95%	95%		
1952	W	100%			
1953	N	100%	100%		
1954	N	100%	100%		
1955	D	95%		95%	
1956	W	100%			
1957	D	100%		100%	
1958	W	100%			
1959	D	100%		100%	
1960	N	100%	100%		
1961	D	100%		100%	
1962	N	100%	100%		
1963	W	100%			
1964	D	100%		100%	
1965	W	100%			
1966	N	100%	100%		
1967	W	100%			
1968	N	100%	100%		
1969	W	100%			
1970	W	100%			
1971	N	100%	100%		
1972	D	100%		100%	
1973	W	100%			
1974	W	100%			
1975	N	100%	100%		
1976	D	100%		100%	
1977	D	100%			
1978	W	100%			
1979	N	100%	100%		
1980	W	100%			
1981	D	100%		100%	
1982	W	100%			
1983	W	100%			
1984	N	100%	100%		
1985	D	100%		100%	
1986	W	100%			
1987	D	100%		100%	100%
1988	D	100%			100%
1989	D	100%			100%
1990	D	95%			95%
1991	N	95%	95%		

1992	D	90%		90%	
1993	W	95%			
1994	D	95%		95%	
1995	W	100%			
1996	W	100%			
1997	W	100%			
1998	W	100%			
1999	N	100%	100%		
2000	N	100%	100%		
2001	D	100%		100%	
2002	N	100%	100%		
2003	N	100%	100%		
2003	W	100%			
2004	N	100%	100%		
2005	N	100%	100%		
2006	W	100%			
2007		100%			
	Average	98%	99%	98%	89%

*Includes first year of consecutive dry years

Appendix E
2009 Delivery Reliability Report for SWP

California Department of Water Resources
Bay-Delta Office
September 27, 2010

Summary:

Final State Water Project Delivery Reliability Report, 2009

The *State Water Project Delivery Reliability Report 2009* updates DWR's estimate of the current (2009) and future (2029) water delivery reliability of the SWP. The report is produced every two years as part of a settlement agreement signed in 2003.

The report shows that future SWP deliveries will be impacted by two significant factors. The first is significant restrictions on SWP and Central Valley Project (CVP) Delta pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (December 2008) and National Marine Fisheries Service (June 2009). The second is climate change, which is altering the hydrologic conditions in the State.

This report represents the state of water affairs if no actions for improvement are taken. It shows continued erosion of SWP water delivery reliability under the current method of moving water through the Delta. The updated analysis shows that the primary component of the annual SWP deliveries (referred to as Table A deliveries) will be less under current and future conditions, when compared to the preceding report (*State Water Project Delivery Reliability Report 2007)*.

The report discusses areas of significant uncertainty to SWP delivery reliability:

- restrictions on SWP and CVP operations due to State and federal biological opinions to protect endangered fish such as delta smelt and spring-run salmon;
- climate change and sea level rise; and
- the vulnerability of Delta levees to failure due to floods and earthquakes.

As in previous reports, estimates of SWP deliveries are based upon operation simulations with DWR's CalSim II model using an extended record of runoff patterns. These patterns have been adjusted to reflect the levels of development in the source areas and, for future conditions, possible impact due to climate change and accompanying sea level rise. Potential deliveries under current conditions are estimated at the 2009 level and assume current methods of conveying water across the Delta and the current operational rules contained in the federal biological opinions. Potential deliveries under future conditions are estimated at the 2029 level and are also based on the assumptions that no changes will be made in either the way water is conveyed across the Delta or in the operational rules. The analysis of future conditions incorporates a climate change scenario from DWR's 2009 report, *Using Future Climate Projections to Support Water Resources Decision Making in California,* which represents the median effects of the 12 scenarios contained in the report.

The 2009 report shows greater reductions in water deliveries on average when compared to the 2007 report. The 2007 report incorporates the interim operation rules established by Judge Wanger in the federal court in 2007. It shows very significant reductions in SWP deliveries when compared to the 2005 report, which assumes operation rules that were less restrictive. The 2007 report shows current SWP annual Table A deliveries averaging 63% (2595 taf) of the maximum contract amount of 4,133 thousand acre-feet (taf) per year. The 2009 report shows a corresponding value of 60% (2485 taf). The 2007 report projects an annual average of 66% to 69% (2725-2850 taf) for the future condition, whereas the updated report has 60%.

Although the averages of the updated estimates are less than were estimated in the 2007 report, the annual deliveries during drier conditions are projected to be somewhat higher than estimated in the 2007 report. This is due to the updated analysis incorporating the ability of SWP contractors to save water allocated in one year for delivery in the subsequent year and because water stored upstream cannot be delivered in some years due to export restrictions and is, therefore, available in drier times. This phenomenon is illustrated in the tables and curves below.

Under current conditions, annual SWP Table A deliveries from the Delta average 60% of the maximum annual amount of 4,133 taf per year. Over the 82-year simulation period, annual SWP Table A deliveries range from 7% to 81% of the maximum amount. Over multiple-year dry periods, average annual Table A deliveries vary from 34% to 36% of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 67 to 71% of the maximum Table A amount. Under current conditions, annual SWP Article 21 deliveries, a secondary component of annual deliveries, average 85 taf and range from 2 taf to 850 taf over the 82-year simulation period.

Under future conditions, annual SWP Table A deliveries from the Delta also average 60% of the maximum Table A amount. Over the 82-year simulation period, annual SWP Table A deliveries range from 11% to 97% of the maximum amount. Over multiple-year dry periods, average annual Table A deliveries vary from 32% to 38% of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 72 to 93% of the maximum Table A amount. Under future conditions, annual SWP Article 21 deliveries average 60 taf, ranging from 1 taf to 540 taf over the 82-year simulation period.

The *State Water Project Delivery Reliability Report, 2009* is available for public review at, http://baydeltaoffice.water.ca.gov. The report is an update to the *State Water Project Delivery Reliability Report, 2007* issued as final in 2008.

Table 1. Highlighted SWP Table A delivery percent exceedence values under Current Conditions

Exceedence	Annual SWP Table A Delivery (taf)		Change in delivery compared to 2007 report (taf)
	2007 SWP Delivery Reliability Report, Study 2007	Updated Studies (2009)	
25%	3218	2920	-298
50%	2976	2675	-301
75%	2168	2397	+229

Table 1 compares the probability estimates for current conditions from the 2007 report and the 2009 report. The comparison is also shown in Figure 1. The 2009 report estimates that for any given year in the future,

- There is a 25% chance that SWP deliveries will be at or above 2,920 taf.
- There is an equal chance (50%) that SWP deliveries will be above or below 2,675 taf. (Illustrated by the dotted lines.)
- There is 75% chance that SWP deliveries will be above 2,397 taf. Another way to state this is that there is a 25% chance that deliveries will be below this value.

Figure 1 SWP Table A delivery probability under Current Conditions

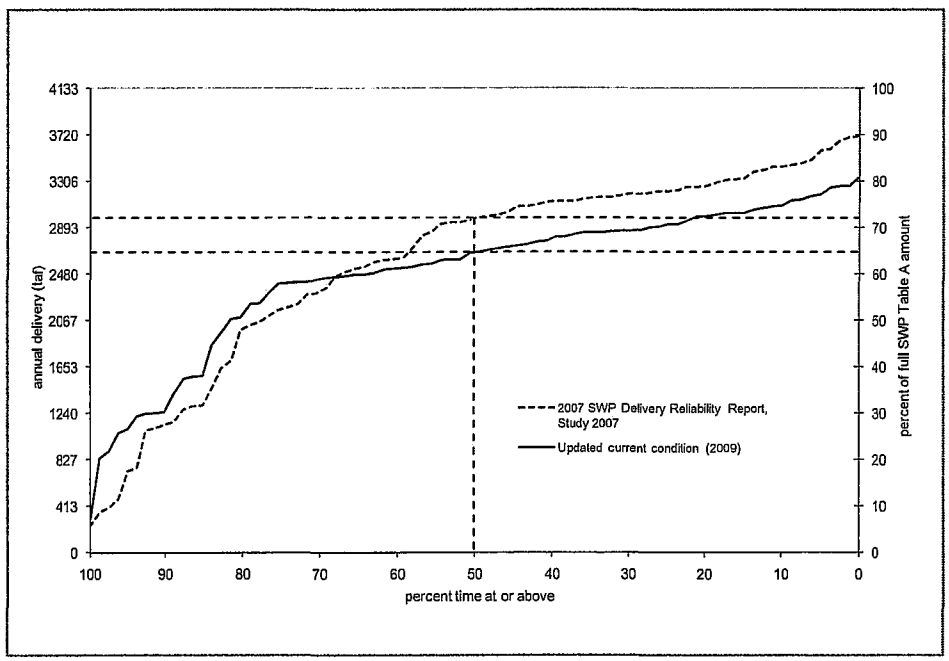

Figure 1 is a plot of all the annual estimates of SWP deliveries in ascending order, with the smallest value on the left and largest on the right.

Table 2 Highlighted SWP Table A delivery percent exceedence values under Future Conditions

Exceedence	Annual SWP Table A Delivery (taf)		Change in delivery in updated studies compared to 2007 report (taf)
	2007 SWP Delivery Reliability Report, Study 2027[1]	Updated Studies (2029)	
25%	3687 – 3815	2915	-772 to -900
50%	2967 – 3205	2596	-371 to -609
75%	1860 – 2077	2137	+60 to +277

1/ Range in value reflects four modified scenarios of climate change.

Table 2 compares the probability estimates for future conditions from the 2007 report and the 2009 report. The 2009 report estimates that for any given year in the future,

- There is 1 chance in 4 (25% chance) that SWP deliveries will be at or above 2,915 taf.
- There is an equal chance (50% chance) that SWP deliveries will be above or below 2,596 taf. (Illustrated by the dotted lines in Figure 2.)
- There is 75% chance that SWP deliveries will be above 2,137 taf. Another way to state this is that there is a 25% chance that deliveries will be below this range.

Figure 2 SWP Delta Table A delivery probability under Future Conditions

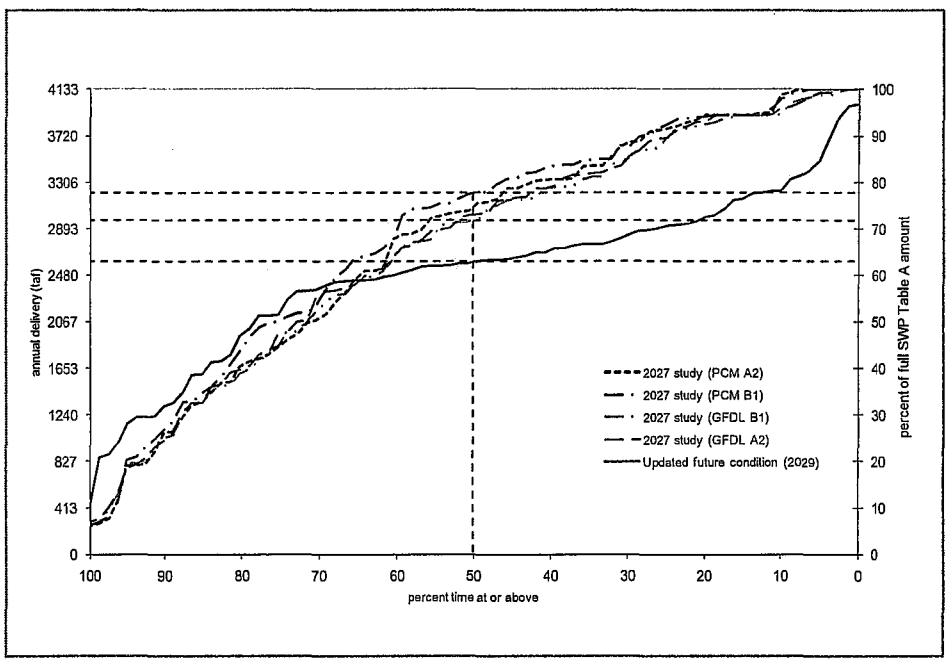

Figure 2 is the corresponding plot of all the annual delivery estimates for the future condition.

Appendix F
Demand Management Documents

Appendix F.1
Water Shortage Contingency Plan Ordinance

DRAFT ORDINANCE

ORDINANCE NO. _____ N.C. (2d)

AN ORDINANCE AMENDING TITLE 11, WATER, OF THE VALLEJO MUNICIPAL CODE BY ADDING CHAPTER 11.XX CONCERNING A WATER SHORTAGE CONTINGENCY PLAN.

THE COUNCIL OF THE CITY OF VALLEJO DOES ORDAIN AS FOLLOWS:

SECTION 1. Section 11.xx.010 is hereby added, and shall read as follows:

"11.xx.010 Scope.

There is established a city water shortage contingency plan."

SECTION 2. Section 11.xx.020 is hereby added, and shall read as follows:

"11.xx.020 Declaration of policy.

It is declared that, because of the conditions prevailing in the city, the general welfare requires that the water resources available to the City be put to the maximum beneficial use to the extent to which they are capable, and that the waste or unreasonable use, or unreasonable method of use of water be prevented, and the conservation of such water is to be extended with a view to the reasonable and beneficial use thereof in the interests of the people of the city and for the public welfare."

SECTION 3. Section 11.xx.030 is hereby added, and shall read as follows:

"11.xx.030 Definitions.

A. The "city" means the city of Vallejo acting by and through the city of Vallejo public works department as operator of the city of Vallejo and Lakes water system.
B. "Director" means the director of the public works department of the city.
C. "Person" means any person, firm, partnership, association, corporation, company, organization, or, governmental entity.
D. "Customer" means any person, whether within or without the geographic boundaries of the city of Vallejo, who uses water supplied by the city.
E. "GPD" means gallons per day.
F. "HCF" means one hundred cubic feet."

SECTION 4. Section 11.xx.040 is hereby added, and shall read as follows:

"11.xx.040 Authorization.

The city manager or his designate, upon the recommendation of the director is authorized and directed to implement the applicable provisions of this chapter upon their determination that such implementation is necessary to protect the public welfare and safety."

SECTION 5. Section 11.xx.050 is hereby added, and shall read as follows:

"11.xx.050 Application.

The provisions of this chapter shall apply to all persons, customers and property served by the city."

SECTION 6. Section 11.xx.060 is hereby added, and shall read as follows:

"11.xx.060 Water Shortage Stages.

No customer of the city shall knowingly make, cause, use, or permit the use of water from the city for residential, commercial, industrial, irrigation, agricultural, institutional, governmental, or any other purpose in a manner contrary to any provision of this chapter, or in amount in excess of that use permitted by the water shortage stage in effect pursuant to action taken by the city manager, or his designate in accordance with the provisions of this chapter.

A. Stage I. Normal Supply - Voluntary Conservation.

1. Customers of the city are requested to voluntarily limit the amount of water used to that amount necessary for health, business, and irrigation.

2. In addition to the above voluntary water use reductions, the following restrictions shall apply to all persons;
   a. All prohibitions within the adopted Wasteful Water Use Prohibition Ordinance. [Ord. No. ___ N.C. (2d)]

B. Stage II. Mandatory Compliance – Water Warning.

1. No residential customer shall make, cause, use, or commence the use of water received from the city for any purpose in an amount in excess of 300gpd (two thousand four hundred cubic feet per sixty-day billing cycle) per residence. Water used in excess of this amount shall be subject to a drought penalty as set forth in Section 11.xx.090. The customer of record may request an increase in the basic allotment as set forth in Section 11.xx.110.

2. No industrial or commercial customer shall make, cause, use, or permit the use of water received for any purpose in an amount in excess of ninety five percent of the amount used during the base period defined as the amount of water used on a customer's premises during the corresponding monthly billing period in the base year of 2004. In addition to the above allotment, for meters that strictly serve landscaping, the allotment shall be seventy-five percent of the amount used during

the base period defined above. New services or services without 2004 history shall be allotted on comparable customer usage. Water used in excess of this amount shall be subject to a drought penalty as set forth in Section 11.xx.090. The customer of record may request an increase in the basic allotment as set forth in Section 11.xx.110.

3. In addition to the above mandatory water use reductions of subdivisions 1 and 2 of this subsection B and in compliance with Section 11.xx.070, the following restrictions shall apply to all persons.

   a. the use of water from hydrants shall be limited to fire fighting and other activities necessary to maintain the health, safety, and welfare of the citizens of Vallejo.
   b. All "waste of water" elements as defined in Stage I shall remain in effect in Stage II.

C. Stage. III. Mandatory Compliance - Water Shortage

1. No residential customer shall make, cause, use, or commence the use of water received from the city for any purpose in an amount in excess of 270 gpd (two thousand one hundred and sixty cubic feet per sixty day billing cycle) per residence. Water used in excess of this amount shall be subject to a drought penalty as set forth in Section 11.xx.090. The customer of record may request an increase in the basic allotment as set forth in Section. 11.xx.110.

2. No industrial or commercial customer shall make, cause, use, or permit the use of water received for any purpose in an amount in excess of eighty five percent of the amount used during the base period defined as the amount of water used on a customer's premises during the corresponding monthly billing period in the base year of 2004. In addition to the above allotment, for meters that strictly serve landscaping, the allotment shall be seventy-five percent of the amount used during the base period defined above. New services or services without 2004 history shall be allotted on comparable customer usage. Water used in excess of this amount shall be subject to a drought penalty as set forth in Section 11.xx.090. The customer of record may request an increase in the basic allotment as set forth in Section 11.xx.110.

3. In addition to the mandatory water use reductions of subdivisions 1 and 2 of this subsection C, and in compliance with Section 11.xx.070, all elements of Stage II shall remain in effect in Stage III.

D. Stage IV. Mandatory Compliance – Water Crisis

1. No residential customer shall make, cause, or commence the use of water received from the city for any purpose in an amount in excess of 240gpd (one thousand nine hundred and twenty cubic feet per sixty-day billing cycle) per residence. Water used in excess of this amount shall be subject to a drought penalty as set forth in

Section 11.xx.090. The customer of record may request an increase in the basic allotment as set forth in Section 11.xx.110.

2. No industrial or commercial customer shall make, cause, use, or permit the use of water received for any purpose in an amount in excess of eighty five percent of the amount used during the base period defined as the amount of water used on a customer's premises during the corresponding monthly billing period in the base year of 2004. In addition to the above allotment, for meters that strictly serve landscaping, the allotment shall be seventy five percent of the amount used during the base period defined above. New services or services without 2004 history shall be allotted on comparable customer usage. Water used in excess of this amount shall be subject to a drought penalty as set forth in Section 11.xx.090. The customer of record may request an increase in the basic allotment as set forth in Section 11.xx.110.

3. In addition to the mandatory water use reductions of subdivisions 1 and 2 of this subsection D, and in compliance with Section 11.xx.070, all elements of Stage III shall remain in effect in Stage IV.

E. Stage V. Mandatory Compliance – Water Emergency

1. No residential customer shall make, cause, use, or commence the use of water received from the city for any purpose in an amount in excess of 195gpd (one thousand five hundred and sixty cubic feet per sixty-day billing cycle) per residence. Water used in excess of this amount shall be subject to a drought penalty as set forth in Section 11.xx.090. The customer of record may request an increase in the basic allotment as set forth in Section 11.xx.110.

2. No industrial or commercial customer shall make, cause, use, or permit the use of water received for any purpose in an amount in excess of seventy percent of the amount used during the base period defined as the amount of water used on a customer's premises during the corresponding monthly billing period in the base year of 2004. In addition to the above allotment, for meters that strictly serve landscaping, the allotment shall be fifty percent of the amount used during the base period defined above. New services or services without 2004 history shall be allotted on comparable customer usage. Water used in excess of this amount shall be subject to a drought penalty as set forth in Section 11.xx.090. The customer of record may request an increase in the basic allotment as set forth in Section 11.xx.110.

3. In addition to the mandatory water use reductions of subdivisions 1 and 2 of this subsection E, and in compliance with Section 11.xx.070, all elements of Stage IV shall remain in effect in Stage V except that:

   a. Section 11.xx.110.A.4 does not apply in this stage. The customer of record may still apply for exceptions as outlined in Section 11.xx.110, but the reason for applying for an exception cannot be based on economic hardship."

SECTION 7. Section 11.xx.070 is hereby added, and shall read as follows:

"11.xx.070 Mandatory water shortage stage implementation.

A. The department of public works shall monitor the projected supply and demand for water by its customers and shall recommend to the city manager the extent of the conservation required in order for the department to prudently plan for and supply water to its customers. Thereafter, the city manager may order that the appropriate water shortage stage be implemented in accordance with the applicable provisions of this section. Said order shall be made by public announcement and shall be published a minimum of one time in a daily newspaper of general circulation and shall continue to be published on a weekly basis until such time as all restrictions are removed. Said order shall become effective immediately upon the first publication.

B. Water shortage stages. The various water shortage stages shall be implemented by the city manager as directed by resolutions of the city council."

SECTION 8. Section 11.xx.080 is hereby added, and shall read as follows:

"11.xx.080 Duration of water shortage stages.

Stage I shall be effective upon the effective date of the ordinance codified in this chapter and the restrictive provisions of Stage I as set forth above shall apply to all water consumption on and after said date. Stage I will be rescinded at such time that conditions as set forth in Section 11.xx.070 indicate a more restrictive stage is necessary."

SECTION 9. Section 11.xx.090 is hereby added, and shall read as follows:

"11.xx.090 Water shortage excess use penalty.

A. Customers will receive prior individual notification of the standard allotment basis, applicable rates, and the opportunity to request exceptions to the standard allotment basis.

B. Water use beyond the maximum allowed for each water shortage stage shall be subject to a drought penalty pursuant to the schedule set forth below. The customer of record may request an increase in this basic allotment as set forth in Section 11.xx.110. Application forms and instructions will be provided to customers and will also be available at the city water billing office.

C. In addition to the normal water service rates, each customer shall pay, during each billing period a drought penalty for water delivered in excess of the water allotment. The drought penalty is as follows:

1. For water delivered up to ten percent in excess of allotment there shall be a drought penalty equal to 2.0 times the applicable volume charge, in addition to the applicable service charge and volume charge;

2. For water delivered from 10.01 percent to twenty percent in excess of allotment there shall be a drought penalty of 3.0 times the applicable volume charge levied on this excess only, in addition to the drought penalty on the first ten percent and the applicable service charge and volume charge;

3. For water delivered over 20.01 percent in excess of allotment, there shall be a drought penalty of 4.0 times the applicable volume charge levied only on this excess over twenty percent, in addition to all drought penalties described above for the first twenty percent and the applicable service charge and volume charge.

D. In addition to the drought penalty, if drought usage exceeds the allowed allotment, a warning will be issued and enforcement actions may be taken as described in Section 11.xx.120."

SECTION 10. Section 11.xx.100 is hereby added, and shall read as follows:

"11.xx.100 Water shortage service charge surcharge.

A. A water shortage service charge surcharge may be imposed by resolution of the city council upon the recommendation of the finance director, to compensate for a loss of water revenue or to pay an additional cost for the purchase of water by the city.

B. The water shortage service charge surcharge shall be in effect until rescinded after the finance director states that the water emergency costs have been fully recovered."

SECTION 11. Section 11.xx.110 is hereby added, and shall read as follows:

"11.xx.110 Exceptions and application for exception.

A. Any customer of record may apply to the director to increase the amount of water which may be used without exceeding the basic allotment based on any one or more of the following reasons:

1. Medical requirements;
2. More than four residents in a single family residential household. The additional amount allotted shall be fifty gpd per person;
3. Incorrect customer classification based on predominant use;
4. When failure to do so would cause severe economic hardship to the applicant, including, but not limited to, threat of imminent insolvency;
5. When failure to do so would cause an emergency condition affecting the health, sanitation, fire protection, or safety of the applicant or the public.

B. Written applications for such exceptions may be granted by the director based upon clear and convincing evidence that any one or more of the foregoing conditions has been satisfied and it is in the public interest to grant such application.

C. The quantity of water allowed in addition to the basic allotment shall be determined by the director, said shall not exceed that quantity necessary to alleviate the condition which justified granting of the application for an exception. "

SECTION 12. Section 11.xx.120 is hereby added, and shall read as follows:

"11.xx.120 Violation Enforcement.

The violation of each provision of this chapter, and each separate violation thereof, shall be deemed a separate offense, and shall be enforced accordingly.

A. Except for the imposition of the drought penalty, as a condition of enforcement of any violation of this chapter, any customer that violates any provision of this chapter shall be given a written warning or notice to refrain from further violations.

B Written warning or notice shall be given to the violator either by mailing said warning or notice to the address given to the city by the customer of record, by personal service on the violator, or by leaving said warning or notice in a conspicuous place on the served property wherein the violation occurred.

C. If after issuance of the written warning or warnings, the director determines that the customer has continued or is continuing to violate the provisions of this chapter, the director may authorize and implement installation of a flow restricting device on the service line or reduce the amount of water available to the customer. Any costs incurred by the city to authorize, implement, and remove the installation of a flow restricting device on the service line or reduce the amount of water available to the customer shall be borne by the customer. The flow restricting device shall be removed and the prior water supply amount resumed no sooner than sixty days after the date of the installation of the flow restricting device, or a reduction in water available, provided that no further violations have occurred within that time.

D. If after implementation of a flow restricting device or reduction of water available to a customer, the customer continues to violate the provisions of the chapter, the director may authorize disconnection of water service to the customer for a period of three days. All costs or expenses incurred by the city for enforcement of this section shall be borne by the customer."

SECTION 13. Section 11.xx.130 is hereby added, and shall read as follows:

"11.xx.130 Violation - Penalties.

In addition to all other remedies provided herein, any person who violates any provision of this chapter after having received a written notice to refrain as provided in Section 11.xx.120, is guilty of an infraction. The violation of each provision of this chapter and each separate violation thereof shall be deemed a separate offense and shall be punished accordingly. Each offense shall be punishable by (1) a fine not exceeding one hundred dollars for the first violation; (2) a fine not exceeding two hundred dollars for a second violation of this chapter within one year; and (3) a fine not exceeding five hundred dollars for each additional violation of this chapter within one year."

SECTION 14. Section 11.xx.140 is hereby added , and shall read as follows:

"11.xx.140 Violation - Additional remedy.

As an additional remedy, the violation of any provision of this chapter by any person who has received more than one written warning pursuant to Section 11.xx.120 to refrain from the same or any other violation under this chapter in one calendar year shall be deemed and is declared to be a public nuisance and may be subject to abatement by a restraining order, or injunction issued by a court of competent jurisdiction."

SECTION 15. This ordinance shall take effect and be in full force and effect from and after _____ days after its final passage.

Appendix F.2

Water Savings Incentive Program

Solano County Water Agency
Commercial, Industrial, Institutional (CII)
Water Savings Incentive Pilot Program
Terms and Conditions for Participation

Purpose: To provide financial incentives for CII accounts to upgrade their irrigation systems, plumbing fixtures, and/or water-using appliances for the purpose of water use efficiency.

Terms: Financial incentives will be provided after analyzing the cost benefit ratio of each proposed project. Incentives are tailored to each individual site as each site has varying water savings potential. Incentives will be granted at the sole discretion of the Solano County Water Agency and its water retailers.

Eligibility: Participants must be CII water customers in Solano County, have a water service account that has been active for at least twelve months, and, for irrigation upgrade requests, use potable water for irrigation. Properties using recycled water or well water do not qualify. (California Water Service customers within the City of Dixon do not qualify). Large landscapes for schools, parks, and publicly funded common areas with a minimum of 30,000 square feet of irrigated landscape will be targeted. Preference will be given to areas of irrigated turf.

Requirements: Water retailers will submit potential site candidates to SCWA for consideration. Potential participants must receive a SCWA water use efficiency survey to determine the potential for water savings at the site. Acceptance into the program will be based on the findings and recommendations outlined in the water survey report. If the survey findings indicate the scope of repairs for a particular site are or found unlikely to be cost-effective, as the costs of upgrade would not significantly improve the water efficiency of the site, the water retailer and/ or water customer will be notified that no repair actions are authorized under this program. Participating customers must submit receipts to SCWA within 90 days of receiving the water use efficiency survey report. An extension of the 90 days may be requested from SCWA, however that request must be submitted to the SCWA within 90 days of the customer receiving the water use efficiency report.

Rebate or Direct Installation Amount: Each publicly-funded site (non-residential, non-commercial), defined as a water account, will be eligible for *up to a maximum of $10,000* in rebates or upgrades in addition to rebates or direct installations received by other SCWA water conservation programs including High Efficiency Toilet installations or weather-based irrigation controllers. Publicly funded sites will receive 100% reimbursement up to $10,000 per account on a pre-approved basis.

When the program serves commercial accounts, reimbursements will be 50% of expenditures, on a pre-approved basis, up to a maximum of $5,000 total expenditures.

Irrigation System elements eligible for reimbursement:
Water customers will be reimbursed for the cost of replacing existing irrigation system parts and equipment only. **No labor costs will be covered by this program.** Eligible expenses include:

- Replacement or upgrade to irrigation equipment (replacement of rotor or spray equipment, replacement with drip, etc.)
- Replacement of sprinkler heads for matching precipitation rates
- Pressure regulators and station control devices
- Rain sensors/ shut-off devices
- On a limited basis, new parts and equipment may be eligible for reimbursements to accommodate small modifications to existing systems to improve overall water efficiency (e.g. adding additional spray heads to an existing line.) Such requests must be requested and approved by SCWA. It is recommended that these requests be made prior to installation to ensure eligibility for reimbursement.

Indoor Water Use Systems or Fixtures Eligible for reimbursement:
Replacement or upgrades of indoor water use systems or fixtures will be determined on a case by case basis depending on the results of the survey, and the needs and water savings potential for the site.

How to Participate:

- Accept a water efficiency survey. If the results of the survey suggest a significant potential for water savings with installation of efficiency upgrades to irrigation or water using fixtures, apply for the Solano County Water savings Incentive Program.
- Obtain written confirmation from Solano County Water Agency water conservation program for upgrades.
- Purchase and install, or hire a contractor to install, the efficiency equipment.
- Provide original receipts to SCWA for reimbursement within 90 days of receiving the results of the water conservation survey.

Additional Information:

- Applicant name must be the same as water account customer of record.
- This program shall at all times be subject to change or termination without prior notice.

- Funding is limited. Program participation is available on a first come, first-served basis only. Program participation is subject to availability of funds and will end upon depletion of program funding.
- SCWA reserves the right to deny any application that does not meet all requirements for program participation. Due to variables beyond the control of SCWA, the Agency cannot guarantee that the installation of any of the program elements will result in a lower utility bill. Applicant waives and releases SCWA, participating water utilities, and their contractors or agents from any and all claims and causes of action arising out of the installation and use of this product. SCWA is not responsible for any damage that may occur to participants' property as a result of the program.

Appendix F.3

Water Waste Prohibition Ordinance No. 1567

Chapter 11.54 - WASTEFUL WATER USE PROHIBITION ORDINANCE

Sections:

11.54.010 - Purpose and intent.
11.54.020 - Short title.
11.54.030 - Regulations and restrictions on water use.
11.54.040 - Water efficient landscaping.

11.54.010 - Purpose and intent.

The purpose of this chapter is to ensure that the water supply of the city of Vallejo is put to maximum beneficial use and that waste or unreasonable use or unreasonable method of use be prevented.

(Ord. 1567 N.C.(2d) § 1 (part), 2006.)

11.54.020 - Short title.

This chapter shall be known and cited as the Wasteful Water Use Prohibition Ordinance.

(Ord. 1567 N.C.(2d) § 1 (part), 2006.)

11.54.030 - Regulations and restrictions on water use.

It is unlawful for any customer to intentionally waste water. As used herein, the term "waste" means:

A.

Use of potable water to irrigate turf, groundcover, shrubbery, crops, vegetation, and trees in such a manner as to result in runoff for more than fifteen minutes;

B.

Use of potable water to wash sidewalks, walkways, driveways, parking lots, open ground or other hard surfaced areas except by hose equipped with a shutoff nozzle and where necessary for public health or safety;

C.

Allowing potable water to escape from breaks within the customer's plumbing system for more than thirty-six hours after the customer is notified or discovers the break;

D.

Washing cars, boats, trailers, aircraft, or other vehicles by hose without a shutoff nozzle except to wash such vehicles at commercial or fleet vehicle washing facilities using water recycling equipment;

E.

Operating decorative water fountains without water recirculation;

F.

Use of potable water for construction, compaction, dust control, street or parking lot sweeping, building wash down where nonpotable or recycled water is available in sufficient quantities;

G.

Use of single-pass cooling systems; and

H.

Use of nonrecirculating systems in new conveyor car wash facilities.

(Ord. 1567 N.C.(2d) § 1 (part), 2006.)

11.54.040 - Water efficient landscaping.

Landscaping shall be installed and maintained in accordance with Section 16.74.030 Water Conservation Guidelines and Chapter 16.71 Water Efficient Landscape Regulations of the Vallejo Municipal Code.

(Ord. No. 1634 N.C.(2d), § 1, 3-23-2010)

Appendix G

UWMP Checklist

To be provided with Draft UWMP