Kennedy/Jenks Consultants

2191 East Bayshore Road, Suite 200
Palo Alto, California 94303
650-852-2800
FAX: 650-856-8527

Revised 2010 Urban Water Management Plan

July 2011

Prepared for

Scotts Valley Water District
P.O. Box 660006
Scotts Valley, CA 95067

K/J Project No. 1188010

Table of Contents

List of Tables

List of Figures

List of Appendices

Section 1: Introduction

1.1 Overview

This volume presents the Urban Water Management Plan 2010 (Plan) for the Scotts Valley Water District (SVWD or District) service area. This section describes the general purpose of the Plan, discusses Plan implementation, and provides general information about SVWD's service area characteristics. A list of acronyms and abbreviations is also provided.

1.2 Purpose

An Urban Water Management Plan (UWMP) is a planning tool that generally guides the actions of water management agencies. It provides elected officials, managers and the public with a broad perspective on a number of water supply issues. It is not a substitute for project-specific planning documents, nor was it intended to be when mandated by the State Legislature. For example, the Legislature mandated that a plan include a section which "describes the opportunities for exchanges or water transfers on a short-term or long-term basis." (California Urban Water Planning Act, Article 2, Section 10630(d)) The identification of such opportunities, and the inclusion of those opportunities in a general water service reliability analysis, neither commits a water management agency to pursue a particular water exchange/transfer opportunity, nor preclude a water management agency from exploring exchange/transfer opportunities not identified in the plan. When specific projects are chosen to be implemented, detailed project plans are developed, environmental analysis, if required, is prepared, and financial and operational plans are detailed.

In short, this Plan is a management tool, providing a framework for action, but not functioning as a detailed project development or action. It is important that this Plan be viewed as a long-term, general planning document, rather than as an exact blueprint for supply and demand management. Water management in California is not a matter of certainty, and planning projections may change in response to a number of factors. From this perspective, it is appropriate to look at the Plan as a general planning framework, not a specific action plan. It is an effort to generally answer a series of planning questions including:

- What are the potential sources of supply and what is the reasonable probable yield from them?
- What is the probable demand, given a reasonable set of assumptions about growth and implementation of good water management practices?
- How well do supply and demand figures match up, assuming that the various probable supplies will be pursued by the implementing agency?

Using these "framework" questions and resulting answers, the implementing agency will pursue feasible and cost-effective options and opportunities to meet demands. SVWD will explore enhancing basic supplies from sources such as the surface water exchange from the City of Santa Cruz Water Department (SCWD) as well as other options. These include continued groundwater extraction, other water exchanges, recycling, and water banking/conjunctive use.

Specific planning efforts will be undertaken in regard to each option, involving detailed evaluations of how each option would fit into the overall supply/demand framework, how each option would impact the environment, and how each option would affect customers. The objective of these more detailed evaluations would be to find the optimum mix of conservation and supply programs that ensure that the needs of the customers are met.

The California Urban Water Management Planning Act (Act) requires preparation of a plan that:

- Accomplishes water supply planning over a 20-year period in five-year increments. (SVWD is going beyond the requirements of the Act by developing a plan which spans 25 years.)
- Identifies and quantifies adequate water supplies, including recycled water, for existing and future demands, in normal, single-dry, and multiple-dry years.
- Implements conservation and efficient use of urban water supplies.

A checklist to ensure compliance of this Plan with the Act requirements is provided in Appendix A.

In short, the Plan answers the question: *Will there be enough water for the SVWD service area in the future years, and what mix of programs should be explored for making this water available?*

It is the stated goal of SVWD to deliver a reliable and high quality water supply for their customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 25 years in combination with conservation of non-essential demand during certain dry years, the Plan successfully achieves this goal.

1.3 Implementation of the Plan

The SVWD served approximately 10,300 persons in its service area, through 3,898 meters, and supplied approximately 1,390 acre-feet (AF) of water in 2010. This subsection provides the cooperative framework within which the Plan will be implemented including agency coordination, public outreach, and resources maximization.

1.3.1 Joint Preparation of the Plan

Water agencies are permitted by the State to work together to develop a cooperative regional plan. SVWD coordinates with the local governments and water agencies for planning purposes. Water resource specialists with expertise in water resource management were retained to assist SVWD in preparing the details of the Plan. Agency coordination for this Plan is summarized in Table 1-1.

Table 1-1: Agency Coordination Summary

	Participated in UWMP Development	Received Notice of Draft Posted on Website	Commented on Draft	Attended Public Meetings	Contacted for Assistance	Sent Notice of Intent to Adopt	Not Involved
County of Santa Cruz		✓				✓	
City of Scotts Valley		✓				✓	
San Lorenzo Valley Water District		✓					
Lompico County Water District		✓					
Mt. Hermon Conference Center		✓					
City of Santa Cruz Water Department		✓					
Santa Cruz Co. Local Agency Formation Commission		✓					
Soquel Creek Water District		✓					

Note: Columns “Commented on Draft” and “Attended Public Meetings” will be finalized after close of public hearing on June 9, 2011, i.e. date of adoption.

Several agencies had representatives at Santa Margarita Groundwater Basin Advisory Committee (SMGBAC) meeting on May 25, 2011. SVWD’s UWMP schedule was discussed, not specific content, however.

1.3.2 Public Outreach

SVWD encourages community participation in water planning. Interested groups were informed about the development of the Plan along with the schedule of public activities. Notices of public meetings were published in the Scotts Valley Press-Banner, the local newspaper. Copies of the Draft Plan were made available at SVWD’s office, and on the SVWD website. SVWD also conferred with the City of Scotts Valley Planning Department to gather data concerning planned development and the probable implementation of approved development.

SVWD notified the City of Scotts Valley and Santa Cruz County of the opportunity to provide input regarding the Plan. Table 1-2 presents a timeline for public participation during the development of the Plan. A copy of the public outreach materials, including paid advertisements, website postings, and notice letters are attached in Appendix B. A copy of the resolution to adopt the 2010 UWMP will be included as Appendix C after the adoption by the Board and before submittal to the California Department of Water Resources (DWR).

Table 1.2: Public Participation Timeline

Date	Event	Description
April 5, 2011	Public notification to Scotts Valley City and Santa Cruz County	Describe UWMP requirements and process
May 25, 2011	Santa Margarita Groundwater Basin Advisory Committee Meeting	Discuss upcoming availability of Public Review Draft and schedule for adoption.
June 1, 2011	Public Review Draft	Release Draft UWMP and solicit input.
June 9, 2011	SVWD Board Workshop and Public Hearing	UWMP considered for approval by the SVWD Board.

The components of public participation include:

- Local Media:
  - Paid advertisements in local newspapers

- SVWD Public Participation:
  - SMGBAC

  - Board meeting/public hearing

- City/County Outreach:
  - Notification letters
  - Public availability of documents
  - SVWD website
  - SVWD office

Copies of the final document will be made available to the entities listed in Table 1-1 as well as the State of California Library. SVWD will submit the UWMP to DWR no later than 30 days after adoption and will make the UWMP available to public review during normal business hours.

1.3.3 Resources Maximization

Several documents were developed to enable SVWD to maximize the use of available resources including the Final Recycled Water Facilities Planning Report (FPR), the Annual Groundwater Reports, and other planning documents. Section 3 of this Plan describes in detail the water resources available to SVWD for the 25-year period covered by the Plan. Multiple efforts to maximize the water resources of the District are underway. The District operates a comprehensive Groundwater Management Program (GWM Program), an expanding water recycling program, and is participating in the development of an Integrated Regional Water Management Plan (IRWMP). All of these efforts serve as management tools to maximize the water resources in the region. Imported water outside the region is not available to SVWD. Additional discussion regarding documents developed to maximize resources is included in Section 3 and Section 6.

1.4 The SVWD Service Area

1.4.1 Location

SVWD was organized in 1961 as a County Water District under the California Water Code (County Water District Act, Water Code Sections 30000, et seq.) Its boundaries include most of the City of Scotts Valley (Scotts Valley or City) as well as some unincorporated areas north of the City. The District lies in the Santa Cruz Mountains, five miles inland from the Monterey Bay. It is approximately five miles from north to south and one mile east to west with an approximate area of 5.5 square miles.

The District's service area relative to DWR established groundwater basins is shown on Figure 1-1. The District overlies a large portion of DWR Basin 3-27 and a small portion of Basins 3-21 and 3-50. The extent of the locally recognized Santa Margarita Groundwater Basin (Santa Margarita Basin or Basin) is also shown in Figure 1-1. Figure 1-2 illustrates the District's location relative to nearby water suppliers and the Scotts Valley city limits. In accordance with water Code §10620(d) each of these water suppliers has received a draft copy of this document with the opportunity to comment.

Sewer service in the Scotts Valley area is provided by Scotts Valley. SVWD coordinates closely with the Scotts Valley to provide recycled water to SVWD customers as described in Section 4.

Figure 1-1: Groundwater Basin Boundaries

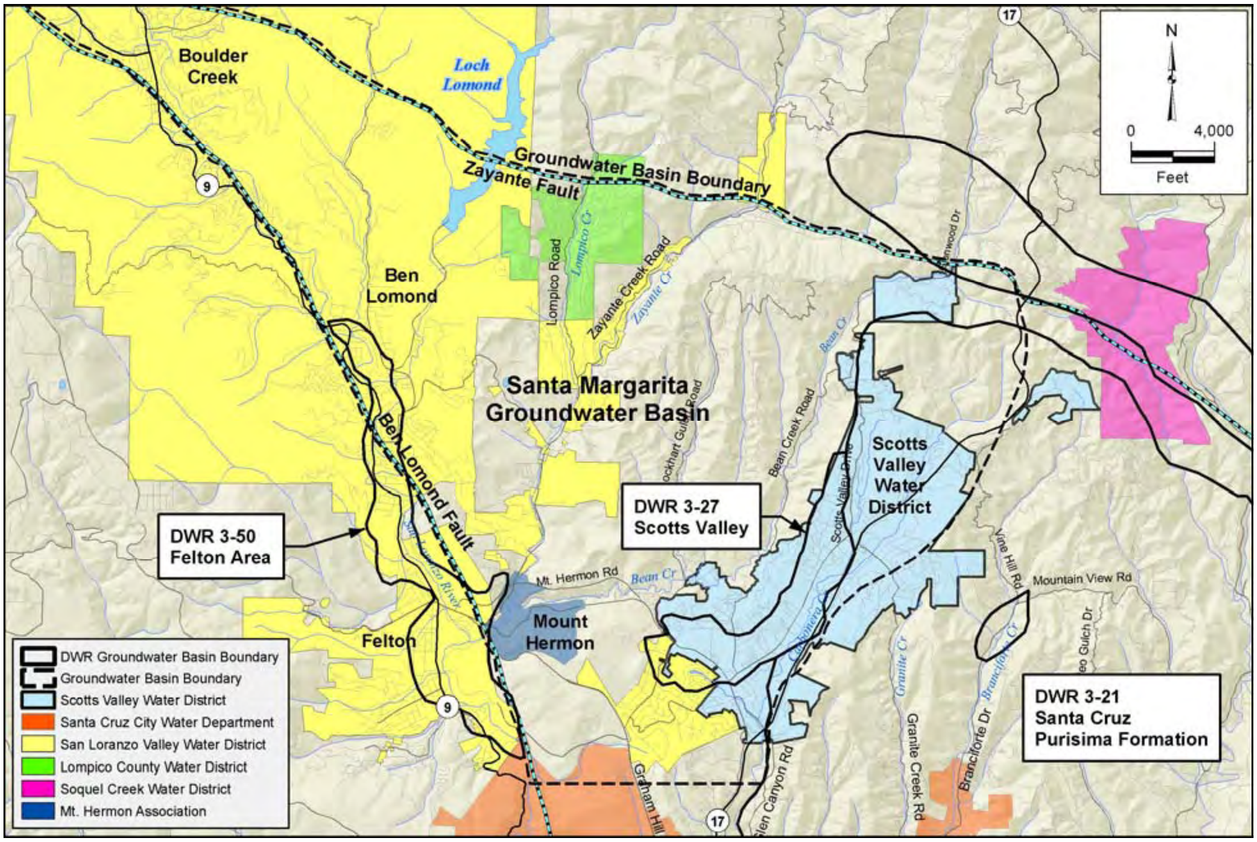
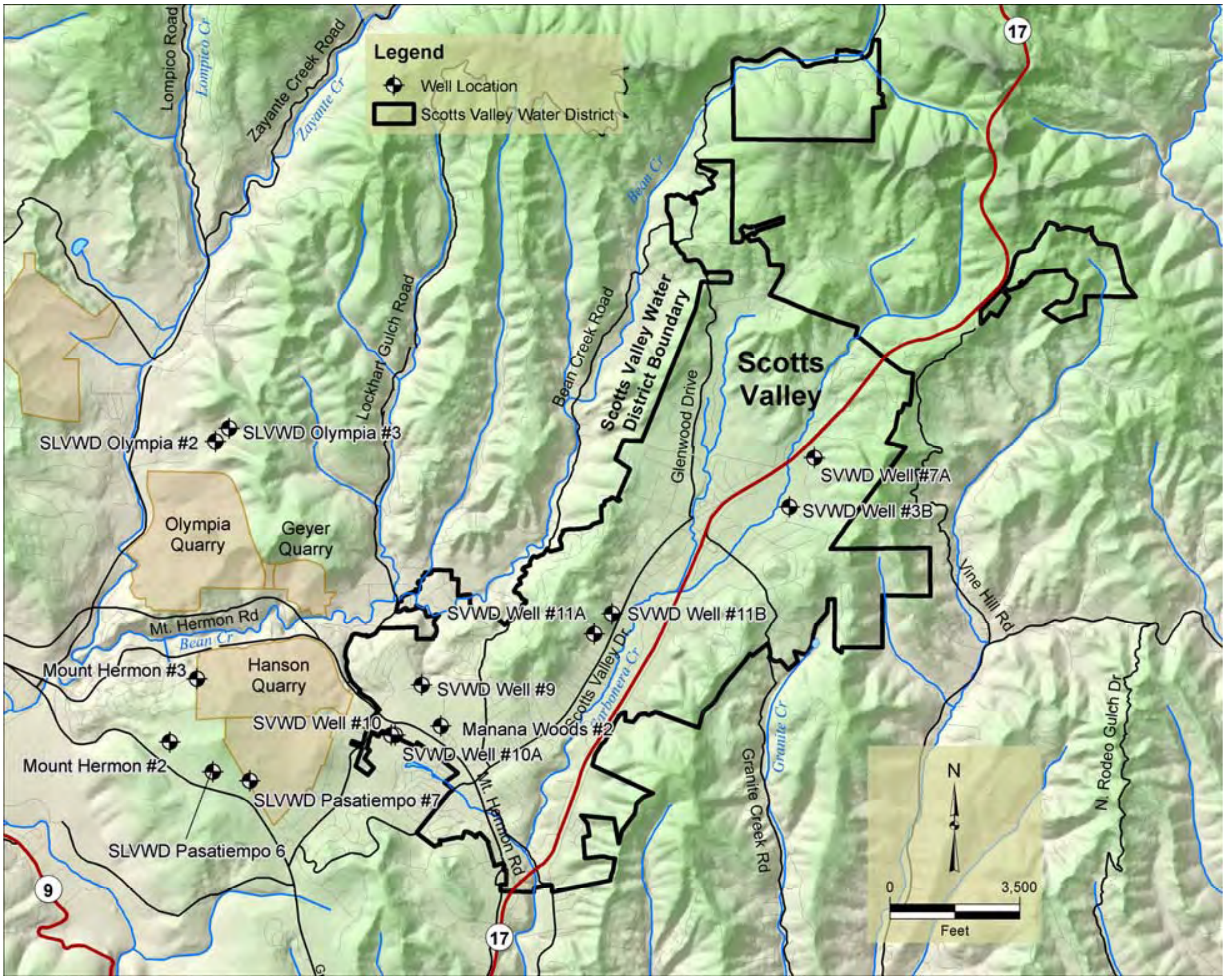


Figure 1-2: Service Area



1.5 Climate

The climate of SVWD's service area is mild. The area is cooled in the summer by early morning and evening coastal fog. Average rainfall is approximately 42.8 inches per year with higher average rainfall of 46 inches seen in the upper watershed of Bean Creek. Table 1-3 presents the region's annual average climate data. Standard Monthly Average Evapotranspiration (ETo) and Average Maximum Temperature data are provided for 1990 – 2010 at CIMIS Station 104 at the De Laveaga Golf Course in the City of Santa Cruz. Although the weather patterns are slightly different at the coastal station than in the Santa Cruz Mountains, the data provide information regarding the regional climate. Evapotranspiration from plants is variable, differing with the type of vegetation cover and with weather and soil conditions. Evaporation in the District is generally low in the winter months and peaks in the summer. Average Monthly Rainfall is from the District's El Pueblo Yard precipitation gauge.

Comparison of the monthly rainfall and evaporation amounts reveal that winter is characterized by a surplus of rainfall over evaporation or ETo. This rainfall is then available for runoff and natural groundwater recharge. Native vegetation ETo is reduced substantially in summer when rainfall is minimal and soil moisture is depleted. At this time, however, landscape irrigation demands become greatest. This contributes to high water demands in the late summer creating a time lag between periods of high demand and high supply.

Table 1-3: Climate Data for the SVWD Service Area

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo[a]	1.36	1.93	3.26	4.70	4.87	5.32
Average Rainfall (inches)[b]	8.66	8.64	6.17	2.60	1.05	0.19
Average Temperature (Fahrenheit)[a]	47.6	48.9	56.2	55.2	57.7	59.2

	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Standard Monthly Average ETo[a]	5.03	4.84	3.60	2.96	1.64	1.30	40.81
Average Rainfall (inches)[b]	0.01	0.04	0.28	1.97	5.05	8.11	42.77
Average Temperature (Fahrenheit)[a]	60.5	61.8	69.9	56.6	51.7	49.9	55.6

Notes:

[a] ETo (evapotranspiration) and temperature data from Station #104 De Laveaga, http://wwwcimis.water.ca.gov/cimis/welcome.jsp

[b] Average Monthly Rainfall data gathered from long-term average precipitation records from El Pueblo Yard during period 1982-2010.

1.6 Potential Effects of Global Warming

A topic of growing concern for water planners and managers is global warming and the potential impacts it could have on California's future water supplies. In June 2005, Governor Arnold Schwarzenegger issued Executive Order S-3-05, which requires biennial reports on climate change impacts in several areas, including water resources. The Climate Action Team (CAT) was formed in response to executive order S-3- 05. To help unify analysis across topic areas, the CAT worked with scientists from the California Applications Program's California Climate Change Center to select a set of future climate projections to be used for analysis. For the

2008-2009 assessment of climate change impacts, the CAT selected six (6) different global climate change models, assuming two (2) different greenhouse gas emission levels (a high end and a low end), for a total of 12 scenarios. The results of the study indicated that climate change has already been observed, in that in the last 100 years, air temperatures have risen about 1 degree Fahrenheit, and there has been a documented greater variance in precipitation, with greater extremes both in terms of heavy flooding and severe droughts.

In July 2006, DWR issued "Progress on Incorporating Climate Change into Management of California's Water Resources," as required by Executive Order S-3-05. That report demonstrated how various analytical tools could be used to address issues related to climate change.

In the 2009 update of the DWR California Water Plan, multiple scenarios of future climate conditions are evaluated. These changing hydrological conditions could affect future planning efforts, which are typically based on historic conditions. The California Water Plan identifies the following probable impacts due to changes in temperature and precipitation:

- Decrease in snowpack, which is a major part of annual water storage, due to increasing winter temperatures.
- More winter runoff and less spring/summer runoff due to warmer temperatures.
- Greater extremes in flooding and droughts.
- Greater water demand for irrigation and landscape water due to increased temperatures and their impacts on plant water needs.

Volume 1, Section 4 of the California Water Plan, "Preparing for an Uncertain Future," lists some potential impacts of global climate change, based on more than a decade of scientific studies on the subject:

- Could produce hydrologic conditions, variability, and extremes that are different from what current water systems were designed to manage
- May occur too rapidly to allow sufficient time and information to permit managers to respond appropriately
- May require special efforts or plans to protect against surprises or uncertainties

Should global warming increase over time, it may cause a number of changes impacting future water supplies, including changes in hydrologic patterns that can alter groundwater recharge, sea level, rainfall intensity, and statewide water demand. Computer models have been developed to show water planners how California water management might adapt to climate change. DWR has committed to continue to update and refine these models based on ongoing scientific data collection and to incorporate this information into future California Water Plans.

As DWR and other entities, such as the University of California, Santa Cruz develop more specific assessments of the potential effects of climate change on California hydrology, local water reliability, and water demands, SVWD can update its plans accordingly. The US Geological Survey is currently assessing the potential climate change impacts on Santa Cruz County water resources which is planned for completion in 2011. Preliminary results suggest that recharge rates will be reduced by 30 percent.

1.7 Other Demographic Factors

Water service is provided to primarily residential customers with some commercial, industrial, institutional, recreational, and landscape customers and for other uses, such as fire protection and pipeline cleaning.

Recently, the service area has experienced modest increases in single family residential construction. Although the local population has increased slightly, the demand for potable water has decreased which is most likely linked to recent rate increases, active implementation of water conservation and recycled water programs, and the recent economic downturn. SVWD expects to see some continuing modest development activity in the near-term.

1.8 List of Abbreviations and Acronyms

The following abbreviations and acronyms are used in this report.

1,2-DCE	1,2-dichlorethane
20x2020 Plan	20x2020 Water Conservation Plan
AB	Assembly Bill
ACOE	U.S. Army Corps of Engineers
Act	California Urban Water Management Planning Act
AF	AF
AFY	AF per year
AMBAG	Association of Monterey Bay Area Governments
AWWARF	American Water Works Association Research Foundation
Basin	Santa Margarita Groundwater Basin
BMOs	Best Management Objectives
BMPs	Best Management Practices
CCF	One Hundred Cubic Feet
CCR	Consumer Confidence Report
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CII	Commercial, Industrial, and Institutional
cis-1,2-DCE	cis-1,2-Dichloroethylene
City	City of Scotts Valley
COG	Council of Government
CUWCC	California Urban Water Conservation Council
DBP	Disinfection by-products
DCE	Dichloroethylene
District	Scotts Valley Water District
DMM	Demand Management Measures
DOF	Department of Finance
DPH	Department of Public Health
DTSC	Department of Toxic Substances Control

DWR	California Department of Water Resources
EC	Electrical conductivity
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPA	Environmental Protection Agency
ETo	Evapotranspiration
FPR	Facilities Planning Report
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
GAC	Granular Activated Carbon
GWM	Groundwater Management Plan
HCD	Housing and Community Development
HCF	Hundred Cubic Feet
HECW	High Efficiency Clothes Washer
HET	High Efficiency Toilet
IRWMP	Integrated Regional Water Management Plan
FPR	Facilities Planning Report
MCL	Maximum Contaminant Level
MF	Multi-Family
M&I	Municipal and Industrial
MGD	million gallons per day
mg/L	milligrams per liter
MOU	Memorandum of Understanding Regarding Water Conservation in California
MTBE	methyl tertiary butyl ether
MWELO	Model Water Efficient Landscape Ordinance
NPDES	National Pollutant Discharge Elimination System
NO3	Nitrates
PCE	tetrachloroethene
PHG	Public Health Goal
Plan	Urban Water Management Plan 2010
ppb	parts per billion
RHNA	Rural Housing Needs Allocation
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SVWD	Scotts Valley Water District
SBX7-7	Senate Bill 7 of Special Extended Session 7
SCWD	City of Santa Cruz Water Department
Scotts Valley	City of Scotts Valley
SF	Single Family
SLVWD	San Lorenzo Valley Water District
TCE	trichloroethylene
TDS	Total Dissolved Solids

TOC	Total Organic Carbon
μg/L	micrograms per liter
UAW	Unaccounted For Water
umhos/cm	Micromhos per centimeter
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
UV	ultraviolet
VOC	Volatile Organic Compound
WRF	Water Reclamation Facility
WSS	WaterSense Specification
WTF	Water Treatment Facility

THIS PAGE INTENTIONALLY BLANK

Section 2: Water Use

2.1 Overview

This section describes historic and current water usage and the methodology used to project future demands within SVWD's service area. Water usage is divided into sectors such as residential, commercial, industrial, institutional, landscape, and other purposes.

Several factors can affect demand projections, including:

- Land use revisions
- New regulations
- Increases in water rates
- Consumer choice
- Economic conditions
- Transportation needs
- Highway construction
- Environmental factors
- Conservation programs
- Plumbing codes

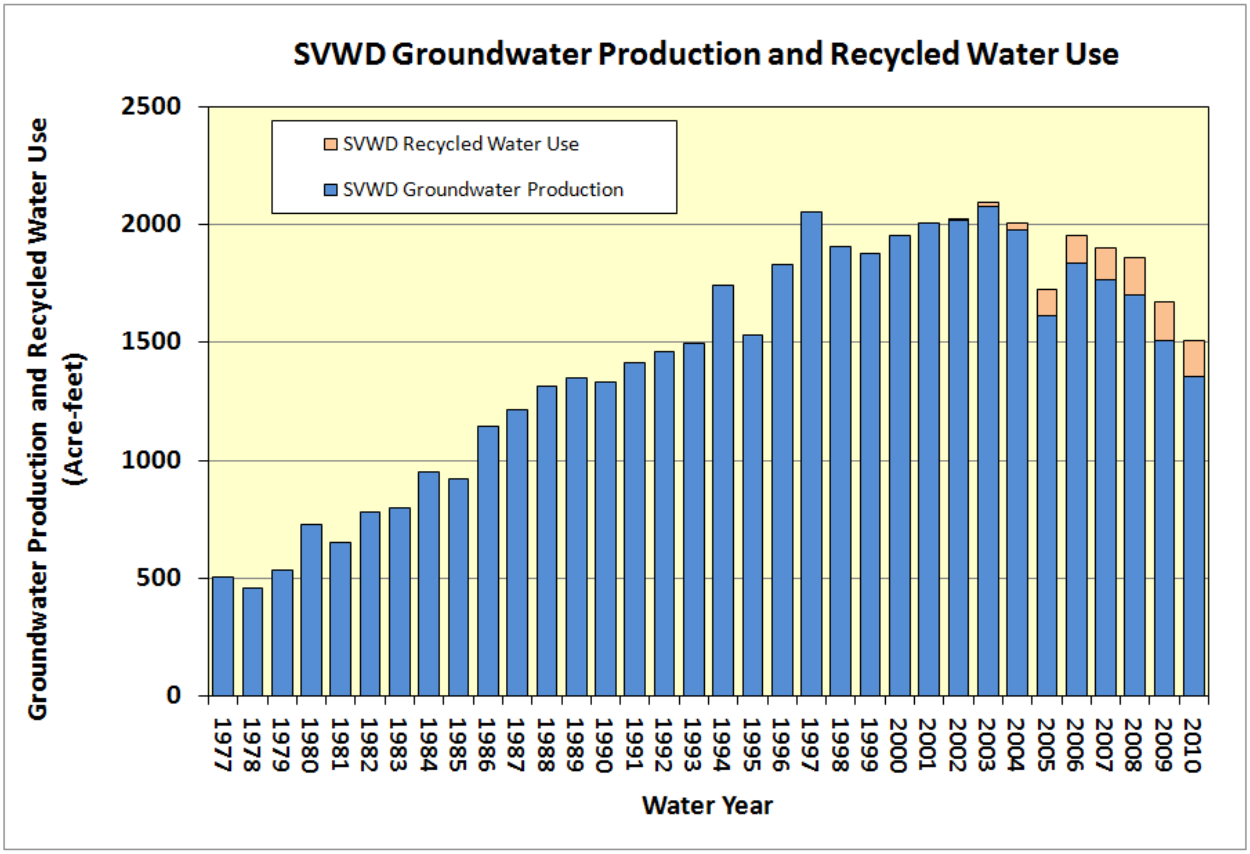
The foregoing factors affect the amount of water needed, as well as the timing of when it is needed. Past experience has indicated that the economy is the biggest factor in determining water demand projections. During an economic recession, there is often a major downturn in development and a subsequent slowing of the projected demand for water. The projections in this Plan do not attempt to forecast recessions or droughts. Likewise, no speculation is made about future plumbing codes or other regulatory changes. However, the projections do include water conservation. There have been, and continue to be, major efforts statewide and locally to conserve water, which have been successful.

2.2 Historic Water Use

Predicting future water supply requires accurate historic water use patterns and water usage records. Both the economy and entitlement process (compliance with the California Environmental Quality Act (CEQA)) are key factors impacting growth in population and demand.

Figure 2-1 presents the historical production of both groundwater and recycled water by SVWD since 1990. The water serves a range of customer types including single family homes, multi-family homes, commercial, industrial, institutional/government, and landscape, much of which is served with recycled water. A more detailed breakdown by customer classification is found in Tables 2-1 and 2-3.

Figure 2-1: Historical Groundwater Production and Recycled Water Production



2.3 Projected Water Use

2.3.1 Projections Based on Service Area Growth

SVWD maintains historical data, as well as works closely with property owners and developers in their service areas, to ensure they have an adequate water supply and the necessary infrastructure to provide water service. Table 2-1 is based on an evaluation of recent historical demand and future proposed projects and summarizes projected water demands in acre-feet per year (AFY) through 2035. Table 2-2 provides an estimate of population projections through 2035 in the SVWD service area which were derived from recent demographic information from the Association of Monterey Bay Area Governments (AMBAG) and demand projections which were adjusted to the 2010 Census estimates (AMBAG, 2011).

Table 2-3 presents the past, current and projected potable water delivery by customer type for the SVWD Service Area.

Table 2-1: Current and Projected Water Demands for Each Customer Class, Potable (AFY)

Projected Demand for Customer Class	2010[(a)]	2015	2020	2025	2030	2035
Single-family	772	923	912	894	893	916
Multi-family	101	121	119	117	117	120
Commercial	187	224	221	217	217	222
Industrial	63	75	74	73	73	75
Institutional/governmental	48	58	57	56	56	57
Landscape (Potable Irrigation)	68	81	80	78	78	80
Landscape (Recycled Water Irrigation)	149	191	241	290	330	330
Other (Fire Service)	1	1	1	1	1	1
Total Water Demand (AFY)	1,389	1,675	1,705	1,726	1,766	1,802

Note:

(a) Demands from 2010 metered deliveries.

Table 2-2: Current and Projected Population in SVWD Service Area

2010	2015	2020	2025	2030	2035
10,309	10,507	10,698	10,829	11,076	11,303

THIS PAGE INTENTIONALLY BLANK

Table 2-3: Current and Projected Water Demands

	2005				2010				2015				2020			
	Metered		Unmetered		Metered		Unmetered		Metered		Unmetered		Metered		Unmetered	
Water Use Sectors	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY
Single family	3014	873	0	0	3085	772	0	0	3611	923	0	0	3676	912	0	0
Multi-family	145	104	0	0	149	101	0	0	174	121	0	0	178	119	0	0
Commercial	191	227	0	0	193	187	0	0	226	224	0	0	230	221	0	0
Industrial	55	104	0	0	56	63	0	0	66	75	0	0	67	74	0	0
Institutional/ governmental	55	79	0	0	40	48	0	0	47	58	0	0	48	57	0	0
Landscape (Potable Irrigation)	77	125	0	0	69	68	0	0	81	81	0	0	82	80	0	0
Landscape (Recycled Water Irrigation)	21	73	0	0	36	149	0	0	55	191	0	0	65	241	0	0
Other (Fire Service)	200	1	0	0	270 1		0	0	270 1		0	0	275	1	0	0
Total	**3758**	**1586**	**0**	**0**	**3898**	**1389**	**0**	**0**	**4,530**	**1675**	**0**	**0**	**4619**	**1705**	**0**	**0**

	2025				2030				2035			
	Metered		Unmetered		Metered		Unmetered		Metered		Unmetered	
Water Use Sectors	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY
Single family	3720	894	0	0	3803	893	0	0	3879	916	0	0
Multi-family	180	117	0	0	184	117	0	0	187	120	0	0
Commercial	233	217	0	0	238	217	0	0	243	222	0	0
Industrial	68	73	0	0	69	73	0	0	70	75	0	0
Institutional/ governmental	48	56	0	0	49	56	0	0	50	57	0	0
Landscape (Potable Irrigation)	83	78	0	0	85	78	0	0	87	80	0	0
Landscape (Recycled Water Irrigation)	74	290	0	0	88	330	0	0	88	330	0	0
Other (Fire Service)	278	1	0	0	284 1		0	0	291	1	0	0
Total	**4684**	**1726**	**0**	**0**	**4800**	**1766**	**0**	**0**	**4896**	**1802**	**0**	**0**

THIS PAGE INTENTIONALLY BLANK

2.3.2 Methodology

The SVWD service area has experienced limited growth and is, for the most part, built out. The projections are based on population projection rates provided by the AMBAG and proposed developments that have been identified by SVWD and the City of Scotts Valley.

Customer Classification

The 2005-2010 meter data provided by SVWD were used to estimate percent representation across the various classes (Table 2-4). The percentage of each classification was calculated based on both connections and demand. It was found that single family residential represents 79.1 percent of the connections but only 55.5 percent of the water demand. Multi-family connections are estimated at 3.8 percent of total connections and 7.3 percent of the demand. For the purposes of distributing overall demand amongst customer classification, the percent distribution based on demand values not connection values was used.

Table 2-4: Regrouping for UWMP Classifications

Class	SVWD Revenue Code and Description	Percent Representation Based on 2010 Connections	Percent Representation Based on 2010 Demand
Single family	1 - Residential -Unknown Number of Units	79.1%	55.6%
	3 – Residential – Single Family Units		
Multi-family	4 - Residential Duplex	3.8%	7.3%
	5 - Residential Tri-Plex		
	6 – Residential – Four Plex		
	7 – Residential – Multi Units		
Commercial	2 - Commercial – Unknown Type of Business	5%	13.5%
	8 – Commercial – Retail		
	9 - Commercial - Offices		
Industrial	12-Industrial	1.4%	4.5%
Institutional / governmental	13 - School	1%	3.5%
	14 - Park		
	15 – Public Building		
	17- Pools (Swimming Centers)		
Landscape (Potable Irrigation)	10 - LSP - Domestic	1.8%	4.9%
Landscape (Recycled Water Irrigation)	11- Recycled Water	0.9%	10.7%
Other(Fire Service)	16 - Fire Service	6.9%	0.1%

2.4 Water Conservation Act of 2009

2.4.1 SBX7-7

As described in Senate Bill 7 of Special Extended Session 7 (SBX7-7), it is the intent of the California legislature to increase water use efficiency and the legislature has set a goal of a 20 percent per capita reduction in urban water use statewide by 2020. SBX7-7 requires that retail water suppliers comply with its requirements. Consistent with SBX7-7, the 2010 UWMP must provide an estimate of Base Daily Per Capita Water Use. This estimate utilizes information on population as well as base gross water use. For the purposes of this UWMP, population was estimated as described in the previous section. Base gross water use is defined as the total volume of water, treated or untreated, entering the distribution system, excluding recycled water; net volume of water placed into long-term storage; and water conveyed to another urban water supplier.

The UWMP Act allows urban water retailers to evaluate their Base Daily Per Capita Water Use using a 10- or 15-year period. A 10-year to 15-year base period within the range January 1, 1990 to December 31, 2010 is allowed if recycled water made up 10 percent or more of the 2008 retail water delivery. If recycled water did not make up 10 percent or more of the 2008 retail water delivery, then a retailer must use a 10-year base period within the range January 1, 1995 to December 31, 2010. Although recycled water was more than 10 percent of the 2008 delivery in SVWD, the Base Daily Per Capita Water Use in SVWD has been based on a 10-year period. In addition, urban retailers must report daily per capita water use for a 5-year period within the range January 1, 2003 to December 31, 2010. This 5-year base period is compared to the Target Based Daily Per Capita Water Use to determine the minimum water use reduction requirement.

For the population data, available GIS-based analysis provided by AMBAG and census data were used to estimate population for each year between 1994 to 2010, based on the approach described below. Data used for population is consistent with the method found in Appendix A of methodologies for *Calculating Baseline and Compliance Urban Per Capita Water Use* from DWR.

- The 1990 population is based on the AMBAG GIS based analysis of 1990 census block population data.

- The 2000 population is based on the AMBAG GIS-based analysis of 2000 census block population data.

- The 2010 population is based on the AMBAG GIS-based analysis of 2010 census block population data.

- For individual years with no population data, the known population data for the years listed were used to generate annual population estimates. The approach includes using a linear interpolation between the years that the population is known.

Groundwater and recycled water production were provided from the SVWD meter records. Table 2-5 summarizes the gallons per capita per day (gpcd) for compliance with SBX7-7. The calculated 10-year baseline is 179.9 gpcd and the 5-year baseline is 164.7 gpcd. The 2010 estimated water use (for the water year 2009-2010) is 117.6 gpcd, with a 2020 target of 143.9 gpcd based on Option 1 method as described in greater detail below.

Table 2-5: Base Period Ranges

Base	Parameter	Value	Units
10-15 year base period	2008 total water deliveries (a)	1,699.7	AF
	2008 total volume of delivered recycled water(a)	182.4	AF
	2008 recycled water as a percent of total deliveries	10.7	percent
	Number of years in base period	10	years
	Year beginning base period range	1995	
	Year ending base period range	2004	
5-year base period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

Note:
(a) Per SVWD meter records.

In addition to calculating base gross water use, SBX7-7 requires that SVWD identify their demand reduction targets for year 2015 and 2020 by utilizing one of four options:

- **Option 1:** 80 percent of baseline gpcd water use (i.e., a 20 percent reduction).
- **Option 2:** The sum of the following performance standards: indoor residential use (provisional standard set at 55 gpcd); plus landscape use, including dedicated and residential meters or connections equivalent to the State Model Landscape Ordinance (80 percent ETo existing landscapes, 70 percent of ETo for future landscapes); plus 10 percent reduction in baseline commercial, industrial institutional use by 2020.
- **Option 3:** 95 percent of the applicable state hydrologic region target as set in the DWR “20x2020 Water Conservation Plan” (20x2020 Plan) (DWR, 2010).
- **Option 4:** Savings by Water Sector: this method identifies water savings obtained through identified practices and subtracts them from the base daily per capita water use value identified for the water supplier.

Option 2 and Option 4 were considered and not selected, because they required data not currently being collected within the SVWD service area.

The SVWD service area is within the Central Coast Hydrologic Region as defined by DWR and this hydrologic region has been assigned a 2020 water use target of 117 gpcd per the DWR 20x2020 Water Conservation Plan (DWR, 2010). Therefore, in order to use Option 3, SVWD’s daily per capita water use for the 5-year base period would have to be close to 95 percent of the

117 gpcd target, or 111 gpcd. Since SVWD’s 5-year base period is greater than 111 gpcd limit, SVWD did not choose this option to reduce demand.

Option 1 is the simplest of the options provided and requires an 80 percent reduction in baseline per capita water use. Option 1 is also the most conservative of the four Options provided. For these reasons, SVWD selected Option 1 to comply with the SBX7-7 target.

This results in the 2020 target of 143.9 gpcd and the 2015 interim target of 161.9 gpcd for SVWD as shown in Tables 2-6 to 2-8.

Table 2-6: Base Daily Per Capita Water Use 10 to 15-Year Range

Base Period Year		Distribution System	Daily System Gross Water Use	Annual Daily Per Capita Water Use
Sequence Year	Water Year	Population	(MGD)	(gpcd)
Year 1	1995	8,797	1.37	155.7
Year 2	1996	8,994	1.63	181.7
Year 3	1997	9,191	1.83	199.3
Year 4	1998	9,388	1.70	181.5
Year 5	1999	9,585	1.68	174.9
Year 6	2000	9,782	1.74	178.1
Year 7	2001	9,835	1.79	182.2
Year 8	2002	9,887	1.80	182.5
Year 9	2003	9,940	1.86	186.6
Year 10	2004	9,993	1.76	176.5
Year 11	2005	10,046	1.44	143.3
Year 12	2006	10,098	1.64	162.2
Year 13	2007	10,151	1.57	155.1
Year 14	2008	10,204	1.52	148.7
Year 15	2009	10,256	1.35	131.2
10-year Average Base Daily Per Capita Water Use				**179.9**

Note: Shaded years indicate data period selected to calculate the Base Daily Per Capita Water Use.

Table 2-7: Base Daily Per Capita Water Use 5-Year Range

Base Period Year		Distribution	Daily System Gross Water Use	Annual Daily Per Capita Water Use
Sequence Year	Water Year	System Population	(MGD)	(gpcd)
Year 1	2003	9,940	1.86	186.6
Year 2	2004	9,993	1.76	176.5
Year 3	2005	10,046	1.44	143.3
Year 4	2006	10,098	1.64	162.2
Year 5	2007	10,151	1.57	155.1
5-Year Average Base Daily Per Capita Water Use				**164.7**

The baseline and 2020 target are presented in Table 2-8. Currently, SVWD’s water use is approximately 131 gpcd, which is below the 2020 target gpcd. The current low water demand is mainly attributed to drought, rate structure, and the economic downturn. SVWD intends to maintain this target as presented in Section 7.

Table 2-8: Baseline, Target and Current gpcd

Basis	gpcd
Baseline	179.9
Target 2020	143.9
Interim Target 2015	161.9
Current 2010	117.6

2.5 Other Factors Affecting Water Usage

Major factors that affect water usage are weather and water conservation. Historically, when the weather is hot and dry, water usage increases. The amount of increase varies according to the number of consecutive years of hot, dry weather and the conservation activities imposed. During cool-wet years, historical water usage has decreased to reflect less water usage for external landscaping. Water conservation measures employed within the SVWD service area have a direct long-term effect on water usage.

Furthermore, SVWD began using an inclining block rate structure with six tiers for all potable water customers in 1992. From 1992 to 2009, the sixth tier was set for consumption over 50,000 gallons in one month. In 2010, the usage ranges for the last four tiers were shortened to provide a greater economic incentive for conserving. The District also has an inclining block rate for all recycled water customers which is 80 percent of the potable rates. These rate structures have also contributed to reductions in water usage and assure that recycled water is also wisely used.

2.5.1 Conservation Effects on Water Usage

In recent years, water conservation has become an increasingly important factor in water supply planning in California. The California plumbing code has instituted requirements for new construction that mandate the installation of ultra low-flow toilets and low-flow showerheads. SVWD continues to support the development of water conservation measures that include public information and education programs.

Residential, commercial, and industrial usage can be expected to decrease as a result of the implementation of more aggressive water conservation practices. The greatest opportunity for conservation is in developing greater efficiency and reduction in landscape irrigation especially in SVWD’s service area where irrigation can be a high proportion of water used. The irrigation demand can represent as much as 50 percent of the water demand for residential customers depending upon the size of the property and the type of landscape. SVWD also encourages recycled water use on landscape in facilities near the recycled water distribution system.

2.6 Low Income Projected Water Demands

Senate Bill 1087 requires that water use projections of a UWMP include the projected water use for single-family and multi-family residential housing for lower income households as identified in the housing element of any city, county, or city and county general plan in the service area of the supplier.

Housing elements rely on the Regional Housing Needs Allocation (RHNA) generated by the State Department of Housing and Community Development (HCD) to allocate the regional need for housing to the regional Council of Governments (COG) (or a HCD for cities and counties not covered by a COG) for incorporation into housing element updates. Before the housing element is due, the HCD determines the total regional housing need for the next planning period for each region in the state and allocates that need. The COGs then allocate to each local jurisdiction its “fair share” of the RHNA, broken down by income categories; very low, low, moderate, and above moderate, over the housing element’s planning period. AMBAG is the COG responsible for preparing the RHNA for the Scotts Valley area. The City of Scotts Valley, in turn incorporated AMBAG’s RHNA into the 2009 update of the housing element of the General Plan.

The housing elements cover the planning period 2009-2014. The allocation for very low and low income classes as defined by the California Health and Safety Code were the following for the AMBAG region (AMBAG, 2008):

- Very Low – 22 percent
- Low – 17 percent

The AMBAG RHNA does not classify the allocation of low income households between single-family and multi-family residential housing types. It has been assumed that, both housing types are included in the projected water use for lower income households. To remain consistent with the intent of the SB1087 legislation and also to comply with the UWMP Planning Act, intent has been made to identify those water use projections for very low- and low- residential income households based on the income category, classification percentage, calculated demand projections as shown in Table 2-9 below.

Note that the current planning period for the RHNA is from January 1, 2007 through June 30, 2014. The next RHNA planning cycle will cover January 1, 2011 to September 30, 2021. Thus, the 2015 UWMP update will need to be updated with the next RHNA planning cycle and allocation of low income category percentages.

SVWD will not deny or condition approval of water services, or reduce the amount of services applied for by a proposed development that includes housing units affordable to lower income households.

Table 2-9: Low Income Water Demand (AFY)

	2010	**2015**	**2020**	**2025**	**2030**	**2035**
Demand(a)	1,389	1,675	1,705	1,726	1,766	1,802
Very low income(b)	169.8	203.2	193.8	191.2	184.9	178.2
Low income(b)	17.1	20.5	19.6	19.3	18.7	18.0
Total	187.0	223.7	213.4	210.5	203.6	196.2

Notes:

(a) Demand from Table 2-1

(b) Draft Regional Housing Need Allocation Plan - Planning Period (January 1, 2007 - June 30, 2014) for Jurisdictions within AMBAG www.co.monterey.ca.us/planning/...2008/.../AMBAG-2008b.pdf

THIS PAGE IS INTENTIONALLY BLANK

Section 3: Water Resources

3.1 Overview

This section describes the SVWD's existing and planned sources of water supply for the 25-year period covered by the Plan. Table 3-1 is a summary of the existing and planned water supply sources discussed in this Section, from the present (2010) to 2035 in five-year increments. Sections 3.2 through 3.4 provide details of the water supplies summarized in Table 3-1.

The term "dry" is used throughout this section and in subsequent sections concerning water resources and reliability as a measure of supply availability. As used in this Plan, dry years are those years when precipitation is lower than the long-term average precipitation and results in lower recharge. The impact of low precipitation in a given year may differ based on how low the precipitation is, or whether the year follows a high-precipitation year or another low-precipitation year. Also, dry conditions can differ geographically. For example, a dry year can be local to the Scotts Valley area (thereby affecting local groundwater replenishment and production in the Santa Margarita Basin), local to northern California, or statewide. When the term "dry" is used in this Plan, local drought conditions are assumed, affecting both local groundwater and surface water supplies at the same time. SVWD relies primarily on groundwater sources from the regional Santa Margarita Basin and does not currently rely on local surface water as part of their supply.

Table 3-1: Summary of Current and Planned Water Supplies (AFY)

Water Supply Sources	2010	2015	2020	2025	2030	2035
Wholesale (Imported) Water	0	0	0	0	0	0
SVWD Produced Potable Groundwater from Santa Margarita Basin	1,358	1,484	1,345	1,316	1,315	1,352
Transfer In/Out	0	0	0	0	0	0
Exchange In (Potable projected use) (a)	0	0	120	120	120	120
Recycled Water (Non-potable local use, existing and projected) (b)	149	191	241	290	330	330
Desalination (c)	0	0	0	0	0	0
Total Water Supply	**1,507**	**1,675**	**1,705**	**1,726**	**1,766**	**1,802**
Total Pumping Amount Potentially Available to SVWD and Other Pumpers (Sustainable Yield) (d)	2,600	2,600	2,600	2,600	2,600	2,600

Notes:

(a) This represents potable exchange with the SCWD in exchange for recycled water sale by SVWD to Pasatiempo Golf Club. SVWD's recycled water sale to the Golf Club is used for irrigation in the Golf Club, which is outside of SVWD's service area; thus, not accounted for in this table.

(b) SVWD's Recycled Water Program is anticipated to expand gradually to provide 330 AFY by 2030.

(c) SVWD currently does not have water supply through desalination.

(d) Based on the sustainable yield estimate for the portion of the basin (Scotts Valley portion of the Santa Margarita Basin) underlying Scotts Valley, as provided by the modeling analysis (ETIC, 2006). Sustainable yield is shared with the SLVWD and other small public and private pumpers.

3.2 Wholesale (Imported) Water Supplies

SVWD has no current and future plans to acquire wholesale (imported) water from a wholesale agency. SVWD obtains its potable water supply from the Santa Margarita Groundwater Basin, as shown in Table 3-1. Future exchanges with SCWD may result for recycled water from Scotts Valley to be exchanged for treated surface water from SCWD.

3.3 Groundwater

SVWD relies on groundwater sources from the regional Santa Margarita Basin. Groundwater has been the sole source of potable water supply for SVWD; thus, careful management is necessary to manage the groundwater resource in a sustainable manner. SVWD has been actively managing the groundwater basin since the early 1980's in an effort to increase water supply reliability and to protect local water supply sources. Through the past groundwater management and resource planning activities, SVWD has proven its commitment in progressively embracing activities that will protect groundwater resources and provide reliable water supply. Currently, SVWD operates six production wells (SVWD Wells #3B, #7A, #9, #10A, #11A, and #11B). Locations of the wells are shown on Figure 1-2.

In addition to SVWD, other water purveyors pump groundwater in the Santa Margarita Basin, including the SLVWD, Lompico County Water Department, the Mt. Hermon Association, the Santa Cruz Water Department, Soquel Creek Water District, and other domestic, private production wells.

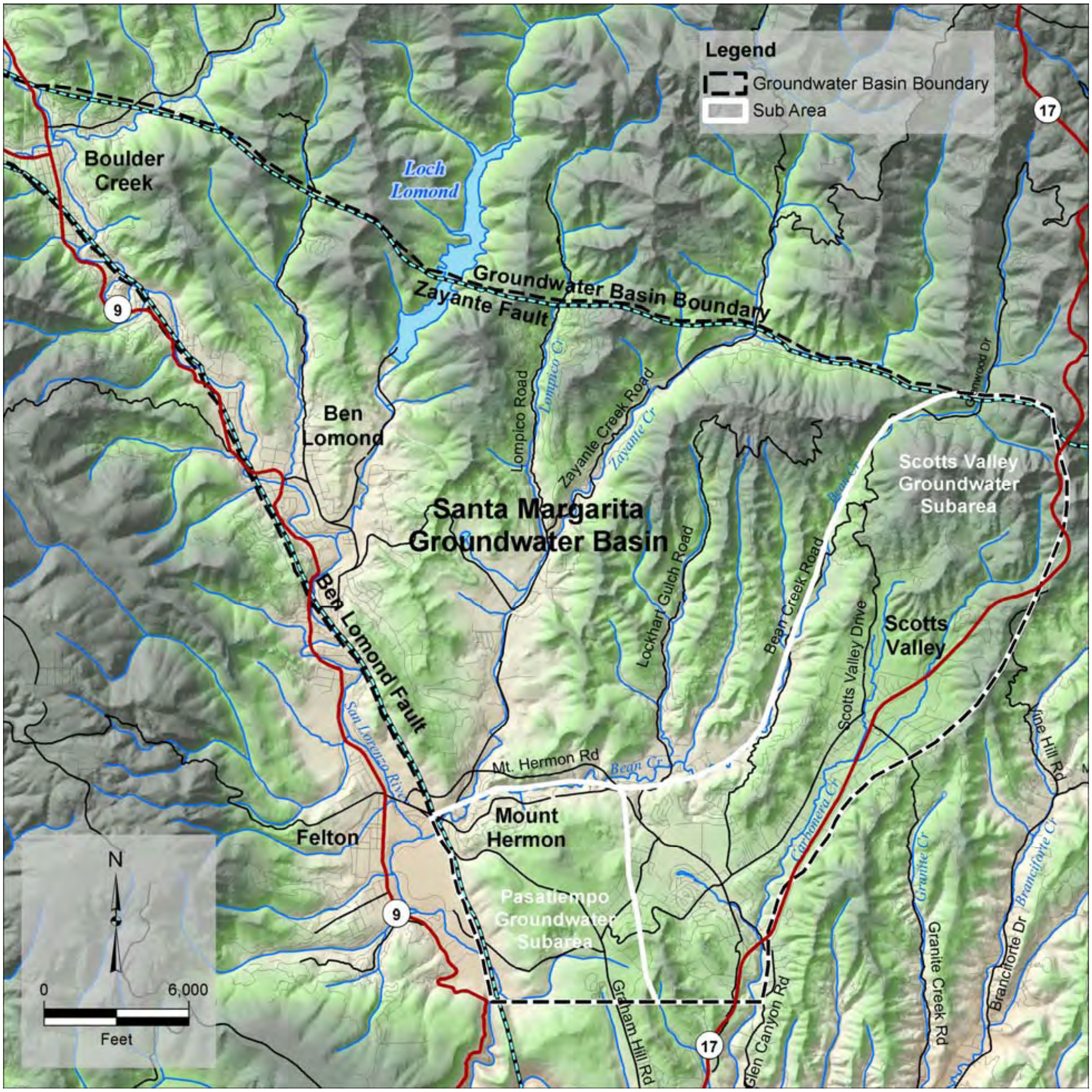
This section presents information about SVWD's groundwater supplies, including a summary of the basin description and historical and projected groundwater pumping from the basin.

3.3.1 Santa Margarita Groundwater Basin

The Santa Margarita Basin covers over 30 square miles in the Santa Cruz Mountains. The basin forms a roughly triangular area that extends from Scotts Valley in the east, to Boulder Creek in the northwest, to Felton in the southwest (Figure 3-1). The Santa Margarita Basin is a geologically complex area that was formed by the same tectonic forces that created the Santa Cruz Mountains. The basin is bounded by two regional faults, the Ben Lomond Fault to the west and the Zayante Fault to the north.

The Santa Margarita Basin includes portions of DWR defined Basins 3-21, 3-27, and 3-50. The DWR has not classified these basins as overdrafted and these basins are not adjudicated as defined by DWR Bulletin 118 (DWR, 2003). SVWD overlies the Scotts Valley Groundwater Basin, designated as Groundwater Basin 3-27 by the DWR (DWR, 2003) and as a Sole Source Aquifer by the USEPA (Figure 3-1). The Scotts Valley Groundwater Basin is defined by DWR as encompassing 1.2 square miles of alluvium in Scotts Valley surrounded by Tertiary sedimentary formations.

Figure 3-1: Santa Margarita Groundwater Basin



3.3.1.1 Geology of the Santa Margarita Basin

The Santa Margarita Basin consists of a sequence of sandstone, siltstone, and shale that is underlain by granite. This sequence of sedimentary rocks is divided into several geologic formations that are defined on the basis of the type of rock and their relative geologic age based on studies by the United States Geological Survey (USGS) in reports by Clark (1966 and 1981), Brabb et al. (1997) and McLaughlin et al. (2001).

In the Santa Margarita Basin, the geologic formations that contain significant sandstone layers are the primary aquifers for water supply. The primary aquifers in the basin include:

- Santa Margarita Sandstone (Santa Margarita),
- Monterey Formation (Monterey),
- Lompico Sandstone (Lompico), and
- Butano Formation (Butano).

Historically, the majority of the water supply in the Scotts Valley area has been derived from the Santa Margarita, Lompico, and Butano.

The Santa Margarita and Lompico have long been recognized as primary aquifers. The Santa Margarita has a long groundwater production history, with several production wells completed within this unit (Muir, 1981). Similarly, the Lompico is currently the primary groundwater-producing horizon with several large production wells completed in this unit.

The Butano had been mapped in surface outcrop by Clark (1966 and 1981). However, it was not recognized as the deep aquifer underlying the northern Scotts Valley until more recently (ETIC, 2006 and 2007) when SVWD Wells #3B and #7A were reinterpreted as being completed primarily within the Butano. The production history of these wells indicates that the Butano is capable of producing significant volumes of groundwater.

The sandstone interbeds and the fractured siltstones in the Monterey can locally produce groundwater; however, the Monterey has limited water supply potential that is typically used for private domestic wells rather than for municipal supply. The SVWD Well #9 is completed across both the Santa Margarita and Monterey. Groundwater production from SVWD Well #9 has significantly decreased from historic production rates now that the well produces almost exclusively from the Monterey.

3.3.1.2 Scotts Valley and Pasatiempo Subbasins

Two subareas in the regional Santa Margarita Basin are defined and reported by SVWD to help facilitate the discussion of local groundwater basin conditions underlying the SVWD service area. These include the Scotts Valley Groundwater Subarea which is the portion of the Santa Margarita Groundwater Basin primarily used by the SVWD and the Pasatiempo Groundwater Subarea which is the portion of the Santa Margarita Groundwater Basin used primarily by the SLVWD. SVWD overlies the Scotts Valley Groundwater Subarea, encompassing 5.5 square miles. Figure 3-1 shows the boundaries of the regional Santa Margarita Basin, the Scotts Valley Groundwater Subarea, Pasatiempo Groundwater Subarea, and the service area for SVWD.

3.3.2 Adopted Groundwater Management Plan

In 1994, SVWD formally adopted its Groundwater Management Plan (GMP) in accordance with the California Groundwater Management Planning Act groundwater legislation (codified in California Water Code Section 10750, et seq). The SVWD GMP (Todd Engineers, 1994) was the third GMP recorded by DWR. A copy of the SVWD's GMP is presented in Appendix D.

The overall purpose of the SVWD GMP is to develop a planning tool that will help guide SVWD in the management of the quantity and quality of the groundwater supply and to comply with the requirements of the California Groundwater Management Planning Act. As stated in the SVWD GMP:

> *"The purpose of this groundwater management plan is to address two major areas of concern in Scotts Valley: (1) management of groundwater supplies to meet present and future demands, and to provide for downstream water rights and in-stream uses; and (2) protection of water quality and remediation of existing groundwater contamination."*

The main goal of the GMP is to better manage the sole source aquifer serving the community's drinking water. The goal of the SVWD GMP is stated as:

> *"By implementation of a groundwater management plan for Scotts Valley, SVWD hopes to preserve and enhance the groundwater resource in terms of quality and quantity, and to minimize the cost of management by coordination of efforts among agencies."*

Prior to the establishment of formalized GMPs, SVWD prepared annual "Water Resources Management Plans". These plans, similar to later GMPs, were prepared from 1984 through 1994. After California Water Code §10700 was enacted, providing authority for local agencies to adopt GMPs, SVWD prepared and adopted its formal GMP in July 1994.

3.3.2.1 Basin Management Objectives

The California Groundwater Management Planning Act requires the development of Basin Management Objectives (BMOs). The BMOs for SVWD's GMP are currently summarized as:

- Encouragement of public participation through an annual report of groundwater management activities at one or more public meetings.
- Coordination with other local agencies.
- Continued monitoring and evaluation of groundwater conditions.

- Implementation of groundwater augmentation projects.

- Investigation of groundwater quality and prevention of groundwater contamination.

These basin management objectives continue to guide the SVWD groundwater management program and serve as the major objectives of groundwater management for SVWD.

3.3.2.2 Groundwater Management Monitoring Program

As part of the GMP, SVWD has conducted a comprehensive Monitoring Program of groundwater conditions in the Scotts Valley area for over 20 years. The primary components of this Monitoring Program are:

- **Groundwater Levels -** Groundwater elevation data collected by SVWD, other local agencies, private entities, and consultants.

- **Groundwater Pumping -** Groundwater pumping compiled by SVWD and nearby groundwater users.

- **Precipitation -** Precipitation data measured by SVWD and other nearby gauges.

- **Water Quality -**Water quality data collected by SVWD production wells, private entities, and environmental compliance sites.

The Monitoring Program is designed to monitor changes in groundwater conditions to provide the basis for making groundwater management decisions. Monitoring and reporting activities are conducted to provide SVWD with necessary data and analyses to meet the Groundwater Management Goals and the BMOs. The monitoring program is reviewed periodically by SVWD to verify that it is providing the appropriate information to meet the Groundwater Management Goals and the BMOs.

3.3.2.3 Groundwater Management Program Annual Report

SVWD prepares an Annual Report each year to provide a summary of groundwater management activities by SVWD and the groundwater conditions in the Scotts Valley area. The results, analysis and interpretation of the Monitoring Program are incorporated into Annual Reports that are intended to provide a summary of the issues and analyses that are most pertinent to the needs and decisions that SVWD is currently facing. The report focuses on the water supply and water quality of the Basin to provide an assessment of groundwater management options and groundwater augmentation goals and options.

Annual Reports from the past several years and SVWD’s complete updated databases can be downloaded from the SVWD website (www.svwd.org/index/District_Reports). In addition to the preparation of the Annual Report, SVWD conducts a public presentation annually to provide an update of the groundwater conditions, per the DWR requirement for the GMP.

3.3.2.4 Groundwater Levels

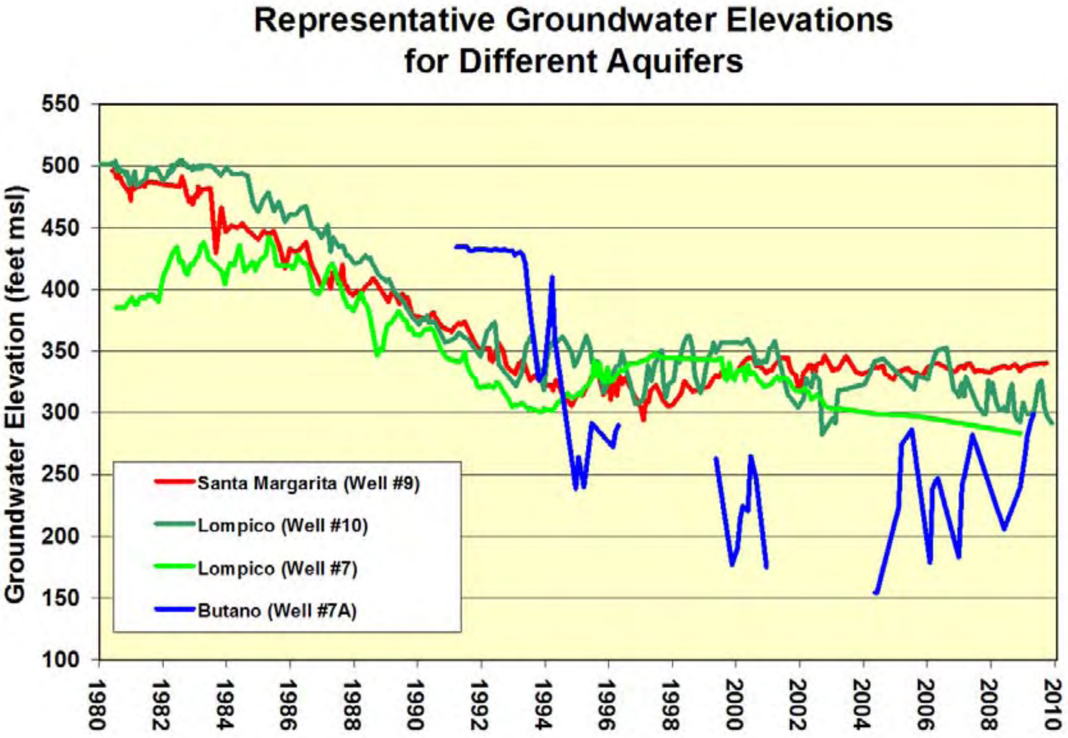
Groundwater flow in the basin is generally westward, toward Bean Creek, in the northern and southern portions of the basin (DWR, 2003). Bean Creek is topographically lower and parallels the basin in the northwest. Precipitation is the primary source of groundwater recharge in the basin in the form of direct percolation of precipitation through the soil to groundwater or infiltration from streams. The major groundwater outflows include discharge to streams and springs and groundwater pumping.

Historically, the majority of SVWD groundwater production has been derived from the major aquifers Santa Margarita, Lompico, and Butano. Groundwater levels in the Santa Margarita and Lompico declined by about 200 feet in the Scotts Valley area between the early 1980s and mid-1990s. Since the mid-1990s, groundwater levels in most Santa Margarita and Lompico wells in the Scotts Valley area have reduced the rapid rate of decline seen earlier. SVWD has conducted special assessments of the drawdown observed in the basin over the past several years to better understand the factors contributing to these trends (Kennedy/Jenks, 2008).

Figure 3-2 shows a hydrograph of groundwater levels since 1980 for representative wells in each of the major aquifers in the Scotts Valley area. The location of these wells is shown on Figure 1-2. The representative wells on Figure 3-2 include:

- The Santa Margarita is represented by SVWD Well #9. This well has not been pumped for several years.
- The Lompico is represented by SVWD Well #10 to represent the western areas and SVWD Well #7 to represent the eastern areas.
- The Butano is represented by SVWD Well #7A.

Figure 3-2: Historical Groundwater Levels from Different Aquifers



Prior to 1980, groundwater levels in the Scotts Valley area were generally higher than those in most of the rest of the Santa Margarita Basin. Therefore, the Scotts Valley area was a major recharge area for the basin, and groundwater flowed outward to the surrounding areas. After 1980, a variety of factors probably contributed to the observed groundwater level declines. The major factors include groundwater pumping increase to meet the water demand of a growing population, reduced recharge from the surface to groundwater due to an increase in paved areas and other land use changes associated with urbanization, and reduced groundwater recharge due to the drought of the late 1980s and early 1990s. A significant portion of the groundwater storage in the Santa Margarita was depleted during this time and has not recovered sufficiently to be considered a viable source of supply for SVWD. Production in other aquifers has been developed to replace the Santa Margarita supply.

Since the mid-1990s, groundwater levels in most Santa Margarita and Lompico wells in the Scotts Valley area have reduced the rapid rate of decline seen earlier. The water levels have generally fallen about 50 feet in the last decade, as shown in Figure 3-2. The most likely factor that has contributed to the observed trend is that lower groundwater levels in the Scotts Valley area allow groundwater from other portions of the basin to flow towards Scotts Valley. The generally above-average rainfall since the drought of the late 1980s and early 1990s may have also contributed to the observed trend in groundwater levels.

Even though total groundwater production from all producers in the Scotts Valley area has steadily declined from 2002 through 2010, as further described below, groundwater levels have not shown any commensurate rise in response to the decline in pumping. Total groundwater pumping in 2010 was 1,358 AF, which is the lowest since 1990. The likely explanation of this pattern is that the potential increase in groundwater storage is spread over a large area so that the groundwater level response is not readily apparent from year to year. In addition, the reduction in recharge from urbanization and other causes has limited the ability of the aquifer to recover. An update to the groundwater model has been approved for funding under Proposition 84 and may provide additional information to understand recharge and aquifer storage and to update the sustainable yield estimate for the Scotts Valley Area.

3.3.2.5 Available Groundwater Supplies

The projected groundwater pumping by SVWD in the Santa Margarita Basin (primarily the Scotts Valley Groundwater Subarea) is summarized in Table 3-2. As the sole source of potable water supply for SVWD, the Santa Margarita Sandstone Aquifer was designated as a “Sole Source Aquifer” by USEPA in 1985 (Federal Register, 1985). The “*Santa Margarita Aquifer, Scotts Valley*” is one of four areas in California designated as a “Sole Source Aquifer”. The technical basis for this designation was the USGS report by Muir (1981). The USEPA defines a “Sole Source Aquifer” as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source that can physically, legally and economically supply all those who depend on the aquifer for drinking water (Federal Register, 1985).

Table 3-2 presents SVWD’s projected pumping from 2015 through 2035 with projected pumping ranging from 1,315 AFY to 1,352 AFY. The pumping from other producers in the area was about 860 AFY in 2010. If this value is added to the estimated pumping from SVWD, the total is below the estimated sustainable yield. Some increase in pumping from the other producers may occur in the future unless additional water conservation measures are implemented.

Table 3-2: Projected SVWD Groundwater Production (AFY)

Water Supply Sources	2015	2020	2025	2030	2035
Supplier Produced Potable Groundwater from Santa Margarita Groundwater Basin[(a)]	1,484	1,345	1,316	1,315 1,352	
Total	**1,484**	**1,345**	**1,316**	**1,315**	**1,352**
Percent of Total Supply	**89%**	**79%**	**76%**	**75%**	**75%**
Total Pumping Amount Potentially Available to SVWD and Other Pumpers (Sustainable Yield)[(b)]	2,600	2,600	2,600	2,600 2,600	

Notes:

(a) Projected groundwater pumping.

(b) Based on the sustainable yield estimate for the portion of the basin underlying Scotts Valley, as provided by the modeling analysis (ETIC, 2006). Projected declines in SVWD pumping may offset future pumping increases by other pumpers keeping overall pumping within the sustainable yield. Other pumpers were estimated to pump 860 AFY in 2010.

The regional Santa Margarita and Lompico aquifers have historically presented a significant source of storage in the region as described in Bulletin 118 (DWR, 2003) although not all portions of the aquifers are available to Scotts Valley.. The Butano was not recognized as the deep aquifer underlying the northern Scotts Valley until more recently when this formation was identified as a water-bearing unit by the revised Santa Margarita Groundwater Basin hydrogeologic interpretation (ETIC, 2006 and 2007). The production history of SVWD wells extracting water from the Butano aquifer indicates that the Butano is capable of producing significant volumes of groundwater. In 2010, SVWD started the Butano Formation Groundwater Monitoring Project, funded by the AB303 Local Groundwater Assistance Program administered by DWR. This project will install two groundwater monitoring wells in the Butano and purchase equipment for conducting long-term groundwater monitoring. The purpose of the project is to better characterize groundwater in the Butano, and help guide future decisions about whether to install new production wells in the Butano.

3.3.2.5.1 Sustainable Yield

The sustainable yield of the Basin was initially estimated to be approximately 4,200 AFY (Todd, 1995). This volume was reevaluated in 1998 by Todd Engineers using the basic water balance equation: inflow minus outflow equals change in storage. In brief, the 1998 study confirmed that the 4,200 AFY value for sustainable yield was reasonably accurate and conservative. In 2006, the basin-wide Santa Margarita Basin Groundwater Model was completed. The numerical model was used to produce a sustainable yield volume given the current pumping scheme in the basin and the revised hydrogeologic interpretation.

Based on the numerical model analysis, the sustainable yield for the entire Santa Margarita Basin was estimated at 3,320 AFY (ETIC, 2006). This volume represents the amount of water that is available to the water producers under the current pumping configuration without causing any overall change in storage. Further analysis estimated the sustainable yield in just the Scotts Valley area at 2,600 AFY (ETIC, 2006). The sustainable yield (as defined by ETIC, 2006) represents the annual amount of water that can be taken from the existing wells in a basin over a period of years without "causing adverse impacts" (i.e. depleting storage beyond the ability of the basin to be replenished naturally). Exceeding the sustainable yield for the basin may lead to perennial declines in groundwater levels which over time may result in widespread loss of well production.

Based on the more recent analysis (ETIC, 2006), in this Plan, the sustainable yield of 2,600 AFY is considered to be the available groundwater resource for SVWD and other users of the Scotts Valley and Pasatiempo Subbasins. This amount represents the annual amount of water that can be taken from the existing wells in the basin over a period of years without "causing adverse impacts". The sustainable yield estimate will be reviewed as part of the update of the groundwater model which is planned for Fall 2011 under a Proposition 84 grant.

SVWD's projected pumping in Table 3-2 is significantly below the estimated sustainable yield of 2,600 AFY and is expected to decline over time as recycled water is more fully utilized. Therefore, potential increased pumping by other pumpers in the Scotts Valley Groundwater Subarea will likely be within the overall sustainable yield of the basin. As shown in Table 3-2, SVWD's groundwater pumping is anticipated to decline from 1,484 AFY in 2015 to 1,352 AFY in

2035 as more recycled water becomes available for non-potable irrigation from the Recycled Water Program and water demand reduces as a result of the Water Conservation Program. Given the pumping projections that are below the estimate of sustainable yield, water supply reliability issues are not anticipated to occur in the SVWD service area.

Table 3-3 presents SVWD's historical and current annual total groundwater pumping from 2005 to 2010. On average, about 90 to 94 percent of water historically used in the service area was from groundwater extraction. The remaining was supplied by recycled water that has increased from about 0.2 AF delivery in 2002 to about 149 AF delivery in 2010. Groundwater production of 1,358 AF in 2010, which is less than historical pumping since 1990, is attributed to drought conditions, use of recycled water, implementation of conservation programs, and poor economic conditions.

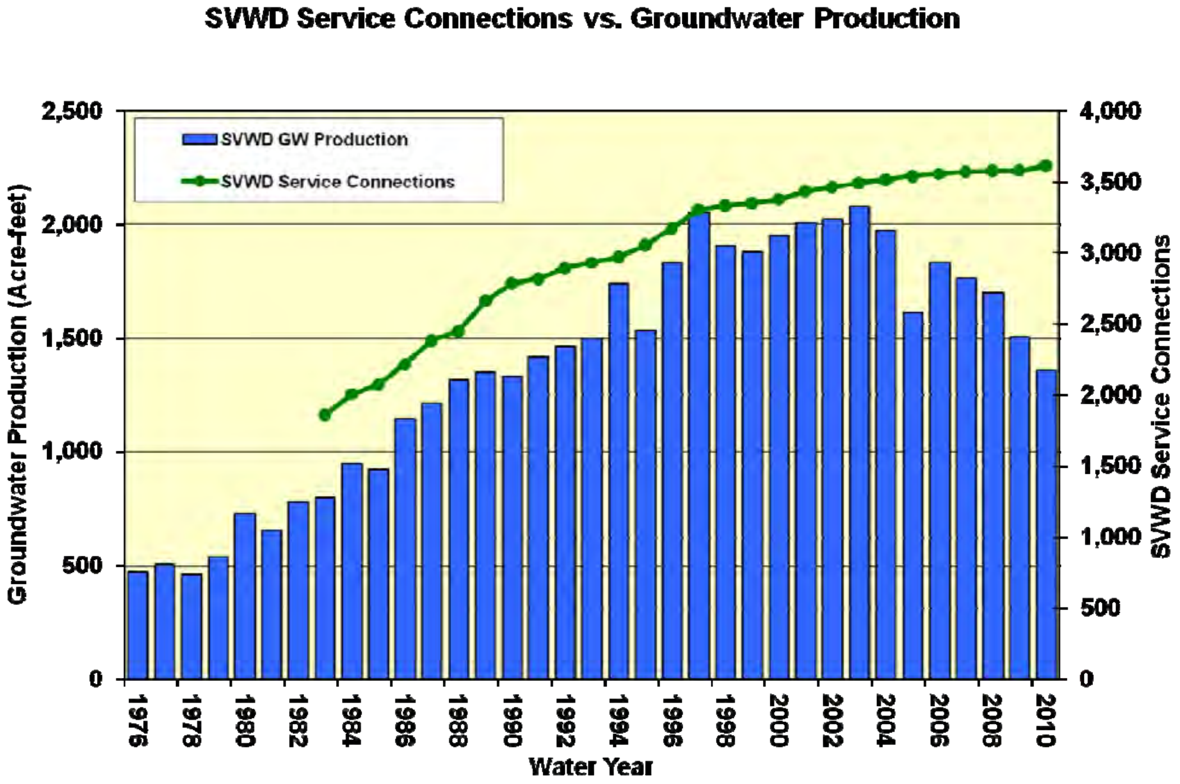
Table 3-3: SVWD Historical Groundwater Production (AFY)

Basin Name	2005	2006	2007	2008	2009	2010
Santa Margarita Basin[a]	1,613	1,834	1,764	1,700	1,507	1,358
Total	**1,613**	**1,834**	**1,764**	**1,700**	**1,507**	**1,358**
Percent of Total Water Supply	93%	94%	93%	91%	90%	90%

Note:
[a] Groundwater pumping production provided by SVWD based on metered data.

Historical groundwater pumping data dating back to 1976 show that prior to 2003, groundwater production grew accordingly with the increase in population in Scotts Valley (Figure 3-3). From 1977 through 2003, groundwater production rose steadily from about 500 AF to over 2,000 AF (Figure 3-3). Since 2004, however, SVWD has actively worked to control the growth in the water supply demand primarily through implementing the Recycled Water and Water Conservation Programs, each of which are described in Sections 4 and 7 respectively. The observed decline in groundwater production primarily results from these programs. In the past seven years, groundwater production has steadily declined by an average of about 100 AFY, even though the number of service connections has slightly increased (Figure 3-3). The exception was 2005, when water demand was affected by climatic conditions and an unusually wet spring reduced the outdoor water needs until late into the summer (Kennedy/Jenks, 2008). SVWD's groundwater production over the past six years has averaged 1,629 AFY, which is below the estimated sustainable yield of 2,600 AFY for the Scotts Valley Groundwater Subarea that is available to SVWD and the other pumpers. About 860 AFY was pumped by the other pumpers in 2010.

Figure 3-3: Annual Groundwater Production by SVWD



Currently, SVWD operates six production wells: SVWD Wells #3B, #7A, #9, #10A, #11A, and #11B (Figure 1-1). The total well capacity for SVWD wells is estimated to be 1,995 gallons per minute (gpm). Wells #7A and #3B were completed in the Butano formation and the remaining four wells were completed in the Lompico and Santa Margarita Sandstone. In 2007, Well #10A was installed as a replacement for Well #10. Well #10 is not considered an active production well, but it does retain some limited capacity for production. Table 3-4 provides an annual summary of the total groundwater production for each well from 2005 to 2010. Of the six active production wells, Wells #3B, #7A, #10A, and #11B are the highest producing wells in 2010, whereas production from Wells #9 and #11A is significantly less. Well #10 was not used in 2010 except for water quality testing and maintenance.

Table 3-5 shows estimated pumping volumes by SVWD from each major formation in the basin. In 2010, the majority (99.8 percent) of the groundwater production for SVWD water supply was derived from the Lompico and the Butano. In 2010, the Lompico is the highest producing aquifer with an estimated 894 AF and the Butano is the second highest producing aquifer with 462 AF.

Table 3-4: Groundwater Production By Well (AFY)

SVWD Well	2005	2006	2007	2008	2009	2010
Well #3B	234	280	409	186	235	150
Well #7A	644	595	456	452	504	427
Well #9	55	54	65	68	16	3
Well #10	153	435	60	0	1	1
Well #10A	0	0	92	544	397	357
Well #11A	117	75	132	84	36	20
Well #11B	411	396	550	365	319	400
Total	**1,613**	**1,834**	**1,764**	**1,700**	**1,507**	**1,358**

Table 3-5: Groundwater Production by Aquifer (AFY)

Aquifer	2005	2006	2007	2008	2009	2010
Santa Margarita	11	11	13	14	3	1
Monterey	44	43	52	55 13		2
Lompico	856	1,081	1,007	1,121	900	894
Butano	702	700	692	510 591		462
Total	**1,613**	**1,834**	**1,764**	**1,700**	**1,507**	**1,358**

3.3.2.6 Groundwater Storage Changes

The Santa Margarita Groundwater Basin Model (ETIC, 2006) was used to evaluate the change in groundwater storage. The updated model was recently used to quantify the overall decline in storage from 1985-2010 (based on water year). Over the past 25 years, the change in groundwater storage has varied from an increase of over 600 AF to decreases of nearly 1,900 AF, depending primarily in response to variation in annual precipitation and groundwater pumping. During the period of extended drought in the Scotts Valley area from 1985 to 1992, the basin has experienced the highest storage decline, at an annual rate of 500 AFY to 1,900 AFY. This was also a period of increasing groundwater production both by SVWD and other users. During the period from 1993 to 2004, groundwater storage typically declined at a lower rate, by 300 AFY to 500 AFY even though groundwater production increased to its highest levels. In 1995 and 1998, groundwater storage was estimated in the model to increase due to above-average precipitation resulting in high recharge rates for those years.

The most recent model analysis indicates a significant storage increase of almost 400 AF in 2010 which is not corroborated by the water level data found in Figure 3-2. As described earlier, the groundwater model will be updated under a Proposition 84 grant which will provide a revised estimate of storage. Increases in groundwater storage were greater than 500 AF in 2005 and 2006, due to above average rainfall, combined with continued lower groundwater production by SVWD as a result of the Recycled Water Program and Water Conservation Program. As further explained in Section 4, recycled water deliveries have increased since the Recycled Water Program started in 2002. In 2010, recycled water deliveries were approximately 149 AF. Between 2002 and 2010, approximately 900 AF of recycled water has been delivered for use.

All the current recycled water users are in the Santa Margarita Basin; thus, the entire 900 AF represents an equivalent groundwater savings. In other words, groundwater not pumped is considered as in-lieu recharge in storage and available for future beneficial uses. Recycled water use is anticipated to gradually increase to 330 AFY by 2030, as shown in Table 3-1, for non-potable irrigation. This will further offset some of groundwater pumping currently used for irrigation.

Adequacy of Supply

Although there have been significant years of drought, the overall storage in the basin is apparently sufficient to provide adequate resources for SVWD given the past, current, and anticipated future demand. The long-term adequacy of the supply will rely on improving direct and in-lieu recharge, and reduction in groundwater pumping through improved water use efficiency, recycled water production. The reliability of supply can be also affected by the loss of individual wells resulting from catastrophe, such as an earthquake, or environmental contamination. These scenarios are discussed further in Section 8 of this Plan.

SVWD overlies a significant portion of the Basin which has been estimated to have an overall storage capacity of over 200,000 AF, a portion of which is accessible to SVWD. The very nature of groundwater reduces the short-term impact of drought years because of the absolute availability of supply, but long-term impacts need to be managed by monitoring the condition of storage, water level, and well performance under these conditions.

The ultimate supply of groundwater in the basin is natural recharge resulting from precipitation in the basin. Because the primary supply of water for SVWD, with the exception of recycled water, is the basin, precipitation and the ability for the precipitation to recharge the aquifer defines the supply of SVWD.

The reliability of the recycled water resource of SVWD is unaffected by climactic conditions given that the source of recycled water is wastewater. The recycled water distribution system is susceptible to major catastrophes, such as a seismic event that can disrupt operation.

Sustainability

The primary purpose of SVWD is to provide a safe and reliable drinking water supply to its customers. As mentioned earlier, groundwater is the sole source of potable water supply for SVWD, so careful management is necessary to manage the groundwater resource in a sustainable manner. SVWD has been actively managing the groundwater basin since the early 1980's in an effort to increase water supply reliability and to protect local water supply sources. As mentioned below, recent decline in SVWD pumping is mainly attributed to the SVWD's Recycled Water and Water Conservation Programs. SVWD has increased its commitment to these two programs which will help sustain and recover groundwater levels and long-term groundwater production by reducing potable water demand. Additional emphasis on in-lieu and direct recharge will further improve the long-term sustainability of the local groundwater aquifer.

Since 1983, SVWD has actively managed the basin through establishment of an integrated climatic, surface water, and groundwater monitoring program; regular reporting of water conditions; a safe yield study; implementation of a recycled water program; assessment of artificial recharge and water transfer options; ongoing groundwater exploration studies; development and revision of a regional groundwater numerical model.

SVWD actively participates in the SMGBAC, a forum for discussing regional water issues and developing collaborative solutions. The SMGBAC typically meets twice each year (spring and fall) at noticed, open public meetings.

3.3.3 Potential Supply Inconsistency

Water supplied within the SVWD service area is almost entirely from groundwater. The Santa Margarita Basin is the primary water source to meet potable demand. The basin is a highly reliable source of supply that is monitored regularly by SVWD and other agencies in the region. The Santa Margarita Basin is not anticipated to have supply inconsistencies because of the management of the basin. Therefore, SVWD does not have any inconsistent water sources that may cause reduced deliveries to users within the service area. A potential exception is areas where water quality could limit use as a potable supply. Groundwater quality in the basin is high in iron, manganese, and hydrogen sulfide and therefore, requires treatment to meet the State water quality standards for aesthetics (i.e., Secondary MCLs). SVWD operates three pressure filter treatment plants for the iron and manganese removal and uses chemical treatment for hydrogen sulfide removal. Other water quality concerns include the presence of perchlorate, VOCs and other chemicals associated with environmental cleanup sites. SVWD continues its active role in cleanup sites across the basin.

Overall, water quality issues in the SVWD service area have been addressed by the water treatment facilities and comprehensive monitoring and measurements activities by SVWD. Water quality produced from SVWD facilities is within standards set for acceptable drinking water by the Federal Government and the California Department of Public Health (DPH).

3.4 Transfers, Exchanges, and Groundwater Banking Programs

Additional water supplies can be purchased from other water agencies and sources. An important element to enhancing the long-term reliability of the total mix of supplies currently available to meet the needs of the service area is the use of transfers, exchanges, and groundwater banking programs, and recycled water such as those described below.

3.4.1 Transfers and Exchanges

An opportunity available to SVWD to increase water supplies is to participate in voluntary water transfer and exchange programs. Since the drought of 1987-1992, the concept of water transfer has evolved into a viable supplemental source to improve supply reliability. The initial concept for water transfers was codified into law in 1986 when the California Legislature adopted the “Katz” Law (California Water Code, Sections 1810-1814) and the Costa-Isenberg Water Transfer Law of 1986 (California Water Code, Sections 470, 475, 480-483). These laws help define parameters for water transfers and set up a variety of approaches through which water or water rights can be transferred among individuals or agencies.

One of the most important aspects of any resource planning process is flexibility. A flexible strategy minimizes unnecessary or redundant investments (or stranded costs). The voluntary purchase of water between willing sellers and buyers can be an effective means of achieving flexibility. However, not all water transfers have the same effectiveness in meeting resource needs. Through the resource planning process and ultimate implementation, several different types of water transfers could be undertaken.

3.4.2 Opportunities for Short and Long-Term Transfers and Exchanges

In 2008, SVWD initiated a long-term recycled water and potable water exchange program that involves Pasatiempo Golf Club and the SCWD, as briefly described below.

There is a small (2-inch) emergency intertie with SLVWD for emergencies arising in either district. The intertie is used primarily for water shortage emergencies and is not considered as regular water transfer option for SVWD; thus, it is not considered as part of water supply projections in Table 3-1.The intertie has been used several times to date, each time for flow from SVWD to SLVWD. Plans for increasing the capacity of the intertie have been made and will be implemented when funding becomes available.

3.4.2.1 Pasatiempo Golf Club Recycled Water Exchange

A cooperative effort took place with SVWD, the SCWD, and Pasatiempo Golf Course to plan the infrastructure that would give Pasatiempo Golf Club access to recycled water for course irrigation, thus reducing the demand for SCWD potable water during the summer months. An MOU was signed in 2008 between SVWD and Pasatiempo Golf Club to ensure a long-term availability of recycled water supply to Pasatiempo Golf Club. A copy of the MOU is presented in Appendix E. Currently, the Golf Club is receiving water for irrigation from the SCWD. SVWD’s current Recycled Water Program has the production capability to meet a portion of the Golf Club’s irrigation needs consistently. In 2007, the SCWD approved a Resolution, expressing desire to participate in this joint effort by providing potable water to SVWD when it is available from surface sources in exchange for an equal volume of recycled water provided by SVWD to the Golf Club to meet the Golf Club's irrigation needs. Through the exchange program, SVWD would provide about 120 AFY of recycled water to the Golf Club beginning in 2020 and in exchange, receive potable water from SCWD when it is available from surface sources, particularly in the winter months.

Both SVWD and the Golf Club recognize the potential for multiple and mutual benefits of this program, including but not limited to improved Golf Club water supply reliability and price stability, reduced SVWD groundwater demand as a result of the potable exchange with the SCWD, lesser peak irrigation season demand on the SCWD potable water system, and overall more efficient use of regional water supplies for long-term sustainability and environmental enhancement.

3.4.3 Groundwater Banking Programs

With recent developments in conjunctive use and groundwater banking, significant opportunities exist to improve water supply reliability in the Santa Margarita Basin. Conjunctive use is the coordinated operation of multiple water supplies to achieve improved supply reliability. Most conjunctive use concepts are based on storing groundwater supplies in times of surplus for use during dry periods and drought when surface water supplies would likely be reduced.

Currently, SVWD is involved in two projects related to groundwater recharge: Conjunctive Use and Enhanced Aquifer Recharge Project and Groundwater Recharge Pilot Project at the Scotts Valley Library, both briefly described below in Section 3.5.

In addition to these ongoing efforts, SVWD will continue to use the numerical model to identify enhanced potential recharge locations to evaluate the long-term sustainability of groundwater production. SVWD has included this item as part of its groundwater management program annual budget and will use the results to identify methods of minimizing potential losses in groundwater storage within the basin.

3.5 Planned Water Supply Project and Programs

SVWD has planned for water supply projects and programs as described in this section. Future planned delivery from each program or project is difficult to quantify, with the exception of anticipated recycled water supply, as noted in Table 3-6. Water supply programs and projects that are not listed in Table 3-6 are briefly described below as these programs and projects will add further reliability to SVWD's existing water supply portfolio and add robustness to its system. SVWD's planning efforts on expanding recycled water use and facilities are presented in Section 4. A detailed description of the current and future projected recycled water use in the SVWD service area and activities undertaken by SVWD on development of recycled water are described in Section 4.

Table 3-6: Planned Water Supply Projects and Programs by SVWD

Name/Type	Planned Delivery (AFY)	Date Supply Available
Recycled Water Distribution System Extensions[a]	330	2030

Note:
[a] These projects and programs will help expand the Recycled Water Program with anticipated recycled water delivery of 330 AFY by 2030.

3.5.1 Recycled Water Facilities Planning

The Recycled Water Program, which was inaugurated in 2002, has increased overall water supply by replacing a significant portion of the landscape irrigation demand in the SVWD service area. In 2010 the recycled water program delivered 149 AF of recycled water to SVWD customers.

SVWD completed a Recycled Water Facilities Planning Report (FPR) in May 2009. The FPR provides an update to the SVWD Recycled Water Master Plan and evaluates future extensions of the existing recycled water distribution pipelines into new areas. The FPR includes a Recycled Water Market Assessment to identify the potential market for additional recycled water use within the SVWD service area and to incorporate a regional element by enlarging the service area to include Pasatiempo Golf Course and parts of the SCWD. The pipeline expansion will allow for potential new customers to be added to the program to further expand recycled water usage. SVWD has also identified customers with the potential to convert from potable water to recycled water for landscaping uses. This potential has been estimated to be at least 330 AFY based on landscaping usage records (Table 3-1).

3.5.2 Recycled Water Distribution System Extensions

The Recycled Water Program continues to expand as funds become available to install infrastructure to support more customers. SVWD received a $705,705 grant under the Proposition 50 IRWMP Implementation Grant to extend recycled water pipelines into new areas within SVWD as identified in the FPR. Three pipeline extensions were installed in 2009. SVWD anticipates submitting future grant proposals to fund additional extensions of recycled water pipelines into other key areas within the SVWD service area. Funding for this construction will be sought through Supplemental Proposition 50 and Proposition 84 (Prop 84) solicitations under the IRWMP.

Through the continuous efforts to expand the Recycled Water Program, SVWD anticipates to increase recycled water delivery from 149 AFY in 2010 to 330 AFY by 2030.

3.5.3 Butano Groundwater Management Project

The Butano Formation Groundwater Monitoring Project is funded by a $250,000 Local Groundwater Assistance Grant from Proposition 84 funds through DWR. This grant proposal was initially submitted in November 2007, but the final award of this grant was postponed until December 2009.

The purpose of the project is to better characterize groundwater in the Butano, and help guide future decisions about whether to install new production wells in the Butano. The project consists of installing two groundwater monitoring wells in the Butano and the purchasing of equipment to conduct long-term groundwater monitoring. During the installation of these wells, additional geologic, geophysical and water quality data will be collected to better characterize the Butano Formation. The installation of monitoring wells will provide groundwater level and water quality data to better evaluate and manage groundwater in the Butano.

The project began in 2010, with efforts consisting primarily of negotiating site access, completing environmental documentation, developing initial monitoring well specifications, and working out project logistics. Installation of the two monitoring wells and completion of the groundwater level monitoring is anticipated in 2011.

3.5.4 New Water Wells

SVWD currently has six active production wells. In 2007, a new Well #10A was installed as a replacement for Well #10. SVWD is currently identifying potential locations for a new production well to augment its potable water supply, and funding for this project has been approved. Three potential sites for a new groundwater production well are currently being evaluated, as shown in Figure 3-4 and briefly described below:

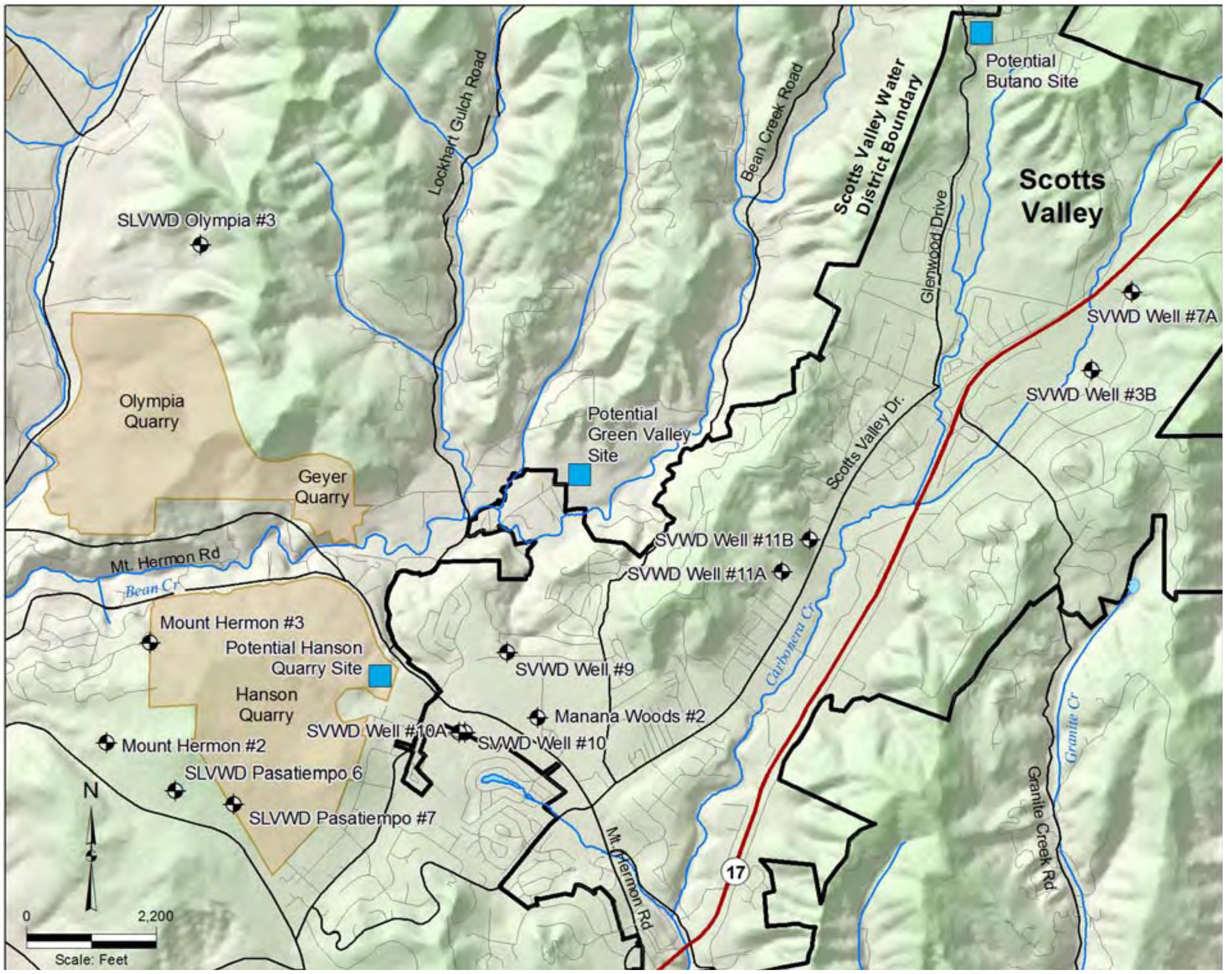
- **Butano Site** – Butano formation may have significant water supply potential; however, limited data is available because the Butano is situated at considerable depths (greater than 1,000 feet deep) which make drilling and well installation expensive. In 2010, efforts were focused on planning for the installation of the deep monitoring wells in the Butano which will provide important data for evaluating the potential for siting a production well in the Butano. No specific production well location has been identified.

- **Green Valley Site** – This area is an open field along Green Valley Road that is located just outside SVWD boundary (Figure 3-4). A potential well would be completed in the Santa Margarita at a depth of about 100 to 150 feet. This site will require additional evaluation of potential impacts to Bean Creek of limiting summer time stream flow. In 2010, updates to the Santa Margarita Basin Groundwater Model were proposed that will improve the analytical tools needed to help address these issues.

- **Well 9 Site** – The existing Well 9 site could be used as a site for a new well completed in the Lompico. The well depth would be approximately 900 feet. SVWD previously explored the possibility of installing a new municipal well at the nearby Hanson quarry site (Figure 3-4). This location offered several advantages over the Well 9 site, but property negotiations with the site owner were discontinued in 2010.

Rehabilitation of old wells and construction of new wells are needed to replace lost capacity and are part of SVWD’s capital improvement program and maintenance budgeting. Although the need for an additional well has been reduced as a result of decreasing water demand which has resulted in lower groundwater production, ongoing evaluations are occurring to identify the most viable location for the installation of a new groundwater production well. One method to help mitigate potential future service disruptions is to have additional redundancy in the system so that SVWD can continue to meet water demand, even in high-demand periods, with at least one high-capacity well offline. Therefore, the installation of a new groundwater production well is considered a prudent step to maintain system reliability. The construction of a new well will most likely increase supply capacity and accommodate anticipated growth, although the main purpose is to redistribute pumping and increase the reliability of supply.

Figure 3-4: Potential New Well Sites



3.5.5 Conjunctive Use and Enhanced Aquifer Recharge Project

Under the Proposition 50 IRWMP Implementation Grant, the Phase 1 Conjunctive Use and Enhanced Aquifer Recharge Project is evaluating potential methods to improve groundwater conditions in the Scotts Valley area. This project is a regional evaluation of the feasibility of conjunctive use projects in the Santa Margarita Groundwater Basin with a primary focus on the Scotts Valley area. The project is focused on screening a variety of potential conjunctive use alternatives with the goal of identifying one or more projects to mitigate declines in groundwater levels and provide for a more secure, reliable water supply. The potential benefits of this project are to identify viable projects to increase the amount of groundwater in storage to improve water supply reliability, improve summer baseflow in nearby streams to improve fishery conditions, and reduce stormwater runoff. The project was completed in December 2010 and a final report is anticipated in 2011. The project was being supervised by the Santa Cruz County Environmental Health Services and had a budget of $227,500.

3.5.6 Groundwater Recharge Pilot Project

Under a Proposition 50 IRWMP Implementation Grant, the Enhance and Protect Groundwater Recharge Areas is a groundwater recharge pilot project that is being implemented at the Scotts Valley Library. This project will evaluate utilizing drainage facilities to enhance groundwater recharge. This project will apply low impact development techniques to divert stormwater runoff from the property towards grassy swales or retention ponds. This water would percolate through the soil to improve water quality before it reaches the groundwater. The results of this pilot study will include recommendations for amendment of policies to promote increased groundwater recharge for new and existing development. The Groundwater Recharge Pilot Project is being supervised by the Santa Cruz County Environmental Health Services, and is expected to be completed in 2011.

3.5.7 Groundwater Model Update

The Santa Margarita Basin Groundwater Model was first developed as part of a DWR Local Groundwater Assistance Grant. The groundwater model was completed in 2006 to provide a quantitative tool to help evaluate and manage groundwater resources (ETIC, 2006). The model is a comprehensive numerical groundwater model developed using the U.S. Geological Survey model code MODFLOW2000. The model represents a management tool to be used in the basin to determine the redistribution of pumping centers and to protect the local groundwater resource. The groundwater model was also used to establish sustainable yield values for the basin as well as to evaluate drought impacts and catastrophic outages as described in Section 8.

Initially, the model was set up and calibrated for the 20-year interval from 1985 to 2004 (ETIC, 2006). The groundwater model is updated regularly to support the groundwater supply assessment. Because of the geologic complexity of the basin in the Scotts Valley Groundwater Subarea, the model provides a more effective tool to evaluate the changes in the water supply over time. More recent modeling analyses included the model update with data from 2005 through 2010 to support the water supply assessment.

Further application of the model includes the identification of a new well location and enhanced groundwater recharge locations within the basin. SVWD has included both of these items as part of its groundwater management program annual budget and will use the results to identify methods of minimizing potential losses in groundwater storage within the basin. The reuse of tertiary treated wastewater or recycled water will also provide the added benefit of reduced groundwater pumping from the basin.

As part of the Santa Cruz IRWMP Proposition 84 Planning Grant, SVWD included a project for the comprehensive update and recalibration for the Santa Margarita Groundwater Basin Model. The model would be updated with new geological, groundwater and streamflow data. The proposed update would implement these improvements to the model to help support further evaluations for groundwater management and conjunctive use projects.

3.5.8 Integrated Regional Water Management Plan

SVWD is among the agencies that participated in the development and completion of the Preliminary Northern Santa Cruz County IRWMP administered by the Regional Water Management Foundation, a subsidiary of the Community Foundation of Santa Cruz County. The partner agencies have worked together since at least 1998 on regional water resources issues, and have coordinated on water bond funding since April 2002. In 2007, the Foundation received a $12,500,000 Implementation Grant under Proposition 50. Several of these projects relate to SVWD. The IRWMP was completed in October 2005 and is available online at www.rcdsantacruz.org/Resources/integrated-regional-water-management-plan.php.

3.5.9 Other Opportunities

SVWD continues to look for opportunities for outside funding and support regional grant application efforts to enhance its groundwater management and water conservation efforts, where possible. Outside funding helps to offset the costs of studies and capital improvements necessary for water planning and groundwater management.

Other opportunities that SVWD is pursuing include the recently awarded grants and pending grant applications, as listed below:

- In October 2010, the Regional Water Management Foundation, a subsidiary of the Community Foundation of Santa Cruz County, submitted the Santa Cruz IRWM Integrated Regional Water Management Proposition 84 Planning Grant to DWR. It included several projects for a total request of $999,750 which has been recommended for award. As part of the Santa Cruz IRWMP Proposition 84 Planning Grant, SVWD included a project for the comprehensive update and recalibration for the Santa Margarita Groundwater Basin Model. The model would be updated with new geological, groundwater and streamflow data. The update would implement these improvements to the model to help support further evaluations for groundwater management and conjunctive use projects and is planned to commence in Fall 2011.

- SVWD received an Urban Drought Assistance Grant in November 2008 from DWR; however, the distribution of funds for the grant was delayed due to the state budget crises. DWR notified SVWD on September 17, 2009 that funding was given the go-ahead. This grant provided funds for conducting leak audits of the main lines, funding landscape conservation incentives for two years, and implementing other conservation measures. The SVWD grant proposal was one of 53 proposals recommended for funding under this program out of 283 proposals received.

3.6 Development of Desalination

The California UWMP Act requires a discussion of potential opportunities for use of desalinated water (Water Code Section 10631[i]).

SVWD has limited opportunities for the development of desalinated water, given its geographical location relative to the ocean and lack of a brackish groundwater resource and has no current plans to pursue groundwater or seawater desalination. Therefore, these water supply options are not included in the supply summaries in this Plan (Table 3-1). Other water suppliers in the region such as the SCWD and Soquel Creek Water District are pursuing ocean desalination as an alternative water resource during dry years. SVWD could potentially benefit from this program if a regional intertie project is constructed with future grant and/or local funding.

THIS PAGE INTENTIONALLY BLANK

Section 4: Recycled Water

4.1 Overview

This section of the Plan describes the existing and future recycled water opportunities available to the SVWD service area. The description includes estimates of potential supply and demand for 2010 to 2035 in five-year increments, as well as SVWD's proposed incentives and optimization plan.

4.2 Potential for Recycled Water Facilities

As discussed in Section 3, the majority of water demand in the SVWD service area is met by water supplies from groundwater pumping in the Santa Margarita Groundwater Basin. Up to 800 AFY of existing and future irrigation demand in the SVWD service area could be supplied by recycled water as discussed in the Recycled Water FPR (Kennedy/Jenks, 2009). Recycled water has been available in Scotts Valley since 2002 and in 2010, 149 AF of recycled water was delivered to 36 existing connections. Recycled water is available for irrigation of a range of facilities including parks, common landscape in commercial and residential properties, medians, and schools. SVWD is also considering interior reuse of recycled water for toilet flushing for some new developments.

As discussed in Section 2, the future water demand in the SVWD service area will increase as development continues; thus, SVWD recognizes that recycled water will continue to be an important and reliable source of additional water. The FPR was prepared under a grant from the State Water Resources Control Board and positions SVWD to obtain other grants to further expand recycled water use in Scotts Valley and the region.

As described in the 2009 FPR, SVWD completed detailed evaluations of existing and future recycled water demands throughout the service area and region. SVWD's unique situation where groundwater is limited and imported water is not available indicate that recycled water is an important element of the District's water portfolio. Some of the potential alternatives developed as part of the recycled water evaluation and key findings are relevant to the future projections of recycled water use.

4.3 Sources of Recycled Water

The City of Scotts Valley is responsible for the collection and safe disposal of wastewater generated within the SVWD service area. Wastewater generated in the SVWD service area is treated at the City Scotts Valley Water Reclamation Facility (WRF) (Figure 4-1).

4.3.1 Existing and Planned Wastewater Treatment Facilities

4.3.1.1 Existing Facilities

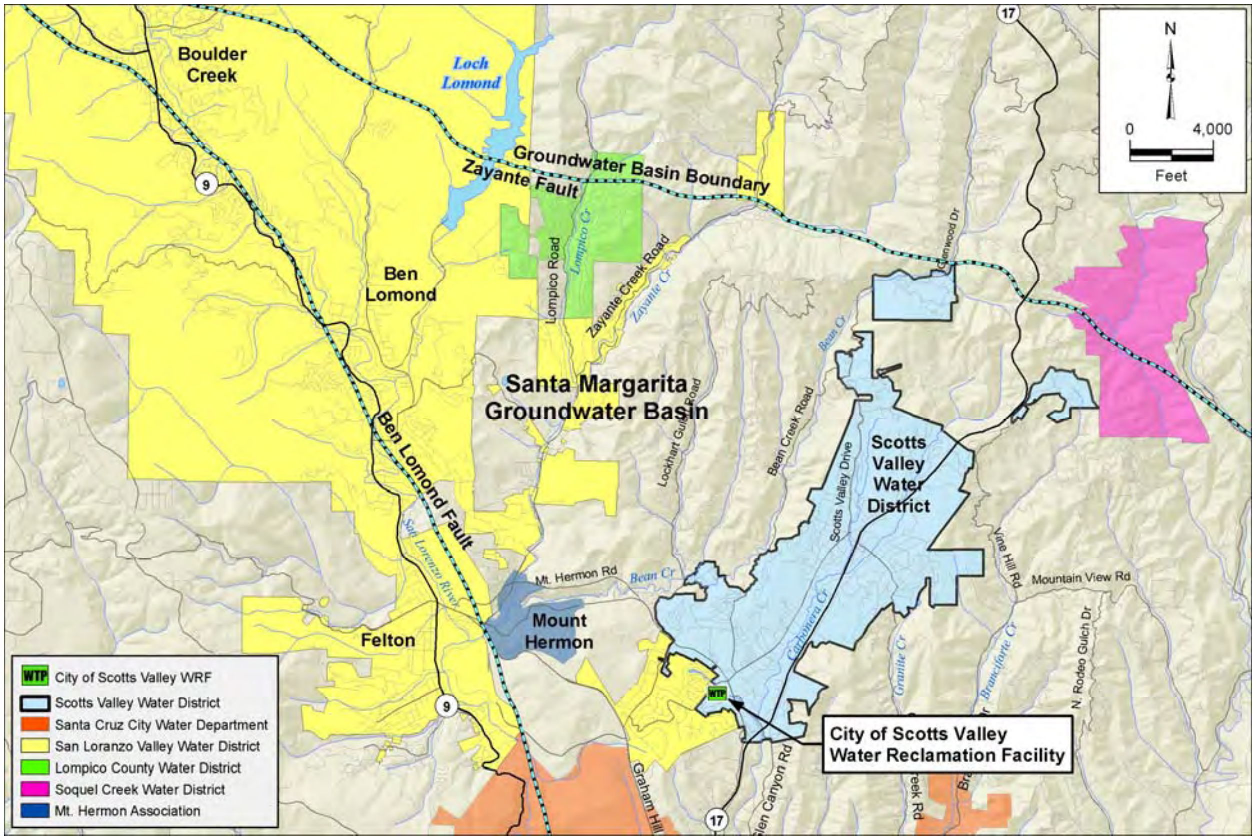
The City has about 5 miles of collection pipelines and eight lift stations to collect and transmit the wastewater flow, as reported in as reported in the Santa Cruz Local Agency Formation

Commission (LAFCO) (Santa Cruz, 2005). The Scotts Valley WRF is a conventional activated sludge wastewater treatment facility with a design dry weather treatment capacity of 1.5 mgd and a design peak wet weather treatment capacity of 5.0 mgd. Major facilities include an influent pump station, a flow equalization structure with 0.9 MG of storage capacity, two aeration basins with fine-bubble diffuser panels, two secondary clarifiers, a chlorine contact tank and an effluent pump station. Disinfected secondary effluent is pumped to Santa Cruz where it is discharged into the Monterey Bay via the existing ocean outfall pipeline shared with Santa Cruz Wastewater Treatment Facility.

The Scotts Valley WRF includes a tertiary treatment facility with a design treatment capacity of 1.0 MGD. The facility is used to treat secondary effluent to a tertiary level using chemical coagulation and flocculation, filtration, denitrification, and ultraviolet (UV) disinfection. The treated effluent meets California DPH Title 22 recycled water standards for unrestricted use (Kennedy/Jenks, 2009).

Current average dry weather wastewater influent flow is approximately 0.85 MGD to the City's WRF (Kennedy/Jenks, 2009). Wastewater flows at ultimate "build-out" conditions may be up to 0.95 MGD (Santa Cruz LAFCO, 2005). Influent wastewater flows have been gradually decreasing in spite of increasing population. One factor in the decreasing flow is the improved efficiency of washers, toilets, sink and shower heads which are using potable water more efficiently As a result, one of the limiting factors in recycled water delivery is the limited dry weather wastewater flows (Kennedy/Jenks, 2009).

Figure 4-1: Recycled Water Facilities



THIS PAGE INTENTIONALLY BLANK

4.3.2 Proposed Improvements and Expansions

The FPR provided direction on improvements and expansions to both the WRF and to the recycled water distribution system to optimize the recycled water production, distribution, and storage. These improvements and expansions are summarized in Table 4-1 which describes improvement and expansion projects, the quantity of recycled water delivered, and estimated project cost, based on the FPR (Kennedy/Jenks, 2009). Not all of the improvements and expansions are necessary in the near-term but would be beneficial in the long-term to provide reliability as additional customers are brought on-line.

Table 4-1: Proposed Improvement and Expansion Projects

Improvement/ Expansion Projects	Project Description	Recycled Water Delivered (AFY)	Estimated Capital Cost (2009)
Phase 1 SVWD Infill Customers	Expansion of recycled water service to 10 Category A customers along Scotts Valley Drive, Civic Center Drive, and Whispering Pines Drive	20	$80,000
Phase II Scotts Valley Stage 2 WRF Upgrades	Upgrades to optimize recycled water production including modification and replacement of tertiary influent pumps, maximizing the filtration rate during backwash and adjusting the turbidity set-point.	n/a	$280,000
Phase III Additional Recycled Water Storage	Addition of up to 400,000-gallon below-grade storage tank and pump station at WRF to meet future peak demands.	n/a	$2,100,000
Phase IV – Pasatiempo Recycled Water Project	Facilities for delivery of recycled water to Pasatiempo Golf Course in summer including connection to ocean outfall piping and existing irrigation system, satellite treatment, and storage and pumping facilities	189	$3,240,000
Phase V Potable Interconnection with Santa Cruz	Pipeline for delivery of potable water from Santa Cruz to SVWD in winter time including 14,800 linear feet of 10" pipeline and pump station to exchange for Phase IV Recycled water delivery to Pasatiempo Golf Course.		$5,500,000
Total Estimated Capital Cost			**$11,200,000**

Source: Recycled Water Facilities Planning Report, prepared by Kennedy/Jenks Consultants (May 2009) prepared for SVWD.

For future projections of wastewater flow discharge to the City's WRF, future average daily wastewater flows, as reported in the Santa Cruz LAFCO projections, were used as the basis for projections. Table 4-2 provides the existing and future projected wastewater flow contribution to the Scotts Valley WRF. The existing and planned methods of wastewater effluent discharge and use are summarized in Table 4-3. It should be noted that future flows in Table 4-2 reflect average daily dry weather flows, and wet weather and peak flows will be higher than those in the table.

Table 4-2: Wastewater Collection and Treatment

Facility Name	**Estimated Existing (2010)**	**2015[a]**	**2020[a]**	**2025[a]**	**2030[a]**	**2035[a]**
City of Scotts Valley WRF (MGD)	0.9	0.93	0.95	0.97	0.99	1.01
City of Scotts Valley WRF (AFY)[b]	1,008	1,042	1,064	1,085	1,107	1,129

Note:

[a] Source: Santa Cruz LAFCO Countywide Service Review -Wastewater Services, June 2005 for 2015 and 2020. 2025, 2030, and 2035 were escalated at 2 percent per year per LAFCO report. Because of water use efficiency and potentially slower growth than assumed, wastewater flow will likely remain quite low in the future. A conservative summer wastewater flow has been assumed for potential recycled water production.

[b] All wastewater cannot be recycled water because of very low demand in winter.

Table 4-3: Non-Recycled Disposal of Wastewater

Facility Name	**Method of Disposal**	**Treatment Level**	**Wastewater Discharge and Use (AFY)**					
			2010	**2015**	**2020**	**2025**	**2030**	**2035**
City of Scotts Valley WRF [a]	Discharge to Monterey Bay	Disinfected, Secondary	859	851 824 795			777	799
	Total		**859**	**851**	**824**	**795**	**777**	**799**

Note:

[a] Projected treated wastewater flow discharge to Monterey Bay from the Scotts Valley WRF is projected to gradually reduce as additional summer time recycled water irrigation uses are added per Table 2-1.

4.3.3 Other Potential Sources of Recycled Water

During the preparation of the SVWD's 2009 FPR, SVWD explored and evaluated other potential sources of recycled water that could be utilized for irrigation purposes. One of the potential sources is to increase wastewater flows to the Scotts Valley WRF through sewering areas that are currently on septic tanks in Scotts Valley. No other sources of recycled water exist in the Scotts Valley area.

4.4 Recycled Water Demand

In this section, current recycled water use is discussed, and potential recycled water users within SVWD's service area and in the region are identified as determined from the SVWD's Recycled Water FPR.

4.4.1 Current Use

Currently, recycled water is served by SVWD to landscape irrigation customers in the service area (Table 4-4).

Table 4-4: Actual Recycled Water Uses

Type of Use	Treatment Level	Actual 2010 Use (AF)
Landscape (45 customers)	Disinfected tertiary	149
Total		**149**

4.4.2 Potential Uses

Potential recycled water uses were mainly identified in SVWD's Recycled Water FPR: In the SVWD service area, total estimated existing recycled water demand is 149 AFY and estimated potential recycled water demand of up to 800 AFY. Recycled water delivery is limited by influent wastewater flows. However, some of the recycled water demand is far from existing infrastructure and could be costly to connect. Currently, existing recycled water customers include parks, schools, and multi-family residential and commercial landscape. Future recycled water customers are similar to the existing customers.

Table 4-5: Potential Recycled Water Uses

		Potential Use (AF)				
Type of Use	**Treatment Level**	**2015**	**2020**	**2025**	**2030**	**2035**
Landscape[a]	Disinfected tertiary	191	241	290	330 330	
Total		**191**	**241**	**290**	**330**	**330**

Note:
[a] Additional recycled water customers may be added if influent wastewater flows increase.

4.4.3 Recycled Water Facilities Planning Report

SVWD's 2009 Recycled Water FPR was completed by Kennedy/Jenks with the following objectives:

- Identify the existing and potential recycled water demands throughout the service area and nearby region;
- Determine infrastructure improvements necessary to serve future recycled water customers;
- Determine the limitations on the existing recycled water supply and identify potential improvements to optimize the Scotts Valley WRF recycled water production; and
- Prepare capital and operations and maintenance cost estimates for the various distribution system and treatment optimization options.

As described in Section 4.3.2, a phased approach was developed to implement infrastructure to expand the recycled water system. Several alternatives were described and evaluated for recycled water delivery as summarized below.

- **Alternative A:** Summer Irrigation within SVWD which identified three tiers and five categories of customers based on proximity to existing infrastructure and timing of connection.
- **Alternative B:** Summer Irrigation within Santa Cruz which identified two categories of customers within the Santa Cruz Water Department service area to deliver recycled water through the existing treated effluent export pipeline.
- **Alternative C:** Wintertime Recharge – Groundwater Recharge Reuse Program (GRRP) within SVWD which identified 2 modes of recharge, surface groundwater recharge and subsurface groundwater recharge using recycled water.
- **Alternative D:** Wintertime Recharge – Surface Water Recharge With Potential For Future GRRP which identified conjunctive use with Santa Cruz County as a potential far-term opportunity.

Table 4-6 summarizes the four alternatives, including the location of the potential customer, and the potential recycled water demand that would be served by each alternative. SVWD is actively pursuing near-term elements of Alternatives A and B to expand recycled water use based on available influent wastewater flows.

4.4.4 Recycled Water Comparison

In the 2005 UWMP, it was reported that there were 21 recycled water meters as of October 2005. As of 2010, SVWD reports that there are 36 recycled water meters distributing irrigation water. Although the 2010 recycled water projection in the 2005 UWMP of 350 AFY (Table 4-7) was not met, the number of recycled water users has significantly increased. Recycled water demand may be moderated by the inclining block rate structure that SVWD has on recycled water users. Since SVWD is limited in recycled water availability, efficient use of recycled water is as important as efficient use of potable water.

Table 4-6: Potential Recycled Water Alternatives and Customer Descriptions

Alternative	Sub-alternative	Category/Description	AFY	Timing (a)
Alternative A: Summer Irrigation Within SVWD	A.1	Category A – Infill Customers along Scotts Valley, Civic Center, and Whispering Pines Drives Category C – New infrastructure < ½ mile along Victor Square/Technology Loop, Bean Creek Road, Blue Bonnet Road, and Hacienda Drive	A – 41.7 C – 98.9	Near-Term
	A.2	Category B – Minor Extensions to Glenwood and Scotts Valley Drive and Mt. Hermon Replacement	B – 40.1	Near-Term
	A.3	Category D –New infrastructure > ½ mile to Mt. Hermon Road Extensions and Gateway South Category E – Distant Potential Customers and Future Development	D – 20.4 E – 169.7	Far-Term
Alternative B: Summer Irrigation Within Santa Cruz	B.1	Category F- Satellite tertiary treatment plant to meet demands at Pasatiempo Golf Course	F-188.6	Near-Term
	B.2	Category F – New Recycled Water pipeline to meet demands at Pasatiempo Golf Course		
	B.3	Category G – New Recycled Water pipeline to meet other Santa Cruz customer demands	G - 93.1	Far-Term
	B.4	Category G – Re-use existing ocean outfall pipeline to meet other Santa Cruz customer demands		
Alternative C: Wintertime Recharge –GRRP within SVWD	C.1	Surface GRRP – Surface Spreading at Hanson Quarry	Not determined	Far-Term
	C.2	Subsurface GRRP – Subsurface injection	Not determined	Far-Term
Alternative D: Wintertime Recharge – Surface Water Recharge With Potential For Future GRRP	D.1	Conjunctive Use with Santa Cruz County - Support surface water recharge project in County with plan to future transition to GRRP	Not determined	Far-Term

Note:

(a) Source: Table 1-2 of Recycled Water FPR (Kennedy/Jenks, 2009).

Table 4-7: Recycled Water Uses - 2005 Projection Compared with 2010 Actual

User Type	2005 Projection for 2010 (AF)	2010 Actual Use (AF)
Landscape	350	149
Total	**350**	**149**

4.5 Methods to Encourage Recycled Water Use

Table 4-8 lists actions taken by SVWD to promote recycled water use and other actions that can be taken in the future to further encourage the use of recycled water as a viable water source. SVWD has been involved with public outreach and coordinating with local cities and wastewater agencies, and other planning agencies to discuss the feasibility of using recycled water in lieu of potable groundwater that is currently used for irrigation. In this Plan, it is projected that some level of additional recycled water use will potentially result from these ongoing efforts. This regional planning and coordination effort should continue to the extent possible as a project develops toward implementation.

In the case of SVWD, funding availability, securing grant funding, and financial incentives are among the factors that will play a big role in the future implementation of recommended recycled water projects. As mentioned earlier, SVWD completed detailed evaluations of potential alternatives and projects to use recycled water, but implementation of such alternatives, at this time, is pending funding availability. State and federal funding, if available, could offset the cost imposed during project construction which typically makes the project cost-prohibitive. Obtaining funding, as SVWD has done, also helps build community support for a project because it results in reduced taxpayer contribution.

Table 4-8: Methods to Encourage Recycled Water Use

	Use Projected to Result From This Action (AF)				
Actions	2015	2020	2025	2030	2035
Local/Regional Planning	0	0	0	0	0
Public Outreach	0	0	0	0	0
State and Federal Funding	191	241	290	330	330
Financial Incentives	0	0	0	0	0
Total	**191**	**241**	**290**	**330**	**330**

4.6 Optimization Plan

Production from the existing Scotts Valley WRF is anticipated to be adequate to meet the total demands of recycled water irrigation demand in the SVWD, especially if proposed improvements to optimize production are implemented. As potable water demands increase and, consequently, recycled water production increases, the water available to meet non-potable demands would also increase. As described earlier, SVWD has already completed the necessary studies to identify both existing and future potential recycled water demands that could be potentially supplied by recycled water sources, thus, freeing up potable supplies currently used to meet portion of irrigation demands. Implementation of the identified recycled water projects is currently pending funding assistance.

Phasing implementation of the expansion of the recycled water system is recommended for the following reasons:

- Recycled water storage and distribution facilities are not immediately available.
- Capital requirements would be spread over SVWD's current planning period through 2035.

In general, the following factors were considered in developing a phasing plan:

- Funding availability
- Ease or willingness of customers to connect to recycled water
- Retrofit costs
- Regulatory requirements
- Community impacts and development requirements
- Wastewater utility involvement/cooperation
- Reliability and operational costs considerations
- System flexibility

The implementation phases are prioritized based on the status of the users (existing or future), the anticipated construction schedule of future users, and the proximity of the users to the recycled water source.

THIS PAGE INTENTIONALLY BLANK

Section 5: Water Quality

This section provides a general description of the water quality of SVWD's water supplies, primarily groundwater as the sole source of water supply for SVWD. A discussion of potential water quality impacts on the reliability of this supply is also provided.

5.1 Overview

The quality of any natural water is dynamic in nature. This is true for the local groundwater of the Santa Margarita Groundwater Basin. During periods of intense rainfall, routes of surface water movement are changed; new constituents are mobilized that are often dependent on local land use and enter the surface and groundwater while other constituents are diluted or eliminated. The quality of water changes over the course of a year. These same basic principles apply to groundwater. Depending on water depth, groundwater will pass through different layers of rock and sediment and leach different materials from those strata. Water depth is a function of local rainfall and recharge. During periods of drought, the mineral content of groundwater increases.

Water quality regulations also change. This is the result of the discovery of new contaminants, changing understanding of the health effects of previously known as well as new contaminants, development of new analytical technology, and the introduction of new treatment technology. All water purveyors are subject to drinking water standards set by the USEPA and the California DPH.

SVWD provides local groundwater to a majority of the residents in and around the City of Scotts Valley. SVWD monitors the active groundwater producing wells for a number of constituents with a frequency that complies with the Safe Drinking Water Act requirements as outlined in the California Code of Regulations, Title 22 requirements. SVWD actively incorporates new constituents into the monitoring program as a result of new regulatory actions or trends in the water quality industry (e.g., methyl-tert-butyl ether (MTBE) was added to the monitoring list in 1987). All water quality results are reported to the California DPH Division of Drinking Water and Environmental Management.

SVWD annually prepares and distributes the "*Scotts Valley Water District Water Quality Report*" to keep customers informed on water quality issues. This report provides the public with detailed results of water-quality testing, a description of the water source, answers to common questions about water quality, and other useful water quality information. SVWD's Water Quality Reports are available at www.svwd.org/index/Water_Quality_Report. Copies of the 2006-2009 Water Quality Reports are found in Appendix F. These reports include detailed information about the results of quality testing of the water supplied during the preceding year (SVWD, 2006-2009). In addition to the annual Water Quality Reports, SVWD describes water quality monitoring data in the Annual Report, prepared each year as part of the Groundwater Management Plan (Kennedy/Jenks, 2011).

The quality of water received by individual customers will vary depending on the groundwater source and level of treatment. Customers may receive water from one well at one time and water from another well at a different time, or blends of well. The source of supply in any single point in the SVWD distribution system may vary over the course of a day, a week, or a year.

5.2 Imported Water Quality

SVWD does not rely on imported water as part of its supply; thus, no water quality impacts from imported water are anticipated.

5.3 Groundwater Quality

SVWD promotes water quality protection by monitoring both groundwater quality and by operating water treatment facilities to ensure that water delivered to customers meets all drinking water standards. SVWD also reviews activities at environmental remediation sites and provides feedback to other agencies responsible for the regulation of these sites with known contamination problems.

The following subsections describe groundwater quality monitoring and groundwater treatment by SVWD and current conditions of groundwater quality in SVWD supply wells with respect to specific constituents of concerns. This section also describes known or potential impacts to active SVWD supply wells by constituents released from the existing environmental remediation sites.

5.3.1 Groundwater Quality Monitoring

SVWD's monitoring program consists of sampling both the raw and treated water from production wells, monitoring of shallow groundwater, and monitoring of surface water in the region. Monitoring raw water quality at the six active SVWD production wells is a key groundwater management objective for SVWD. SVWD also collects and analyzes samples for general minerals, physical characteristics, select metals, and organic chemicals often associated with industrial or commercial sites. Results of SVWD's annual monitoring are reported in the Water Quality Reports, available at the SVWD's website (www.svwd.org/index/Water_Quality_Report). Copies of the Water Quality Reports 2006 through 2009 are presented in Appendix F.

In addition to groundwater quality monitoring, SVWD actively monitors groundwater and surface water as part of Recycled Water Program, as summarized in Section 5.3.5 below.

5.3.2 Groundwater Treatment

Under the Safe Drinking Water Act, the USEPA and the California DPH have set primary maximum contaminant level (MCLs) associated with public health risks as drinking water standards for various chemicals and constituents. Secondary MCLs are not defined as public health risks, but create taste, odor, and other aesthetic issues that are regulated. The California DPH also defines public health goals (PHG) for various parameters that serve as guidelines for water quality.

SVWD monitors water quality at the groundwater production wells for constituents that meet requirements outlined in the Safe Drinking Water Act and under Title 22 of the California Code of Regulations. Groundwater is sampled from SVWD Wells #3B, #7A, #9, #10, #10A, #11A and #11B (Figure 1-2) for major cations, anions, trace metals, total dissolved solids (TDS), pH, volatile organic compounds (VOCs), and MTBE. Results of water quality analysis are reported to the California DPH.

SVWD monitors and samples both raw and treated water. Raw water samples represent native groundwater quality conditions prior to any treatment. SVWD treats groundwater at four water treatment plants (WTP) prior to distribution. These facilities and their operations are listed in Table 5-1. SVWD applies treatment technologies to raw water extracted from wells to compensate for groundwater with concentration levels above or approaching primary and secondary MCLs (Table 5-1). By applying the appropriate treatment technology, SVWD is able to deliver tap water to customers that meets regulatory standards and is safe to drink.

Table 5-1: Summary of Water Treatment Processes

Water Treatment Plant	SVWD Wells	Aquifer Formation	Chemicals of Concerns	Treatment Type
Orchard Run	Wells #3B and #7A	Butano and Lompico	Iron, manganese and hydrogen sulfide	Air stripper, chlorination, dual media filtration, and sequestering agent.
SVWD Well #9	Well #9	Santa Margarita and Monterey	Sulfate, MTBE, VOCs and hydrogen sulfide	Chlorination and granular activated carbon (GAC) filtration
SVWD Well #10	Wells #10 and #10A	Lompico	Iron, manganese, VOCs and hydrogen sulfide	Air stripper, chlorination, dual media filtration, sequestering agent, and standby GAC filtration.
El Pueblo	Wells #11A and #11B	Lompico	Iron, manganese, arsenic and VOCs	pH adjustment, chlorination, dual media filtration, and sequestering agent

5.3.3 Groundwater Quality Conditions

The groundwater in the SVWD is naturally high in iron, manganese, TDS, and hydrogen sulfide, as further described in below. It requires treatment to meet the related federal and state drinking water aesthetic or secondary standards (Table 5-1). In addition, the Scotts Valley area has a number of sites contaminated with VOCs, including petroleum hydrocarbons (benzene, toluene, ethylbenzene and xylenes) and gasoline additives such as 1,2-dichlorethane (1,2-DCA) and MTBE. Solvents such as tetrachloroethene (PCE) and trichloroethylene (TCE) have also been identified in the local groundwater, as described below in Section 5.3.4.

5.3.3.1 Arsenic

Arsenic is a naturally occurring element in groundwater that forms from the erosion and breakdown of geologic deposits; however, arsenic can less commonly be associated with contaminant plumes. The primary MCL for arsenic is 10 micrograms per liter (μg/L).

Arsenic measurements in groundwater indicate that arsenic primarily occurs in the Lompico with the highest concentrations in SVWD's Wells #11A and #11B. Arsenic has been very low or more typically non-detect in wells completed in the Butano and Santa Margarita/Monterey.

5.3.3.2 Iron

Iron is a naturally-occurring constituent in groundwater resulting from the dissolution of minerals within the aquifer. California DPH established a secondary MCL of 300 μg/L due to undesirable conditions including the discoloration of water, laundry, and fixtures, or the buildup of deposits in pipes and plumbing.

Iron measurements in groundwater indicate that iron is primarily occurs in the Lompico with the highest concentrations in SVWD Wells #10A, #11A and #11B. Iron concentrations are above the secondary MCLs for many wells, especially those completed in the Lompico. Iron has typically been near or below the secondary MCL for wells in the Butano and Santa Margarita/Monterey. It is unclear if the variable iron in SVWD Well #3B is from the Lompico or Butano.

5.3.3.3 Manganese

Manganese is naturally-occurring groundwater constituent similar to iron. California DPH established a secondary MCL of 50 μg/L due to undesirable conditions including the discoloration of water, laundry, and fixtures, or the buildup of deposits in pipes and plumbing. Manganese concentrations are above the secondary MCLs for many wells especially those completed in the Lompico.

Manganese measurements in groundwater indicate that manganese is primarily occurs in the Lompico with the highest concentrations in SVWD Wells #10A, #11A and #11B. Manganese has typically been near or below the secondary MCL for wells in the Butano and Santa Margarita/Monterey. It is unclear if the variable manganese in SVWD Well #3B is from the Lompico or Butano.

5.3.3.4 Total Dissolved Solids (TDS)

Total Dissolved Solids is not considered a public health risk but rather relates to the aesthetic quality of water. Depending on the location and water usage, TDS can contribute to the corrosion of metal surfaces or have deleterious effects on sensitive crops. Taste however, is the driving force behind the secondary MCLs from the state. Past customer surveys performed by the US EPA indicated that around 300 miligrams per liter (mg/L) of TDS taste was acceptable and not acceptable around 1000 mg/L. Based on these taste surveys, a threshold of 500 mg/L was established for dissolved solids with an upper limit of 1000 mg/L. In California, a secondary MCL range of 500 to 1,000 mg/L, including a short-term limit of 1,500 mg/L, has been developed for TDS (California Code of Regulations Title 22, §64449).

Measured TDS in groundwater indicates that TDS is highest in SVWD Well #9 with the source most likely derived from the Monterey. Well #9 is not currently actively pumped. TDS is near the secondary MCL in the Butano, and TDS is typically near or below the secondary MCL in the Lompico.

5.3.3.5 Hydrogen Sulfide

Hydrogen sulfide is a naturally-occurring groundwater constituent that exists as a dissolved gas in groundwater. The presence of hydrogen sulfide is usually associated with a “rotten egg” smell and foul taste in water. No MCL or other groundwater standard has been established for hydrogen sulfide in groundwater.

Based on measured data by SVWD, hydrogen sulfide is detected primarily in the Butano. Detections in SVWD Well #9 are most likely from the Monterey. In recent years, hydrogen sulfide has not been detected in wells completed in the Lompico, although treatment for hydrogen sulfide was included with SVWD Well #10 when it was in operation.

5.3.3.6 Nitrate

The California DPH places nitrate into the health risk category of “acute toxicity.” Therefore, a single detection may result in public health concerns. DPH states that “infants below the age of six months who drink water containing nitrate in excess of the MCL may quickly become seriously ill and, if untreated, may die because high nitrate levels can interfere with the capacity of the infant’s blood to carry oxygen. Symptoms include shortness of breath and blueness of the skin. High nitrate levels may also affect the oxygen-carrying ability of the blood in pregnant women.”

Historically, SVWD production wells have reported only sporadic detections of low levels of nitrate that were well below MCLs. Investigations into nitrates occurred in the 1980’s to evaluate potential impacts related to septic tanks and treated wastewater disposal in the Basin. Investigations typically focused on the Santa Margarita as it is typically the high water bearing zone and therefore more likely to be impacted from nitrate releases near the surface. In the early 1980s, treated wastewater disposal was changed from land disposal around Scotts Valley to diversion to an ocean outfall and the wastewater system was expanded to reduce the number of septic tanks. In 2010, nitrate was analyzed for, but was not detected in any of the SVWD production wells. Since 1999, nitrate has not been detected at any SVWD production well.

5.3.3.7 Sulfate

Sulfate is a naturally-occurring groundwater constituent. California DPH has established a secondary MCL of 250 mg/L to account for the aesthetic characteristics of sulfate. Concentrations below the secondary MCL are acceptable barring reports of aesthetic concerns.

Based on measured data by SVWD, sulfate is highest in SVWD Well #9 with the source most likely derived from the Monterey. Sulfate is well below the secondary MCL in the Butano and Lompico.

5.3.4 Environmental Sites

SVWD actively monitors environmental compliance sites where groundwater quality has been impacted by pollution or chemical spills in the Scotts Valley area. Due to the potential impact of these sites to the water supply in the groundwater basin, SVWD has been closely involved with activities in these sites by reviewing monitoring data, status reports, and work plans, and by providing comments to regulatory agencies. These sites may also affect future groundwater augmentation plans because raising groundwater levels in these impacted areas has the potential to re-activate pockets of contamination that may be isolated in the overlying unsaturated sediments.

Table 5-2 below summarizes potential impacts from the existing sites on SVWD wells. Currently, six active environmental compliance sites are known within the SVWD with chemicals of potential concern to groundwater quality. As listed in Table 5-2, the primary chemicals of concern emanating from these sites are MTBE, chlorinated VOCs, including PCE, TCE, and cis-1,2-DCE (Dichloroethylene), and chlorobenzenes. These chemicals are of concern both because of their toxicity and their persistence in groundwater. Two former SVWD supply wells have been taken out of service due to impact from chemicals originating from these sites, including Mañana Woods #2 (see Figure 1-1) and the former Hidden Oaks well (located about 700 feet north/northeast of Mañana Woods #2), both impacted by MTBE from the Camp Evers site.

The clean up of MTBE at SLVWD's Mañana Woods well and SVWD Well #9 continues such that if it appeared that the plume was migrating, the responsible parties would be required to contain the plume.

Table 5-2: Summary of Potential Impacts from Environmental Sites on SVWD Production Wells

Well	Sites with Potential Impact	Chemicals of Concern	Assessment of Potential Impact
Well #3B	None Known	None Known	Impact not expected given well location (~0.5 miles up-gradient from nearest known release site) and screen depth (>700 ft)
Well #7A	None Known	None Known	Impact not expected given well location (>0.75 miles up-gradient from nearest known release site) and screen depth (>700 ft)
Well #9	Camp Evers; Watkins-Johnson; Scotts Valley Dry Cleaners; King's Cleaners	MTBE, PCE, TCE; cis-1,2-DCE	MTBE consistently detected at below MCL concentrations since August 2006, ongoing and apparently increasing impact is a concern; TCE/cis-1,2-DCE detected sporadically at <MCL concentrations and significant increases not expected given cleanup status; PCE not detected to date, however uncertainty in sources presents a potential concern.
Well #10A	Scotts Valley Dry Cleaners	PCE	No impact detected to date, but proximity to site presents ongoing concern until cleanup is completed, which could take many years based on relatively flat concentration trends

Well	Sites with Potential Impact	Chemicals of Concern	Assessment of Potential Impact
Well #11A	Scotts Valley Drive Dichlorobenzene	Chlorobenzenes	Monochlorobenzene present at trace (~100x less than MCL) and generally declining concentrations; given cleanup status, significant increases not expected
Well #11B	Scotts Valley Drive Dichlorobenzene	Chlorobenzenes	Monochlorobenzene present historically but none detected presently, historically generally declining concentrations; given cleanup status, significant increases not expected

5.3.5 Recycled Water Monitoring Program

SVWD actively monitors groundwater and surface water as part of the Recycled Water Program. SVWD has performed monitoring on surface water sampling locations as part of meeting the BMO of monitoring changes in water quality. During 2010, samples were collected from a total of nine surface water sampling locations on Carbonera Creek, Bean Creek, Eagle Creek, and Spring Lakes Park. The key parameters that are evaluated are potential increases in nutrients (primarily nitrate) and salt (primarily TDS), as briefly described below.

5.3.5.1 Nitrate

The presence of nitrate in recycled water has been noted in the effluent samples. Nitrate as N concentrations in surface water samples ranged from <0.1 to 0.64 mg/L during the 2010 sampling. These are similar to trends seen in previous years and below the USEPA primary MCL of 10 mg/L for nitrate (as N).

5.3.5.2 TDS

The presence of elevated TDS in recycled water has been noted in the effluent samples. The 2010 measurements show TDS levels ranging from 70 mg/L to 590 mg/L, except in Spring Lakes where TDS concentration was 730 mg/L, compared to the USEPA secondary MCL of 500 mg/L for TDS. This is similar to results since 2006 and is indicative that recycled water is put into Spring Lakes.

5.4 Water Quality Impacts on Reliability

SVWD's previous and current efforts to manage the basin and comprehensive active monitoring of groundwater quality have contributed to the projection of no changes to water supply as a result of water quality conditions. Therefore, no reductions to supply are expected from any of the constituents listed in this section (Table 5-3).

Table 5-3: Current and Projected Water Supply Changes Due to Water Quality-Percentage Change

Water Source	2010	2015	2020	2025	2030
Santa Margarita Basin	0%	0%	0%	0%	0%

THIS PAGE INTENTIONALLY BLANK

Section 6: Reliability Planning

6.1 Overview

The Act requires urban water suppliers to assess water supply reliability that compares total projected water use with the expected water supply over the 20 years in five year increments (SVWD is going beyond the requirements of the Act by developing a plan which spans 25 years). The Act also requires an assessment for a single dry year and multiple dry years. This section presents the reliability assessment for SVWD's service area.

It is the stated goal of SVWD to deliver a reliable and high quality water supply for their customers, even during dry periods. Based on conservative water supply and demand assumptions over the next 25 years in combination with conservation of non-essential demand during certain dry years, the Plan successfully achieves this goal.

6.2 Reliability of Water Supplies

Each water supply source has its own reliability characteristics. In any given year, the variability in weather patterns around the region may affect the availability of supplies to the Santa Margarita Basin.

For SVWD, the assessment of water supply reliability under normal or average conditions is best described by the sustainable yield. SVWD overlies a relatively large groundwater basin. Considering the nature of stored groundwater in the basin, the impact of drought years does not affect the absolute availability of shorter term supply, but rather the condition of overall storage, water level, and well performance if groundwater is depleted on a localized basis. Furthermore, the long-term impact on the groundwater basin, specifically additional loss of storage during extended droughts is of significant concern.

The ultimate supply of groundwater in the basin is natural recharge resulting from precipitation in the basin. Because the primary supply of water for SVWD, with the exception of recycled water, is the basin, precipitation defines the supply of SVWD. Precipitation has been measured at the El Pueblo Yard in Scotts Valley since 1982. Prior to 1982, precipitation records date back to 1947 at the Blair Ranch on the outskirts of Scotts Valley in Santa Cruz County. The Blair Ranch precipitation records provide a historical sequence of 63 years. Table 6-1 defines average supply, single dry year supply, and multiple dry years supply as related to precipitation over the 63-year historical sequence. The assessment of water supply reliability, as presented in Table 6-1, is similar to the assessment that was reported in the 2005 UWMP. The 2005 UMWP reliability assessment was based on the results of the numerical groundwater modeling analysis where the model scenarios were developed and used to provide background data for basin management and response criteria during extended drought and also catastrophic conditions. The drought assessment from the numerical modeling analysis is relevant to SVWD today because it reflects the capacity of SVWD to provide water under drought conditions.

Table 6-1: Supply Reliability Based on Precipitation

	Normal Water Year	Single Dry Year	Multiple-Dry Water Years				
			Year 1	Year 2	Year 3	Year 4	Year 5
Year	2002	1990	1987	1988 1989		1990	1991
Inches of Rain	42.33	20.58	23.42	23.81	30.67	20.58 26.64	
Percent of Normal	100%	49%	55%	56%	72%	49% 63%	

Although there have been significant years of drought, the overall storage in the basin is apparently sufficient to provide adequate resources for SVWD given the past, current, and anticipated future demand. The current basin conditions are supported by less rapid decline in groundwater levels as well as model results that indicate increases in groundwater storage. The current basin conditions are mainly attributed to above average rainfall, combined with continued lower groundwater production by other users and SVWD as a result of the Recycled Water Program and Water Conservation Program (Kennedy/Jenks, 2011). While the supply is generally sufficient during a shorter-term drought because the demands are reduced through SVWD action and the reliance on groundwater in storage, the long-term reliability of supply needs to be monitored closely and groundwater storage enhanced through continued attention to water use efficiency, recycled water and enhanced in-lieu and direct recharge. Short-term droughts can also be affected by the loss of individual wells resulting from catastrophe, such as an earthquake, or environmental contamination, which is discussed further in Section 8.

In the context of overall water supply reliability, the expansion of SVWD's Recycled Water Program plays a significant role. As discussed in Section 2, the future water demand in the SVWD service area will increase as development continues; thus, SVWD recognizes that recycled water will continue to be an important and reliable source of additional water. SVWD's unique situation is that when groundwater is limited and potable exchange water is not available, recycled water is an important element of SVWD's water portfolio. As more recycled water customers are anticipated to be added to the recycled distribution system, landscape irrigation with groundwater supply will go down. Therefore, increased use of recycled water will further enhance the reliability of the groundwater source since groundwater that is not pumped will replenish the basin storage and be available for future beneficial uses.

A summary of the factors limiting supplies is found in Table 6-2. The reliability of the recycled water resource of SVWD is unaffected by climactic conditions given that the source of recycled water is wastewater. The recycled water distribution system is susceptible to major catastrophes, such as a seismic event that can disrupt operation. Potable exchange water supply from the SCWD is considered on a regular basis; however, the reliability of this supply may depend on the availability of surface water in the wintertime from the SCWD.

Table 6-2: Factors Resulting in Inconsistency of Supply

Water Supply Sources	Specific Source Name, if any	Limitation Quantification	Legal	Environmental	Water Quality	Climatic	Additional Information
Supplier produced groundwater		None			✓		Groundwater is monitored per California DPH regulatory requirements and the water meets all MCLs.
Recycled water	Scotts Valley WRF	Influent summer wastewater flows					
Future exchange from SCWD	Surface water	Recycled water exchange and surface water availability	✓	✓			This supply depends on the availability of surface water during a dry winter as well as the exchange of recycled water during the summer.

6.3 Normal, Single-Dry and Multiple-Dry Year Planning

Currently, SVWD has groundwater and recycled water supplies available to meet demands during normal, single-dry, and multiple-dry years. In addition to these current sources, potable exchange water from the SCWD is anticipated to become available by 2020 and continue on a regular basis through 2035. The following sections elaborate on the different supplies available to SVWD.

6.3.1 Groundwater

A portion of the local groundwater of up to 2,600 AFY of sustainable yield is theoretically available in both average and dry years to SVWD since deficits can be satisfied with local groundwater and be replenished in wet years. In addition, the sustainable yield estimated will be refined during the update of the groundwater model planned for Fall 2011. It should be noted that of the pumpers over the Scotts Valley groundwater Subarea; SVWD pumps the largest quantity of water of all of the pumpers. However, as discussed in Section 8, SVWD will impose voluntary and mandatory demand reduction measures to account for the reduced precipitation and resulting loss of recharge and storage.

It is assumed that a regional message regarding reduced supplies will also influence customers of the other pumpers. Table 6-3 summarizes SVWD's water supplies available in an average year, in a single-dry year, and multiple-dry water years, based on the current water supply conditions. Table 6-4 summarizes SVWD's water supply projections through 2025 during a single-dry year with an assumed 15 percent demand reduction in response to the drought condition. SVWD supply from recycled water is a defined quantity while projected groundwater supply in Tables 6-3 and 6-4 will vary as local groundwater will be pumped according to the demand.

Single and multiple-dry year demand and supply were assessed in the event that drought conditions occur similar to the past droughts that were experienced in the region. Single-dry year is represented by water year 1990, which is the driest year in the historical sequence. The five multiple sequential dry years used, which is longer than the required three consecutive years, in this analysis are 1987 through 1991 to account for the driest consecutive dry years in the historical sequence. While Tables 6-3 and 6-4 show adjusted, reduced groundwater pumping according to the reduced demand, it does not imply reduced supply.

As mentioned above, the Santa Margarita Basin is considered a reliable supply as the basin is managed through the GWP by SVWD and other members of the SMBAC. In addition, a regional message from SCWD and other agencies regarding water conservation during dry years, which can be reinforced by SVWD, will likely minimize increases in dry year demand throughout the Scotts Valley Groundwater Subarea. Given the large volume of basin storage and the estimated basin sustainable yield of 2,600 AFY, combined with demand reduction measures that can be imposed during droughts, SVWD is anticipated to have sufficient supply to meet the demand in average and single dry years.

Table 6-3: Supply Reliability – Current Water Sources – AFY

Water Supply Sources	Average/ Normal Water Year Supply (2011)	Single Dry Water Year Supply (2011)	Multiple Dry Water Year Supply				
			2011	2012	2013	2014	2015
Wholesale (Imported) Water[a]	0	0	0	0	0	0 0	
SVWD Produced Potable Groundwater from Santa Margarita Basin (b)	1,383	1,152	1,383	1,408	1,273	1,212	1,149
Transfer In/Out (a)	0	0	0	0	0	0 0	
Exchange In (Potable projected use)(c)	0	0	0	0	0	0 0	
Recycled Water (Non-potable local use, existing and projected)(d)	157	157	157	166	174	183 191	
Desalination (a)	0	0	0	0	0	0 0	
Total Water Supply	1,541	1,309	1,541	1,574	1,447	1,395	1,340
Percent of Normal Demand	100%	85%	100%	100%	90%	85% 80%	
Total Pumping Amount Potentially Available to SVWD and Other Pumpers (Sustainable Yield)(e)	2,600	2,600	2,600	2,600	2,600	2,600	2,600

Notes:

(a) SVWD currently does not have water supply through wholesale imported water, transfers, or desalination.

(b) Groundwater pumping during a drought will vary according to the demand projections that account for reduced demand measures.

(c) Potable exchange with the SCWD in exchange of recycled water sale to Pasatiempo Golf Club by SVWD is anticipated to become available by 2020; thus, it is not included in this table.

(d) SVWD's Recycled Water Program is anticipated to expand gradually to provide 191 AFY of recycled water by 2015 for landscape irrigation.

(e) Based on the sustainable yield estimate for the portion of the basin underlying the City of Scotts Valley, as provided by the modeling analysis (ETIC, 2006). This represents an average of water available for pumping without negatively impacting the aquifer or long-term storage volumes.

Table 6-4: Supply Reliability for a Single-Dry Year -Current and Future Supplies – AFY

Water Supply Sources	2010	2015	2020	2025	2030	2035
Wholesale (Imported) Water (1)	0	0	0	0	0	0
SVWD Produced Potable Groundwater from Santa Margarita Basin (2)	1,358	1,233	1,089	1,057	1,051	1,081
Transfer In/Out (1)	0	0	0	0	0	0
Exchange In (Potable projected use) (3)	0	0	120	120	120	120
Recycled Water (Non-potable local use, existing and projected) (4)	149	191	241	290	330	330
Desalination (1)	0	0	0	0	0	0
Total Water Supply	**1,507**	**1,424**	**1,450**	**1,467**	**1,501**	**1,531**
Percent of Normal Demand	85%	85%	85%	85%	85%	85%
Total Pumping Amount Potentially Available to SVWD and Other Pumpers (Sustainable Yield) (5)	2,600	2,600	2,600	2,600	2,600	2,600

Notes:

(1) SVWD currently does not have water supply through wholesale imported water, transfers, or desalination.

(2) Groundwater pumping during a single dry year will vary according to the demand projections that account for reduced demand measures at an assumed 15 percent reduction in demand to reflect the condition of the hydrologic year 1990.

(3) Potable exchange with the SCWD in exchange of recycled water sale by SVWD to Pasatiempo Golf Club is anticipated to become available by 2020 and continue on a regular basis through 2035.

(4) SVWD's Recycled Water Program is anticipated to expand gradually to provide 330 AFY of recycled water by 2030 for landscape irrigation.

(5) Based on the sustainable yield estimate for the portion of the basin underlying the City of Scotts Valley, as provided by the modeling analysis (ETIC, 2006). This represents an average of water available for pumping without negatively impacting the aquifer or long-term storage volumes.

6.4 Supply and Demand Comparisons

Water use patterns typically change during dry years. This is often the result of landscape irrigation demand increasing to compensate for the lack of precipitation. Although increased water demand during dry years is possible in SVWD, it will likely be managed through mandatory demand reductions and does not impact SVWD's water service reliability even if demand reductions do not occur. This is because the groundwater storage beneath SVWD ensures a consistent supply during dry years. In addition, SVWD's Recycled Water Program is primarily marketed to landscape irrigation users to decrease this demand on the aquifer. The result is no disparity between water supply and demand values as described in Water Code §10635 (a-c).

The available supplies and water demands for SVWD's service area were analyzed to demonstrate SVWD's ability to satisfy demands during three scenarios: Normal Water Year, Single-Dry Water Year, and Multiple-Dry Year supplies. The tables in this section present the supplies and demands for these various drought scenarios for the projected planning period of 2010-2035 in five year increments. Table 6-5 presents the base years for the development of water year data. Projected demand during a single dry year presented in Table 6-5 is based on conditions of water year 1990, the driest year in the historical sequence. The five multiple sequential dry years used in this analysis are years 1987 through 1991 that account for the driest consecutive dry years in the historical sequence and also includes the driest three year consecutive as required by the water code.

Supply projections during a normal water year as presented in Table 3-1 have been previously discussed in detailed in Section 3. The changes (i.e., reductions) in demand due to single and multiple dry years are enforced by SVWD to protect the overall groundwater basin health. As mentioned above, supplies from recycled water are defined quantities and assumed to remain the same as in normal water year conditions. Groundwater pumping, however, is assumed to vary from the average/normal water year pumping conditions depending on the demand during Single-Dry and Multiple-Dry Year demand. It is assumed that future potable exchanges from SCWD will not be available during dry years. Tables 6-6, 6-7 and 6-8 at the end of this section summarize, respectively, Normal Water Year, Single-Dry Water Year, and Multiple-Dry Year supplies, based on the demand projections with reduced demand measures.

Table 6-5: Basis of Water Year Data

Water Year Type	Base Years
Normal Water Year	2010
Single-Dry Water Year	1990
Multiple-Dry Water Years	1987-1991

6.4.1 Normal Water Year

Table 6-6 summarizes SVWD's water supplies available to meet demands over the 25-year planning period during an average/normal year.

6.4.2 Single-Dry Year

The water supplies and demands for SVWD's service area over the 25-year planning period were analyzed in the event that a single-dry year occurs, similar to the drought that occurred in California in 1990. Table 6-7 summarizes the existing and planned supplies available to meet demands during a single-dry year. Demand during single dry years was assumed to decrease by 15 percent based on the average year projections. This reduction is due to the imposed voluntary and mandatory demand reduction measures to account for the reduced precipitation and resulting loss of recharge and storage. There is no difference in the supply and the demand as presented in Table 6-7 since the local groundwater supplies will be pumped according to the demand.

6.4.3 Multiple-Dry Year

The water supplies and demands for SVWD's service area over the 25-year planning period were analyzed in the event that a multiple-dry year event occurs, similar to the drought that occurred during the hydrological years from 1987 through 1991. Table 6-8 summarizes the existing and planned supplies available to meet demands during Multiple-Dry Years. Similar with the Single-Dry Year analysis, there is no difference in the supply and the demand since the local groundwater supplies will be pumped according to the demand. While the overall demand volumes increase based on increase in populations, demand decreases throughout the progression of a drought based on SVWD's various stages of action.

For the purpose of the three-year multiple-dry year analysis as presented in Table 6-8, hydrological conditions of years 1989 through 1991 were used since SVWD is not anticipating to impose voluntary or mandatory demand reduction measures in the first two years (1987 and 1988) of the actual five year extended drought. In Table 6-8, demand was assumed to decline 10 percent in the first year, 15 percent in the second year, and 20 percent in the third year, compared to the average year supply and demand projections. These demand reduction measures reflect SVWD's proactive approach to addressing the possibility of an extended drought. Consistent with the water shortage contingency plan discussed in Section 8, the 10 percent to 20 percent demand reduction corresponds to a three stage demand reduction that would be invoked during SVWD's declared water shortages, as listed below:

- 10 Percent Reduction – Stage 1 action with voluntary demand reduction.
- 15 Percent Reduction – Stage 2 action with mandatory demand reduction measures.
- 20 Percent Reduction – Stage 3 action with mandatory demand reduction measures.

The 10 percent to 20 percent reduction decreases the loss of storage associated with a three year drought, and raises public awareness of drought conditions. Although the 20 percent reduction is not absolutely necessary during an extended drought to ensure a continuous water supply, it represents the level of conservation required to protect the health of the aquifer and ensure a long-term sustainable water supply for the future.

Table 6-6: Supply and Demand Comparison-Normal Year – AFY

	2010	**2015**	**2020**	**2025**	**2030**	**2035**
Supply Totals	1,507	1,675	1,705	1,726	1,766	1,802
Demand Totals	1,507	1,675	1,705	1,726	1,766	1,802
Difference	0	0	0	0	0	0
Difference as Percent of Supply	0%	0%	0%	0%	0%	0%
Difference as Percent of Demand	0%	0%	0%	0%	0%	0%

Table 6-7: Supply and Demand Comparison-Single Dry Year – AFY

	2010	**2015**	**2020**	**2025**	**2030**	**2035**
Supply Totals	1,507	1,424	1,450	1,467	1,501	1,531
Demand Totals	1,507	1,424	1,450	1,467	1,501	1,531
Difference	0%	0%	0%	0%	0%	0%
Difference as Percent of Supply	0%	0%	0%	0%	0%	0%
Difference as Percent of Demand	0%	0%	0%	0%	0%	0%

Table 6-8: Supply and Demand Comparison-Multiple Dry-Year Events – AFY

		2010	2015	2020	2025	2030	2035
Multiple-dry year first year supply	Supply Totals	1,507	1,507	1,535	1,554	1,589	1,622
	Demand Totals	1,507	1,507	1,535	1,554	1,589	1,622
	Difference	0	0	0	0	0	0
	Difference as Percent of Supply	0%	0%	0%	0%	0%	0%
	Difference as Percent of Demand	0%	0%	0%	0%	0%	0%
Multiple-dry year second year supply	Supply Totals	1,507	1,424	1,450	1,467	1,501	1,531
	Demand Totals	1,507	1,424	1,450	1,467	1,501	1,531
	Difference	0	0	0	0	0	0
	Difference as Percent of Supply	0%	0%	0%	0%	0%	0%
	Difference as Percent of Demand	0%	0%	0%	0%	0%	0%
Multiple-dry year third year supply	Supply Totals	1,507	1,340	1,364	1,381	1,412	1,441
	Demand Totals	1,507	1,340	1,364	1,381	1,412	1,441
	Difference	0	0	0	0	0	0
	Difference as Percent of Supply	0%	0%	0%	0%	0%	0%
	Difference as Percent of Demand	0%	0%	0%	0%	0%	0%

6.4.4 Summary of Comparisons

As shown in the analyses above, SVWD has adequate supplies to meet demands during Normal, Single-Dry, and Multiple-Dry years throughout the 25-year planning period. There is no difference in the supply and the demand as presented in Tables 6-6, 6-7, and 6-8 since the local groundwater supplies will be pumped according to the demand. SVWD will impose demand reductions to further extend the groundwater supply. In addition, as shown in Table 3-1, there is more than sufficient production capacity to meet future demands, given the estimated sustainable yield of 2,600 AFY in the basin available to SVWD and the other pumpers. With the large amount of storage in the basin and projected future groundwater pumping that is within sustainable basin yield, SVWD is not concerned with the absolute availability of the dry year supply, but the impact on wells and water level declines during water supply shortages, as further discussed in Section 8. Future UWMP updates will reevaluate this conclusion with updated information the sustainable yield of the basin as well as the potential impacts of climate change on increased demand and reduced supply.

Section 7: Water Demand Management Measures

7.1 Background

SVWD recognizes that conserving water is an integral component of a responsible water management strategy and is committed to providing education, tools, and incentives to help its customers reduce the amount of water they use. This section describes the water Demand Management Measures (DMMs) implemented by the District.

The District became a signatory to the Memorandum of Understanding Regarding Water Conservation in California (MOU) of the California Urban Water Conservation Council (CUWCC) in 2005, establishing a firm commitment to the implementation of the Best Management Practices (BMPs) or DMMs. The CUWCC is a consensus-based partnership of agencies and organizations concerned with water supply and conservation of natural resources in California. By becoming a signatory, the District committed to implement a specific set of locally cost-effective conservation practices in its service area.

The District actively pursues the implementation of the DMMs and as of 2010 the District's water use is currently lower than their SBx7-7 2020 target of 143.9 gcpd as reported in Section 2. The District will continue actively investing in water efficient practices and programs to ensure that it continues to meet its water savings goals and maintain compliance with SBX7-7 in the future.

7.2 Implementation Levels of DMMS/BMPS

The District is subject to the Urban Water Management Planning Act, AB1420 and SBX7-7 requirements, in addition to the commitment of compliance with the BMPs as a signatory to the MOU. In the District service area, demand management is addressed at the local (retail agency) level.

The MOU and BMPs were revised by the CUWCC in 2008. The revised BMPs now contain a category of "Foundational BMPs" that signatories are expected to implement as a matter of their regular course of business. These include Utility Operations (metering, water loss control, pricing, conservation coordinator, wholesale agency assistance programs, and water waste ordinances) and Public Education (public outreach and school education programs). These revisions are reflected in the reporting database starting with reporting year 2009. The new category of foundational BMPs is a significant shift in the revised MOU. Programmatic BMPs include residential, commercical, industrial, institutional (CII), and landscape BMPs. Signatories have the option of implementing each of the programmatic BMP as described below, or implementing measures identified in the Flex Track Menu alternative included in each Programmatic BMP.

Signatories to the MOU are allowed by Water Code Section 10631(j) to include their biennial CUWCC BMP reports in an UWMP to meet the requirements of the DMMs sections of the UWMP Act. The District has been a signatory since 2005. At the time of this Plan preparation, the development of the new CUWCC database is not yet complete. Therefore, the District's BMP activity information is included in this section. Due to delays in development of the CUWCC database, the District will file its 2009 through 2010 CUWCC reports in 2011. The District is currently in progress with submitting these CUWCC reports at the time of publication of this 2010 UWMP. All BMP information is included in the following sections. Once the 2009 and 2010 BMP reports are filed with the CUWCC, copies of the reports will be included in Appendix G.

The following sections describe the various programs and conservation activities implemented by the District and provide an implementation plan for compliance with the UWMP Act, including DMMs and SBX7-7 requirements. SVWD is implementing all of the Foundational BMPs as required in the revised MOU and UWMP Act. The Programmatic BMPs are being implemented through a GPCD approach. The GPCD goals and implementation plan are discussed further in Section 7.5. SVWD plans to meet the proposed 20x2020 water use targets implementing conservation methods that are discussed in this section, as well as with recycled water as described in Section 4. SVWD's water conservation activities reported below represent SVWD's commitment to water conservation. As discussed in Chapter 3, SVWD's water demand has already shown significant decline in recent years, which is attributed to SVWD's ongoing water conservation activities in conjunction with the expansion of the recycled water use for landscape irrigation. SVWD will continue its water conservation efforts towards meeting the 20X2020 water use target.

7.3 Foundational BMPs

7.3.1 Utility Operations – Operations Practices

7.3.1.1 Conservation Coordinator

The District hired a part-time Water Conservation Coordinator in April 2007 which evolved into a 75 percent time position as of 2009. The District's initial Water Conservation Coordinator trained a replacement, who took over in August 2010. The two coordinators have successfully implemented programs that address the requirements established by the CUWCC BMPs.

7.3.1.2 Water Waste Prevention

The District actively pursues incidents of water waste. Incidents of waste are investigated and recommendations for any corrections are provided. Water sources are regulated and can be disconnected in cases of excessive leakage and/or facilities failure.

To enforce the policy, Ordinance 74-83 was adopted by SVWD in 1983 prohibiting the following:

1. The use of water from any fire hydrant unless specifically authorized by permit from the District, except by regularly constituted fire protection agencies for fire suppression purposes.

2. The watering of grass, lawn, groundcover, shrubbery, open ground, crops and trees, including agricultural irrigation, in a manner or to an extent which allows excess water to run to waste.

3. The escape of water through leaks, breaks, or malfunctions within the water user's plumbing or distribution system for any period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight (48) hours after the water user discovers such break, leak, or malfunction, or receives written notice from the District of such condition, whichever occurs first, is a reasonable time within which to correct such condition or to make arrangements for correction.

4. The use of water for washing cars, building exteriors, mobile home exteriors, boats, sidewalks, driveways, or other exterior surfaces, without the use of a quick acting positive shut-off nozzle on the hose.

5. The operation of any ornamental fountain, car wash, or other such structure using water from the District water system, unless water for such use is recycled.

6. The indiscriminate running of water or washing with water not otherwise prohibited above which is wasteful and without reasonable purpose.

A copy of the Ordinance 74-83 is presented in Appendix H. In addition, the Ordinance 150-09, adopted by the District in September 2009, established penalties for violation of water conservation restrictions (attached as Appendix I). The District has also updated its Water Shortage Contingency Plan as described in Section 8. The plan is designed to facilitate implementation of water shortage response measures. The Water Shortage Contingency Plan can be found within the 2005 Urban Water Management Plan available at http://www.svwd.org/index/District_Reports.

7.3.1.3 Water Loss Control

In the Annual Water Supply Report to the Department of Health Services Drinking Water Field Operations Division, a simple system-wide audit of the previous year's water production and water sales quantified the unmetered water usage. Authorized uses such as water used for fire fighting, street cleaning, water sold through portable meters, and water used for filter backwashing at the treatment plants are subtracted from the total to provide an estimate of "unaccounted-for" or "lost" water.

Estimates for unaccounted-for water prior to 2009 did not include several acre feet of water delivered due to a computer programming error. In 2009, it was discovered that approximately 40 customer accounts had been under-billed dating back to 2002. The billing errors had caused an increase in unaccounted-for water estimates by approximately 3.5 percent. After adjusting for billing errors, unaccounted-for water measurements were between 6.2 percent and 18.2 percent for water years 2005-2010 as shown in Table 7-1 below. As described below, SVWD has initiated significant efforts in the past two years that aimed to reduce the amount of unaccounted-for water. These included conducting a full system-wide water audit and full system leak detection, and running the AWWA M36 software. SVWD plans to use the results of these efforts to direct efforts to reduce and maintain the amount future unaccounted-for water estimates less than 10 percent.

Table 7-1: Unaccounted-for Water Estimates WY2005-WY2009

	WY2005	WY2006	WY2007	WY2008	WY2009	WY 2010
Groundwater Produced	1,613	1,834	1,764	1,700	1,507	1,358
Potable Water Delivered	1,512	1,500	1,601	1,532	1,393	1,240
Percent Water Loss	6.2%	18.2%	9.2%	9.9%	7.2%	8.7%

Key: WY: Water Year

In November 2008, the District was awarded a grant to perform a full system wide audit in order to reduce the amount of unaccounted-for water. A full system-wide audit includes testing meter accuracy and detecting water leaks in the distribution system. Meter analysis began in early November 2009. The consultant, Advanced Flow Measurement, initiated the program to establish and maintain maximum flow measurement accuracy and precision from meters used for groundwater extraction, potable water treatment and distribution, recycled water treatment, and recycled water distribution. Twenty-nine meter installations were field tested and catalogued by photo, location, size, brand, model, type, serial number, and year of manufacture. The District has initiated replacement of those meters recommended for replacement and have replaced 2 meters to date with the balance planned for the next several years.

Full system leak detection is scheduled to begin July 2010. The leak detection consultant, Utility Services Associates, will survey for and pinpoint water leaks using highly sophisticated leak detection technology. Utility Services Associates will provide a daily detailed report of leak locations, estimated gallons per minute (gpm) loss, and area covered. The survey indicated some minor distribution leaks that were repaired immediately.

In 2010, District staff used AWWA M36 software to calculate a Water Audit Data Validity Score. The District received 83 out of 100. Worksheets for determining the District's Water Audit Data Validity Score can be found in Appendix J. Given the high score from the District water audit and that the percent water loss is less than 10 percent, the District's efforts in water loss in the past several years are effective and will be continued on an as-needed basis.

In addition to system leaks, the District has operated a leak detection program for customers since 1996. Customers who have spikes in water consumption are sent a leak letter informing them of an increase in water usage and suggesting that there may be a leak at the customer's property. In addition, customers who fix leaks may be eligible for a leak adjustment on their water bill according to the policy below.

> ***Section 4.18 – Leakage Adjustment Policy 1***
> *The General Manager is hereby authorized, upon written request of the Customer, to adjust water billings for documented undetected leaks in an amount not to exceed seventy-five percent (75%) of existing water rates. The General Manager may adjust the Customer's account one time per year for not more than two (2) billing cycles, providing a credit to the Customer in an amount consistent with written District guidelines, approved by the Board of Directors, which are fair and equitable to the Customer and the District and which reflect the nature, extent, and responsible repair of the leak. The Customer must provide the District with a written adjustment request stating the date of repair and the type of repair, together with copies of any receipts. The General Manager shall make the final determination in interpreting the District's written guidelines.*

The District credits approximately $20,000-$30,000 annually for customer leak adjustments.

7.3.1.4 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

All potable water use in the District is metered and customers are billed by volume of usage on a bi-monthly basis. An increasing block rate structure has been in place in the District for several years. Recycled water is also metered and billed by volume of usage on a monthly basis.

The District's billing system keeps record of the following meter data: size, type, year installed, customer class served. An abnormal meter read automatically creates a work order for meter testing and repair or replacement when necessary. An abnormal read would include exceptionally high or low reads, zero reads, or non-reads.

Meter inventory data is compiled according to size, type, customer class and date of installment. The District in September 2010 implemented a meter testing, repair, and replacement plan. The plan includes testing meters prior to installation and replacement of meters over 10 years old.

The largest incentive for retrofitting mixed use accounts is conversion to recycled water. Recycled water costs less than potable water and there is not basic service fee for a recycled water meter. The District continues to pursue this option

7.3.1.5 Retail Conservation Pricing (formerly BMP 11)

The revenue from volumetric rates for the District was approximately 70 percent of total for fiscal year 2008-2009, meeting the requirements for the Conservation Pricing BMP. Based on the fiscal year 2009-2010 data, the proportion of revenue from volumetric charges was approximately 69 percent ($2.724 million of volumetric charges vs. 1.216 million of meter service charges), which is slightly below the threshold requirement of 70 percent. It should be noted that fiscal year 2009-2010 had very low water demand where the groundwater pumping was less than the District's historical pumping that occurred since 1990, as discussed earlier in Section 3 (Figure 3-3). The reduced demand in fiscal year 2009-2010 is partially attributed to implementation of water conservation programs combined with other factors including drought conditions, use of recycled water, and poor economic conditions. It is assumed that given the combined effects of several factors affecting water demand, the fiscal year 2009-2010 data may not reflect the District's representative revenue proportions between volumetric and fixed charges. The District will continue to monitor its volumetric revenues as compared to fixed charges but it should be recognized that declining potable water demands over the last five years are at least, in part, attributable to the rate structure regardless of the actual proportion of volumetric revenues as compared to fixed charges.

The District began using a six-tier inclining block rate structure for all potable water customers in 1992. Currently, the first tier is set at $3.19 per 1,000 gallons for the first 6,000 gallons in a month. The last of six tiers is set at $10.31 per 1,000 gallons for all consumption over 50,000 gallons per month. From 1992 to 2009, the sixth tier was set for consumption over 50,000 gallons in one month. In 2010, the usage ranges for the last four tiers were shortened to provide a greater economic incentive for conserving. Table 7-2 lists water rates before and after the recent rate change.

Table 7-2: Water Rates

Rates for 02/15/2009 - 02/15/2010

Usage (gallons)	Rate per 1,000 gallons
0-6,000	$3.19
6,001-14,000	$5.35
14,001-30,000	$6.50
30,001-50,000	$7.69
50,001-10,000	$9.66
Over 100,000	$10.31

Rates for 02/15/2010 - 02/15/2011

Usage (gallons)	Rate per 1,000 gallons
0-6,000	$3.19
6,001-14,000	$5.35
14,001-24,000	$6.50
24,001-36,000	$7.69
36,001-50,000	$9.66
Over 50,000	$10.31

In February 2010, the District began offering a flat rate to qualifying non-single family residential customers. In order to qualify for the flat rate the customer must fulfill flat rate guidelines which require a water conservation audit. This audit is more thorough than the Green Business Water Conservation Audit in that more data are collected and additional fixtures are checked. Flat rate is granted after the audit verifies compliance with both indoor and outdoor water efficiency criteria, including the use of recycled water where/when feasible.

The District also has an inclining block rate for all recycled water customers with rates 80 percent of the potable rates. The District has no jurisdiction over the sewer rates set by the City of Scotts Valley. However, for billing purposes, SVWD supplies the City with commercial and industrial customer usage data.

7.3.2 Education

7.3.2.1 Public Information Programs

The District has conducted a variety of public education activities over the past five years. Several activities aimed to motivate customers to respond to a drought situation, while others were more general and informational in scope. The following is a list of activities that the District has undertaken:

7.3.2.1.1 Website

The District website existed in minimal form prior to March 2007. At that time the District hired a part-time intern to revamp the website (http://www.svwd.org/index/Water_Conservation) which included the addition of a section dedicated to Conservation and Recycled Water. Currently the District website is used to promote new and existing conservation and recycled water programs. The website is updated weekly.

7.3.2.1.2 Bill Messages and Inserts

Several bill messages and bill inserts promoting water conservation have been delivered to customers. SVWD bills on a bi-monthly basis for potable water customers and monthly basis for recycled water customers. The number of bill messages and bill inserts delivered annually varied year to year. A total of 24 bill inserts and bill messages were delivered from 2007 to April 2011, including six bill messages and three bill inserts in 2010. The 2010 bill messages were typically delivered bi-monthly. The messages and inserts inform customers of drought conditions and promote water conservation and rebate programs. A bill message is printed directly on the front page of the water bill. A bill insert is a separate sheet of paper inserted along with the bill into the bill envelope. The District has also used water bills to conduct customer surveys. The survey is printed in red ink and is located at the top of the water bill. Two surveys have been conducted over the past three years. The first survey inquired about toilet installations and the second survey inquired about landscape irrigation systems.

A log of bill inserts and messages is kept in a spreadsheet to be used for BMP reporting purposes. The bill messages and bill inserts since 2007 included water conservation tips, reminder of water conservation regulations, and drought measures as summarized below:

- “Save Water, Save Money!” for replacing old toilets, free aerators, showerheads, hose nozzles and toilet leak detection tablets.
- “Winterize Your Irrigation System” sent out in winder months for tips on checking system for breaks and leaks.
- Announcement of “Water Awareness Month” of May to raise awareness about water conservation, inspecting irrigation systems and checking for leaks.
- Tips to customers for landscape watering schedule and efficient landscape irrigation
- Announcement and reminder for toilet and landscape rebates
- Announcement of drought conditions and drought measures, penalties for drought measure violations
- ‘Water Smart Gardening” in Santa Cruz County for free online gardening tool
- Invitation to grand opening of “Water-Smart demo Garden” and “Water For Tomorrow” magazine

7.3.2.1.3 Print Ads

The District prints bi-weekly advertisements in the local Press Banner newspaper promoting water conservation, rebate programs, contests and more. Ads are selected and/or designed by the Conservation Coordinator. A log describing the date and content of each ad is kept in a spreadsheet to be used for BMP reporting purposes.

7.3.2.1.4 Conservation Presentations

District staff makes presentations to local service clubs and public agencies on water supply and water conservation related topics. This includes the Scotts Valley City Council and Chamber of Commerce, Santa Margarita Groundwater Basin Advisory Committee, Scotts Valley Rotary, Kiwanis, Lions, and Exchange Clubs. More recently, SVWD had a water conservation presentation at the Scotts Valley Rotary Club in May 2011 and intends to have additional public presentationsP in the future.

7.3.2.1.5 Water Conservation Banners

In August 2008, the District hung banners down Scotts Valley Drive and Mt Hermon Road which carried water conservation messages. Each banner contained one of the following three slogans:

1. Water Use it Wisely Conserve it Recycle it
2. Got Water
3. Save Water Year-Round Every Drop Counts

In September 2009, additional banners were made to be displayed in the late summer of 2010. The new banners contain the following slogans:

1. Conserving Together Water Forever
2. Watch Your Waste

7.3.2.1.6 Smart Gardening Faire/The Garden Faire

The District has been sponsoring The Smart Gardening Faire since 2006. The faire is held annually in June at Sky Park in Scotts Valley. The Smart Gardening Faire is a free admission, educational event under clusters of canopies on Skypark's grassy fields, and includes:

- Speakers on aspects of sustainable gardening;
- Expert demonstrations of sustainable gardening practices;
- Vendors of garden plants and garden-related goods and services;
- Informative and educational exhibits and by local groups;
- Vendors of healthful food and entertainment to add to the festive atmosphere;
- Activities for children and families

SVWD has been a Gold Sponsor of this event since the first Smart Garden Faire was held in 2006. In addition, the District co-operates a booth at the event for promoting water conservation.

7.3.2.1.7 Green Gardener Program

The District began promoting the Monterey Bay Green Gardener Program in the summer of 2007. A link to the program can be found on the Outdoor Conservation section of the District website. In addition, Green Gardeners are included on a list of landscaping professionals who are qualified to perform work for the Landscape Rebate Program – also found on the District website. The Monterey Bay Green Gardener Program provides professional training and certification in ecological landscaping. The program goals are to reduce reliance on synthetic fertilizers and pesticides, reduce water pollution and encourage water conservation. The District sponsored one low-income student to take the spring 2010 Green Gardener class series – a $100 value.

7.3.2.1.8 Cooperative Agency Program

The District participates in a cooperative water agency committee, Water Conservation Coalition of Santa Cruz County, consisting of Santa Cruz County, Soquel Creek Water District, Pajaro Valley Water Management Agency, the City of Watsonville Water, and SLVWD. This committee contributes funds for community awareness campaigns to better inform the public about conservation methods and practices. Some of the accomplishments include:

- Sponsored a Green Plumber Workshop - September 20, 2008

- Paid for water conservation advertisements on local radio and in local newspapers

- Presented water conservation materials at local events such as the County Fair and Earth Day Festival

- Created an educational workbook for all 5th grade students in the County which teaches about local water resources

- Created and distributed table cards for restaurants asking that water only served upon request and linen cards for hotels asking that guests reuse linens at least once before washing

- Sponsored the Green Gardener Program, a 10-12 class program which educates gardeners and landscapers about water conservation in the landscape and other sustainable landscape practices

- Maintains a Water Smart Gardening Website – WaterSavingTips.org

The total annual budget for public outreach programs is approximately $10,500.

7.3.2.2 School Education Programs

The District has water conservation promotional materials for grades K-8. Additionally, a booklet was created by the Water Conservation Coalition of Santa Cruz County that promotes water awareness specifically in the local region. This booklet is appropriate for grades 5-8 and is available upon a teacher's request.

In the spring of 2008, the District sponsored its first annual Water Conservation Poster contest for grades 3-5. The contest ran from 2008-2010. In the first poster contest, a dozen entries were received - all of which were from students in the 5th grade. Winning entries received savings bonds and awards certificates. First place received a $100 savings bond, second place received a $75 savings bond, and third place received a $50 savings bond. The results of the first poster contest suggested that in 5th grade, students learn about the water cycle and begin discussing water use more in depth. In 2009, the contest was only offered to 5th grade students and only five entries were received. School officials suggested that low participation was partly due to other poster contests being held concurrently.

The District's annual Water Conservation Print Ad Design Contest has been very successful. This contest, first introduced in the winter of 2008/2009, invites high school students to create an ad promoting water conservation using digital graphic art. Students are encouraged to use the District website and other internet resources to research how to effectively promote water conservation. Winners are awarded scholarships in the amount of $500, $300, and $200. All entrants receive a participation certificate and consolation prizes. Nine ads were received during the first year and 41 ads were received during the second year of the contest as part of the class' assignment.

The annual budget for school outreach programs is approximately $3,000.

7.4 Programmatic BMPS

The District has chosen the implement the Programmatic BMPs through a GPCD approach for complying with the MOU. . The GPCD goals and implementation plan are discussed further in

Section 7.5. The following sections describe the various programs and conservation activities being implemented by SVWD as part of its commitment to water conservation.

Where possible, the District provides an estimate of expected conservation savings and expects to track savings as the water conservation program further develops. Additional conservation efforts are expected to reduce demand as the service area has not achieved saturation of water conserving devices. District programs are represented in Table 7-3.

Table 7-3: Summary of Conservation Rebates and Give-Aways

Year	Residential Audits	SF aerators	SF shower heads	MF aerators	SF shower heads	SF HET	MF HET	SF HECW	MF HECW
2006	0	0	0	0	0	37	4	87	1
2007	0	0	0	0	0	42	8	81	2
2008	19	42	42	2	3	68	3	93	1
2009	33	61	61	4	6	117	1	84	0
2010	44	42	36	2	3	171	3	107	5
TOTAL	**96**	**145**	**139**	**8**	**12**	**435**	**19**	**452**	**9**

Key: SF: Single family; MF: Multi-Family; HET: High Efficiency Toilet; HECW: High Efficiency Clothes Washer.

7.4.1 Residential Programs

The largest customer class in the District service area is residential, accounting for approximately 79 percent of connections and 55 percent of total demand. The District has about 3,085 single-family (SF) and 149 multi-family (MF) residential accounts. The District has focused the majority of its conservation efforts on residential use. The number of rebates offered is found in Table 7-3 above and additional summaries of the programs are found in the following sections.

7.4.1.1 Residential Assistance Program and Landscape Water Surveys (formerly DMMs 1 and 2)

When SVWD signed the MOU in 2005 the Residential BMP was divided into BMP 1 – Residential Water Surveys and BMP 2 Residential Plumbing Retrofits. Those two BMPs are now described as the Residential Assistance Program and Landscape Water Survey. The following describes activities for both the former BMP 1 and the former BMP 2.

SVWD first introduced its Water-Wise House Call program in the spring of 2008. The first house call was on March 28, 2008. Postcards were sent to the top 20 percent of single-family customers and the top 20 percent of multi-family customers, who use the most water, inviting them to schedule a water-wise house call. Each spring thereafter, additional postcards have been mailed to the previous year’s top 20 percent residential customers who use the most water. Appointments for water-wise house calls are made over the phone, via email, or at the District office and are scheduled on a spreadsheet shared by staff. A survey of data is taken at each house call which is later entered into a spreadsheet for analysis. A follow-up letter is sent to each customer detailing the results of the survey.

Very few multi-family customers have scheduled house calls. In contacting local multi-family unit managers it appears that scheduling is the number one reason why property managers do not participate in the water-wise house call program. With the new non-single family residential flat rate, the number of multi-family audits has increased.

Table 7-4 presents single-family water-wise house calls for the past three years. the District provides an estimate of expected conservation savings and expects to track savings in the future. The District estimated potential water savings from these surveys, ranging from approximately 0.9 AFY in fiscal year 2008 to 6.9 AFY in fiscal year 2009. Annual savings was estimated by comparing usage the year prior to the house call to usage the year following the house call. The dramatic increase in fiscal 2009 was partly due to high rainfall compared to the year 2008 and may not fully reflect the effect of surveys.

Table 7-4: Water-Wise House Calls

	FY 2008	FY 2009	FY 2010
Number of Surveys	19	33	44
District Expenditures	$1,477	$2,177	$2,744
Percent of Base Year Residential Customers Surveyed	0.6	1.1	1.4

Key: FY: fiscal year

To determine the saturation of other low-flow plumbing fixtures the District uses data gathered during water-wise house calls. It was found that an estimated 98 percent of faucet aerators meet low-flow requirements and 83 percent of showerheads. In July of 2007, the District began offering low-flow aerators and showerheads free of charge to District customers. The devices offered have an even lower flow than required by the Residential Assistance Program BMP. Customers are invited to stop by the District office to pick up the devices they need and a distribution log is kept for tracking purposes. Low-flow aerators and showerheads are also installed as needed during water-wise house calls.

Table 7.5 presents the number of low-flow device distributed by SVWD in the past three years 2008 through 2010. SVWD estimated potential expected water savings from low-flow device distribution program, ranging from 0.9 AFY in fiscal year 2010 to 1.5 AFY in fiscal year 2009.

Table 7-5: Low-Flow Device Distribution

	FY 2008	FY 2009	FY 2010
Number of Single Family Accounts Retrofitting Aerators	42	61	42
Number of Single Family Accounts Retrofitting Showerheads	41	62	36
Number of Multi-Family Accounts Retrofitting Aerators	2	4	2
Number of Multi-Family Accounts Retrofitting Showerheads	3	6	3
District Expenditures	$474.52	$553.09	$341.40

Key: FY: fiscal year.

7.4.1.2 Water Sense Specification for New Residential Development

The requirements of the DMM is that the District provide incentives such as rebates, recognition programs, reduced connection fees, or ordinances requiring residential construction meeting water sense specifications (WSS) for single and multi-family housing until a local, state or federal regulation is passed requiring water efficient fixtures.

For water efficient design in new development, the District relies on the City of Scotts Valley water efficient fixture ordinance described below:

> *17.51.025 Special water mitigation requirements.*
>
> *A. All new construction and remodels over 500 square feet in the city limits of the City of Scotts Valley shall install only high efficiency fixtures as follows:*
> 1. *All new commercial construction shall install high efficiency fixtures and will be required to rough plumb dual piping to use recycled water when it becomes available in toilet fixtures and for landscaping. Connection to the recycled water system will be governed by the requirements in Chapter 17.47 of the Zoning Ordinance.*
> 2. *All new residential construction shall install only high efficiency toilet fixtures.*
> 3. *All remodels over 500 square ft for residential, commercial and industrial buildings shall install high efficiency fixtures in the area being remodeled.*
>
> *(Ord. 16.123.1, § 2, 10-1-2008)*

The above ordinance does not specify the type of high efficiency fixtures but provides a guideline for their use. The District supports the City of Scotts Valley ordinance by providing review of the fixtures using standards set by the California Green Building Standard Code and the California Plumbing Code, but the City commonly issues building permits with little or no fixture review.

In addition, the 2010 California Green Building Standards Code (CAL Green Code, CALGreenCode.pdf) addresses these WSS requirements. The CAL Green Code sets mandatory green building measures, including a 20 percent reduction in indoor water use, as well as dedicated meter requirements and regulations addressing landscape irrigation and design. The code also identifies voluntary measures that set a higher standard of efficiency.

7.4.2 Residential and Commercial Assistance Programs

Several of the programs, described below, that SVWD administers benefit both residential and commercial customers.

7.4.2.1 High-Efficiency Clothes Washers (former DMM 6)

The District allows a rebate (or credit) of $100 for each non-Energy Star approved washing machine that is replaced with an Energy Star approved washing machine for residential application and $200 for each commercial application. Approved applications appear as a rebate credit applied directly to the customer account that is participating to the rebate program. Table 7-6 summarizes the outcome of the Waster Rebate Program for the past five years from fiscal year 2006 through fiscal year 2010. SVWD estimated potential water savings from these rebate programs, ranging from 1.5 AFY to 2.1 AFY.

Table 7-6: Clothes Washer Rebate Program

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Number of SF Rebates	87	81	93	84	107
Number of MF Rebates	1	2	1	0	5
Number of CII Rebates	2	0	1	1	0
Total Number of Customers Participating	90	83	95	85	112
District Expenditures	$9,100	$8,100	$9,500	$8,600	$10,700

Key: FY: fiscal year; SF: Single Family; MF; Multi-Family.

Since 2005, the District has seen an annual 3 percent of single-family customers when compared to the number of customers found in Table 2-3 qualify for the HECW rebate. Therefore, the District has already met requirements of this BMP.

7.4.2.2 Water Sense Specification (WSS) toilets (former DMM 14)

The District began a ULFT rebate program in 1999. At that time, customers replacing a toilet flushing greater than 1.6 gallons per flush (gpf) with a toilet that flushes 1.6 gpf or less qualified for up to $100 credit on their water bill. In November 2007, the toilet retrofit credit program was amended that changed the retrofit credit to $200 for replacing with a high efficiency toilet (HET). HETs flush on average 1.28 gpf or less. Customers who replaced a toilet flushing 1.6 gpf with an HET received up to $100 credit on their water bill. Replacing a urinal that uses water with a waterless urinal qualified for a rebate of up to $200 and $100 for one that uses 1.0 gpf or less.

Within a few months of implementing the HET retrofit credit program, the City of Scotts Valley began a rebate program that matched the District's. They offered a cash rebate for the remaining cost of a toilet up to an additional $200 for replacing a toilet flushing greater than 1.6 gpf and up to an additional $100 for replacing a toilet flushing exactly 1.6 gpf. Similarly, the City offered up to an additional $200 for replacing a urinal that uses water with one that is waterless and an additional up to $100 for replacing an old urinal using more than 1.0 gpf with one that uses 1.0 gpf or less.

Effective July 1, 2010, both the District and the City of Scotts Valley reduced the amounts available for each toilet rebate by 50 percent because the price of the fixtures have dropped considerably. The District's credits now range from up to $50 - $100/ toilet or urinal while the

City's rebate is up to an additional $100. The HET rebate program numbers can be found in Table 7.7.

Table 7-7: Toilet Rebate Program

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Number of SF Rebates	37	42	68	117	171
Number of MF Rebates	4	8	3	1	3
Number of CII Rebates	1	1	5	9	2
Total Number of Customers Participating	42	47	76	127	176
Number of Toilets Retrofitted	57	70	145	217	329
District Expenditures	$5,700	$7,000	$20,516	$35,113	$56,534

Key: FY: fiscal year; SF: Single Family; MF; Multi-Family.

In February 2008, a survey was printed on the top of every water bill inquiring about the number of toilets installed, along with dates of installation, at the home, business, institution, etc associated with the customer's SVWD account. Survey results indicated that the average number of toilets per customer is 2.5 and that approximately 35 percent of toilets were installed before 1992. The remaining 65 percent of toilets installed after 1992 meet the requirements of the Residential Assistance Program BMP. Since the time of the survey up through fiscal year 2010, an additional 422 (5 percent) pre-1992 toilets were retrofitted to HETs bringing the total percentage of toilets in compliance with this BMP up to 70 percent.

7.4.2.3 Landscape

Dedicated landscape irrigation meters account for about 16 percent of the District's demand. Of this, about 5 percent of landscape irrigation is supplied by potable water and the remaining 11 percent is currently using recycled water for irrigation. In addition, it is estimated that up to 50 percent of the single family, multi family and commercial industrial, institutional meter demand is for landscape use as well.

The District's primary goal for large landscape water users is conversion to recycled water. The largest irrigators in the District are the Enterprise Business Campus (formerly Borland International), Scotts Valley School District's high school (playing fields) and the City parks – all of which have been converted to recycled water. Currently the largest irrigators still use potable water (e.g., Scottsboro Town Homes, Hidden Oaks HOA, Granite Creek Business Center, and Hilton Santa Cruz/Scotts Valley). Granite Creek Business Center had its irrigation converted to recycled water in the spring of 2010 and discussions for conversion at both Scottsboro Town Homes and Hidden Oaks HOA are under way. The Hilton Santa Cruz/Scotts Valley received a water conservation audit in March of 2009 at which time it was recommended that all irrigation be converted to drip irrigation. The District has a long-term goal to serve the Hilton with recycled water.

The primary incentive for customers to convert to recycled water is the lower cost of the water. Recycled water customers pay 80 percent of potable rates with no basic service fee. Also, California Water Code Section 13551 states that potable water shall not be used for irrigation if recycled water is available.

A conservation incentive built into the recycled water pricing system encourages existing recycled water customers to conserve water. In addition, recycled water use site permits mandate periodic checks and assurances that no water is running offsite.

Large landscape customers still using potable water have a strong incentive to audit themselves due to conservation pricing. The top tier water rate is now $10.31 per 1,000 gallons of water used, compared to $3.19 per 1,000 gallons for the first tier.

The District does not have land use planning jurisdiction and although the District has adopted landscape water conservation ordinance (Ordinance #119-96, amended by Resolution #1-01); the District leaves the implementation to the City of Scotts Valley. The District works closely with the City of Scotts Valley in adopting and implementing water conservation and recycled water ordinances. The City of Scotts Valley has an ordinance (Resolution #1413) mandating use of recycled water if it is accessible to the project to be constructed. All new projects are required to comply for final approval. City of Scotts Valley ordinances are available online via http://www.scottsvalley.org/

The Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881, Laird) required cities and counties, including charter cities and charter counties, to adopt landscape water conservation ordinances by January 1, 2010. In accordance with this law, DWR prepared an updated Model Water Efficient Landscape Ordinance (MWELO) to serve as an example ordinance for local agencies. All local agencies had until January 1, 2010, to adopt DWR's updated MWELO or their own local water efficient landscape ordinance. If a local agency did not adopt its own ordinance on or before January 1, 2010, the updated MWELO applied within the jurisdiction of that local agency as of that date. The MWELO is available for download at http://www.water.ca.gov/wateruseefficiency/landscapeordinance/

The City of Scotts Valley has not adopted a water efficient landscape ordinance. Therefore, the updated MWELO applies within the City limits. At this time, the law is not being enforced due to lack of staff and funding. The District has communicated to the City regarding the creation of a water efficient landscape ordinance within the District boundaries and there is discussion of adopting ordinances in parallel in the near future.

The District introduced a new Landscape Water Conservation Pilot Program funded by the 2008 Urban Drought Assistance Grant Program. The program is offered to all customers and consists of the following rebate offers:

1. Customers who replace existing lawn with artificial turf, drought tolerant plants, and/or qualifying xeriscape may be eligible for a credit of $1 per square foot up to 1,000 square feet of replaced lawn and $0.30 per square foot for additional area. New landscape must not require permanent irrigation unless the irrigation is a temporary drip system required to establish drought tolerant plants.

2. Customers who retrofit an old irrigation controller with an approved weather based irrigation controller (WBIC) or install a rain shut-off device may qualify for a credit of up to $100-$500 on their water bill. The credit amount is based on historical summer water usage. The District offers up to $100 if summer outdoor use is within the range 250-749 gallons per day (gpd); up to $250 if within the range 750-2,999 gpd; up to $500 if 3,000 gpd or greater.

3. Customers who install an approved cistern may qualify for a credit of up to $25 for each 100 gallons of storage up to a maximum of $500.

One of the District's largest potable water users, Bethany University, has taken advantage of the rebate program. Bethany retrofitted four irrigation controllers with weather-based technology and has been approved for three more system retrofits.

Table 7-8 contains information for landscape rebate program. SVWD estimated potential water savings from the landscape rebate program, ranging from 0.7 AFY to 1.0 AFY from lawn replacement rebates, from 0.5 AFY to 0.2 AFY from weather-based irrigation controller rebates, and from 0.1 AFY to 0.3 AFY from cistern installation rebates.

Table 7-8: Landscape Rebate Program Summary

	FY 2009	FY 2010
Lawn Replacement Rebates		
Number of Rebates	9	18
District Expenditures (Reimbursed by Grant)	$7,035	$10,057
Area of lawn replaced (sq ft)	7,466	11,242
Weather-Based Irrigation Controller Rebates		
Number of Rebates	3	3
District Expenditures (Reimbursed by Grant)	$762	$1,296
Cistern Installation Rebates		
Number of Rebates	1	4
District Expenditures (Reimbursed by Grant)	$500	$975

Key: FY: fiscal year.

Currently the District does not create water budgets for dedicated irrigation customers.

7.4.3 Commercial, Industrial and Institutional (CII) BMPs

2009 deliveries to CII customers was 298 AF, 8 percent of total use. The District has been categorizing CII customers for over a decade. CII customers are eligible for the same toilet rebate program as residential customers. The rebate program offers a credit up to $100 for replacing a toilet using over 1.6 gpf with a HET using 1.28 gpf or less.

The District conducts water audits in the CII sector in coordination with the Monterey Bay Area Green Business Program - a partnership of environmental agencies, professional associates, waste management agencies, utilities and concerned public working together to recognize and assist businesses that operate in an environmentally friendly manner. Businesses who apply for Green Business certification are subject to a series of audits, one of which is a water conservation audit. When businesses within Scotts Valley apply for certification, the District is contacted via email and District staff arranges an audit with the applicant. The auditor checks compliance with a list of indoor and outdoor conservation measures. The District provides conservation recommendations and free water saving devices upon request. A follow up written analysis of water use is provided to the business when necessary. If a business is not able to achieve compliance by the end of an audit, a follow-up audit may be necessary.

The District has achieved a significant reduction in water use in the CII sector. Table 7-9 presents CII water consumption data since 2005. The District has added 15 recycled water customers since 2005, most of these were II customers with mixed use meters that converted landscape irrigation to recycled water during the past six years.

Table 7-9: Commercial, Industrial, Institutional Water Consumption (AFY)

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Commercial	227	217	236	234	198	187
Industrial	104	90	102	85	93	63
Institutional	79	70	69	60	56	48
CII Total	**410**	**377**	**407**	**379**	**347**	**298**

Key: FY: fiscal year.

7.5 SVWD AB 1420 and SBX7-7 Compliance

As discussed earlier, the Programmatic BMPs are being implemented by the District through a GPCD approach. The GPCD option for MOU compliance and the SBX7-7 targets are consistent with one another (Table 7-10) and SVWD is currently building on its existing water conservation program to implement activities that meet these goals.

The District's 2020 SBX7-7 compliance goal is 144 gpcd (Table 7-10) and as of 2009 the District's water use is currently lower than both the SBX7-7 2020 target of 144 gpcd and the 2018 MOU target of 151 gpcd with a 2009 per capita demand of 131.2 gpcd and 117.6 gpcd in 2010. Baseline per capita water use was estimated using the guidelines stated by the MOU and Appendix A of DWR's report "*Methodologies for Calculating Baseline and Compliance Urban per Capita Water Use*".

Table 7-10: Compliance Targets

		Target (gpcd) by Year		
	Baseline (gpcd)	2015	2018	2020
MOU/AB 1420	179.9		151	
SBX7-7	179.9	162		144

The District recognizes the need to continue to expand conservation and recycled water programs and efforts in order to continue to meet both its SBX7-7 and gpcd requirements in the future. The adoption of SBX7-7 and the 20 percent reduction goal has increased the urgency for implementation.

The District is in the process of planning programs to maintain the gpcd target. The conservation programs identified to meet future requirements combine financial incentives, and build on the existing activities as part of the SVWD's ongoing water conservation program. Included in the programs considered for implementation are the following that shows SVWD's continuing efforts in water conservation programs to maintain demand reductions.

Financial Incentives

1. High-Efficiency Clothes Washers (HECWs): The District will continue its existing Washer Rebate Program. The District will keep track of potential water savings from the Washer Rebate Program.

2. High-Efficiency Toilets (HETs): The District will continue its existing HET retrofit rebate program. The District began the rebate program in 1999 and amended the program in 2007 to offer a higher credit for replacing old toilets with HETs that flush on average 1.28 gpf or less. The District also has a rebate program in place for replacing an old urinal.

3. Low-Flow Aerators and Showerheads: The District began offering low-flow aerators and showerheads free of charge to its customers in 2007 and will continue to distribute these water conservation devices. Low-flow aerators and showerheads will be also installed as needed during water-wise house calls. The District will keep track of potential water savings from the low-flow device distribution program.

4. Large Landscape Program: The District's primary goal for large landscape water users is conversion to recycled water. The primary incentive to convert to recycled water is the discounted cost of the recycled water as recycled water customers pay 80 percent of potable rates with no basic service fee. In addition, the District has a landscape rebate program that introduced a new Landscape Water Conservation Pilot Program with rebates offered for lawn replacement, weather-based irrigation controller, and cistern installation. The District will continue both expanding recycled water to landscape irrigation and offer rebates.

5. Water Audits and Retrofit Rebates to CII: CII customers are eligible for the same toilet rebate programs as residential customers. In addition, the District will continue to conduct water audits in the CII sector in coordination with the Monterey Bay Area Green Business Program. When a business applies for Green Business certification, the District will be contacted for a water conservation audit and the District staff will arrange an audit with indoor and outdoor conservation measures and will provide conservation recommendations and free water savings devices upon request.

Water-Wise House Calls

SVWD first introduced its Water-Wise House Call program in the spring of 2008 and will continue this program to mainly target the top 20 percent of single-family and multi-family customers who use the most water. The District will continue to send out follow-up letters to each customer participating to the program detailing the results of the survey. The District will also keep track of potential water savings from the Water-Wise House Call program.

Recycled Water for Large Landscape

The District continues to evaluate the use of recycled water for large landscapes to offset potable water use for landscape irrigation. Implementation is expected to continue to achieve a goal of 330 AF of recycled water delivered by 2030. Future plans to expand the recycled water use are discussed in Section 4.

In addition to these programs, the District plans to develop agency coordination to monitor implementation within the service area, program participation and changes in use. The District will then have the capacity to adjust programs based on how well they are meeting projected goals.

THIS PAGE INTENTIONALLY BLANK

Section 8: Water Shortage Contingency Plan

8.1 Overview

Water supplies may be interrupted or reduced significantly in a number of ways, such as a drought which limits supplies, an earthquake which damages water delivery or storage facilities, a regional power outage, or a toxic spill that affects water quality. This section of the Plan describes how SVWD plans to respond to such emergencies so that emergency needs are met promptly and equitably. This section considers the impact on groundwater supplies of two types of drought and two types of catastrophic interruption of water supply as analyzed using the numerical groundwater model.

Of the current supplies, water from the Santa Margarita Basin is vulnerable to drought due to the reliance on rainfall for recharge. Rainfall varies based on the hydrologic conditions of a given year. The Santa Margarita Groundwater Basin Advisory Committee and implementation of the SVWD's GMP are critical to monitoring the water balance within the basin. The basin serves over 20,000 people amongst various purveyors.

Overdraft of the basin especially in time of drought presents a concern for reliability over extended periods of time. In 2010, the estimated sustainable yield for the Scotts Valley and Pasatiempo Groundwater Sub areas, a portion of the Santa Margarita Basin, was 2,600 AFY and 2,100 AF was pumped by the various users according to the 2010 Annual Groundwater Report (Kennedy/Jenks, 2011). An update of the groundwater model is planned for Fall 2011 which will include review of the sustainable yield estimate. It should be noted that 2009 and 2010 represent the first two years since 1995 that total groundwater pumping has been below the estimated sustainable yield. Safe yields for the basin have been developed through modeling for SVWD and the Santa Margarita Groundwater Basin Advisory Group and serve as the basis for planning and pumping within the Basin. Drought and water shortage conditions ultimately influence the purveyors that utilize water within the Santa Margarita Basin.

A Water Shortage Contingency Plan was prepared and presented in the 2005 UWMP (SVWD, 2005) and is updated in this section. Prohibitions, penalties and financial impacts of shortages have been developed by SVWD and are summarized in this section. SVWD's Water Shortage Contingency Plan and drought related documents, prepared by SVWD, are presented in Appendix K.

8.2 Coordinated Planning

SVWD has coordinated efforts in the past to meet water shortages on several levels which include coordination within the groundwater Basin with adjacent water and emergency services agencies and coordination with the City of Scotts Valley in emergency planning.

SVWD has a 2-inch-diameter emergency intertie with the SLVWD which allows the two agencies to support each other during an emergency. Plans are underway to expand the capacity of this intertie and to construct an additional intertie with the SCWD to provide an additional emergency supply.

SVWD's Water System Emergency Response Plan, of which this water shortage contingency is an element, is consistent with the activities of the City's Office of Emergency Services. The Emergency Response Plan contains procedures for the distribution of potable water in a disaster; which procedures are consistent with guidelines prepared by the California State Office of Emergency Services.

8.3 Stages of Action to Respond to Water Shortages

Stages of action for many water agencies are defined by available storage in a surface water reservoir or by the annual allotment provided by a water wholesaler. The District's distinction from these other agencies is the considerable groundwater storage which the District overlies. The amount of storage enables the District to endure periods of drought without a drastic shortfall in supply. Regardless of the storage capability of the aquifer, the District implements water rationing practices during drought and other emergency conditions to protect the health of the aquifer and ensure acceptable well production rates.

The amount of rainfall in a given year or series of years is the basis for defining the stages of action. Rainfall, the ultimate source of recharge to the Basin, is readily monitored and is recognized as the basis for defining drought. During a shortfall in annual rainfall, the District could take the appropriate response, such as mandating conservation measures near the beginning of the high demand period when such actions are most likely to have a positive impact on water supplies.

SVWD has developed a three stage demand reduction plan to be invoked during declared water shortages including up to 50 percent reduction in supply. The conservation stages vary depending on the causes, severity, and anticipated duration of the water supply shortage. These stages of action were evaluated based on results of the numerical model in support of the overall management of the Basin. Table 8-1 presents the three-stage rationing and demand reduction targets for SVWD.

Table 8-1: Water Supply Condition and Demand Reduction Levels

Stage	Water Supply Condition	Conservation Level[a]	Voluntary/Mandatory
1	Cumulative rainfall over 2 years < 60% of average and/or Single year rainfall < 50% of average	10% demand reduction	Voluntary
2	Cumulative rainfall over 3 years < 60% of average and/or Cumulative rainfall over 2 years < 50% of average and/or Catastrophic loss of > 35% of well capacity	15% demand reduction	Mandatory measures
3	Cumulative rainfall over 4 years < 60% of average and/or Cumulative rainfall over 3 years < 50% of average and/or Catastrophic loss of > 50% of well capacity	20% demand reduction	Mandatory measures

Note:

[a] SVWD Board may require mandatory measures, including rationing, if necessary to achieve the desired conservation level.

Stage one is defined as a precipitation < 60 percent of average for two consecutive years and/or a single year with < 50 percent of average precipitation. The voluntary demand reduction of 10 percent reflects the District's proactive approach to addressing the possibility of an extended drought and to plan for 10 percent shortage of the water supply to maintain water in storage. The 10 percent reduction decreases the loss of storage associated with a two-year drought, and raises public awareness of drought conditions. By raising public awareness, additional voluntary conservation by customers is more likely, and further demand reduction increases, if needed, will not be unexpected.

Stage two occurs when the District is in its third year of a drought with average precipitation less than 60 percent of normal, and/or its second year of precipitation less than 50 percent of normal, and/or a catastrophic loss of more than 35 percent of well capacity. Stage two is defined by a mix of voluntary and mandatory conservation measures intended to achieve 15 percent demand reduction to reflect a 15 percent shortage in supply. This is also a proactive measure to decrease the loss in storage in the aquifer and ensure a stable supply for the District for the future.

A stage three condition represents emergency conditions in the District which would occur as the result of a four year extended drought with precipitation averaging less than 60 percent of normal and/or a precipitation averaging less than 50 percent of average over a three year period, and/or a loss of more than 50 percent of pumping capacity from the production wells to reflect a 50 percent supply shortage. This stage would trigger a mix of voluntary and mandatory conservation measures intended to achieve 20 percent reduction in consumption from customers. Customer rationing would be considered. Although this is a steep reduction, it is necessary to ensure a continuous water supply in the event of a catastrophe. Although the 20 percent reduction is not absolutely necessary during an extended drought to ensure a continuous water supply, it represents the level of conservation required to protect the health of the aquifer and ensure a water supply for the future.

It should be noted that water shortages in Scotts Valley may not need to be addressed solely through water conservation; for instance, additional potable demand reduction will be accomplished by transfer of more local groundwater producers to recycled water use for landscaping needs. Recycled water conversion is an activity that SVWD has been actively pursuing for almost 10 years.

The potential for additional demand reduction in the District will decrease as more landscape irrigation users convert to recycled water and conservation measures on landscape are permanently implemented. This is considered a demand hardening situation. If this were to occur, a four year drought might justify a 15 percent demand reduction instead of a 20 percent reduction while other alternatives are investigated.

Priorities for use of available water, based on Section 3 of the California Water Code, are:

- Health and Safety: Interior residential, sanitation and fire protection
- Commercial, Industrial, and Governmental: Maintain jobs and economic base
- Existing Landscaping: Especially trees and shrubs
- New Demand: Projects with permits when shortage declared

Based on the California Water Code, priorities specific to SVWD's service area for use of available potable water during shortages were based on input from SVWD and legal requirements set forth in the California Water Code, Sections 350-358. Water allocations are established for all customers according to the following ranking system:

- Minimum health and safety allocations for interior residential needs (includes single family, multi-family, hospitals and convalescent facilities, retirement and mobile home communities, and student housing, and fire fighting and public safety)
- Commercial, industrial, institutional/governmental operations (where water is used for manufacturing and for minimum health and safety allocations for employees and visitors), to maintain jobs and economic base of the community (not for landscape uses)
- Existing landscaping
- New customers, proposed projects without permits when shortage declared.

Water quantity calculations used to determine the interior household gpcd requirements for health and safety are provided in Table 8-2. As developed in Table 8-2, the California Water Code Stages 2, 3, and 4 health and safety allotments are 68 gpcd, or 33 100-cubic feet (CCF) units per person per year. When considering this allotment and the 2010 population of 10,309, as presented in Table 2-2, the total annual water supply required to meet the first priority use during a water shortage is approximately 785 AFY based on a 68-gpcd allotment.

Table 8-2: Per Capita Health and Safety Water Quantity Calculations per California Water Code

	Non-Conserving Fixtures		**Habit Changes**		**Conserving Fixtures**	
Toilets	5 flushes x 5.5 gpf =	27.5	3 flushes x 5.5 gpf =	16,5	5 flushes x 1.6 gpf =	8.0
Showers	5 min x 4.0 gpm =	20.0	4 min x 3.0 gpm =	12.0	5 min x 2.0 gpm =	10.0
Washers	12.5 gpcd (1/3 load) =	12.5	11.5 gpcd (1/3 load) =	11.5	11.5 gpcd (1/3 load) =	11.5
Kitchens	4 gpcd =	4.0	4 gpcd =	4.0	4 gpcd =	4.0
Other	4 gpcd =	4.0	4 gpcd =	4.0	4 gpcd =	4.0
Total gpcd		68.0		48.0		37.5
GPC per year (a)		24,800		17,500		13,700

Note:

(a) SVWD bills on 1,000 gallons units.

8.4 Shortage Conditions Evaluated and Supply Reliability

Impacts of drought and catastrophe for the District are expressed in terms of water level declines in wells and the loss of storage over the long term. Storage at any given time is predicated on replenishment of groundwater during wet years, and the long-term declines in groundwater levels has decreased since 2005 with recycled water and water conservation efforts. During a drought, with the large amount of storage in the Basin, the District is less concerned with the absolute availability of supply, but more on the impact on wells and water level declines during water supply shortages. The District also focuses on long-term sustainability of the groundwater supply through continued attention to expansion of recycled water, sustaining water conservation efforts and both in-lieu and direct recharge projects.

The assessment of the reliability of the District's groundwater supply has been evaluated previously during the development of safe yield volumes and recharge relative to precipitation. The Basin numerical model was applied in the 2005 UWMP to evaluate reliability based on the redistribution of pumping centers, the expansion of the water recycling program, and potential increases in demand on the aquifer. The discussion that follows incorporates the modeling prepared for the 2005 UWMP in the context of the water supply situation in 2011.

8.4.1 Overview of Drought and Catastrophic Conditions Evaluated

The 2005 UWMP presented some drought and catastrophic conditions that were evaluated using the numerical groundwater model under 2004 demand and aquifer conditions which are a conservative assumption since 2004 was amongst the higher demand years within the last 10 years. Two drought conditions and a catastrophic outage, and environmental/water quality outage were simulated as follow.

- Drought conditions were identified using a single extreme drought year where rainfall is reduced to 50 percent of normal, and an extended drought where the average rainfall is at less than 60 percent of normal for three or more years. The major implication of these conditions to the District would be: production well capacity, groundwater storage decline, and the potential loss of a well(s) if water levels drop below well production zones.

- A catastrophic interruption of water supply that could occur in Scotts Valley is analyzed in the numerical model by shutting down the potentially effected wells. Given an earthquake condition the model applies the loss of two of the District's largest producing Wells #7A and #3B.

- The potential for environmental contamination is most significant in the south Scotts Valley area, where past experiences with gasoline contaminants near the District's Well #9, and chlorinated solvent contaminants near Wells #10 and #10A have increased the potential for closure of a key production well. The likelihood of such occurrences without prior warning has been reduced considerably through preparation and implementation of the District's Drinking Water Source Assessment and Protection Program. Currently, Wells #9 and #10 are minimally used because of water quality and limited production. When in use, the wells have wellhead treatment prior to delivery as described in Section 5. The District's 2004 well ordinance also provides the District with the ability to regulate activities surrounding private wells in the Scotts Valley area; however, these considerations necessitate ongoing vigilance in the area of groundwater protection and are considered in the District's Water Shortage Contingency Plan.

8.4.2 Shortage Scenarios

In the 2005 UWMP, the model was applied to drought and catastrophe scenarios for the purpose of developing a water shortage contingency plan. The scenarios were designed to simulate water shortage emergencies under 2004 aquifer storage, extraction volumes, and conditions as evaluated by the numerical model. 2004 was amongst the higher demand years and 2010 demands are about 600 AFY lower. Precipitation values and recharge conditions are based on actual drought years experienced by the region based on the 57-year precipitation record and provide insight into how the aquifer system would support SVWD under current and projected future conditions.

In alignment with anticipated supply curtailments, the scenarios modeled in the 2005 UWMP included:

- An extreme one-year drought when rainfall is reduced to 50 percent of normal;
- A severe, prolonged (five-year) drought with rainfall averaging less than 60 percent of normal;
- The same severe, prolonged (five-year) drought with demand reduced by mandatory conservation. Mandatory conservation practices are applied on an increasing scale throughout drought progression;
- Catastrophic interruption of water supply due to the sudden loss of Wells #7A and #3B as the result of an earthquake;
- Catastrophic loss of water supply due to the sudden loss of Well #9 and Well #10 as a result of environmental contamination, and;
- The same catastrophic interruptions with demand reduced through emergency, mandatory water conservation.

8.4.3 Summary of Numerical Modeling Results

The results of the model scenarios were used to provide background data for basin management and response criteria. Considering the large volume of stored groundwater in the Basin, the ability to access the water resource in a drought or catastrophe situation is of particular concern. A secondary consideration is the long-term impact on the groundwater basin, specifically loss of storage as well as the reduced baseflow discharge to local streams resulting from declining water levels.

Table 8-3 summarizes the drought and catastrophe scenarios modeled in the numerical groundwater model. The 2005 UWMP provides more detailed description of the modeling results. The model results are relevant to SVWD today because they reflect the capacity of SVWD to provide water even under drought and catastrophic conditions.

In the scenario simulating a catastrophe, the 20 percent mandatory conservation measure is necessary since the District is currently capable of providing only 80 percent of its supply from existing wells. Although this is often considered an unrealistic percentage, the modeling exercise is only intended to simulate the interruption of service for six months under normal aquifer and precipitation conditions.

During the preparation of the 2005 UWMP, Well #10 was operational as it was considered in the numerical modeling analysis. Well #10 experienced a casing failure in 2007 and was rehabilitated with the lower screens destroyed. Currently, it is maintained for emergency backup purposes only and production capacity is significantly reduced, due to the loss of the lower screens. Well #10A was constructed approximately 50 feet away and became operational in late 2007. It now serves the same function and purpose that Well #10 served at the time of the 2005 UWMP preparation. With Well #10A replacing Well #10, SVWD has essentially the same maximum production capacity as in 2005.

8.5 Minimum Water Supply Available During Next Three Years

As discussed in the 2005 UWMP, the most significant impact of the drought scenarios is the increased loss of storage predicted during particular scenarios and the dewatering of Well #9.The loss of storage impact remains today while the dewatering of Well #9 is no longer significant as it does not currently represent a significant SVWD supply. These scenarios continue to address Water Code §10632(b) by presenting the minimum water supply available over the next five years. The model scenarios were performed using the driest five-year sequence, which also includes the driest three year sequence as required by the water code. Overall, the District has the storage capacity and production ability to withstand drought conditions as defined by Water Code §10632 (b). The sustainable yield of 2,600 AFY for the Scotts Valley and Pasatiempo Subbasins of the Santa Margarita Basin is shared between the SVWD and SLVWD (Kennedy/Jenks, 2011) and is augmented by the SVWD recycled water projected for use in the Basin. As shown in Table 8-4, the total supplies range from approximately 2,766 AFY to 2,783 AFY during the next three years (2012 – 2014). When comparing these supplies to the demand projections provided in Sections 2 and 6 of this Plan, SVWD has adequate supplies available to meet projected demands should a multiple-dry year period occur during the next three years.

Table 8-4: Three-Year Estimated Minimum Water Supply (AFY)

Water Supply Sources	2012	2013	2014
Santa Margarita Basin, Scotts Valley and Pasatiempo Subbasins[(a)]	2,600	2,600	2,600
Recycled Water (projected use)	166	174	183
Total	**2,766**	**2,774**	**2,783**

Note:

[(a)] SVWD and SLVWD together pumped approximately 1,700 AFY while other pumpers accounted for another 300 AFY from the Scotts Valley and Pasatiempo Subbasins in WY 2010.

THIS PAGE INTENTIONALLY BLANK

Table 8-3: Summary of Numeric Modeling Results Under Drought and Catastrophic Conditions from 2005 UWMP

Scenario	Description	Key Assumptions	Results	Applicability to 2010
Drought Scenario 1	1-year drought with precipitation < 50 percent of normal	WY 1990 precipitation (49 percent of average) resulting in 50 percent supply reduction for one year under WY 2004 (high demand) operating conditions	2004 pumping rates were sustained in all SVWD wells	Indicates that high pumping rates to meet high demands, with commensurate loss of storage is still hydrogeologically feasible in SVWD.
Drought Scenario 2	5-year drought with precipitation < 60 percent of normal	WY 1987-1991 precipitation (5-year drought) under WY 2004 (high demand) operating conditions	2004 pumping rates could not be sustained at Well #9 while other wells maintained production without dewatering.	Well #9, the oldest in SVWD, has had reduced production since 2005 because of both diminished water quality and reduced production. Other wells can be used to meet demand.
Drought Scenario 3	5-year drought with precipitation < 60 percent of normal and gradually increased demand reduction	Same as Scenario 2 with reduced pumping/ demand as follows: Drought Yr 1 – 0% reduction Drought Yr 2 – 10% reduction Drought Yr 3 – 15% reduction Drought Yr 4 – 15% reduction Drought Yr 5 – 20% reduction	2004 pumping rates could not be sustained at Well #9 while other wells maintained production without dewatering. Other wells could increase production to offset loss of production from Well #9.	Well #9, the oldest in SVWD, has had reduced production since 2005 because of both diminished water quality and reduced production. Other wells can be used to meet demand.
Catastrophe Scenario 4	Catastrophic interruption of supply resulting from environmental contamination	Average precipitation and recharge conditions with WY 2004 (high demand) operating conditions without Wells #9 and #10/#10A for first 6 months of 1-year simulation.	2004 pumping rates can be sustained in remaining SVWD wells within planned operating levels	With Well #10A replacing Well #10, current SVWD facilities can be used to meet expected loss of supply.
Catastrophe Scenario 5	Catastrophic interruption of supply resulting from earthquake	Average precipitation and recharge conditions with WY 2004 (high demand) operating conditions without Wells #3B and #7A (50 percent loss of supply for 6 months).	2004 pumping rates were reduced by 15 percent even with remaining wells at maximum capacity with Well #9 dewatering within first 3 months of simulation reducing maximum capacity by an additional 6 percent	With Well #10A now replacing Well #10, SVWD has essentially the same maximum production capacity as in 2004 in the event of loss of Wells #3B and #7A.
Catastrophe Scenario 6	Catastrophic interruption of supply resulting from earthquake with reduction in demand	Average precipitation and recharge conditions with 20 percent reduction in WY 2004 (high demand) operating conditions without Wells #3B and #7A (50% loss of supply for six months).	2004 pumping rates in remaining wells were reduced by 20 percent to reflect reduced demand. Remaining wells can meet catastrophic outage under reduced demand.	With Well #10A now replacing Well #10, SVWD has essentially the same maximum production capacity as in 2004 in the event of loss of Wells #3B and #7A.

THIS PAGE INTENTIONALLY BLANK

8.6 Actions to Prepare for Catastrophic Interruption

As described in Section 8.4, SVWD evaluated shortage conditions under both drought and catastrophic conditions. The District’s Emergency Response Plan (ERP) provides the District with a standardized response and recovery protocol to prevent, minimize, and mitigate injury and damage resulting from emergencies or disasters of man-made or natural origin. The ERP describes how the District will respond to potential threats or actual terrorist scenarios identified in the vulnerability assessment, as well as additional emergency response situations. The goals of this ERP are to:

- Rapidly restore water service after an emergency.
- Ensure adequate water supply for fire suppression.
- Minimize water system damage.
- Minimize impact and loss to customers.
- Minimize negative impacts on public health and employee safety.
- Provide emergency public information concerning customer service.

A copy of the District’s ERP is presented in Appendix L.

8.6.1 General

As described earlier, the greatest catastrophic threats to SVWD’s water supply are a major seismic event resulting in a regional power outage and/or an environmental/water quality emergency, either of which could take wells out of service and damage distribution and storage facilities.

As a contingency to this scenario, SVWD has implemented back-up power at Orchard Run and El Pueblo Water Treatment Plants and has mobile generators available for use at all wells, booster pumps, and other key facilities. However, if there are significant pipeline breakages, operation of the full water system will be limited by the location and the extent of pipeline damage. It is likely that smaller service areas served by individual wells can be valved off and served while more extensive pipeline repairs are performed. Furthermore, SVWD’s reservoirs totaling 4.32 million gallons of storage provide dedicated emergency water supply equal to 240 percent of maximum day demand (maximum daily demand in 2010 was 1.8 MGD), in addition to supply reserved to meet fire flow, and peak demands. During a catastrophic interruption, the public would be asked to reduce consumption until groundwater production facilities can be restored.

8.6.2 Water Sources

The SVWD currently has seven production wells, four of which provide the primary supply for the service area leaving three wells for redundancy. All existing water supply storage, treatment, and distribution facilities are now inspected daily in preparation for emergencies. Generators are tested monthly for preparedness. In addition, a canvassing to identify specific water-critical customers (including individual customers with medical conditions dependent on continuous water availability) was performed; distribution of water to these water-critical facilities will occur on a priority basis.

SVWD has a 2-inch emergency intertie to the SLVWD as an additional source of water. This intertie is identified for upgrade and an additional intertie with SCWD is also in the planning phases. Water storage facilities are capable of serving each of the pressure zones within the service area if groundwater pumping becomes unavailable. Redundancies including generators, multiple pressure zones, storage reservoirs, and interties within the service region will facilitate the delivery of water to customers in cases of power outages and earthquakes.

In addition to an intertie and storage, Table 8-5 summarizes the actions SVWD has discussed in preparation for a water supply catastrophe. Coordination with other agencies and emergency response teams are key elements to the preparative actions SVWD has undertaken.

Table 8-5: Preparative Actions for Catastrophic Interruption

Action	Actions taken
Determined what constitutes a proclamation of a water shortage	✓
Stretch existing water storage	✓
Obtain additional water supplies	✓
Develop alternative water supplies.	✓
Determine funding sources	✓
Contact and coordinate with other agencies	✓
Created an Emergency Response Team/Coordinator	✓
Created a catastrophe preparedness plan	✓
Put employees/contractors on-call	✓
Developed methods to communicate with the public.	✓
Developed methods to prepare for water quality interruptions	✓

8.7 Mandatory Prohibitions During Shortages

In 1983, SVWD enacted Ordinance 74-83 (attached as Appendix H), which lists mandatory prohibitions against specific water activities at all times. Additional measures are adopted during times of water shortages, especially during droughts. Ordinance 149-09, adopted by SVWD in July 2009, established recycled water use only for construction, as noted in Table 8-6 (attached as Appendix M). The potential prohibitions include specific changes in water use. The levels are additive and the higher levels of drought response are inclusive of the lower levels requirements (Table 8-6)

.

Table 8-6: Drought Shortage Plan Prohibitions

Prohibition	Stage When Prohibition is Mandatory		
	Stage 1	**Stage 2**	**Stage 3**
Consumption Reduction Measures in Effect at All Times			
Unauthorized use of water from any fire hydrant.	X	X	X
Adjust sprinklers and irrigation systems to avoid overspray, runoff, and waste.	X	X	X
Repair leaks within 48 hours	X	X	X
Use bucket and a hand-held hose with a positive shut-off nozzle, mobile high-pressure/low-volume wash system to wash vehicles	X	X	X
Use re-circulated water to operate decorative fountains, ponds, lakes	X	X	X
Indiscriminate running of water or washing with water not otherwise prohibited which is wasteful and without reasonable purpose	X	X	X
Recycled water only for construction (requirement established in 2009 by Ordinance 149-09)	X	X	X
Additional Consumption Reduction Measures in Declared Stages of Action			
Notification of all customers of the water shortage	X	X	X
Water Shortage Pricing		Ongoing program	
Provision of Technical Information to customers on means to promote water use efficiency	X	X	X
Development of a media campaign to promote water conservation		X	X
Development/expansion of efficiency programs such as toilet rebates		Ongoing program	
Use of recycled water for irrigation whenever possible		Ongoing program	
Additional Measures For Consideration by SVWD Board			
Irrigate residential and commercial landscape before dawn		X	X
Prohibit operating of non-water conservation pre-rinse nozzle in a food preparation establishment such as a restaurant or cafeteria			X
No filling of pools or aesthetic water features			X
Landscape irrigation restricted to designated watering days		X	X
Time limits on automatic irrigation systems		X	X
Require large landscapes to adhere to water budgets.			X
Require large users to audit premises and repair leaks			X
Pool and spa cover installation		X	X
No washing down of paved or impervious outdoor surfaces	X	X	X
Display by restaurants and hotels of water conservation signs	X	X	X
Water served upon request at restaurants		X	X
Per capita allotment by customer type			X

Penalties for violation or non-compliance are described in Section 8.9.

8.8 Consumptive Reduction Methods During Restrictions

Once a water shortage stage has been declared, consumption reduction measures will be implemented to meet water conservation goals which are summarized in Table 8-5 above. The District's actual response to a water shortage emergency will require specific action by the Board of Directors. Nothing in this plan is intended to limit the District's available options in defining a specific response to any future water shortage.

The District will provide suggested water saving measures to its customers. Water conservation measures should be directed toward conserving potable water supplies. Use of recycled water need not be curtailed, although waste is never encouraged.

8.8.1 Supply Shortage Triggering Levels

Water agencies manage water supplies to minimize the social and economic impact of water shortages. The Plan is designed to provide a minimum 50 percent of normal supply during a severe or extended water shortage as described in Section 8.4 above. As the water purveyor, SVWD must provide the minimum health and safety water needs of the community at all times. The Stages of Action triggering levels described in Table 8-1 were established to ensure that this goal is met.

Stages of Action levels may be triggered by a shortage in one water source or a combination of sources. Although an actual shortage may occur at any time during the year, a drought shortage (if one occurs) is usually forecasted by the SVWD on or about April 1st each year.

SVWD's potable water sources are groundwater and an emergency intertie with an adjacent agency. Stages of Action levels may be triggered by a supply shortage or by contamination in one source or a combination of sources as described in Table 8-1. Triggers automatically implement the more restrictive demand reduction level.

SVWDs supply is reliable because of the number of wells providing a number of sources of supply.

8.8.2 Consumption Limits

If rationing is determined necessary by the Board, SVWD may use the following allocation method for each customer type, as presented in Table 8-7.

Table 8-7: Rationing Allocation Method

User Type	Allocation Method
Single Family	Hybrid of Per-capita and Percentage Reduction
Multi-Family	Hybrid of Per-capita and Percentage Reduction
Commercial	Percentage Reduction
Industrial	Percentage Reduction
Governmental/Institutional	Percentage Reduction
Agricultural/Landscape-Permanent	Percentage Reduction - vary by efficiency
Agricultural/Landscape-Recycled Water	Percentage Reduction - vary by efficiency
Recreational Percentage	Reduction - vary by efficiency
New Customers	Per-capita (no allocation for new landscaping during a declared water shortage.)

Based on current and projected customer demand, water will be allocated to each customer type by priority and rationing level during a declared water shortage. Individual customer allotments are based on a five-year period or as much data are available. This gives SVWD a more accurate view of the usual water needs of each customer and provides additional flexibility in determining allotments and reviewing appeals. However, no allotment may be greater than the amount used in the most recent year of the five-year base period or as many years as data are available.

The General Manager shall classify each customer and calculate each customer's allotment according to the Sample Water Rationing Allocation Method seen in the above table. The allotment shall reflect seasonal patterns. Customers shall be notified of their classification and allotment by mail before the effective date of the Water Shortage Emergency. New customers will be notified at the time the application for service is made. In a disaster, prior notice of allotment may not be possible; notice will be provided by other means. Any customer may appeal the General Manager’s classification on the basis of use or the allotment on the basis of incorrect calculation.

8.8.3 New Demand

During any declared water shortage emergency requiring mandatory rationing, SVWD recommends that City and County building departments continue to process applications for grading and building permits, but not issue the actual permits until mandatory rationing is rescinded. In Stage 3, it may be necessary to ban all use of water for non-essential uses, such as new landscaping and pools.

8.9 Penalties for Excessive Use

If excessive use (water leaks and/or waste pursuant to Ordinance 74-83 or other Board actions) is detected from any water user, the following enforcement plan instituted in 2009 through Ordinance No. 150-09 will apply.

Any customer found repeatedly violating District water conservation restrictions in a given calendar year shall be assessed penalties to be applied to the customer's next water bill as set forth below.

- First offense: Explanation of restrictions is provided to customer
- Second offense: Written notice of violation
- Third offense: One hundred dollar ($100.00) penalty.
- Fourth offense: Two hundred and fifty dollar ($250.00) penalty.
- Fifth offense: Five hundred dollar ($500.00) penalty.

Noncompliance with Ordinance 74-83 may be enforced by discontinuing service to the property at which the violation occurs with 48-hour written notice.

8.10 Financial Impacts of Actions During Shortages

Successful implementation of water conservation measures results in a decrease in water demand, with the unintended effect of reducing a water purveyor's revenues. Accordingly, the water code requires analysis of fiscal impacts of the water shortage contingency plan on revenues and expenditure, and discussion of measures to reduce impacts.

For the District, effective implementation of the Water Shortage Contingency Plan would result in a decline in potable water sales by as much as 10 to 20 percent in terms of numbers of gallons of demand. Because of the steep tiers for usage charges, the impacts on revenues would be even greater. In addition, recycled water sales during a water shortage could also decline slightly, reflecting the community's overall reaction to the water shortage. This impact could be minimized through public information.

Revenues from connection fees would also decline, but only if a moratorium were placed on new service connections during the water shortage.

Revenues derived from penalties for excessive water use or water wasting during the water shortage would not effectively offset lost revenues. These presumably limited revenues should be applied toward administration of the water shortage contingency plan.

Declining water demands would be offset to a small degree by a decline in operating expenses related to the amount of water provided, such as pumping (energy) and water treatment chemicals. Nonetheless, to offset short-term revenue decline without raising water rates, the District would need to rely on financial reserves and/or decrease its expenditures. A decrease in expenditures could entail deferring planned capital improvements

8.11 Mechanism to Determine Reductions in Water Use

The Urban Water Management Planning Act requires a mechanism for determining if reductions in water use are actually being achieved in response to conservation measures. Regular monitoring during a Stage 1, Stage 2, or Stage 3 shortage would include reporting of weekly production figures to the General Manager. In addition, water usage by customers from bimonthly billings would be reported to the General Manager. The General Manager would provide a monthly status report to the District Board on the status and effectiveness of the conservation program. If reduction goals are not met, the General Manager would inform the District Board so that corrective action can be taken in a timely manner.

THIS PAGE INTENTIONALLY BLANK

References

Association of Monterey Bay Area Governments (AMBAG), 2008, Revised DRAFT – Regional Housing Needs Allocation (RHNA) Plan 2007-2014 for Monterey and Santa Cruz Counties.

AMBAG, 2011. AMBAG Forecast 2005 through 2035, Methodology for SVWD Population Figure, April 2011.

California Department of Water Resources (DWR), 2003, California's Groundwater Bulletin 118.

Brabb, E.E., S. Graham, C. Wentworth, D. Knifong, R. Graymer, and J. Blissenbach, 1997, Geologic Map of Santa Cruz County, California: A Digital Database, Open-File Report 97-489.

Clark, J.C., 1981, Stratigraphy, Paleontology, and Geology of the Central Santa Cruz Mountains, California Coast Ranges, U.S. Geological Survey Professional Paper 1168, US Government Printing Office.

Clark, J.C., 1966, Tertiary Stratigraphy of the Felton-Santa Cruz Area, Santa Cruz Mountains, California, Ph.D. dissertation Stanford University, 1966, available from University Microfilms, Inc., Ann Arbor, Michigan.

ETIC Engineering, Inc., 2007, Scotts Valley Water District Groundwater Management Program Annual Report 2006 Water Year, Prepared for: Scotts Valley Water District, July 2007.

ETIC Engineering, Inc., 2006, Groundwater Modeling Study of the Santa Margarita Groundwater Basin Final Report, Prepared for: Scotts Valley Water District, May 2006.

Federal Register, 1985, Final Determination; Ground Water System of the Scotts Valley Area, Santa Cruz County, CA; Aquifer Determination: Agency: Environmental Protection Agency: Action – Final Determination, Vol. 50, No. 9, pp 2023-2025, January 14, 1985.

Kennedy/Jenks, 2008, 2007 Annual Report, Scotts Valley Water District Groundwater Management Program, Prepared for: Scotts Valley Water District, May 2008.

Kennedy/Jenks, 2011, Admin Draft 2010 Annual Report, Scotts Valley Water District Groundwater Management Program, Prepared for: Scotts Valley Water District, April 2011.

McLaughlin, R.J.; J.C. Clark, E.E. Brabb, E.J. Helley, C.J. Colon, 2001, Geologic maps and structure sections of the southwestern Santa Clara Valley and southern Santa Cruz Mountains, Santa Clara and Santa Cruz counties, California, USGS Miscellaneous Field Studies, MF-2373.

Muir, K.S., 1981, Assessment of the Santa Margarita Sandstone as a Source of Drinking Water for the Scotts Valley Area, California, USGS Water Resources Investigation WRI81-6.

Santa Cruz County Local Agency Formation Commission. 2003, Countywide Service Review, Wastewater Services.

Scotts Valley Water District (SVWD), 2005, Scotts Valley Urban Water Management Plan and Water Shortage Contingency Plan, Prepared in conjunction with ETIC Engineering, December 2005.

Todd Engineers, 1994, Scotts Valley Groundwater Management Plan (AB 3030), report prepared for Scotts Valley Water District, 94 p.

Todd Engineers, 1998, Reevaluation of the Water Balance, report prepared for Scotts Valley Water District. 91 p., December 1998.

Appendix A

DWR Checklist

Table I-2 Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Section 1.3.1
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Section 1.3.1 & Appendix B
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Appendix C
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Table 1-1 and Appendix B
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Section 1.3.2 Table 1-2
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Appendix B Table 1-2
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix C
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Section 3.5; 4.4; 4.6;7.5

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 1.3.2
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 1.3.2
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Section 1.4.1 Figure 1-1
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Section 1.5
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in “Baseline Daily Per Capita Water Use.” See Section M.	Table 2-2
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Table 2-2
12	Describe other demographic factors affecting the supplier’s water management planning.	10631(a)		Section 1.7
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Section 2.3.3 Table 2-5 through Table 2-8
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier’s implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Not applicable

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		Table 2-8
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Table 2-3
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Section 6
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Section 2.6 Table 2-9
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Table 3-1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Yes
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Section 3.3.2 Appendix D
16	Describe the groundwater basin.	10631(b)(2)		Section 3.3.1 Section 3.3.2

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		No Section 3.3.1
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Not applicable
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 3.3.1
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Section 3.3.2.5 Table 3-3, 3-4, 3-5 Figure 1-2
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Table 3-3
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 3.4
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Section 3.5
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Section 3.6
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Section 4
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Section 4.3 Figure 4-1 Table 4-2

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Table 4-3
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Table 4-4
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Section 4.4.2 Table 4-5
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Section 4.4.2 Table 4-5
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Section 4.5 Table 4-8
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Section 4.6
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Section 6.2
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Section 6.3
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Table 6-2 Section 6.3.1
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Section 8.3 Table 8-1 Section 8.7

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Table 8-4
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Section 8.6
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Section 8.7 Table 8-5 Table 8-6
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Section 8.8.1
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 8.9
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Section 8.10
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Appendix K
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 8.11
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	Section 5 Table 5-3

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Table 6-6 Table 6-7 Table 6-8
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 7
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 7-3 Section 7-4 Section 7.5
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Section 7.1 Section 7.3 Section 7.4
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Section 7.3 Section 7.4
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Section 7.2 Appendix G

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

Appendix B

Public Outreach Materials

Scotts Valley Water District
P.O. BOX 660006 • SCOTTS VALLEY, CA 95067-0006
(831) 438-2363 • *FAX* (831)438-6235
EMAIL: contact@svwd.org

Office Address:
2 CIVIC CENTER DR.
SCOTTS VALLEY, CA 95066

Board of Directors:
CHRIS PERRI
President
DAVID T. HODGIN
Vice President
JAY MOSLEY
Director
JOE MILLER
Director
KEN KANNEGAARD
Director

CHARLES McNIESH
General Manager

April 5, 2011

Stephen H. Ando
City Manager
City of Scotts Valley
1 Civic Center Drive
Scotts Valley, California 95060

Re: Urban Water Management Plan Update

Dear Mr. Ando:

Scotts Valley Water District is preparing an update to its Urban Water Management Plan, as required by state law. This letter is to notify the City of Scotts Valley that over the next two months we will be reviewing the plan, establishing our urban water use target methodology, and considering changes and amendments to the plan. We welcome the City's input and comments during the update process.

A draft plan update is expected to be available for public review in late May 2011. Public hearings on the urban water use target methodology and the draft update are tentatively scheduled for our regular Board of Directors meeting, June 9, 2011, at 7 p.m. at the Scotts Valley Water District office. The Board may consider adoption of the updated plan the same evening.

Please contact me if you have any questions or wish to discuss the information covered in the plan or update process.

Yours truly,

Charles McNiesh
General Manager

Scotts Valley Water District
P.O. BOX 660006 • SCOTTS VALLEY, CA 95067-0006
(831) 438-2363 • *FAX* (831)438-6235
EMAIL: contact@svwd.org

Office Address:
2 CIVIC CENTER DR.
SCOTTS VALLEY, CA 95066

April 5, 2011

Susan A. Mauriello
County Administrative Officer
Santa Cruz County
701 Ocean Street, Room 520
Santa Cruz, California 95060

Re: Urban Water Management Plan Update

Dear Ms. Mauriello:

Scotts Valley Water District is preparing an update to its Urban Water Management Plan, as required by state law. This letter is to notify Santa Cruz County that over the next two months we will be reviewing the plan, establishing our urban water use target methodology, and considering changes and amendments to the plan. We welcome the County's input and comments during the update process.

A draft plan update is expected to be available for public review in late May 2011. Public hearings on the urban water use target methodology and the draft update are tentatively scheduled for our regular Board of Directors meeting, June 9, 2011, at 7 p.m. at the Scotts Valley Water District office. The Board may consider adoption of the updated plan the same evening.

Please contact me if you have any questions or wish to discuss the information covered in the plan or update process.

Yours truly,

Charles McNiesh
General Manager

Appendix C

Resolution to Adopt the 2010 UWMP

Appendix D

SVWD Groundwater Management Plan

Scotts Valley Water District
Scotts Valley, California

SCOTTS VALLEY
GROUNDWATER MANAGEMENT PLAN
(AB 3030)

July 1994

David Keith Todd
Consulting Engineers, Inc.
Berkeley, California

Table of Contents

Table of Contents
(continued)

List of Tables

EXECUTIVE SUMMARY

The Scotts Valley Water District (SVWD) holds the primary responsibility for the management and supply of water to the Scotts Valley area of Santa Cruz County. In recognition of this responsibility, SVWD has directed a Water Resource Management Plan since 1983. On January 1, 1993, California Assembly Bill 3030 (AB 3030) was codified into law. This law encourages local water agencies to manage groundwater resources within their jurisdictions and outlines guidelines for a groundwater management plan. In accordance with these guidelines, SVWD held a public hearing on September 9, 1993 to declare their intention to develop a groundwater management plan.

This report outlines the proposed Groundwater Management Plan for SVWD, and addresses two major areas of concern in Scotts Valley: (1) management of groundwater supplies to meet present and future demands, and to provide for downstream water rights and instream uses; and (2) protection of water quality and remediation of existing groundwater contamination. The report also includes a brief discussion of the hydrogeology of Scotts Valley. Major conclusions and recommendations are presented. If this report is adopted in accordance with the AB 3030 law as the Groundwater Management Plan for Scotts Valley Water District, the conclusions and recommendations would serve as guidelines for groundwater management by SVWD.

Major findings and recommendations of the report are summarized briefly in the paragraphs below, followed by a complete listing of the Conclusions and Recommendations.

Hydrogeology

The hydrogeologic investigations have revealed that the areal extent, thickness, and depth of the local aquifers are strongly affected by erosion and geologic folding and faulting, resulting in a complex and varied setting for groundwater storage and flow. As a consequence, groundwater and storage available to a given well could be limited. In such a situation, effective groundwater basin management must be based on extensive groundwater exploration and comprehensive but detailed hydrogeologic investigations. Accordingly, the Groundwater Management Plan recommends that groundwater exploration efforts and hydrogeologic studies should be undertaken in cooperation with the neighboring San Lorenzo Valley Water District (SLVWD) and Santa Cruz County to more fully evaluate the Scotts Valley groundwater basin as a whole.

Groundwater Supply

The groundwater supply section includes a summary of the current groundwater supply status of the basin. Although the basin is not in overdraft, localized groundwater level declines have resulted in adverse effects, including drying up of shallow private wells, loss of production and efficiency in wells, and locally decreased groundwater quality. Along with groundwater level declines, groundwater storage in the developed portion of the basin declined between April 1986 and April 1994 by an estimated 550 to 600 acre-feet per year (AFY), or about 10 percent of estimated total groundwater storage. Although the recent 1992-1993 season was wet, it resulted only in a moderation of the extent and severity of localized groundwater level declines. However, the major natural drain for the basin, Bean Creek, responded to the wet 1992-1993 season with increased baseflow during the summer of 1993.

The report also updates groundwater production in the basin. About 70 percent of the total groundwater production is metered, while the remainder had to be estimated, including groundwater production by landscape irrigators, private water purveyors, commercial and industrial firms, and domestic users. The total estimated groundwater production is 3,460 AFY, not accounting for return flows to the groundwater basin via percolation from irrigation and landscaping ponds, leakage from pipelines, and percolation from septic tanks. The perennial yield for the Scotts Valley groundwater basin had been estimated previously to be 4,200 AFY. Accordingly, estimated groundwater production amounts to over 80 percent of the estimated perennial yield. In addition, the preponderance of pumpage is concentrated in a small portion of the groundwater basin.

In response to concerns over the long-term groundwater supply, the report evaluates current groundwater basin management and makes recommendations for future action. The report summarizes the SVWD monitoring program, finding it to be comprehensive, with an appropriate focus on the developed portions of the basin. In addition, the existing Santa Margarita groundwater basin computer model is evaluated. Although requiring periodic updating and refinement, the model can be used to observe effects of proposed well locations and pumping configurations, and potential recharge projects, consequently aiding in groundwater management. In addition, the model can be supplemented by other computer programs for use in simulating migration of dissolved contaminants in groundwater.

The Groundwater Management Plan notes that the current estimate of perennial yield is an annual average value. Given the variability of rainfall and recharge in recent years, the perennial yield should be evaluated to provide more specific information on the effect of varied rainfall on groundwater recharge. Recommendations also are provided for more accurate evaluation of basin-wide groundwater storage in light of increased knowledge of the hydrogeology of the area.

The efforts of SVWD to redistribute its pumpage have not been sufficient to mitigate localized groundwater declines. Accordingly, SVWD efforts should be supplemented by actions of SVWD and others to redistribute pumpage, minimize groundwater losses, and to initiate groundwater replenishment programs. Six conceptual projects for direct artificial recharge or wastewater irrigation are presented with possible yields ranging from 20 to 200 AFY each. More than one such project would be needed to mitigate the current groundwater level declines, and additional conservation, management, and replenishment efforts would be required for any additional increase in local water demands. Replenishment projects should be planned and implemented in the context of basin-wide groundwater resource management, and coordinated with SLVWD, Santa Cruz County, and major groundwater producers. Accordingly, roundtable meetings are recommended for the major groundwater producers in Scotts Valley to discuss and coordinate means to mitigate groundwater level decline problems. The report also recommends continued efforts toward water conservation and wastewater reclamation and reuse.

Groundwater Quality

The portion of the report addressing groundwater quality presents the regulatory framework for the identification and remediation of contamination problems, discusses existing contamination, and reviews groundwater contamination prevention programs. Recommendations are presented for specific action by SVWD and for cooperation with other agencies.

In brief, the agencies with regulatory responsibility for groundwater contamination in Scotts Valley are the United States Environmental Protection Agency (USEPA), the Department of Toxic Substance Control of the California Environmental Protection Agency (Cal-EPA), Regional Water Quality Control Board (RWQCB), and Scotts Valley Fire Protection District. SVWD does not have regulatory authority for the prevention, identification, or remediation of groundwater contamination. SVWD is responsible for monitoring of its water supply and provision of water satisfying state and federal drinking water standards. In addition, it holds responsibility for enforcement of standards for construction, abandonment, and destruction of water supply wells.

Areas of known groundwater contamination are described briefly in the report, including the benzene plume in the Camp Evers area, three problems in the El Pueblo Road area, and the Watkins-Johnson plume. Ten possible sources of the benzene contamination in Camp Evers have been investigated by the RWQCB. Of these, three service stations along Mount Hermon Road have been identified as possible sources. Cal-EPA is the lead agency overseeing the investigation and remediation of contamination in the El Pueblo Road area, and is in the process of identifying possible sources of the trichloroethene (TCE) and chlorobenzene problems. Of seven possible sources, one site has been identified as a possible source of TCE contamination. A remedial investigation and feasibility study for the site has been prepared, while a remedial action plan remains to be drafted and approved. The USEPA is overseeing remediation at the Watkins-Johnson site, which has reduced groundwater contamination to within site boundaries.

The existence of potential sources of groundwater contamination in Scotts Valley are identified, including 64 facilities using hazardous materials and 37 active underground storage tanks (USTs), of which 22 are double-walled and meet new tank standards. Septic tanks also are potential sources of contamination.

Given the existence of contamination and the susceptibility of local aquifers to contamination, the report also reviews means to prevent groundwater contamination problems. These include well construction, abandonment, and destruction; hazardous materials management; regulation of underground storage tanks; sewering of areas dependent on septic tanks; and city planning and zoning. In terms of standards for well construction, abandonment, and destruction, SVWD is encouraged to strengthen its enforcement of standards. This would involve updating the well inventory database, tracking the status of wells within SVWD, establishing a notification system to alert private groundwater users of contamination problems, and implementing well construction standards to prevent cross-contamination of aquifers.

In accordance with its responsibility to provide water satisfying state and federal drinking water standards, SVWD should continue its policy of siting new wells in areas and aquifers that are less susceptible to contamination. SVWD also should consider installation of monitor wells sited between possible contamination source areas and major municipal well fields to allow early identification of groundwater contamination problems.

The report notes that no single agency has a regional outlook on groundwater contamination. Given SVWD's existing role in monitoring and managing local water resources and its key role in providing safe drinking water, SVWD can help provide such a regional overview, through cooperation with the regulatory agencies and information sharing.

Conclusions

Hydrogeology

1. The areal extent, thickness, and depth of the local aquifers are strongly affected by erosion and geologic folding and faulting, resulting in a complex and varied setting for groundwater storage and flow. As a consequence, groundwater and storage available to a given well could be limited.

2. Much valuable information is available on the hydrogeology of the margins of the Scotts Valley groundwater basin. However, geologic data are relatively lacking for the central portion of the basin.

Groundwater Supply

3. The water resource monitoring program is comprehensive, with an appropriate focus on the developed portions of the basin.

4. Although the basin is not in overdraft, localized groundwater level declines have resulted in adverse effects, including drying up of shallow private wells, loss of production and efficiency in wells, and a somewhat lower groundwater quality.

5. The wet 1992-1993 season resulted only in a moderation of the extent and severity of localized groundwater level declines.

6. Although affected by recent drought, Bean Creek responded to the wet 1992-1993 season with increased baseflow during the summer of 1993.

7. Perennial yield for the Scotts Valley groundwater basin has been estimated to be 4,200 AFY. This is an annual average value and is relevant to the area of the Scotts Valley groundwater basin.

8. Groundwater storage in the developed portion of the basin has declined between April 1986 and April 1994 by an estimated 550 to 600 AFY, or about 10 percent of estimated total groundwater storage.

9. The Santa Margarita groundwater basin computer model can be used to observe effects of proposed well locations and pumping configurations, consequently aiding in optimization of the distribution of pumping.

10. The model can be supplemented by other computer programs for use in simulating migration of dissolved contaminants in groundwater.

11. About 70 percent of the total estimated groundwater production is metered by SVWD, SLVWD, Watkins-Johnson, and the Mount Hermon Association. Groundwater production was estimated for other groundwater users, including landscape irrigators, private water purveyors, commercial and industrial firms, and domestic users.

12. Total estimated groundwater production is 3,460 AFY, not accounting for return flows to the groundwater basin via percolation from irrigation and landscaping ponds, leakage from pipelines, and percolation from septic tanks.

13. The estimated total groundwater pumpage amounts to over 80 percent of the estimated 4,200 AFY of perennial yield for the Scotts Valley groundwater basin, and is concentrated in the southeast one-quarter of the groundwater basin.

14. The efforts of SVWD to redistribute its pumpage have not been sufficient to mitigate localized groundwater declines. SVWD efforts should be supplemented by actions of SVWD and others to redistribute pumpage, minimize groundwater losses, and to initiate groundwater replenishment programs.

15. More than one replenishment program will be needed to mitigate localized groundwater level declines and to ensure long-term groundwater supply.

16. Six conceptual projects for direct artificial recharge or wastewater irrigation are presented with possible yields ranging from 20 to 200 AFY each.

Groundwater Quality

17. The Scotts Valley Fire Protection District oversees the City of Scotts Valley's hazardous materials management program, implements state regulations of underground storage tanks, oversees monitoring and soil boring installation and destruction, and responds first to a hazardous material release.

18. The RWQCB regulates sites where groundwater contamination occurs from underground tanks or other sources.

19. The Cal-EPA oversees groundwater contamination sites where the potentially responsible party is not known or is not financially solvent.

20. The USEPA oversees sites that are on or proposed for the Superfund list.

21. SVWD does not have regulatory authority for the prevention, identification, or remediation of groundwater contamination. SVWD is responsible for monitoring of its water supply and provision of

water satisfying state and federal drinking water standards.

22. Ten possible sources of the benzene contamination in Camp Evers have been investigated by the RWQCB. Of these, three service stations along Mount Hermon Road have been identified as possible sources.

23. Cal-EPA is the lead agency overseeing the characterization and remediation of contamination in the El Pueblo Road area, and is in the process of identifying possible sources of the TCE and chlorobenzene problems. Of seven possible sources, Scotts Valley Circuits has been identified as a possible source of TCE contamination. A remedial investigation and feasibility study for the site has been prepared; a remedial action plan remains to be drafted and approved.

24. The USEPA is overseeing remediation at the Watkins-Johnson site, which has reduced groundwater contamination to within site boundaries.

25. Prevention of groundwater contamination in Scotts Valley is important because of the susceptibility of aquifers to contamination, difficulty in determining sources of contamination, extended time and high costs to remediate contamination, and added costs of wellhead treatment by water purveyors.

26. Improperly constructed or abandoned wells can provide conduits for downward migration of contaminants from the ground surface.

27. SVWD and Santa Cruz County share responsibility for enforcing standards for permitting, construction, abandonment, and destruction of water supply wells.

28. Sixty-four facilities using hazardous materials exist in Scotts Valley, located mostly along Scotts Valley Drive.

29. Thirty-seven active underground storage tanks have been identified in Scott Valley, of which 22 are double-walled and meet new tank standards.

30. Septic tanks represent other potential sources of contamination.

Recommendations

Hydrogeology

1. Groundwater exploration efforts and hydrogeologic studies should be undertaken in cooperation with SLVWD and Santa Cruz County to more fully evaluate the Scotts Valley groundwater basin as a whole.

Groundwater Supply

2. SVWD should continue data compilation on wells and geology and the program of climatic, surface water, and groundwater monitoring with annual reporting.

3. Groundwater level monitoring by all agencies should be coordinated so that the quarterly measurements occur within a small time period, such as one week.

4. SVWD in cooperation with other agencies should expand data compilation and monitoring as groundwater exploration and production are extended into new areas, or as needed for groundwater replenishment projects or for groundwater contamination investigations or remediation.

5. The perennial yield and groundwater storage of the Scotts Valley groundwater basin should be reevaluated in greater detail.

6. The computer model should be maintained, but revised as additional hydrogeologic data become available.

7. Information on wells and metered groundwater production should be compiled and updated regularly. Groundwater production by large groundwater users should be measured.

8. Following metering of major groundwater producers, consumptive use of groundwater should be analyzed.

9. SVWD should continue its efforts to redistribute its pumpage throughout its service area.

10. Roundtable meetings should be convened by the major groundwater producers to discuss means to analyze and mitigate groundwater level declines.

11. Replenishment projects should be planned and implemented in the context of basin-wide groundwater resource management, and coordinated when appropriate with SLVWD, Santa Cruz County, and major groundwater producers.

12. The conceptual replenishment projects, in addition to others that may be suggested, should be considered in greater depth.Additional investigations would include field work, computer modeling, cost/benefit analysis, and assessment of environmental impacts.

13. SVWD, SLVWD, and other groundwater producers should continue efforts to encourage conservation measures such as low flow plumbing fixtures and drought resistant vegetation.

14. SVWD should continue to work with the City of Scotts Valley to encourage appropriate recycling and reuse of wastewater.

Groundwater Quality

In order to aid in groundwater contamination prevention, SVWD should strengthen its enforcement of standards for construction, abandonment, and destruction of water supply wells, including the following:

15. Continue to update and maintain the well inventory database to include all wells within SVWD boundaries.

16. Conduct a survey to document the status of wells within SVWD boundaries, and to identify both active and destroyed wells.

17. Once the well survey is complete, establish a notification system to alert private groundwater users of contamination problems within the SVWD boundaries.

18. Given the existence of multiple aquifer systems within SVWD, implement well construction standards to prevent cross-contamination of aquifers.

19. Establish and enforce a permitting system for well destructions within the SVWD boundaries and track well destruction in the well database.

20. Establish a program to identify and encourage the proper destruction of abandoned wells within SVWD.

21. In accordance with its responsibility to provide water satisfying state and federal drinking water standards, SVWD should continue its policy of siting new wells in areas and aquifers that are less susceptible to contamination, and should consider installation of monitor wells sited between possible contamination source areas and major municipal well fields to allow early identification of groundwater contamination problems.

Overall, SVWD should encourage and cooperate fully with responsible agencies in the investigation and remediation of contamination sites, identification of potentially responsible parties, and prevention of groundwater contamination. SVWD also can provide a regional groundwater management overview and can aid in information sharing among agencies. Accordingly, SVWD and other agencies should:

Hazardous Materials Management
- Establish a public/business education program emphasizing the importance of the proper disposal of hazardous materials.
- Institute programs encouraging reduced hazardous material use and waste minimization programs.
- Institute stricter regulations for sites which use hazardous materials.

Underground Storage Tanks
- Develop more stringent local standard for the use, monitoring, removal, and replacement of USTs.
- Eliminate exemptions to UST requirements such as residential tanks, farm tanks, and elevator vaults.
- Require replacement of single walled tanks or upgrade monitoring requirements.
- Evaluate feasibility of local regulation of UST cleanups to speed the process of source identification and remediation.
- Discourage additional installations of USTs in Scotts Valley.

Septic Tank Disposal Systems
- Review records of Scotts Valley City Finance Department to identify businesses and residences not currently connected to sanitary sewer system.
- Encourage hookup of all businesses and residences not currently connected to the sanitary sewer system.

City Planning and Zoning
- Limit future industrial and commercial service development to existing areas.
- Encourage consideration by City planners of groundwater protection issues in land use planning.

Section 1

INTRODUCTION

1.1 Background

The Scotts Valley Water District (SVWD) is a public agency responsible for management and supply of water to the Scotts Valley area. The SVWD service areas includes most of the City of Scotts Valley and some areas outside the city limits (Figures 1 and 2). The City of Scotts Valley is situated in the Santa Cruz Mountains along Highway 17 in Santa Cruz County, north of the City of Santa Cruz, California.

The Scotts Valley area is underlain by the Santa Margarita groundwater basin which was designated as a sole source aquifer by the U.S. Environmental Protection Agency (USEPA) in 1982. This means that the City of Scotts Valley and nearby communities use this aquifer as their sole or principal water supply. Therefore, it is deserving of special protection.

Extensive work toward groundwater management of the Scotts Valley groundwater basin (California Department of Water Resources, 1975) already has been accomplished. SVWD has directed a Water Resource Management Plan since 1983 (Todd Engineers, 1984-1994). In addition, a computer model of the basin was recently developed for a groundwater management study initiated by the Association of Monterey Bay Area Governments (Watkins-Johnson Environmental, Inc., September 1993). The adjacent San Lorenzo Valley Water District (SLVWD) also has conducted a program of groundwater monitoring and specific studies for its portion of the groundwater basin.

Assembly Bill 3030 (AB 3030), codified into law on January 1, 1993, permits local agencies to adopt significant programs to manage groundwater. The purpose of AB 3030 is to "encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions". Accordingly the bill outlines a procedure to develop a groundwater management plan for any local public agency that provides water service to all or a portion of its service area. In accordance with guidelines for the development of a groundwater management plan, a public hearing was held by SVWD on September 9, 1993 to declare their intention to develop a groundwater management plan.

1.2 Purpose

The purpose of this groundwater management plan is to address two major areas of concern in Scotts Valley: (1) management of groundwater supplies to meet present and future demands, and to provide for downstream water rights and instream uses; and (2) protection of water quality and remediation of existing groundwater contamination. By implementation of a groundwater management plan for Scotts Valley, SVWD hopes to preserve and enhance the groundwater resource in terms of quality and quantity, and to minimize the cost of management by coordination of efforts among agencies.

1.3 Scope

The area served by SVWD is the focus of this study. However, it is necessary in some cases to extend the field of study to areas surrounding SVWD boundaries in order to provide a meaningful discussion of hydrogeologic processes and to support basin management planning strategies. Three differing study areas are depicted on Figure 1. The shaded area is within SVWD boundaries while the dotted line outlines the study area defined for the Water Resources Management Plan, which includes hydrogeologically significant regions. The third area is the area encompassed in a groundwater flow model developed for the Santa Margarita basin (Watkins-Johnson Environmental, Inc., September 1993).

This groundwater management plan begins with a brief review of the current understanding of hydrogeologic conditions encountered in the Santa Margarita basin. These hydrogeologic processes influence groundwater recharge and flow patterns, and the potential for groundwater contamination. The plan then proceeds to focus on the management of groundwater supply and groundwater quality.

The groundwater supply section begins by evaluating the monitoring programs in the Water Resources Management Plan. Following this is a description of groundwater level trends and subsequent storage volumes in the Santa Margarita basin. The application and uses of the Santa Margarita groundwater basin flow model for simulating future scenarios is discussed. A section on groundwater replenishment discusses various options for direct or in-lieu groundwater recharge.

The discussion of groundwater quality focusses on: (1) documenting existing groundwater contamination and the status of remediation, and (2) prevention of groundwater contamination in the future. Several items are discussed under the topic of prevention including: hazardous materials management program, underground storage tank programs, well construction and destruction standards, septic systems, and city planning and zoning.

Finally, the conclusions reached in the study are presented. Recommendations for improved management of groundwater supply and quality are suggested.

1.4 Acknowledgements

A number of agencies have been helpful in providing information for this report including: the Scotts Valley Water District, the City of Scotts Valley City Hall, the Scotts Valley Department of Public Works, the Scotts Valley Fire Protection District, The Scotts Valley Building Department, the Santa Cruz County Health Department, the California Regional Water Quality Control Board, the State Water Resources Control Board, the State Department of Water Resources, the California Environmental Protection Agency Toxic Substances Control Division, and the U.S. Environmental Protection Agency.

This report was prepared by Iris Priestaf, Peter Leffler, Sally McCraven, and Katherine White under the supervision of David Keith Todd.

Section 2

HYDROGEOLOGY OF SCOTTS VALLEY

2.1 Geologic Units and Structure

A detailed geologic cross-section has been prepared trending northeast-southwest through the most developed portion of Scotts Valley (see Figure 3). This cross-section shows seven major geologic units (Figure 4). The oldest unit consists of pre-Tertiary age granite that underlies Tertiary sedimentary units and Quaternary alluvium in the region. The Lompico sandstone is a major unit in the area with thicknesses of up to several hundred feet. The Monterey shale overlies the Lompico and consists primarily of shale with sandstone interbeds in the lower portion. As shown on Figure 4, the thickness of the Monterey shale varies from locally absent or very thin (less than 20 feet) to as much as 600 feet. This variation is due to structural folding and faulting and erosion of the Monterey shale, resulting in a surface with considerable relief.

The Santa Margarita sandstone was deposited subsequently on top of the irregular Monterey shale surface. As a result, the Santa Margarita tends to thin markedly and locally pinch out in areas where the underlying granite or shale forms a relative "high". The thickness of Santa Margarita ranges up to 350 feet. Overlying the Santa Margarita in some areas is the Santa Cruz mudstone. Deposits of Quaternary alluvium are present in the major valleys.

The major geologic structure in the area is Scotts Valley syncline, a gentle geologic downwarp that extends from Boulder Creek eastward through Scotts Valley. The syncline is characterized by gently dipping beds (0 to 6 degrees) on the south limb of the syncline and slightly steeper dips (0 to 20 degrees) on the northern limb. In the Scotts Valley area, the syncline becomes increasingly deep, and apparently flattens out to the east.

The location of the syncline is shown on Figure 3. In addition, the syncline is portrayed on Figure 4 as the downwarped geologic layers. As indicated, this downwarping has resulted in accumulation and preservation of the thickest part of the geologic formations along the synclinal axis with thinning along the limbs of the fold. This is particularly noticeable for the Monterey shale. Gentle folding in the overlying Santa Cruz mudstone indicates continued downwarping.

As indicated on Figure 4, the Scotts Valley syncline in this area is apparently broken by the two unnamed faults, which occur on either side of the syncline. The down-thrown side of each fault is located towards the synclinal axis, resulting in a down-thrown block. In addition, a second faulted and down-thrown block is apparent in the Camp Evers area. These faults significantly influence the thickness of the Monterey shale and depth to the Lompico sandstone. As shown, the down-thrown blocks are characterized by the thickest Monterey shale and the greatest depth to the Lompico sandstone. The up-thrown blocks are characterized by more extensively eroded and thinner Monterey shale and shallower depths to the Lompico sandstone.

2.2 Hydrogeology

In essence, the Scotts Valley groundwater basin is like a bowl or bathtub, rimmed by granitic rocks and filled with sandstone and shale layers which contain groundwater. The two major aquifers in Scotts Valley are the Santa Margarita sandstone and the Lompico sandstone. Local groundwater exhibits unconfined conditions in the Santa Margarita aquifer, and semiconfined to confined conditions in the underlying Lompico sandstone. The two major aquifers are generally separated from each other by varying thicknesses of the Monterey shale. However, locally the Monterey shale is absent and the two sandstone units are not separated.

The Santa Margarita sandstone receives recharge from rainfall and streamflow where it crops out at the surface, plus subsurface inflow from overlying formations. The Monterey and Lompico formations are recharged at outcrops in northern portions of the basin, and also receive groundwater from overlying units.

According to groundwater level and flow maps, groundwater flow generally is from recharge areas toward Bean Creek, which serves as the basin's outlet. Available data suggest no other significant outlets except pumping wells, which have substantially altered local groundwater flow patterns. Carbonera Creek does not intersect the water table, and water table contours do not suggest subsurface outflow through the granitic rocks.

In recent years considerable hydrogeologic exploration and assessment has been accomplished by SVWD, SLVWD, and private groundwater users. As a result, much valuable information now is available on the hydrogeology of the southeastern, southwestern, and western margins of the Scotts Valley groundwater basin. However, geologic data are relatively lacking for the central portion of the basin.

The hydrogeologic investigations have revealed that the areal extent, thickness, and depth of the local aquifers are strongly affected by erosion and geologic folding and faulting, resulting in a complex and varied setting for groundwater storage and flow. As a consequence, groundwater and storage available to a given well could be limited. In such a situation, effective groundwater basin management must be based on extensive groundwater exploration and comprehensive but detailed hydrogeologic investigations. In the future, groundwater exploration efforts and hydrogeologic studies should be undertaken in cooperation with SLVWD and Santa Cruz County to more fully evaluate the Scotts Valley groundwater basin as a whole.

Section 3

GROUNDWATER SUPPLY

3.1 Current Monitoring Programs

Todd (1980) defines a monitoring program as a scientifically designed surveillance system of continuing measurements, observations, and evaluations. As part of the Scotts Valley Water Resources Management Plan, SVWD maintains a comprehensive monitoring program to protect the long-term supply and quality of groundwater. Results of these monitoring programs are analyzed and presented in annual reports (Todd Engineers, 1984-1994). The current program includes collection of groundwater level data from over 40 wells and collection of water quality and pumpage data from SVWD wells. In addition, there are three streamflow gages, five rainfall gages, and one evaporation measurement station. Drillers logs of wells have been compiled for most of the Scotts Valley and surrounding area with over 400 wells identified and located on a base map. Locations of notable monitoring sites are depicted on Figure 5 while Table 1 is a summary of current Scotts Valley monitoring programs. These programs are described briefly below.

Precipitation. Precipitation is recorded automatically at least every 15 minutes at the El Pueblo Yard and at the City of Scotts Valley wastewater treatment plant (WWTP). The El Pueblo Yard gage has been in operation since 1985. Previously, a bucket gage was in operation at the El Pueblo facility between 1981 and

TABLE 1
SUMMARY OF SCOTTS VALLEY MONITORING PROGRAMS

MONITORING TYPE	LOCATION	MEASUREMENT TYPE	DATE STARTED	FREQUENCY/ MAINTAINER	HISTORIC MONITORING
PRECIPITATION	El Pueblo Yard	15-minute recording	Feb. 1985	Daily/District, Monthly/City	OTHER HISTORIC GAGES: 1) Blair site on Granite Ck. Rd. (Jan. 1975-Dec. 1980) 2) Hacienda Dr. (Jul. 1974-Mar. 1979) 3) El Pueblo Yard bucket gage (Jan. 1981-Jan. 1985)
	WWTP	5-minute recording	1990	Daily/City	
	Kaiser Sand and Gravel Co.	Bucket	Mar. 1985	Varies/Kaiser	
	Carbonera Ck. headwaters @ Scoppetone property	Bucket	Apr. 1985	Varies/Scoppetone	
	Near Lockhart Gulch @ Fabrin's Circle K	Bucket	Mar. 1985	Varies/G.W. Fabrin	
EVAPORATION	El Pueblo Yard	Pan	Jan. 1986	Daily/District	Evaporation pan raw data not compiled after Jul 1990
STREAMFLOW	Carbonera Ck. at Scotts Valley @ Carbonera Way Bridge (#11161300)	15-minute recording	Jan. 1985	Daily/USGS	OTHER HISTORIC GAGES: 1) Carbonera Ck. @ Santa Cruz (#11161400) 250 feet upstream from mouth (1974-1976 partial data) 2) Bean Ck. near Felton (#11160320) (1973-1978 partial data), low flows at same location (1983-1988)
	Carbonera Ck. @ Glen Canyon	5-minute recording	1990	Monthly/City	
	Bean Ck. near Scotts Valley @ Mt. Hermon Crossing (#11160430)	15-minute recording	Dec. 1988	Daily/USGS	
WELL INVENTORY	T10/R01 Sections 6-9, 16-20, 30 and T10/R02 Sections 1, 11-14, 23-26, 36	Over 400 wells: location, log, type, capacity, etc.	1950's	Logs from California DWR and others	-
GROUNDWATER LEVELS	~41 Santa Margarita aquifer and ~7 Lompico formation wells	Depth to water	1968	At least quarterly/ District and others	Data from over 75 wells, as early as 1968, bi-monthly 1983-1989
PUMPAGE	District wells in production and on standby	Metered, compiled monthly	1975	Monthly/District	Additional pumpage from other wells
GROUNDWATER QUALITY	District wells in production and on standby	Title 22 constituents	1963	At least semi-annually/ District and others	Data from over 80 wells, as early as 1963, monitoring frequency similar to groundwater level program
WASTEWATER OUTFLOWS	City of Scotts Valley WWTP @ Lundy Lane	Wastewater outflow volume and effluent quality	1965	Daily/City	Plant operational in 1965 (Septic systems pre-1965)

REF: Todd Engineers (1993)
Todd Engineers (1989)
Todd Engineers (1988)
Handwritten monitoring notes from SVWD on El Pueblo evaporation pan and Kaiser, Scoppetone, and Fabrin rain gages
Water Quality data sheets from various laboratories

1985. Before 1981, rainfall was measured at the Blair site on Granite Creek Road and along Hacienda Drive. The WWTP gage has been in operation since 1990. The rain gages at the El Pueblo Yard and WWTP are also read manually once a day by SVWD or City of Scotts Valley staff, respectively. Manually read data are kept on file at the yard or WWTP, while electronic data are sent to the local consulting firm of Linsley, Kraeger Associates. Data have not been compiled since 1993 due to lack of funding.

In addition, three bucket rain gages have been maintained since 1985 at the Kaiser Sand and Gravel site (Kaiser), on the Scoppetone property near the headwaters of Carbonera Creek, and at the Fabrin's Circle K Ranch near Lockhart Gulch.

Evaporation. An evaporation pan has been maintained at the El Pueblo Yard since 1986. Current data have not been compiled into useable form because of lack of funding.

Streamflow. Two streamgages are monitored in cooperation with the United States Geological Survey (USGS); SVWD provides the funding for gage installation and maintenance. One gage is located on Carbonera Creek at the Carbonera Way Bridge (USGS #11161300) and was installed in early 1985. It has a punch paper tape and records water levels every 15 minutes. The other gage is on Bean Creek at the Mount Hermon crossing (USGS #11160430) and has been in operation since late 1988.

A third gage is located on Carbonera Creek at Glen Canyon. Data for this third gage are recorded every 5 minutes and manually read once a month by City of Scotts Valley staff. Data recorded at this gage has not been compiled because of lack of funding.

Well Inventory. Over 400 water well drillers' reports have been compiled from the California Department of Water Resources (DWR) and other sources. These wells are located throughout the Scotts Valley area. Compiled well data include location, well log, well use, capacity, depth, and ground surface elevation. It should be noted that these wells include all those drilled historically, many of which are now unused.

Groundwater Levels. The groundwater level monitoring program has included SVWD wells, SLVWD wells, other municipal wells, monitoring wells, and private wells. Between 1983 and 1989 groundwater levels were measured every two months. In 1989 it was determined that static groundwater levels and regional flow patterns did not change significantly over a two-month period, and that measurements of water levels on a quarterly basis would be sufficient. Consequently, water level measurements are taken on or about the first day of January, April, July, and October. Data are compiled into computer databases by Todd Engineers and made available to SVWD.

Water level contour maps are prepared for autumn and spring conditions for the regional Santa Margarita aquifer and for the

Lompico Formation; spring maps are presented in annual reports. Wells used to produce the Santa Margarita aquifer and the Lompico Formation water level contour maps are shown on Figure 5.

Pumpage. Pumpage is recorded daily for operating SVWD wells, and compiled on a monthly basis for management purposes. Available pumpage information from SLVWD is also compiled.

Groundwater Quality. Currently, groundwater quality samples are collected from SVWD wells in production and on standby as shown on Figure 5. These pumping wells are generally sampled semi-annually or more frequently if constituents of concern are detected.

Historically, analyses from over 80 wells are available in the database. Selected sites were originally sampled bi-monthly and analyzed for nitrate, chloride, and total dissolved solids (TDS). Due to the slow rate of change typical of groundwater quality and lack of significant regional trends, this program was revised in 1989 to focus on SVWD wells. Groundwater is sampled for the constituents required by Title 22, California Administrative Code, Chapter 15. Analyses include: general mineral, physical, inorganic, radiological, bacteriological, and regulated and unregulated organics. Since 1982 groundwater from the SVWD wells has also been analyzed for volatile organic compounds (VOCs).

Wastewater Outflows. Data are available from the City of Scotts Valley on wastewater outflow volumes and effluent quality; monthly flow data are compiled.

Recommendations

- The groundwater level and quality monitoring network is comprehensive and provides good areal coverage of Camp Evers and Scotts Valley. Accordingly it should be continued. Monitoring sites are relatively few and far between in the northern half of the study area and along the eastern margin; however, additional test or monitoring wells are planned for the latter area (see Figure 5).
- The quarterly groundwater level measurements should be coordinated so that they are conducted within a small time period, such as a week.
- Monitoring programs should be flexible and open to supplementary frequency and locations to document or understand site specific occurrences such as recharge rates or potential groundwater contamination.
- Data sharing with other agencies should continue and improve, and the processing of rainfall, evaporation, and streamflow data should be encouraged.

3.2 Groundwater Level Trends

Figure 6 depicts water level trends (hydrographs) for select wells in the vicinity of SVWD. The wells depicted on the figure are El Pueblo Well 7, Businessmen's Well 10, monitoring Well 13, Well 7A, and the Estrella well which is not within SVWD boundaries. Seasonal fluctuations can be seen in these curves, with higher water levels in late winter and spring and lower levels in summer and fall. It is apparent from the figure that water levels have been steadily declining since the mid-1980's. The sharpest decline has occurred in Businessmen's Well 10 in the Camp Evers area, where levels have dropped over 150 feet between 1985 and 1993. Water levels have been recovering in this well since January 1994 because pumpage has been shifted to other SVWD wells, particularly Well 7A. El Pueblo wellfield and Estrella well water level elevations have both dropped over 100 feet since 1987. These three wells are in developed portions of the basin while monitoring Well 13 (destroyed) and Well 7A are in the less developed northern area. Recent water levels in Well 7A have declined sharply due to a shift of pumpage from the developed areas (Camp Evers area) to Well 7A.

A bar graph on the bottom of Figure 6 indicates the monthly Scotts Valley rainfall measured at the El Pueblo Yard. Comparison of the bar graph with the water level hydrographs demonstrates that periods of high rainfall cause water levels to rise while, conversely, periods of low rainfall or drought result in declining water levels. Clearly, the drought that occurred from the mid-1980's to the early 1990's contributed to the declining water levels due to less recharge and increased pumpage. However, the 1992-1993 rainfall season was marked by rainfall of 50 inches or

125 percent of average. Although this rainfall resulted in seasonal recovery of water levels in wells, the longer term effect was only a moderation of the extent and severity of the area's localized water level declines. This indicates that in the past decade the predominant factor in groundwater levels in the Camp Evers and Scotts Valley Drive areas is groundwater pumpage and not recharge.

As documented in the 1993-1994 Water Resources Management Plan (Todd Engineers, June 1994), baseflows of Bean Creek showed a noticeable response to the increased rainfall of the 1992-1993 season, despite the continued groundwater level declines in the Camp Evers area. This suggests that the baseflow (as measured at the Mount Hermon crossing) is maintained primarily by groundwater inflow from the northern part of the basin. In the short term, the intensive pumpage in the Camp Evers area has resulted primarily in localized groundwater storage depletion and not in depletion of stream baseflows.

Increased pumpage, reduction of recharge, and drought conditions have resulted in groundwater declines since the mid-1980's and the subsequent repercussions listed below.

- Water levels have dropped below well screens causing some shallow wells to dry up.
- Well screens across upper aquifers (i.e. Santa Margarita aquifer) are exposed when the aquifer locally goes dry.
- Well efficiency decreases due to pumping groundwater from deeper and less permeable aquifers.

- Groundwater quality may decline as a result of extracting water from a deeper aquifer of poorer quality.

Previous reports by Todd Engineers have concluded that despite localized groundwater declines, the groundwater basin as a whole is not in overdraft. This was corroborated by an extensive regional groundwater study, Santa Margarita Ground-Water Basin Management Plan (Watkins-Johnson Environmental, Inc., September 1993). This investigation considered an area of 111 square miles in the San Lorenzo River watershed, focusing on Scotts Valley, and entailed development of a computerized groundwater model of the Santa Margarita, Monterey, and Lompico aquifers. The report states that the groundwater basin is not considered to be in overdraft, and concluded that the safe yield of the basin may be defined as maintenance of flow in Bean Creek. Although streamflows are quite low because of the past drought, the long-term safe yield has not been exceeded.

3.3 Perennial Yield and Groundwater Storage

The perennial yield is defined as the rate at which water can be withdrawn perennially under specified operating conditions without producing an undesired result (Todd, 1980). Perennial yield was estimated at about 4,200 acre-feet per year (AFY) for the area within the dotted line on Figure 1 (Todd Engineers, 1987). The area used for the 4,200 AFY estimate is approximately three times the area within SVWD boundaries. Note that a constraint on available groundwater is the quality of the water and the presence of contaminants in groundwater. Persistent contamination can not only limit the usable storage capacity of the aquifer and circumscribe areas of groundwater development, but also can adversely affect significant recharge areas. It should also be noted that perennial yield was estimated as an average annual value, and does not take into account annual or short-term variations in rainfall. Given the variability of rainfall and recharge in recent years, consideration should be given to a more detailed perennial yield study that would evaluate the effect of varied rainfall on groundwater recharge.

Figure 7 documents change in groundwater levels over the seven years between April 1986 and April 1993. Wells used to prepare the contour map are indicated with a solid black dot with a groundwater level change number by the well. The pattern of groundwater level decline is similar to annual water level declines depicted in Todd Engineers yearly management plan reports, although the magnitudes of the declines are greater. Minimal groundwater level changes have occurred throughout most of the area, with localized declines in the areas where flow converges into major pumping wells in the Scotts Valley Drive/El Pueblo area and Camp Evers area. Groundwater levels changes for the seven year period are on the order of 120 feet in the center of these depressions. Several minor isolated groundwater level changes have occurred outside these major depressions and are indicated but not contoured on the figure.

A storage volume change can be calculated by measuring the volumetric change in groundwater between April 1986 and April 1993. Assuming a storage coefficient of 0.12, the amount of storage depletion was approximately 4,152 acre-feet (AF) or an average of 593 AFY over the seven year period. A loss of 565 AF was calculated for the storage depletion between April 1993 and April 1994 (Todd Engineers, June 1994). Thus, approximately 500 to 600 AF have been lost from groundwater storage each year since the mid-1980's. It should be noted that this change in storage has been computed using a consistent methodology as in previous years. However, estimates of total groundwater storage and change in storage should be revised to take into account increased knowledge of the extent, depth, and storativity of the Lompico aquifer and to take into account the decline in some areas of groundwater levels from the Santa Margarita aquifer into the Lompico aquifer.

Available water stored in the Santa Margarita has been estimated at 43,460 AF (Todd Engineers, 1987). Previously, a slightly larger value was used, but was revised following improved mapping of water levels in the vicinity of the Grace Way monitoring well. Thus, using the groundwater storage depletion number calculated above (4,152 AF), approximately 9.6 percent of the total storage volume has been depleted between April 1986 and April 1993.

3.4 AMBAG Model

A proposed management plan for the Santa Margarita groundwater basin was developed by Watkins-Johnson Environmental, Inc. for the Association of Monterey Bay Area Governments (AMBAG) (Watkins-

Johnson Environmental, Inc., September 1993). The purpose of the plan was to coordinate users of the Santa Margarita groundwater basin, establish groundwater and streamflow resource management, and prevent groundwater pollution.

A major accomplishment of the plan was development of a groundwater flow model for the Santa Margarita basin. This model can be used to study the effects of possible future development and environmental stresses on the groundwater basin. The model area of 24.3 square miles encompasses the Santa Margarita aquifer and major portions of the Monterey and Lompico aquifers as depicted on Figure 1 (Watkins-Johnson Environmental, Inc., July 1993). The model is a modified version of MODFLOW, developed by the USGS and simulates groundwater flow in the three aquifers (three layers). The model was calibrated using 1986 water levels and verified with 1991 data.

Model Simulations. The model was used to study the four simulations listed below.

- 5 years additional drought (60 percent recharge) and 1992 pumping.
- 5 years normal recharge and 1992 pumping.
- 5 years normal recharge, 1992 pumping quantities with a shift of pumpage to Well 7A.
- 25 years drought (80 percent recharge), increased pumpage of wells in simulation above for the estimated population in 2015 (almost 30 percent increase from 1993).

Results of these simulations indicate that pumping and drought conditions have resulted in declining water levels and reduction of stream baseflow. Although the basin is not considered to be in overdraft, declining surface water quantities and future groundwater levels are a concern. The above scenarios also indicated that it would be advantageous to extract future groundwater from the Lompico aquifer rather than the Santa Margarita aquifer. The worst case simulation indicated that surface water flow would be substantially reduced and additional wells would need to be dispersed across the basin to support the estimated 2015 population due to a greater area of the Santa Margarita aquifer going dry.

Limitations. The MODFLOW program is widely used and accepted, and has been applied to the Santa Margarita basin with diligent regard for the considerable complexity of the groundwater basin. However, a model can only reflect data available at the time it was written. For example, the eastern boundary of the model was simulated as a groundwater divide between the Santa Margarita and Soquel-Aptos groundwater basins. However, the Lompico aquifer extends into the Soquel-Aptos basin in the area of Blackburn Gulch. To properly simulate the pumping of new wells in this area it may be necessary to revise the model by extending it to the east or changing the boundary conditions to reflect the possible influence of the adjoining groundwater basin.

General model limitations are listed in the Santa Margarita Groundwater Basin Management Plan report (Watkins-Johnson

Environmental, Inc., September 1993). These limitations include the problems inherent in the simplification, interpretation, and limited availability of field data. For instance, a single transmissivity value was used for the Lompico aquifer and a few average values of transmissivity were used for the Monterey aquifer. Future, more detailed transmissivity data could be incorporated into the model in the future, although the model would need to be recalibrated at that time.

Recent Simulations. Pre- and post-processor programs (MODEDIT and MODPOST) allow some modification of the program data packages, such as model timing for transient simulations, well locations and pumping rates, recharge rates, and solution criteria (i.e. how refined the solution will be). For example, the model can be used to simulate the effect of new wells or changing pumping rates of existing wells, various droughts, and/or changes in recharge.

Todd Engineers modified the program to run the four preliminary scenarios listed below.

- 6 years drought (60 percent recharge) and 1992 pumping.
- Same as above with one additional year of drought at 80 percent recharge.
- 5 years drought (80 percent recharge), drought pumping, 1986 starting heads, and Well 7A pumping at 32,000 cubic feet per day (ft^3/d).
- Same as above with estimated Lompico fault location simulated as a barrier.

Preliminary results indicate that the pumping of Well 7A at 32,000 ft^3/d (500 gallons per minute for 8 hours per day) did not appreciably increase drawdowns, although it is near the eastern edge of the model. Insufficient hydrogeologic data exist for this boundary; therefore the accuracy of the model response to pumping in this area is questionable. The simulated Lompico fault caused water levels to deepen on the southeast side of the fault resulting in greater groundwater drawdowns in the El Pueblo area.

In summation, the model can be used to observe effects of proposed well locations and pumping configurations, consequently aiding in optimization of the distribution of pumping. The model also would be useful in regional assessment of proposed replenishment or recharge projects. The AMBAG model is not designed for contaminant transport; nonetheless a program called MT3D, developed by S.S. Papadopulos & Associates, Inc. can be used to model migration of dissolved substances in groundwater. MT3D utilizes MODFLOW groundwater level output and simulates contaminant transport taking into account advection, dispersion, and chemical reactions. Other codes, such as MODPATH and PATH3D, are designed for three dimensional particle tracking and can use groundwater levels from MODFLOW. These model codes can be used to track a contaminant "particle" back to its source or forward in time to a future position. The usefulness of these programs is limited to the availability and reliability of the hydrogeologic and chemical data for the area of interest.

Recommendations

- When additional hydrogeologic data become available, modifications to the basic model should be made, such as simulation of the presence of a fault in the Lompico formation northwest of the El Pueblo well field.
- Future model revisions should extend the model eastward to more accurately simulate the effects of pumping wells in that area.
- Current production data should be incorporated into the model.

3.5 Pumpage

The localized decline of groundwater levels raises concern about overall groundwater supply and the risk of overdraft. Previous groundwater studies conducted for SVWD have indicated that the groundwater basin is not in overdraft. This conclusion also was reached by the recent Santa Margarita aquifer study sponsored by AMBAG. However, this study rightly noted the need to update the amount of groundwater use. Accordingly, this section summarizes the updated inventory of wells and amount of groundwater production, and discusses groundwater consumption.

Well Inventory. The well inventory has been updated recently, as summarized in the 1994 annual report for the Water Resources Management Plan (Todd Engineers, 1994). This inventory was based largely on water well drillers' reports filed with the DWR. Accordingly, it provides only an approximation of wells currently in use. The actual number of wells could be greater, because water well drillers' reports may not have been filed for all wells. Conversely, the number of wells in use could be smaller, because information on abandonment of wells is lacking.

Review of the database, which includes wells drilled as early as the 1950's, indicates that well drilling activities peaked in the 1970's and have since declined. In the 1970's, well drillers' reports were filed for production wells at rates exceeding 20 per year. During the 1980's and early 1990's, these rates declined to less than 10 per year.

The inventory indicates that over 400 known wells have been drilled in the Scotts Valley groundwater basin in addition to the numerous (over 70) monitor wells drilled at the Watkins-Johnson site. Of the 400, approximately 260 wells have been drilled for domestic purposes. Other use categories include wells drilled for municipal supply, landscape irrigation, industrial and commercial purposes, and groundwater remediation.

Groundwater Pumpage. Actual groundwater production data are available only for SVWD, SLVWD, Mount Hermon water system, and Watkins-Johnson remedial wells. Mount Hermon's groundwater production from both springs and wells amounted to 145 AF in 1993 (R. Jones, personal communication). The remedial pumpage amounts to about 200 AFY (Watkins-Johnson, Environmental, Inc., 1994). Historic groundwater production by the two districts is illustrated on Figure 8.

Data are available for SVWD from 1976 to present; note that groundwater pumpage in 1980 was estimated because of meter failure in that year. SLVWD data currently are being processed into an easily accessible, computerized form; and are available from 1987 to present. As indicated, SVWD groundwater pumpage increased 2.6 times from 537 AFY in 1979 to 1,400 AFY in 1989. However, in recent years, the rate of increase has slowed. In 1993, SVWD groundwater pumpage amounted to 1,505 AF.

SLVWD operates three well fields, including two in the Scotts Valley groundwater basin--the Olympia well field located near Zayante Creek and the southern wells, notably the Pasatiempo wells near Graham Hill Road. The third well field, Quail Hollow, was not considered here. As shown on Figure 8, groundwater pumpage by SLVWD from the Olympia and Pasatiempo wells during the past seven years has been fairly steady, averaging 675 AFY. In water year 1993, SLVWD pumpage was 645 AF, including about 335 AF from Olympia and 310 AF from Pasatiempo.

The remaining groundwater producers do not meter their wells. Accordingly, their pumpage can only be estimated. Previous estimates of pumpage were made for the AMBAG model (Watkins-Johnson Environmental, Inc., September 1993), and by Jacobvitz (1987), Todd Engineers (1987), and Luhdorff & Scalmanini (April 1984).

A significant amount of groundwater is pumped from the Scotts Valley groundwater basin by private well owners for landscaping purposes, including irrigation and maintenance of decorative ponds. Major landscaped areas include Valley Gardens golf course and the landscaped commons of the Montevalle, Spring Lakes, and Vista del Lago residential developments. Of these, only Montevalle is located within SVWD boundaries; the others are located along the southern boundary. Other large landscaped areas, notably the new Borland campus, are supplied with SVWD water. As an indication, meters for the Borland site indicate water use of 38 AF from June 24, 1993 to May 5, 1994, or an estimated annual use of about 45 AF. Estimates of landscaping use for each of the other properties have ranged as high as 196 AFY (Todd Engineers, 1987). Accordingly, a rough estimate of 125 AFY for each of the four major landscapers was assumed, for a total of 500 AFY.

The Scotts Valley groundwater basin is also tapped by a number of privately owned water purveyors, listed below in Table 2 along with their number of connections.

Table 2
Private Water Purveyors

Water System	Number of Connections
Mount Hermon	462
Spring Lakes	223
Vista del Lago	202
Manana Woods	118
Mission Springs	100
Fern Grove Club	69
Hidden Meadows	11
Spring Brook Park	11
Fern Brook	9

As noted previously, water production is metered by Mount Hermon for its 462 connections and conference facility, and amounts to 145 AFY. Groundwater production for the remaining water purveyors was estimated by applying groundwater pumpage factors to the number of connections. Based on the SVWD average groundwater production factor of 0.32 AFY per connection (288 gallons per day per connection), (J. Sansing personal communication), an approximate factor of 0.3 AFY per connection was assumed for most of the private purveyors (Manana Woods, Mission Springs, Fern Grove Club, Hidden Meadows, Spring Brook Park, and Fern Brook). Accordingly, the estimated total groundwater pumpage of these purveyors for their 318 connections is approximately 95 AFY (0.3 AFY per connection x 318 connections).

The Spring Lakes and Vista del Lago developments consist of relatively densely-spaced pre-fabricated homes with minimal individual landscaping. Accordingly, a pumpage factor of 0.15 AFY per connection was assumed, resulting in an estimated groundwater demand of 64 AFY (0.15 AFY per connection x 425 connections). However, in 1993 SLVWD supplied about 47 AF to the two water systems. For simplicity's sake and to avoid double-counting, this amount was assumed to be applied to domestic use. Consequently, groundwater pumpage in 1993 for domestic use by Spring Lakes and Vista del Lago is computed as 17 AF, or about 15 AF. Groundwater pumpage for their landscaped common areas was accounted for in the previous section.

In sum, total groundwater pumpage by the private water purveyors is estimated to be 255 AFY, including 145 AFY for Mount Hermon, 15 AF for Spring Lakes and Vista del Lago (not including landscaping or the SLVWD contribution), and 95 AFY for the remaining purveyors.

The updated well inventory indicates the existence of about 260 domestic wells in the Scotts Valley groundwater basin. It is assumed that most of these wells serve a single household with landscaping. Accordingly, assumption of the groundwater pumpage factor of 0.3 AFY yields a total estimated pumpage of approximately 80 AFY. Little of this pumpage occurs within SVWD boundaries.

Of the local industrial and commercial groundwater users, the largest is Kaiser Sand and Gravel. Previous estimates of Kaiser's groundwater pumpage has ranged from 106 AFY (Jacobvitz, 1987) to 268 AFY (Todd Engineers, 1987), with a more recent estimate of 200 AFY (Watkins-Johnson Environmental, Inc., September 1993). For this study, an approximate pumpage of 200 AFY was assumed for Kaiser.

Other industrial and commercial groundwater pumpers include such disparate businesses as food processing companies, lumber yards, computer-related fabrication plants, and retail stores. With such various activities, groundwater pumpage by each business could range from less than one AFY for a small business using the well for domestic purposes to 40 AFY (Jacobvitz, 1987). Less than 15 current small industrial/commercial well owners are known. Assuming an average groundwater pumpage of 5 AFY, the approximate total pumpage is 75 AFY, most of which occurs within SVWD bounds.

The groundwater pumpage by the Silverking aquaculture enterprise amounts to an additional 66 AFY (Watkins-Johnson, Environmental, Inc., September 1993) However, this pumpage represents essentially a groundwater diversion near the outlet of the basin with minimal consumption. Accordingly, it is not included in the sum of groundwater pumpage.

Groundwater production estimates are summarized in Table 3 and on Figure 9, along with the 1993 pumpage totals for SVWD, SLVWD, Mount Hermon, and Watkins-Johnson remediation. It should noted that this pumpage is summarized for the Scotts Valley groundwater basin, as defined for the Scotts Valley Water Resources Management Plan (see Figure 1). Pumpage occurring within SVWD boundaries amounts to about 1,880 AFY and includes pumpage by SVWD itself, Montevalle landscaping use, Watkins-Johnson remedial pumpage, and most of the other commercial/industrial pumpage.

Table 3
Current Groundwater Pumpage, AFY
Scotts Valley Groundwater Basin

Municipal	
SVWD	1,505
SLVWD	645
Major Landscapers	500
Water Purveyors	255
Domestic	80
Watkins-Johnson Remedial	200
Kaiser Sand & Gravel	200
Other Industrial/Commercial	75
Total Estimated Pumpage	3,460

Summary of Pumpage. Approximately 3,460 AFY of groundwater are currently being pumped from the Scotts Valley groundwater basin. Of this amount, 2,495 AFY or 72 percent is metered by SVWD, SLVWD, Mount Hermon, and Watkins-Johnson. The remainder is estimated and subject to correction. Measurement of production by only six additional groundwater producers (Montevalle, Valley

Gardens, Spring Lakes, Vista del Lago, Manana Woods, and Kaiser) would result in compilation of reliable data for over 90 percent of total pumpage.

This gross pumpage value does not account for return flows. Return flows represent pumped groundwater that is returned to recharge the groundwater basin. They include percolation from landscaping ponds and irrigation, leakage from water supply pipelines, and percolation from septic systems. In addition to return flows, gross pumpage also includes actual groundwater consumption, which results from evaporation and transpiration, wastewater export to the ocean outfall, and possibly through overflow of groundwater-supplied decorative ponds and waterways to streams leaving the groundwater basin. At this time, insufficient data are available to assess return flows and actual groundwater consumption. However, a preliminary review of return flows suggests that consumptive groundwater use probably is on the order of 60 to 70 percent of gross pumpage or 2,000 to 2,800 AFY. Accordingly, groundwater consumption is on the order of 50 to 65 percent of the perennial yield of 4,200 AFY.

The estimated total pumpage of 3,460 AFY amounts to over 80 percent of the estimated perennial yield of 4,200 AFY for the Scotts Valley groundwater basin. Even accounting for return flows, the groundwater pumpage and consumption represents a substantial portion of the perennial yield. As will be discussed in greater detail in later sections, successful maintenance of this groundwater production into the future will require intensive management of the water resources of the entire groundwater basin.

Groundwater pumpage currently is focused on a small portion of the groundwater basin. Pumpage within SVWD boundaries amounts to about 1,900 AFY, including production by SVWD, Montevalle, Watkins-Johnson, and other industrial/commercial firms. In the contiguous areas bounding SVWD on the southwest, an additional 1,100 AFY is pumped by SLVWD, landscape irrigators, water purveyors, and Kaiser. Thus, 3,000 AFY or about 87 percent of the groundwater pumpage is being produced from the southeast one-quarter of the groundwater basin. Not surprisingly, these areas of focused pumpage coincide with localized groundwater level declines.

It should be acknowledged that SVWD has and is making a considerable effort toward redistribution of its pumpage out of the localized areas of groundwater decline. However, the efforts of a single, albeit major, pumper to redistribute pumpage will not be sufficient to mitigate the groundwater level declines. Current SVWD efforts should be supplemented by additional actions of SVWD and other major local groundwater producers to reduce or redistribute pumpage, to minimize groundwater losses from the basin, or to initiate groundwater replenishment programs.

Recommendations

- The well inventory should be maintained and updated periodically.

- Information on pumpage by SVWD and SLVWD should be compiled regularly, with periodic compilation of production data from Mount Hermon and Watkins-Johnson.
- The amount of groundwater production should be measured for the larger groundwater users including Montevalle, Valley Gardens, Spring Lakes, Vista del Lago, Manana Woods, and Kaiser.
- An analysis should be made of return flows and consumptive use of groundwater in the basin.
- SVWD should continue its efforts to redistribute its pumpage throughout its service area to mitigate localized impacts of pumpage.
- Roundtable meetings should be convened by the major groundwater producers in Scotts Valley to discuss various means to analyze and mitigate groundwater level decline problems in the Camp Evers - Lockewood Lane - Mount Hermon area. Such means could include redistribution of pumpage, groundwater replenishment projects, minimization of outflows through the Camp Evers tributary, construction of interties among water systems, determination of operational groundwater levels ("target levels"), and development of joint drought contingency plans.

3.6 Replenishment of Groundwater

SVWD has sponsored or participated in a number of studies involving groundwater replenishment. These have included consideration of treated groundwater, reclaimed wastewater, and local surface water as potential sources for groundwater recharge or irrigation use. No projects have yet been implemented because of regulatory or economic constraints. Nonetheless, groundwater replenishment remains an important management method to mitigate groundwater pumpage impacts and to ensure long-term groundwater supply. Accordingly, this section presents a re-evaluation of previous replenishment studies and an update of the potential for wastewater recycling.

Review of Previous Studies. In the early 1970's treated sewage effluent was being recycled in Scotts Valley for various uses. As part of this wastewater reuse effort, a study was conducted to evaluate percolation rates at Skypark Airport (Lowney, 1973). Nine percolation pits were drilled with a bucket auger rig to depths ranging from 28 to 55 feet. Two percolation tests were conducted and measured percolation rates were 0.67 feet/day for a seven foot deep pit with an average head of 1.3 feet and 13.4 feet/day for a 40 foot deep pit with an average head of 35 feet.

A 1974 study completed by Harding Lawson described the disposal of treated effluent to the Kaiser sand pit and Skypark Airport, and its use for irrigation at Valley Gardens golf course and other sites. At the time, the approximate treatment plant capacity was 100,000 gallons per day (gpd) with plans to expand to 400,000 gpd. The increased flow was to be discharged to Kaiser sand pit. Hydraulic conductivity values estimated for the Santa

Margarita sandstone in the vicinity of Kaiser sand pit ranged from 0.0016 to 0.16 feet/day. The estimated groundwater flow direction was northward from the sand pit towards Bean Creek.

A nitrate pollution study conducted in 1984 described the use of treated wastewater for irrigation at Valley Gardens golf course and discharge to Kaiser sand pit and Skypark (Luhdorff & Scalmanini, September 1984). Regulations adopted by the Regional Water Quality Control Board (RWQCB) in 1976 limited the quantity of wastewater disposal to 400,000 gpd at Kaiser and 80,000 gpd at Skypark. In 1978, the RWQCB adopted an order to stop wastewater disposal at Skypark in 1979 and at Kaiser upon completion of the Santa Cruz outfall in 1981. Average wastewater discharge rates were estimated to be 144,000 to 288,000 gpd for Kaiser sand pit for the period 1974 to 1975. Discharge rates at Skypark were unknown and essentially terminated by 1976. Treated wastewater also was sold to Scotts Valley Intermediate School and the California Department of Transportation for landscaping, and to construction companies for dust control. It was estimated that 12 to 95 AFY of treated wastewater were used for landscape irrigation and construction between 1981 and 1983.

In 1988, SVWD retained Todd Engineers to evaluate water reuse options for the Watkins-Johnson remediation system. Watkins-Johnson was pumping 250 gpm on a continuous basis and discharging most of the treated water to Bean Creek. Five alternatives under consideration for this study were artificial recharge, landscape irrigation, an upgradient injection barrier, a perimeter injection barrier, and reuse at the fish hatchery. Options for artificial recharge included seasonal recharge through SVWD wells, surface recharge in Carbonera Creek channel, and year-round recharge in dedicated wells. Landscape irrigation options included four private organizations in the Camp Evers area, and a planned golf course in the Glenwood area. An evaluation of feasibility, costs, and benefits showed that the best alternative was to combine surface recharge of Carbonera Creek during dry months with recharge through SVWD wells during wet months.

In 1989, SVWD retained Todd Engineers to evaluate water recycling and conservation measures. Artificial recharge was considered from three sources: urban runoff, streamflow, and treated wastewater. The primary concern regarding urban runoff is water quality; therefore, this study proposed to use runoff only from residential and public land uses. It was estimated that 1,160 to 2,150 AFY of runoff was potentially available, although only a portion of this total could realistically be conserved. Streamflow was initially considered from both Bean and Carbonera Creeks. However Bean Creek was subsequently eliminated as a source of water due to high pumping lifts and potential environmental impacts. It was estimated that 4,335 AFY was potentially available from Carbonera Creek, although recharge rates and other factors limit the actual amount that can be retained. The recharge capability of the existing channel was estimated to be 176 AFY, with a potential increase to 312 AFY through construction of check dams. Estimates indicated that off-stream spreading basins could recharge an additional 616 to 1,267 AFY of Carbonera Creek streamflow.

The quantity of treated wastewater available in 1988 was estimated to be 754 AFY. At that time only 100 AFY were being reused for golf course irrigation. Water quality is the primary concern for utilization of treated wastewater in artificial recharge, and its reuse for artificial recharge could require abandonment of water supply wells adjacent to a proposed recharge facility.

Four specific projects were considered in detail in the 1989 study for artificial recharge of surface water and treated wastewater: Whispering Pines, Valley Gardens golf course, Skypark Airport, and Carbonera Creek channel. Whispering Pines appeared to be the best site, and involved shallow spreading basins to obtain 1,750 AFY of recharge with a net wetted area of nine acres. This site has since been developed for commercial purposes. Skypark Airport also appeared to be a good site, with 590 to 980 AFY of water potentially being recharged over a net wetted area of four acres. This recharge estimate for Skypark was based on diversion of Carbonera Creek flows as the primary source water. The Carbonera Creek channel was suggested as another artificial recharge area with good potential. The evaluation of Valley Gardens golf course indicated poor potential for use in artificial recharge.

Todd Engineers conducted a very brief assessment in 1990 of recharge characteristics for a parcel located adjacent to Well 11 on Scotts Valley Drive at El Pueblo Road. This site encompassed an abandoned sand quarry and included approximately five acres of level ground. In addition, a small unnamed channel, draining a watershed of approximately 45 acres, crosses the site and flows into Carbonera Creek. The site is underlain by permeable soils and the Santa Margarita sandstone. Potential recharge projects included check dams in the unnamed channel and percolation in the sand pit.

In 1990, SVWD requested that Todd Engineers evaluate potential artificial recharge basins at Skypark in more detail. Three possible conceptual designs were considered: a seasonal recharge basin, a perennial landscaping pond, and a dedicated recharge basin. The source of water would be local runoff diverted from the adjacent Dufours Tributary. A seasonal recharge basin was envisioned near the center of the site with potential to recharge approximately 120 AFY over a net wetted area of two acres. This seasonal recharge basin could serve as a softball field during the dry season. Alternatively, the basin could serve as a perennial landscaping pond if wet season runoff were supplemented by reclaimed wastewater/surface water during the dry season. A perennial pond would be capable of considerably more recharge than a seasonal facility. The third design involved a two-acre dedicated recharge basin along the eastern property line. Local runoff during the wet season would be supplemented by reclaimed wastewater during the dry season. Conclusions of this study indicated that artificial recharge at Skypark would not directly increase potable groundwater supplies to SVWD wells because of groundwater flow patterns at the time. However, such recharge would mitigate impacts of urbanization on groundwater and Bean Creek streamflow. Furthermore, recharge at this site could help mitigate future increased pumpage in other areas of the basin.

Again in 1991, SVWD retained Todd Engineers to evaluate alternative methods of artificial recharge at Skypark. Other options besides spreading basins included modification of landscaping and infiltration trenches. Preliminary analyses indicated that considerably less recharge would be achieved by landscape modification or infiltration trenches compared to spreading basins. However, spreading basins would require considerably more land for construction.

Current and Future Status of Wastewater Treatment. The Scotts Valley wastewater treatment plant (WWTP) currently meets secondary discharge requirements. The treatment process includes organics removal, aeration/oxidation, and disinfection. Effluent from the plant is presently piped to Santa Cruz for discharge to the ocean. The average effluent volume is approximately 0.8 million gallons per day (mgd). The flow process includes an influent pumping station, aeration tank, secondary clarifier, and chlorine contact tank.

Future plans for the wastewater treatment plant would increase capacity to 1.5 mgd. In addition, expansion plans will upgrade the treatment process to meet secondary reclamation requirements. The treatment process would include additional disinfection needed for wastewater recycling (S. Hamby, personal communication). This water could be reused for construction activities, irrigation, or blended for surface recharge basins (up to 20 percent of total source water). Facilities to be added or expanded upon include a new influent pumping station with mechanical barscreens, a new flow equalization structure, an additional secondary clarifier, modifications to the aeration tank, expansion of the chlorine contact tank, and expansion of the laboratory and buildings.

Additional funding is currently being pursued to add facilities necessary to achieve tertiary treatment standards. AMBAG is considering a feasibility study of costs and benefits for tertiary treatment of wastewater at the WWTP. In addition, an application was filed in 1993 with the State Water Resources Control Board to obtain funding for tertiary treatment. The WWTP was subsequently notified in 1994 that they have been placed on the state priority list for such funding.

Potential Replenishment Projects. Potential replenishment projects can be grouped into two categories:

- Indirect or in-lieu replenishment involving use of non-potable water for industrial/dust control or landscaping purposes, or
- Direct artificial recharge.

The indirect or in-lieu replenishment projects result in conservation of groundwater for potable use by satisfying industrial or irrigation water demands with untreated surface water or reclaimed wastewater in lieu of groundwater. Water for industrial uses could be supplied by secondary reclaimed wastewater, but the quantity conserved in Scotts Valley would likely be small. Water for irrigation and landscaping may also be supplied by secondary reclaimed wastewater in place of groundwater.

Water for direct artificial recharge may be supplied by streamflow or reclaimed wastewater. Direct recharge of wastewater is highly regulated and constrained to protect public health. Current draft regulations for artificial recharge of reclaimed wastewater are shown in Table 4. For example, wastewater must account for less than 50 percent (with tertiary treatment including filtration) or 20 percent (with secondary treatment) of the total recharged water recovered in a well. In addition, nearby production wells within 500 to 2,000 feet of a recharge site may have to be abandoned as drinking water sources.

Specific potential sources of replenishment water include the following:

- Streamflow from Bean Creek,
- Streamflow from Carbonera Creek,
- Reclaimed wastewater,
- Local streamflow, and
- Watkins-Johnson remedial pumpage.

Bean Creek was eliminated as a source due to its sensitivity as a year-round fish and wildlife habitat. Watkins-Johnson was eliminated as a potential source because it is already being reused for other purposes. Therefore, the primary sources of water are Carbonera Creek (only during the wet season), reclaimed wastewater

TABLE 4
MINIMUM TREATMENT AND RECHARGE REQUIREMENTS FOR WASTEWATER RECYCLING

RECHARGE METHOD:	SURFACE SPREADING				DIRECT INJECTION
PROJECT CATEGORY:	I	II	III	IV	V
Maximum % reclaimed water in extracted groundwater	50	20	20	20	50
Depth to groundwater (feet) Initial percolation rate:					
<0.20 inches/minute	10	10	20	50	NA
<0.33 inches/minute	20	20	50	100	NA
Underground retention time (months)	6	6	12	12	12
Horizontal separation* (feet)	500	500	1000	1000	2000
Level of treatment:					
Oxidation	X	X	X	X	X
Filtration	X	X			X
Organics removal	X				X
Disinfection**	X	X	X		X

* From edge of recharge/spreading operation to nearest domestic supply well.

** Disinfection level varies.

REF: Proposed Title 22 Groundwater Recharge Regulations (year-round), and local streamflow (only during the wet season).

Chemical analyses of water from Carbonera Creek evaluated in previous studies indicate that it is probably of satisfactory quality. Evaluation and correlation of streamflow data indicate that the average annual Carbonera Creek streamflow quantity is approximately 4,000 AFY. Reclaimed wastewater is currently discharged at a rate of approximately 900 AFY and meets secondary discharge (water quality) requirements. Local streamflow is derived primarily from residential area runoff. No water quality analyses are available, and thus the quality for recharge is unknown. The initial major storms of the wet season tend to result in the poorest runoff water quality and would not be retained for artificial recharge purposes. However, water from subsequent storms typically is of higher quality and probably would be suitable for recharge. The total quantity of local streamflow is estimated to be 1,200 to 2,200 AFY, although only a fraction could potentially be retained for recharge due to its flashy nature.

Based upon our review of previous studies and an assessment of the current conditions in Scotts Valley, the following potential projects were identified:

(1) Skypark basins,

(2) Carbonera Creek check dams,

(3) El Pueblo recharge wells,

(4) Kaiser sand pit,

(5) Bergstrom Cliffs check dams/El Pueblo sand pit, and

(6) Valley Gardens golf course irrigation.

The preliminary replenishment projects are summarized in Table 5 and described in the paragraphs below.

(1) Skypark basins.

Skypark, slated for residential development in the near future, is one of few large flat parcels that are suitable for artificial recharge. Based upon a review of various options, it is proposed that two recharge basins be built. One basin would be located near the center of the site and dedicated to year-round recharge. The source of water during the rainy season would be local runoff generated within the new development and local streamflow diverted from the adjacent Dufuors tributary. Reclaimed wastewater could be recharged during the dry season. A second seasonal recharge basin would be located along the eastern boundary of the site. The source of water for this basin would be local runoff and streamflow.

Estimates of the quantity of recharge at Skypark were based on the following assumptions: a conservative percolation rate of 1 foot/day, a wetted area of two acres for each basin, a fully wetted basin for 60 days during the rainy season, and 20 percent wastewater usage in the dedicated basin. These assumptions yield estimates of 120 AFY for the seasonal basin and 170 AFY for the dedicated basin, for a total potential recharge of 290 AFY. This estimate of potential recharge is lower than previous estimates, which assumed Carbonera Creek streamflow would serve as a source of recharge water for Skypark.

The estimates of recharge should be compared to the estimated

TABLE 5
SUMMARY OF GROUNDWATER REPLENISHMENT ALTERNATIVES

GROUNDWATER REPLENISHMENT ALTERNATIVE	SOURCE WATER TYPE/ MAXIMUM QUANTITY	QUALITY OF SOURCE WATER	EXPECTED RECHARGE QUANTITY	COMMENTS	POTENTIAL FOR RECOVERY
Skypark Basins	Local Streamflow/280 to 495 AFY	Unknown	Less Than 200 AFY	Not compatible with Kaiser, basin siting critical.	Wells 9 and 10
	20% Reclaimed Wastewater/56 to 99 AFY	Secondary Treatment			
Carbonera Creek Check Dams	Carbonera Streamflow/4,300 AFY	Satisfactory	Less than 100 AFY	Narrowing channel since 1980's.	Well 11 and El Pueblo
El Pueblo Recharge Wells	Carbonera Streamflow/4,300 AFY	Treatment Necessary	Unknown	Requires upgrade of treatment facility.	Well 11 or El Pueblo
Kaiser Sand Pit	Local Streamflow/280 to 495 AFY	Unknown	200 AFY	Not compatible with Skypark, outside SVWD boundaries, large storage capacity.	New recovery well or Well 10
	20% Reclaimed Wastewater/56 to 99 AFY	Secondary Treatment			
Bergstrom Cliffs/ El Pueblo Sand Pit	Local Streamflow/30 AFY	Unknown	20 to 30 AFY	Check dams may alleviate flooding problems.	Well 11 and El Pueblo
	Carbonera Streamflow/4,300 AFY	Satisfactory	270 AFY		
Valley Gardens Golf Course Irrigation	Reclaimed Wastewater/up to 900 AFY	Secondary Treatment	100 AFY	Replaces groundwater pumpage, potential impact on Well 10.	NA

Notes:
AFY=Acre-feet per year
NA=Not Applicable

quantity of available water. Local streamflow generated from a portion of Camp Evers and central Scotts Valley amount to 280 to 495 AFY, although only a portion of this amount may realistically be retained for recharge. In addition, a portion of local streamflow generated from runoff within the future Skypark development could also be retained. The amount of recharge actually achieved will depend on stream discharge and duration, size of diversion works, and available storage and recharge rate in the basins. Reclaimed wastewater also could be available for recharge, amounting to 20 percent of retained streamflow. Based on the limited quantity of local recharge water that realistically can be diverted, it is estimated that the amount of water that can be percolated at Skypark probably is 200 AFY or less.

A portion of recharged water at Skypark may be recovered with Wells 9 and 10. Some of the recharged water would also flow towards the Watkins-Johnson pumping depression and Bean Creek. Alternately, a new recovery well could be sited northwest of Skypark. Basin siting will be crucial at Skypark to maintain an acceptable distance from recovery wells (due to recharge of reclaimed wastewater), while still allowing for recovery of an acceptable portion of recharged water.

(2) Carbonera Creek check dams.

Carbonera Creek channel consists of alluvium overlying the Santa Margarita sandstone along a 3,700 foot stretch between Highway 17 and Bob Jones Lane. The creek flows generally from October through June with an average annual discharge of approximately 4,300 AFY.

The average annual flow during the past eight water years from October 1, 1985 to September 30, 1993 was approximately 2,750 AFY. These recent flows have been below average due to drought. Average annual recharge in the existing stream channel was previously estimated to be 176 AFY. Previous studies also indicated that modification of the channel with three check dams could increase recharge in the channel by an additional 136 AFY.

Based upon a May 1994 preliminary survey of stream characteristics, suitable locations for check dams exist between Carbonera Way and Bob Jones Lane. However, the morphology of the channel has changed significantly in recent years with a build-up of rather large, vegetated sand/silt bars. This has reduced the wetted channel area and likely has caused a reduction in natural stream recharge. Accordingly, the previous estimates of recharge using check dams also would need to be reduced. It is now estimated that the amount of recharge to be gained by three check dams is less than 100 AFY unless the channel is scraped out. A vacant parcel at the Carbonera Way crossing should be considered as a potential site for an off-stream spreading basin.

Recharged water could be recovered by Well 11 and the El Pueblo well field. However, the impact of contaminants in groundwater locally should be considered.

(3) El Pueblo recharge wells.

Recharge wells inject water directly into the aquifer, and thus require high quality source water, such as treated surface water or tertiary treated wastewater. Wastewater can constitute only up to

50 percent of recharged water, so an additional source of high quality water is needed for blending (see Table 4). A source of high quality recharge water would be available if Carbonera Creek water could be diverted to the water treatment facility at El Pueblo well field. However, the treatment facility would likely have to be upgraded to handle a higher capacity of water and to filter sediment.

Carbonera Creek water could be diverted by imbedding a perforated diversion pipe several feet below the channel bed. This would allow some natural filtration to occur through the sand in the channel bed. The creek water would then flow through the pipeline to the El Pueblo treatment facility. Following treatment, the water could be injected into Well 3A, Well 7 or a new injection well, and subsequently extracted through Well 11. The quantity of recharged water would be dependent upon available flow in Carbonera Creek, the capacity of diversion, transmission, and treatment facilities, and recharge capacity of the injection well.

(4) Kaiser sand pit.

Kaiser sand pit previously served as a recharge/disposal site for treated wastewater in the 1970's and early 1980's. In 1974, the majority of the wastewater treatment plant capacity of 100,000 gpd was disposed of at Kaiser sand pit. A 1974 study (Harding Lawson Associates, 1974) indicated that as much as 400,000 gpd (or 450 AFY) of reclaimed wastewater could be disposed of in the sand pit.

The sources of water are the same as those for Skypark. As with Skypark, the use of reclaimed wastewater would require a second source of water for blending. It is anticipated that local streamflow (amounting to 280 to 495 AFY) could serve as the other source of water unless it is diverted for other uses (such as Skypark). Based upon the available sources of water, it is estimated that the total quantity of recharge in Kaiser sand pit would potentially be greater than at Skypark because of the greater storage available in the sand pit. It is estimated to be approximately 200 AFY.

Although this site is located outside SVWD boundaries, a significant portion of recharged groundwater could be expected to flow north into SVWD boundaries. A portion of recharged water could potentially be recovered by Well 10 or a new recovery well located northwest of Well 10. Some recharged water would also be expected to flow toward Bean Creek.

(5) Bergstrom Cliffs check dams/El Pueblo sand pit. This site includes a small drainage watershed of about 45 acres and a relatively flat quarried area on Scotts Valley Drive at El Pueblo Road. It is estimated that an annual average runoff of 30 AFY would be available from the watershed. Check dams could be constructed along the drainage to retain water and percolate it into the permeable, underlying Santa Margarita sandstone. It is likely that much of the 30 AFY could be recharged.

A second phase of this project could involve construction of a three acre recharge basin, receiving water diverted from Carbonera Creek. Assuming the basin could remain wetted for 90 days per year with a conservative percolation rate of one foot per day yields a recharge quantity of 270 AFY. Recovery of the recharged water would be achieved through Wells 11, 3A, or 7. Wastewater recharge was not considered, as it would entail abandonment of Well 11 as a drinking water source.

(6) Valley Gardens golf course irrigation.
Valley Gardens golf course consists of 33 acres including 1.5 acres of ponds and waterways. Groundwater is currently pumped into the ponds, which also serve as storage for irrigation water. A large portion of the irrigation needs of the golf course could be met with reclaimed wastewater. Valley Gardens has previously used on the order of 100 AFY of reclaimed wastewater for irrigation purposes. This conservation measure would indirectly benefit the water table by reducing pumpage in Valley Gardens' well. In addition, nearby residential developments with landscaped commons (i.e. Vista del Lago, Spring Lakes) may offer potential for irrigation with reclaimed wastewater. However, potential impacts on Well 10 would have to be considered.

Mitigation of Pumpage Impacts. In summation, groundwater storage declines in recent years have been on the order of 500 to 600 AFY. These declines are localized in the Camp Evers and Scotts Valley Drive areas, and reflect intensive pumpage from major municipal and private wells. Recovery of groundwater levels in these areas probably will require not only redistribution of groundwater production, but also increased conservation of water and active replenishment. Given the complexity of the local hydrogeologic setting, such active groundwater management will need to be based on a comprehensive, but detailed understanding of the local hydrogeology.

As indicated, alternatives exist for mitigation of the pumpage impacts in the Camp Evers and Scotts Valley Drive areas. It is likely that more than one replenishment project would be needed to offset the groundwater declines of 500 to 600 AFY experienced in recent years. Additional management, conservation, and replenishment efforts would be needed to provide for any additional increase in local water demands.

Replenishment projects can entail significant costs, and for that reason should be planned and implemented in the context of basin-wide water resource management and in coordination with SLVWD, Santa Cruz County, and other major groundwater users. This is particularly true in the Camp Evers area. Replenishment projects also should be supplemented with continued efforts to encourage conservation measures (such as low flow plumbing fixtures and drought resistant vegetation) and efforts to encourage wastewater reclamation and recycling.

Recommendations

- More than one project should be considered to mitigate local impacts of groundwater pumpage and to ensure long-term groundwater supply.

- Each project described in this section has been presented in a preliminary and conceptual manner. More detailed investigations would need to be carried out to further evaluate the proposed projects. Additional studies should include:
  1) The discharge of the Camp Evers tributary of Carbonera Creek should be measured periodically to determine this flow out of the basin. The contribution of landscaping ponds and waterways to this outflow should be assessed. If the contribution is significant, SVWD and SLVWD should encourage local landscaping entities to develop a joint landscaping water management plan, including determination and implementation of measures to mitigate this loss of water.
  2) Field work to evaluate subsurface stratigraphy, percolation rates, stream discharge/duration, and water quality.
  3) Computer modeling to evaluate mounding effects, subsurface retention times, and the ultimate destination of water originating from recharge facilities.
  4) Cost/benefit analysis to evaluate the actual cost per acre-foot of recharge water.
  5) Assessment of environmental impacts.
- All projects discussed in this section warrant further consideration, in addition to others that may be proposed.
- Replenishment projects should be planned and implemented in

the context of basin-wide groundwater resource management, and coordinated when appropriate with SLVWD, Santa Cruz County, and major groundwater producers.

- SVWD, SLVWD and other groundwater producers should continue efforts to encourage conservation measures such as low flow plumbing fixtures and drought resistant vegetation.
- SVWD should continue to work with the City of Scotts Valley to encourage appropriate recycling and reuse of wastewater.

Section 4

GROUNDWATER QUALITY

The natural quality of groundwater in the Scotts Valley groundwater basin is typically high. However, the occurrence volatile organic compounds in SVWD wells and the Manana Woods well has resulted in increasing concern over groundwater contamination and the lack of timely and effective source identification and remediation. The Santa Margarita aquifer is particularly vulnerable to contamination by leaks and spills at the surface due to the permeable nature of deposits which crop out at the ground surface. In 1982, the Santa Margarita groundwater basin was designated as a sole source aquifer by the USEPA. This means that the City of Scotts Valley and nearby communities use this aquifer as their sole or principal water supply. Therefore, it is deserving of special protection.

The discussion of groundwater quality presented here will focus on human-induced groundwater quality problems. This section will present the regulatory framework for the identification and remediation of contamination problems; areas of contamination identified in the Scotts Valley; and various groundwater contamination prevention programs and activities.

4.1 Regulatory Responsibilities

Several local, state, and federal agencies have responsibilities for preventing, identifying, and remediating groundwater contamination problems in Scotts Valley. These agencies include: the USEPA; the California Environmental Protection Agency, Department of Toxic Substance Control (Cal-EPA); the Regional Water Quality Control Board, Central Coast Region (RWQCB); and the Scotts Valley Fire Protection District (SVFPD). Generally, responsibility for potential contamination sites, suspected contamination sites, and actual contamination sites are distributed between these various agencies. The criteria for distribution of sites between the various agencies is somewhat vague; however, there are some guidelines for the allocation of responsibility.

At the local level, the SVFPD oversees the City of Scotts Valley's hazardous materials management program; implements state regulations for the installation, monitoring, use, and removal of underground storage tanks; and is the first responder in the event of a hazardous material release. The SVFPD also oversees monitoring well and deep soil boring installations and destructions. At the state level, the RWQCB regulates sites where groundwater contamination from underground storage tanks or other sources has occurred. Generally, Cal-EPA oversees sites where groundwater contamination has been detected but the potentially responsible party (PRP) has not been identified or the identified PRP is not financially solvent. At the federal level, the USEPA commonly oversees sites that are on, or proposed for, inclusion on the National Priority List (NPL) of federal Superfund sites.

SVWD is responsible for monitoring of its water supply and provision of water satisfying state and federal drinking water standards. Although SVWD does not have regulatory authority for the prevention, identification or remediation of contamination sites in Scotts Valley, several groundwater contamination problems have been discovered by SVWD through its regular monitoring of water supply wells. SVWD monitors the groundwater at its active water supply wells at least semi-annually, and monthly if constituents of concern are detected. Groundwater is sampled at the frequency specified and for the constituents required by Title 22, California Administrative Code, Chapter 15. Analyses which have been performed include: general mineral, physical, inorganic, radiological, bacteriological, and regulated and unregulated organics. Water quality data are compiled and analyzed by SVWD and its consultants; water quality concerns are discussed in the annual Scotts Valley Water Resources Management Plan reports (Todd Engineers, 1984 to 1994).

Identification of sources and remediation of groundwater contamination problems is often a slow and difficult process. As a result SVWD has been compelled to provide well head treatment for contaminated groundwater in order to provide water to its costumers which meets regulatory standards. To protect its production wells from the adverse effects of contamination SVWD has previously identified groundwater protection and management zones (Todd Engineers, 1988). Management and protection zones were delineated primarily on the basis of recharge areas, pumpage areas, and risk of contamination. Groundwater management and protection zones were further refined in the AMBAG study (Watkins-Johnson Environmental, Inc., September 1993).

4.2 Groundwater Contamination

Several areas of groundwater contamination have been identified in Scotts Valley as shown on Figure 10. Groundwater contamination problems include: benzene and 1,2-dichloroethane (1,2-DCA) identified in the Camp Evers area; chlorobenzene, dichlorobenzene and other solvents found along Scotts Valley Drive; and trichloroethene (TCE) and other solvents under remediation at the Watkins-Johnson site.

Camp Evers. Volatile organic compounds (VOCs) have been detected in three water supply wells in the Camp Evers area including the SVWD's Hidden Oaks well and Well 9, and the Manana Woods Mutual Water Company well (Manana Woods well). The Hidden Oaks well has shown detectable concentrations of a variety of VOCs in past sampling events including: benzene, ethylbenzene, 1,4-dichlorobenzene, 1,1-dichloroethane, 1,2-DCA, and xylenes. Well 9 and the Manana Woods well have shown detections of benzene only, with the exception of a single detection of 0.6 parts per billion (ppb) of 1,2-DCA in Well 9 in March 1994. The highest concentration of benzene detected has been 1,300 ppb, 39 ppb, and 9.4 ppb in the Hidden Oaks well, Well 9, and the Manana Woods well, respectively.

The RWQCB has identified ten possible sources of the contamination detected in these water supply wells (RWQCB, July 1993, September 1993, and April 1994). Figure 11 shows the wells that are monitored in the Camp Evers area, and the possible contamination source locations that have been investigated by the RWQCB. The highest concentration of benzene detected in wells along with the general groundwater flow direction are also indicated on the figure. The RWQCB has not yet found a definitive link between the contamination detected in water supply wells and any of the potential sources. Each of the potential sources is discussed below.

(1) Scotts Valley Middle School, 8 Bean Creek Road. Two or three underground diesel tanks were removed from the site in 1988. Analyses performed on samples from a boring in the vicinity of the site showed no detected concentrations of VOCs. The RWQCB does not believe this site is a likely source of water supply well contamination.

(2) City of Scotts Valley, 370 Kings Village Road. Two underground fuel tanks were removed from the Scotts Valley Old City Hall site. Soil samples taken during tank removal showed minor contamination (approximately 200 ppb total petroleum hydrocarbon). The RWQCB does not believe this site is a likely source of water supply well contamination.

(3) City of Santa Cruz, Skypark, Kings Village Road. The Skypark Airport was operated in the past by the City of Santa Cruz. The Skypark property was recently annexed to the City of Scotts Valley. Four underground gasoline tanks were removed from

the site in 1984. Petroleum hydrocarbons were identified at elevated concentrations (6,400,000 ppb) in one of four soil borings at a depth of 15 feet. No gasoline hydrocarbons or benzene, toluene, ethylbenzene, or xylene (BTEX) compounds were detected in groundwater sampled from the Skypark Airport supply well. Petroleum hydrocarbons were detected at low levels (64 ppb) in a perched groundwater sample taken from a shallow soil boring (Weber, Hayes & Associates, 1994). The contamination associated with the underground tanks at Skypark appears to be localized. Remediation of soil contamination is being required. The RWQCB does not believe this site is a source of water supply well contamination.

(4) Hidden Oaks.

This site was used as an equipment storage yard in the past, and it is possible that petroleum products were spilled on the ground surface. No investigations have been performed at this site. The RWQCB has no evidence that this site is a source of water supply well contamination.

(5) Manana Woods.

The Manana Woods Mutual Water Company has at least two old wells on their site which could act as conduits to the aquifer. The RWQCB has no evidence that this site is a source of water supply well contamination.

(6) BP Service Station, 201 Mount Hermon Road.

Minor hydrocarbon soil contamination was detected at this site when fuel tanks were replaced with double walled tanks. Groundwater contaminated with petroleum hydrocarbons has been detected at the site; however, higher levels of contamination have been detected upgradient of the site at the Unocal Service Station. The RWQCB does not consider this site a likely source of water supply well contamination.

(7) Unocal Service Station, 99 Mount Hermon Road. Groundwater and soil contaminated with petroleum hydrocarbons were discovered at this site in October 1986. Remediation at the site has included replacement of four underground storage tanks and a waste oil tank in November 1990 with new double walled tanks, removal of 730 cubic yards of hydrocarbon affected soil around the tanks, installation of 18 monitoring wells, operation of a groundwater extraction and treatment system, and operation of a vapor extraction system. Recent sampling of wells downgradient from the Unocal site indicate that groundwater contamination is localized (RESNA, 1994). The RWQCB will consider the Unocal plume delineated and therefore not a source of water supply well contamination if additional monitoring confirms recent results.

(8) Shell Service Station, 90 Mount Hermon Road. Groundwater and soil contaminated with petroleum hydrocarbons have been discovered at and downgradient of the site (Pacific Environmental Group, 1993). Three underground fuel tanks at the site were replaced with double walled tanks. A soil vapor extraction system has been proposed to remediate soil contamination at the site. A former Chevron Service Station, which shows higher levels of soil and groundwater contamination than the Shell site, is located downgradient. As this site is located upgradient of a

source with higher concentrations of contaminants, this site could be at most a minor contributor to water supply well contamination.

(9) Former Chevron Service Station, 200 Mount Hermon Road. Groundwater contaminated with petroleum hydrocarbons have been discovered at and downgradient of the site. 1,2-DCA has also been detected in onsite monitoring wells. One set of underground tanks located on the east site of the site were probably removed around 1963 when new tanks were installed on the west side of the property (Pacific Environmental Group, January 1994). These three newer underground fuel tanks and one waste oil tank were removed in 1982. Recent groundwater sampling indicated elevated levels of benzene detected downgradient of the site (Pacific Environmental Group, March 1994). The RWQCB considers this site a possible source of water supply well contamination.

(10) Former ARCO Service Station, 4253 Scotts Valley Drive. Preliminary investigations have found two previously unknown underground tanks still in the ground at this site. Soil samples have been taken at the site and the results are pending. Further investigation will be performed to determine if a gasoline release occurred at this site. The RWQCB currently has no evidence that this site is a source of water supply well contamination.

Figure 12 shows the highest concentration of benzene detected in 1993-1994 in monitoring wells located at the intersection of Mount Hermon Road and Scotts Valley Drive. As shown, the highest concentrations of benzene are detected in the vicinity of the former Chevron Station. General groundwater flow is to the west and northwest, or in other words, from the vicinity of the Mount Hermon/Scotts Valley Drive intersection towards the affected wells. Accordingly, the groundwater flow direction and distribution of benzene in the area of the service stations indicate that this area probably is a source of contamination in the water supply wells. Accordingly, the Camp Evers benzene problem probably is a single extensive plume as illustrated on Figure 10.

El Pueblo Road. Three separate VOC problems have occurred in the El Pueblo Road area (between Scotts Valley Drive and Highway 17) affecting four SVWD water supply wells. The affected wells include Wells 6, 3A, 7 and 11. Tetrachloroethene (PCE) was detected first in Well 6 in 1984, and was consistently detected at low concentrations (less than 2.2 ppb) from 1984 to 1986. However, sampling performed in late 1986 and 1988 showed no detected concentrations of PCE. Well 6 is no longer in service. Second, TCE was detected in Wells 3A and 7 in 1984. However, VOCs have not been detected in these two wells since September 1991. A third problem was identified when chlorobenzene was detected in 1991 in Well 11. Chlorobenzene and dichlorobenzene were detected in varying concentrations in several other local wells during sampling performed in 1986 and 1988. Chlorobenzene was detected at 2.8 ppb in Well 11 during the most recent sampling event in March 1994. Figure 13 shows the approximate extent of the chlorobenzene plume based on the highest concentrations detected in Well 11 and other wells in the area.

Cal-EPA is the lead agency overseeing characterization and remediation of contamination detected in the El Pueblo Road area. Identification of possible sources of contamination in the El Pueblo Road area has been the focus of investigation for a number of years (California Department of Health Services (DHS), 1987 and 1988). The USEPA funded a study to identify current and past hazardous materials users in the area (Ecology & Environment, Inc., 1986). Priority sites were inspected for use and hazardous materials management practices. Several potential sources of contamination in the area have been identified; however, to date the source or sources of elevated chlorobenzene detected in Well 11 have not been determined (PRC Environmental Management, Inc., 1993). A discussion of potential sources of contamination detected in SVWD water supply wells is presented below.

(1) Scotts Valley Circuits, 66 El Pueblo Road.

VOCs have been detected in soil and groundwater at the Scotts Valley Circuits site. VOCs in soil were first detected at the site in December 1988 in the vicinity of an underground wastewater treatment sump, which is thought to be the primary source of contamination. Chemicals detected in perched groundwater at the site include: PCE, TCE, trichloroethane (TCA), dichloroethene (DCE), dichloroethane (DCA), benzene, toluene, and xylenes. Monitoring wells at the site are screened opposite this perched groundwater zone; however, deeper groundwater monitoring at the site has not been performed. Scotts Valley Circuits has completed a Remedial Investigation (On-Site Technologies, 1992 and 1993), and a Feasibility Study (Cypress Environmental, 1993). The preferred remedial alternative is soil excavation, vapor extraction, and perched groundwater extraction and treatment. A final remedial action plan remains to be drafted and approved by the Cal-EPA following the results of a treatability study. The Scotts Valley Circuits site is a possible source of the contamination detected in Wells 3A and 7.

(2) Former Technical Plastics (Currently Seagate Technology and Si-Fab Corporation), 19 and 27 Janis Way.

Hazardous materials may have been disposed onsite. Soil sampling conducted in 1990 found various chemicals in the soil including: toluene (less than 6 ppb), PCE (2 ppb), ethylbenzene (less than 450 ppb), xylene (less than 100 ppb), 4-methyl,2-pentanone (3 ppb), hexanone (14 ppb), and styrene (less than 980 ppb). This site has moderate potential for release of contaminants to groundwater.

(3) J&E Machine (Currently Ashland Machines), 5998 Butler Lane.

The site was operated by J&E Machine from 1980 to 1986 and was cited by the RWQCB in 1984 for illegal discharge of TCE to Carbonera Creek and illegal hazardous waste storage. The site reportedly contained a 5,000 gallon underground storage tank. This site was given a high priority for further sampling by the Ecology and Environment, Inc. study; however, it appears that no further sampling has been performed at this site.

(4) Tate Western, 340-F El Pueblo Road.

Soil contamination with toluene (less than 6,300 ppb) was detected on an adjacent property due to Tate Western chemical handling activities. Approximately 36 cubic yards of affected soil and 3,000 gallons of contaminated rain water were removed from the site. No further sampling was recommended in the Ecology & Environment, Inc. study.

(5) Pettibone Signs, 17 Janis Way.

Small quantities of wastes may have been disposed onsite. This site was given a medium priority for further sampling in the Ecology & Environment, Inc. study. It does not appear that any additional sampling has been performed at this site.

(6) Carbonera Trailer Park, Disc Drive.

Chlorobenzene (76 ppb) and dichlorobenzene (1,100 ppb) have been detected in two groundwater wells located at this site. These concentrations are the highest detections of chlorobenzene and dichlorobenzene in groundwater in the El Pueblo Road area. No soil sampling has been done at this site. Due to the relatively high detections in wells on the site, a possible source may be located nearby.

(7) Septic Systems, regional.

All facilities in the El Pueblo Road area used septic systems and leach fields until 1970 to dispose of sanitary wastewater. Between 1970 and 1975, sewers were installed. Discussions with the Scotts Valley Department of Public Works indicates that a small percentage of businesses scattered around the city could still be on septic systems. Improper disposal of chemicals into septic systems and leach fields could result in groundwater contamination. Septic system cleaners have in the past contained hazardous chemicals including orthochlorobenzene. There is a potential for inactive and active septic and leach field systems in the area to contribute to groundwater contamination.

Watkins-Johnson. Watkins-Johnson is located at 440 Kings Village Road adjacent to the Skypark Airport on the western perimeter of the City of Scotts Valley. Investigations initiated in 1984 found a number of organic compounds in soil and groundwater at the site. Site characterization and remedial activities were originally overseen by the RWQCB; currently the USEPA provides regulatory guidance because Watkins-Johnson is a proposed NPL site. A dilution tank located on the site and removed in 1987 is the major suspected source of site contamination. In the vicinity of the Watkins-Johnson site, the Santa Margarita aquifer is comprised of a perched and regional zone. TCE is the key constituent detected in perched and regional groundwater (Watkins-Johnson Environmental, Inc., April 1989). In 1987, a program of aquifer restoration was initiated (Watkins-Johnson Environmental, Inc., November 1989). Operation of remedial facilities at the site has reduced the extent of groundwater contamination at the site to within site boundaries. The Watkins-Johnson site is not a suspected source of contamination to water supply wells.

Other Identified Contamination Sites. Several other leaking underground storage tanks sites have been identified in Scotts Valley. These sites include:

- Jeff Mora Property, 5276 Scotts Valley Drive,
- Exxon Station, 5620 Scotts Valley Drive,
- Chevron Station, 6012 Scotts Valley Drive,
- Shell Station, 1 Hacienda, and
- Fast Gas, 5451 Scotts Valley Drive.

These sites show minor contamination which is either confined onsite or has been remediated to low levels. These sites are not likely sources of water supply well contamination.

4.3 Groundwater Contamination Prevention

Groundwater contamination prevention programs are the best strategy for minimizing future groundwater contamination problems. This is particularly true in Scotts Valley because of the permeability and susceptibility of local aquifers to contamination, difficulty in determining the sources of groundwater contamination, extended periods of time and high costs required to remediate known contamination problems, and added cost of wellhead treatment by water purveyors.

There are a number of groundwater contamination prevention activities which have been or could be implemented in Scotts Valley. The topics related to groundwater protection discussed in the following sections include well construction, abandonment, and destruction; hazardous material management; underground storage tanks; septic tank disposal systems; and city planning and zoning. These activities are performed by various state and local agencies. While SVWD has some responsibility for the construction and destruction of supply wells, the prevention of groundwater contamination requires the cooperation of a number of local and state agencies. The regulatory framework for the implementation of groundwater prevention programs is discussed at the end of this section. Recommendations to improve groundwater protection are presented at the end of each section.

Well Construction, Abandonment, and Destruction. Water wells connect the ground surface to the aquifer, and can connect one aquifer to another; consequently they can act as conduits for the transmission of pollutants from the land surface to the aquifer or from a shallower aquifer to a deeper aquifer. However, properly constructed and destroyed wells are engineered to minimize such mechanisms of transmission.

Responsibility for regulation of the construction, abandonment, and destruction of water wells is divided between the DWR, SVWD, Santa Cruz County, SVFPD, and the USEPA. The California Water Code Section 231 requires the DWR to develop well standards to protect California's water quality. DWR Bulletin 74-81 (1981) and supplemental Bulletin 74-90 (1991) contain the minimum requirements for constructing, altering, maintaining, and destroying wells. Local governments may have more stringent standards than those of the DWR. In Scotts Valley, DWR standards for the permitting, construction, abandonment, and destruction of water supply wells are enforced by SVWD and Santa Cruz County; while the permitting, construction, abandonment and destruction of monitoring wells and soil borings are enforced by the SVFPD.

A database of domestic, industrial, and municipal water supply wells and around the SVWD boundaries has been compiled by Todd Engineers. The database documents the well owner, location, uses, and construction and hydrogeologic information. Figure 14 shows the locations of known private, irrigation, industrial and municipal water supply wells in and around Scotts Valley. As can be seen on the figure, many wells have been constructed, with at least 100 wells drilled within the district boundaries. A review of the water well drillers reports show that many of these wells are old and screened at relatively shallow depths. It is likely that many of these wells are no longer in use and have been destroyed; however, documentation of well destructions is scarce and in many cases does not exist. It is likely that some of these wells have been lost or covered over at the surface and have not been properly destroyed. These lost and abandoned wells provide a potential conduit for the migration of contaminants from the ground surface to the depth penetrated.

In addition, since small private groundwater users in Scotts Valley are not well documented, it is not clear whether some private well users may be consuming groundwater that is contaminated with low levels of VOCs. There is no mechanism currently in place, other than newspaper articles, to inform small private well owners of contamination problems.

The SVFPD implements DWR standards and the more strict standards for monitoring wells that were developed by the Santa Clara Valley Water District (SCVWD, 1989). The SVFPD keeps records of all monitoring well installations in Scotts Valley with the exception of monitoring wells installed at the Watkins-Johnson site, which are regulated by the USEPA. There are 87 groundwater monitoring, vadose zone monitoring, groundwater recovery, and vapor extraction wells documented in SVWPD records. An additional 51 monitoring wells are located on and around the Watkins-Johnson facility.

To date, Scotts Valley has had no documented problems associated with old wells acting as conduits for the migration of contaminants. Nonetheless, prevention of future problems can be facilitated by better documentation of existing wells and stricter enforcement of DWR guidelines.

Recommendations

- Continue to update and maintain the well inventory database to include all wells within SVWD boundaries.
- Document the status of wells within the SVWD boundaries and update well inventory database (i.e. identify and inventory active and destroyed wells).
- Establish a notification system to alert private groundwater users of contamination problems within the SVWD boundaries.

- Given the existence of multiple aquifer systems within SVWD, implement well construction standards to prevent cross-contamination of aquifers (i.e. installation of conductor casings and minimum seal depths).
- Establish and enforce a permitting system for well destructions within the SVWD boundaries and track well destruction in the well database.
- Establish a program to identify (e.g. during real estate property transfers) and encourage the proper destruction of abandoned wells within the SVWD boundaries.

Hazardous Materials Management. Hazardous materials users pose a threat to groundwater quality through accidental or intentional surface spills, leaking underground storage tanks, and improper handling, storage, and disposal. It should be noted that the general public also handles hazardous wastes in the form of paints, fertilizers, pesticides, household cleaners, and waste oil.

The SVFPD is the local agency which oversees hazardous materials management for the City of Scotts Valley, while hazardous wastes are regulated by the Santa Cruz County Health Services Agency, Environmental Health Service (Santa Cruz County). Santa Cruz County also oversees the household hazardous waste programs in Scotts Valley. The hazardous materials management program as implemented by the SVFPD is intended to insure that hazardous materials are properly stored and monitored, that leaks and spills are detected in a timely manner, and that proper reporting and corrective actions are taken in the event of a leak or spill. A Hazardous Materials Management/Business Plan (HMMP) must be submitted by businesses or individuals who use or store toxic chemicals or hazardous materials over certain volumes, as part of the application for a Hazardous Materials Permit. The HMMP contains information on types and volumes of hazardous materials used, storage, and safety procedures.

A risk management and prevention program (RMPP) is required if a location stores or uses extremely or acutely hazardous material. No business in Scotts Valley has been required to file a RMPP.

Figure 15 shows the locations of hazardous materials users in Scotts Valley on file at the SVFPD. Sixty-four facilities have been identified as hazardous materials users in Scotts Valley. As shown, hazardous materials users are clustered along Scotts Valley Drive and between Scotts Valley Drive and Highway 17. There are no hazardous waste transfer, treatment, storage, and disposal facilities (TSDF) in Scotts Valley.

Recommendations

It is recommended that SVWD cooperate with the city and other agencies to:

- Establish a public/business education program emphasizing the importance of the proper disposal of hazardous materials.
- Institute programs encouraging reduced hazardous material use and waste minimization programs.
- Consider stricter regulations for hazardous material users.

Underground Storage Tanks. The SVFPD implements state regulations for the installation, monitoring, use, and removal of underground storage tanks (USTs) in Scotts Valley. The SVFPD keeps a database that documents the locations, status, capacity, construction, and contents of USTs in Scotts Valley. The UST information is reported to State Water Resources Control Board (SWRCB).

Review of SVFPD records show that there are 37 active USTs located at 13 sites in Scotts Valley. Of the 37 active USTs, 15 are single-walled, and 22 are double-walled and meet new tank requirements for UST construction and monitoring standards. At least 50 USTs within Scotts Valley have been removed, while one tank was identified as closed in place and two previously unknown tanks are scheduled for removal. Figure 15 shows the locations of active, inactive, removed, and closed-in-place USTs in Scotts Valley, most of which are located along Scotts Valley Drive. Because of the density of USTs and other hazardous material use, this area has a high potential for release of pollutants to groundwater and surface water. It should be noted that it is likely that USTs may exist which have not been documented. Two recently discovered tanks on Scotts Valley Drive attest to this possibility. Other USTs may have been removed prior to institution of inspection programs without proper testing to determine if the tanks had leaked.

Chapter 6.7, Division 20 of the Health and Safety Code and the California Underground Storage Tank Regulations (Subchapter 16 of

Title 23 CCR), established a program for regulation of USTs that requires local implementing agencies to permit, inspect, and oversee monitoring programs to detect leakage of hazardous materials from USTs. The following requirements for new and old USTs are among those described in the California Underground Storage Tank Regulations.

New tank construction standards require that all new USTs (including associated piping) used for the storage of hazardous substances shall be required to have primary and secondary levels of containment. New tank monitoring standards require that all exterior surfaces of the USTs and the surface of the floor directly beneath the USTs shall be capable of being monitored by direct viewing. The liquid level in the USTs shall be recorded at the time of each inspection. The secondary containment system shall be equipped with a continuous monitoring system that is connected to an audible and visual alarm system.

The observation of any liquid around or beneath a UST shall require the owner/operator to undertake the following action or actions:

1) Conduct an appropriate laboratory or field analysis of the observed liquid. If the liquid is a hazardous substance, proceed with actions 2 and 3 below.
2) Conduct an appropriate tank integrity test.
3) If a leak is confirmed, immediately remove all hazardous substances from the UST and the secondary containment system.

Old tank monitoring standards apply to owners of existing USTs that do not meet new tank construction requirements. These standards require implementation of a monitoring program that is capable of detecting any unauthorized release from any portion of the UST system at the earliest possible opportunity. The monitoring program shall include visual and non-visual monitoring.

The owner or operator shall undertake all of the following activities if any liquid around or beneath an old UST is observed:

1) Any and all action necessary shall be taken to promptly determine if the observed liquid constitutes an unauthorized release.
2) Observed liquid shall be analyzed in the field or laboratory to determine if an unauthorized release has occurred.
3) The UST shall be tested utilizing a quantitative release detection method.
4) If the above steps indicate that an unauthorized release has occurred, the owner or operator shall replace, repair or close the UST.

The California Trade and Commerce Agency, Office of Small Business offers low interest loans for repairing underground petroleum storage tank projects (RUST). Qualified businesses have total resources not exceeding 21 million dollars over a three year period. Eligible projects include the upgrade, repair, or removal of underground storage petroleum products. Measures can also include minor cleanup. Loan amounts are from $10,000 to $350,000 with low, fixed-rate financing, and up to 20 years to repay.

The California State Legislature created the UST Cleanup Fund (SB 2004) to provide funding to eligible UST owners and operators for the cleanup of contaminated soil and groundwater caused by leaking petroleum USTs. Owners/operators of petroleum USTs are eligible for funding if they meet the following requirements:

1) There has been an unauthorized release of petroleum from the UST reported to and confirmed by the regulatory agency.
2) As a result of this unauthorized release, the owner/operator must take corrective action as required by a regulatory agency.
3) The owner/operator must be in compliance with any applicable financial responsibility requirements and by UST requirements.

The maximum amount available from the UST Cleanup Fund per occurrence is $990,000. Claimants are responsible for the first $10,000 of eligible corrective costs.

It is clear that leaking USTs have been a serious groundwater contamination source in Scotts Valley. Several sites have been identified where leaking USTs have impacted groundwater. The high cost and extended time required to identify and remediate these sites makes the prevention of leaks a desirable alternative. Single walled tanks pose a particular hazard because leakage is often not detected until a release has occurred. The current application of state standards to the use, monitoring, and removal of USTs may not provide adequate protection to the groundwater resources of Scotts Valley. Although SVWD has no regulatory authority over USTs, SVWD should encourage stricter regulation.

Recommendations

SVWD should cooperate with the City of Scotts Valley and other agencies to:

- Develop more stringent local standards for the use, monitoring, removal, and replacement of USTs.
- Eliminate exemptions to UST requirements such as residential tanks, farm tanks, and elevator vaults.
- Require replacement of single walled tanks or upgrade monitoring requirements.
- Evaluate feasibility of local regulation of UST cleanups to speed the process of source identification and remediation.
- Discourage additional installations of USTs in Scotts Valley.

Septic Tank Disposal Systems. Septic tanks and cesspools are one of the most frequently reported sources of groundwater contamination in the United States. Prior to 1964, all of Scotts Valley used septic systems, leach fields and cesspools for the disposal of wastewater. The first sewage treatment plant in Scotts Valley was built in 1965 and sewer lines were extended to various areas over a period of years. For example, homes and facilities in the El Pueblo Road area used septic systems and leach fields until 1970, while some residential neighborhoods located along Lockewood Lane south of Mount Hermon Road were not sewered until the mid-

1980s. Four major outlying residential areas still rely upon septic systems for waste disposal (Figure 16). Currently, all businesses and private residences within 200 feet of sewer lines are required to hook into the sanitary sewer system. Discussions with the Scotts Valley Department of Public Works indicate that a small percentage of businesses and private residences (less than 5 percent) scattered around the city could still be on septic systems.

In the past, problems with elevated nitrate concentrations in groundwater have been attributed in part to use of residential septic systems. In addition, improper disposal of chemicals into septic systems and leach fields can result in the release of metals and organic constituents to groundwater. Septic system cleaners and drain cleaners contain hydrocarbons and chlorinated hydrocarbons which can leach into groundwater.

Recommendations

SVWD should cooperate with the City of Scotts Valley to:

- Review records of Scotts Valley City Finance Department to identify businesses and residences not currently connected to sanitary sewer system; and
- Encourage all businesses and residences not currently hooked to the sanitary sewer system to connect to system.

City Planning and Zoning. A city zoning map, Figure 17, shows the distribution of land use in the City of Scotts Valley. Light industrial and commercial service zones are shown to be concentrated along Scotts Valley Drive and Highway 17 and along Mount Hermon Road. These zones represent the areas of greatest risk to groundwater quality because they are current and potential locations of hazardous materials users, USTs, and potential sources of contaminant release. These areas have been recognized as "high risk" (Todd Engineers, 1988), and as needing greater management. Accordingly, groundwater prevention programs by the City and other agencies should focus on these areas as a first priority. On its part, SVWD should continue its policy of limiting groundwater supply development in shallow aquifers in these areas. In addition, SVWD should consider installation of monitor wells sited between possible contamination source areas and major municipal well fields to allow early identification of groundwater contamination problems.

Recommendations

SVWD should encourage the City to:

- Limit future industrial and commercial service development to existing areas.
- Encourage greater consideration by City planners of groundwater protection issues in land use planning.

Summary. In summation, the Scotts Valley groundwater basin is locally susceptible to groundwater contamination, and has experienced serious local groundwater contamination problems.

Several local, state, and federal agencies share responsibility for groundwater protection and remediation in Scotts Valley. However, no single regulatory agency has a regional outlook or authority on groundwater contamination problems.

SVWD does not have authority for the prevention, identification, or remediation of contamination sites. It does have some authority over the construction, abandonment, and destruction of water wells, and specific recommendations are provided to aid groundwater contamination prevention through this limited authority. However, SVWD is responsible for monitoring its groundwater supply and providing water satisfying state and federal drinking water standards. Given this responsibility, SVWD has delineated zones of groundwater contamination risk and has pursued a policy of developing groundwater supplies in areas and aquifers of low contamination risk. In addition, SVWD provides wellhead treatment for contaminated groundwater affecting some of its wells.

SVWD also monitors the status of groundwater contamination sites that pose a potential threat to groundwater resources, and to SVWD wells. Generally, key reports are sent to the SVWD; however, no official policy or agreement exists whereby SVWD is automatically and fully informed of groundwater contamination problems. Given SVWD's existing role and proven record in monitoring local water resources, and its critical responsibility in providing safe drinking water, SVWD should be automatically and fully informed of groundwater contamination situations. This information will become increasingly important if artificial recharge or other local groundwater supply management efforts are implemented in the Camp Evers or Scotts Valley Drive areas. In turn, SVWD could help to provide a regional overview and aid in information sharing among agencies.

Section 5

CONCLUSIONS

Conclusions of each of the major sections of the report are summarized below.

HYDROGEOLOGY

1. The areal extent, thickness, and depth of the local aquifers are strongly affected by erosion and geologic folding and faulting, resulting in a complex and varied setting for groundwater storage and flow. As a consequence, groundwater and storage available to a given well could be limited.
2. Much valuable information is available on the hydrogeology of the margins of the Scotts Valley groundwater basin. However, geologic data are relatively lacking for the central portion of the basin.

GROUNDWATER SUPPLY

Monitoring

3. The water resource monitoring program is comprehensive, with an appropriate focus on the developed portions of the basin.

Groundwater Level Trends

4. Although the basin is not in overdraft, localized groundwater level declines have resulted in adverse effects, including drying up of shallow private wells, loss of production and efficiency in wells, and a somewhat lower groundwater quality.

5. The wet 1992-1993 season resulted only in a moderation of the extent and severity of localized groundwater level declines.

6. Although affected by recent drought, Bean Creek responded to the wet 1992-1993 season with increased baseflow during the summer of 1993.

Perennial Yield and Groundwater Storage

7. Perennial yield for the Scotts Valley groundwater basin has been estimated to be 4200 acre-feet/year. This is an average annual value and is relevant to the area of the Scotts Valley groundwater basin.

8. Groundwater storage in the developed portion of the basin has declined between April 1986 and April 1994 by an estimated 500 to 600 acre-feet/year, or about 10 percent of estimated total groundwater storage.

AMBAG Model

9. The model can be used to observe effects of proposed well locations and pumping configurations and potential recharge projects, consequently aiding in groundwater management.

10. The model can be supplemented by other computer programs for use in simulating migration of dissolved contaminants in groundwater.

Pumpage

11. About 70 percent of the total estimated groundwater production is metered by SVWD, SLVWD, Watkins-Johnson, and the Mount Hermon Association. Groundwater production was estimated for other groundwater users, including landscape irrigators, private water

purveyors, commercial and industrial firms, and domestic users.

12. Total estimated groundwater production is 3,460 AFY, not accounting for return flows to the groundwater basin via percolation from irrigation and landscaping ponds, leakage from pipelines, and percolation from septic tanks.

13. The estimated total groundwater pumpage amounts to over 80 percent of the estimated 4,200 AFY of perennial yield for the Scotts Valley groundwater basin, and is concentrated in the southeast one-quarter of the groundwater basin.

14. The efforts of SVWD to redistribute its pumpage have not been sufficient to mitigate localized groundwater declines. SVWD efforts should be supplemented by additional actions of SVWD and others to redistribute pumpage, minimize groundwater losses, and to initiate groundwater replenishment programs.

Replenishment

15. More than one replenishment program will be needed to mitigate localized groundwater level declines and to ensure long-term groundwater supply.

16. Six conceptual projects for direct artificial recharge or wastewater irrigation are presented with possible yields ranging from 20 to 200 AFY each.

GROUNDWATER QUALITY

Regulatory Responsibilities

17. The Scotts Valley Fire Protection District oversees the City of Scotts Valley's hazardous materials management program,

implements state regulations of underground storage tanks, oversees monitoring and soil boring installation and destruction, and responds first to a hazardous material release.

18. The California Regional Water Quality Control Board (RWQCB) regulates sites where groundwater contamination occurs from underground tanks or other sources.

19. The California Environmental Protection Agency (Cal-EPA) oversees groundwater contamination sites where the potentially responsible party is not known or is not financially solvent.

20. The United States EPA oversees sites that are on or proposed for the Superfund list.

21. The Scotts Valley Water District does not have regulatory authority for the prevention, identification, or remediation of groundwater contamination. SVWD is responsible for monitoring of its water supply and provision of water satisfying state and federal drinking water standards.

Groundwater Contamination

22. Ten possible sources of the benzene contamination in Camp Evers have been investigated by the RWQCB. Of these, three service stations along Mount Hermon Road have been identified as possible sources.

23. Cal-EPA is the lead agency overseeing the characterization and remediation of contamination in the El Pueblo Road area, and is in the process of identifying possible sources of the TCE and chlorobenzene problems. Of seven possible sources, Scotts Valley Circuits has been identified as a possible source of TCE

contamination. A Remedial Investigation and Feasibility Study for the site have been prepared; a remedial action plan remains to be drafted and approved.

24. The United States EPA is overseeing remediation at the Watkins-Johnson site, which has reduced groundwater contamination to within site boundaries.

Groundwater Contamination Prevention

25. Prevention of groundwater contamination in Scotts Valley is important because of the susceptibility of aquifers to contamination, difficulty in determining sources of contamination, extended time and high costs to remediate contamination, and added costs of wellhead treatment by water purveyors.

26. Improperly constructed or abandoned wells can provide conduits for downward migration of contaminants from the ground surface.

27. SVWD and Santa Cruz County share responsibility for enforcing standards for permitting, construction, abandonment, and destruction of water supply wells.

28. Sixty-four facilities using hazardous materials exist in Scotts Valley, located mostly along Scotts Valley Drive.

29. Thirty-seven active underground storage tanks have been identified in Scott Valley, of which 22 are double-walled and meet new tank standards.

30. Septic tanks represent other potential sources of contamination.

Section 6

RECOMMENDATIONS

HYDROGEOLOGY

1. Groundwater exploration efforts and hydrogeologic studies should be undertaken in cooperation with SLVWD and Santa Cruz County to more fully evaluate the Scotts Valley groundwater basin as a whole.

GROUNDWATER SUPPLY

Monitoring

2. Continue data compilation on wells and geology and the program of climatic, surface water, and groundwater monitoring with annual reporting.
3. Encourage coordination of groundwater level monitoring by all agencies so that the quarterly measurements occur within a small time period, such as one week.
4. Expand data compilation and monitoring as groundwater exploration and production are extended into new areas, or as needed for groundwater replenishment projects or for groundwater contamination investigations or remediation.

Perennial Yield and Groundwater Storage

5. The perennial yield and groundwater storage of the Scotts Valley groundwater basin should be reevaluated in greater detail.

AMBAG Model

6. The model should be maintained, but revised as additional hydrogeologic and groundwater production data become available.

Pumpage

7. Information on wells and metered groundwater production should be compiled and updated regularly. Groundwater production by large groundwater users should be measured.

8. Following metering of major groundwater producers, consumptive use of groundwater should be analyzed.

9. SVWD should continue its efforts to redistribute its pumpage throughout its service area.

10. Roundtable meetings should be convened by the major groundwater producers to discuss means to analyze and mitigate groundwater level declines.

Replenishment

11. Replenishment projects should be planned and implemented in the context of basin-wide groundwater resource management, and coordinated when appropriate with SLVWD, Santa Cruz County, and major groundwater producers.

12. The conceptual replenishment projects, in addition to others that may be suggested, should be considered in greater depth. Additional investigations would include field work, computer modeling, cost/benefit analysis, and assessment of environmental impacts.

13. SVWD, SLVWD and other groundwater producers should continue efforts to encourage conservation measures such as low flow plumbing fixtures and drought resistant vegetation.

14. SVWD should continue to work with the City of Scotts Valley to encourage appropriate recycling and reuse of wastewater.

GROUNDWATER QUALITY

SVWD does not have regulatory authority for the prevention, identification, or remediation of groundwater contamination. However, SVWD and Santa Cruz County share responsibility for enforcing standards for construction, abandonment, and destruction of water supply wells. Accordingly, specific recommendations for SVWD are as follows:

Well Construction, Abandonment, and Destruction

15. Continue to update and maintain the well inventory database to include all wells within SVWD boundaries.

16. Conduct a survey to document the status of wells within SVWD boundaries, and to identify both active and destroyed wells.

17. Once the well survey is complete, establish a notification system to alert private groundwater users of contamination problems within the SVWD boundaries.

18. Given the existence of multiple aquifer systems within SVWD implement well construction standards to prevent cross-contamination of aquifers (i.e. installation of conductor casings and minimum seal depths).

19. Establish and enforce a permitting system for well destructions within the SVWD boundaries and track well destruction in the well database.

20. Establish a program to identify (e.g. during real estate property transfers) and encourage the proper destruction of abandoned wells within SVWD.

21. In addition, SVWD is responsible for provision of water satisfying state and federal drinking water standards. Accordingly, SVWD should continue its policy of siting new wells in areas and aquifers that are less susceptible to contamination. SVWD should also consider installation of monitor wells sited between possible contamination source areas and major municipal well fields to allow early identification of groundwater contamination problems.

The remaining recommendations, grouped according to the specific areas of groundwater contamination prevention, are long-term and require cooperations between agencies.

Hazardous Materials Management

- Establish a public/business education program emphasizing the importance of the proper disposal of hazardous materials.
- Institute programs encouraging reduced hazardous material use and waste minimization programs.
- Consider stricter regulations for sites which use hazardous materials.

Underground Storage Tanks

- Develop more stringent local standard for the use, monitoring, removal, and replacement of USTs.
- Eliminate exemptions to UST requirements such as residential tanks, farm tanks, and elevator vaults.
- Require replacement of single walled tanks or upgrade monitoring requirements.
- Evaluate feasibility of local regulation of UST cleanups to speed the process of source identification and remediation.
- Discourage additional installations of USTs in Scotts Valley.

Septic Tank Disposal Systems

- Review records of Scotts Valley City Finance Department to identify businesses and residences not currently connected to sanitary sewer system.
- Encourage hookup of all businesses and residences not currently connected to the sanitary sewer system.

City Planning and Zoning

- Limit future industrial and commercial service development to existing areas.
- Encourage greater consideration by City planners of groundwater protection issues in land use planning.

Overall SVWD should encourage and cooperate fully with responsible agencies in the investigation and remediation of contamination sites, and in the identification of potentially responsible parties. SVWD also can provide a regional groundwater management overview and aid in information sharing among agencies.

Section 7

REFERENCES

California Department of Health Services, *Fact Sheet 1, El Pueblo Road Site*, November 1987.

California Department of Health Services, *Fact Sheet 2, El Pueblo Road Site*, December 1988.

California Department of Water Resources, *California's Ground Water, Bulletin 118*, September 1975.

____, *Water Well Standards: State of California, Bulletin 74-81*, December 1981.

____, *California Well Standards, Water Wells, Monitoring Wells, Cathodic Protection, Bulletin 74-90*, June 1991.

California Regional Water Quality Control Board, Central Coast Region, *Scotts Valley Ground Water Problem, Agenda Item 18*, July 9, 1993.

____, *Scotts Valley Ground Water Problem, Agenda Item 20*, September 10, 1993.

____, *Scotts Valley Ground Water Problem, Agenda Item 23*, April 8, 1994.

Cypress Environmental, *Feasibility Study, Scotts Valley Circuits*, October 1993.

Ecology and Environment, Inc., *Project Summary Report--Scotts Valley Study Area,* prepared for USEPA, January 1986.

Handy, Scott, personal communication, Scotts Valley Wastewater Treatment Plant, May 31, 1994.

Harding Lawson Associates, *Groundwater Investigation, Treatment Plant Effluent Disposal Site, Scotts Valley, California*, prepared for John Carollo Engineers, October 23, 1974.

Jacobvitz, Michael, *A Comparison of Recharge Estimates Using a Numerical Flow Model, Santa Margarita Aquifer, Scotts Valley, California,* Master's thesis, U.C. Santa Cruz, June 1987.

Jones, Randy, personal communication, Mount Hermon Association, June 13, 1994.

Lowney, John, V. and Associates, *Evaluation of Sewage Effluent Percolation Pits, Scotts Valley, California*, prepared for John Carollo Engineers, March 13, 1973.

Luhdorff & Scalmanini, *North-Central Santa Cruz County Water Supply Master Plan, Groundwater Resources: Scotts Valley Area,* April 1984.

____, *Scotts Valley Groundwater Basin, Nitrate Pollution Study, Task 1 Report, Groundwater Monitoring Design,* prepared for Association of Monterey Bay Area Governments, July 1984.

On-Site Technologies, *Remedial Investigation Report, Scotts Valley Circuits, Inc.*, prepared for Scotts Valley Circuits, Inc., January 1992.

____, *Addendum to Remedial Investigation Report, Scotts Valley Circuits, Inc.*, prepared for Scotts Valley Circuits, Inc., November 17, 1993.

Pacific Environmental Group, *Letter to Shell Oil Co. regarding: Monitoring Well MW-5 Installation/Soil Vapor Extraction Testing, Shell Service Station*, prepared for RWQCB, December 29, 1993.

____, *Letter to Chevron USA regarding: Former Chevron USA Station 9-1337*, prepared for RWQCB, January 4, 1994.

____, *Letter to Chevron USA regarding: Preliminary Off-Site Investigation Report, Former Chevron USA Station 9-1337*, prepared for RWQCB, March 13, 1994.

PRC Environmental Management, Inc., *Shallow Groundwater Environmental Investigation Work Plan, El Pueblo Road Site,* prepared for Cal-EPA, June 1993.

RESNA, *Problem Assessment Report for Unocal Station 6153, 99 Mount Hermon Road*, prepared for RWQCB, February 24, 1994.

Sansing, J., personal communication, SVWD, June 13, 1994.

Santa Clara Valley Water District, *Standards for the Construction and Destruction of Wells and other Deep Excavations in Santa Clara County*, June 1989.

Todd, David Keith, *Groundwater Hydrology, Second Edition,* New York, John Wiley & Sons, 1980.

Todd Engineers, *Scotts Valley Water Resources Management Plan*, prepared for Scotts Valley Water District, June 1984.

____, *Scotts Valley Water Resources Management Plan*, prepared for Scotts Valley Water District, June 1985.

____, *Scotts Valley Water Resources Management Plan*, prepared for Scotts Valley Water District, June 1986.

____, *Scotts Valley Water Resources Management Plan*, prepared for Scotts Valley Water District, August 1987.

____, *Scotts Valley Water Resources Management Plan*, prepared for Scotts Valley Water District, June 1988.

____, *Scotts Valley Water Resources Management Plan 1988-1989*, prepared for Scotts Valley Water District, July 1989.

____, *Scotts Valley Water Resources Management Plan 1989-1990*, prepared for Scotts Valley Water District, June 1990.

____, *Scotts Valley Water Resources Management Plan 1990-1991*, prepared for Scotts Valley Water District, June 1991.

____, *Scotts Valley Water Resources Management Plan 1991-1992*, prepared for Scotts Valley Water District, June 1992.

____, *Scotts Valley Water Resources Management Plan 1992-1993*, prepared for Scotts Valley Water District, June 1993.

____, *Scotts Valley Water Resources Management Plan 1993-1994*, prepared for Scotts Valley Water District, June 1994.

Watkins-Johnson Environmental, Inc., *Remedial Investigation, Watkins-Johnson Company,* prepared for USEPA, April 28, 1989.

____, *Feasibility Study, Watkins-Johnson Company,* prepared for USEPA, November 27, 1989.

____, *Operator's Manual for The Santa Margarita Groundwater Basin Computer Model, Santa Cruz, California*, prepared for the Association of Monterey Bay Area Governments, Marina, California, July 23, 1993.

____, *Final Santa Margarita Groundwater Basin Management Plan,* prepared for Association of Monterey Bay Area Governments, Marina, California, September 8, 1993.

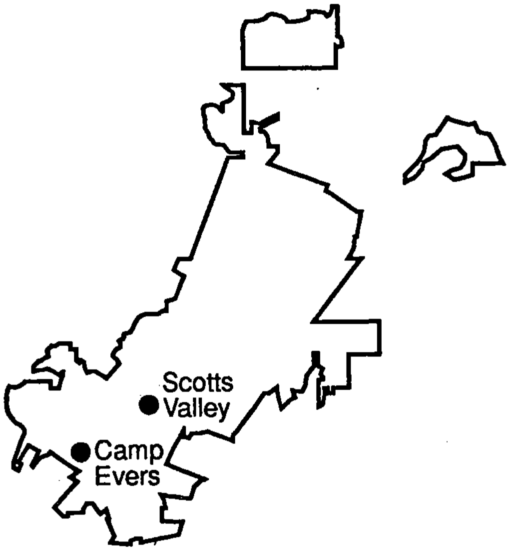
____, *First Quarter 1994 Operations Report, Watkins-Johnson Company, Scotts Valley,* April 20, 1994.

Weber, Hayes & Associates, *Underground Tank Investigation for Skypark Airport Property,* prepared for the City of Santa Cruz Public Works Department, February 21, 1994.

Scotts Valley Water District
Scotts Valley, California

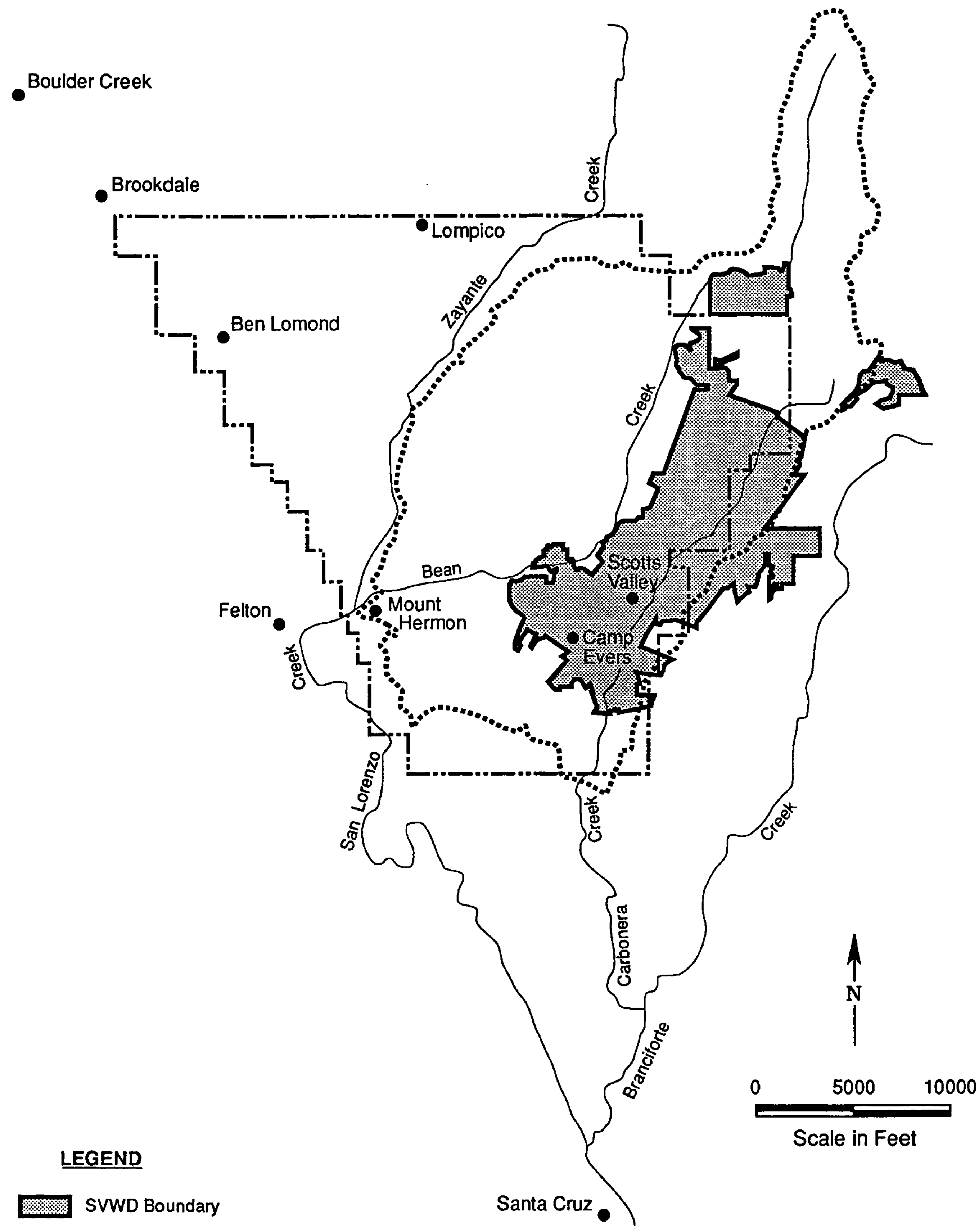
SCOTTS VALLEY
GROUNDWATER MANAGEMENT PLAN
(AB 3030)

July 1994



David Keith Todd
Consulting Engineers, Inc.
Berkeley, California

List of Figures



June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Figure 1
Study Areas

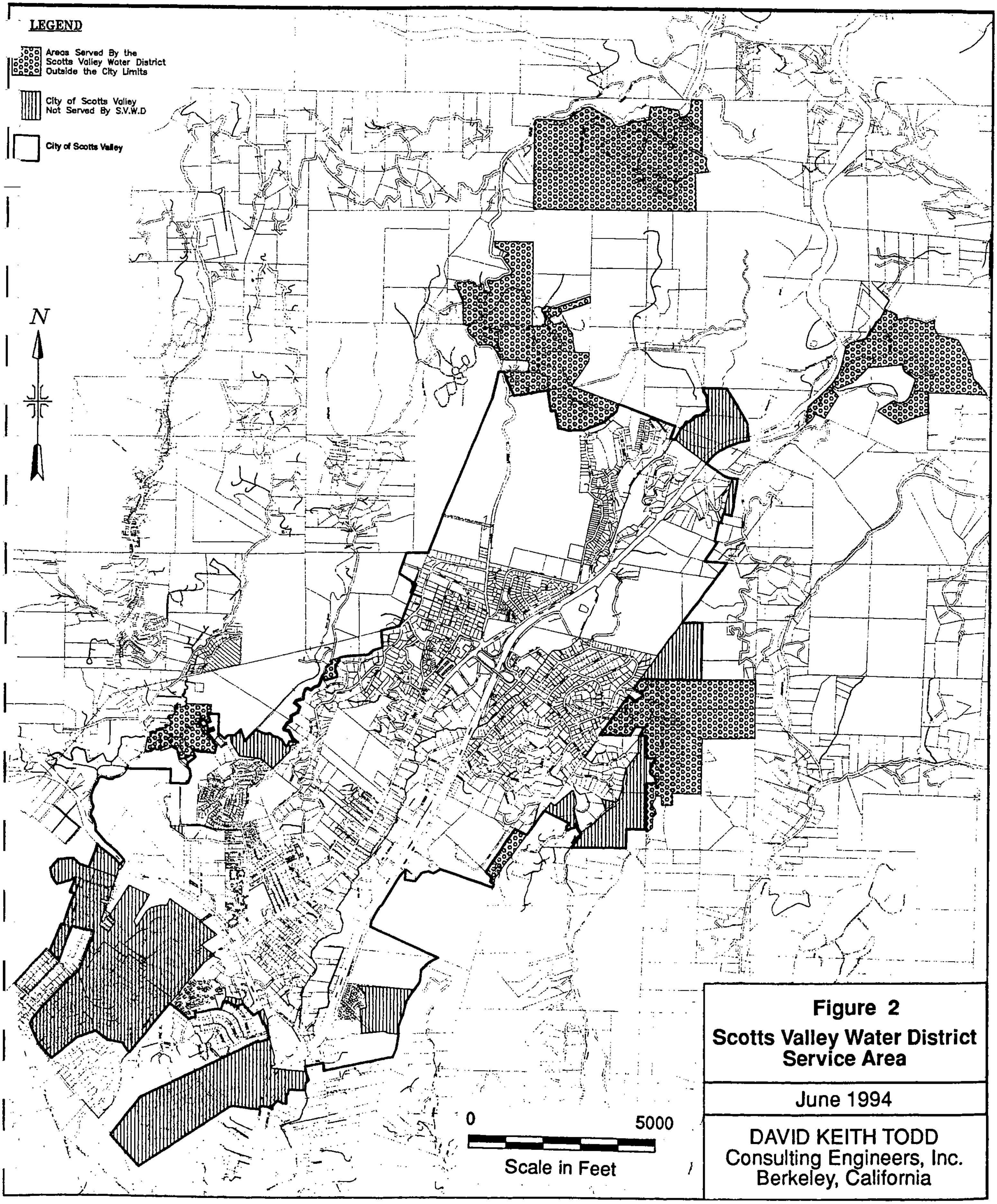
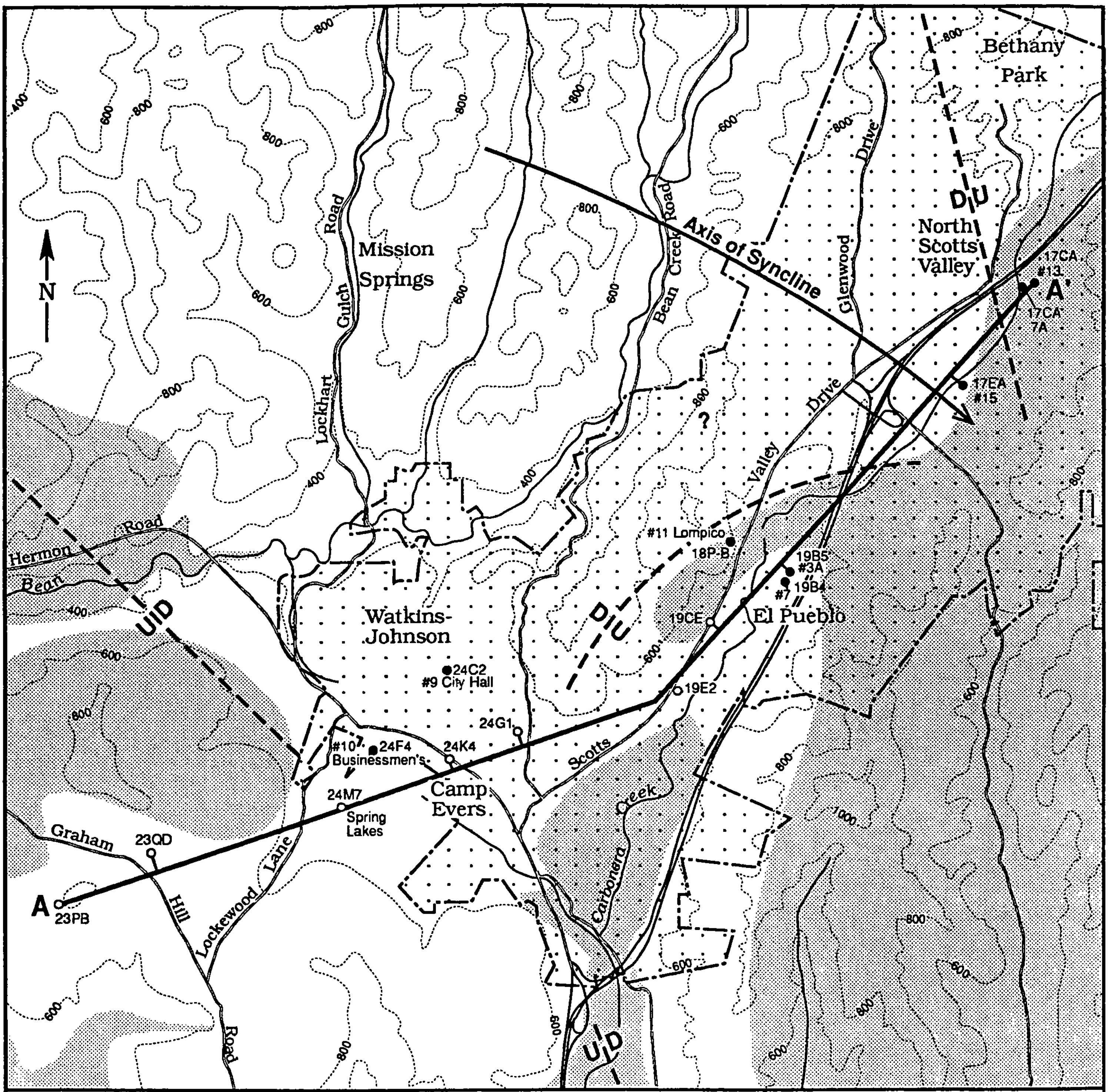


Figure 2
Scotts Valley Water District Service Area

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California



Legend

○ Well

● SVWD Production Well

Scale

0 2000 4000 feet

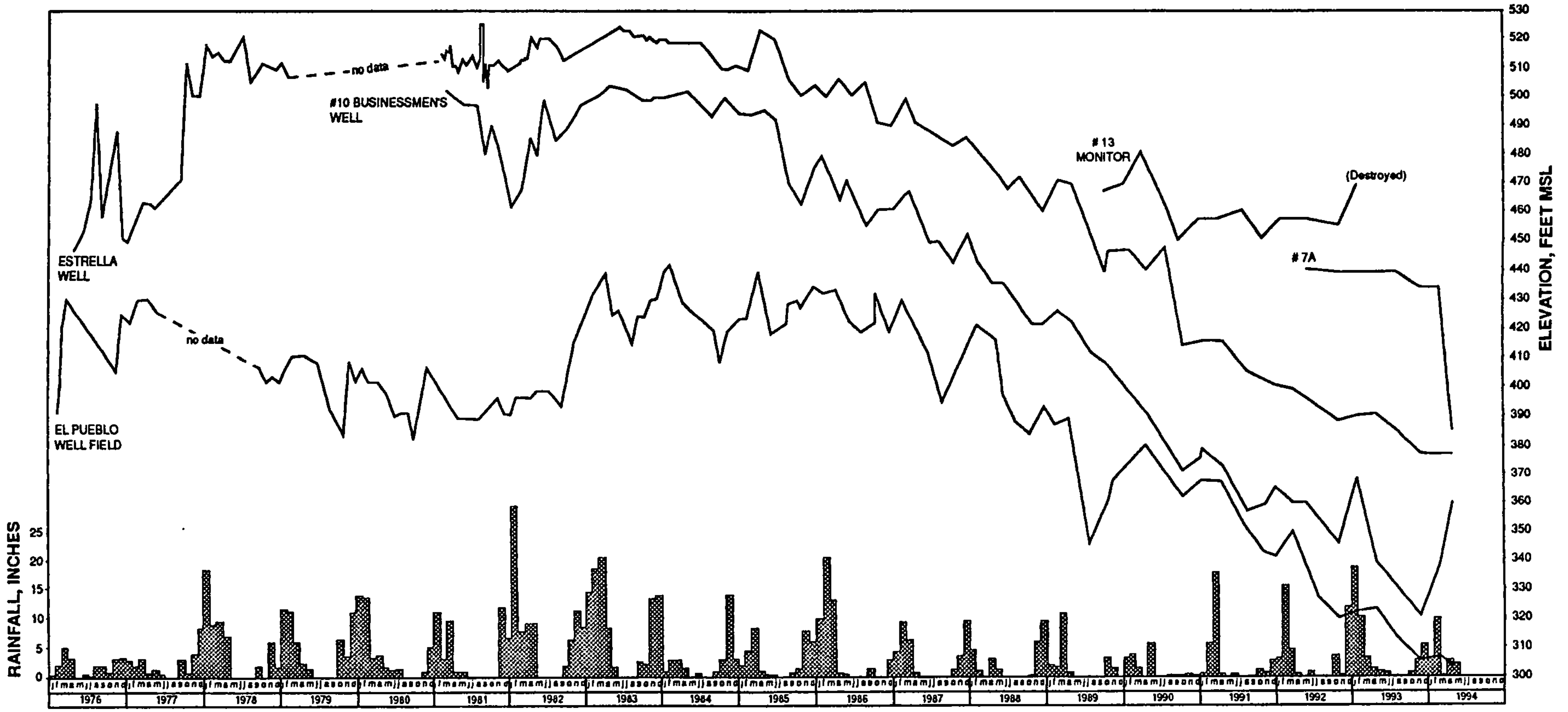
⁙ SVWD Boundary

▨ Unsaturated Santa Margarita Sandstone

Figure 3
Cross Section A - A'
Location Map

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California



June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Figure 6
Water Level Trends in Selected Wells

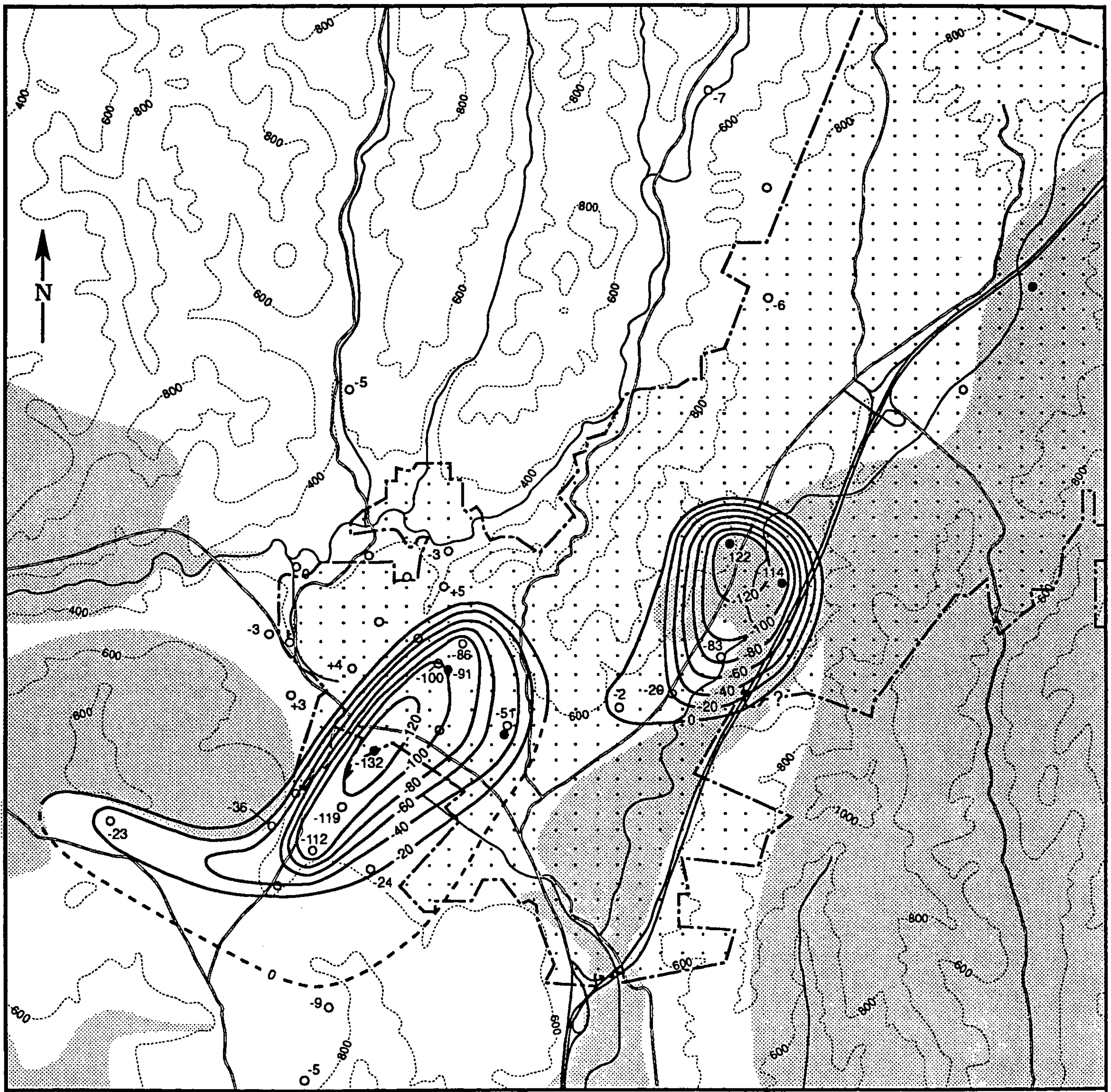
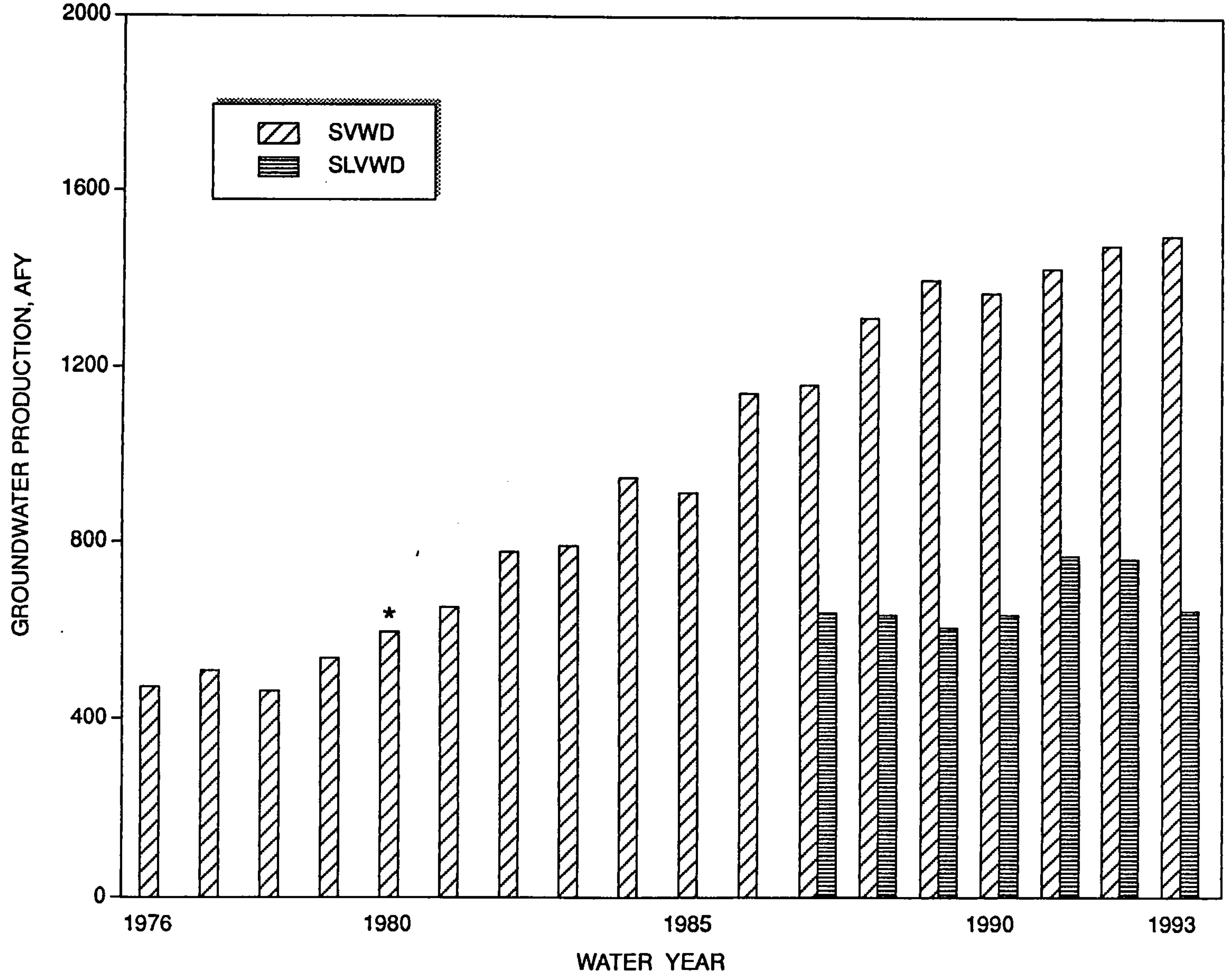


Figure 7
Water Level Change
April 1986 - April 1993

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

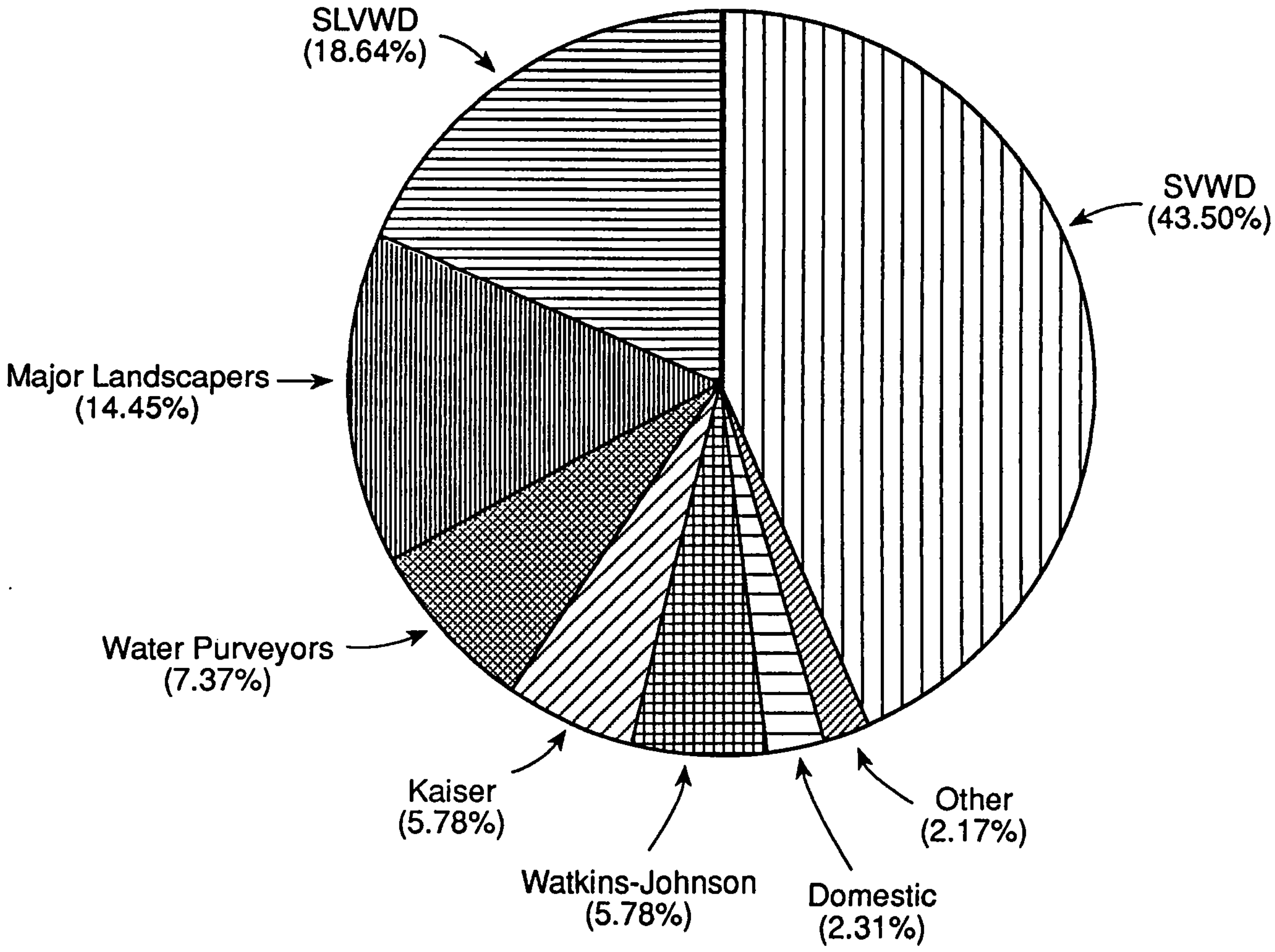


* Estimated

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Figure 8
Groundwater Production
SVWD 1976 - 1993 and
SLVWD 1987 - 1993



Estimated Total Pumpage: 3460 AFY

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Figure 9
Current Distribution of Groundwater Production

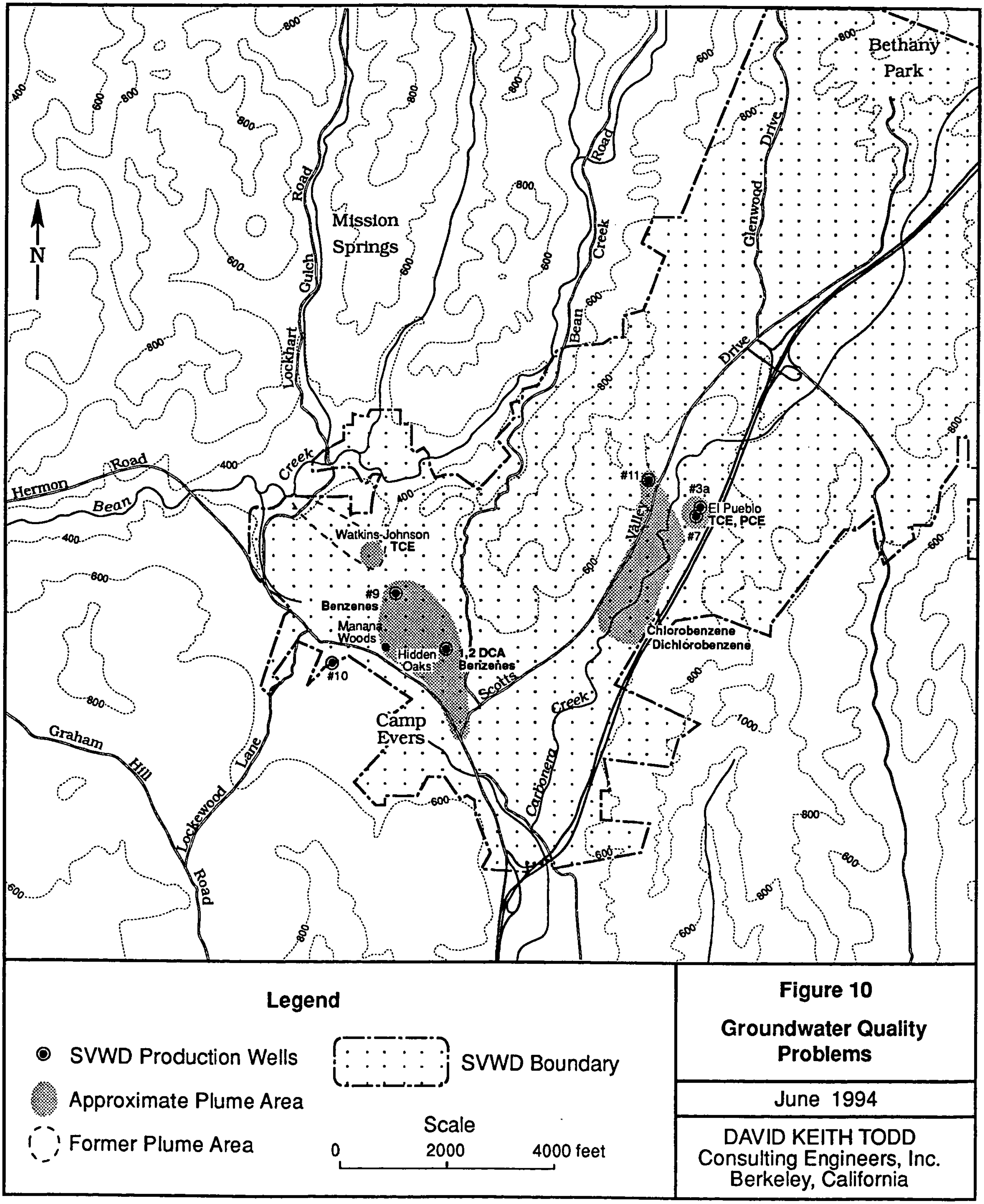
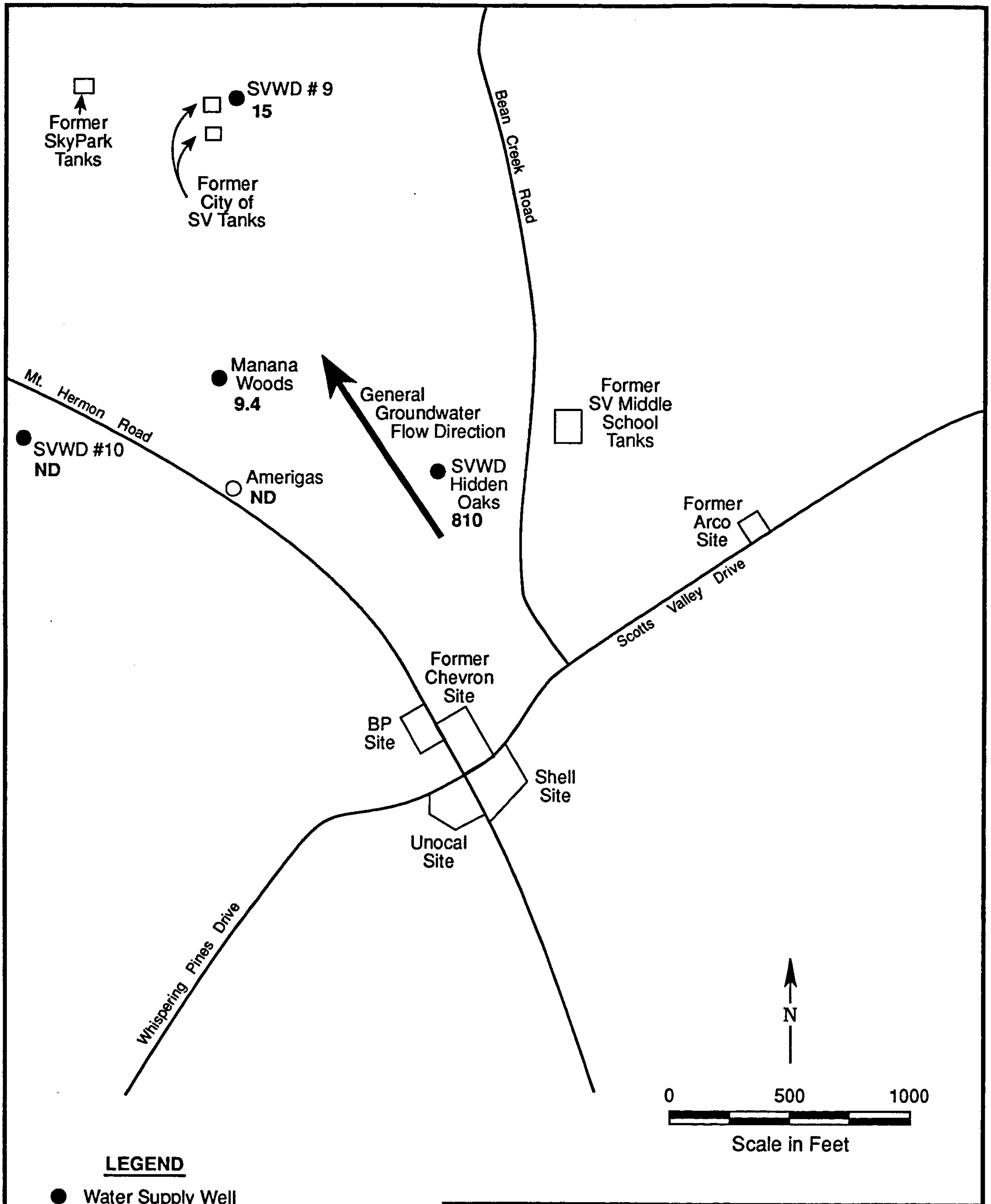


Figure 10

Groundwater Quality Problems

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California



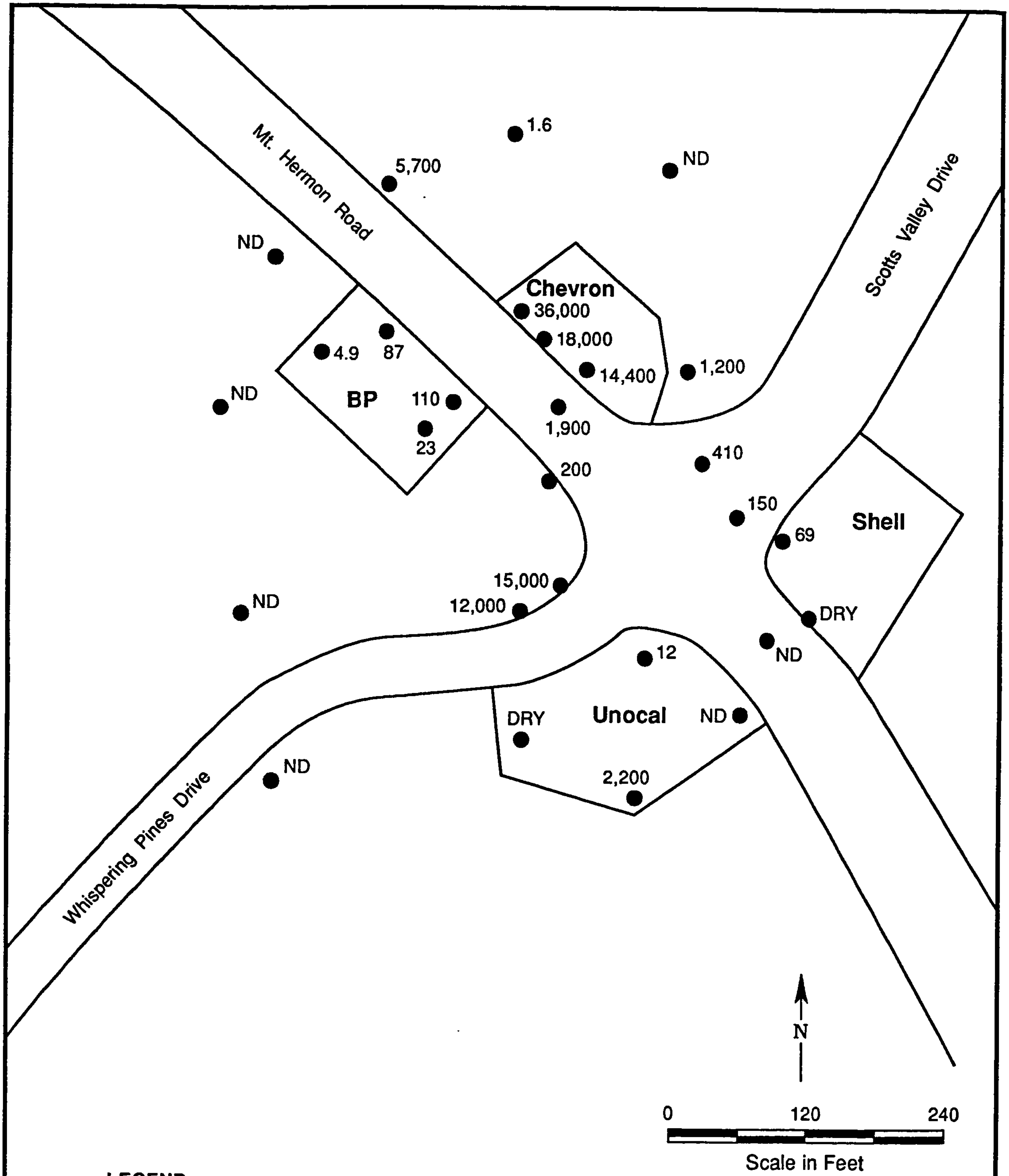
LEGEND

● Water Supply Well
○ Irrigation/Industrial Well
15 Highest Concentration of Benzene(ppb)
ND Not Detected

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Figure 11
Possible Sources of Camp Evers Water Supply Well Contamination



LEGEND

● Monitoring Well

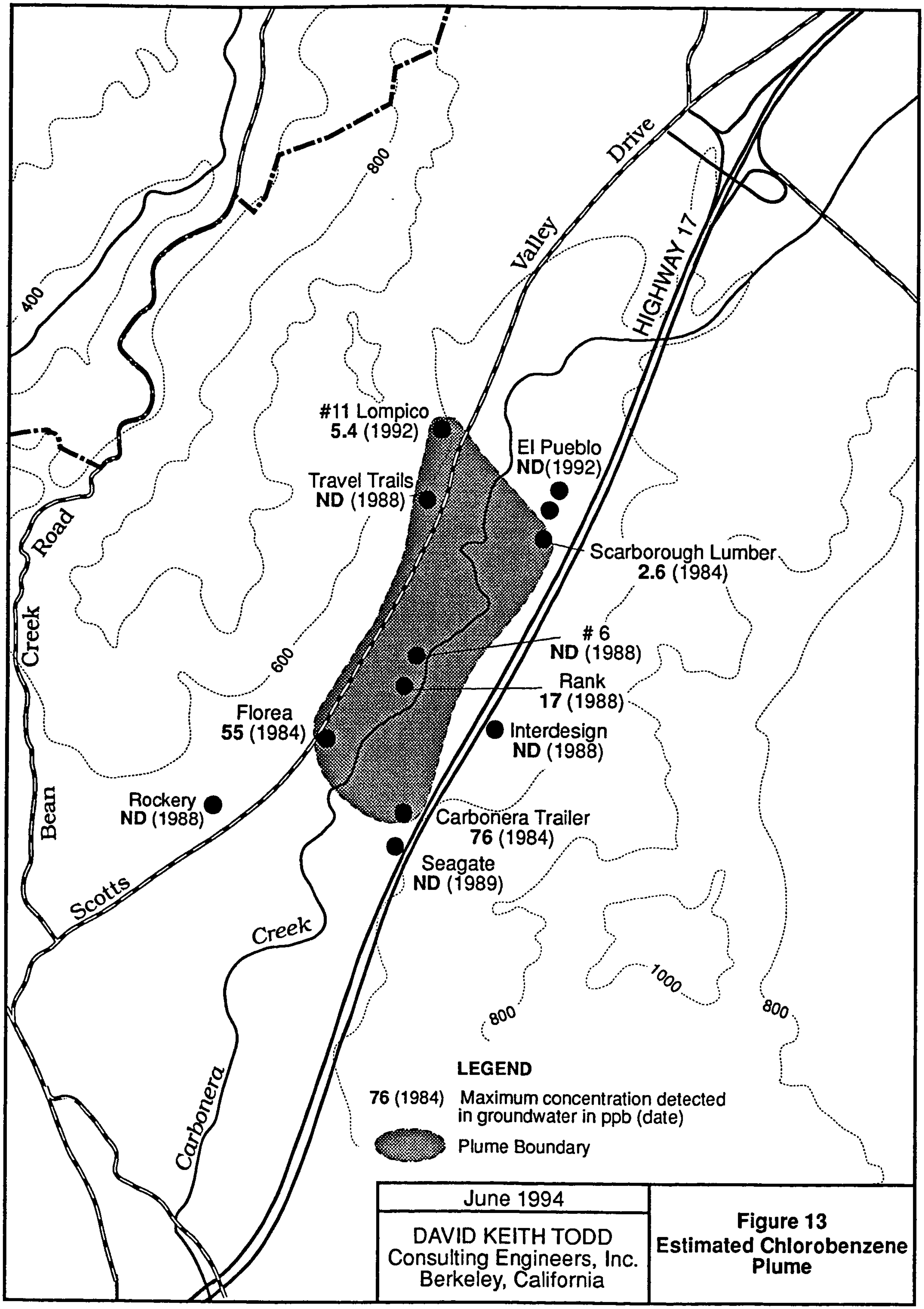
15 Highest Concentration of Benzene(ppb)

ND Not Detected

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

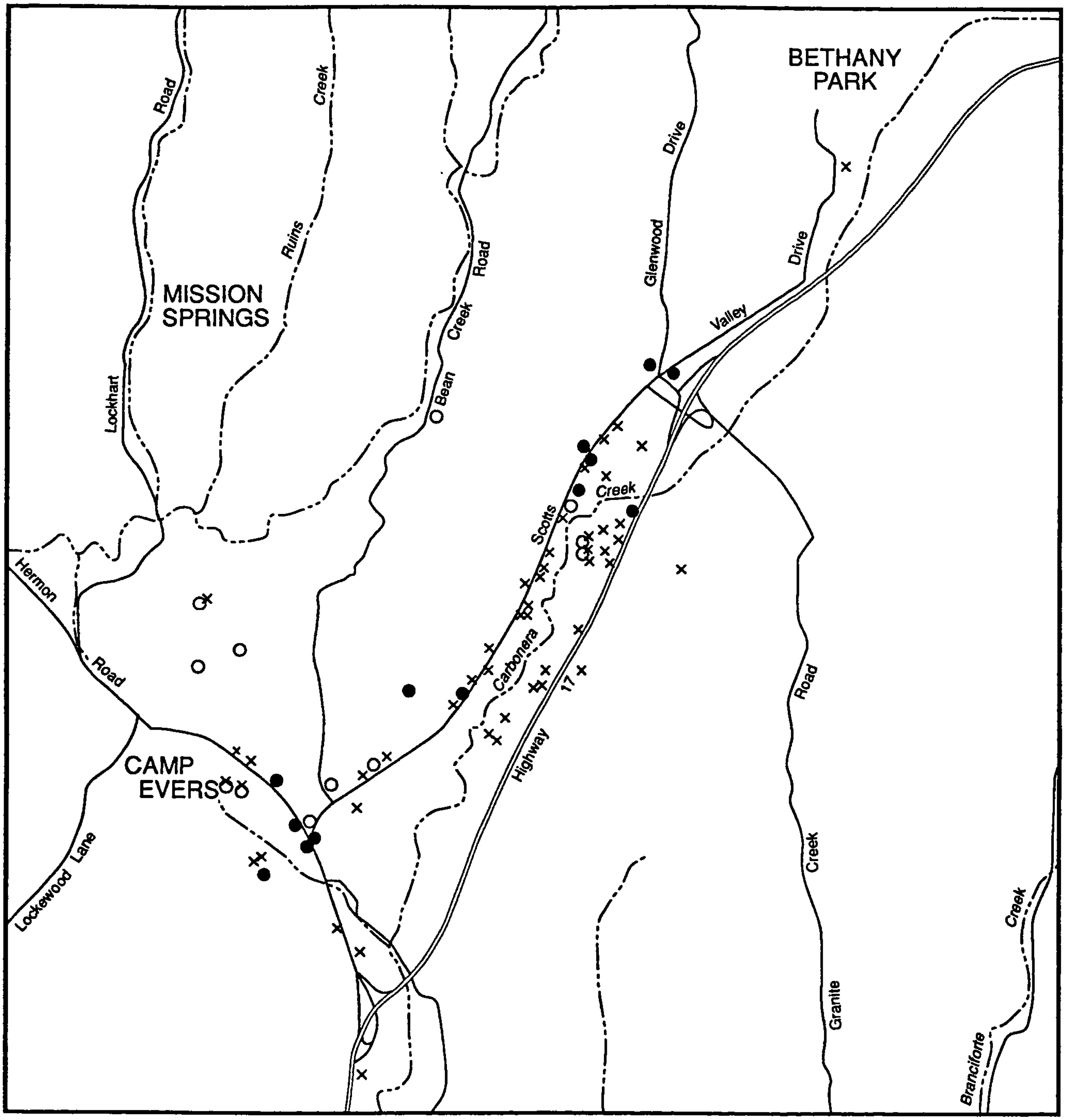
Figure 12
Possible Sources of Camp Evers Water Supply Well Contamination



June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Figure 13
Estimated Chlorobenzene Plume



LEGEND

- ● Underground Storage Tanks, Active
- ○ Underground Storage Tanks, Inactive, Removed or Closed in Place
- × Hazardous Materials Use

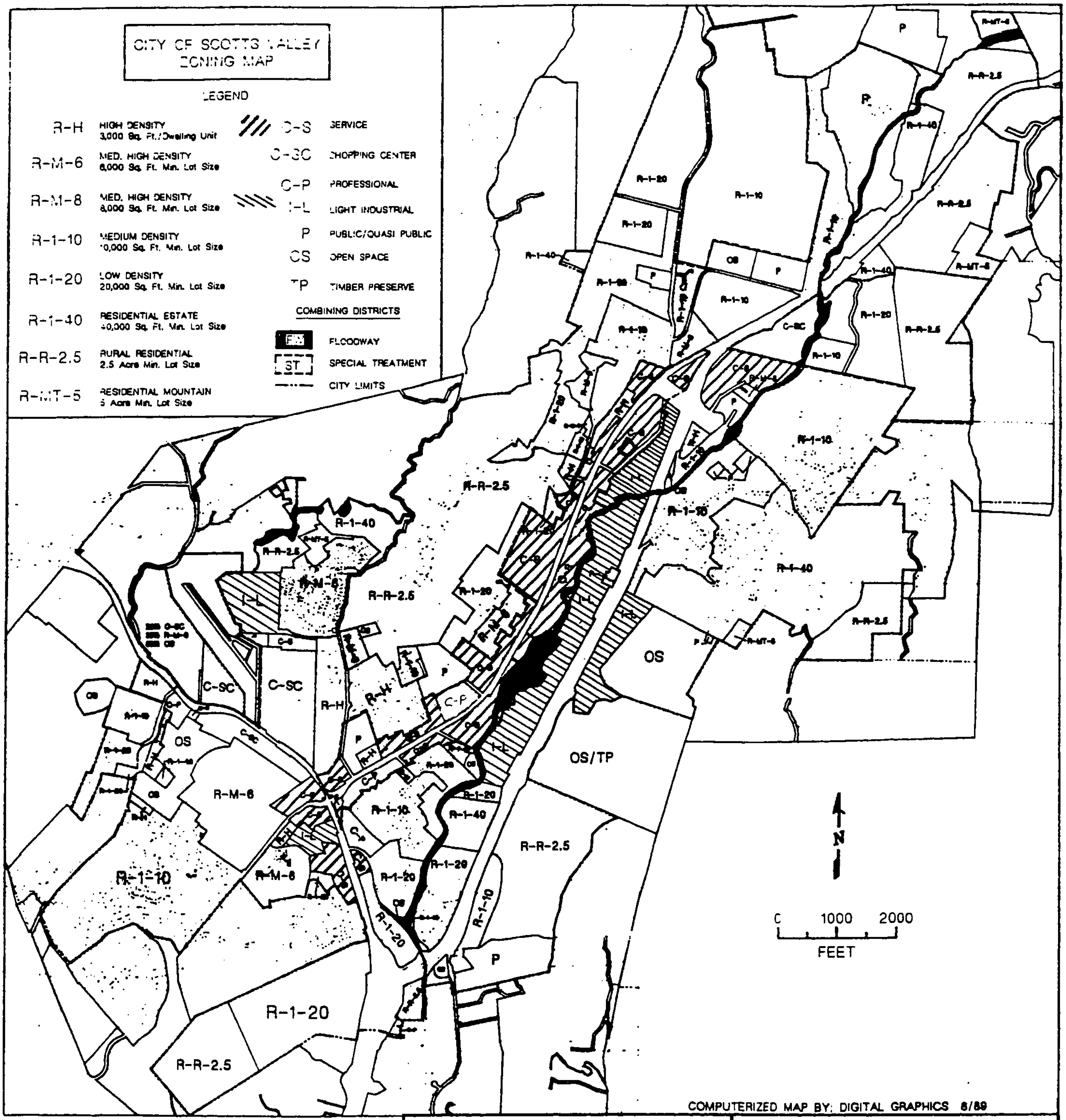
N

0 2000
Scale in Feet

Figure 15
Underground Storage Tank and Hazardous Material Locations

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California



June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Figure 17
City of Scotts Valley
Zoning

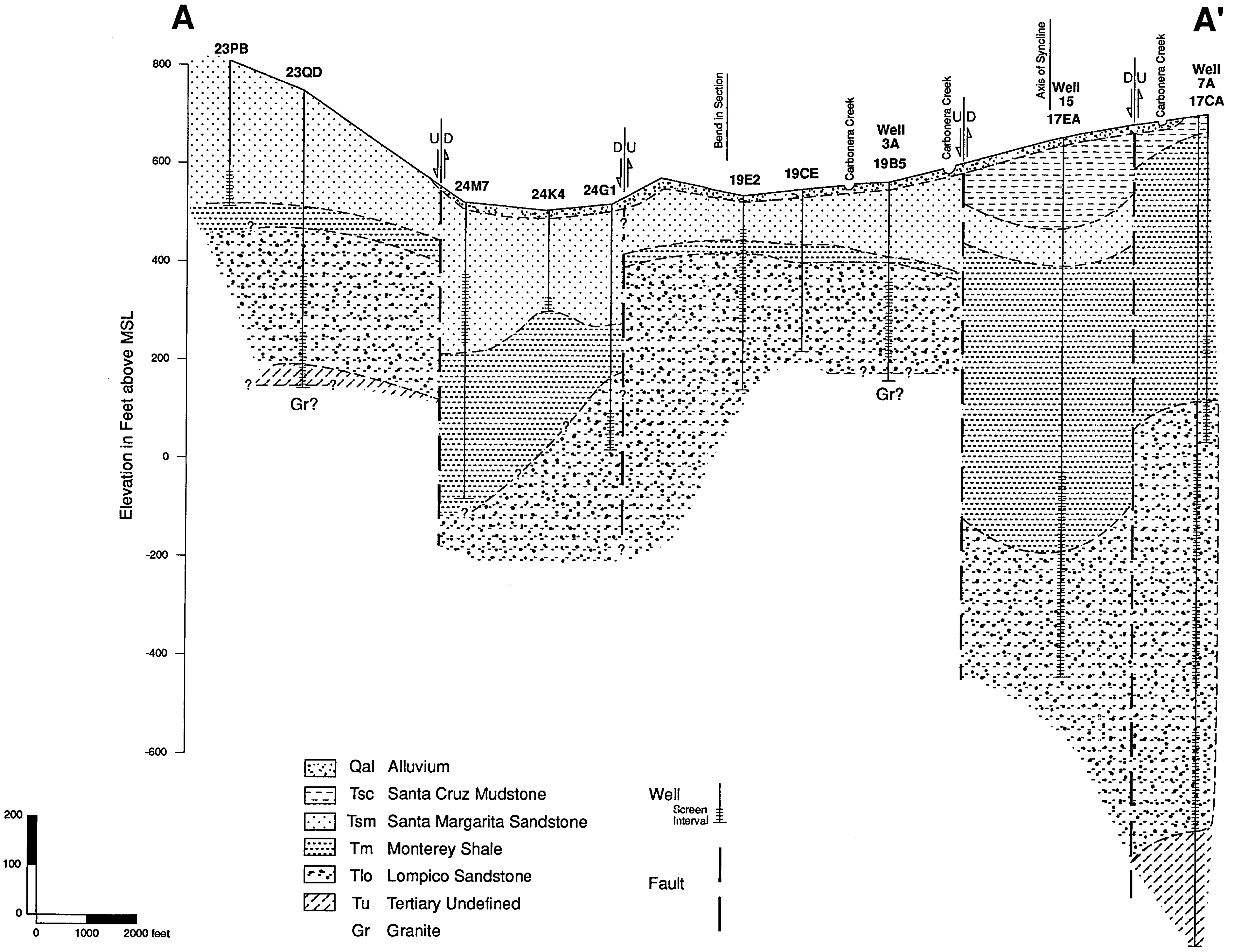


Figure 4
Cross Section
A - A'

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

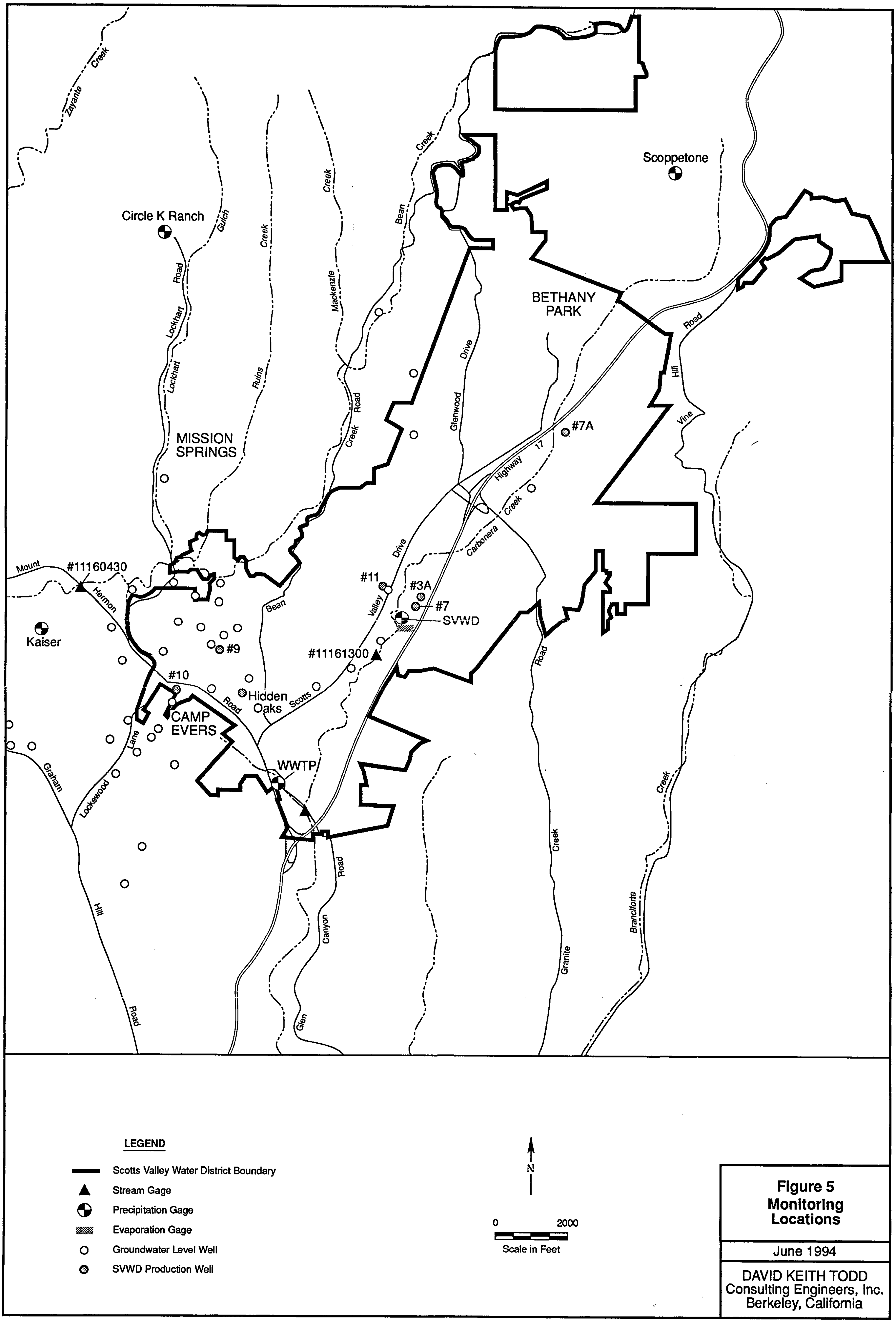


Figure 5
Monitoring Locations

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

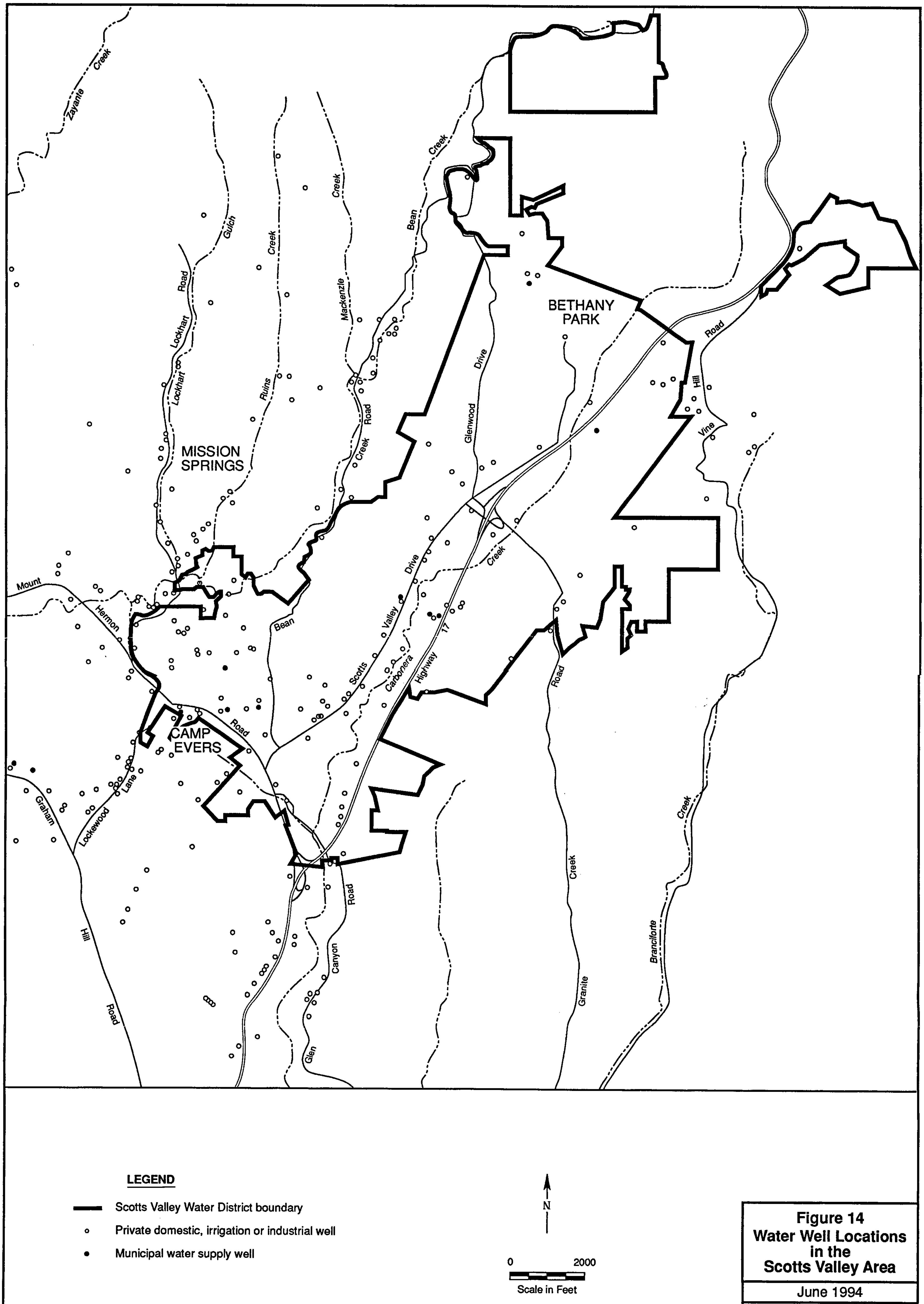


Figure 14
Water Well Locations in the Scotts Valley Area

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

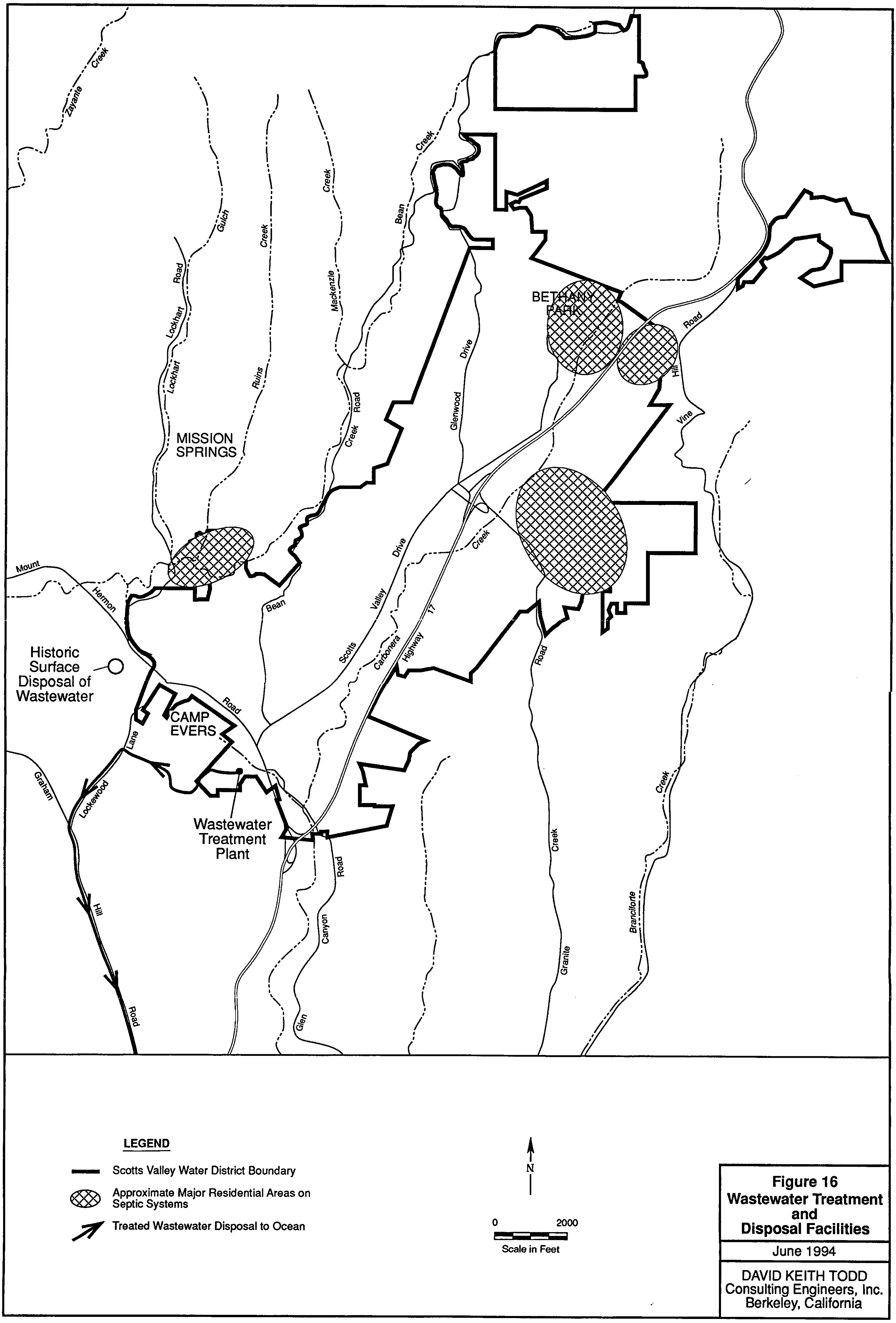


Figure 16
Wastewater Treatment and Disposal Facilities

June 1994

DAVID KEITH TODD
Consulting Engineers, Inc.
Berkeley, California

Appendix E

Memorandum of Understanding Between SVWD and Pasatiempo Golf Club

MEMORANDUM OF AGREEMENT BETWEEN PASATIEMPO GOLF CLUB AND SCOTTS VALLEY WATER DISTRICT EXPRESSING INTENT TO IMPLEMENT "PASATIEMPO WATER CONSERVATION INITIATIVE" IN COOPERATION WITH CITY OF SANTA CRUZ

WHEREAS, the Pasatiempo Golf Club ("Golf Club") seeks to ensure the availability of its golf course irrigation water supply, currently obtained from the City of Santa Cruz ("City"); and,

WHEREAS, the Scotts Valley Water District ("District") operates a recycled water program with the objective to supplement its local groundwater supply, which program has the production capability to meet the Golf Club's irrigation needs consistently, even during periods of drought; and,

WHEREAS, the City Council by its approval of Resolution NS-27,653 on November 27, 2007, has expressed the City's desire to participate jointly in a Pasatiempo Water Conservation Initiative ("Project") by providing potable water to the District when it is available from surface sources in exchange for an equal volume of recycled water provided by the District to the Golf Club to meet the Golf Club's irrigation needs; and

WHEREAS, the Golf Club and the District (the "Parties") recognize the potential for multiple and mutual Project benefits, including but not limited to improved Golf Club water supply reliability and price stability, reduced District groundwater demand as a result of the potable exchange with the City, lesser peak irrigation season demand on the City potable water system, and overall more efficient use of regional water supplies for long-term sustainability and environmental enhancement.

NOW, THEREFORE, the Parties do hereby enter into this Memorandum of Agreement and do hereby agree as follows:

1. The District shall be responsible for design, engineering, environmental approvals, permits, construction, and other elements of Project implementation for the overall Project and for all Project components except those located on the Golf Club property. The Golf Club shall be responsible for constructing any and all Project-related irrigation system or other improvements on the Golf Club property.

2. Each Party shall bear construction and related costs for those Project components for which it has implementation responsibility, except the Parties may subsequently agree that the Golf Club shall bear some of the District's share of the costs, e.g., for siting and constructing a water storage tank on or near the Golf Club property.

3. The Parties shall agree on a minimum volume of recycled water to be purchased each year for a specified period of time by the Golf Club and on water quality standards acceptable for the Golf Club's irrigation use. The Golf Club shall be obligated to purchase the agreed-upon minimum volume, whether or not it is delivered, provided that

the District has recycled supply available that meets or exceeds the agreed-upon water quality standards.

4. The Parties understand that the Golf Club intends to rely upon other sources of water, including City water service, for the purposes of meeting potable water needs, irrigating greens and tee areas, and providing backup to the District's recycled supply in case of short-term unavailability.

5. The Parties shall agree on a long-term price schedule to be paid by the Golf Club to the District for delivered recycled water, which schedule shall take into account the sharing of Project construction and related costs, the District's regular recycled water rates, the City's regular commercial potable water rates, and other factors as agreed to by the Parties.

6. The Golf Club understands that it shall receive and use recycled water from the District only in full compliance with all relevant Federal, State, and District rules and regulations.

7. The Parties shall cooperate diligently and in good faith by communicating timely; sharing information; meeting together and with the City as necessary; mutually supporting public outreach, grant funding, and regulatory approval efforts; and otherwise collaborating to implement the Project as expeditiously and economically as possible.

8. The Parties understand and accept that, despite their diligent and best efforts, the Project may prove infeasible for reasons of cost, regulatory approval, public acceptance, or other factors unanticipated at present.

Signed:

PASATIEMPO GOLF CLUB

Edward W. Newman
President, Board of Directors

Date: 5-28-08

SCOTTS VALLEY WATER DISTRICT

Margo Hober

Margo Hober
President, Board of Directors

Date: 6-10-08

Appendix F

SVWD Water Quality Reports – 2006 - 2009

Scotts Valley
Water District

water news
Vital Information on Community Water Issues

REPORT ON WATER QUALITY FOR 2006

Scotts Valley Water Meets All Water Quality Standards

Once again the District is proud to present its annual report on water quality. The report covers testing during 2006, demonstrating that the quality of your drinking water meets or is better than state and federal regulations.

Besides providing detailed results of water-quality testing, this report contains a description of your water source, answers to common questions about water quality, and other useful water quality information.

Get Involved With Water

We urge all water customers to attend meetings of the District's Board of Directors. Learn more about water in your community. The Board meets every second Thursday at 7 p.m. at the District office, 2 Civic Center Drive, Scotts Valley.

How to Contact Us

Call Operations Manager/Assistant General Manager William O'Brien at 438-2363 for more information about your water quality.

Professional Team Serves Your Water Needs

Every member of the District's field team is dual certified in water treatment and distribution. All continue to upgrade their skills and state certifications through additional education classes and training.

California's certification regulations have become increasingly stringent, requiring college-level courses, years of experience, skills testing and on-going updates to retain certification.

Our staff has met the challenge to ensure both the reliability and quality of your water system. Our goal: to better serve you in a way that is effective, economical, and environmentally friendly.

How We Provide Top-Quality Water

Water Quality Regulations

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Department of Health Services prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

Quality Water Supply

Your drinking water comes from high-quality local groundwater supplies.

Your Water Is Highly Treated

We treat your water in four advanced water treatment facilities before we deliver it to you.

We Test for Quality

Our state-certified water quality professionals monitor your water 24 hours a day, 7 days a week, so you don't have to be concerned about it.

Frequency of Tests: Some tests are done daily, others weekly, monthly or at other intervals, even continuously around the clock, using sophisticated equipment. We do more testing than is required by the regulators.

Certified Labs: Tests and results are produced by independent state-certified facilities.

Test Accuracy: The thousands of tests we conduct every year are done with extraordinary accuracy. We can detect two-tenths of a gram of some substances in a billion gallons of water.

When to Seek Health Care Advice

Our water supply is from underground aquifers that are less susceptible to surface water contaminants. Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer who are undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune-system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available by calling the Safe Drinking Water Hotline at 1/800/426-4791.

Water in the Environment

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. The District's current source of supply is 100 percent groundwater. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, that are by-products of industrial processes and petroleum production and can also come from gas stations, urban storm water runoff, agricultural applications, and septic systems.

Radioactive contaminants, that can be naturally occurring or the result of oil and gas production and mining activities.

Where to Get More Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants.

The presence of contaminants does not necessarily indicate that water poses a health risk.

More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1/800/426-4791.

SCOTTS VALLEY WATER DISTRICT

RESULTS OF 2006 DRINKING WATER QUALITY TESTS

The tables below list all the drinking water contaminants and other constituents that we detected during the 2006 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The data presented in these tables are from testing between January 1 and December 31, 2006. Secondary Standards in the chart below refer to aesthetic aspects of water that do not impact health.

			SCOTTS VALLEY WATER DISTRICT TREATED WATER		
CONTAMINANT	MCL	PHG or (MCLG)	RANGE	AVERAGE	SOURCE OF CONTAMINATION
REGULATED CONTAMINANTS WITH PRIMARY MCLS					
Arsenic (PPB)	10	4	ND to 3.5	0.9	Naturally occuring minerals.
Barium (PPB)	1000	2	17.0 to 39.0	26.9	Naturally occuring minerals.
Chromium (PPB)	50	(100)	ND to 2.7	0.4	Naturally occuring minerals.
Copper[1] (PPB)	AL=1300	170	26 to 820	265	Naturally occuring minerals.
Fluoride (PPB)	2000	1000	87 to 670	271	Naturally occuring minerals.
Lead[1] (PPB)	AL=15	2	ND to 6.3	0.81	Naturally occuring minerals.
VOCs					
Methyl ethyl keytone (PPB)	NS	NA	ND to 5.3*	0.13	Solvent.
Methyl-*tert*-butyl ether/MTBE (PPB)	13	5	ND to 1.3**	0.1	Leaking underground storage tanks; discharge of petroleum.
DISINFECTION BY-PRODUCTS					
Total Trihalomethanes (PPB)	80	NA	ND to 58	11.5	By-product of drinking water chlorination.
Haloacetic acids 5/HAA5 (PPB)	60	NA	ND to 6	3.6	By-product of drinking water chlorination.
REGULATED CONTAMINANTS WITH SECONDARY MCLS					
	SECONDARY MCL				
Chloride (PPM)	500		20-86	46	Naturally occurring minerals.
Color (ACU)	15		ND-5	1.1	Naturally occurring minerals.
Iron (PPB)	300		ND to 540	79	Naturally occurring minerals.
Manganese (PPB)	50		ND to 24	7	Naturally occurring minerals.
Odor threshold (TON)	3		1 to 8	3.6	Naturally occurring minerals.
Specific Conductance (micromhos per cm)	1,600		317 to 1,710	884	Naturally occurring minerals.
Sulfate (PPM)	500		68 to 540	208	Naturally occurring minerals.
Lab Turbidity (NTU)	5		0.10 to 0.95	0.34	Naturally occurring minerals.
Total Dissolved Solids (PPM)	1000		194 to 1,100	555	Naturally occurring minerals.
Zinc (PPB)	5000		ND to 30.0	9.9	Naturally occuring minerals.
NO STANDARDS					
PH			7.4 to 8.3	7.9	
Sodium (PPM)			29 to 350	80	
Total Hardness (as CaCO3) (PPM)			88 to 330	216	
Bicarbonate (HCO3) (PPM)			60.3-332.5	202.4	
Calcium (PPM)			27 to 74	53.6	
Carbonate (C03) (PPM)			ND to 332.5	1.7	
Magnesium (PPM)			4.3 to 38	20.1	
Potassium (PPM)			1.6 to 6.1	2.6	
Total Alkalinity (PPM)			44 to 303	174.3	
ortho-Phosphates (PPM)			0.25 to 3.4	1.8	
Carbon Dioxide (PPM)			ND to 14	4.6	
Langelier Index			Minus 0.7 to 1.2	0.4	
Silver (PPB)			ND to 25	3.1	

*One detect from Orchard Run WTP following filter booster repair, follow-up sample non-detect.
** MTBE has only been detected in one well that provides 2.6% of the District's water supply.

FOOTNOTES

[1] Copper and lead were sampled in the summer of 2005 directly from 21 consumer taps.

Note: The State allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Most testing samples are taken from treated water. Our treatment plants remove arsenic, iron, and manganese. Coliform, color, odor, and turbidity are taken from sample stations located throughout the District. Some Volatile Organic Compounds are removed by treatment.

Definitions Used in This Chart:

(AL) Regulatory Action Level: The concentration of a contaminant, which, if exceeded, triggers treatment or other r ements that a water system must follow.

(ACU) Apparent Color Units: A measurement of color.

Lab Turbidity: A measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

Langelier Index: This index is used in stabilizing water to control both corrosion and the deposition of scale.

(MCLG) Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

(MCL) Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Micromhos per centimeter: An indicator of dissolved minerals in the water.

NA: Not applicable.

ND: Not detected at testing limit.

NS: No standard.

NTU: Nephelometric turbidity unit, indicating the clarity of the water.

PPB: Parts per billion or micrograms per liter. 1 PPB is equal to about one drop in 17,000 gallons of water.

PPM: Parts per million or milligrams per liter. 1 PPM is equal to about one drop in 17 gallons of water.

(PHG) Public Health Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

(TDS) Total Dissolved Solids: An indicator of dissolved minerals in the water.

(TON) Threshold Odor Number: The unit of odor.

We Will Give You $100 (or More) to Help You Save Water!!

For rebate forms and ideas, visit our upgraded website at www.svwd.org.

By using water wisely and efficiently, you can maintain a beautiful landscape, save money, and help the environment.

There are many ways to use water wisely:

- Purchase and install a high-efficiency washing machine and toilet
- Landscape with low-water-use and native plants
- Adjust sprinklers and timers as the seasons change

Your water District provides water conservation information to schools, participates in water conservation events, and sponsors newspaper and radio water conservation messages.

For more conservation ideas, details about rebates and other water saving tips, contact our Customer Service representatives at 831/438-2363 or visit our website at www.svwd.org.

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien.

Water Recycling Growing To Meet Community Needs

The District's water recycling program continues to expand. The program now provides highly treated, recycled water from the City's wastewater plant to irrigate all the parks in Scotts Valley, the high school grounds, and all the elementary schools.

Recycled water used for landscape accounts for about 10 percent of the District's total water supply during summer.

Recycled water reduces the impact of District operations on our limited groundwater resources. This is especially critical during a dry year, such as the current one, when rainfall totaled only about half of the normal amount.

Continued expansion of the recycling program is expected and will be needed as future demand for water increases.

Scotts Valley Water District
P.O. Box 660006
Scotts Valley, CA 95067-0006
831/438-2363

Please visit us at www.svwd.com

Learn about the District, its Board of Directors, meeting agendas and minutes, water quality, rates, conservation and more.

PRST. STD.
U.S. POSTAGE
PAID
COMPLETE MAILING
SERVICE, INC.

Printed on recycled paper with soy ink.
Each ton of recycled paper saves
7,000 gallons of water.

Scotts Valley
Water District

water news

Vital Information on Community Water Issues

REPORT ON WATER QUALITY FOR 2007

How to Get Involved

We urge our customers to learn more about water in our community by attending the meetings of the District's elected Board of Directors. The Board meets regularly on the second Thursday of the month at 7 p.m. in the Boardroom, downstairs at the District Office at 2 Civic Center Drive in Scotts Valley. Visit www.svwd.org.

Who to Contact

For more information about water quality, please contact Assistant General Manager/Operations Manager William O'Brien at 831/438-2363.

Scotts Valley Water District Brings You High-Quality Drinking Water

As part of Scotts Valley Water District's commitment to provide you with the best possible water at the lowest reasonable cost, we are pleased to present this detailed report on our 2007 water quality. Once again, the report shows that your tap water meets or is better than the increasingly stringent standards set by state and federal regulators. Results of hundreds of water quality tests conducted in 2007 and other useful and educational water quality information are contained in the report. Included are a description of our water source and answers to common questions about water quality.

How We Provide Top-Quality Water

Our state-certified water quality experts work as a team to ensure that the water provided to your home or business is safe and clean.

TESTING — Water treatment staff, following a strict schedule, test the water throughout the system on a daily, weekly, quarterly and annual basis.

ACCURACY — Testing is so sophisticated and accurate that we can detect substances as small as one-tenth of a part per billion.

TREATMENT — Your water is treated at modern treatment plants to meet local water quality needs. Trace amounts of chlorine are added to the water to disinfect it and keep it safe as it travels through pipelines to your home or business.

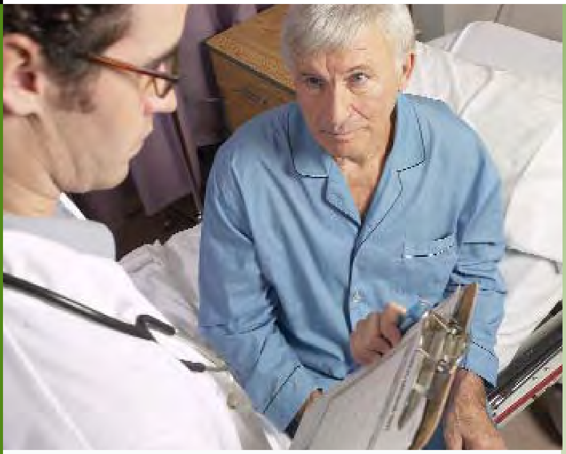
FLUSHING — Pipelines need to be cleaned periodically, so we flush them out through fire hydrants. This removes small amounts of natural sand and minerals that can slowly build up.

Scotts Valley Water District Provides Quality Drinking Water

High-Quality Source Water

Your drinking water comes from local groundwater supplies. The water is treated and tested before it is delivered to you. This results in a high-quality supply of drinking water.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Department of Public Health (DPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems.



People With Special Needs

Some people may be more vulnerable to contaminants in drinking water than the general population.

Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers.

USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791), www.epa.gov/OW.

Water in the Environment

The sources of drinking water include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.

Radioactive contaminants, that can be naturally-occurring or be the result of oil and gas production and mining activities.

Assessing Health Risks

Drinking water may reasonably be expected to contain at least small amounts of some contaminants.

The presence of contaminants does not necessarily indicate that water poses a health risk.

More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

SCOTTS VALLEY WATER DISTRICT

RESULTS OF 2007 DRINKING WATER QUALITY TESTS

The data presented in these tables are from testing by state certified labs between January 1 and December 31, 2007. Secondary Standards in the chart below refer to aesthetic aspects of water that do not impact health. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk.

			SCOTTS VALLEY WATER DISTRICT TREATED WATER		
CONTAMINANT	MCL	PHG or (MCLG)	RANGE	AVERAGE	SOURCE OF CONTAMINATION
REGULATED CONTAMINANTS WITH PRIMARY MCLS					
Total Coliform Bacteria*	2/month	0	0 - 2	NA	Naturally present in the environment.
Arsenic (PPB)	50	4	ND to 3.5	0.7	Naturally occurring minerals.
Copper** (total) (PPB)	1000	170	26 to 820	265	Naturally occurring minerals.
Fluoride (PPB)	2000	1000	90 to 630	285	Naturally occurring minerals.
Lead** (total) (PPB)	AL=15	2	ND to 6.3	0.8	Naturally occurring minerals.
Aluminum (total) (PPB)	1000	600	ND to 58.0	7.4	Naturally occurring minerals.
DISINFECTION BY-PRODUCTS					
Total Trihalomethanes (PPB) all treated water	80	NA	ND to 53	12.1	By-product of drinking water chlorination.
Haloacetic acids (PPB)	60	NA	ND to 5.8	3.5	By-product of drinking water chlorination.
REGULATED CONTAMINANTS WITH SECONDARY MCLS					
	SECONDARY MCL				
Chloride (PPM)	500		22 to 61	41	Naturally occurring minerals.
Color (ACU)	15		ND to 5	0.6	Naturally occurring minerals.
Iron (PPB)	300		ND to 120	22	Naturally occurring minerals.
Manganese (PPB)	50		ND to 20	4	Naturally occurring minerals.
Odor threshold (TON)	3		1 to 8	2.9	Naturally occurring minerals.
Specific Conductance (micromhos per cm)	1,600		301 to 1,690	750	Naturally occurring minerals.
Sulfate (PPM)	500		54 to 480	101	Naturally occurring minerals.
Lab Turbidity (NTU)	5		0.10 to 1.70	0.30	Naturally occurring minerals.
Total Dissolved Solids (PPM)	1000		190 to 1,100	501	Naturally occurring minerals.
Zinc (total) (PPB)	5000		ND to 63.0	15.2	Naturally occurring minerals.
NO STANDARDS					
PH			7.5 to 8.3	7.8	
Sodium (PPM)			31 to 330	81	
Total Hardness (as CaCO3) (PPM)			72 to 310	227	
Calcium (PPM)			22 to 76	59.3	
Carbonate (C03) (PPM)			ND to 4.9	1.1	
Magnesium (PPM)			4.1 to 37	18.8	
Potassium (PPM)			1.4 to 5.3	2.5	
Total Alkalinity (PPM)			57 to 380	202.6	
ortho-Phosphate (PPM)			0.04 to 6.9	1.5	
Carbon Dioxide (PPM)			ND to 11	5.2	
Langelier Index			Minus 0.6 to 1.2	0.4	

FOOTNOTES

* 2 out 194 coliform samples drawn in 2007 were positive for coliform bacteria.

** Copper and Lead were sampled in the summer of 2005 directly from 21 consumer taps to comply with the Lead and Copper Rule.

Note: The State allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Most testing samples are taken from treated water. Our treatment plants remove arsenic, iron, and manganese. Coliform, color, odor, and turbidity are taken from sample stations located throughout the District. Some Volatile Organic Compounds are removed by treatment.

Definitions Used in This Chart:

(AL) Regulatory Action Level: The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements that a water system must follow.

(ACU) Apparent Color Units: A measurement of color.

Lab Turbidity: A measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

Langelier Index: This index is used in stabilizing water to control both corrosion and the deposition of scale.

(MCLG) Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

(MCL) Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Micromhos per centimeter: An indicator of dissolved minerals in the water.

NA: Not Applicable.

ND: Not detected at testing limit.

NTU: Nephelometric turbidity unit, indicating the clarity of the water.

PPB: Parts per billion or micrograms per liter. 1 PPB is equal to about one drop in 17,000 gallons of water.

PPM: Parts per million or milligrams per liter. 1 PPM is equal to about one drop in 17 gallons of water.

(PHG) Public Health Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

(TDS) Total Dissolved Solids: An indicator of dissolved minerals in the water.

(TON) Threshold Odor Number: The unit of odor.

Use Water Wisely: Water is Too Precious to Waste

In the face of a statewide drought and two straight years of below average rainfall in Scotts Valley, we all need to do our part to use water wisely. The District is asking its customers to reduce water use by at least 10 percent.

Some tips about how to save water:

- Water only before 6 a.m. and after 8 p.m. to reduce evaporation and interference from wind.
- Don't over-water landscaping. Irrigate 2 or 3 days per week, and only after the top inch of soil is dry.
- Adjust sprinklers to prevent overspray and run-off. Repair leaks and broken sprinkler heads.
- Add 2" to 3" of mulch around trees and plants to reduce evaporation.
- Install a water-efficient drip irrigation system for trees, shrubs, and flowers to get water to the plant's roots more efficiently.
- Sign-up for a free water conservation analysis of your landscaping and sprinkler systems. The analysis will provide recommendations on ways you can conserve water.
- For more information and tips about water conservation, visit our newly revamped website at www.svwd.org or call the District office at 831/438-2363.

Recycled Water Use Continues to Expand

Recycled water is becoming a bigger and more important part of our water supply. About 10 percent of our water supply in Summer 2007 came from recycled water, and the amount is continuing to grow.

New customers brought online in 2007, include: Emerald Hills, Vine Hills School, Scotts Valley Square, and Tree Circus.

Recycled water is ideally suited and safe for irrigating landscaped areas. It also supplements the potable water supply, making more drinking water available for our non-recycled water customers.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguien que lo entienda bien.

Scotts Valley Water District
P.O. Box 660006
Scotts Valley, CA 95067-0006
831/438-2363

Please visit us at www.svwd.org

Learn about the District, its Board of Directors, meeting agendas and minutes, water quality, rates, conservation and more.

PRST. STD.
U.S. POSTAGE
PAID
COMPLETE MAILING
SERVICE, INC.

Printed on recycled paper with soy ink.
Each ton of recycled paper saves
7,000 gallons of water.

Scotts Valley
Water District

water news

Vital Information on Community Water Issues

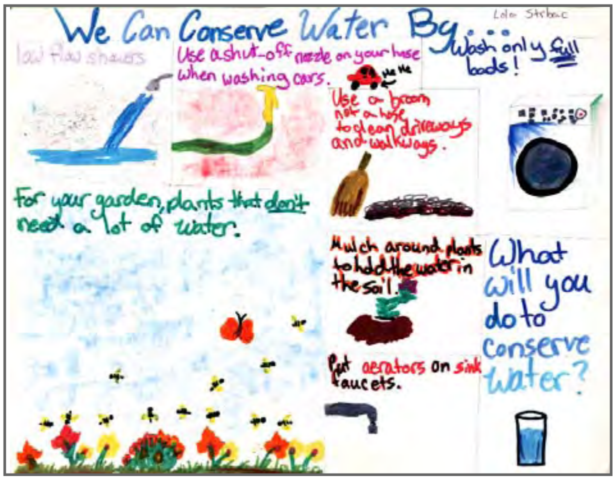
REPORT ON WATER QUALITY FOR 2008

Scotts Valley Water Continues to Provide High-Quality Drinking Water

As part of our commitment to provide you with the best possible water at the lowest cost, we are pleased to present this detailed report on Scotts Valley Water District's 2008 water quality.

Once again, the report shows that your tap water meets or is better than the increasingly stringent standards set by State and Federal regulators.

This report provides detailed results of water quality testing, water sources, and basic information about drinking water.



Poster by: Lola Strbac

High-Quality Water Supply for Our Customers

Our drinking water comes from local groundwater supplies. The water is treated and tested before it is delivered to you. The result is a high-quality supply of drinking water.

How to Get Involved: We urge our customers to learn more about water in our community by attending the meetings of the District's elected Board of Directors. The Board meets on the second Thursday of every month at 7 p.m. in the District Office at 2 Civic Center Drive in Scotts Valley. A schedule of meetings and agendas are available at www.svwd.org.

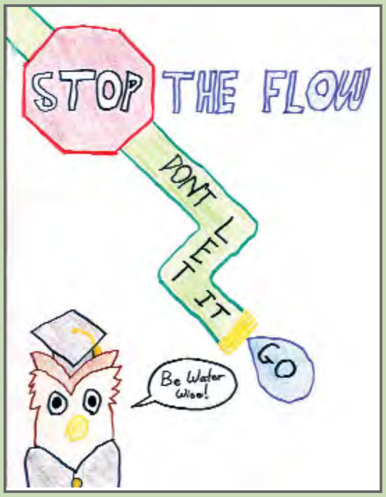
Who to Contact: For more information about water quality, please contact Scotts Valley Water District Office at 831/438-2363.

En Espanol *Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.*

Student Water Conservation Artwork

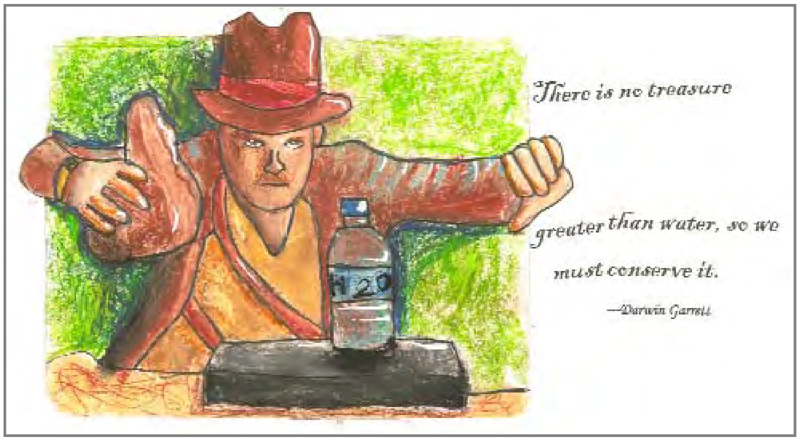
In celebration of May as Water Awareness Month, the District invited students to design posters depicting the importance of water conservation. Students from Vine Hill Elementary School's 2008 fourth and fifth grade class brought water conservation home with the "Know Your Flow" Water Conservation Poster Contest.

Water Conservation Poster Contest Winners were presented with U.S. Savings Bond awards and a large round of applause at a public Board meeting. From left are: Lola Strbac (2nd place 5th grade), Sedona Bragdon (3rd place 5th grade), Darwin Garrett (1st place 5th grade), Nikolas Osorio (1st place 4th grade), and Jessica Perak, SVWD Water Conservation Coordinator.



Poster by: Nikolas Osorio

State Certified Staff Ensure Quality Water Service



Poster by: Darwin Garrett

Scotts Valley Water District relies solely on groundwater sources from the Santa Margarita Groundwater Basin, including the Santa Margarita, Monterey, Lompico and Butano formations. The District operates six wells and four water treatment plants to ensure water delivered to customers meets all drinking water standards.

Our raw groundwater is naturally high in iron, manganese, total dissolved solids, and hydrogen sulfide and requires treatment to meet the State drinking water standards. The District operates a combination of pressure filters, air stripping towers, chemical treatment, and granular activated carbon treatment to condition raw water into a potable drinking water supply.

District staff certified by California Department of Public Health is constantly carrying out projects to better serve customers and increase the quality and reliability of supply. The success of our treatment process, our on-going maintenance program, and our effective operations are confirmed through periodic testing of the water delivered.

Assessing Health Risks

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants.

The presence of contaminants does not necessarily indicate that water poses a health risk.

More information about contaminants and potential health effects can be obtained at the sources listed below.

People With Special Needs

Some people may be more vulnerable to contaminants in drinking water than the general population.

Immuno-compromised persons such as persons with cancer undergoing chemo-therapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections.

These people should seek further advice about drinking water from their health care providers.

USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the sources below.

USEPA's SAFE DRINKING WATER HOTLINE:
1-800/426-4791
website: www.epa.gov/safewater.

Water Quality Standards

Your drinking water comes from local groundwater supplies. The water is treated and tested before it is delivered to you. This results in a high-quality supply of drinking water.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Department of Public Health (DPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems.

Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Poster by: Evan Ockow

Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.

Radioactive contaminants, that can be naturally-occurring or be the result of oil and gas production and mining activities.

SCOTTS VALLEY WATER DISTRICT

RESULTS OF 2008 DRINKING WATER QUALITY TESTS

The tables below list all of the drinking water contaminants and other constituents detected between January 1 and December 31, 2008. Secondary Standards in the table refer to aesthetic aspects of water. In general, water quality remained constant or improved in 2008 and meets all State and Federal standards.

			SCOTTS VALLEY WATER DISTRICT TREATED WATER		
CONTAMINANT	MCL	PHG or (MCLG)	RANGE	AVERAGE	SOURCE OF CONTAMINATION
REGULATED CONTAMINANTS WITH PRIMARY MCLs					
Total Coliform Bacteria	2/month	0	0 - 1	NA	Naturally present in the environment.
Arsenic (PPB)	10	4	ND to 3.8	0.8	Naturally occurring minerals.
Fluoride (PPB)	2,000	1,000	110 to 740	308	Naturally occurring minerals.
Gross alpha particle activity*	15	3	ND to 7.2	2.4	Naturally occurring minerals.
DISINFECTION BY-PRODUCTS					
Total Trihalomethanes all treated water (PPB)	80	NA	ND to 60	12.7	By-product of drinking water chlorination.
Haloacetic acids (5/HAA5)	60	NA	1.3 to 3.2	2.9	By-product of drinking water chlorination.

LEAD AND COPPER**

	ACTION LEVEL	PHG OR (MCLG)	# OF SITES SAMPLED	# OF SITES EXCEEDING	90^{TH} PERCENTILE	SOURCE OF CONTAMINATION
Lead** (total) (PPB)	15	2	20	0	3.0	Customer household plumbing.
Copper** (total) (PPB)	1,300	170	20	0	370	Customer household plumbing.

REGULATED CONTAMINANTS WITH SECONDARY MCLs

CONTAMINANT	SECONDARY MCL	RANGE	AVERAGE	SOURCE OF CONTAMINATION
Chloride (PPM)	500	19 to 93	41	Naturally occurring minerals.
Color (ACU)	15	ND to 3	0.8	Naturally occurring minerals.
Iron (PPB)	300	ND to 420	70	Naturally occurring minerals.
Manganese (PPB)	50	ND to 26	7.5	Naturally occurring minerals.
Odor threshold (TON)	3	1 to 4	2.6	Naturally occurring minerals.
Specific Conductance (micromhos per cm)	1,600	314 to 1,750	714	Naturally occurring minerals.
Sulfate (PPM)	500	60 to 530	154	Naturally occurring minerals.
Turbidity (NTU)	5	0.10 to .90	0.29	Naturally occurring minerals.
Total Dissolved Solids (PPM)	1,000	210 to 1,120	467	Naturally occurring minerals.
Zinc (total) (PPB)	5,000	ND to 34.0	8.8	Naturally occurring minerals.

NO STANDARDS

PH	7.3 to 8.6	8.0
Sodium (PPM)	32 to 350	85
Total Hardness*** (as CaC03) (PPM)	80 to 335	209
Calcium (PPM)	25 to 77	56
Carbonate (C03) (PPM)	ND to 15	2.0
Magnesium (PPM)	4 to 39	17
Potassium (PPM)	ND to 6.6	2.4
Total Alkalinity (PPM)	54 to 483	193
ortho-Phosphate (PPM)	0.07 to 1.73	1.1
Carbon Dioxide (PPM)	ND to 17	3.7
Langelier Index	Minus 0.6 to 1.7	0.5

FOOTNOTES

*Radiological constituents samples were drawn from three treatment plants in September 2008.

** Lead and Copper Rule samples were drawn from 20 customer taps in the Summer of 2008.

*** Average Total Hardness for 2008 was 12 grains.

Note: The State allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Most testing samples are taken from treated water. Our treatment plants remove arsenic, iron, and manganese. Coliform, color, odor, and turbidity are taken from sample stations located throughout the District. Some Volatile Organic Compounds are removed by treatment.

DEFINITIONS USED IN THIS CHART:

AL: Regulatory Action Level: The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements that a water system must follow.

ACU: Apparent Color Units: A measurement of color.

Grains Per Gallon: A unit of hardness where 17.1 parts per million equals 1 grain per gallon.

Turbidity: A physical characteristic of water that makes the water appear cloudy. The condition is caused by the presence of suspended matter. We monitor it because it is a good indicator of the effectiveness of our filtration system.

Langelier Index: This index is used in stabilizing water to control both corrosion and the deposition of scale.

MCLG: Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

MCL: Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Micromhos per Centimeter: An indicator of dissolved minerals in the water.

NA: Not applicable.

ND: Not detected at testing limit.

NTU: Nephelometric turbidity unit, indicating the clarity of the water.

PPB: Parts per billion or micrograms per liter. 1 PPB equals 0.001 PPM and is equivalent to about one drop in 17,000 gallons of water.

PPM: Parts per million or milligrams per liter. 1 PPM equals 1,000 PPB and is equivalent to about one drop in 17 gallons of water.

PHG: Public Health Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Total Dissolved Solids: An indicator of dissolved minerals in the water.

TON: Threshold Odor Number: The unit of odor.

90^{TH} Percentile: The third highest sample results of 20 sample results.

Save Water and Improve Your Landscape

Most gardens are overwatered, harming the plants. Proper irrigation not only reduces water waste and cost but also is essential for a healthy, beautiful landscape.

WATER CONSERVATION GARDENING TIPS:

1. Remember to check your irrigation systems at least once per month (or after each mowing) to identify obvious problems and to confirm all of the components are functioning properly.
2. Applying a 2-3 inch layer of mulch in planting beds conserves water, suppresses weeds, and protects the soil from compaction and erosion.
3. Use low volume irrigation such as drip, soaker hoses, and micro-spray whenever possible.
4. Use "cycle and soak" or multiple run times on the sprinkler controller, especially with fixed spray sprinklers, clay soils, and slopes. Dividing the total watering time into shorter increments allows water to soak in. Set a goal of no runoff.
5. Irrigate early in the morning and/or late in the evening to reduce water loss due to evaporation and wind drift.

Examples of Scotts Valley low water use landscapes.

CALL THE DISTRICT OFFICE FOR A FREE LANDSCAPE IRRIGATION CHECK-UP: Phone 831/438-2363 or visit us at www.svwd.org.

Cooperative Efforts Continue to Expand Recycled Water Use

Operations Manager Bill O'Brien inspects Siltanen Recycled Water Booster Station.

Conversion of landscape irrigation at The Vineyards residential homes to recycled water helped to push recycled water use to its highest level yet, with over 160 acre feet served during the year. Recycled water use in July 2008 reached 13 percent of the total water supplied by the District, a monthly high. Using recycled water makes more drinking water available for our non-recycled water customers.

Scotts Valley Water District and City of Scotts Valley continue to work together to provide recycled water for irrigation. In 2009, the District will complete several recycled water projects to further diversify the community's water supply.

REBATES! REBATES! REBATES!

- **GET PAID TO REMOVE YOUR LAWN!** You may qualify for a rebate of $1 per square foot, up to 1,000 square feet, plus $0.30 per square foot for additional area.
- **REPLACE YOUR OLD IRRIGATION TIMER** with a weather-based irrigation controller (WBIC) and receive a rebate from $100-$500, depending on your usage history.
- **SET UP A CISTERN ON YOUR PROPERTY** and receive a rebate of $25 per 100 gallons of storage up to 2,000 gallons.

A pre-inspection is required for these rebates.

The District promoted water conservation during the 2008 Smart Gardening Faire at Skypark.

FOR MORE INFORMATION ABOUT LANDSCAPE WATERING AND REBATES CALL: 831/438-2363 • Web: www.svwd.org

Scotts Valley Water District
P.O. Box 66006
Scotts Valley, CA 95067-0006
831/438-2363

Please visit us at www.svwd.org

Learn about the District, its Board of Directors, meeting agendas and minutes, water quality, rates, conservation and more.

PRST. STD.
U.S. POSTAGE
PAID
COMPLETE MAILING
SERVICE, INC.

Scotts Valley
Water District

water
news
Vital Information on Community Water Issues

REPORT ON WATER QUALITY FOR 2009

Scotts Valley Water Meets All Water Quality Standards

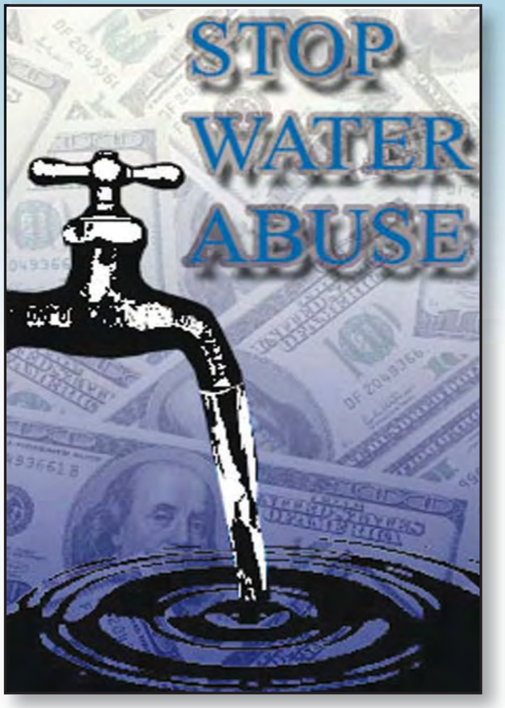
Once again the District is proud to present its annual report on water quality. The report covers testing during 2009, demonstrating that the quality of your drinking water meets or is better than state and federal regulations.

Besides providing detailed results of water-quality testing, this report contains a description of your water source, answers common questions about water quality, and provides other useful water quality information.

Student Water Conservation Print Ad Contest

Scotts Valley Water District high school students used their graphic design skills to promote water conservation in 2009.

First Place: Igor Strbac



Second Place: Jonathon Poore

Third Place: Jack Fogelquist

Get Involved With Water

Learn more about water in your community! We urge customers to attend monthly Board Meetings held on the second Thursday of every month at 7 p.m. at the District office, 2 Civic Center Drive, Scotts Valley.

How to Contact Us

Contact Assistant General Manager/Operations Manager William O'Brien at 831-438-2363 or by e-mail at contact@svwd.org for more information about your water quality.

Please Visit Us at www.svwd.org

Use our website to access meeting agendas and minutes as well as information about the Board of Directors, rates, water quality, and water conservation.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguien que lo entienda bien.

How We Provide Quality Water

Water Quality Regulations

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Department of Health Services prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water that must provide the same protection for public health. For information go to www.epa.gov.

Quality Water Supply

Your drinking water comes from local groundwater supplies.

Your Water Is Highly Treated

We treat your water in four advanced water treatment facilities before we deliver it to you.

We Test for Quality

Our state-certified water quality professionals monitor your water 24 hours a day, 7 days a week, so you don't have to be concerned about it.

Frequency of Tests: Some tests are done daily, others weekly, monthly or at other intervals, even continuously around the clock, using sophisticated equipment. We do more testing than is required by the regulators.

Certified Labs: Tests and results are produced by independent state-certified facilities.

Test Accuracy: The thousands of tests we conduct every year are done with extraordinary accuracy. We can detect two-tenths of a gram of some substances in a billion gallons of water.

When to Seek Health Care Advice

Our water supply is from underground aquifers that are less susceptible to surface water contaminants. Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer who are undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune-system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available by calling the Safe Drinking Water Hotline at 1-800-426-4791.

Water in the Environment

Sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. The District's current source of supply is 100 percent groundwater. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, that are by-products of industrial processes and petroleum production and can also come from gas stations, urban storm water runoff, agricultural applications, and septic systems.

Radioactive contaminants, that can be naturally occurring or the result of oil and gas production and mining activities.

An assessment of the drinking water sources for the Scotts Valley Water District was completed in September 2001. The sources are considered most vulnerable to the following activities associated with contaminants detected in the water supply: drycleaning, gasoline storage and distribution, and manufacturing. In addition, the sources are considered most vulnerable to these activities: abandoned water and monitoring wells, septic systems, transportation corridors and commercial parking lots, and sewer collection systems.

Where to Get More Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants.

The presence of contaminants does not necessarily indicate that water poses a health risk.

More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

SCOTTS VALLEY WATER DISTRICT

RESULTS OF 2009 DRINKING WATER QUALITY TESTS

The tables below list all of the drinking water contaminants and other constituents detected between January 1 and December 31, 2009. Secondary Standards in the table refer to aesthetic aspects of water.

SCOTTS VALLEY WATER DISTRICT TREATED WATER

CONTAMINANT	MCL or MRDL	PHG or MCLG	RANGE	AVERAGE	SOURCE OF CONTAMINATION
REGULATED CONTAMINANTS WITH PRIMARY MCLs					
Total Coliform Bacteria	2/month	0	0 - 2	NA	Naturally present in the environment.
Arsenic* (PPB)	10	4	ND to 5.0	1.1	Naturally occurring minerals.
Fluoride (PPB)	2,000	1,000	110 to 690	285	Naturally occurring minerals.
Gross alpha particle activity** (pCi/L)	15	3	ND to 7.2	2.4	Naturally occurring minerals.
Total Xylene (PPB)	1750	1,000	ND to 180	5	Naturally occurring minerals.
DISINFECTION BY-PRODUCTS AND DISINFECTANT RESIDUAL					
Total Trihalomethanes (PPB)	80	NA	ND to 63	11.7	By-product of drinking water chlorination.
Haloacetic acids (PPB)	60	NA	ND to 3.3	2.9	By-product of drinking water chlorination.
Chlorine [free] (PPM)	4	4	0.1 to 2.3	0.9	Drinking water disinfectant added for treatment.

LEAD AND COPPER***

	ACTION LEVEL	PHG	# OF SITES SAMPLED	# OF SITES EXCEEDING	90TH PERCENTILE	SOURCE OF CONTAMINATION
Lead*** [total] (PPB)	15	2	20	0	3.0	Customer household plumbing.
Copper*** [total] (PPB)	1,300	170	20	0	370	Customer household plumbing.

REGULATED CONTAMINANTS WITH SECONDARY MCLs

CONTAMINANT	SECONDARY MCL	RANGE	AVERAGE	SOURCE OF CONTAMINATION
Chloride (PPM)	500	23.0 to 91.0	38.8	Naturally occurring minerals.
Color (ACU)	15	ND to 3.0	0.4	Naturally occurring minerals.
Iron (PPB)	300	ND to 420	59	Naturally occurring minerals.
Manganese (PPB)	50	ND to 31.0	7.7	Naturally occurring minerals.
Odor threshold (TON)	3	1 to 4	2.4	Naturally occurring minerals.
Specific Conductance (micromhos per cm)	1,600	370 to 1,100	744	Naturally occurring minerals.
Sulfate (PPM)	500	71 to 300	146	Naturally occurring minerals.
Turbidity (NTU)	5	ND to .35	0.17	Naturally occurring minerals.
Total Dissolved Solids (PPM)	1,000	220 to 700	470	Naturally occurring minerals.

NO STANDARDS

pH	7.5 to 8.3	7.9
Sodium (PPM)	32 to 150	78
Total Hardness**** [as CaC03] (PPM)	90 to 311	210
Calcium (PPM)	25 to 70	55
Carbonate [as C03] (PPM)	ND to 5.1	1.3
Magnesium (PPM)	5 to 35	17
Potassium (PPM)	1.5 to 3.9	2.5
Total Alkalinity (PPM)	55 to 337	192
ortho-Phosphate [as P04] (PPM)	0.7 to 2.2	1.3
Carbon Dioxide (PPM)	ND to 10	4
Langelier Index	Minus 0.6 to 1.2	0.5
Methyl Ethyl Keytone (PPB)	ND to 7.9	0.9

FOOTNOTES

* While your drinking water meets the federal and state standard for arsenic, it does contain low levels of arsenic. The arsenic standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. The U.S. Environmental Protection Agency continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

** Radiological constituents samples were drawn from three treatment plants in September 2008.

*** Lead and Copper Rule samples were drawn from 20 customer taps in the Summer of 2008.

**** Average Total Hardness for 2009 was 12 grains.

Note: The State allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Most testing samples are taken from treated water. Our treatment plants remove arsenic, iron, and manganese. Coliform, color, odor, and turbidity are taken from sample stations located throughout the District. Some Volatile Organic Compounds are removed by treatment.

DEFINITIONS USED IN THIS CHART:

AL: Regulatory Action Level: The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements that a water system must follow.

ACU: Apparent Color Units: A measurement of color.

Grains Per Gallon: A unit of hardness where 17.1 parts per million equals 1 grain per gallon.

Turbidity: A physical characteristic of water that makes the water appear cloudy. The condition is caused by the presence of suspended matter. We monitor it because it is a good indicator of the effectiveness of our filtration system.

Langelier Index: This index is used in stabilizing water to control both corrosion and the deposition of scale.

MCLG: Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

MCL: Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Micromhos per Centimeter: An indicator of dissolved minerals in the water.

MRDL: Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

NA: Not applicable.

ND: Not detected at testing limit.

NTU: Nephelometric turbidity unit, indicating the clarity of the water.

pCi/L: Picocuries per liter is a measure of radioactivity.

PDWS: Primary Drinking Water Standards: MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PPB: Parts per billion or micrograms per liter. 1 PPB equals 0.001 PPM and is equivalent to about one drop in 17,000 gallons of water.

PPM: Parts per million or milligrams per liter. 1 PPM equals 1,000 PPB and is equivalent to about one drop in 17 gallons of water.

PHG: Public Health Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Total Dissolved Solids: An indicator of dissolved minerals in the water.

TON: Threshold Odor Number: The unit of odor.

90TH Percentile: The third highest sample result of 20 sample results.

Scotts Valley Water District
P.O. Box 660006
Scotts Valley, CA 95067-0006
831-438-2363

www.svwd.org

Printed on recycled paper with soy ink.
Each ton of recycled paper saves 7,000 gallons of water.

Thank You For Conserving. In April 2009, Scotts Valley Water District responded to a third year of lower than normal rainfall by calling for a mandatory 10% reduction in water use and approving six new temporary drought response measures. Potable water demand dropped by just under 10% in the 2009 water year. We encourage all customers to keep conserving.

NO DRUGS DOWN THE DRAIN

Finally, a safe, free, and environmentally responsible way to get rid of old household medicines and sharps.
USE THESE CONVENIENT DROP-OFF SITES:

- CVS -
  Sharps Only
  257 Mt. Hermon Road
- SCOTTS VALLEY MEDICAL CLINIC -
  Medicines Only
  2980 El Rancho Drive
- WALGREENS -
  Medicines and Sharps
  210 Mt. Hermon Road

www.sharpmedsolutions.org or 831-454-2160

Free! Online Gardening Tool For Our Diverse Local Climate!

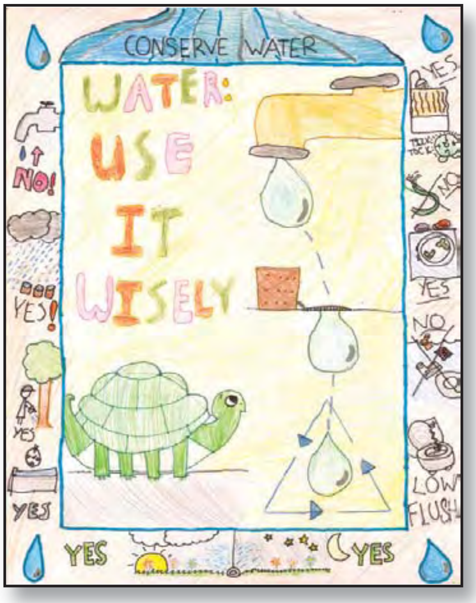
www.watersavingtips.org

Sponsored by: Water Conservation Coalition of Santa Cruz County

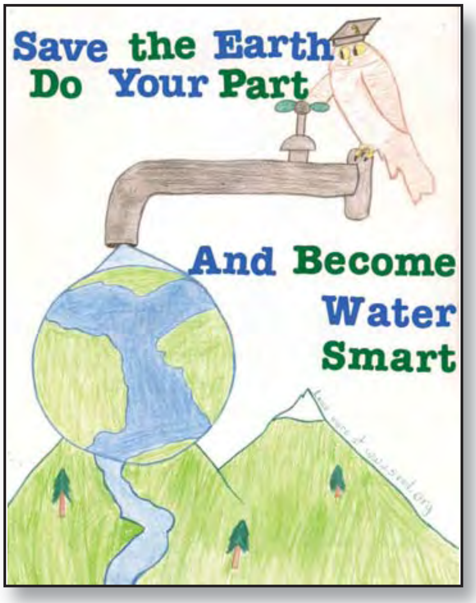
Water-Smart Gardening in Santa Cruz County is a free online tool to help create inspirational, water smart landscapes. Use this program to:

- View beautiful local gardens for design ideas.
- Use interactive tools to design your garden.
- Evaluate hundreds of plant species and make a plant list.
- Learn how to reduce landscape water use.
- Prevent and solve pest problems with less-toxic methods.

Be Water Smart - Scotts Valley Fifth Grade 2009 Poster Contest Winners



First Place: Katie Okamura, Genevieve Imboden and Elise Wadsworth



Second Place: Nikolas Osorio

Third Place: Rachel Huang and Emily Chaffin

Appendix G

CUWCC Reporting

Appendix H

Ordinance 74-83

EXHIBIT C

ORDINANCE NO. 74-83

AN ORDINANCE TO ADOPT WATER CONSERVATION REGULATIONS PURSUANT TO THE PROVISIONS OF SECTION 2.5.1 OF ORDINANCE NO. 68-82

BE IT ORDAINED by the Board of Directors of the Scotts Valley Water District (Board), Santa Cruz County, California, as follows:

WHEREAS, the Board adopted Ordinance No. 68-82 on March 11, 1982, which provides authority in Section 2.5.1 to adopt Water Conservation Regulations; and

WHEREAS, water is a finite resource that should not be wasted; and

WHEREAS, it is imperative to the public well-being that those uses of water which constitute waste or abuse of the resource be prohibited; and

WHEREAS, it is necessary to conserve the water supply of the Scotts Valley Water District for the greatest public benefit and to discourage wasteful and unproductive uses of water; and

WHEREAS, the Board has considered the proposed Negative Declaration attached hereto and the comments received during the public review period; determines that the project will not have any significant effect on the environment and that a Negative Declaration has been prepared in accordance with the provisions of CEQA; and approves the Negative Declaration.

NOW, THEREFORE, BE IT ORDAINED, that the Board does hereby adopt the attached Water Conservation Regulations as authorized by Section 2.5.1 of Ordinance 68-82.

* * * * * * * * * * *

Passed and adopted this 14th day of April, 1983, by the following vote:

AYES: Directors **Scothorn, Miles, Tetter, Dunkle**
NOES: Directors **None**
ABSENT: Directors **Snyder**

Vice-PRESIDENT OF THE BOARD OF DIRECTORS

ATTEST:

Deborah L. Hazen
Secretary to Said Board

11-49

WATER CONSERVATION REGULATIONS
ADOPTED PURSUANT TO
SECTION 2.5.1

SECTION 1. - DECLARATION OF CONDITION

It is hereby found and declared that water is a finite resource and should not be wasted within the service area of the Scotts Valley Water District, and that it is necessary to prohibit and regulate water uses as provided in this Ordinance.

SECTION 2. - APPLICATION OF REGULATIONS

The provisions of this Ordinance shall apply to all persons using District water both within and outside the District Service Area, regardless of whether any person using water shall have a contract for water service with the District.

SECTION 3. - PROHIBITED WATER USES

The use and withdrawal of water by any person from District sources within the District for the following purposes is hereby prohibited:

Revised Ord. 74-83
Date APR. 14, 1983

A. The use of water from any fire hydrant unless specifically authorized by permit from the District, except by regularly constituted fire protection agencies for fire suppression purposes.

B. The watering of grass, lawn, groundcover, shrubbery, open ground, crops and trees, including agricultural irrigation, in a manner or to an extent which allows excess water to run to waste.

C. The escape of water through leaks, breaks, or malfunction within the water user's plumbing or distribution system for any period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight (48) hours after the water user discovers such break, leak, or malfunction, or receives written notice from the District of such condition, whichever occurs first, is a reasonable time within which to correct such condition or to make arrangements for correction.

D. The use of water for washing cars, building exteriors, mobilehome exteriors, boats, sidewalks, driveways, or other exterior surfaces, without the use of a quick-acting positive shut-off nozzle on the hose.

E. The operation of any ornamental fountain, car wash, or other such structure using water from the District water system, unless water for such use is recycled.

Revised Ord. 74-83

Date APR. 14, 1983

F. The indiscriminate running of water or washing with water not otherwise prohibited above which is wasteful and without reasonable purpose.

SECTION 4. - DISCONNECTION

Any person in violation of the provisions of Section 3 who fails to take corrective action within forty-eight (48) hours after first written notification of the violation shall be subject to disconnection of water service.

SECTION 5. - NON-COMPLIANCE WITH REGULATIONS

Water service may be discontinued by the District for non-compliance with this or any other ordinance or regulation applicable to the water service and the District Manager is hereby authorized to terminate water service forty-eight (48) hours after written notice of the customer's non-compliance therewith. Water service will be reinstated under the terms and conditions of District Ordinances.

SECTION 6. - APPEAL TO THE DISTRICT BOARD

Should any applicant or customer be dissatisfied with the actions or decisions of the District Manager pursuant to the regulations or prohibitions herein set forth, said applicant may file an appeal of the decision of the District Manager with the Board of Directors of the District, which appeal shall be placed on the agenda of the District Board whose decision therein shall be final. The applicant or customer may request a special meeting of the Board of Directors to consider the appeal, as provided in Section 1.5 of Ordinance 68-82.

Revised Ord. 74-83

Date APR. 14, 1983

Appendix I

Ordinance 150-09

SCOTTS VALLEY WATER DISTRICT

ORDINANCE NO. 150-09

AN ORDINANCE ESTABLISHING PENALTIES FOR VIOLATION OF WATER CONSERVATION RESTRICTIONS AND REVISING CERTAIN CHARGES FOR WATER METER SERVICE CALLS

BE IT ORDAINED by the Board of Directors of the Scotts Valley Water District, Santa Cruz County, California, that Ordinance No. 119-96, as amended, is hereby further amended at Article 4 and Article 9 as stated in Sections 1 and 2 of this Ordinance No. 150-09.

SECTION 1. REVISION OF CHARGES FOR WATER METER SERVICE CALLS

The current "Section 4.3 – Meter Test – Deposit" at Article 4 shall be amended, revising the District's meter test deposit amount from twenty-five dollars ($25.00) to one hundred dollars ($100.00). The new Section 4.3 shall read as follows:

> ***"Section 4.3 - Meter Test – Deposit***
> *All meters will be tested prior to installation and no meter will be installed which registers more than two percent (2%) fast. If a customer desires to have the meter serving his premises tested, a deposit of One Hundred Dollars ($100.00) will be required. Should the meter register more than two percent (2%) fast, the deposit will be refunded, and the meter will be replaced. Should the meter register less than two percent (2%) fast, the deposit will be retained by the District."*

The current "Section 4.16 – Re-Connection Charge" at Article 4 shall be amended, revising the District's re-connection charge from twenty dollars ($20.00) between the hours of 8:00 a.m. and 5:00 p.m. and thirty five dollars ($35.00) at other times to fifty dollars ($50.00) between the hours of 8:00 a.m. and 4:00 p.m. on regular workdays and two hundred dollars ($200.00) at other times. The new Section 4.16 shall read as follows:

> ***"Section 4.16 - Re-Connection Charge***
> *Between the hours of 8:00 a.m. and 4:00 p.m. on regular workdays, a re-connection charge of Fifty Dollars ($50.00) will be made prior to renewing service following a discontinuance. At all other times, a re-connection charge of Two Hundred Dollars ($200.00) will be made prior to renewing service following a discontinuance."*

SECTION 2. ESTABLISHMENT OF PENALTIES FOR VIOLATING WATER CONSERVATION RESTRICTIONS

The current "Section 9.4 – Claims Against District" at Article 9 shall be renumbered to "Section 9.5 – Claims Against District." A new Section 9.4 shall be added at Article 9 to read as follows:

"Section 9.4 – Violation of Water Conservation Restrictions
Any customer found repeatedly violating District water conservation restrictions in a given calendar year shall be assessed penalties to be applied to the customer's next water bill as set forth below.

First offense:	*Explanation of restrictions is provided to customer*
Second offense:	*Written notice of violation*
Third offense:	*$100 penalty*
Fourth offense:	*$250 penalty*
Fifth and subsequent offenses:	*$500 penalty"*

SECTION 3. SEVERABILITY

If any section, subsection, paragraph, subparagraph, sentence, clause or phrase of this Ordinance is for any reason held to be invalid or unconstitutional, such invalidity or unconstitutionality shall not affect the validity or constitutionality of the remaining portions of this Ordinance; and the Board declares that this Ordinance and each section, subsection, paragraph, subparagraph, sentence, clause and phrases thereof would have been adopted irrespective of the fact that one or more of such section, subsection, paragraph, subparagraph, sentence, clause or phrase be declared invalid or unconstitutional.

SECTION 4. EFFECTIVE DATE

This Ordinance shall be in full force and effect forthwith upon adoption and shall be published once in full in a newspaper of general circulation, printed, published, and circulated in the District within fifteen (15) days after adoption and shall be posted within said time in three (3) public places within the District.

PASSED AND ADOPTED this 10th day of September 2009 by the following vote:

AYES:	DIRECTORS - Hodgin, Kannegaard, Kassis, Miller, Perri
NOES:	DIRECTORS -
ABSENT:	DIRECTORS -
ABSTAIN:	DIRECTORS -

By: /s/ Chris Perri
Chris Perri
President of the Board of Directors

ATTEST:

/s/ Deborah L. Hazen
Deborah L. Hazen
Secretary to the Board

I hereby certify that the foregoing Ordinance was duly passed and adopted by the Board of Directors of the Scotts Valley Water District, Santa Cruz County, California, at its regular meeting thereof held on the 10th day of September in the year 2009, by the following vote:

AYES:	DIRECTORS - Hodgin, Kannegaard, Kassis, Miller, Perri
NOES:	DIRECTORS -
ABSENT:	DIRECTORS -
ABSTAIN:	DIRECTORS -

By: /s/ Chris Perri
Chris Perri
President of the Board of Directors

ATTEST:

/s/ Deborah L. Hazen
Deborah L. Hazen
Secretary to the Board

Appendix J

AWWA M36 Water Audit

AWWA WLCC Free Water Audit Software: Reporting Worksheet

WAS v4.1

Back to Instructions

? Click to access definition

Water Audit Report for: Scotts Valley Water District
Reporting Year: 2009 10/2008 - 9/2009

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

WATER SUPPLIED

<< Enter grading in column 'E'

Volume from own sources:	?	8	1,507.000	acre-ft/yr
Master meter error adjustment (enter positive value):	?	8		acre-ft/yr
Water imported:	?	n/a	0.000	acre-ft/yr
Water exported:	?	n/a	0.000	acre-ft/yr
WATER SUPPLIED:			1,507.000	acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:
Billed metered:	?	10	1,339.000	acre-ft/yr			
Billed unmetered:	?	10	0.000	acre-ft/yr			
Unbilled metered:	?	10	10.000	acre-ft/yr			
Unbilled unmetered:	?		18.838	acre-ft/yr	1.25%	● ○	

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION:	?		1,367.838	acre-ft/yr

Use buttons to select percentage of water supplied
OR
value

WATER LOSSES (Water Supplied - Authorized Consumption) 139.163 acre-ft/yr

Apparent Losses

					Pcnt:		Value:
Unauthorized consumption:	?		3.768	acre-ft/yr	0.25%	● ○	

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	?	8	0.000	acre-ft/yr		○ ●	
Systematic data handling errors:	?	9	0.250	acre-ft/yr			
Apparent Losses:	?		4.018				

? Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?		135.145	acre-ft/yr
WATER LOSSES:			139.163	acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER:	?		168.000	acre-ft/yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	?	7	62.0	miles
Number of active AND inactive service connections:	?	8	3,859	
Connection density:			62	conn./mile main
Average length of customer service line:	?	8	33.0	ft (pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	?	7	120.0	psi

COST DATA

Total annual cost of operating water system:	?	8	$4,627,200	$/Year
Customer retail unit cost (applied to Apparent Losses):	?	9	$8.71	$/1000 gallons (US)
Variable production cost (applied to Real Losses):	?	8	$1,994.21	$/acre-ft/yr

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	11.1%
Non-revenue water as percent by cost of operating system:	7.3%
Annual cost of Apparent Losses:	$11,402
Annual cost of Real Losses:	$269,508

Operational Efficiency Indicators

Apparent Losses per service connection per day:	0.93	gallons/connection/day
Real Losses per service connection per day*:	31.26	gallons/connection/day
Real Losses per length of main per day*:	N/A	
Real Losses per service connection per day per psi pressure:	0.26	gallons/connection/day/psi
? Unavoidable Annual Real Losses (UARL):	47.97	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	135.15	million gallons/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.92	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 83 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unauthorized consumption
3: Customer metering inaccuracies

For more information, click here to see the Grading Matrix worksheet

Appendix K

Water Shortage Contingency and Drought Response Documents

Scotts Valley
Water District

On February 27th, Governor Schwarzenegger proclaimed a state of emergency due to the drought and ordered immediate action to deal with the crisis. This is the first time a statewide drought emergency has been declared covering all counties. The proclamation requests that all urban water users immediately increase their water conservation activities in an effort to reduce their individual water use by 20 percent.

According to the SVWD Urban Water Management Plan (UWMP), a 20 percent demand in reduction is considered to be a Stage III water supply shortage action. Based on rainfall levels as of April 3rd, Scotts Valley Water District does not meet UWMP conditions for automatic water supply shortage actions. The Board of Directors is concerned with continuing low rainfall, however, and would like to hear the public's recommendations regarding possible drought response measures.

Existing Prohibitions:

1. Unauthorized use of water from any fire hydrant
2. Landscape irrigation that allows excess water to run to waste
3. Uncorrected plumbing leaks, breaks, or malfunctions
4. Use of water for washing cars, boats, sidewalks, driveways, or other exterior surfaces without a quick-acting shut-off nozzle on the hose
5. Operation of any ornamental fountain or car washes unless the water is re-circulated

Proposed Mandatory Measures:

1. No watering between 9:00 a.m. and 6:00 p.m.
2. Sweeping of paved areas instead of washing down (regardless of shut-off hose nozzle)
3. Prohibit washing of any outdoor impervious surface
4. Display by restaurants and hotels of water conservation signs
5. Restaurant serving of water to patrons upon request only
6. No potable bulk water sales – construction bulk use with recycled water only

Additional Possible Mandatory Measures:

1. Prohibit operating a non-water conserving pre-rinse nozzle in a food-preparation establishment, such as a restaurant or cafeteria
2. Prohibit use of water for filling any existing or new swimming pool or hot tub.
3. Prohibit use of water to clean, fill or maintain levels in decorative fountains.
4. Landscape irrigation restricted to designated watering days
5. Time limits on automatic irrigation systems
6. Require large landscapes to adhere to water budgets
7. Require large users to audit premises and repair leaks
8. Covering pools and hot tubs when not in use

Proposed Penalties –
First Offense: verbal warning if possible; otherwise hanging of yellow card
Second Offense: Fine of $50
Third Offense: Fine of $150
Fourth Offense: Fine of $500
Fifth Offense: Shut-off

Drought Response Matrix

Updated April 3, 2009

	City of Santa Cruz	Watsonville	San Lorenzo Valley	Soquel Creek*
Voluntary conservation	X		X	X
No watering between 9:00 a.m. and 6:00 p.m.	between 10:00-5:00		X	X
Outdoor watering limited to 2 days per week	X			
Time limits on automatic irrigation systems	X			
Sweeping of paved areas instead of washing down/ Prohibit washing of any outdoor impervious surface	X		X	
No car washing unless with a bucket and hose with shut-off nozzle			X	
Water service in public restaurants by request only			X	X
Display by restaurants and hotels of water conservation signs	X			X
Large landscapes to adhere to water budgets	X			
Bulk water sales for domestic use only - No construction water			X	
Suspend District's water line flushing program except in immediate interest of health and safety				X
Linen service in hotels/motels by request only				X

*These recommendations were made as of Feb. 17th and may change with latest rainfall.

Scotts Valley Water District

April 3, 2009

To: BOARD OF DIRECTORS

From: General Manager

Meeting of: April 9, 2009

Subject: **ITEM 2: PUBLIC HEARING: POSSIBLE DROUGHT RESPONSE MEASURES**

As recommended by the Water Resources Committee, the Board of Directors is seeking public input to help guide the District's 2009 drought response.

The first question is, what should be the voluntary conservation goal for District customers? The Governor recommended a statewide 20% voluntary conservation goal in his drought proclamation of February 27th. This would be a higher level of conservation than called for in the District's Urban Water Management Plan, based on rainfall.

The second question is, what if any additional mandatory measures should be adopted by the District? The attached list shows existing prohibitions, additional mandatory measures proposed by the Water Resources Committee, and other possible mandatory measures for consideration. The second attachment here is a matrix illustrating drought response measures in place in other Santa Cruz County service areas.

After a short staff presentation, the Board President will conduct a public hearing to solicit opinions on appropriate District drought responses. Once the public hearing is complete, the Board may approve a voluntary conservation goal for 2009 and any additional mandatory measures it deems necessary and warranted.

Attachments:

- List of proposed and possible mandatory measures
- Matrix illustrating drought response implementation within Santa Cruz County

SCOTTS VALLEY WATER DISTRICT
MINUTES OF THE
REGULAR BOARD MEETING
APRIL 9, 2009

SCOTTS VALLEY WATER DISTRICT
BOARD ROOM, 2 CIVIC CENTER DRIVE
SCOTTS VALLEY, CALIFORNIA

1. CONVENE MEETING

Item 1.1 President Perri called the meeting to order at 7:00 p.m.

ROLL CALL
Present: Directors Kassis, Miller, Hodgin, Kannegaard and Perri
Absent: Director

Item 1.2 Pledge of Allegiance and Invocation

Director Kassis led the Pledge of Allegiance and Invocation.

Item 1.3 Closed Session Report: None

Item 1.4 Approval of Minutes from Regular Board Meeting of March 12, 2009

Director Hodgin moved, seconded by Director Kannegaard, to approve minutes of the Regular Board Meeting of March 12, 2009, as submitted. Motion carried unanimously, with Director Miller abstaining.

ADDITIONS/DELETIONS TO THE REGULAR AGENDA:

President Perri advised that a matter came to the District's attention on April 8th, after the agenda was posted; this item is an opportunity for economic stimulus grant funding through the U.S. Bureau of Reclamation that needs immediate consideration. The item is to consider expenditure of up to $30,000 to Kennedy/Jenks to assist District in preparing the grant application.

General Manager McNiesh recommended that the District consider using this grant money opportunity for the inter-tie between SVWD and Santa Cruz City; he explained that the "Challenge Grant Program: Recovery Act of 2009" is for water use efficiency and water transfers.

Director Hodgin moved to add item to agenda, Director Miller seconded. Motion carried unanimously.

Attorney Bosso advised that this requires a 4/5 vote under the Brown Act, since it was added after the agenda was posted.

President Perri said this item will be considered under Item 6.3, Facilities Engineering Committee.

PUBLIC COMMENTS ON ITEMS NOT ON THE AGENDA: None

2. PUBLIC HEARINGS AND PRESENTATIONS: POSSIBLE 2009 DROUGHT RESPONSE MEASURES

Item 2.1 Presentation of Staff Report

General Manager McNiesh presented overhead slides: Record of annual rainfall at El Pueblo Water Treatment Plant shows last three years having below average rainfall; District annual pumping 1983 to present shows water use has been declining for several years, in part due to strong conservation measures; advised that the governor issued a water conservation proclamation in February calling for 20% conservation savings across the state; reviewed lists of proposed mandatory measures and possible mandatory measures included in the Board packet; one question for public hearing is what should be the water conservation target for SVWD this year; other question is what, if any, mandatory measures be implemented.

Item 2.2. Public Hearing

President Perri opened the public hearing.

Paul Locatelli with Save Some Water addressed the Board, showing a Flush Smart dual-flush toilet insert that he and his associate Ran Bendori are marketing locally; explained the potential for water savings at a low cost; said they have discussed trial testing with the City of Scotts Valley and other water districts; City has said it would need SVWD approval before it participated in a testing program; Save Some Water's request is that SVWD approve testing of the unit.

General Manager McNiesh said the Flush Smart device had been discussed by the Water Resources Committee, but District has no basis to approve the product since it is not recommended by the California Urban Water Conservation Council (CUWCC); all of the devices currently approved by District for rebates are on the CUWCC list. Mr. Bendori disputed the CUWCC's objectivity and presented other product certification information.

Director Kannegaard said he would potentially support a study of the Flush Smart unit. Director Miller suggested Save Some Water advertise and offer to put their system in for a trial three-month period of time. Director Hodgin said he would be willing to approve putting in a limited number and monitoring them. Attorney Bosso said there would be no liability to the District as long as the District did not endorse the product.

President Perri advised the question before the Board right now is if they would approve the City sponsoring a study of the unit.

Linda Alsbury, longtime Scotts Valley resident, addressed the Board; applauded District efforts to improve water quality and promote water conservation; she said her household are already using conservation efforts; 20% conservation target seems high for those who have already been conserving; she is concerned if there are penalties for those who are not able to reach 20% savings.

President Perri closed the public hearing.

Item 2.3 Consider approval of 2009 Drought Response Measures

General Manager McNiesh explained that the 20% mark would only be a target for voluntary savings; no one would be penalized for not meeting the target.

Director Hodgin moved approval of Items 1-6 on the list of proposed mandatory measures included in the Board packet. Director Miller seconded the motion. Motion carried unanimously.

President Perri said he would support the City testing the Flush Smart unit. After discussion by the Board, President Perri moved, seconded by Director Miller, that the Board approve and support Flush Smart testing by the City of Scotts Valley. Motion carried, with Director Kassis abstaining.

Director Kassis said SVWD should contact the City before making a decision, and if the City chooses to test this device, SVWD could be supportive of the testing, but the District should not commit to supporting one company.

Director Hodgin pointed out that the City also gives rebates, but they don't approve what the rebates are for; they go by the list the District has.

Associate Engineer Smith addressed the Board stating that, in his opinion, as a public agency SVWD should not be helping a private company to run tests on their devices.

General Manager McNiesh noted that the rebate for the Flush Smart would be less costly to the District than the current rebate, so this is not a cost issue.

Discussion moved back to the list of possible mandatory measures included in the Board packet. General Manager McNiesh advised that the District does not currently have the capacity to implement all of the listed measures without additional resources. The Board decided to keep these in mind for possible future use.

There was discussion by the Board regarding whether or not to approve a penalty for failure to comply with the approved mandatory measures. Director Miller suggested using same warning as is in place for existing prohibitions. General Manager McNiesh said staff would report back to the Board if people refuse to comply with mandatory measures and the matter can be dealt with at that time if necessary.

There was discussion regarding requesting a 20% goal for voluntary conservation, with staff including a notice in water bills and asking customers to monitor their own water use and strive to reduce it.

Director Hodgin moved, seconded by Director Kannegaard, to ask customers for a 10% voluntary reduction in consumption of water. Motion carried unanimously.

3. CONSENT AGENDA:

Item 3.1 Approve Resolution No. 13-09 Adopting Identify Theft Prevention Program

Item 3.2 Approve Plan of Finance Proposal Submitted by Del Rio Advisors, LLC, for Cost Not to Exceed $5,000

Item 3.3 Designate Accounting Manager as District's Election Office for CalPERS Board of Administration Election

Director Miller moved, seconded by Director Kannegaard, to approve Consent Agenda, as presented. Motion carried unanimously.

4. ITEMS REMOVED FROM CONSENT AGENDA: None

5. DIRECTOR'S AGENDA ITEMS

Item 5.1 Individual Director Reports:

Director Hodgin distributed pre-production copies of ACWA's Water Conservation and Water Use Efficiency Policy Principles; advised that he attended ACWA Region 5 meeting last week where conservation and mandatory water reductions were discussed; announced that on May 20th at ACWA Conference in Sacramento there will be a water rally at the capitol building.

Director Miller said he has been out of commission for about a month and would like to publicly thank Directors and staff for their concern for him.

Item 5.2 ACWA Update: None

Item 5.3 Anticipated Directors' Expenses: None

Item 5.4 Board Priority List: No discusion

6. COMMITTEE REPORTS:

Item 6.1 Business Administration Committee

6.1.1 Budget, Audit, and Rate Ordinance Schedules

General Manager McNiesh advised that this is an information item; objective is to get budget completed earlier this year with final budget approved at July board meeting; then Accounting Manager can work on audit process beginning in July; SVWD is in the last year of the current rate ordinance so the Board should look at setting rates this fall.

6.1.2 GASB 45 Implementation

General Manager McNiesh reported this item is for informational purposes as well; no action necessary.

Item 6.2 Water Resources Committee

6.2.1 Correspondence to Board Regarding Leak Adjustment Policy

General Manager McNiesh reported that this was discussed at committee; a leak adjustment is not warranted in this case in staff's determination; a second letter has been sent to Board by customer; staff needs to make sure that cross-connection has not been re-established by customer.

Director Hodgin suggested since individual involved is a long-time customer and is requesting his one-time leak adjustment, the Board approve it.

General Manager McNiesh said the policy of the District for a leak adjustment is the customers are supposed to be using good conservation practices. Assistant General Manager/Operations Manager O'Brien said the leak would not have happened if there were not an illegal cross-connection.

President Perri said this was discussed at committee, and this customer is not eligible for a leak adjustment.

Attorney Bosso advised that this is a matter between the customer and his neighbor, who cut the line and caused the leak; no reason for the District to be involved.

Director Miller moved, seconded by President Perri, to deny leak adjustment. Motion carried, with Director Hodgin voting no.

6.2.2 ACWA Blueprint Document on Water Conservation and Water Use Efficiency Policy Principles

General Manager McNiesh reported that he has been in communication with ACWA legislative committee regarding getting new recycled water customers on when customers have a well on their property and are reluctant to let go off well use; ACWA has asked SVWD to serve as case study; individuals would not be named, but it could help lead to a solution for any district that faces that same situation; General Manager asked if the Board is supportive of ACWA using SVWD for a case study.

President Perri said he would be supportive of ACWA using SVWD cases as long as names are not given and every person's privacy is protected.

The Board concurred that they are supportive of participating in this case study with ACWA with the limitation specified by President Perri.

Item 6.3 Facilities Engineering Committee

6.3.1 Cost Share Agreement with City Regarding Recycled Water Program

General Manager McNiesh reported that the original recycled water agreement with City of Scotts Valley dates back to 1996; now operating on 2004 amendment to agreement for five-year period that terminates in May; City pays 25% tertiary treatment plant operation and maintenance costs, but gets a rate reduction to 10% of potable rates. He has met with City Manager Ando; recommends an ad-hoc committee to meet with two City Council members to negotiate a new agreement. President Perri said he would like to be on the ad-hoc committee and asked Director Hodgin to be on it.

6.3.2 Cost Share Agreement with City Regarding Phase Two Glenwood Open Space Management Plan

General Manager McNiesh reported Scotts Valley City Council approved going forward to seek proposals for preparation of a Phase 2 management plan; City would like to cost share with the District and Santa Cruz Land Trust, which would manage the property; benefit to District would be potential siting of a Butano well and associated treatment plant in a corner of the open space; new management plan will require CEQA approval; District's share would be 1/3 of total cost or about $20-30,000; suggests newly designated ad-hoc committee could meet with City for negotiations.

6.3.3 District Review of Development Projects

General Manager McNiesh said a process was implemented to get deposits from developers for reviewing their project; this was an improvement, but process is still not perfect.

President Perri said he thinks District should review projects before they go through tentative map stage; Todd Kramer, C2G, is putting together a checklist for the District to review projects before the will serve letter is given.

6.3.4 Recycled Water Pipeline Extensions Project

General Manager McNiesh advised that 50% design meeting with Todd Creamer, C2G, was held last week; plan is to go to bid in May, award bid in June, and finish work in October; will need to make decision whether to proceed since the State grant funding freeze still has not been lifted; SVWD may not receive anticipated grant reimbursement in a timely manner.

6.3.5 Pasatiempo Recycled Water Project

General Manager McNiesh said this item was included at request of Director Miller. President Perri noted there was going to be a Facilities Engineering Committee meeting soon, and these questions could be addressed at that time. Director Miller concurred that this would be acceptable.

6.3.6 Added item: Consider approval of expenditure of up to $30,000 to Kennedy/Jenks Consultants to assist the District in preparing a grant application in response the recent "Challenge Grant Program: Recovery Act of 2009" announcement

General Manager McNiesh reported that the funding for this program would come through the U.S. Bureau of Reclamation; program funds construction projects; limits are one million dollar minimum and five million dollar maximum; the project SVWD would be looking at is the inter-tie with Santa Cruz; deadline for filing is May 22 and will cost about $30,000 to file application, perhaps more; District may be able to split that cost with other entities if a joint application appears promising; approval needed at this meeting, otherwise there will not be enough time to prepare an application; no application will be submitted if additional investigation shows application not likely to succeed.

President Perri moved, seconded by Director Miller, to authorize up to $30,000 to Kennedy/Jenks for preparing grant application for funding. Motion carried unanimously.

7. STAFF REPORTS

Item 7.1 Accounting/Customer Service Reports

Accounting Manager Catalano said general ledger is up to date with February close; nothing out of the ordinary to report. Staff answered questions of the Board.

Item 7.2 Operational Reports

Assistant General Manager/Operations Manager O'Brien reported El Pueblo tank project has been completed; staff has filled tank with water, will have results on VOC sampling tomorrow; tank is clean, healthy and ready to go; will be ready to go back online immediately if VOC samples come back clean.

Item 7.3 General Manager's Report

General Manager McNiesh referred a question regarding page 7.3.2 chart illustrating water quality sample results to Associate Engineer Smith.

Item 7.4 Attorney's Report:

Attorney Bosso said he had nothing more to report.

8. DIRECTOR'S COMMENTS ON ITEMS NOT ON THE AGENDA: None

Director Miller asked if there was anything he needed to know about ACWA conference; advised that he is going and asked General Manager McNiesh to make the arrangements.

9. MISCELLANEOUS CORRESPONDENCE:

Item 9.1 Letter from Congresswoman Eschoo Dated March12, 2009
Regarding Potential American Recovery and Reinvestment Act Funding.

10. CLOSED SESSION: None

11. CLOSED SESSION REPORT AND ACTIONS ON MATTERS RELATED TO CLOSED SESSION

12. ADJOURNMENT

Director Kassis moved, seconded by Director Kannegaard, to adjourn at 9:30 p.m. Motion carried unanimously.

Appendix M

Ordinance 149-09

ORDINANCE NO. 149-09

AN ORDINANCE REVISING POLICY FOR TEMPORARY SERVICE FROM HYDRANTS BY AMENDING SECTION 3.25 OF ORDINANCE NO. 119-96, AS AMENDED

BE IT ORDAINED by the Board of Directors of the Scotts Valley Water District ("District"), Santa Cruz County, California, that:

SECTION 1. TEMPORARY SERVICE FROM A HYDRANT

Section 3.25 of the ordinance cited in the title shall be, and is hereby amended to read as follows:

> ***"Section 3.25 – Temporary Service From a Hydrant***[1]
> If temporary service is supplied through a hydrant, a bulk meter permit for the use of the hydrant for up to three months shall first be obtained from the District. Bulk meter permits will require the use of recycled water for construction and other purposes whenever possible. Use of recycled water under a bulk meter permit shall be subject to all District rules and regulations and pursuant to the terms and limitations of the District's recycled water distribution permit.
>
> A deposit of $2,000.00 will be required when the bulk meter permit is issued. The bulk meter permit may be renewed without additional deposit payment. The deposit is: $1,000.00 for water usage and $1,000.00 for the bulk meter. The $1,000.00 meter deposit will be returned to the customer upon the return of the meter in good working condition, or less the cost of repair of the meter. The $1,000.00 water usage deposit will be returned after the meter has been returned, less any outstanding balance of water charges. The customer shall read the meter once a month and provide this reading to the District along with a list of all locations where bulk water was delivered during the month and the amounts delivered to these locations. Whenever returning the meter or renewing a permit, the customer shall bring the meter to the District office for a District reading and at that time shall provide a comprehensive list indicating all locations where bulk water was delivered during the permit period and the amounts delivered to these locations.
>
> Water consumption will be charged according the District's current rate schedules, prorated as necessary for monthly payment. Whether approved for recycled or potable supply, the customer will be charged the basic service charge for a three-inch potable meter, subject to a one-month minimum and proration after one month. All other District rules and regulations regarding time and calculation of payment shall apply.
>
> Bulk water for construction or other non-emergency purposes may not be used outside the District. Except in emergencies, the customer shall notify the District in advance

---

[1] As amended on July 16, 2009, by Ordinance No. 149-09

of all locations where bulk water will be used. The bulk meter must be placed on the hydrant assigned by the District. Operating the valve of a hydrant other than by the use of a spanner wrench designed for that purpose is prohibited. A temporary tank or truck with appropriate backflow protection as determined by the District shall be used for all applications. The bulk permit may be canceled, the deposit forfeited, the meter removed by the District, and the permittee deemed ineligible for a new bulk meter permit for a period of up to one year if (a) the District finds any violation of the preceding conditions, (b) the District finds that the meter has been tampered with or used in such a way that flow volume is registered inaccurately, (c) the permittee fails to bring the bulk meter to the District office for a meter read or provide the required list of delivery sites and amounts within twenty days after the monthly payment due date, or (d) the permittee fails return the bulk meter or renew the permit within twenty days after the permit expiration date.

The newly amended Section 3.25 hereby replaces and supersedes the previous section of the same number:

~~***"Section 3.25 – Temporary Service From a Fire Hydrant***~~[2]
~~If temporary service is supplied through a fire hydrant, a permit for the use of the hydrant shall first be obtained from the District. It shall be unlawful to operate the valve of any fire hydrant other than by the use of a spanner wrench designed for that purposes.~~

~~A deposit of $1,500.00 will be required when the permit is issued. The deposit is: $1,000.00 for water usage, and $500.00 for the water meter. The $500.00 meter deposit will be returned to the customer upon the return of the meter in good working condition, or less the cost of repair of the meter. The $1,000.00 water usage deposit will be returned after the meter has been returned, less outstanding balance of water consumption, less payments on the account. The meter must be placed on the fire hydrant assigned by the District. Direct application of water, for dust control, from a fire hydrant is prohibited. A temporary tank with a float valve or truck shall be used for application. The water must be used for the assigned project work being done within the District boundaries. If the District finds that the water is being used outside the District, or at a different fire hydrant location, the permit will be canceled and the meter shall be removed by the Water District staff. The deposit shall be returned as per this paragraph. The permittee will not be issued a new meter for a period of one year. The meter shall be read by the customer, once a month and reported to the Water District. The customer will be billed according to the usage, at the current consumption rate, and all other rules and regulations regarding time of payment shall apply."~~

SECTION 2. MISCELLANEOUS

---

[2] ~~As amended on October 9, 1997 by Ordinance No. 123-97.~~

SECTION 2.1 - Severability

If any section, subsection, paragraph, subparagraph, sentence, clause or phrase of this ordinance is for any reason held to be invalid or unconstitutional, such validity or unconstitutionality shall not affect the validity or constitutionality of the remaining portions of this ordinance; and the Board declares that this ordinance and each section, subsection, paragraph, subparagraph, sentence, clause and phrases thereof would have been adopted irrespective of the fact that one or more of such section, subsection, paragraph, subparagraph, sentence, clause or phrase be declared invalid or unconstitutional.

SECTION 2.2 - Immediate Effect

This ordinance shall be in full force and effect forthwith upon adoption and shall be published once in full in a newspaper of general circulation, printed, published, and circulated in the District within fifteen (15) days after adoption and shall be posted within said time in three (3) public places within the District.

SECTION 2.3 - Violation A Misdemeanor: Punishment

After the publication or posting of this ordinance, it is a misdemeanor for any person to use or apply water received from the District contrary to or in violation of the restriction or prohibition, until the ordinance has been repealed or the emergency or threatened emergency has ceased, and, upon conviction thereof, that person shall be punished by imprisonment in the County jail for not more than thirty (30) days or by fine of not more than Six Hundred Dollars ($600.00), or by both the fine and imprisonment.

PASSED AND ADOPTED this 16th day of July 2009 by the following vote:

AYES:	Directors – Hodgin, Kassis, Miller, Perri
NOES:	Directors –
ABSENT:	Directors – Kannegaard

By: /s/ Chris Perri
Chris Perri
President, Board of Directors

ATTEST:

/s/ Deborah L. Hazen
Deborah L. Hazen
Secretary to the Board

I hereby certify that the foregoing Ordinance was duly passed and adopted by the Board of Directors of the Scotts Valley Water District, Santa Cruz County, California, at its regular meeting thereof held on the 16th day of July in the year 2009, by the following vote:

AYES:	Directors – Hodgin, Kassis, Miller, Perri
NOES:	Directors –
ABSENT:	Directors – Kannegaard

By: /s/ Chris Perri
Chris Perri
President, Board of Directors

ATTEST:

/s/ Deborah L. Hazen
Deborah L. Hazen
Secretary to the Board