2005 Integrated Urban Water Management Plan for the Antelope Valley

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Table of Contents

Table of Contents (cont'd)

Table of Contents (cont'd)

Table of Contents (cont'd)

List of Tables

Table of Contents (cont'd)

Table of Contents (cont'd)

List of Figures

List of Appendices

Section 1: Introduction and Summary

This Section presents a brief description of the provisions of the Urban Water Management Planning Act (Act) and provides a description of the participating water agencies and their service area characteristics, including population, climate, water demand, water supply, water conservation, water recycling, and reliability planning. The contents of this plan are also provided.

1.1 The Urban Water Management Plan

In 1983, the California Legislature enacted the Act (AB 797; Water Code, Division 6, Part 2.6, Section 10610-10656). This Act requires water suppliers serving more than 3,000 customers or water suppliers providing more than 3,000 acre-feet (AF) of water annually to prepare an Urban Water Management Plan (UWMP) to promote water demand management and efficient water use. The Act also requires water suppliers to develop, adopt, and file an UWMP (or update) every five years until 1990. In 1990, the Legislature deleted this sunset provision (AB 2661). Accordingly, the UWMP must be updated a minimum of once every five years on or before December 31 in the years ending in 0 and 5. The Act has subsequently been amended since its adoption.

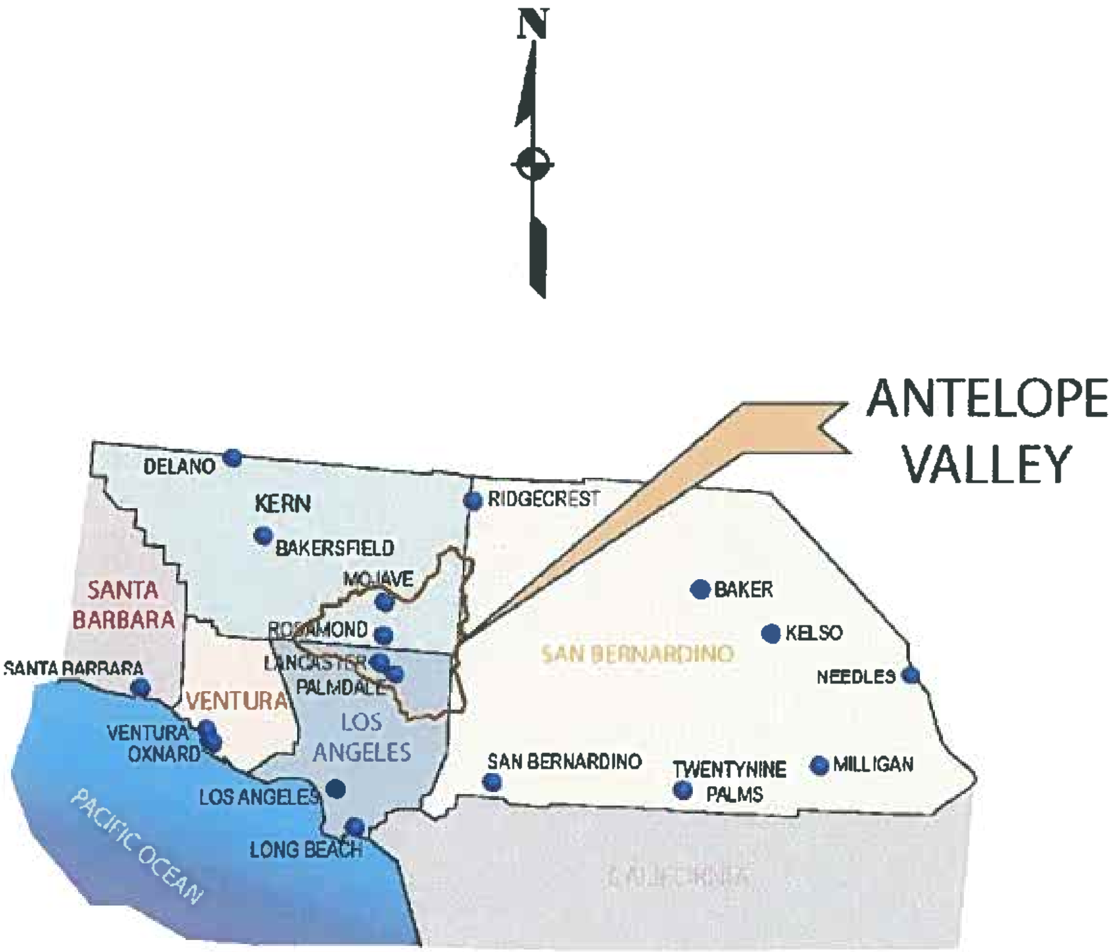
Recent changes approved in 2002 and 2004 include SB 1348, SB 1384, SB 1518, AB 105, and AB 318. SB 1348 requires that the Department of Water Resources (DWR) consider the demand management activities of an urban water supplier in the grant and loan application evaluation. SB 1384 requires that an urban water supplier to submit a copy of their UWMP to their wholesale supplier. This bill encourages coordination between the wholesale and retail agencies. SB 1518 requires additional information regarding the use of recycled water including a comparison of previously projected use to actual use to determine the effectiveness of recycled water initiatives. AB 105 requires an urban water supplier to submit a copy of their UWMP to the California State Library. AB 318 requires urban water suppliers to provide a discussion of the desalination opportunities available to them. This includes ocean water, brackish water, and groundwater desalination for use as a long-term water supply.

A copy of the current Act is provided in Appendix A.

1.1.1 Purpose of the Plan

An UWMP is designed to provide an effective management and planning tool for water agencies throughout California. It allows for a succinct summary of an agency's water supplies, demands, and plans to ensure future reliability. It also encourages the efficient management of water supplies by requiring a discussion of potential water transfers and exchanges, desalination, and recycled water opportunities.

In addition to meeting the requirements of the Act, this plan will also meet the requirements of a regional water management plan. Detailed discussion of potential water supply projects will be provided in conjunction with a recommended water supply strategy for the Antelope Valley to ensure a reliable future water supply. Figure 1-1 provides a vicinity map of the Antelope Valley.



Source: Antelope Valley Water Resource Study
(Kennedy/Jenks Consultants, 1995)

Kennedy/Jenks Consultants

2005 Integrated UWMP for the Antelope Valley

Antelope Valley Vicinity Map

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Figure No. 1-1

1.1.2 Regional Approach in Preparation of the Plan

In efforts to improve coordination and assist in inter-agency planning to maximize resources within the Antelope Valley, the Los Angeles County Waterworks District No. 40 (District No. 40) is acting as the lead agency for this Integrated UWMP. All agencies located within the Antelope Valley were given the opportunity to participate in this joint-effort of Plan preparation. As such, this plan has been prepared for District No. 40, Rosamond Community Services District (RCSD), Quartz Hill Water District (QHWD) and the Los Angeles County Sanitation Districts (LACSD). This plan was also prepared in conjunction with efforts of other agencies within the Antelope Valley that have chosen to not participate in this joint-effort. Table 1-1 provides a summary of the Agency Coordination for this Plan.

TABLE 1-1
AGENCY COORDINATION

	Participated in developing the plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft plan	Was sent a notice of intention to adopt
Los Angeles County Waterworks District No. 40	X	X	X	X	X	X
Rosamond Community Services District	X	X	X	X	X	X
Quartz Hill Water District	X	X	X	X	X	X
Los Angeles County Sanitation Districts	X	X	X	X	X	X
Palmdale Water District					X	
Antelope Valley-East Kern Water Agency				X	X	
City of Palmdale					X	
City of Lancaster					X	
Littlerock Creek Irrigation District					X	
Kern County					X	

Prior to adoption, the UWMP was made available to the public for inspection and a public hearing was held. The UWMP must be adopted by the Districts' Boards, and is subject to California Government Code pertaining to legal public noticing. The UWMP must be filed with the DWR within 30 days of adoption. A copy of the notice for a public hearing and the resolution of adoption are included in Appendix B.

1.2 The Water Purveyors of the Antelope Valley

As discussed previously, this plan has been prepared as part of a joint effort between District No. 40, RCSD, QHWD, and LACSD. A brief discussion of each water purveyor follows. Figure 1-2 provides a map of the water purveyors' service areas.

1.2.1 District No. 40

District No. 40 was formed in accordance with Division 16 Sections 55000 through 55991 of the State Water Code to supply water for urban use throughout the Antelope Valley. It is governed by the Los Angeles County Board of Supervisors with the Waterworks and Sewer Maintenance Division of the County Department of Public Works providing administration, operation and maintenance of District No. 40's facilities. District No. 40 is comprised of eight regions serving customers in the communities of Lancaster and Palmdale (Regions 4 and 34), Pearblossom (Region 24), Littlerock (Region 27), Sun Village (Region 33), Rock Creek (Region 39), Northeast Los Angeles County (Region 35), and Lake Los Angeles (Region 38). Regions 4 and 34 are integrated and are operated as one system. Similarly, Regions 24, 27, and 33 are also integrated and operated as one system. In an effort to reduce administrative costs and increase system efficiency, the various regions were consolidated into a single district on November 2, 1993.

1.2.2 RCSD

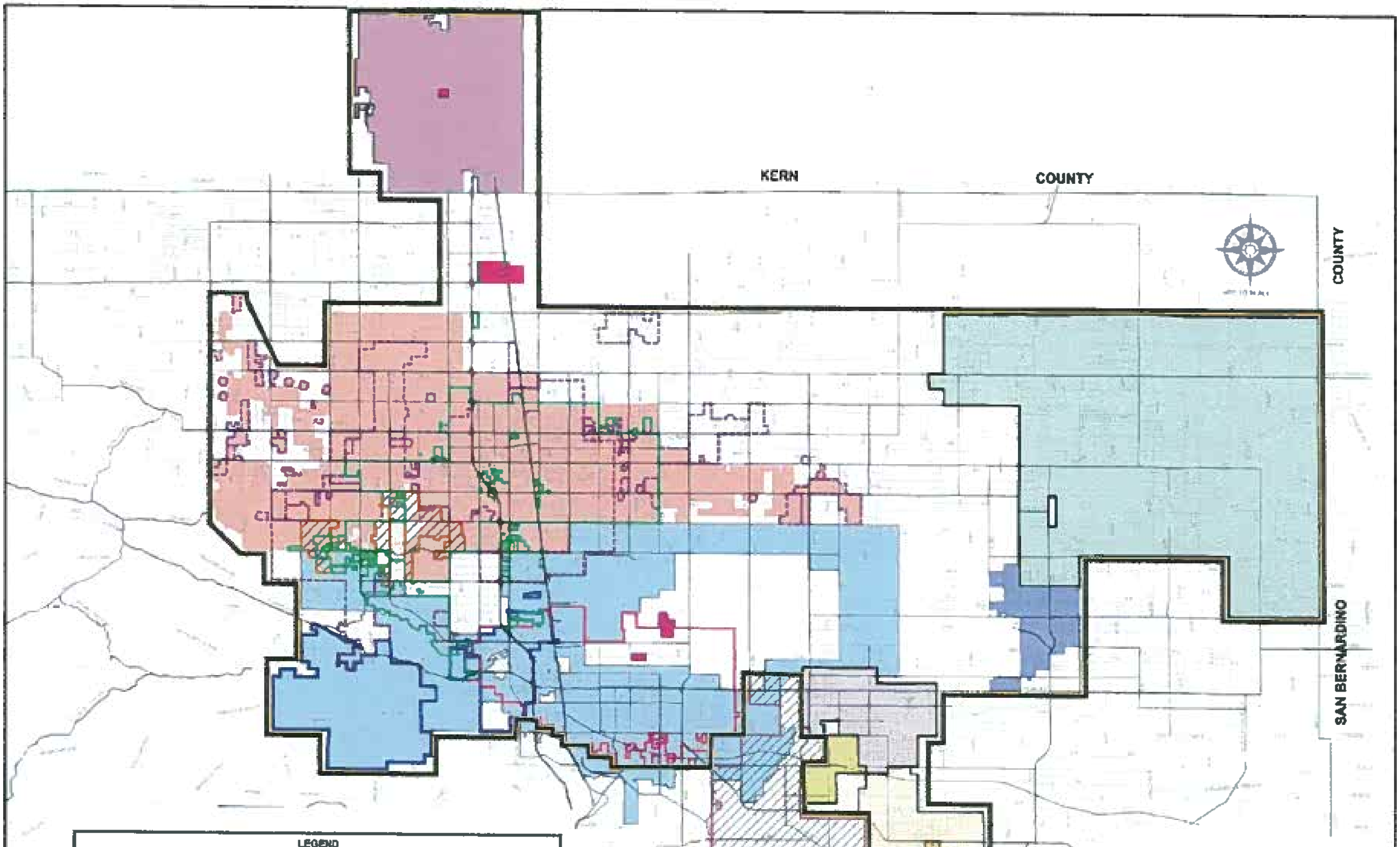
RCSD was formed in 1966 under the Community Services District Law, Division 3, 61000 of Title 6 of the Government code of the State of California. It provides water, sewer, lighting service, and public park maintenance services to residential, commercial, industrial, and agricultural customers, and for environmental and fire protection uses. RCSD's service area boundary encompasses approximately 31 square miles of unincorporated residential, industrial, and undeveloped land in Kern County. The majority of the land located within the RCSD's service area is undeveloped. The developed property focuses around central Rosamond, with additional developed areas in the Tropico Hills.

1.2.3 QHWD

QHWD is located in the southwest end of the Antelope Valley at the north end of Los Angeles County. It is 65 miles northwest of Los Angeles on the Antelope Valley Highway 14 and west of both Palmdale and Lancaster. QHWD occupies an area of about 6.0 square miles. Incorporation of QHWD occurred in May 1954 and water service is provided to all residential, commercial, industrial, and agricultural customers, and for environmental and fire protection uses.

1.2.4 LACSD

LACSDs are a confederation of independent special districts serving about 5.1 million people in Los Angeles County. LACSD's service area covers approximately 800 square miles and encompasses 78 cities and unincorporated territory within the County.



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2005 Integrated UMWP for the Antelope Valley

Study Area Boundary Map

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Figure No. 1-2

The agency is made up of 24 separate Sanitation Districts working cooperatively under a Joint Administration Agreement with one administrative staff headquartered near the City of Whittier. Each Sanitation District has a separate Board of Directors consisting of the Mayor of each city within that District and the Chair of the Board of Supervisors for county unincorporated territory. Each Sanitation District pays for its proportionate share of joint administrative costs.

1.3 Service Area Characteristics

The Antelope Valley Study Area (Study Area), as defined for the purposes of this report, encompasses the service areas of the three water purveyors described above: District No. 40, RCSD, and QHWD. LACSD provides wastewater collection and treatment services for the Study Area. The Study Area is generally in the southern portion of the Antelope Valley. Figure 1-3 provides a topographic overview of the Study Area.

1.3.1 Climate

Comprising the southwestern portion of the Mojave Desert, Antelope Valley ranges in elevation from approximately 2,300 feet to 3,500 feet above sea level. Vegetation native to the Antelope Valley are typical of the high desert and include Joshua trees, saltbush, mesquite, sagebrush, and creosote bush. The climate is characterized by hot summer days, cool summer nights, cool winter days and cool winter nights. Typical of a semiarid region, mean daily summer temperatures range from 63°F to 93°F, and mean daily winter temperatures range from 34°F to 57°F. The growing season is primarily from April to October. Precipitation ranges from 5 inches per year along the northern boundary to 10 inches per year along the southern boundary.

Table 1-2 provides a summary of the Study Area's climate.

TABLE 1-2
CLIMATE

	Jan	Feb	Mar	Apr	May	Jun
Standard Monthly Average ETo (inches)	2.02	2.61	4.55	6.19	7.30	8.85
Average Rainfall (inches)	1.52	1.65	1.28	0.46	0.13	0.04
Average Max Temperature (°F)	58.3	62.1	67.2	73.9	81.7	90.1
Average Min Temperature (°F)	32.4	35.6	39.0	43.7	50.6	57.7

	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo (inches)	9.77	8.99	6.52	4.66	2.68	2.05	66.19
Average Rainfall (inches)	0.05	0.18	0.20	0.32	0.68	1.39	7.9
Average Max Temperature (°F)	95.5	96.9	91.3	80.3	67.1	58.7	77.1
Average Min Temperature (°F)	64.9	63.7	57.4	48.0	37.9	32.6	47.0

Source: CIMIS data for Palmdale # 197 station and Western Regional Climate Center, Palmdale station.

1.3.1.1 Effects of Global Warming

In the recent draft update of DWR's Water Plan, an assessment of the impacts of global warming on the State's water supply was conducted using a series of computer models and based on decades of scientific research. Model results indicate increased temperature, reduction in Sierra snow depth, early snow melt, and a raise in sea level. These changing hydrological conditions could affect future planning efforts which are typically based on historic conditions. Difficulties that may arise include:

- hydrological conditions, variability, and extremes that are different than current water systems were designed to manage.
- changes occurring too rapidly to allow sufficient time and information to permit managers to respond appropriately.
- requiring special efforts or plans to protect against surprises and uncertainties.

As such, DWR will continue to provide updated results from these models as further research is conducted.

1.3.2 Other Demographic Factors

Historically, land uses within the Antelope Valley have focused primarily on agriculture; however, the Valley is in transition from predominately agricultural uses to predominately residential and industrial uses. As this transition continues, demand will increase.

Growth in the Antelope Valley proceeded at a slow pace until 1985. However, between 1985 and 1990, the growth rate increased approximately 1,000 percent from the average growth rate between the years 1956 to 1985. Current and projected population for the Study Area is shown in Table 1-3. Approximately 514,000 people will reside in the Study Area by 2030. This represents an increase of nearly 300 percent from the current population.

TABLE 1-3
POPULATION PROJECTION

	2004	2010	2015	2020	2025	2030
District No. 40	156,889	200,743	243,236	284,958	323,730	360,731
RCSD	15,510	24,901	36,944	54,812	81,322	120,656
QHWD	15,500	17,980	20,857	24,194	28,065	32,555
Study Area	187,899	243,624	301,037	363,964	433,117	513,942

Source: District No. 40 – Southern California Association of Governments (SCAG) Projections, Los Angeles County Local Agency Formation Committee (LAFCO) Projections. Rosamond – Water Master Plan dated August 2004. QHWD – LAFCO Projections

1.4 Contents of this Plan

The organization of this report and a brief description of the respective sections are outlined below.

Section 1: Introduction and Summary

This section provides a brief introduction and summary of the Integrated UWMP, describes the planning process for this Integrated UWMP, provides an overview of this Integrated UWMP's Study Area, and summarizes the key elements of this Integrated UWMP.

Section 2: Water Supply Resources

This section describes the existing and planned water supplies available to the Study Area. Supplies include groundwater, imported water, and recycled water. Projected supply by source is presented over the next 25 years, in 5-year increments.

Section 3: Water Supply Reliability Planning

This section presents the water reliability assessment for the Study Area by water purveyor. It compares the total projected water demand with the expected water supply over the next 25 years, in 5-year increments (i.e., 2010, 2015, 2020, 2025, and 2030). Assessments are also presented for a single dry year and multiple dry years (i.e., droughts). The purpose of this analysis is to determine whether there is a reasonable likelihood of meeting projected future demands with the mix of resources currently under consideration.

Section 4: Water Use Provisions

This section on water demand describes historic, current, and projected water usage within the Study Areas. Historic water usage patterns and future water demand are determined by population, land use, and water services. In addition, the effects of weather and water conservation on historic water usage are discussed.

Section 5: Water Demand Management Measures

This section addresses the 14 water conservation measures called Demand Management Measures (DMM), specified in the latest revision of the UWMP Act, and describes current and future implementation of these water conservation measures within the agencies' service areas. The measures range from public information and education programs to physical solutions, such as residential plumbing retrofit, as well as policy/financial incentives, such as rebate programs and pricing policies. Many of the conservation measures are already being implemented in the Study Area.

The DMMs are the same as the 14 urban Best Management Practices (BMPs) developed by the California Urban Water Conservation Council (CUWCC).

Section 6: Water Supply Strategy

This section provides a discussion and evaluation of the various alternative water management strategies and supplies available to the Study Area. Based on the evaluation, a recommended water supply strategy is presented to ensure a reliable source of supply for all three water purveyors in the Study Area to meet the projected demand.

Section 7: Water Shortage Contingency Analysis

This section presents the activities to be utilized in the event of a catastrophic water supply interruption, such as an earthquake or a drought. Stages of action are described, including levels of rationing and reduction goals, priorities of use, water shortage stages and triggering mechanisms, water allotment methods, mandatory prohibitions on water use, and excessive use penalties.

1.5 List of Abbreviations and Acronyms

AF	acre-feet
AFY	acre-feet per year
Study Area	Antelope Valley Study Area
AVTTP	Antelope Valley Tertiary Treatment Plant
AVEK	Antelope Valley-East Kern Water Agency
ASR	Aquifer Storage and Recharge
BMPs	Best Management Practices
SWP	California State Water Project
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CII	commercial/industrial/institutional
cfs	cubic feet per second
DMM	Demand Management Measures
DWR	Department of Water Resources
DAWN	Domestic-Agricultural Water Network
ERPs	Emergency Response Procedures
EPA	Federal Environmental Protection Agency
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
GIS	Geographical Information System
hcf	hundred cubic feet
LWRP	Lancaster Water Reclamation Plant
LAFCO	Los Angeles County Local Agency Formation Committee
District No. 14	Los Angeles County Sanitation District No. 14
District No. 20	Los Angeles County Sanitation District No. 20
LACSD	Los Angeles County Sanitation Districts
District No. 40	Los Angeles County Waterworks District No. 40
MCL	Maximum Contamination Level
MOU	Memorandum of Understanding
MWD	Metropolitan Water District
mg/L	milligrams per liter
mgd	million gallons per day
M&I	municipal and Industrial
NACWA	National Association of Clean Water Agencies
OEHHA	Office of Environmental Health Hazard Assessment
PWRP	Palmdale Water Reclamation Plant

ppb	parts per billion
PWCP	Phased Water Conservation Plan
QHWD	Quartz Hill Water District
RCSD	Rosamond Community Services District
RWWTP	Rosamond Wastewater Treatment Plant
RRBWSD	Rosedale-Rio Bravo Water Storage District
Semitropic	Semitropic Water Storage District
SCAG	Southern California Association of Governments
SIC	Standard Industrial Classification
SWRU	Stored Water Recovery Unit
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
THM	Trihalomethane
ULFT	ultra low flush toilets
USGS	United States Geological Society
UWMP	Urban Water Management Plan
Act	Urban Water Management Planning Act
WCC	water conservation coordinator
WET	Water Education for Teachers
WEL	Water Efficiency Landscape
WSCP	Water Shortage Contingency Plan
WDS	Western Development and Storage

Section 2: Water Supply Resources

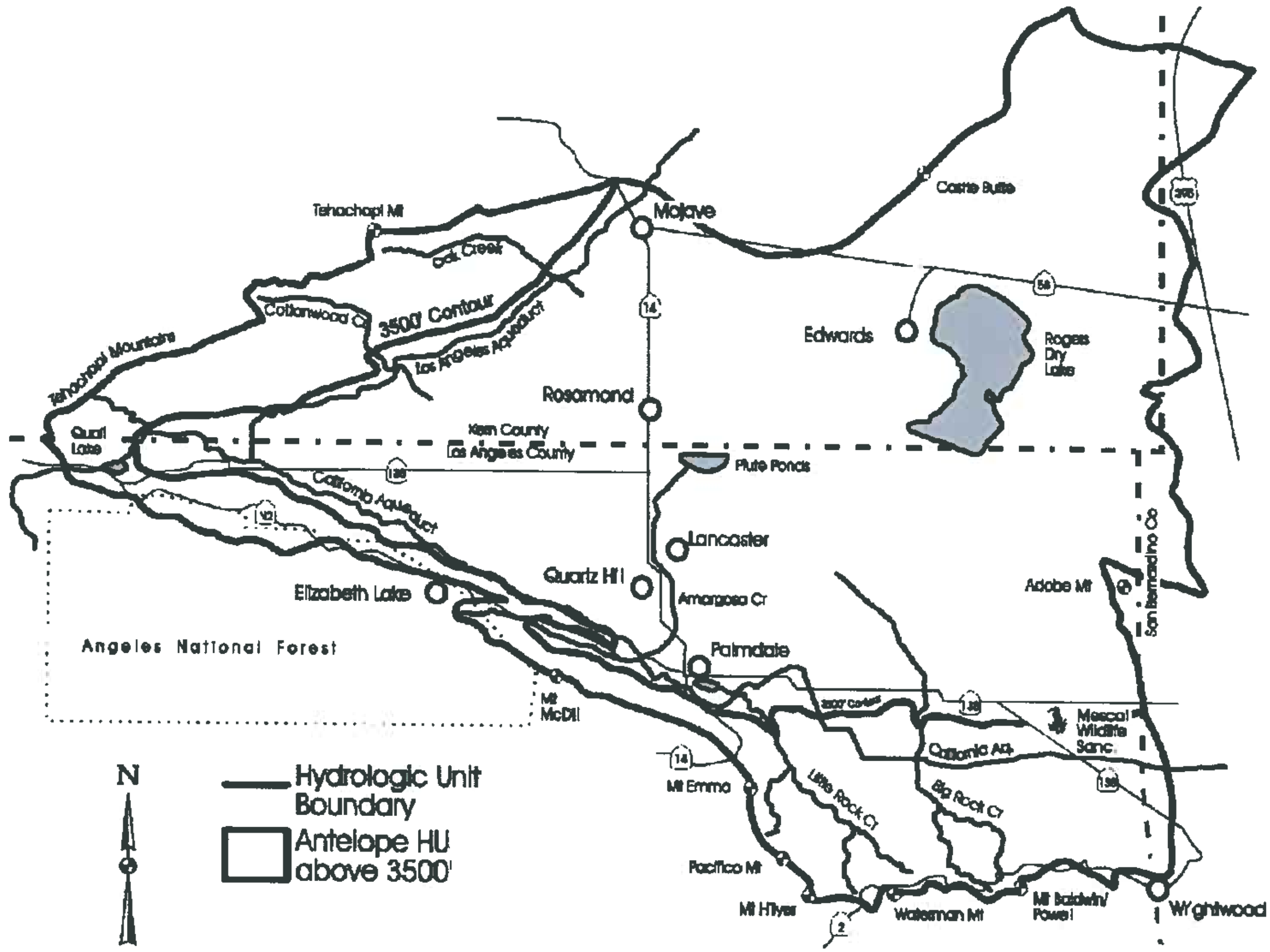
This Section provides a detailed discussion of the existing and planned water supplies available to the Study Area. The Antelope Valley anticipates receiving water from local groundwater, imported water, and recycled water sources. Each of the water sources are described in detail in the subsections below. Figure 2-1 provides a map of the hydrologic features of the Study Area.

2.1 Local Groundwater Supplies

Groundwater makes up approximately 37 percent of the total water supply for the Study Area and comes entirely from the Antelope Valley Groundwater Basin. No groundwater management plan currently exists for the basin as a whole but an AB 3030 plan has been developed for the RCSD service area. A copy of this groundwater management plan is provided as Appendix C. Although the groundwater basin is not currently adjudicated, an adjudication process has begun and is in the early stages. Since the basin is not adjudicated and has not been deemed in overdraft by DWR, there are no existing restrictions on pumping. However, water rights may be assigned as part of the adjudication process. A summary of the historic pumping by each water purveyor is provided in Table 2-1. According to the 1980 DWR report, there is an estimated 68 million AF of total storage capacity and 20 million AF of useable storage in the groundwater basin. In recent years, groundwater pumping has resulted in subsidence and earth fissures in the Lancaster and Edwards Air Force Base areas which permanently reduced storage by 50,000 AF (DWR Bulletin 118, 2003 update). Although an exact groundwater budget is not available, estimates for 1992 extraction include 25,803 AF for urban uses and 1,006 AF for agricultural uses. Recharge is estimated to be approximately 48,000 AF. Data from 1975 to 1998 show a groundwater level change from an increase of 84 feet to a decrease of 66 feet (DWR Bulletin 118, 2003 update).

TABLE 2-1
GROUNDWATER PUMPING HISTORY (AF)

	2000	2001	2002	2003	2004
Antelope Valley Groundwater Basin:					
District No. 40	17,419	21,736	21,195	16,837	21,357
Percent of Total	34	41	39	31	37
RCSD	1,464	2,169	2,364	1,773	1,990
Percent of Total	47	69	72	59	63
QHWD	1,421	3,041	2,802	1,555	1,348
Percent of Total	30	62	52	30	25
Study Area	20,304	26,946	26,361	20,165	24,695
Percent of Total Supply	34	44	42	32	37



Source: Lahontan Regional Water Quality Control Board Basin Plan (1995), Figure 4.1-22.

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2005 Integrated UWMP for the Antelope Valley

Hydrologic Features

K/J 0589015

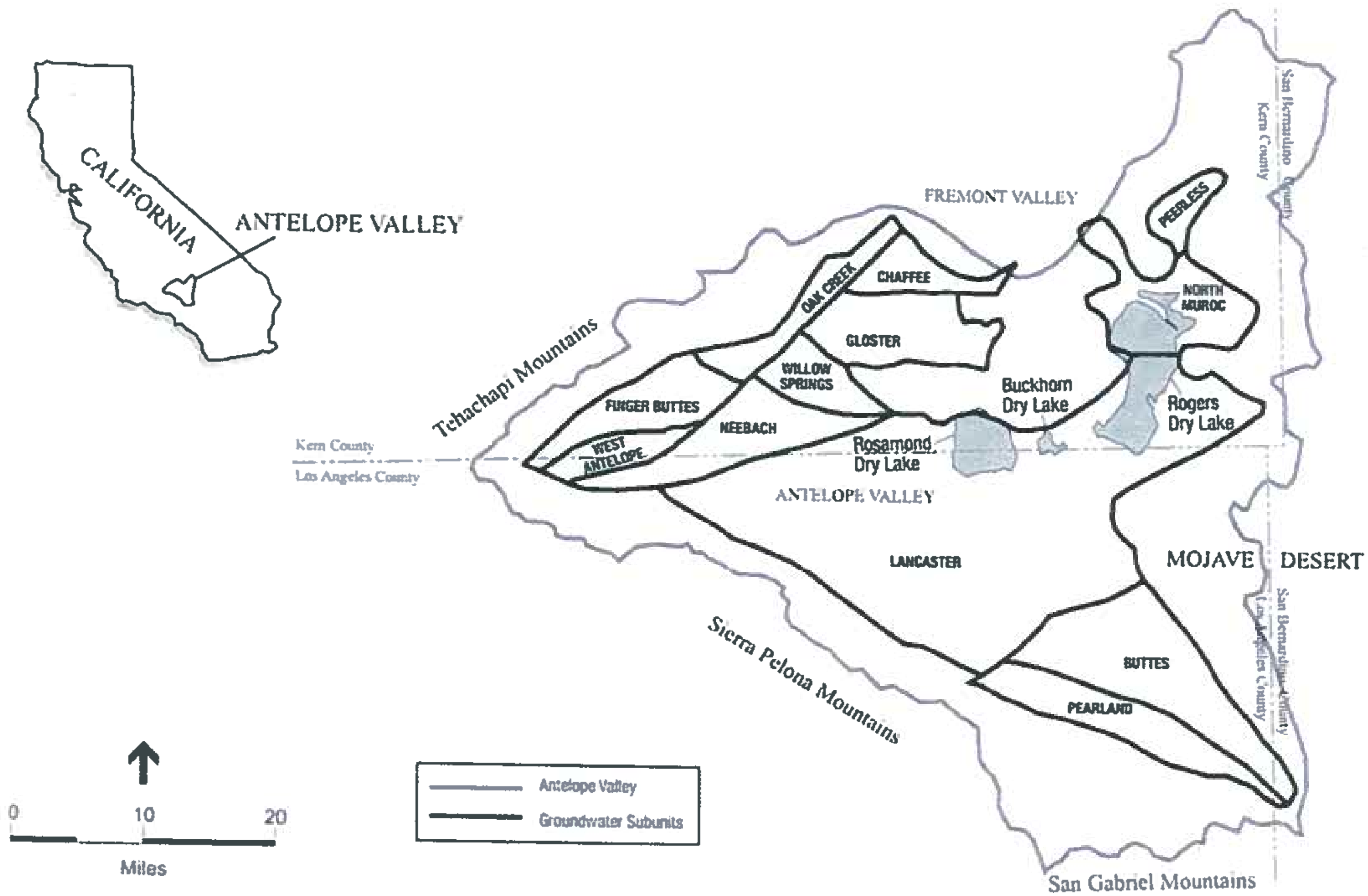
Figure No. 2-1

2.1.1 Source Characteristics

The Antelope Valley Groundwater Basin is comprised of two primary aquifers: (1) the principal aquifer and (2) the deep aquifer. The principal aquifer is an unconfined aquifer. Separated from the principal aquifer by clay layers, the deep aquifer is generally considered to be confined. In general, the principal aquifer is thickest in the southern portion of the Valley near the San Gabriel Mountains, while the deep aquifer is thickest in the vicinity of the dry lakes on Edwards Air Force Base. The Antelope Valley Groundwater Basin is divided into twelve subunits. The subunits are Finger Buttes, West Antelope, Neenach, Willow Springs, Gloster, Chaffee, Oak Creek, Pearland, Buttes, Lancaster, North Muroc, and Peerless. The groundwater basin is principally recharged by deep percolation of precipitation and runoff from the surrounding mountains and hills. Figure 2-2 depicts the groundwater basin boundaries. According to DWR, the safe yield of the Basin is somewhere between 31,200 acre feet per year (AFY) and 59,100 AFY (District No. 40, 2000 UWMP).

2.1.2 Availability of Supply

Groundwater extractions between 1926 and 1972 resulted in the overdraft of the aquifer that caused groundwater levels to drop 200 to 300 feet or an average of 4 to 6 feet per year. The implementation of the State Water Project has since stabilized groundwater levels in some areas of the Antelope Valley. Studies performed by the United States Geological Society (USGS) and DWR indicate that groundwater levels appear to be generally dropping in the eastern areas of the basin and rising in the western areas. The adjudication process has begun for the Groundwater Basin, however it is still in the early stages. Therefore, for purposes of this report three scenarios for the availability of groundwater will be considered: a zero pumping rate, a reduced pumping rate, and the existing pumping rate. Table 2-2 provides the projected groundwater pumping for each of these scenarios. The maximum pumping capacity of groundwater is also provided as it represents the likely pumping rate for dry water years. Percentage of total supply assumes delivery of average year Table A Amounts.



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2005 Integrated UWMP for the Antelope Valley

Antelope Valley Groundwater Basin

K/J 0589015

Figure No. 2-2

Source: Draft Palmdale Water Reclamation Plant 2025 Facilities Plan and Environmental Impact Report April 2005, Figure 14-3.

TABLE 2-2
PROJECTED GROUNDWATER PUMPING (AF)

Basin Name	2010	2015	2020	2025	2030
Antelope Valley (Without Pumping):					
District No. 40	0	0	0	0	0
Percent of Total Supply	0	0	0	0	0
Rosamond CSD	0	0	0	0	0
Percent of Total Supply	0	0	0	0	0
Quartz Hill WD	0	0	0	0	0
Percent of Total Supply	0	0	0	0	0
Study Area	0	0	0	0	0
Percent of Total Supply	0	0	0	0	0
Antelope Valley (With Reduced Pumping):					
District No. 40	10,000	10,000	10,000	10,000	10,000
Percent of Total Supply	9	9	9	9	9
Rosamond CSD	1,000	1,000	1,000	1,000	1,000
Percent of Total Supply	10	9	7	5	4
Quartz Hill WD	2,500	2,500	2,500	2,500	2,500
Percent of Total Supply	29	29	30	30	30
Study Area	13,500	13,500	13,500	13,500	13,500
Percent of Total Supply	10	10	10	10	10
Antelope Valley (With Existing Pumping):					
District No. 40	20,000	20,000	20,000	20,000	20,000
Percent of Total Supply	16	16	16	17	17
Rosamond CSD	2,000	2,000	2,000	2,000	2,000
Percent of Total Supply	19	16	13	10	8
Quartz Hill WD	5,000	5,000	5,000	5,000	5,000
Percent of Total Supply	44	45	46	46	46
Study Area	27,000	27,000	27,000	27,000	27,000
Percent of Total Supply	19	19	18	18	18
Antelope Valley (With Maximum Pumping):					
District No. 40	20,000	20,000	20,000	20,000	20,000
Percent of Total Supply	16	16	16	17	17
Rosamond CSD	4,500	4,500	4,500	4,500	4,500
Percent of Total Supply	34	30	25	21	17
Quartz Hill WD	8,500	8,500	8,500	8,500	8,500
Percent of Total Supply	57	58	59	59	59
Study Area	33,000	33,000	33,000	33,000	33,000
Percent of Total Supply	22	22	21	21	21

Note: All numbers rounded to the nearest 100 AF.

2.1.2.1 District No. 40

Currently District No. 40 has 36 active wells with a combined pumping capacity of 27,947 gallons per minute (gpm) (maximum 45,187 AFY). District No. 40 has 7 new wells currently under construction with an additional pumping capacity of 3,955 gpm (6,395 AFY). While District No. 40 has the capacity to pump more water, it maintains a pumping rate of 20,000 AFY. Furthermore, the groundwater levels in District No. 40 wells show fluctuations on a year-to-year basis, but over the last ten years, the groundwater levels in District No. 40 wells have remained steady.

2.1.2.2 RCSD

RCSD currently operates four wells for a total maximum pumping capacity of 1,970 gpm (3,185 AFY). One new well with a 800 to 1,000 gpm capacity is planned to come on-line in 2006 for a maximum pumping capacity of 2,770 gpm (4,478 AFY). According to RCSD records, the water table continued to decline an average of two to three feet per year until 1995. With the increased usage of surface water sources and decreasing deep well usage, the water table has been rising an average of two to three feet per year.

2.1.2.3 QHWD

QHWD currently operates seven wells at an average water level depth of 250 to 300 feet for a total maximum pumping capacity of 4,225 gpm (6,831 AFY). Two new wells with 500 gpm capacity each have been drilled and are expected to be on-line by the end of the year for a future maximum pumping capacity of 5,225 gpm (8,448 AFY).

2.1.3 Water Quality

Groundwater quality is excellent within the principal aquifer but degrades toward the northern portion of the dry lakes areas. Considered to be generally suitable for domestic, agricultural, and industrial uses, the water in the principal aquifer has a total dissolved solids (TDS) concentration ranging from 200 to 800 milligrams per liter (mg/L). The deep aquifer typically has a higher TDS level. Hardness ranges from 50 to 200 mg/L and high fluoride, boron, and nitrates are a problem in some areas of the basin. The groundwater in the basin is used for both agricultural and municipal and industrial (M&I) uses.

An emerging contaminant of concern is arsenic. In California, there are 763 sources in 404 water systems in 45 counties that show arsenic levels greater than the new federal drinking water standard of 10 parts per billion (ppb) (California Department of Health Services, May 2005).

Arsenic is a naturally occurring inorganic contaminant often found in groundwater and occasionally found in surface water. Anthropogenic sources of arsenic include agricultural, industrial and mining activities. Arsenic can be toxic in high concentrations. Arsenic is considered a chronic carcinogen when accounting for lifetime exposures.

There has been a United States Environmental Protection Agency (US EPA) drinking water regulation for arsenic since 1975, which included a maximum contamination level (MCL) of 0.05 mg/L (50 ppb).

In 2001, the US EPA revised the drinking water regulation for arsenic to include an MCL of 0.010 mg/L (10 ppb), effective nationwide (including California) 23 January 2006.

The State of California is in the process of developing its own regulation for arsenic in drinking water, which could include a revised, lowered MCL. While by statute, the regulation should have been proposed by 30 June 2004, it is not expected out until the end of 2005.

The compliance date for this revised state regulation is the same as the federal rule, 23 January 2006.

Arsenic has been observed in all three districts. Arsenic levels above the current MCL of 10 ppb have been observed in approximately 20 wells for District No. 40; as a result 6 wells have been placed in an inactive status. Five active wells with high arsenic levels are under going a partial abandonment process that would restrict flow from areas containing arsenic and allow pumping in arsenic free zones. Similarly, RCSD has observed levels of arsenic in the range of 11 to 14 ppb in 3 of its wells. RCSD is utilizing similar methods to District No. 40 to manage arsenic levels so that delivered water meets the arsenic MCL. QHWD has also observed levels above the MCL in a number of wells, however, it has the ability to blend the water to acceptable levels. It is not anticipated that the existing arsenic problem will lead to future loss of groundwater as a supply for the Antelope Valley.

Copies of each District's Consumer Confidence Report are provided as Appendix D.

2.2 Wholesale (Imported) Water Supplies

Imported water supplies consist of California State Water Project (SWP) water contracted through the Antelope Valley-East Kern Water Agency (AVEK). All three water purveyors began receiving imported water from the SWP through AVEK in 1972. The SWP is the nation's largest state-built water and power development and conveyance system. It includes pumping and power plants, reservoirs, lakes, storage tanks, canals, tunnels, and pipelines that capture, store, and convey water to 29 water agencies.

The SWP is operated by DWR for the benefit of SWP contractors. The SWP includes 660 miles of aqueduct and conveyance facilities, from Lake Oroville in the north to Lake Perris in the south. The SWP is contracted to deliver a maximum 4.17 million AFY of Table A water to the 29 contracting agencies. Table A water is a reference to the amount of water listed in "Table A" of the contract between the SWP and the contracting agencies and represents the maximum amount of water an agency may request each year.

AVEK, the third largest contracting agency, has a current contractual Table A Amount of 141,400 AFY. This volume includes both agricultural and municipal/industrial SWP water which AVEK distributes to municipal/industrial retailers such as District No. 40, QHWD and RCSD. Table 2-3 provides a summary of the historic and current imported water volumes for the Study Area.

TABLE 2-3
HISTORIC IMPORTS FROM AVEK (AF)

	2000	2001	2002	2003	2004
District No. 40	34,655	30,965	33,442	37,442	36,231
Percent of Total	67	59	61	69	63
RCSD	1,641	981	938	1,229	1,191
Percent of Total	53	31	28	41	37
QHWD	3,353	1,830	2,630	3,706	4,099
Percent of Total	70	38	48	70	75
Study Area	39,649	33,776	37,010	42,377	41,521
Percent of Total Supply	66	56	58	68	63

Each year by October 1st, the contracted agencies provide DWR with a request for water delivery up to the full Table A Amount. Actual delivery from DWR may vary from the request due to variances in supply availability resulting from hydrology, storage availability, regulatory or operating constraints, etc. When supply is limited, a reduction of the requested amount is determined per the water allocation rules.

In addition to fluctuations in the availability of SWP water, District No. 40's ability to use AVEK supply is currently limited in certain areas due to transmission facility restrictions as well as by the limited 65 million gallons per day (mgd) capacity of the Quartz Hill Treatment Plant. RCSD and QHWD also have similar transmission and treatment restrictions. It is estimated that approximately 119,300 AFY of AVEK's full Table A Amount will be available to serve the Study Area in the future. This amount was determined by taking AVEK's full Table A Amount (141,400 AFY) and subtracting out AVEK's "other" future demand outside of the Study Area (22,100 AFY for 2010 to 2025). Future "other" demand was based on an average "other" M&I demand from 2000 to 2004 and a future agricultural demand of approximately 7,600 AFY from AVEK's draft 2005 UWMP. Table 2-4 provides a summary of the SWP water demands for the individual water purveyors assuming average water year delivery of the 119,300 AF of AVEK's Table A Amount to the Study Area and existing groundwater pumping rates.

TABLE 2-4
WHOLESALE DEMAND PROJECTIONS PROVIDED TO AVEK (AF)

	2010	2015	2020	2025	2030
District No. 40	69,800	70,400	70,000	68,600	64,500
Percent of District Total	57	58	58	57	56
RCSD	8,700	10,700	13,500	17,200	21,500
Percent of District Total	81	84	87	90	91
QHWD	6,200	6,000	5,900	6,000	5,800
Percent of District Total	55	55	54	55	54
Study Area	84,700	87,100	89,400	91,800	91,800
Percent of Study Area Total	59	60	60	61	61

Note: All numbers rounded to the nearest 100 AF.

2.2.1 Source Characteristics

The SWP's watershed encompasses the mountains and waterways around the Feather River. Rain and melting snow run off mountainsides and into waterways that lead into Lake Oroville. The lake in Butte County is the SWP's official start and a part of a complex that includes three power plants, a forebay, and an afterbay. One of the power plants, Hyatt Powerplant, is the largest and was built in the bedrock under the lake.

When water is needed, water is released from Lake Oroville into the Feather River. It travels down the river to where the river converges with the Sacramento River, the state's largest waterway. Water flows down the Sacramento River into the Sacramento-San Joaquin Delta. From the Delta, water is pumped into the California Aqueduct.

The Antelope Valley is served by the East Branch of the California Aqueduct. The bulk of the water imported by AVEK is treated and distributed to customers throughout its service area through Domestic-Agricultural Water Network (DAWN) Project facilities. AVEK's Table A Amount also provides for delivery of untreated irrigation water from the Aqueduct and AVEK turnouts to Antelope Valley farmers.

The DAWN Project consists of:

- More than 100 miles of water distribution pipeline;
- Four Water Treatment Plants;
- Four 8 million gallon water storage reservoirs near Mojave, and one 3 million gallon capacity reservoir at Vincent Hill Summit.

A $71 million bond issue that was authorized by AVEK-area voters in 1974 financed the DAWN Project. Proceeds from the first bond issue, Series A, amounted to $23 million for project start-up construction. Series A bonds have been completely repaid. The second phase was initiated in 1976, when $19 million in Series B bonds were issued. Series B bonds have been completely repaid. In 1977, the $18 million Series C bond issued heralded phase three of DAWN facilities construction. Series C bonds have been completely repaid. The final Phase of DAWN Project construction began in August 1986, when expenditure of the remaining $11 million in bonds, Series D, was approved by the AVEK Board of Directors. Beginning with the 2000 to 2001 tax year, AVEK no longer collects a tax to pay off series D bonds.

2.2.2 Availability of Supply

DWR reports in their "Excerpts from the Working Draft of 2005 SWP Delivery Reliability Report" (Reliability Report) that existing SWP facilities will on average receive 69 percent of their full Table A Amount for current demand conditions and 77 percent of their full Table A Amount for 2025 demand conditions.

Availability of SWP water varies from year to year, depending on precipitation, regulatory restrictions, legislative restrictions, and operational conditions, and is especially unreliable during dry years. The DWR Reliability report anticipates a minimum delivery of 5 percent of full Table A Amounts for 2025 demand conditions. However, results of the Monte Carlo simulation conducted in Section 3 of this report indicate a minimum 7 percent delivery for a single dry year and a minimum of 18 percent delivery for multi-dry year conditions.

Tables 2-5 and 2-6 provide a summary of the availability of wholesale water for average, single dry, and multi-dry water years.

TABLE 2-5
WHOLESALER IDENTIFIED AND QUANTIFIED EXISTING AND PLANNED SOURCES OF WATER AVAILABLE TO THE STUDY AREA FOR AVERAGE/NORMAL WATER YEARS

Wholesaler (Supply Source)	2010	2015	2020	2025	2030
AVEK (SWP)					
Table A Supply (AF)[(a)]	84,700	87,100	89,400	91,800	91,800
Percent of Table A Amount	71	73	75	77	77

Note: (a) The percentages of Table A Amount projected to be available are from Table 6-5 of DWR's "Excerpts from Working Draft of 2005 State Water Project Delivery Reliability Report (May 2005). Supplies are calculated by multiplying AVEK's Table A Amount available to the Study Area (119,300 AF) by these percentages. All numbers are rounded to the nearest 100 AF.

TABLE 2-6
WHOLESALER WATER RELIABILITY

Wholesaler	Single Dry Year	Multiple Dry Years
AVEK (SWP Supply)		
2005		
Table A Supply (AF)[(a)]	8,400	21,500
Percent of Table A Amount	7	18
2025/2030		
Table A Supply (AF)[(a)]	8,400	21,500
Percent of Table A Amount	7	18

Note: (a) The percentages of Table A Amount projected to be available are from a Monte Carlo Simulation based on DWR Study 7 historic data. Supplies are calculated by multiplying AVEK's Table A Amount available to the Study Area (119,300 AF) by these percentages. All numbers rounded to the nearest 100 AF.

2.2.3 Water Quality

SWP water is treated by four AVEK facilities prior to delivery to the water purveyors. The Quartz Hill Water Treatment Plant was the first plant built by the AVEK. The treatment plant receives water by gravity from the California Aqueduct. Screening and metering are provided at the head of the plant, followed by treatment chemical addition, flash mixing, tapered energy flocculation, clarification utilizing traveling bridges for sediment removal, dual media filters, and disinfection. Treated water is stored in a 9.2 million-gallon reservoir which supplies water by gravity into the distribution system. Decanted water from the solids removal process is returned to the plant influent. After the completion of the second expansion in 1989, the Quartz Hill Water Treatment Plant became capable of producing 65 mgd, enough to serve the needs of

280,000 people. The Quartz Hill Water Treatment Plant is planning a conversion of their disinfection system from chlorine to ozone/chloramines. This conversion will significantly reduce the levels of Trihalomethanes (THMs) from the treated water which was previously limiting District No. 40 from implementing their Aquifer Storage and Recharge program, as discussed in Section 2.3 below.

Expansion of the Eastside Water Treatment Plant located between Littlerock and Pearblossom to 10 mgd was completed in late 1988. It can now serve the needs of about 44,000 consumers.

The 14 mgd Rosamond Water Treatment Plant was established to support the needs of consumers in southeastern Kern County, an area that includes Rosamond, Mojave, California City, Edwards Air Force Base and Boron. Rosamond Water Treatment Plant is capable of providing water for 60,000 people.

The 4 mgd Acton Water Treatment Plant was completed in 1989. Water is pumped from the plant site near Barrell Springs Road, on Sierra Highway, to Vincent Hill Summit. From there it is pumped into a Los Angeles County Waterworks pipeline for transport to the Acton area. The plant's capacity is sufficient to supply the needs of 17,000 consumers.

The treated water is generally considered to be of excellent quality. Appendix D contains the Consumer Confidence Reports for AVEK deliveries in Kern County and Los Angeles County.

2.3 Aquifer Storage and Recharge

The Aquifer Storage and Recharge (ASR) program utilized by District No. 40 includes the use of new or existing wells for direct injection of water into the aquifer. District No. 40 is just beginning its use of the ASR Program and RCSD and QHWD have yet to implement an ASR program.

2.3.1 Source Characteristics

Certain characteristics affect economic viability and technical feasibility and are a key to a successful ASR program. If the aquifer is unsuitable for groundwater extraction, it is likely to be unsuitable for groundwater injections. The following characteristics are desirable for injection programs:

- Suitable surface and sub-surface hydrogeologic conditions
- Adequate storage capacity
- Proximity to potential recharge water sources
- Proximity to existing groundwater production sites
- Impermeable faults to impound groundwater
- Compatible water quality

Injection requires aquifer materials that have a high ability to accept and transmit water. These materials include sands and gravels in the subsurface for rapid acceptance of injected water. In order to have a cost-effective recharge program, the potential recharge sites should be located within a reasonable distance and hydraulic gradient of the potential source waters. Potential injection sites should be assessed relative to the location of existing facilities in order to minimize capital costs. In certain instances where it is necessary to control the ultimate storage location of the injected groundwaters, fault, and bedrock control of the groundwater impound may be a necessary characteristic that will need to be investigated further. In addition, it is important that the potential recharge site has a good quality groundwater that will not compromise the quality of the water to be injected.

Previous studies have shown that the groundwater recharge zones described in the Los Angeles County Department of Public Works "Final Report on the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation" have potential.

2.3.2 Availability of Supply

The entire groundwater basin of the Antelope Valley is estimated to have 68 million AF of storage of which 20 million AF is currently available. Approximately 55 million AF of groundwater was estimated to remain in storage as of 1975. This stored water, however, may not be entirely accessible due to (1) uneconomical pumping depths, (2) distance between the groundwater basin and current users, and (3) the potential for causing land subsidence.

At present, the principal source of recharge of the groundwater is runoff, principally recharged in the foothills of the mountains. Numerous studies have been conducted to estimate the natural recharge since 1924, some based on little data. The most recent studies estimate natural recharge at 31,200 to 59,100 AFY. (USGS, 1993)

As such, it is anticipated that an ASR project in the Antelope Valley could provide up to 20 million AF of additional water storage that could be extracted by maximizing well production capacity during dry years.

From an ASR study conducted by District No. 40 in conjunction with AVEK, District No. 40 has received a Conditional Waiver of Waste Discharge Requirements for an ASR project for a period of 5 years with ground water monitoring requirements stipulated in the waiver. The waiver stipulates that District No. 40 can only inject water to fill the basin to the 2,150 feet groundwater contour interval. This "bowl" has a radius of approximately 2 miles centered around the middle of Lancaster. The permit allows for injection up to 6,843 AFY. District 40 plans to use five of its well fields consisting of a total of 15 wells for injection when surplus water is available. This project has previously been delayed due to water quality issues as discussed below.

It is anticipated that ASR would be utilized to ensure the availability of groundwater in dry water years. This volume was assumed to be the difference in the existing and maximum pumping rates or approximately 31,600 AF. With an injection capacity of approximately 6,800 AFY, it is estimated that District No. 40 would require 5 years of maximum injection to reach their storage goal. Thus assuming a maximum injection rate from 2006 and continuing each year, District No. 40 would have 31,600 AF stored by 2010.

2.3.3 Water Quality

There are a variety of source waters that could be available for recharge into the groundwater of the Antelope Valley. They include:

- State Water Project
  - Treated potable water or
  - Untreated raw water direct from the California Aqueduct
- Reclaimed Water (for spreading only or blending)
  - Secondary or
  - Tertiary treated

The water quality of the recharged water depends on which supply is used. However, there are restrictions to the quality of the water recharged outlined in the Regional Water Board's Watershed Basin Plan. Recharge source water would need to meet with these requirements before recharge could occur. Requirements are stricter for water that is injected versus water that is infiltrated.

The current waiver prevents injection of water that has THM levels greater than 40 ppb. AVEK's current treatment process does not consistently produce water that meets this requirement. However, their planned conversion of disinfection facilities to the use of a combination of ozone and chloramines will achieve the THM levels required for injection. The conversion is scheduled for completion in October 2006. However, District No. 40 has begun and will continue injection as long as the average THM levels are under 40 ppb for the injection cycle.

Because this alternative would allow an increase in the availability of local groundwater, the quality of the water available for potable use is the same as the existing sources distributed to customers.

2.3.4 Cost

The purchase cost for the 31,600 AFY of injection water from AVEK (assuming a rate of $135/AF) is approximately $4,266,000. The extraction cost for to pump the injected water from the basin would be an additional $4,740,000 (assuming a pumping cost of $150/AF). These estimates are based on current costs. Since existing wells will be used for injection and extraction no additional capital costs are anticipated. Furthermore, no additional operation and maintenance costs are assumed beyond District No. 40's current efforts. Thus the annual cost for the ASR project is approximately $9,006,000.

2.4 Summary of Supplies

As previously mentioned, groundwater availability is uncertain due to the recent adjudication activities. Thus three scenarios for groundwater availability are presented below. Tables 2-7 through 2-9 provide a summary of the water sources and quantities for each of the participating agencies over the 25-year planning period, in 5-year increments for the various groundwater pumping scenarios. Table 2-10 provides the availability of groundwater in a dry water year.

TABLE 2-7
CURRENT AND PLANNED WATER SUPPLIES WITHOUT GROUNDWATER PUMPING (AFY)

Water Supply Sources		2004	2010	2015	2020	2025	2030
District # 40							
Groundwater[(a)]		21,400	0	0	0	0	0
ASR		0	31,600	31,600	31,600	31,600	31,600
SWP[(b)]		36,200	69,800	70,400	70,000	68,600	64,500
	Total	57,600	101,400	102,000	101,600	100,200	96,100
Rosamond CSD							
Groundwater[(a)]		2,000	0	0	0	0	0
SWP[(b)]		1,200	8,700	10,700	13,500	17,200	21,500
	Total	3,200	8,700	10,700	13,500	17,200	21,500
Quartz Hill WD							
Groundwater[(a)]		1,300	0	0	0	0	0
SWP[(b)]		4,100	6,200	6,000	5,900	6,000	5,800
	Total	5,400	6,200	6,000	5,900	6,000	5,800
Study Area							
Groundwater[(a)]		24,700	0	0	0	0	0
ASR		0	31,600	31,600	31,600	31,600	31,600
SWP[(b)]		41,500	84,700	87,100	89,400	91,800	91,800
	Total	66,200	116,300	118,700	121,000	123,400	123,400

Notes: All numbers rounded to the nearest 100 AF.
(a) Assumes no groundwater would be available.
(b) SWP water delivery at 71 to 77 percent of Table A Amount available to the Study Area. Distribution among water purveyors determined by percent population.

TABLE 2-8
CURRENT AND PLANNED WATER SUPPLIES WITH REDUCED GROUNDWATER PUMPING (AFY)

Water Supply Sources		2004	2010	2015	2020	2025	2030
District # 40							
Groundwater[(a)]		21,400	10,000	10,000	10,000	10,000	10,000
ASR		0	31,600	31,600	31,600	31,600	31,600
SWP[(b)]		36,200	69,800	70,400	70,000	68,600	64,500
	Total	57,600	111,400	112,000	111,600	110,200	106,100
Rosamond CSD							
Groundwater[(a)]		2,000	1,000	1,000	1,000	1,000	1,000
SWP[(b)]		1,200	8,700	10,700	13,500	17,200	21,500
	Total	3,200	9,700	11,700	14,500	18,200	22,500
Quartz Hill WD							
Groundwater[(a)]		1,300	2,500	2,500	2,500	2,500	2,500
SWP[(b)]		4,100	6,200	6,000	5,900	6,000	5,800
	Total	5,400	8,700	8,500	8,400	8,500	8,300
Study Area							
Groundwater[(a)]		24,700	13,500	13,500	13,500	13,500	13,500
ASR		0	31,600	31,600	31,600	31,600	31,600
SWP[(b)]		41,500	84,700	87,100	89,400	91,800	91,800
	Total	66,200	129,800	132,200	134,500	136,900	136,900

Notes: All numbers rounded to nearest 100 AF.
(a) Assumes groundwater available at 50 percent of existing pumping rate.
(b) SWP water delivery at 71 to 77 percent of Table A Amount available to the Study Area. Distribution among water purveyors determined by percent population.

TABLE 2-9
CURRENT AND PLANNED WATER SUPPLIES WITH EXISTING GROUNDWATER PUMPING (AFY)

Water Supply Sources	2004	2010	2015	2020	2025	2030
District # 40						
Groundwater[(a)]	21,400	20,000	20,000	20,000	20,000	20,000
ASR	0	31,600	31,600	31,600	31,600	31,600
SWP[(b)]	36,200	69,800	70,400	70,000	68,600	64,500
Total	57,600	121,400	122,000	121,600	120,200	116,100
Rosamond CSD						
Groundwater[(a)]	2,000	2,000	2,000	2,000	2,000	2,000
SWP[(b)]	1,200	8,700	10,700	13,500	17,200	21,500
Total	3,200	10,700	12,700	15,500	19,200	23,500
Quartz Hill WD						
Groundwater[(a)]	1,300	5,000	5,000	5,000	5,000	5,000
SWP[(b)]	4,100	6,200	6,000	5,900	6,000	5,800
Total	5,400	11,200	11,000	10,900	11,000	10,800
Study Area						
Groundwater[(a)]	24,700	27,000	27,000	27,000	27,000	27,000
ASR	0	31,600	31,600	31,600	31,600	31,600
SWP[(b)]	41,500	84,700	87,100	89,400	91,800	91,800
Total	66,200	143,300	145,700	148,000	150,400	150,400

Notes: All numbers rounded to the nearest 100 AF.
(a) Assumes groundwater available at the existing pumping rate.
(b) SWP water delivery at 71 to 77 percent of Table A Amount available to the Study Area. Distribution among water purveyors determined by percent population.

TABLE 2-10
CURRENT AND PLANNED WATER SUPPLIES WITH MAXIMUM GROUNDWATER PUMPING (AFY)

Water Supply Sources		2004	2010	2015	2020	2025	2030
District # 40							
Groundwater[a]		21,400	20,000	20,000	20,000	20,000	20,000
ASR		0	31,600	31,600	31,600	31,600	31,600
SWP[b]		36,200	69,800	70,400	70,000	68,600	64,500
	Total	57,600	121,400	122,000	121,600	120,200	116,100
Rosamond CSD							
Groundwater[a]		2,000	4,500	4,500	4,500	4,500	4,500
SWP[b]		1,200	8,700	10,700	13,500	17,200	21,500
	Total	3,200	13,200	15,200	18,000	21,700	26,000
Quartz Hill WD							
Groundwater[a]		1,300	8,400	8,400	8,400	8,400	8,400
SWP[b]		4,100	6,200	6,000	5,900	6,000	5,800
	Total	5,400	14,600	14,400	14,300	14,400	14,200
Study Area							
Groundwater[a]		24,700	32,900	32,900	32,900	32,900	32,900
ASR		0	31,600	31,600	31,600	31,600	31,600
SWP[b]		41,500	84,700	87,100	89,400	91,800	91,800
	Total	66,200	149,200	151,300	153,900	156,300	156,300

Notes: All numbers rounded to the nearest 100 AF
(a) Assumes groundwater available at the maximum pumping capacity.
(b) SWP water delivery at 71 to 77 percent of Table A Amount available to the Study Area. Distribution among water purveyors determined by percent population.

2.5 Economic Analysis of Supplies

This subsection provides an economic evaluation of the existing supplies available to the District. Further, these sources are ranked based on this analysis and consideration of source reliability. Table 2-11 provides a summary of the unit costs for each of the supplies available to the Antelope Valley. As shown by the table groundwater is the most cost effective source available to the Antelope Valley, however, due to the uncertainty of this supply as the adjudication process continues there is no guarantee of its reliability. Reliability of these three sources is discussed in more detail in the Section 3.

TABLE 2-11
ECONOMIC SUMMARY OF THE EXISTING SUPPLIES FOR THE STUDY AREA

	Cost per AF[(a)]	Reliability Factor[(b)]	Ranking
District No. 40			
Groundwater	$120	90	1
ASR	$285	90	3
Imported Water	$225 ($275 summer)	77	2
RCSD			
Groundwater	$110	90	1
Imported Water	$251	77	2
QHWD			
Groundwater	$110	90	1
Imported Water	$225 ($275 summer)	77	2

Notes:
(a) Costs are indicated in 2005 dollars and will increase as power and treatment costs go up.
(b) Reliability factor for imported water is based on DWR Reliability Report for Study 7; reliability factor for groundwater is based on the assumption that adjudications currently in progress will likely reduce the available groundwater below current pumping levels unless replenishment occurs; reliability factor for ASR is assumed to be 90 percent because of the availability once stored.

Section 3: Water Supply Reliability Planning

This Section provides a discussion of the reliability of the water supply within the Antelope Valley. A comparison between the water supply and demand for an average water year, single-dry water year, and multi-dry water years is also provided.

3.1 Reliability

Reliability is "how much one can count on a certain amount of water being delivered to a specific place at a specific time" and depends on the availability of water from the source, availability of the means of conveyance and level and pattern of water demand at the place of delivery.

Reliability criteria define the maximum acceptable level of supply shortage an agency is willing to sustain during a drought. For this study, a reliability criterion has been used to evaluate water supply plans. This criterion requires water supply to be sufficient to meet projected demands 95 percent of the time. In the remaining 5 percent of the time, it is assumed that the maximum allowable supply shortage will be 5 percent of the demand. This level is chosen because a 5 percent water demand reduction is anticipated to be attainable by voluntary conservation. Typically when a shortage occurs, water customers increase their awareness of water usage and voluntarily reduce water demands, avoiding water rationing.

3.2 Plan to Assure Reliable Water Supply

In order to assure a reliable water supply, and as part of this Integrated UWMP, several water management strategies have been evaluated and are discussed in Section 6. The main objective of the recommended water management strategies will be to assure that the Study Area will have sufficient water supply to meet increasing water demands. This is particularly important with the recent start of adjudication in the groundwater basin. None of the water purveyors, at this time, have a guaranty to the amount of groundwater available to them. For the comparison discussed in the following subsection, it was assumed that the amount of groundwater available would remain the same. If however, this availability is reduced through the adjudication process, the difference would be made up by the implementation of the water management strategies described in Section 6.

Additionally, a reliability assessment of the SWP with respect to the Study Area was conducted as described in Section 6. The assessment determined that AVEK will receive approximately a minimum of 7 percent of their Table A Amount in a single dry year and approximately a minimum of 18 percent in multi-dry year conditions. The analysis was based on the Study 7 data from the draft 2005 DWR SWP Reliability Report. DWR recommends using Studies 6 and 7 for planning purposes since they include updated assumptions for Contractor Demands. Study 6 includes revised current demand whereas Study 7 includes revised future demand.

3.3 Projected Water Banking Requirements

The primary reliability concern is curtailed SWP deliveries due to hydrologic conditions in northern California. In order to firm up the reliability of water from the SWP, banking or storage of available surplus water during wet years must be accomplished in some form. To assess the Antelope Valley's water banking requirements, a reliability model was developed based on a statistical evaluation of projected SWP delivery capability. The basis for the statistical evaluation is the recent DWR draft 2005 SWP Delivery Reliability Report (DWR, 2005) and the dry year water supply and demand projections described in Chapter 4.

In evaluating water banking requirements, there are two characteristics that must be established: the required volume of water in storage and the required pumpback capacity for the most severe three-year delivery projection. The three-year drought sequence is commonly utilized for water supply planning in California and in UWMPs. For the purpose of this evaluation, the pumpback capacity requirement is the largest annual delivery that must be provided by the Antelope Valley's water banking programs.

3.3.1 Development of the Reliability Model

The statistical evaluation was performed using model study results presented by DWR in its draft 2005 SWP Delivery Reliability Report (DWR, 2005). DWR uses its CALSIM II model to simulate operation of the SWP and, among other things, evaluate SWP delivery reliability. Results from the CALSIM II model (Study 7) were utilized as the basis for the analysis in this report. Based on the CALSIM II model, the projected SWP delivery capability, based on historic hydrology and maximum contractor demands, is shown on Figure 3-1. Using these projected deliveries, the probability of projected deliveries, expressed as a percentage of Table A Amount, is shown on Figure 3-2. Table A is an exhibit to SWP Contracts and is used by DWR to allocate available supply and costs to SWP contractors.

To evaluate the Antelope Valley's water banking requirements, a regression analysis was performed to determine if there is a relationship between a given year's delivery and the delivery of the preceding year(s). The regression analysis was based on the following delivery equation that was developed from CALSIM II model delivery projections from the year 1922 to 1994:

$$D_{(t)} = C + M * D_{(t-1)}$$

Where:

$D_{(t)}$ = Delivery for a given year
$D_{(t-1)}$ = Delivery for the previous year
C, M = Constants

The results indicated that the regression co-efficient (R^2) for linear, log, or semi-log distribution was low (0.25). The low R^2 value indicates that there is a weak relationship between the current year delivery and the previous year delivery.

Subsequently, a cumulative percent distribution analysis was performed on the historical delivery projections to identify the type of distribution that can best describe these data. As shown in Figure 3-2, the distribution for each of the conditions had two different patterns.

Figure 3-1
DWR Study 7 Historical SWP Delivery

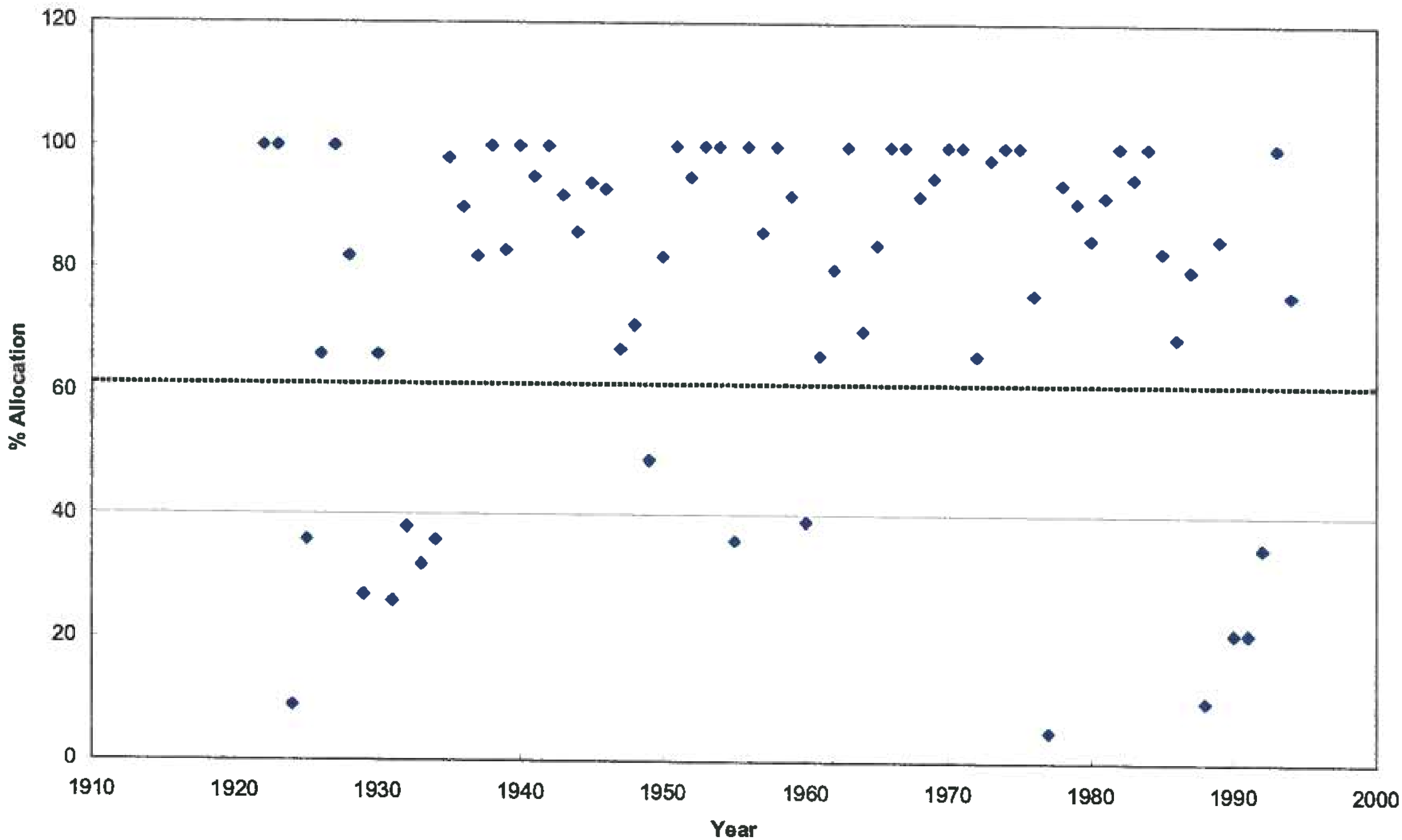
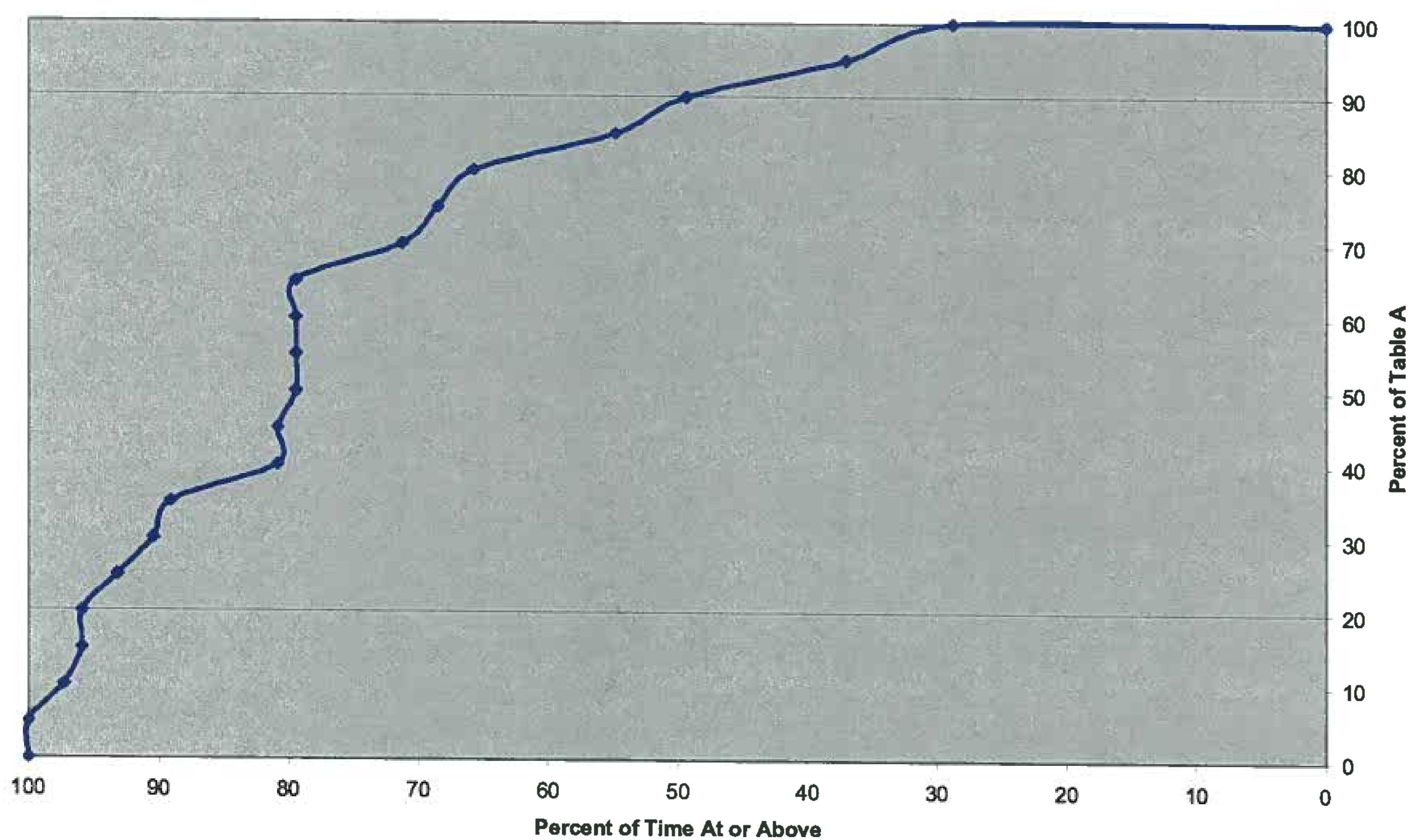


Figure 3-2
Probablity of SWP Delivery (Study 7)



Approximately 75 percent of the years, the DWR deliveries would have been more than 69 percent of the Table A Amount. During the remaining periods, the deliveries varied from about 5 percent to 69 percent. Therefore, the projected delivery for each period can be described by the following equation:

$$D = R_1(X) \text{ or } R_2(X)$$

Where:

$R_1(X)$ = a random function describing the variability of the projected delivery during 75 percent of the time (Antelope Valley would receive more than 69 percent of the Table A Amount during this period), and

$R_2(X)$ = a random function describing the variability of the projected delivery during 25 percent of the time (Antelope Valley would receive 5 percent to 69 percent of the Table A Amount during this period)

In addition, because the dry years (i.e., projected deliveries below 60 percent) occur in multi-year sequences, the duration of these sequences are incorporated in the same probability as those in the 73-year period of record by imposing the following additional constraints on the model:

- The probability of selecting $R_1(X)$ or $R_2(X)$ distribution is proportional to the relative frequency of occurrence (i.e., number of years) of each function;
- As shown on Figures 3-1 and 3-2, the low-delivery years (< 60 percent Table A Amount) appear to occur in clusters. For example, in a ten-year span from 1924 to 1934, the SWP would have delivered less than 50 percent of Table A Amount during seven years; and in 4 out of 5 years from 1988 to 1992, the SWP would have delivered less than 30 percent of the Table A Amount. In order to simulate this pattern of delivery, a constraint was included in the model so that the low-delivery distribution $R_2(X)$ occurs with the equivalent duration and frequency of consecutive low-delivery years as the CALSIM II model projections based on historical hydrology. These projections of consecutive low-delivery years are summarized in Table 3-1.

TABLE 3-1
CALSIM II MODEL PROJECTIONS OF DURATION AND FREQUENCY OF CONSECUTIVE LOW-DELIVERY YEARS

No. of Consecutive Low-Delivery Years	Frequency of Occurrence	Reference Years from CALSIM II Model
1	5	1929; 1955; 1960; 1977; 1988
2	1	1924 to 1925
3	1	1990 to 1992
4	1	1931 to 1934

A Monte Carlo analysis (Crystal Ball Version 4.0) was utilized to generate 1,000 water delivery forecasts to simulate delivery randomness. Each forecast contained a delivery projection for 73 consecutive years.

To evaluate the storage requirements, the lowest three-year sequence was identified for each forecast. The lowest cumulative three-year delivery sequences from the 1,000 forecasts were ranked and the three-year deliveries corresponding to 95 percent confidence levels were identified (i.e., a confidence level of 95 percent means that 95 percent of the time the three-year SWP deliveries will be greater than the specified level of delivery or percent of the Table A Amount, or one year in every 20 years, deliveries will be less than the specified level of delivery). The storage requirements were calculated as the difference between the dry three-year demand and the projected three-year delivery.

The lowest one-year delivery was identified for each forecast to identify the pumpback requirement for that forecast. The lowest one-year deliveries from the 1,000 forecasts were ranked and the deliveries corresponding to 95 percent confidence levels were identified. The pumpback requirements were calculated as the difference between the dry year demand and the projected one-year delivery.

The estimated one-year pumpback and three-year storage requirements corresponding to the 95 percent confidence levels are presented in Table 3-2. The storage-to-pumpback ratio for the 95 percent confidence level is 2.68:1. Table 3-3 provides the three-year storage requirements per year.

TABLE 3-2
ESTIMATED ONE-YEAR PUMPBACK AND THREE-YEAR STORAGE REQUIREMENTS[(a)]

Probability of Delivery (%)	One-Year Pumpback (AFY)	Three-Year Storage (AF)
95	63,500	170,600

Note: (a) Pumpback and storage requirements were derived from the water supply reliability model.

TABLE 3-3
THREE-YEAR STORAGE REQUIREMENTS FOR 95 PERCENT CONFIDENCE LEVEL[(a)]

Year	Storage Requirement (AF)
1	53,600
2	63,500
3	53,500
Totals (AF)[(a)]	170,600

3.4 Reliability Comparison

As required by the Act, a comparison of water supply and demand for an average water year, single dry water year, and multi-dry water years should be present from 2005 to 2030 in five-year increments.

3.4.1 Average Water Year Assessment

Table 3-4 provides a summary of the average water year reliability for each of the water purveyors and the Study Area as a whole. The overall delivery of SWP water to the Study Area was estimated at 70 to 77 percent of AVEK's Table A Amount less AVEK's "other" 2025 demand. Deliveries to the individual water purveyors were determined based percent population for the given year. Demand estimates are based on the per capita projection developed in Section 4. Conservation was determined assuming a 2.0 percent reduction per five-year interval for a maximum reduction of 10 percent in 2030. As shown by the comparison, RCSD and QHWD will have sufficient supply to meet with 2030 demand during an average water year by continuing with existing water supply strategies, assuming the availability of groundwater remains the same as it is today. District No. 40 will need to implement a new water supply or additional water demand management measures by 2020 in order to meet demand. Potential water supply alternatives are discussed in Section 6.6. Water demand management measures are discussed in Section 5.

3.4.2 Single Dry-Year Water Assessment

Table 3-5 provides a summary of the single dry water year reliability for each of the water purveyors and the Study Area as a whole. Overall SWP water delivery to the Study Area was estimated to be available at 7 percent (as determined by the Monte Carlo Simulation discussed above) of AVEK's Table A Amount less AVEK's "other" 2025 demand. Delivery to individual water purveyors was based on percent population for the given year. Demand estimates were based on per capita projections as developed in Section 4. Conservation was determined assuming a 2.0 percent reduction per five-year interval for a maximum reduction of 10 percent in 2030.

As shown by the comparison, all of the water purveyors will have sufficient supply to meet the increasing demand through 2030 with implementation of the planned water supplies and assuming the availability of groundwater remains the same as it is today. However, historically it has been the practice of the water purveyors to conserve groundwater use during average water years for additional pumping and availability in dry years to make up for the losses in SWP. Table 3-5 reflects this additional groundwater pumping as well as the planned water supplies (such as water banking) as identified and discussed in Section 6.

3.4.3 Multi Dry-Year Assessment

Tables 3-6 through 3-10 provide a summary of the multi dry water year reliability for each of the water purveyors and the Study Area as a whole. Each table presents a five year period of supply and demand (e.g., Table 3-6 presents data for years 2006 to 2010, Table 3-7 presents data for years 2011 to 2015, etc.) For all cases, overall delivery of SWP water to the Study Area was estimated to be available at 18 percent (as determined by the Monte Carlo Simulation discussed above) of AVEK's Table A Amount available to the Study Area. Demand estimates are based on the per capita projections developed in Section 4. Conservation was determined assuming a 2.0 percent reduction per five-year interval for a maximum reduction of 10 percent in 2030.

As shown by the comparison, all of the water purveyors will have sufficient supply to the increasing demand through 2030 with the implementation of the planned water supplies, assuming the availability of groundwater remains the same. Again, the table reflects the water purveyors' practice of conserving groundwater for additional availability in dry water years.

TABLE 3-4
AVERAGE WATER YEAR ASSESSMENT

	2010	2015	2020	2025	2030
District 40					
Existing Water Supplies					
Groundwater	20,000	20,000	20,000	20,000	20,000
ASR[(a)]	0	0	0	0	0
Imported Water	69,800	70,400	70,000	68,600	64,500
Total Existing Supply	89,800	90,400	90,000	88,600	84,500
District 40 Demand (w/out conservation)	74,900	90,700	106,300	120,800	134,600
Conservation	1,500	3,600	6,400	9,700	13,500
Demand (w/conservation)	**73,400**	**87,100**	**99,900**	**111,100**	**121,100**
Difference (supply minus demand)	16,400	3,300	(9,900)	(22,500)	(36,600)
Difference as Percent of Supply	18	4	(11)	(25)	(43)
Difference as Percent of Demand	22	4	(10)	(20)	(30)
Planned Water Supplies					
New Supply	0	0	2,000	11,600	23,100
Recycled Water	2,700	5,400	8,200	10,900	13,600
Total Planned Supply	2,700	5,400	10,200	22,500	36,700
Total Existing and Planned Supplies	**92,500**	**95,800**	**100,200**	**111,100**	**121,200**
District 40 Demand (w/out conservation)	74,900	90,700	106,300	120,800	134,600
Conservation	1,500	3,600	6,400	9,700	13,500
Demand (w/conservation)	**73,400**	**87,100**	**99,900**	**111,100**	**121,100**
Difference (supply minus demand)	19,100	8,700	300	0	100
Difference as Percent of Supply	21	9	0	0	0
Difference as Percent of Demand	26	10	0	0	0

	2010	2015	2020	2025	2030
RCSD					
Existing Water Supplies					
Groundwater	2,000	2,000	2,000	2,000	2,000
Imported Water	8,700	10,700	13,500	17,200	21,500
Total Existing Supply	10,700	12,700	15,500	19,200	23,500
Demand (w/out conservation)	4,700	7,000	10,400	15,500	23,000
Conservation	100	300	600	1,200	2,300
Demand (w/conservation)	**4,600**	**6,700**	**9,800**	**14,300**	**20,700**
Difference (supply minus demand)	6,000	6,000	5,700	4,900	2,800
Difference as Percent of Supply	56	47	37	26	12
Difference as Percent of Demand	130	90	58	34	14
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	0	0
Recycled Water	1,000	1,000	1,000	1,000	1,000
Total Planned Supply	1,000	1,000	1,000	1,000	1,000
Total Existing and Planned Supplies	**11,700**	**13,700**	**16,500**	**20,200**	**24,500**
Demand (w/out conservation)	4,700	7,000	10,400	15,500	23,000
Conservation	100	300	600	1,200	2,300
Demand (w/conservation)	**4,600**	**6,700**	**9,800**	**14,300**	**20,700**
Difference (supply minus demand)	7,100	7,000	6,700	5,900	3,800
Difference as Percent of Supply	61	51	41	29	16
Difference as Percent of Demand	154	104	68	41	18

	2010	2015	2020	2025	2030
QHWD					
Existing Water Supplies					
Groundwater	5,000	5,000	5,000	5,000	5,000
Imported Water	6,200	6,000	5,900	6,000	5,800
Total Existing Supply	11,200	11,000	10,900	11,000	10,800
Demand (w/out conservation)	6,300	7,400	8,500	9,900	11,500
Conservation	100	300	500	800	1,100
Demand (w/conservation)	**6,200**	**7,100**	**8,000**	**9,100**	**10,400**
Difference (supply minus demand)	5,000	3,900	2,900	1,900	400
Difference as Percent of Supply	45	35	27	17	4
Difference as Percent of Demand	81	55	36	21	4
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	0	0
Recycled Water	0	0	0	0	0
Total Planned Supply	0	0	0	0	0
Total Existing and Planned Supplies	**11,200**	**11,000**	**10,900**	**11,000**	**10,800**
Demand (w/out conservation)	6,300	7,400	8,500	9,900	11,500
Conservation	100	300	500	800	1,100
Demand (w/conservation)	**6,200**	**7,100**	**8,000**	**9,100**	**10,400**
Difference (supply minus demand)	5,000	3,900	2,900	1,900	400
Difference as Percent of Supply	45	35	27	17	4
Difference as Percent of Demand	81	55	36	21	4

	2010	2015	2020	2025	2030
Study Area					
Existing Water Supplies					
Groundwater	27,000	27,000	27,000	27,000	27,000
ASR	0	0	0	0	0
Imported Water	84,700	87,100	89,400	91,800	91,800
Total Existing Supply	111,700	114,100	116,400	118,800	118,800
Demand (w/out conservation)	86,000	105,100	125,300	146,200	169,100
Conservation	1,700	4,200	7,500	11,700	16,900
Demand (w/conservation)	**84,300**	**100,900**	**117,800**	**134,500**	**152,200**
Difference (supply minus demand)	27,400	13,200	(1,400)	(15,700)	(33,400)
Difference as Percent of Supply	25	12	(1)	(13)	(28)
Difference as Percent of Demand	33	13	(1)	(12)	(22)
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	2,000	11,600	23,100
Recycled Water	3,700	6,400	9,200	11,900	14,600
Total Planned Supply	3,700	6,400	11,200	23,500	37,700
Total Existing and Planned Supplies	**115,400**	**120,500**	**127,600**	**142,300**	**156,500**
Demand (w/out conservation)	86,000	105,100	125,300	146,200	169,100
Conservation	1,700	4,200	7,500	11,700	16,900
Demand (w/conservation)	**84,300**	**100,900**	**117,800**	**134,500**	**152,200**
Difference (supply minus demand)	31,100	19,600	9,800	7,800	4,300
Difference as Percent of Supply	27	16	8	5	3
Difference as Percent of Demand	37	19	8	6	3

Notes: All numbers rounded to nearest 100 AF.
(a) ASR supplies are available but will not be used in average years

TABLE 3-5
SINGLE DRY WATER YEAR ASSESSMENT

	2010	2015	2020	2025	2030
District 40					
Existing Water Supplies					
Groundwater	20,000	20,000	20,000	20,000	20,000
ASR	31,600	31,600	31,600	31,600	31,600
Imported Water	6,900	6,800	6,500	6,300	5,900
Total Existing Supply	58,500	58,400	58,100	57,900	57,500
District 40 Demand (w/out conservation)	74,900	90,700	106,300	120,800	134,600
Conservation	1,500	3,600	6,400	9,700	13,500
Demand (w/conservation)	**73,400**	**87,100**	**99,900**	**111,100**	**121,100**
Difference (supply minus demand)	(14,900)	(28,700)	(41,800)	(53,200)	(63,600)
Difference as Percent of Supply	(25)	(49)	(72)	(92)	(111)
Difference as Percent of Demand	(20)	(33)	(42)	(48)	(53)
Planned Water Supplies					
Groundwater Banking/New Supplies	12,300	23,400	33,700	42,400	50,100
Recycled Water	2,700	5,400	8,200	10,900	13,600
Total Planned Supply	15,000	28,800	41,900	53,300	63,700
Total Existing and Planned Supplies	**73,500**	**87,200**	**100,000**	**111,200**	**121,200**
District 40 Demand (w/out conservation)	74,900	90,700	106,300	120,800	134,600
Conservation	1,500	3,600	6,400	9,700	13,500
Demand (w/conservation)	**73,400**	**87,100**	**99,900**	**111,100**	**121,100**
Difference (supply minus demand)	100	100	100	100	100
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

	2010	2015	2020	2025	2030
RCSD					
Existing Water Supplies					
Groundwater	4,500	4,500	4,500	4,500	4,500
Imported Water	900	1,000	1,300	1,600	2,000
Total Existing Supply	5,400	5,500	5,800	6,100	6,500
Demand (w/out conservation)	4,700	7,000	10,400	15,500	23,000
Conservation	100	300	600	1,200	2,300
Demand (w/conservation)	**4,600**	**6,700**	**9,800**	**14,300**	**20,700**
Difference (supply minus demand)	800	(1,200)	(4,000)	(8,200)	(14,200)
Difference as Percent of Supply	15	(22)	(69)	(134)	(218)
Difference as Percent of Demand	17	(18)	(41)	(57)	(69)
Planned Water Supplies					
Groundwater Banking/New Supplies	0	300	3,100	7,300	13,300
Recycled Water	1,000	1,000	1,000	1,000	1,000
Total Planned Supply	1,000	1,300	4,100	8,300	14,300
Total Existing and Planned Supplies	**6,400**	**6,800**	**9,900**	**14,400**	**20,800**
Demand (w/out conservation)	4,700	7,000	10,400	15,500	23,000
Conservation	100	300	600	1,200	2,300
Demand (w/conservation)	**4,600**	**6,700**	**9,800**	**14,300**	**20,700**
Difference (supply minus demand)	1,800	100	100	100	100
Difference as Percent of Supply	28	1	1	1	0
Difference as Percent of Demand	39	1	1	1	0

	2010	2015	2020	2025	2030
QHWD					
Existing Water Supplies					
Groundwater	8,400	8,400	8,400	8,400	8,400
Imported Water	600	600	600	500	500
Total Existing Supply	9,000	9,000	9,000	8,900	8,900
Demand (w/out conservation)	6,300	7,400	8,500	9,900	11,500
Conservation	100	300	500	800	1,100
Demand (w/conservation)	**6,200**	**7,100**	**8,000**	**9,100**	**10,400**
Difference (supply minus demand)	2,800	1,900	1,000	(200)	(1,500)
Difference as Percent of Supply	31	21	11	(2)	(17)
Difference as Percent of Demand	45	27	13	(2)	(14)
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	300	1,600
Recycled Water	0	0	0	0	0
Total Planned Supply	0	0	0	300	1,600
Total Existing and Planned Supplies	**9,000**	**9,000**	**9,000**	**9,200**	**10,500**
Demand (w/out conservation)	6,300	7,400	8,500	9,900	11,500
Conservation	100	300	500	800	1,100
Demand (w/conservation)	**6,200**	**7,100**	**8,000**	**9,100**	**10,400**
Difference (supply minus demand)	2,800	1,900	1,000	100	100
Difference as Percent of Supply	31	21	11	1	1
Difference as Percent of Demand	45	27	13	1	1

	2010	2015	2020	2025	2030
Study Area					
Existing Water Supplies					
Groundwater	32,900	32,900	32,900	32,900	32,900
ASR	31,600	31,600	31,600	31,600	31,600
Imported Water	8,400	8,400	8,400	8,400	8,400
Total Existing Supply	72,900	72,900	72,900	72,900	72,900
Demand (w/out conservation)	85,900	105,100	125,200	146,200	169,100
Conservation	1,700	4,200	7,500	11,700	16,900
Demand (w/conservation)	**84,200**	**100,900**	**117,700**	**134,500**	**152,200**
Difference (supply minus demand)	(11,300)	(28,000)	(44,800)	(61,600)	(79,300)
Difference as Percent of Supply	(16)	(38)	(61)	(84)	(109)
Difference as Percent of Demand	(13)	(28)	(38)	(46)	(52)
Planned Water Supplies					
Groundwater Banking/New Supplies	12,300	23,700	36,800	50,000	65,000
Recycled Water	3,700	6,400	9,200	11,900	14,600
Total Planned Supply	16,000	30,100	46,000	61,900	79,600
Total Existing and Planned Supplies	**88,900**	**103,000**	**118,900**	**134,800**	**152,500**
Demand (w/out conservation)	85,900	105,100	125,200	146,200	169,100
Conservation	1,700	4,200	7,500	11,700	16,900
Demand (w/conservation)	**84,200**	**100,900**	**117,700**	**134,500**	**152,200**
Difference (supply minus demand)	4,700	2,100	1,200	300	300
Difference as Percent of Supply	5	2	1	0	0
Difference as Percent of Demand	6	2	1	0	0

Notes: All numbers rounded to nearest 100 AF.

TABLE 3-6
MULTI DRY WATER YEAR ASSESSMENT 2006-2010

	2006	2007	2008	2009	2010
District 40					
Existing Water Supplies					
Groundwater	20,000	20,000	20,000	20,000	20,000
ASR	0	0	0	0	0
Imported Water	17,800	17,800	17,800	17,700	17,700
Total Existing Supply	37,800	37,800	37,800	37,700	37,700
District 40 Demand (w/out conservation)	61,800	65,000	68,300	71,600	74,900
Conservation	200	500	800	1,100	1,500
Demand (w/conservation)	**61,600**	**64,500**	**67,500**	**70,500**	**73,400**
Difference (supply minus demand)	(23,800)	(26,700)	(29,700)	(32,800)	(35,700)
Difference as Percent of Supply	(63)	(71)	(79)	(87)	(95)
Difference as Percent of Demand	(39)	(41)	(44)	(47)	(49)
Planned Water Supplies					
Groundwater Banking/New Supplies	23,400	25,700	28,200	30,700	33,100
Recycled Water	500	1100	1600	2200	2700
Total Planned Supply	23,900	26,800	29,800	32,900	35,800
Total Existing and Planned Supplies	**61,700**	**64,600**	**67,600**	**70,600**	**73,500**
District 40 Demand (w/out conservation)	61,800	65,000	68,300	71,600	74,900
Conservation	200	500	800	1,100	1,500
Demand (w/conservation)	**61,600**	**64,500**	**67,500**	**70,500**	**73,400**
Difference (supply minus demand)	100	100	100	100	100
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

	2006	2007	2008	2009	2010
RCSD					
Existing Water Supplies					
Groundwater	4,500	4,500	4,500	4,500	4,500
Imported Water	1,900	2,000	2,100	2,100	2,200
Total Existing Supply	6,400	6,500	6,600	6,600	6,700
Demand (w/out conservation)	3,300	3,700	4,000	4,400	4,700
Conservation	0	0	0	100	100
Demand (w/conservation)	**3,300**	**3,700**	**4,000**	**4,300**	**4,600**
Difference (supply minus demand)	3,100	2,800	2,600	2,300	2,100
Difference as Percent of Supply	48	43	39	35	31
Difference as Percent of Demand	94	76	65	53	46
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	0	0
Recycled Water	500	600	800	950	1,000
Total Planned Supply	500	600	800	950	1,000
Total Existing and Planned Supplies	**6,900**	**7,100**	**7,400**	**7,550**	**7,700**
Demand (w/out conservation)	3,300	3,700	4,000	4,400	4,700
Conservation	0	0	0	100	100
Demand (w/conservation)	**3,300**	**3,700**	**4,000**	**4,300**	**4,600**
Difference (supply minus demand)	3,600	3,400	3,400	3,250	3,100
Difference as Percent of Supply	52	48	46	43	40
Difference as Percent of Demand	109	92	85	76	67

	2006	2007	2008	2009	2010
QHWD					
Existing Water Supplies					
Groundwater	8,400	8,400	8,400	8,400	8,400
Imported Water	1,700	1,700	1,600	1,600	1,600
Total Existing Supply	10,100	10,100	10,000	10,000	10,000
Demand (w/out conservation)	5,600	5,800	6,000	6,200	6,300
Conservation	0	0	100	100	100
Demand (w/conservation)	**5,600**	**5,800**	**5,900**	**6,100**	**6,200**
Difference (supply minus demand)	4,500	4,300	4,100	3,900	3,800
Difference as Percent of Supply	45	43	41	39	38
Difference as Percent of Demand	80	74	69	64	61
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	0	0
Recycled Water	0	0	0	0	0
Total Planned Supply	0	0	0	0	0
Total Existing and Planned Supplies	**10,100**	**10,100**	**10,000**	**10,000**	**10,000**
Demand (w/out conservation)	5,600	5,800	6,000	6,200	6,300
Conservation	0	0	100	100	100
Demand (w/conservation)	**5,600**	**5,800**	**5,900**	**6,100**	**6,200**
Difference (supply minus demand)	4,500	4,300	4,100	3,900	3,800
Difference as Percent of Supply	45	43	41	39	38
Difference as Percent of Demand	80	74	69	64	61

	2006	2007	2008	2009	2010
Study Area					
Existing Water Supplies					
Groundwater	32,900	32,900	32,900	32,900	32,900
ASR	0	0	0	0	0
Imported Water	21,400	21,500	21,500	21,400	21,500
Total Existing Supply	54,300	54,400	54,400	54,300	54,400
Demand (w/out conservation)	70,700	74,500	78,300	82,200	85,900
Conservation	200	500	900	1,300	1,700
Demand (w/conservation)	**70,500**	**74,000**	**77,400**	**80,900**	**84,200**
Difference (supply minus demand)	(16,200)	(19,600)	(23,000)	(26,600)	(29,800)
Difference as Percent of Supply	(30)	(36)	(42)	(49)	(55)
Difference as Percent of Demand	(23)	(26)	(30)	(33)	(35)
Planned Water Supplies					
Groundwater Banking/New Supplies	23,400	25,700	28,200	30,700	33,100
Recycled Water	1,000	1,700	2,400	3,150	3,700
Total Planned Supply	24,400	27,400	30,600	33,850	36,800
Total Existing and Planned Supplies	**78,700**	**81,800**	**85,000**	**88,150**	**91,200**
Demand (w/out conservation)	70,700	74,500	78,300	82,200	85,900
Conservation	200	500	900	1,300	1,700
Demand (w/conservation)	**70,500**	**74,000**	**77,400**	**80,900**	**84,200**
Difference (supply minus demand)	8,200	7,800	7,600	7,250	7,000
Difference as Percent of Supply	10	10	9	8	8
Difference as Percent of Demand	12	11	10	9	8

Notes: All numbers rounded to nearest 100 AF.

TABLE 3-7
MULTI DRY WATER YEAR ASSESSMENT 2011-2015

	2011	2012	2013	2014	2015
District 40					
Existing Water Supplies					
Groundwater	20,000	20,000	20,000	20,000	20,000
ASR	31,600	100	0	0	0
Imported Water	17,600	17,500	17,500	17,400	17,300
Total Existing Supply	69,200	37,600	37,500	37,400	37,300
District 40 Demand (w/out conservation)	78,100	81,200	84,400	87,600	90,700
Conservation	1,900	2,300	2,700	3,200	6,300
Demand (w/conservation)	**76,200**	**78,900**	**81,700**	**84,400**	**84,400**
Difference (supply minus demand)	(7,000)	(41,300)	(44,200)	(47,000)	(47,100)
Difference as Percent of Supply	(10)	(110)	(118)	(126)	(126)
Difference as Percent of Demand	(9)	(52)	(54)	(56)	(56)
Planned Water Supplies					
Groundwater Banking/New Supplies	3,800	37,600	39,900	42,200	41,800
Recycled Water	3,300	3,800	4,400	4,900	5,400
Total Planned Supply	7,100	41,400	44,300	47,100	47,200
Total Existing and Planned Supplies	**76,300**	**79,000**	**81,800**	**84,500**	**84,500**
District 40 Demand (w/out conservation)	78,100	81,200	84,400	87,600	90,700
Conservation	1,900	2,300	2,700	3,200	6,300
Demand (w/conservation)	**76,200**	**78,900**	**81,700**	**84,400**	**84,400**
Difference (supply minus demand)	100	100	100	100	100
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

	2011	2012	2013	2014	2015
RCSD					
Existing Water Supplies					
Groundwater	4,500	4,500	4,500	4,500	4,500
Imported Water	2,300	2,400	2,500	2,600	2,600
Total Existing Supply	6,800	6,900	7,000	7,100	7,100
Demand (w/out conservation)	5,200	5,700	6,100	6,600	7,000
Conservation	100	200	200	200	300
Demand (w/conservation)	**5,100**	**5,500**	**5,900**	**6,400**	**6,700**
Difference (supply minus demand)	1,700	1,400	1,100	700	400
Difference as Percent of Supply	25	20	16	10	6
Difference as Percent of Demand	33	25	19	11	6
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	0	0
Recycled Water	1,000	1,000	1,000	1,000	1,000
Total Planned Supply	1,000	1,000	1,000	1,000	1,000
Total Existing and Planned Supplies	**7,800**	**7,900**	**8,000**	**8,100**	**8,100**
Demand (w/out conservation)	5,200	5,700	6,100	6,600	7,000
Conservation	100	200	200	200	300
Demand (w/conservation)	**5,100**	**5,500**	**5,900**	**6,400**	**6,700**
Difference (supply minus demand)	2,700	2,400	2,100	1,700	1,400
Difference as Percent of Supply	35	30	26	21	17
Difference as Percent of Demand	53	44	36	27	21

	2011	2012	2013	2014	2015
QHWD					
Existing Water Supplies					
Groundwater	8,400	8,400	8,400	8,400	8,400
Imported Water	1,600	1,500	1,500	1,500	1,500
Total Existing Supply	10,000	9,900	9,900	9,900	9,900
Demand (w/out conservation)	6,500	6,800	7,000	7,200	7,400
Conservation	200	200	200	200	300
Demand (w/conservation)	**6,300**	**6,600**	**6,800**	**7,000**	**7,100**
Difference (supply minus demand)	3,700	3,300	3,100	2,900	2,800
Difference as Percent of Supply	37	33	31	29	28
Difference as Percent of Demand	59	50	46	41	39
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	0	0
Recycled Water	0	0	0	0	0
Total Planned Supply	0	0	0	0	0
Total Existing and Planned Supplies	**10,000**	**9,900**	**9,900**	**9,900**	**9,900**
Demand (w/out conservation)	6,500	6,800	7,000	7,200	7,400
Conservation	200	200	200	200	300
Demand (w/conservation)	**6,300**	**6,600**	**6,800**	**7,000**	**7,100**
Difference (supply minus demand)	3,700	3,300	3,100	2,900	2,800
Difference as Percent of Supply	37	33	31	29	28
Difference as Percent of Demand	59	50	46	41	39

	2011	2012	2013	2014	2015
Study Area					
Existing Water Supplies					
Groundwater	32,900	32,900	32,900	32,900	32,900
ASR	31,600	100	0	0	0
Imported Water	21,500	21,400	21,500	21,500	21,400
Total Existing Supply	86,000	54,400	54,400	54,400	54,300
Demand (w/out conservation)	89,800	93,700	97,500	101,400	105,100
Conservation	2,200	2,700	3,100	3,600	6,900
Demand (w/conservation)	**87,600**	**91,000**	**94,400**	**97,800**	**98,200**
Difference (supply minus demand)	(1,600)	(36,600)	(40,000)	(43,400)	(43,900)
Difference as Percent of Supply	(2)	(67)	(74)	(80)	(81)
Difference as Percent of Demand	(2)	(40)	(42)	(44)	(45)
Planned Water Supplies					
Groundwater Banking/New Supplies	3,800	37,600	39,900	42,200	41,800
Recycled Water	4,300	4,800	5,400	5,900	6,400
Total Planned Supply	8,100	42,400	45,300	48,100	48,200
Total Existing and Planned Supplies	**94,100**	**96,800**	**99,700**	**102,500**	**102,500**
Demand (w/out conservation)	89,800	93,700	97,500	101,400	105,100
Conservation	2,200	2,700	3,100	3,600	6,900
Demand (w/conservation)	**87,600**	**91,000**	**94,400**	**97,800**	**98,200**
Difference (supply minus demand)	6,500	5,800	5,300	4,700	4,300
Difference as Percent of Supply	7	6	5	5	4
Difference as Percent of Demand	7	6	6	5	4

Notes: All numbers rounded to nearest 100 AF.

TABLE 3-8
MULTI DRY WATER YEAR ASSESSMENT 2016-2020

	2016	2017	2018	2019	2020
District 40					
Existing Water Supplies					
Groundwater	20,000	20,000	20,000	20,000	20,000
ASR	31,600	31,600	100	0	0
Imported Water	17,200	17,100	17,000	16,900	16,800
Total Existing Supply	68,800	68,700	37,100	36,900	36,800
District 40 Demand (w/out conservation)	94,000	97,000	100,000	103,200	106,300
Conservation	4,100	4,700	5,200	5,800	6,400
Demand (w/conservation)	**89,900**	**92,300**	**94,800**	**97,400**	**99,900**
Difference (supply minus demand)	(21,100)	(23,600)	(57,700)	(60,500)	(63,100)
Difference as Percent of Supply	(31)	(34)	(156)	(164)	(171)
Difference as Percent of Demand	(23)	(26)	(61)	(62)	(63)
Planned Water Supplies					
Groundwater Banking/New Supplies	15,200	17,200	50,700	53,000	55,000
Recycled Water	6,000	6,500	7,100	7,600	8,200
Total Planned Supply	21,200	23,700	57,800	60,600	63,200
Total Existing and Planned Supplies	**90,000**	**92,400**	**94,900**	**97,500**	**100,000**
District 40 Demand (w/out conservation)	94,000	97,000	100,000	103,200	106,300
Conservation	4,100	4,700	5,200	5,800	6,400
Demand (w/conservation)	**89,900**	**92,300**	**94,800**	**97,400**	**99,900**
Difference (supply minus demand)	100	100	100	100	100
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

	2016	2017	2018	2019	2020
RCSD					
Existing Water Supplies					
Groundwater	4,500	4,500	4,500	4,500	4,500
Imported Water	2,800	2,900	3,000	3,100	3,200
Total Existing Supply	7,300	7,400	7,500	7,600	7,700
Demand (w/out conservation)	7,700	8,400	9,000	9,800	10,400
Conservation	300	400	500	500	600
Demand (w/conservation)	**7,400**	**8,000**	**8,500**	**9,300**	**9,800**
Difference (supply minus demand)	(100)	(600)	(1,000)	(1,700)	(2,100)
Difference as Percent of Supply	(1)	(8)	(13)	(22)	(27)
Difference as Percent of Demand	(1)	(8)	(12)	(18)	(21)
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	100	800	1,200
Recycled Water	1,000	1,000	1,000	1,000	1,000
Total Planned Supply	1,000	1,000	1,100	1,800	2,200
Total Existing and Planned Supplies	**8,300**	**8,400**	**8,600**	**9,400**	**9,900**
Demand (w/out conservation)	7,700	8,400	9,000	9,800	10,400
Conservation	300	400	500	500	600
Demand (w/conservation)	**7,400**	**8,000**	**8,500**	**9,300**	**9,800**
Difference (supply minus demand)	900	400	100	100	100
Difference as Percent of Supply	11	5	1	1	1
Difference as Percent of Demand	12	5	1	1	1

	2016	2017	2018	2019	2020
QHWD					
Existing Water Supplies					
Groundwater	8,400	8,400	8,400	8,400	8,400
Imported Water	1,500	1,500	1,500	1,400	1,400
Total Existing Supply	9,900	9,900	9,900	9,800	9,800
Demand (w/out conservation)	7,600	7,800	8,000	8,300	8,500
Conservation	300	400	400	500	500
Demand (w/conservation)	**7,300**	**7,400**	**7,600**	**7,800**	**8,000**
Difference (supply minus demand)	2,600	2,500	2,300	2,000	1,800
Difference as Percent of Supply	26	25	23	20	18
Difference as Percent of Demand	36	34	30	26	23
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	0	0
Recycled Water	0	0	0	0	0
Total Planned Supply	0	0	0	0	0
Total Existing and Planned Supplies	**9,900**	**9,900**	**9,900**	**9,800**	**9,800**
Demand (w/out conservation)	7,600	7,800	8,000	8,300	8,500
Conservation	300	400	400	500	500
Demand (w/conservation)	**7,300**	**7,400**	**7,600**	**7,800**	**8,000**
Difference (supply minus demand)	2,600	2,500	2,300	2,000	1,800
Difference as Percent of Supply	26	25	23	20	18
Difference as Percent of Demand	36	34	30	26	23

	2016	2017	2018	2019	2020
Study Area					
Existing Water Supplies					
Groundwater	32,900	32,900	32,900	32,900	32,900
ASR	31,600	31,600	100	0	0
Imported Water	21,500	21,500	21,500	21,400	21,400
Total Existing Supply	86,000	86,000	54,500	54,300	54,300
Demand (w/out conservation)	109,300	113,200	117,000	121,300	125,200
Conservation	4,700	5,500	6,100	6,800	7,500
Demand (w/conservation)	**104,600**	**107,700**	**110,900**	**114,500**	**117,700**
Difference (supply minus demand)	(18,600)	(21,700)	(56,400)	(60,200)	(63,400)
Difference as Percent of Supply	(22)	(25)	(103)	(111)	(117)
Difference as Percent of Demand	(18)	(20)	(51)	(53)	(54)
Planned Water Supplies					
Groundwater Banking/New Supplies	15,200	17,200	50,800	53,800	56,200
Recycled Water	7,000	7,500	8,100	8,600	9,200
Total Planned Supply	22,200	24,700	58,900	62,400	65,400
Total Existing and Planned Supplies	**108,200**	**110,700**	**113,400**	**116,700**	**119,700**
Demand (w/out conservation)	109,300	113,200	117,000	121,300	125,200
Conservation	4,700	5,500	6,100	6,800	7,500
Demand (w/conservation)	**104,600**	**107,700**	**110,900**	**114,500**	**117,700**
Difference (supply minus demand)	3,600	3,000	2,500	2,200	2,000
Difference as Percent of Supply	3	3	2	2	2
Difference as Percent of Demand	3	3	2	2	2

Notes: All numbers rounded to nearest 100 AF.

TABLE 3-9
MULTI DRY WATER YEAR ASSESSMENT 2021-2025

	2021	2022	2023	2024	2025
District 40					
Existing Water Supplies					
Groundwater	20,000	20,000	20,000	20,000	20,000
ASR	31,600	31,600	31,600	200	0
Imported Water	16,600	16,500	16,300	16,200	16,000
Total Existing Supply	68,200	68,100	67,900	36,400	36,000
District 40 Demand (w/out conservation)	109,200	112,100	115,000	117,900	120,800
Conservation	7,000	7,600	8,300	9,000	9,600
Demand (w/conservation)	**102,200**	**104,500**	**106,700**	**108,900**	**111,200**
Difference (supply minus demand)	(34,000)	(36,400)	(38,800)	(72,500)	(75,200)
Difference as Percent of Supply	(50)	(53)	(57)	(199)	(209)
Difference as Percent of Demand	(33)	(35)	(36)	(67)	(68)
Planned Water Supplies					
Groundwater Banking/New Supplies	25,400	27,300	29,100	62,300	64,400
Recycled Water	8,700	9,200	9,800	10,300	10,900
Total Planned Supply	34,100	36,500	38,900	72,600	75,300
Total Existing and Planned Supplies	**102,300**	**104,600**	**106,800**	**109,000**	**111,300**
District 40 Demand (w/out conservation)	109,200	112,100	115,000	117,900	120,800
Conservation	7,000	7,600	8,300	9,000	9,600
Demand (w/conservation)	**102,200**	**104,500**	**106,700**	**108,900**	**111,200**
Difference (supply minus demand)	100	100	100	100	100
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

	2021	2022	2023	2024	2025
RCSD					
Existing Water Supplies					
Groundwater	4,500	4,500	4,500	4,500	4,500
Imported Water	3,400	3,600	3,700	3,900	4,000
Total Existing Supply	7,900	8,100	8,200	8,400	8,500
Demand (w/out conservation)	11,500	12,500	13,500	14,500	15,500
Conservation	700	800	1,000	1,100	1,200
Demand (w/conservation)	**10,800**	**11,700**	**12,500**	**13,400**	**14,300**
Difference (supply minus demand)	(2,900)	(3,600)	(4,300)	(5,000)	(5,800)
Difference as Percent of Supply	(37)	(44)	(52)	(60)	(68)
Difference as Percent of Demand	(27)	(31)	(34)	(37)	(41)
Planned Water Supplies					
Groundwater Banking/New Supplies	2,000	2,700	3,400	4,100	4,900
Recycled Water	1,000	1,000	1,000	1,000	1,000
Total Planned Supply	3,000	3,700	4,400	5,100	5,900
Total Existing and Planned Supplies	**10,900**	**11,800**	**12,600**	**13,500**	**14,400**
Demand (w/out conservation)	11,500	12,500	13,500	14,500	15,500
Conservation	700	800	1,000	1,100	1,200
Demand (w/conservation)	**10,800**	**11,700**	**12,500**	**13,400**	**14,300**
Difference (supply minus demand)	100	100	100	100	100
Difference as Percent of Supply	1	1	1	1	1
Difference as Percent of Demand	1	1	1	1	1

	2021	2022	2023	2024	2025
QHWD					
Existing Water Supplies					
Groundwater	8,400	8,400	8,400	8,400	8,400
Imported Water	1,400	1,400	1,400	1,400	1,400
Total Existing Supply	9,800	9,800	9,800	9,800	9,800
Demand (w/out conservation)	8,800	9,100	9,400	9,600	9,900
Conservation	600	600	700	700	800
Demand (w/conservation)	**8,200**	**8,500**	**8,700**	**8,900**	**9,100**
Difference (supply minus demand)	1,600	1,300	1,100	900	700
Difference as Percent of Supply	16	13	11	9	7
Difference as Percent of Demand	20	15	13	10	8
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	0	0	0
Recycled Water	0	0	0	0	0
Total Planned Supply	0	0	0	0	0
Total Existing and Planned Supplies	**9,800**	**9,800**	**9,800**	**9,800**	**9,800**
Demand (w/out conservation)	8,800	9,100	9,400	9,600	9,900
Conservation	600	600	700	700	800
Demand (w/conservation)	**8,200**	**8,500**	**8,700**	**8,900**	**9,100**
Difference (supply minus demand)	1,600	1,300	1,100	900	700
Difference as Percent of Supply	16	13	11	9	7
Difference as Percent of Demand	20	15	13	10	8

	2021	2022	2023	2024	2025
Study Area					
Existing Water Supplies					
Groundwater	32,900	32,900	32,900	32,900	32,900
ASR	31,600	31,600	31,600	200	0
Imported Water	21,400	21,500	21,400	21,500	21,400
Total Existing Supply	85,900	86,000	85,900	54,600	54,300
Demand (w/out conservation)	129,500	133,700	137,900	142,000	146,200
Conservation	8,300	9,000	10,000	10,800	11,600
Demand (w/conservation)	**121,200**	**124,700**	**127,900**	**131,200**	**134,600**
Difference (supply minus demand)	(35,300)	(38,700)	(42,000)	(76,600)	(80,300)
Difference as Percent of Supply	(41)	(45)	(49)	(140)	(148)
Difference as Percent of Demand	(29)	(31)	(33)	(58)	(60)
Planned Water Supplies					
Groundwater Banking/New Supplies	27,400	30,000	32,500	66,400	69,300
Recycled Water	9,700	10,200	10,800	11,300	11,900
Total Planned Supply	37,100	40,200	43,300	77,700	81,200
Total Existing and Planned Supplies	**123,000**	**126,200**	**129,200**	**132,300**	**135,500**
Demand (w/out conservation)	129,500	133,700	137,900	142,000	146,200
Conservation	8,300	9,000	10,000	10,800	11,600
Demand (w/conservation)	**121,200**	**124,700**	**127,900**	**131,200**	**134,600**
Difference (supply minus demand)	1,800	1,500	1,300	1,100	900
Difference as Percent of Supply	1	1	1	1	1
Difference as Percent of Demand	1	1	1	1	1

Notes: All numbers rounded to nearest 100 AF.

TABLE 3-10
MULTI DRY WATER YEAR ASSESSMENT 2026-2030

	2026	2027	2028	2029	2030
District 40					
Existing Water Supplies					
Groundwater	20,000	20,000	20,000	20,000	20,000
ASR	31,600	31,600	31,600	31,600	300
Imported Water	15,800	15,600	15,400	15,200	15,100
Total Existing Supply	67,400	67,200	67,000	66,800	35,400
District 40 Demand (w/out conservation)	123,500	126,300	129,000	131,800	134,600
Conservation	10,400	11,100	11,900	12,700	13,500
Demand (w/conservation)	**113,100**	**115,200**	**117,100**	**119,100**	**121,100**
Difference (supply minus demand)	(45,700)	(48,000)	(50,100)	(52,300)	(85,700)
Difference as Percent of Supply	(68)	(71)	(75)	(78)	(242)
Difference as Percent of Demand	(40)	(42)	(43)	(44)	(71)
Planned Water Supplies					
Groundwater Banking/New Supplies	34,400	46,900	37,700	39,300	72,200
Recycled Water	11,400	1,200	12,500	13,100	13,600
Total Planned Supply	45,800	48,100	50,200	52,400	85,800
Total Existing and Planned Supplies	**113,200**	**115,300**	**117,200**	**119,200**	**121,200**
District 40 Demand (w/out conservation)	123,500	126,300	129,000	131,800	134,600
Conservation	10,400	11,100	11,900	12,700	13,500
Demand (w/conservation)	**113,100**	**115,200**	**117,100**	**119,100**	**121,100**
Difference (supply minus demand)	100	100	100	100	100
Difference as Percent of Supply	0	0	0	0	0
Difference as Percent of Demand	0	0	0	0	0

	2026	2027	2028	2029	2030
RCSD					
Existing Water Supplies					
Groundwater	4,500	4,500	4,500	4,500	4,500
Imported Water	4,300	4,500	4,700	4,900	5,000
Total Existing Supply	8,800	9,000	9,200	9,400	9,500
Demand (w/out conservation)	17,000	18,500	20,000	21,500	23,000
Conservation	1,400	1,600	1,800	2,100	2,300
Demand (w/conservation)	**15,600**	**16,900**	**18,200**	**19,400**	**20,700**
Difference (supply minus demand)	(6,800)	(7,900)	(9,000)	(10,000)	(11,200)
Difference as Percent of Supply	(77)	(88)	(98)	(106)	(118)
Difference as Percent of Demand	(44)	(47)	(49)	(52)	(54)
Planned Water Supplies					
Groundwater Banking/New Supplies	5,900	7,000	8,100	9,100	10,300
Recycled Water	1,000	1,000	1,000	1,000	1,000
Total Planned Supply	6,900	8,000	9,100	10,100	11,300
Total Existing and Planned Supplies	**15,700**	**17,000**	**18,300**	**19,500**	**20,800**
Demand (w/out conservation)	17,000	18,500	20,000	21,500	23,000
Conservation	1,400	1,600	1,800	2,100	2,300
Demand (w/conservation)	**15,600**	**16,900**	**18,200**	**19,400**	**20,700**
Difference (supply minus demand)	100	100	100	100	100
Difference as Percent of Supply	1	1	1	1	0
Difference as Percent of Demand	1	1	1	1	0

	2026	2027	2028	2029	2030
QHWD					
Existing Water Supplies					
Groundwater	8,400	8,400	8,400	8,400	8,400
Imported Water	1,400	1,400	1,400	1,400	1,400
Total Existing Supply	9,800	9,800	9,800	9,800	9,800
Demand (w/out conservation)	10,200	10,500	10,900	11,200	11,500
Conservation	900	900	1,000	1,100	1,100
Demand (w/conservation)	**9,300**	**9,600**	**9,900**	**10,100**	**10,400**
Difference (supply minus demand)	500	200	(100)	(300)	(600)
Difference as Percent of Supply	5	2	(1)	(3)	(6)
Difference as Percent of Demand	5	2	(1)	(3)	(6)
Planned Water Supplies					
Groundwater Banking/New Supplies	0	0	200	400	700
Recycled Water	0	0	0	0	0
Total Planned Supply	0	0	200	400	700
Total Existing and Planned Supplies	**9,800**	**9,800**	**10,000**	**10,200**	**10,500**
Demand (w/out conservation)	10,200	10,500	10,900	11,200	11,500
Conservation	900	900	1,000	1,100	1,100
Demand (w/conservation)	**9,300**	**9,600**	**9,900**	**10,100**	**10,400**
Difference (supply minus demand)	500	200	100	100	100
Difference as Percent of Supply	5	2	1	1	1
Difference as Percent of Demand	5	2	1	1	1

	2026	2027	2028	2029	2030
Study Area					
Existing Water Supplies					
Groundwater	32,900	32,900	32,900	32,900	32,900
ASR	31,600	31,600	31,600	31,600	300
Imported Water	21,500	21,500	21,500	21,500	21,500
Total Existing Supply	86,000	86,000	86,000	86,000	54,700
Demand (w/out conservation)	150,700	155,300	159,900	164,500	169,100
Conservation	12,700	13,600	14,700	15,900	16,900
Demand (w/conservation)	**138,000**	**141,700**	**145,200**	**148,600**	**152,200**
Difference (supply minus demand)	(52,000)	(55,700)	(59,200)	(62,600)	(97,500)
Difference as Percent of Supply	(60)	(65)	(69)	(73)	(178)
Difference as Percent of Demand	(38)	(39)	(41)	(42)	(64)
Planned Water Supplies					
Groundwater Banking/New Supplies	40,300	53,900	46,000	48,800	83,200
Recycled Water	12,400	2,200	13,500	14,100	14,600
Total Planned Supply	52,700	56,100	59,500	62,900	97,800
Total Existing and Planned Supplies	**138,700**	**142,100**	**145,500**	**148,900**	**152,500**
Demand (w/out conservation)	150,700	155,300	159,900	164,500	169,100
Conservation	12,700	13,600	14,700	15,900	16,900
Demand (w/conservation)	**138,000**	**141,700**	**145,200**	**148,600**	**152,200**
Difference (supply minus demand)	700	400	300	300	300
Difference as Percent of Supply	1	0	0	0	0
Difference as Percent of Demand	1	0	0	0	0

Notes: All numbers rounded to nearest 100 AF.

Section 4: Water Use Provisions

This Section describes historic/current water usage and the methodology used to project future demands within the water purveyors' service areas. Water usage is divided into sectors such as: residential, industrial, institutional/governmental, landscape/recreational, agricultural, and other purposes.

4.1 Historic/Current Water Use

This subsection will present the historic and current water use for each of water purveyors in the Study Area.

4.1.1 District No. 40

District No. 40 did not keep records of water use or number of meters by customer class until 2001. Past and current water use is based on the billing records of District No. 40 and is presented in Table 4-1.

TABLE 4-1
DISTRICT NO. 40 HISTORIC AND CURRENT WATER USE (AF)

Customer Category	2001		2002		2003		2004	
	Water Use (AF)	Meters	Water Use (AF)	Meters	Water Use (AF)	Meters	Water Use (AF)	Meters
Single Family	34,083	39,435	36,102	40,500	35,044	41,878	37,328	43,356
Multi Family-duplex	279	290	299	291	288	290	286	290
Multi Family-complex	4,325	709	4,049	714	4,466	717	4,109	716
Commercial	3,413	1333	3,711	1346	3,867	1376	3,965	1408
Industrial/ Manufacturing	112	37	92	36	123	37	135	36
Private Fire Protection	32	330	48	337	32	344	26	365
Landscape Irrigation	2,433	563	2,726	573	2,778	589	2,839	603
Public/Government Agency	3,362	185	3,426	185	3,276	196	3,581	204
Other Districts	208	1	0	0	0	0	0	0
Outside District	1	1	0	1	1	1	0	1
Temporary Construction Meter	563	80	498	93	1,262	115	1,695	142
Domestic/Private	225	12	245	12	258	12	289	12
Other	9	1	8	1	9	1	10	1
Total	49,045	42,977	51,204	44,089	51,404	45,556	54,263	47,134

4.1.2 RCSD

RCSD currently serves 3,849 connections of which approximately 97 percent are residential. Commercial connections account for approximately 2 percent, landscape irrigation and non-potable connections account for less than 1 percent, and industrial and other connections account for the remaining connections. Table 4-2 provides a summary of the RCSD historic and existing service connections. The reduction in water usage from 2000 to 2004 is most likely a direct result of the implementation of a tiered water rate structure in 2002.

TABLE 4-2
RCSD HISTORIC AND CURRENT WATER USAGE

	2000		2004	
Customer Category	**Water Use (AF)**	**Meters**	**Water Use (AF)**	**Meters**
Single Family	2,547	3,387	2,339	3,651
Multi Family	310	102	310	102
Commercial	181	75	155	77
Industrial/Manufacturing	7	3	5	2
Landscape Irrigation	64	14	119	12
Other	10	5	6	5
Total	3,119	3,586	2,933	3,849

4.1.3 QHWD

QHWD, up until 2004, has not had the ability to breakdown water usage by sector. However, QHWD currently serves 4,972 connections. Of the 4,972 connections, approximately 98 percent are residential. Commercial connections account for approximately 1 percent, landscape irrigation and non-potable connections account for less than 1 percent, and other connections account for the remaining number of connections. Table 4-3 provides a summary of the QHWD's historic and existing service connections.

TABLE 4-3
QHWD HISTORIC AND CURRENT WATER USAGE

	2000		2004	
Customer Category	**Water Use (AF)**	**Meters**	**Water Use (AF)**	**Meters**
Single Family	(a)	(a)	4,355	4,835
Multi Family	(a)	(a)	358	28
Commercial	(a)	(a)	204	66
Industrial/Manufacturing	(a)	(a)	0	0
Landscape Irrigation	(a)	(a)	234	43
Other	(a)	(a)	344	0
Total	5,432	4,788	5,495	4,972

Note: (a) Prior to 2004 all connections were grouped together.

4.2 Other Factors Affecting Water Usage

Two 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 Study Area have a direct long-term effect on water usage. Both of these factors are discussed below in detail.

4.2.1 Weather Effects on Historical Water Usage

Historically, both agricultural and urban usage have increased in dry weather. However, in recent years, conservation efforts limit increases in demand due to higher temperatures and often reduce overall demand. Further effects due to global warming may also begin to influence future water usage and planning efforts as previously discussed in Section 1.

4.2.2 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. As a signatory to the CUWCC MOU, District No. 40 has participated in water conservation measures that include public information and education programs and the implementation of water efficient operations and maintenance practices. As retail customers of AVEK, QHWD and RCSD have also implemented Demand Management Measures as described in Chapter 5. It is anticipated that approximately a 10 percent reduction in demand will result by 2030 due to conservation measures.

4.3 Projected Water Usage

In the past, the water purveyors have used a population based calculation to determine future water usage. However, projected demands based on land-use and projected build-out usually provide a more accurate demand projection. Thus, three projection methods: 1) per capita based, 2) service connection based, and 3) land use based water demands are presented and compared for accuracy. Each method and its advantages and disadvantages is presented below.

4.3.1 Per Capita Based Projection

The population projections, as presented in Section 1, for the Study Area are shown in Table 4-4.

TABLE 4-4
POPULATION PROJECTION

	2005	2010	2015	2020	2025	2030
District No. 40	156,889	200,743	243,236	284,958	323,730	360,731
Rosamond	15,510	24,901	36,944	54,812	81,322	120,656
Quartz Hill	15,500	17,980	20,857	24,194	28,065	32,555
Study Area	187,899	243,624	301,037	363,964	433,117	513,942

Source: District No. 40 – SCAG Projections, Los Angeles County Local Agency Formation Committee (LAFCO) Projections. Rosamond – Water Master Plan dated August 2004. QHWD – LAFCO Projections

Population projections are often used to determine future demand by utilizing an average water demand (typically based on historic water use). District No. 40 water use per person averages about 333 gallons per day (gpd). RCSD's average water use per person is about 170 gpd, and QHWD's average water use per person is about 315 gpd. Using these values and the population estimates from Table 4-4, the estimated future water usage is presented in Table 4-5. These values could be reduced in the future with the implementation of stricter demand management measures, which could reduce the average use per person.

TABLE 4-5
PER CAPITA BASED WATER USE PROJECTIONS (AF)

	2005	2010	2015	2020	2025	2030
District No. 40	58,500	74,900	90,700	106,300	120,800	134,600
Rosamond	3,000	4,700	7,000	10,400	15,500	23,000
Quartz Hill	5,500	6,300	7,400	8,500	9,900	11,500
Study Area	67,000	85,900	105,100	125,200	146,200	169,100

Note: All numbers rounded to nearest 100 AF.

Per Capita based water use projections often require the least amount of time and money to develop. However, they often mask economic trends, changes in land use, and non-population based water demands.

4.3.2 Service Connection Projection

Another method typically used to project future water usage is to base the water use on the number of service connections or meters. This method involves an extrapolation of historic service connection trends and is fairly accurate for near-term forecasts.

4.3.2.1 District No. 40

As per the District No. 40 staff, District No. 40 has experienced 1,300 new service connections a year over the last fifteen years. However, in recent years, this growth rate as increased. Assuming a straight-line projection based on the number of connections from 2000 to 2005, District No. 40 should anticipate approximately 1,500 new connections a year. Table 4-6 provides a summary of District No. 40's projected service connections. Furthermore, the water demand data from 2000 to 2005 indicate an average use of 1.15 AF per connection. Table 4-7 presents the water usage projections based on this rate of growth in number of service connections through 2030 with a demand of 1.15 AF per connection.

4.3.2.1.1 Residential Sector

Single-family residential customers are estimated to average about 3.06 persons per connection (SCAG and Los Angeles County Department of Regional Planning, 2000), with an average consumption rate between of 785 gallons per connection per day. Multi-family residential customers are estimated to average about 2.3 persons per housing unit, with an average consumption rate of 880 gallons per connection per day for duplex connections and 5,200 gallons per connection per day for complex multiple family connections.

4.3.2.1.2 Commercial Sector

A variety of commercial customers exist within District No. 40 with uses that include family and high-volume restaurants, insurance offices, beauty shops, gas stations, hotels and motels, shopping centers, and other facilities that serve the non-resident population. The commercial sector continues to expand each year in response to ongoing population increases. The average consumption rate for the commercial sector is estimated to be 2,500 gallons per connection per day.

4.3.2.1.3 Industrial Sector

District No. 40 serves a relatively small industrial sector, primarily centered on aerospace and light manufacturing. The average consumption rate for the industrial sector is 3,300 gallons per connection per day.

4.3.2.1.4 Institutional/Governmental Sector

District No. 40 has a stable institutional/governmental sector, primarily local government, schools, visitor-serving public facilities, and medical facilities. Consumption rates within this sector vary considerably depending upon the specific facility but averages of 16,000 gallons per connection per day is reflected in actual 2004 data.

4.3.2.1.5 Landscape/Recreational Sector

Increased efficiency and landscape conversions at existing parks, golf courses, and cemeteries should help offset new demand resulting from projected increases in this sector. The average consumption rate for landscape/recreation sector is 4,200 gallons per connection per day.

TABLE 4-6
DISTRICT NO. 40 SERVICE CONNECTION BASED PROJECTION (NO. OF METERS)

	2010	2015	2020	2025	2030
Single Family	51,945	58,870	65,810	72,742	79,675
Multi Family-duplex	347	394	440	487	533
Multi Family-complex	858	972	1,087	1,201	1,316
Commercial	1,687	1,912	2,137	2,362	2,587
Industrial/Manufacturing	43	49	55	60	66
Private Fire Protection	437	496	554	612	671
Landscape Irrigation	722	819	915	1,012	1,108
Public/Government Agency	244	277	310	342	375
Other Districts	0	0	0	0	0
Outside District	1	1	2	2	2
Temporary Construction Meter	170	193	216	238	261
Domestic/Private	14	16	18	20	22
Other	1	1	2	2	2
Total	56,471	64,000	71,545	79,081	86,618

TABLE 4-7
DISTRICT NO. 40 SERVICE CONNECTION BASED PROJECTION DEMAND (AF)

	2010	2015	2020	2025	2030
Single Family	44,800	50,800	56,800	62,800	68,800
Multi Family-duplex	300	400	400	500	500
Multi Family-complex	5,100	5,800	6,400	7,100	7,800
Commercial	4,600	5,200	5,800	6,500	7,100
Industrial/Manufacturing	100	200	200	200	200
Private Fire Protection	0	100	100	100	100
Landscape Irrigation	3,300	3,800	4,200	4,700	5,100
Public/Government Agency	4,300	4,900	5,500	6,100	6,700
Other Districts	0	0	0	0	0
Outside District	0	0	0	0	0
Temporary Construction Meter	1,500	1,700	1,900	2,100	2,300
Domestic/Private	300	300	400	400	500
Other	0	0	0	0	0
Total	64,300	73,200	81,700	90,500	99,100

Note: All numbers rounded to the nearest 100 AF.

4.3.2.2 RCSD

According to the RCSD 2000 Urban Management Plan, RCSD expects to add new connections at a rate of 2 percent per year. This growth does not correspond with the estimated population growth for RCSD. The 2005 water usage and population indicate that RCSD customers number about 4 per connection. Additional connections may be added as a result of annexations. Table 4-8 provides a summary of the growth in number of connections by customer type. An average demand per connection of 0.762 AF was assumed, as determined from 2004 demand. Although Table 4-9 presents an estimate of demand based on service connection increases for RCSD, it is not the recommended demand projection method because it is believed that it would underestimate the estimated demand.

TABLE 4-8
RCSD SERVICE CONNECTION BASED PROJECTION (METERS)

	2005	2010	2015	2020	2025	2030
Single Family	5,125	6,859	7,951	9,217	10,685	12,387
Multi Family	30	40	46	53	62	72
Commercial	70	94	109	126	146	169
Industrial/Manufacturing	0	0	0	0	0	0
Landscape Irrigation	46	61	71	82	95	110
Other	0	0	0	0	0	0
Total Connections	5,270	7,053	8,176	9,478	10,988	12,738

TABLE 4-9
RCSD SERVICE CONNECTION BASED PROJECTION DEMAND (AF)

	2005	2010	2015	2020	2025	2030
Single Family	2,400	2,600	2,900	3,200	3,500	3,900
Multi Family	300	300	400	400	500	500
Commercial	200	200	200	200	200	300
Industrial/Manufacturing	0	0	0	0	0	0
Landscape Irrigation	100	100	100	200	200	200
Other	0	0	0	0	0	0
Total Demand	3,000	3,200	3,600	4,000	4,400	4,900

Note: Total demand rounded to the nearest 100 AF.

4.3.2.3 QHWD

QHWD is currently adding new connections at a rate of 6 percent per year. This accelerated rate is expected to continue through 2010 and then return to a more moderate rate of 3 percent per year. Table 4-10 provides a summary of the growth in number of connections by customer type. Demand factors for each customer type were determined based on average use from 2004 and averaged approximately 1.11 AF per connection. The projected water usage for QHWD is as presented in Table 4-11.

TABLE 4-10
QHWD SERVICE CONNECTION BASED PROJECTION (METERS)

	2005	2010	2015	2020	2025	2030
Single Family	5,125	6,859	7,951	9,217	10,685	12,387
Multi Family	30	40	46	53	62	72
Commercial	70	94	109	126	146	169
Industrial/Manufacturing	0	0	0	0	0	0
Landscape Irrigation	46	61	71	82	95	110
Other	0	0	0	0	0	0
Total Connections	5,270	7,053	8,176	9,478	10,988	12,738

TABLE 4-11
QHWD SERVICE CONNECTION BASED PROJECTION DEMAND (AF)

	2005	2010	2015	2020	2025	2030
Single Family	4,600	6,200	7,200	8,300	9,600	11,200
Multi Family	400	500	600	700	800	900
Commercial	200	300	300	400	500	500
Industrial/Manufacturing	0	0	0	0	0	0
Landscape Irrigation	200	300	400	400	500	600
Other	0	0	0	0	0	0
Total Demand	5,400	7,300	8,500	9,800	11,400	13,200

Note: Total demand rounded to the nearest 100 AF.

4.3.2.4 Study Area

Table 4-12 provides a summary of the Study Area service connection based demand projection. A total of 105,797 connections accounting for a total demand of 117,200 AF is anticipated by 2030 for the Study Area.

TABLE 4-12
STUDY AREA SERVICE CONNECTION BASED PROJECTION (METERS)

	2010	2015	2020	2025	2030
District No. 40	56,471	64,000	71,545	79,081	86,618
RCSD	4,335	4,786	5,284	5,834	6,441
QHWD	7,053	8,176	9,478	10,988	12,738
Total Demand	67,859	76,962	86,307	95,903	105,797

TABLE 4-13
STUDY AREA SERVICE CONNECTION BASED PROJECTION DEMAND (AF)

	2010	2015	2020	2025	2030
District No. 40	64,300	73,200	81,700	90,500	99,100
RCSD	3,200	3,600	4,000	4,400	4,900
QHWD	7,300	8,500	9,800	11,400	13,200
Total Demand	74,800	85,300	95,500	106,300	117,200

Note: Total demand rounded to the nearest 100 AF.

4.3.3 Land Use Projection

Land-use based water use projections tend to be the most accurate for long-term forecasts (such as build-out) but don't predict a time frame for development. They also require the most time and money to develop. However, they can provide water use projections per water use class, which can be a great benefit for planning.

The City of Lancaster recently prepared a GIS analysis of proposed developments within the city that are expected to be constructed by 2010. An analysis of the data showed an increase in District No. 40 service area of 1,511 connections per year; a growth rate of about 3.2 percent per year. Developments of more than 500 units that were considered in this analysis include Ana Verde, Del Sur and Ritter Ranch. Assuming a 3.2 percent growth in demand each year from the 2004 demand, the resulting demand in 2030 would be 123,000 AF. This projected water demand is 24 percent greater than the estimate made based upon number of connections.

If projected residential development is sustained at a rate expected to occur over the next five years, water demand will be considerably higher than the demand estimated using growth in service connections.

Section 5: Water Demand Management Measures

This Section will discuss the existing and planned Demand Management Measures (DMMs) implemented by each of the water purveyors.

5.1 Water Demand Management Measures

As outlined below, the UWMP Act requires water suppliers implement "demand management" in their UWMP through a five step process. "Demand management," as applied to water conservation, refers to the use of measures, practices, or incentives implemented by water utilities to permanently reduce the level or change the pattern of demand. Per California Water Code (CWC) §10631(f) and (g), UWMPs must include:

1. A description of each water demand management measure being implemented, or scheduled for implementation:

   DMM 1. Water survey programs for single-family residential and multifamily residential customers.

   DMM 2. Residential plumbing retrofit.

   DMM 3. System water audits, lead detection, and repair.

   DMM 4. Metering with commodity rates for all new connections and retrofit of existing connections.

   DMM 5. Large landscape conservation programs and incentives.

   DMM 6. High-efficiency washing machine rebate programs.

   DMM 7. Public information programs.

   DMM 8. School education programs.

   DMM 9. Conservation programs for commercial, industrial, and institutional accounts.

   DMM 10. Wholesale agency programs.

   DMM 11. Conservation pricing.

   DMM 12. Water conservation coordinator.

   DMM 13. Water waste prohibition.

   DMM 14. Residential ultra-low-flush toilet replacement programs.

2. A schedule of implementation for all water DMMs proposed or described in the water supplier's UWMP.

3. A description of the methods, if any, the water supplier will use to evaluate the effectiveness of the DMMs implemented or described under the UWMP.

4. An estimate, if available, of existing conservation savings on water use within the water supplier's service area and the effect of the savings on the supplier's ability to further reduce demand.

5. An evaluation of each DMM not being implemented or scheduled for implementation, which shall include cost-benefit, funding availability, and legal authority analyses.

The UWMP Act allows one of two ways for water utilities to provide DMM information so as to meet the respective requirements of CWC §10631(f) and (g):

- Signatory. A water supplier who is a member of the California Urban Water Conservation Council[1] (CUWCC) and signatory of the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU) may submit their Best Management Practice (BMP) Activity Reports (Annual Reports). Signatories pledge to develop and implement the 14 BMPs that are intended to reduce long-term urban water demands. These BMPs are functionally-equivalent to the DMMs in CWC §10631(f)(1).

  It should be noted that exemptions are available for BMPs that cannot be implemented; certain criteria must be met regarding cost-effectiveness, budgetary constraints, or legal issues that prohibit the implementation of any BMP for a signatory.

- Non-signatory. A water supplier who is not a member of CUWCC, or who is a member of CUWCC, but chooses not to submit the Annual Reports, must discuss all 14 DMMs, along with any additional measures the supplier is implementing or has scheduled for implementation in their UWMP submittal.

5.2 Implementation Levels of DMM's/BMP's

The DMMs which were implemented, or scheduled to be implemented, by the District No. 40, RCSD, and QHWD are outlined the respective sections below. Included in the discussions are the five descriptive "demand management" elements as per the UWMP Act.

5.2.1 District No. 40

District No. 40 has been a signatory to the CUWCC MOU since April 1996 and, as such, is a member of CUWCC. According to the recently updated CUWCC database, which is made

[1] CUWCC, a non-governmental agency, was formed to increase water use efficiency statewide through partnerships among urban water agencies, public interest organizations, and private entities. CUWCC's goal is to integrate urban water conservation BMPs into the planning and management of California's water resources. Since it's founding in 1991, CUWCC has grown to over 300 members

available to the public at http://bmp.cuwcc.org/bmp/read_only/home.lasso?rui=5029, District No. 40 has implemented or plans to implement 11 of the 14 DMMs for 2005. DMM 6 and DMM 14 are not planned for implementation since neither DMM is cost effective at this time. DMM 10 does not apply to water retailers. Copies of District No. 40's Best Management Practices Activity Reports for 2004 are provided in Appendix E. These reports contain all the necessary information to meet with the Act requirements.

5.2.2 RCSD

RCSD is not a signatory to the CUWCC MOU and is not a member of CUWCC. As such, a description of all 14 DMMS as required by the Act is provided below with a discussion of the proposed methods to measure efficiency.

5.2.2.1 DMM 1: Water survey programs for single-family residential and multifamily residential customers

RCSD will begin offering free residential water use surveys to single-family and multi-family customers in 2006. These surveys focus on the top 20 percent of water users in each sector, but are offered to any customer by request. The top 20 percent of users, as determined from the RCSD's existing database of billing records, receive a letter offering the free survey. If the users remain on the top 20 percent list the following year, up to three letters will be mailed offering an additional incentive to conduct the survey.

Interior single family audits may take two hours and are conducted by trained RCSD staff.

An interior water audit generally includes the following elements:

- Identify types of water usage
- Estimate the amount of water used for each device or fixture
- Recommend fixture repair options if necessary
- Identify alternative water usage device or fixture possibilities
- Instruct customer on proper installation and use of plumbing retrofit kits
- Inform customer on how to read their own water meter
- Inform and educate residents to use and conserve water efficiently

RCSD also has a landscape ordinance which pertains to new and existing single family homes, and an active landscape conservation program. RCSD has a Water Efficiency Landscape (WEL)/firescape demonstration garden and works with Kern County and others to promote efficient landscaping practices. RCSD is also considering a financial incentive program to help homeowners convert to more water efficient landscapes (which may include landscape materials, irrigation conversions, automatic controllers, soil moisture sensors, gray water, etc.).

In addition to the interior water audits, the survey team also conducts the landscape or exterior water survey at the residence. Exterior water audits may include one of two types - routine and detailed. A routine exterior water audit generally includes the following elements:

- estimate the size of landscaped area
- assess in-ground irrigation systems for leaks and broken sprinklers
- measure precipitation rate of irrigation system
- evaluate the automatic control settings
- develop suggested irrigation schedules
- provide customer with public education materials

Examples of public education materials titles include, "Low Water Using Plants," "For Your Xeriscape Garden (Low Water Using Plants)," "Ground Covers for Your Xeriscape Garden," "Making Your Garden Grow," "Drought Survival Guide for Home and Garden."

Detailed exterior audits include all of the elements of the routine audit in addition to irrigation uniformity audits and soil assessments.

Institutional and governmental customers have also been offered water use surveys. All publicly-owned facilities including the Rosamond library, fire stations, RCSD's corporation yard facilities, and public restrooms have been surveyed for recommended retrofitting. Surveys have been conducted by consultants in the past.

Interior water savings achieved as the result of common water audits is difficult to predict, however savings of 10 to 30 percent have been reported (Deoreo, 2001; Bruvold, 1993; Nelson, 1992). However, an additional water savings ranging from 10 to 57 percent may be generated via detailed exterior audits (CUWCC, 2000; Hawn, 1997). In 2004 average daily demand for residential connections was approximately 0.784 AF per connection. Thus, the combination of interior and exterior audits could generate a minimum water savings of 20 percent per connection surveyed or 0.157 AF per survey. RCSD has allotted a budget of $30,000 for interior audits and $15,000 for exterior audits to implement this DMM.

In order to measure the methods effectiveness, RCSD will utilize a database system. For each dwelling unit the survey team will complete a customer data form (including number of people per household, number of bathrooms, age of appliances, and lot and landscaped area square footage). This data is used to analyze the customer's water use, evaluate the effectiveness of the measure refine the program.

RCSD staff reviews the surveyed customers' water use records, and compares historic use with current use for one year after the survey. If the reduction in water use is not in line with DMM water savings estimates, staff will flag the customer's account and offer a follow up survey.

5.2.2.2 DMM 2: Plumbing Retrofit

The plumping retrofit DMM was implemented in 2000. Through National Association of Clean Water Agencies (NACWA), RCSD participates in the distribution of retrofit kits during Water Awareness Month. Residential plumbing retrofit programs include distributing retrofit kits that may include high quality low-flow showerhead, faucet aerator/restrictor, toilet displacement device, toilet leak detection tablets, garden hose nozzle, hose washers, and hose repair kits. Retrofit kits include instructions on the proper installation and benefits of the low-flow devices. In addition, each of the kits includes printed materials promoting interior and exterior conservation practices. Retrofit programs may also include a water survey as described above or toilet replacement with ultra low flush toilets (ULFT, see Section 5.2.2.14).

Conservative estimates of interior water savings achieved due to retrofit with only the showerhead and faucet restrictor for single-family and multi-family homes ranges from approximately 48 to 114 gallons per day per housing unit (Deoreo, 2001; Bruvold, 1993; Nelson, 1992; Maddaus, 1987). Significant additional savings may be generated due to fixture leakage reduction and installation of toilet dams or replacement. Installation of retrofit fixtures in older single-family homes tend to produce more savings, while newer multi-family homes tend to produce less savings per housing unit.

RCSD will continue to implement this DMM at a targeted rate of 10 percent of pre-1992 single and multi-family customers every two years. The cost for this DMM is combined with the overall annual cost for DMM 1.

This measure will be evaluated for effectiveness as described for DMM 1.

5.2.2.3 DMM 3: System Water Audits, Leak Detection and Repair

RCSD has conducted monthly water audits, leak detection, and repair on their distribution system since 1997.

Because RCSD is located in an earthquake zone, it has permanently incorporated the system water audit and leak detection, and meter calibration (production and customer meters) programs into its utility operations, on a three-year rotation schedule. On average, RCSD water department crews spend about 35 days surveying approximately 100 miles of main and laterals per year. The RCSD also participates in the NACWA-sponsored annual valve exercise program, established in 1991, to ensure that interconnections with adjacent utilities actually work. No major line replacements were necessary from 2000 to 2005. Approximately $6,000 has been allocated for this DMM as part of the operation and maintenance budget.

Effectiveness of this DMM is measured through the reduction in number of leaks detected and unaccounted for water losses in comparison to past years. RCSD utilizes an annual review of the data records to confirm that the unaccounted for water losses stay under 6 percent.

5.2.2.4 DMM 4: Metering with Commodity Rates

RCSD is fully metered for all customer sectors, including separate meters for single-family residential, commercial, large landscapes, and all institutional/governmental facilities. Since 1990, RCSD policy has been to separately meter each dwelling unit in multi-family complexes. There are approximately 110 multi-family complexes, with 3,753 single family dwelling units in the service area.

RCSD's building department coordinates the implementation of this DMM with Kern County. RCSD is working with the Kern County Building and Safety Department when it reviews the building plans to determine the water use efficiency before a permit is issued to the new commercial/industrial/institutional customers. Additionally, all customers are metered with landscape meters for landscape areas other than residential lawn areas. Cost for meter installation is covered through service connection fees.

This DMM will be measured for effectiveness through the measures illustrated in DMM 1. Commercial water reduction achieved is estimated at 12 to 15 percent. However, a further reduction in potable water demand will result once recycled water becomes available.

5.2.2.5 DMM 5: Large Landscape Conservation Programs and Incentives

In 1992, motivated by the drought, RCSD established a landscape ordinance. It has since been amended to include firescaping guidelines and to conform to California Water Code Section 65590 et seq. (AB325).

RCSD continues to work in partnership with the local fire department, local nurseries, landscape designers, contractors and the local floriculture growers to help educate landowners in regards to WEL. In cooperation with AVEK a proposed information pamphlet has been developed to explain evapotranspiration and procedures involved in developing irrigation schedules. Additionally, RCSD co-authored a "Landscape Plants for the California High Desert" booklet that has been provided to customers, Kern County Planning and local nurseries.

RCSD has used WEL at all median strips in conjunction with the County and developers. The potential benefits will be: (1) allowing the public to see attractive low-water using landscapes; (2) demonstrating RCSD's commitment to improved efficiencies in public water uses; (3) improving safety records due to the reduced exposure in maintaining median strip landscaping; and (4) providing cost savings associated with lower water bills, reduced median strip maintenance, and fewer street and gutter repairs.

Furthermore, RCSD conducts irrigation surveys for all large landscape customers (currently defined as three acres or greater). RCSD also began an inventory of landscaped areas over one acre, based on the County's and the California Department of Water Resources' Geographical Information System (GIS), in 2000.

A landscape water audit generally includes the following elements:

- estimate size of landscaped area
- define soil characteristics
- assess in-ground irrigation systems for leaks and broken sprinklers
- measure irrigation system uniformity rate
- evaluate automatic control settings
- develop suggested irrigation schedules
- provide customer with public education materials

During the survey, a trained RCSD team determines a water budget for the site, which defines the amount of water allotted for the site based on the size of the landscape and the climate. Water use is monitored on a monthly basis and any water use over the water budget is billed at a higher rate. If the water budget is exceeded for three consecutive months, the customer is offered technical assistance. On-site follow-up evaluations are recommended for customers whose annual water use exceeds their water budget.

RCSD has considered a financial incentive program to encourage high water users to convert to more water efficient landscapes. Types of financial incentives considered include: irrigation system conversions, automatic controllers, soil moisture sensors, automated CIMIS scheduling, and plants and other landscape materials.

This DMM has been permanently incorporated into RCSD's ordinances with an annual budget of $965 for water audits and $5,800 for conservation efforts. It is anticipated that this DMM will provide a 15 percent reduction in landscape water use. In 2004, landscape irrigation use averaged 8,812 gpd per connection (38.6 million gallons a year/12 connections/365 days a year). Thus a 15 percent reduction could result in a water savings of 17.8 AFY (15 percent* 8,812 gpd per connection * 12 connections * 365 days/325,075 gallons per AF), assuming water budgets are developed just for the existing landscape/irrigation connections. Additional savings could be achieved for commercial/institutional connections with large landscaped areas.

Its effectiveness will be measured through cost savings, the attendance to the WEL demonstration garden, and the number of WEL materials distributed. RCSD will report annually on the landscape water savings associated with this DMM to the Board of Directors.

5.2.2.6 DMM 6: High Efficiency washing machine rebate programs

RCSD does not currently implement or plan on implementing this DMM because this DMM would not be economically viable due to the high cost of washing machines, high program costs (i.e., rebates), and low cumulative water savings compared to other DMMs. On average, washing machines use approximately 22 percent of the interior water demand for an average single family home (AWWA, 1999). New washers generally use less water and energy compared to older appliances. Some of the new high-efficiency models use up to 52 percent less water and up to 63 percent less energy per load compared to older less efficient models (Vickers, 2001). Water and energy savings vary with the new models, however mean water savings of approximately 14 gallons per household per day would be expected. High efficiency models cost from $600 to $1,100 (compared to $300 to $700 for conventional units) which may reduce the rate of participation. Examples of customers that would derive maximum benefit from this program include multifamily residential units and Laundromats with multiple washing machines per location.

The Los Angeles Department of Water and Power, in partnership with member agencies, offer rebates which normally range between $85 and $150. Rebates are based on the projected combined water and energy savings. Examples of other agencies which have cosponsored programs with MWD include Los Angeles Department of Water and Power, San Diego County Water Authority, and Southern California Edison.

5.2.2.7 DMM 7: Public Information Programs

RCSD promotes water conservation and other resource efficiencies in coordination with NACWA and the energy utilities. It also distributes public information through bill inserts, brochures, community speakers, paid advertising, and many special events every year. Special events include the William Ketchum Armed Forces Day Parade, an annual water conservation fair, and a display case and Small Change Theatre at the Kern County Public Library.

RCSD has formed a Citizens' Advisory Committee to assist in developing new ways to communicate with the public and the media about water conservation and other resource issues. Due to arid conditions of the region, it also has become a priority to develop conservation materials focused on the short term residents and visitors though working with restaurants, hotels, and real estate offices. RCSD has considered establishing a World Wide Web Home Page, which will include information on water conservation, recycling, and other resource issues.

RCSD will continue to provide public information services and materials to remind the public about water and other resource issues. RCSD will track the commentary regarding the information provided. RCSD has a proposed annual budget of $10,000 (from public affairs office budget) for staff and materials for this activity.

5.2.2.8 DMM 8: School Education

RCSD continues to work with NACWA and the local school districts to promote water conservation and other resource efficiencies at school facilities and to educate students about these issues. They are currently studying the retrofitting of school playground irrigation systems.

RCSD contacts local school boards and principals about implementing DMM 8. RCSD will provide educational materials for several grade levels, State and County water system maps, posters, workbooks, interactive computer software, videos, tours, and sponsors Water Education for Teachers (WET) training, science fairs, and water conservation contests. Specific events include the Small Change Theatre for Kindergarten through third grade, Dr. Wildemess for third grade through sixth grade, and Resource Action Programs and Saving Water One Student at a Time for fifth grade.

To measure the effectiveness of this DMM, RCSD will continue to survey the institutions and educators on the number of programs, materials and attendance at water conservation activities. The proposed annual budget for this DMM is $10,000 for labor expense and materials.

5.2.2.9 DMM 9: Conservation programs for commercial, industrial, and institutional account

For the last several years, RCSD has provided water use audits to any commercial/industrial/institutional (CII) customer who so requested. RCSD utilizes a database program to identify the top 10 percent of the commercial customers and the top 20 percent of the industrial and institutional customers. These high demand customers are contacted by letter and with follow up telephone calls to offer audits. RCSD has allotted an annual budget of $5,720 for water audits. An additional annual budget of $10,680 has been allotted for CII conservation programs.

In 2001, RCSD developed a billing insert which includes water survey information. This insert along with the October 1994 DWR publication Water Efficiency Guide for Business Managers and Facility Engineers will continue to be distributed. Staff will also complete a program to identify CII customers by Standard Industrial Classification (SIC) codes.

Audits are coordinated and evaluated by staff personnel with a consulting engineering firm (Boyle Engineering Corporation) providing the data evaluation and projections.

RCSD will continue to implement this DMM at the annual target rate for at least the next five years. Estimates of the water savings will be provided by the consultant.

5.2.2.10 DMM 10: Wholesale Agency Programs

RCSD is not a wholesale agency and thus this DMM is not applicable.

5.2.2.11 DMM 11: Conservation Pricing

RCSD converted their flat rate structure to a tiered rate structure in 2002. The current rate structure is provided in Table 5-1. Cost for this DMM is covered in RCSD's general operating fund.

TABLE 5-1
RCSD TIERED RATE STRUCTURE

	No. of Units	Cost ($)
Base rate	3	$10.00
Tier 1	4 to 30	$1.06
Tier 2	31 to 40	$1.19
Tier 3	41 to 50	$1.37
Tier 4	51 and up	$1.56

5.2.2.12 DMM 12: Water Conservation Coordinator

RCSD designated one part-time water conservation coordinator (WCC) in 2001. In addition, the RCSD currently has one additional staff person (who works part-time on water conservation), and other part time staff to coordinate the landscape programs. On occasion, RCSD also employs student interns or consultants from the local area to aid in this effort.

RCSD will continue to survey the institutions and educators on the number of programs, materials, and attendance at water conservation activities in order to measure the DMM's effectiveness. The proposed annual budget is $46,400 for water conservation staff costs.

5.2.2.13 DMM 13: Water Waste Prohibition

RCSD has enacted a "No Waste" ordinance. Enforcement includes the "gutter flooder" patrol to educate customers, and if necessary, issue warnings and citations for violations. See Appendix F for the "No Waste" Ordinance and information on regulations, restrictions and enforcement.

As a method to measure efficiency, RCSD will monitor the number of annual violations. RCSD has allotted an annual budget of $2,000 for this DMM.

5.2.2.14 DMM 14: Ultra low-flush toilets replacement program

RCSD established a high visibility ultra-low flush toilet replacement program in 2001. Ultra-low flush toilets (ULFT) commonly use 1.5 gallons per flush. However, some types use as little as

0.5 gallon per flush and require a supply of compressed air to assist the flushing action. Higher savings are found in high-density housing and commercial/industrial settings. Savings also persist over the entire lifespan of the toilet (approximately 25 years). RCSD plans to continue the DMM until at least 80 percent of all non-conserving and low-flush model toilets have been replaced. Since 2001, the Board of Directors homes, RCSD offices, and toilets at Rosamond High School have been converted to ultra-low flush models. Rebates up to $75 per toilet were offered.

Alternative methods to rebate offers for promoting toilet replacement include: (1) implementing a retrofit on resale ordinance where homes are required to retrofit to low flow fixtures upon a resale, and (2) direct distribution programs. Retrofit on resale ordinances are relatively inexpensive since costs are shifted to the home seller/purchaser. These ordinances tend to be unpopular with the real estate community and home sellers, since it may impede a sale due to timing and may require replacing floor coverings around the toilet. Communities in California which have a retrofit on resale ordinance include the Monterey Peninsula Water Management District, North Marin Water District, City of San Diego, City of San Francisco, and City of Santa Monica (DWR website). Direct distribution programs consist of providing a ULFT (1.6 gallons/flush) in exchange for a customer provided toilet (generally 3.5 to 7 gallons/flush). This alternative is generally effective but may have an increased administrative cost due to the need for staffing the distribution center and also for disposal of the retired toilets.

However, RCSD has helped establish the East Kern County recycling policy, which will direct that recycled toilets (and other locally generated waste materials such as sludge from the RCSD treatment plant) should be used by government in its own operations. Thus one possible mode of disposal for the retired toilets could be use as crushed aggregate road base in both the County and as rip-wrap for ponds.

In coordination with East Kern County, RCSD plans to offer rebates to customers, will establish a referral installation program, and will provide commercial sources for toilets and urinals for installation at public facilities including schools, libraries, and fire department facilities.

Projected total annual water savings from toilet retrofits at full implementation has yet to be determined, however water conserved in ULFT replacement programs have been shown to be 1.9 to 5.4 gallons of water savings per flush per toilet which equates to 12 to 45 gallons per replacement per day. Assuming 240 replacements a year, the minimum annual water savings from this DMM is approximately 3.2 AFY (240 * 12 gpd *365 days/325,828 gallons per AF).

To measure effectiveness, RCSD will calculate annual ULFT replacement program water savings to confirm the savings are within 10 percent of calculated retrofit-on-resale water savings, using the CUWCC MOU Exhibit 6 methodology and water savings estimates. Exhibit 6 has become an industry standard for evaluation of ULFT replacement programs.

5.2.3 QHWD

QHWD is not a signatory to the CUWCC MOU and is not a member of CUWCC. As such, a description of all 14 DMMS is provided below with a discussion of the proposed methods to measure efficiency.

5.2.3.1 DMM 1: Water survey programs for single-family residential and multifamily residential customers

Since 1996, QHWD began offering free residential water use surveys to single-family and multi-family customers. These surveys focus on the top 20 percent of water users in each sector, but are offered to any customer by request. In QHWD's 2000 UWMP, a goal to complete surveys for 15 percent of the single family and 15 percent of the multi-family connections by 2010 was stated. However, one of the problems QHWD faces is that historically, water connections have not been separated into type categories. It has been only recently that QHWD has implemented the ability to break-down water connections by type. With that ability, QHWD can now begin to target single and multi-family homes at the 15 percent goal established in the 2000 UWMP. QHWD would need to conduct 72 single family and 1 multi-family survey each year to meet the 15 percent goals by 2015.

QHWD utilizes a similar program to one described for RCSD above. Trained staff conduct both interior and exterior audits and measure effectiveness through database monitoring of water use comparisons. In 2004 average daily demand for single family connections was approximately .9 AFY per connection (4355 AF/4835 connections) and 12.8 AFY(358 AF/28 connections) per multi-family connection. Thus, the combination of interior and exterior audits could generate a minimum water savings of 20 percent per connection surveyed or 0.18 AFY per single family connection surveyed and 2.6 AFY per multi-family connection surveyed. Assuming 73 single family and 1 multi-family surveys a year, an overall savings of 15.7 AFY could result for a total of 78.5 AF of water savings by 2010. At this time, QHWD has not budgeted for these expenditures.

5.2.3.2 DMM 2: Plumbing Retrofit

Since 2000, QHWD participates in the distribution of information of suppliers for showerheads, aerators, and toilet tank leak detection tablets during Water Awareness Month and emphasizes water use surveys and ultra-low flush toilet replacement programs. However to date, no fixtures have been distributed and no budget has been prepared.

QHWD plans to implement this DMM at a targeted rate of 10 percent of the pre-1992 single and multi-family customers every two years. The cost for this DMM is combined with the overall annual cost for DMM 1.

This measure will be evaluated for effectiveness as described for DMM 1.

5.2.3.3 DMM 3: System Water Audits, Leak Detection and Repair

QHWD has conducted water audits and leak detection and repair checks on an "as-needed" basis since its formation in 1955. QHWD began preventative audits and leak detections in 2002.

As with RCSD, QHWD is located in an earthquake zone, and as such has permanently incorporated the system water audit and leak detection, and meter calibration (production and customer meters) programs into its utility operations. On average, QHWD crews spend about 20 days surveying approximately 40 miles of main and laterals per year. QHWD also participates in an annual valve exercise program to ensure that all connections operate as required. Broken or poorly operating valves are scheduled for repair or replacement.

Effectiveness of this DMM is measured through the reduction in number of leaks detected and unaccounted for water losses in comparison to past years. Typically unaccounted for water loss is around 5 percent. QHWD utilizes an annual review of the data records to confirm that the unaccounted for water losses stay under 6 percent.

5.2.3.4 DMM 4: Metering with Commodity Rates

QHWD is fully metered for all customer sectors, including separate meters for single-family residential, commercial, large landscapes, and all institutional/governmental facilities. Since 1990, its policy has been to separately meter each dwelling unit in multi-family complexes. QHWD has an inclining multi-block rate structure. Detailed rate information for a one month billing cycle is provided in Table 5-2.

TABLE 5-2
QHWD TIERED RATE STRUCTURE

No. of Units	Rate Area 1	Rate Area 2
0-30	$1.02	$1.07
31 to 60	$1.12	$1.17
61 to 90	$1.28	$1.34
91-105	$1.53	$1.60
106 and up	$1.83	$1.92

QHWD's building department coordinates the implementation of this DMM. Project designers must demonstrate the use of water saving devices in their designs. A staff member reviews the building plans to determine the water use efficiency before a permit is issued to the new customer.

This DMM will be measured for effectiveness through the measures illustrated in DMM 1. Commercial water reduction achieved is estimated at 12 to 15 percent. At this time, no additional budget has been allotted for this DMM.

5.2.3.5 DMM 5: Large Landscape Conservation Programs and Incentives

In 1992, QHWD established a landscape ordinance similar to the one described for RCSD above.

This DMM has been permanently incorporated into QHWD ordinances. It is anticipated that the survey could result in 10 percent reduction in water use and the conservation measures an additional 15 percent reduction in water use. Landscape/irrigation average daily demand in 2004 was approximately 5.4 AF per connection. Assuming budgets are created for only the landscape/irrigation meters (41 meters total) over the next five years and a combined water savings of 25 percent, an annual water savings of 58 AFY could be achieved by 2010. However, at this time no additional budget has been allotted for this DMM.

Its effectiveness will be measured through cost savings, the attendance to the WEL demonstration garden, and the number of WEL materials distributed. An annual report on the landscape water savings associated with this DMM will be submitted to the Board of Directors.

5.2.3.6 DMM 6: High Efficiency Washing Machine Rebate Programs

QHWD does not currently implement or plan on implementing this DMM because, as with RCSD, this DMM would not be economically viable due to the high cost of washing machines, high program costs (i.e., rebates), and low cumulative water savings compared to other DMMs.

The cost to benefit analysis is the same as for RCSD.

5.2.3.7 DMM 7: Public Information Programs

QHWD also promotes water conservation and other resource efficiencies in coordination with NACWA and the energy utilities. It also distributes public information through bill inserts, brochures, community speakers, paid advertising, and many special events every year.

It has formed a Citizens' Advisory Committee to assist in developing new ways to communicate with the public and the media about water conservation and other resource issues. Due to arid conditions of the region, it also has become a priority to develop conservation materials focused on the short term residents and visitors though working with restaurants, hotels, and real estate offices. QHWD has established a World Wide Web Home Page, which includes information on water conservation, recycling, and other resource issues.

QHWD will continue to provide public information services and materials to remind the public about water and other resource issues. QHWD will track the commentary regarding the information provided. QHWD has a proposed budget of $5,000 for public relations purposes.

5.2.3.8 DMM 8: School Education

QHWD continues to work with the school districts to promote water conservation and other resource efficiencies at school facilities and to educate students about these issues. As part of the commercial/industrial/institutional water conservation programs, all new public school toilets, urinals, showerheads, and faucet aerators will utilize ultra-low flow models. QHWD continually works with the school districts to complete retrofits of school and facilities and playground irrigation systems and provides educational materials for several grade levels, State and County water system maps, posters, workbooks, interactive computer software, videos, tours, and sponsors WET training, science fairs, and water conservation contests. To date, QHWD has not presented to any classes.

To measure the effectiveness of this DMM, QHWD will continue to survey the institutions and educators on the number of programs, materials and attendance at water conservation activities. No additional budget has been allotted for this DMM.

5.2.3.9 DMM 9: Conservation programs for commercial, industrial, and institutional account

For the last several years, QHWD has provided water use audits to any CII customer who so requested. However, no audits have yet to been conducted. QHWD utilizes a database program to identify the top 10 percent of the commercial customers and the top 20 percent of the industrial and institutional customers. These high demand customers are contacted by letter and with follow up telephone calls to offer audits.

In 2003, QHWD developed a billing insert which includes water survey information. This insert along with the October 1994 DWR publication Water Efficiency Guide for Business Managers and Facility Engineers will continue to be distributed. Staff will also complete a program to identify CII customers by SIC codes.

QHWD will continue to implement this DMM at the annual target rate for at least the next five years. At this time, no additional budget has been allotted for this DMM.

5.2.3.10 DMM 10: Wholesale Agency Programs

QHWD is not a wholesale agency and thus this DMM is not applicable.

5.2.3.11 DMM 11: Conservation Pricing

QHWD has an inclining block rate structure for all customer sectors. Large landscape and agricultural customers have individualized water budgets, billed at the first block rate. Usage above the water budget is billed at a higher block rate.

QHWD will monitor the number of violators who use water in excess of their established allotment. The incentive of this DMM is to decrease the customers' water costs and water use through price incentives. At this time no additional budget has been allotted for this DMM.

5.2.3.12 DMM 12: Water Conservation Coordinator

QHWD has designated one full-time WCC in 2002. One staff person (who works 30 percent on water conservation) and part time staff who coordinate the landscape programs provide additional support to the WCC. On occasion, QHWD also employs student interns from the local area to aid in this effort and when necessary, contract with consultants.

QHWD will continue to survey the institutions and educators on the number of programs, materials and attendance at water conservation activities in order to measure the DMM's effectiveness.

5.2.3.13 DMM 13: Water Waste Prohibition

QHWD has enacted a "No Waste" ordinance. Enforcement includes the "gutter flooder" patrol to educate customers, and if necessary, issue warnings and citations for violations. See Appendix F for the "No Waste" Ordinance and information on regulations, restrictions and enforcement.

As a method to measure efficiency, QHWD will monitor the number of annual violations.

5.2.3.14 DMM 14: Ultra low-flush toilets replacement program

QHWD established a high visibility ultra-low flush toilet replacement program in 2001and plans to continue the DMM until at least 80 percent of all non-conserving and low-flush model toilets have been replaced. Initially, the Board of Directors homes and QHWD offices will be converted to ultra-low flush models, followed by student and faculty toilets (and later urinals) at QHWD High School. Rebates up to $325 per toilet will be offered. However, to date no replacements have taken place.

All public facilities in the QHWD will also eventually have ULFTs, urinals, showerheads, and self-closing faucets. Funding for replacement programs will come in part from the Demand Offset Program, where new development provides funds to improve the water use efficiency of existing customers.

QHWD will offer rebates to customers, will establish a direct installation program, and will provide rebates for toilets and urinals for installation at public facilities including schools, libraries, and fire department facilities.

Projected total annual water savings from toilet retrofits at full implementation has yet to be determined, however water conserved in ULFT replacement programs have been shown to be 1.9 to 5.4 gallons of water savings per flush per toilet which equates to 12 to 45 gallons per replacement per day. Assuming 20 replacements a year, the minimum annual water savings from this DMM is approximately 0.27 AFY (20 * 12 gpd *365 days/325,075 gals per AF).

To measure effectiveness, QHWD will calculate annual ULFT replacement program water savings to confirm the savings are within 10 percent of calculated retrofit-on-resale water savings, using the CUWCC MOU Exhibit 6 methodology and water savings estimates. Exhibit 6 has become an industry standard for evaluation of ULFT replacement programs.

5.3 Summary of Conservation

Through the implementation of the existing DMMs, a reduction of approximately 10 percent in average water use is expected by 2030 for the Study Area. However, it is difficult to determine actual water savings since most conservation measures are voluntary. Typically when a shortage occurs, water customers increase their awareness of water usage and voluntarily reduce water demand even more to avoid water rationing. Since most of the DMMs implemented for the Study Area are still in the early stages, there is still a high potential to achieve further reduction if and when it is needed, as in a water shortage. For purposes of this report, conservation is estimated at a rate of 0.4 percent per year from 2010 to 2030 (2 percent for each five year interval).

Section 6: Water Supply Strategy

This Section provides a description and evaluation of the potential water supply alternatives available to the Antelope Valley to meet the projected water demands. This section describes these opportunities and the stage of development of each opportunity. The interim and long-term opportunities outside of the Antelope Valley and long-term opportunities within the Antelope Valley are described below. The recommended water supply strategy is also presented with a proposed implementation plan.

6.1 Recommended Water Supply Reliability Objectives

To establish specific banking requirements, appropriate reliability objectives (i.e., confidence levels) must be established. For water supply planning purposes, reliability objectives are generally greater than 90 percent (less than 1 in 10 year occurrence). For purposes of this planning effort a 95 percent reliability objective was selected. In the remaining 5 percent of the time, the maximum supply shortage will be limited to 10 percent of total demand. Based on these reliability objectives, the recommended storage and pumpback requirements for the Antelope Valley are 170,600 AF and 63,500 AFY, respectively (Table 3-2) for a three-year dry period. The storage and pumpback requirements would be greater for a dry period of longer than three years.

Because water demands are expected to increase during the planning period (to 2030), water supply reliability requirements are lower in the early years of the planning period because lower water demands in the early years generally provide excess water supplies and less frequent need for banked water.

6.2 Recommended Water Supply Strategy

Based on the water demands presented in Section 4, the need for reliable water supplies is expected to be increasingly important as more of the existing available supplies are utilized. Accordingly, the water supply strategy for the Antelope Valley includes demand management through conservation, which is addressed in Section 5, use of recycled water to minimize potable water demands and water banking to improve the reliability of imported water supplies. Recycled water and water banking are presented in this Section.

There appears to be a number of water banking opportunities available to the Antelope Valley water purveyors to address the identified water banking requirements. These opportunities are located inside and outside of the Antelope Valley. Generally, water banking within the Antelope Valley is preferred over those outside because risks of disruption due to conveyance interruptions are minimized. However, potential water banking opportunities within the Antelope Valley require additional development and are not expected to be available for approximately five years. Accordingly the recommended water supply strategy includes utilizing short-term water banking to provide necessary time to implement a long-term water bank. It is recommended that additional demand management and recycled water use be implemented as soon as possible.

In order for any of the water banking alternatives to utilize SWP for banking, a Memorandum of Understanding (MOU) with AVEK is crucial. This MOU would be developed to allow the water purveyors within the Antelope Valley to have access to DWR's and AVEK's SWP facilities and treatment plants. This access is required to transmit and treat the banked water when needed. Without this access, the water purveyors of the Antelope Valley would have no means of distributing the SWP water to the selected water banks or receiving the banked water. This MOU is currently being developed and will be complete prior to initiation of banking activities.

6.3 Potential Short-Term Water Banking Alternatives

The following subsections provide a discussion of the various water banking alternative options available to the Antelope Valley on a short-term (5-year) basis. These opportunities provide an advantage in that they are immediately available. However, since some are located outside of the Antelope Valley, they are not as reliable as an alternative located within the Antelope Valley.

6.3.1 Agricultural In-Lieu Use

Based on personal communication with AVEK staff, an in-lieu water banking program has been and could provide additional water supply reliability for the Antelope Valley. The purpose of the proposed AVEK In-Lieu Water Banking Program is to deliver the banking partner's water to locations where wells would otherwise be operating, thereby recharging groundwater supplies by delivering surface water in-lieu of pumping groundwater. It is important that the program be structured so that there are no adverse impacts to the landowners in terms of either water supply or capacity. Banking partners willing to recharge more water than they recover (such as recharging lower value wet-year water for recovery of higher value dry-year water) would be compensated by a reduction in fees.

Recharge capacity and pumpback would be available to banking partners in any year. The actual capacity available would vary depending on hydrologic conditions and previous recharge rates. Recovery of banked water would occur primarily by pumping groundwater from within the Antelope Valley Groundwater Basin.

In the past, AVEK has successfully used an in-lieu approach to recharge the groundwater basin in wet years which was utilized during a recent dry period to provide an additional water supply. The proposed project would expand upon the agricultural users near the proposed location of the Western Development and Storage banking project.

6.3.2 Operating Water Banks

One other significant short-term water supply alternative is the utilization of operating water banks. These banks have already been established and participation could begin upon agreement of terms and conditions.

6.3.2.1 Semitropic – Newhall Land and Farming Assets

Newhall Land and Farming Company (NLFC) is engaged in the development of agriculture, and residential, industrial, and commercial real estate on its approximately 49,000 acres in California. Since 1965, the Company has been developing the community of Valencia on a portion of its landholdings in Los Angeles County, which is now home to approximately 45,000 residents and over 1,400 companies that provide 45,000 jobs. In 1994, NLFC started the entitlement process on Newhall Ranch, a new master-planned community located on 12,000 acres adjacent to Valencia west of Interstate 5.

NLFC would like to divest its water holdings, which includes 55,000 AF of storage in the Semitropic Water Banking and Exchange Program. NLFC's ownership of the Semitropic assets and the terms and conditions for the sale of these assets are described below.

6.3.2.1.1 Water Quantity

NLFC and Vidler Water Company, Inc. (Vidler) made an agreement on March 22, 2001 that provides for the acquisition and assignment of 29.9297 percent of Vidler's rights under an agreement between Semitropic Water Storage District and Vidler, dated October 8, 1999. In that 1999 agreement, Vidler acquired 18.5 percent of the capabilities, rights, and capacities of the Semitropic Water Banking and Exchange Program. As a result of the 2001 agreement between NLFC and Vidler, NLFC now owns 5.5 percent of the capabilities, rights, and capacities of the Semitropic Water Banking and Exchange Program.

NLFC's 5.5 percent ownership of the Semitropic program includes at least 55,000 AF of water storage capacity in the Semitropic storage facility; a maximum of 4,950 AFY of pumpback capacity; an estimated 4,977 AFY maximum annual estimated program delivery capability; a maximum of 7,315 AF in Table A exchange rights, depending upon the amount of SWP Table A allocated to Semitropic during the year; and 2,654 AF of water stored in Vidler's Semitropic account. However, NLFC does not have a priority or right to SWP transmission.

6.3.2.1.2 Cost

The terms and conditions discussed below are from the March 22, 2001 agreement between Vidler and NLFC and from the May 21, 2001 agreement between NLFC and Semitropic. It is assumed that the water purveyors of the Antelope Valley would obtain the water storage assets through similar terms.

DESCRIPTION OF PROGRAM
NLFC's Assets in the Existing Semitropic Water Banking and Exchange Program

Status	Semitropic's existing groundwater banking program is currently operational.
Location	Kern County, Southern San Joaquin Valley, approximately 20 miles northwest of Bakersfield.
Type of Program	Sale of capabilities, rights, and capacities of the Semitropic Water Banking and Exchange Program.
Amount of Water	See description of Storage/Recharge/Recovery below.
Source of Water	NLFC's current assets in the Semitropic Water Banking and Exchange Program.
Term of Contract	Contract expires December 31, 2035 and may be renewed

	by mutual agreement of the parties.
Commencement of Program	Available now.
Parties to Transaction	NLFC and water purveyors of the Antelope Valley.
Delivery Point	Semitropic Water Bank/California Aqueduct Reach 10A.
Length of New Conveyance Facilities	N/A
Estimated Cost of Facilities	N/A
Approvals	The POD agreement from Semitropic to the Antelope Valley water purveyors will need DWR approval.

PROGRAM ELEMENTS
NLFC's Assets in the Existing Semitropic Water Banking and Exchange Program

Storage Capacity	55,000 AF
Recovery (Pumpback/Take) Capacity	4,950 AF
Recharge (Put) Capacity	4,977 AFY
Storage Loss	10 percent on puts only.
Exchange Water	0 – 7,315 AFY of Table A exchange rights.

FINANCIAL PARAMETERS
NLFC's Assets in the Existing Semitropic Water Banking and Exchange Program

Total Capital Cost	$8,317,918 (i.e., total capital costs consists of purchase price to Vidler and storage payments to Semitropic.)
Purchase Price (to acquire 29.9297 percent of Vidler's assets)	$3,461,430[2]

[2] NLFC has already paid Vidler a total of $3,461,430 for its water rights. This amount includes $35,112 for 2,654 AF of stored water, $3,236,606 for the remainder of the rights, and $189,712 in capitalized interest.

Storage payments to Semitropic	\$6,236,566[3]
Put Fee	\$57.56 per AF from and after the time the water purveyors have delivered to storage 55,000 AF of water. (Put fees have been prepaid for the first 55,000 AF delivered to storage.) The put fee is subject to annual increases based on the Consumer Price Index. (Adjusted from 2003 fee of \$53.95 per AF.)
Take Fee	\$11.51 per AF (plus energy costs) for the first 55,000 AF of water removed from storage. The take fee is subject to annual increases based on the Construction Cost Index. (Adjusted from 2003 fee of \$5.11 per AF.) Then \$57.56 per AF for each acre-foot of water after the first 55,000 AF are recovered, for which storage payments have already been made. (Adjusted from 2003 fee of \$53.95 per AF.)
Annual O&M Charges	Annual (fixed) O&M fees are the greater of (a) the combined put and take fees paid or (b) the O&M fee. The O&M fee is \$5.81 per AF of permanent storage allocation (\$5.81 x 55,000 AF= \$319,550 per year). The \$5.81 per AF rate is subject to annual increases based on the Consumer Price Index.
Energy/Power Costs on Puts	None.
Energy/Power Costs on Takes	Average unit power costs actually incurred by Semitropic.[4]
Exchange Fee	N/A
Conveyance Costs	N/A
Storage Loss	10 percent on puts only.
Discount Rate	N/A
Put Fee Escalator	Consumer Price Index.
Take Fee Escalator	Construction Cost Index for the first 55,000 AF removed from storage. Consumer Price Index after the first 55,000 AF have been removed from storage.
O&M Escalator	Consumer Price Index.

[3] The storage payments to Semitropic consist of 7 annual payments of \$693,784 each (7 x \$693,784 = \$4,856,488). NLFC has made four of the seven required annual payments of \$693,784, which equals \$2,775,136 (4 x \$693,784 = \$2,775,136). The remaining three annual payments are to be paid by the water purveyors directly to Semitropic. These payments are due annually within 45 days of October 8, 2005 through 2007. Therefore, the cost to the water purveyors in 2005 would be \$3,461,430 (see previous footnote) plus \$2,775,136 = \$6,236,566.

[4] The actual energy costs in 2001 for return of banked water by exchange was \$43.52 per AF, and for return by pumpback was \$58.26 per AF (Paul Oshel, personal communication, March 31, 2003).

Energy/Power Cost Escalator	Consumer Price Index.
Annual O&M	$319,550 per year starting in 2005. (i.e., 55,000 AF @ $5.81/AF).
Wheeling Fees	N/A.

6.3.2.2 Rosedale Rio-Bravo

Rosedale-Rio Bravo Water Storage District (RRBWSD) is located west of Bakersfield and has a gross area of approximately 43,000 acres. RRBWSD has developed a water banking and exchange program. The program offers a storage and extraction capacity of 20,000 AFY with an overall storage volume of 100,000 AF. Supply from the water bank could be in the form of an exchange of RRBWSD's Table A supply or pumpback into the California Aqueduct.

6.3.2.2.1 Water Quantity

The Castaic Lake Water Agency recently executed an MOU with RRBWSD to purchase banking capacity and is currently preparing the required environmental documentation. The water purveyors of the Antelope Valley are likely to have similar terms and environmental concerns as the Castaic Lake Water Agency.

6.3.2.2.2 Water Quality

Generally of same quality as water that would have ordinarily have been delivered through the SWP project.

6.3.2.3 Dry Year Water Purchase Program

It is possible to buy water from many agents within the California water system on a one-time or short-term basis. DWR, through the State Water Contractors, operates a dry-year program that permits contractors that are with SWP to buy options on water usually dedicated for agricultural concerns in the Sacramento River Basin. Typical water costs include an option payment (to hold water); the call price (actual purchase price); and loss of water due to movement through the Sacramento/San Joaquin Delta, in addition to SWP movement costs.

6.4 Potential Long-Term Water Banking Alternatives

The following subsections provide a discussion of the identified water banking alternative options available to the Antelope Valley on a long-term basis. Other opportunities may also be available. Long term alternatives can be located within or outside of the Antelope Valley.

6.4.1 Within Antelope Valley

The following subsections provided a discussion of the various water supply alternative options available to the Antelope Valley on a long-term basis but with the added advantage of being located within the Valley, thereby increasing their reliability. However, these alternatives are not immediately available. The three viable water banking alternatives available within the Antelope

Valley are a Water Agency sponsored, Tejon Ranch, and Western Development and Storage (WDS) water bank.

6.4.1.1 Western Development and Storage

Western Development and Storage (WDS) has proposed to develop a water bank located within the Antelope Valley. WDS has conducted numerous hydrogeological, environmental, and well survey studies since 2001. The location selected is near existing statewide infrastructure on existing farmland which is anticipated to have minimal environmental issues. In a presentation to Los Angeles County in May 2005, it is anticipated that the bank would provide 100,000 AFY and have a total capacity of 500,000 AF. Well sampling results from the proposed water banking area showed excellent water quality. The groundwater was well below all State and Federal water quality requirements. WDS anticipates project cost to be under $1,000 per AF, assuming 30 years and 6 percent discount. This cost also does not include reservoir operation costs. WDS anticipates operation within 2 to 3 years.

6.4.1.2 Antelope Valley Agencies' Water Bank

This water banking option would be similar to the proposed by WDS with the exception that the three water purveyors and potentially AVEK would own and operate the water bank themselves. Potential advantages include reduced costs, more control, and abbreviated schedule. Disadvantages include the need to conduct further study and the lack of an experienced agency with water banking experience. Furthermore, the water purveyors would be responsible for conducting the necessary technical studies, environmental documentation, and all capital costs.

6.4.1.3 Tejon Ranch

The Tejon Ranch Water Company has proposed a SWP banking project through surface spreading on the property owed by the Tejon Ranch northeast of the location where the East branch of the California Aqueduct enters Los Angeles County. The exact size and cost of this project is still being developed. It is likely the bank would include a non-exclusive membership where members share cost proportional to their portion of capacity. Initial members are expected to be Tejon-Castaic Water District and the water purveyors of the Antelope Valley.

A Joint Powers Authority (JPA) may need to be established prior to implementation. The Joint Powers Authority is likely to be similar to the one established for the Kern Water Bank Authority with joint action to develop the bank and individual autonomy over assigned capacity. The following is also likely to be included in the establishment of the JPA:

- Voting would be based on each members' share.
- Decisions would be determined by majority vote.
- Recharge, recovery, and storage capacity would be proportional to shares.
- Water stored in the bank would remain in the ownership of the member.
- Capital and O&M costs would be proportional to shares.
- There would be a put and take fee applied to all banked water.
- The JPA would have the authority to apply for grants.
- The JPA would be considered a separate entity.

- The JPA would have the authority to construct the initial facilities and conduct the necessary studies as clearly defined in the agreed upon project description.

Due to the minimal number of required permits and environmental impacts, it is anticipated that utilization of the water bank could begin once the JPA has been established.

6.4.2 Outside Antelope Valley

The following subsections provided a discussion of the various water supply alternative options available to the Antelope Valley on a long-term basis. However, these alternatives are not immediately available or located within the Antelope Valley. The three viable water banking alternatives available outside the Antelope Valley are the operating water banks, Whitewolf, and others.

6.4.2.1 Operating Water Banks

This alternative is simply the extension of the operating water banks discussed in the short-term sections. Ideally, all operations and terms would remain the same as previously described.

6.4.2.2 Whitewolf Rio Ridge

The Wheeler Ridge Maricopa Water Storage District is currently developing a potential water bank in the Whitewolf Rio Ridge region located in the south east corner of San Joaquin Valley approximately 4 miles east of the I-5 and 99 freeway crossing. A pilot study has just been completed along with a 10 percent design and both indicate feasibility. However, at this time there has been no preliminary design, economic evaluation, CEQA documentation, or funding completed or identified. Thus far no partners have been identified and the potential storage capacity is unknown.

6.4.2.3 Semitropic Water Banking and Exchange Program

The Semitropic Water Storage District (Semitropic) is located in the San Joaquin Valley in north-central Kern County, about 20 miles northwest of Bakersfield and immediately east of the California Aqueduct. Semitropic was originally formed in 1958 with the expectation of receiving water from the SWP and surplus water from the Kern River. Prior to the formation of Semitropic, irrigated agricultural land was dependent on water from deep wells and local streams, when available. In 1973, Semitropic contracted with Kern County Water Agency for 155,000 AFY of SWP Table A Amount. Semitropic is composed almost entirely of agricultural users and serves 136,000 acres of irrigated land within a total area of 221,000 acres (345 square miles).

In 1995, Semitropic began implementation of the Semitropic Groundwater Banking and Exchange Program by utilizing a portion of the available immense groundwater storage capacity (approximately 1 million AF out of over 3 million AF). This long-term water storage program is designed to recharge groundwater and reduce overdraft, increase operational reliability and flexibility, and optimize the distribution and use of available water resources between Semitropic and the banking partners. The existing Semitropic water bank has a storage capacity of 1 million AF; a recharge capacity of 90,500 AFY; a firm extraction capacity of 90,000 AFY through the pumpback and physical return of groundwater to the SWP facilities; and the ability to return up to 133,000 AFY through exchange of Table A SWP entitlement. Approximately 700,000 AF are currently in storage. This program is currently fully operational and is a proven and working water bank.

Under the existing Semitropic Groundwater Banking and Exchange Program, the banking partner delivers a portion of its unused SWP, Central Valley Project (CVP), or other surface water supplies to Semitropic during periods when such water is available. Semitropic either uses this water in lieu of pumping groundwater for irrigation, or uses a small portion to directly recharge the underlying groundwater basin. Upon request, Semitropic returns the banking partner's previously stored water by providing the banking partner with an equivalent portion of Semitropic's SWP supply (and delivering a like amount of pumped groundwater to the landowners). Or, in particularly dry years when insufficient SWP Table A Amount is available to Semitropic for delivery to the banking partners, Semitropic extracts stored water from its groundwater basin and physically returns it through pumpback facilities to the California Aqueduct. Semitropic has constructed facilities so that groundwater can be pumped into its canal and, through reverse pumping plants, a maximum of 90,000 AFY can be delivered back into the California Aqueduct at a maximum instantaneous flow rate of 300 cubic feet per second (cfs).

6.4.2.3.1 Water Quantity

Semitropic currently has six fully subscribed banking partners, and the total amount of storage under contract is 1 million AF. The six partners (and their contract storage capacities) are as follows: the Metropolitan Water District of Southern California (350,000 AF); Santa Clara Valley Water District (350,000 AF); Alameda County Water District (150,000 AF); Alameda County Zone 7 Water Agency (65,000 AF); the Newhall Land & Farming Company (55,000 AF); and Vidler Water Company (30,000 AF).

Semitropic has recently completed environmental documentation to expand its existing program and construct new storage and return facilities as part of the Phase 2 project, also known as the Stored Water Recovery Unit (SWRU). The SWRU will provide 650,000 AF of additional storage. Recharge rates for the SWRU during wet and surplus years will range from 50,000 to 235,000 AFY. The new SWRU facilities will provide Semitropic with the additional capability to pumpback to the California Aqueduct 200,000 AF annually for a total pumpback capacity of 290,000 AFY. This return capacity will be provided by Table A exchange, if available, or by approximately 65 new wells located in the well field that will be pumping 150,000 AFY during a ten-month period, and existing wells that are pumping 50,000 AFY in winter months (i.e., a five- to seven-month period, when water is not required by Semitropic's growers). The water will be pumped to the Pond Poso Canal for transfer to the Junction Pumping Plant and Reservoir, and the 108-inch supply/return pipeline will transfer the water to the California Aqueduct.

One of the goals of the SWRU is to increase the recovery rate for the participants. The existing Semitropic Groundwater Banking Program has a return ratio of between 8:1 and 9:1 (i.e., it takes 8 to 9 years to recover the participant's total amount of water from storage). The expanded SWRU will have a ratio of 3:1 (i.e., it will take approximately 3 years to recover each participant's stored water). Recharge, recovery, and storage capacity on a firm or first priority basis in the SWRU are issued in a set ratio as follows:

- 3.3 AFY Recharge
- 10 AFY Recovery
- 30 AF Storage

In addition, SWRU banking partners will have the annual option to utilize any unused and available recharge capacity (up to 350,000 AFY) and recovery capacity (up to 223,000 AFY) from the existing unit of the banking program. If, in any given year, the SWRU banking partners collectively call on more than the unused and available recharge and/or recovery capacity in the existing unit, said capacity will be allocated on a pro rata basis based upon the SWRU banking partners existing recharge and extraction capacity in the SWRU.

6.4.2.3.2 Water Quality

Water quality is a potential risk for the Semitropic existing groundwater storage program and the SWRU. A preliminary policy discussed in the Spring of 2001 for the return of water to the California Aqueduct requires that no constituent can exceed the ambient or background levels of SWP water. It was ultimately recognized that this proposed policy would potentially eliminate or reduce the beneficial use of many, if not all, groundwater storage projects. A list of constituents of concern was developed that includes: TDS, Arsenic, Chromium VI (hexavalent chromium), Uranium, Nitrate, Sulfate, Bromide, and Total Organic Carbon (TOC). Table 6-1 lists these seven constituents of concern as well as the concentrations of these constituents in the California Aqueduct, the groundwater beneath the existing Semitropic bank, and in the groundwater beneath the proposed SWRU.

TABLE 6-1
WATER QUALITY IN CALIFORNIA AQUEDUCT, EXISTING SEMITROPIC BANK, AND SWRU

	California Aqueduct (10-Year Average)[a]	Wells in Existing Semitropic Bank	Wells in SWRU
TDS (mg/l)	260	320	160
As (µg/l)	2	9	60
Cr VI (µg/l)	0.2	6[b]	5
Ur (pCi/l)	1.5	3.6	0.13
NO_3 (mg/l)	2.3	11.1	0.6
Br (µg/l)	210	250[b]	90
TOC (mg/l)	3	0.8	0.57

Source: Rhone (2001) and Layne (2003).
Notes:
(a) The quality of SWP water in the California Aqueduct would tend to be worse during the primary pumpback periods of fall and early winter of drought years.
(b) Preliminary number. Most water quality analyses were run with standard detection limits, which were 50 µg/l for Chromium VI and 500 µg/l for Bromide. Most samples were non-detect, but only a few samples are available with lower limits (Rhone, 2001).
TDS - Total Dissolved Solids; As - Arsenic; Cr - Chromium; Ur - Uranium; NO_3 - Nitrate; Br - Bromide; TOC - Total Organic Carbon.
mg/l - milligrams per liter
pCi/l - picocuries per liter
µg/l - micrograms per liter

For the existing groundwater program, the estimated water quality (except for total organic carbon, TOC) is equal to or worse than SWP 10-year average levels. (McGuire Environmental Consultants, 2001) However, in 2001 Semitropic demonstrated that by selecting certain wells in the existing Semitropic bank (which includes Semitropic wells located along the existing canals and farmer wells), it is capable of producing water, without further treatment, that has the characteristics shown in Table 6-1 for the California Aqueduct. (Rhone, 2001; Layne, 2003) Furthermore, in most, if not all payback years, the Antelope Valley would receive Table A water via exchange, rather than by pumpback.

For the proposed SWRU, the arsenic and chromium levels are elevated. However, for the other five constituents, the water quality is better than SWP levels (Table 6-1). Semitropic has a portfolio of tools to manage the elevated arsenic and chromium levels to ensure that the water quality is acceptable before being placed back into the SWP for delivery to the banking partners. SWRU water can be exchanged with other agricultural water supplies (i.e., CVP Friant Kern sources), and blended with the existing Semitropic groundwater to improve the water quality (for constituents other than arsenic and chromium) before being returned to the SWP, provided it does not adversely affect existing Banking Partners' pumpback operations. A more practical and a much less costly solution to any degradation of constituents is to pay downstream users for any incremental increase in treatment costs in those years when pumping actually occurs. There could also be offsetting considerations for improvement in some constituents such as TDS. Semitropic will also utilize water treatment technology to remove arsenic at times when the previous options are unavailable.

Preliminary work by McGuire Environmental Consultants (2001) indicates that treatment of the arsenic in the stored groundwater from both the existing bank and the SWRU using known conventional treatment methods would cost approximately $107 to $623 per AF. Basin Water Technology Group (Rowe, 2001) estimated that the capital cost to provide wellhead treatment at 65 locations would be $25 million. In addition, the cost to treat the groundwater and dispose of waste brines is estimated to be $20 to $25 per AF (Rowe, 2001).

Because of the intermittent operations of any treatment facilities, it is very difficult to obtain a reliable firm estimate of costs for treatment. The most recent estimate for the variable operation and maintenance cost of arsenic water treatment is $80 per AF (Werner, personal communication, July 29, 2003). Semitropic plans to explore all options and use treatment only as a last resort and only when there is no extraction capacity available from the existing bank through exchange of Semitropic's SWP Table A Amount and blending with other sources is not an option. Therefore, the unit treatment costs will not be applicable in all situations.

6.4.2.3.3 Schedule

Environmental documentation of the SWRU is complete. Acquisition of the well field land (over 2,000 acres) has been completed. The reservoir at the Junction Pumping Plant will be shallow and not subject to California Division of Safety of Dams Jurisdiction. The 1994 Memorandum of Understanding, with five adjacent local districts (Southern San Joaquin Municipal Utility District, North Kern Water Storage District, Shafter-Wasco Irrigation District, Rosedale-Rio Bravo Water Storage District, and Buena Vista Water Storage District), addressed and resolved any potential groundwater impacts of the Semitropic Groundwater Bank.

As of March 31, 2003, Semitropic has received formal proposals for the design/build of the SWRU. It is estimated that design of the 108-inch supply/return pipeline, Junction Reservoir, and Junction Pumping Plant can be completed in 16 weeks after authorization. Construction is estimated to take approximately 13 months. Storage of water does not require construction of new facilities and can be initiated by utilizing unused capacity as soon as agreements are in place and water is available. Semitropic is currently seeking additional banking partners prior to embarking on construction of the SWRU.

6.4.2.3.4 Economic Terms and Conditions of SWRU

The Semitropic Water Storage District is proposing to expand their existing program to include the SWRU. Layne Water Development and Storage, LLC (Layne) is marketing Semitropic's SWRU. The anticipated terms and conditions for participation in the SWRU are listed below. Please note that these terms were effective for another agency and although they may be similar, there is the potential for further modification.

DESCRIPTION OF PROGRAM
Semitropic Water Banking and Exchange Program - Stored Water Recovery Unit (SWRU)

Status	Existing groundwater banking program is currently operational. SWRU is currently operated on a second priority basis using the existing program and will be operational on an independent 1st priority basis by approximately the end of 2005.
Location	Kern County, Southern San Joaquin Valley, approximately 20 miles northwest of Bakersfield.
Type of Program	Groundwater Banking and Exchange Program. The banked water will be returned to the SWP by release of Semitropic contract Table A Amount, and/or by "pumpback" to the California Aqueduct at a current rate of 300 cfs and ultimately at a rate of 720 cfs.
Amount of Water	See description of Storage/Recovery/Recharge below.
Source of Water	State Water Project, Central Valley Project, Kern County Surface Water, Pre-1914 Water from North of the Delta.
Term of Contract	25 years per current proposal.
Commencement of Program	Existing program is operational right now. SWRU will be available by approximately the end of 2005. SWRU can take delivery for storage immediately.
Parties to Transaction	Semitropic, water purveyors of the Antelope Valley.
Delivery Point	Semitropic Groundwater Banking and Exchange Program/California Aqueduct Reach 10A.
Length of New Conveyance Facilities	Seven miles of 108-inch-diameter pipe, seven miles of 84-inch pipe, 65 wells, and pipe distribution system to serve 12,000 to 14,000 acres.

Estimated Cost of Facilities	$130 million to $150 million plus cost of arsenic treatment, for a total possibly over $200 million.
Description of Facilities	The new SWRU program has been developed and fully permitted to install up to 65 wells in the SWRU area and provide conveyance facilities to the California Aqueduct. The new SWRU is sized to deliver up to 200,000 AFY (at 300 cfs) to the California Aqueduct via a fourteen-mile-long 108-inch and 84-inch-diameter pipe (200,000 AFY is 10 percent of the SWP yield in a 50 percent year). Approximately 6 sections of land will be acquired in fee under Semitropic's name.
Approvals	Approval by the DWR and KCWA will be required for additional point of delivery.

PROGRAM ELEMENTS
Semitropic Water Banking and Exchange Program - Stored Water Recovery Unit (SWRU)

Storage Capacity	The Antelope Valley can utilize unused capacity as soon as agreements are in place. Total storage capacity of the new SWRU will be 650,000 AF, which is in addition to the initial 1 million AF of storage. The Antelope Valley portion of storage capacity would be 75,000 AF.
Recovery (Pumpback/Take) Capacity	200,000 AFY of recovery capacity in the new SWRU program. In addition, 223,000 AFY of recovery can be made available to new banking partners when that capacity goes unused by the existing partners (i.e., the Antelope Valley would have second priority on a pro-rata portion of the 223,000 AFY recharge capacity). Existing facilities have a guaranteed return capability in excess of 90,000 AF, of which 50,000 AFY could be made immediately available to the Antelope Valley. The Antelope Valley's guaranteed portion of the recovery capacity would be 25,000 AFY.
Recharge (Put) Capacity	50,000 AFY available to all new banking partners. In addition, 350,000 AFY of recharge can be made available to new banking partners when that capacity goes unused by the existing partners (i.e., the Antelope Valley would have second priority on a pro-rata portion of the 350,000 AFY recharge capacity). The Antelope Valley's guaranteed portion of the recharge

	capacity would be 8,300 AFY.
Current Water in Storage	700,000 AF
Storage Loss	10 percent one-time loss to the aquifer and in-district conveyance.
Exchange Water	SWRU participants have a first priority right to unused Semitropic State Table A Amount by existing Banking Partners.

FINANCIAL PARAMETERS
Semitropic Water Banking and Exchange Program - Stored Water Recovery Unit (SWRU)

Price/Cost of Facilities	Participant pays pro rata share of actual capital costs estimated to be $130 million to $150 million for the core project plus arsenic treatment, if treatment is required. The total cost of the project could exceed $200 million. The Antelope Valley will pay a one-time fee to Semitropic equal to the actual development cost per AF of extraction in the SWRU, plus 20 percent.[5]
Capital Costs	To be determined.
Payment Plan	New participants will be given an option to pay up-front and/or commit to annual debt service payments. Semitropic is still offering to sell tax-exempt bonds on behalf of those participants that are willing and can qualify for bond financing.
Payment Due Date	To be determined.
Term of Financing	To be determined.
Put Fee	None.

[5] The Antelope Valley's cost would be a percentage of the total cost, based on the Antelope Valley's portion (12.5 percent) of the total recovery capacity (i.e., 25,000 AFY = 12.5 percent of 200,000 AFY). 12.5 percent of $200 Million = $25 Million. One-time fee of 20 percent of $25 Million = $5 Million. Therefore, the total cost to the Antelope Valley = $25 Million + $5 Million = $30 Million.

Take Fee	None. However, a 50,000 AFY portion of recovery capacity in the SWRU is relatively less expensive than the original Banking Program. Existing Banking Partners will be given an option to pay $15 to $20 million for 50,000 AF of recovery. However, this deal is offered to existing participants only, on an existing percentage basis of the original program.
Fixed O&M Costs	G & A: Estimated at $7 per AF of annual extraction capacity. Treatment and Well Maintenance: Estimated at $10 per AF of annual extraction capacity.
Arsenic Water Treatment	$80 per AF of extraction[6]
Energy/Power Costs on Puts	None.
Energy/Power Costs on Takes	Actual costs, which currently are approximately $43.52 per AF for return of banked water by exchange, and $58.26 per AF for return of banked water by pumpback.
Exchange Fee	N/A
Conveyance Costs	N/A
Storage Loss	10 percent one-time loss to the aquifer and in-district conveyance.
Discount Rate	N/A
Put Fee Escalator	Consumer Price Index.
Take Fee Escalator	Consumer Price Index.
O&M Escalator	Consumer Price Index.
Arsenic Water Treatment Escalator	Consumer Price Index.
Energy/Power Cost Escalator	Actual.

[6] This is the variable cost associated with arsenic treatment, if treatment is necessary. If the Antelope Valley obtains its water through entitlement exchange (rather than by pumpback), then arsenic treatment would not be necessary. However, recovery through entitlement exchange is only available if unused by Banking Partners in the existing Semitropic bank. Cost of arsenic water treatment is adjusted annually per the Consumer Price Index.

Annual O&M See Fixed O&M Costs plus Energy Costs.

6.5 Transfer and Exchange Opportunities

No transfer and exchange opportunities in addition to the water banking alternatives discussed above were identified for the Study Area at this time. However, the Antelope Valley water purveyors will continue to evaluate such opportunities as they arise.

6.6 Potential Water Supply Alternatives

Potential water supply alternatives that are available to the Antelope Valley besides those mentioned above include stormwater re-use, groundwater management, and desalination. However, these alternatives are limited in their supply capacities, are already in the process of implementation, or not cost effective.

6.6.1 Recycled Water Supplies

Another source of water that is available to the Antelope Valley but is not yet being utilized by the Study Area is recycled water. District No. 40 is currently leading an effort to develop a Recycled Water Facilities Plan for the Antelope Valley. This Facilities Plan recommends a backbone recycled water system to serve the Study Area.

6.6.1.1 Source Characteristics

Lancaster Water Reclamation Plant (LWRP), Palmdale Water Reclamation Plant (PWRP) and Rosamond Wastewater Treatment Plant (RWWTP) are three wastewater treatment plants in the Study Area. These three plants primarily provide secondary treated effluent. Currently, the only recycled water in the Study Area that is treated to a tertiary level is a small percentage of the wastewater at the LWRP through additional onsite facilities known as the Antelope Valley Tertiary Treatment Plant (AVTTP). Effluent management is challenging in Antelope Valley because the area is a closed basin with no river or other outlet to the Pacific Ocean. Effluent management options are restricted to methods such as reuse, evaporation, and percolation. LWRP, PWRP and RWWRP will all provide tertiary treated effluent with future upgrades. A description of each of the three treatment plants that may provide recycled water to the Study Area is provided below.

6.6.1.1.1 Lancaster Water Reclamation Plant (LWRP)

The LWRP, built in 1959 and located north of the City of Lancaster, is owned, operated, and maintained by the Los Angeles County Sanitation District No. 14 (District No. 14). LWRP, which has a permitted capacity of 16.0 mgd, treated an average flow of 13.3 mgd in 2004 to secondary standards for agricultural irrigation, wildlife habitat, maintenance, and recreation. Additionally, 0.6 mgd is currently treated to tertiary standards and used to replace evaporative losses at the Apollo Lakes Regional County Park.

District No. 14 plans to upgrade the existing LWRP for a total capacity of 21 mgd by 2008 with a proposed future upgrade to 26 mgd by 2014. Tertiary treated effluent from the upgraded LWRP will be available for municipal reuse in addition to the existing uses.

6.6.1.1.2 Palmdale Water Reclamation Plant (PWRP)

PWRP, built in 1953 and located on two sites adjacent to the City of Palmdale, is owned, operated, and maintained by the Los Angeles County Sanitation District No. 20 (District No. 20). PWRP, which has a permitted capacity of 15.0 mgd, treated an average flow of 9.4 mgd in 2004 to secondary standards for land application or agricultural irrigation.

A recent revision to the Waste Discharge Requirements, due to concerns about nitrate in the groundwater, required District No. 20 to eliminate their existing practice of land application and agricultural irrigation above agronomic rates of treated effluent by October 15, 2008. By November 15, 2009, District No. 20 is required to prevent the discharge of nitrogenous compounds to the groundwater at levels that create a condition of pollution or violate the water quality objectives identified in the 1994 Water Quality Control Plan for the Lahontan Region (1994 Basin Plan). In response, the treatment capacity of the PWRP will be increased to 22.4 mgd and tertiary treatment will be added. All tertiary treated water is anticipated to be used for municipal purposes.

6.6.1.1.3 Rosamond Wastewater Treatment Plant (RWWTP)

RWWTP, located in the City of Rosamond, is owned, operated, and maintained by the RCSD. RWWTP, which has a permitted capacity of 1.3 mgd, treated an average flow of 1.1 mgd to undisinfected secondary standards for landscape irrigation on-site.

RCSD plans to increase the capacity to 1.8 mgd in 2006 through the addition of 0.5 mgd tertiary treatment facility. The tertiary treatment facility will then be upgraded to 1.0 mgd in 2010.

Design for the proposed treatment plant improvements is complete and has been approved by the State of California. Construction is currently delayed due to lack of funding. Once constructed, the plant would provide tertiary treated recycled water for landscape irrigation at median strips, parks, schools, senior complexes and new home developments.

6.6.1.2 Availability of Supply

For the purpose of this study, wastewater flow projections are being used to define the amount of recycled water available to the Study Area. These projections were determined from the Draft Facilities Plan and are for tertiary treated water only. They also consider recycled water that has already been contracted out to users outside of the Study Area. Table 6-2 provides a summary of the recycled water flow projections for the Study Area through 2030. The flow projections for LWRP and PWRP in 2005 include secondary treated effluent because the tertiary treatment plant upgrades are not yet constructed.

TABLE 6-2
RECYCLED WATER AVAILABILITY TO STUDY AREA 2005 – 2030

	2005	2010	2015	2020	2025	2030
LWRP[a] (mgd)	12	14.8	19	23	27.1	31.2
PWRP[b] (mgd)	10.0	13.2	16.4	19.5	22.4	25.5
RWWTP[c] (mgd)	0	1.0	1.0	1.0	1.0	1.0
Study Area (mgd)	22.0	29.0	36.4	43.5	50.5	57.7
Study Area (AFY)	24,700	32,500	40,800	48,800	56,700	64,800

Notes:
(a) Obtained from the *Lancaster Water Reclamation Plant 2020 Facilities Plan*, prepared by the Sanitation Districts of Los Angeles County, May 2004, less the 3.03 mgd already committed to contract.
(b) Obtained from the *Draft Palmdale Water Reclamation Plant 2025 Facilities Plan and Environmental Impact Report*, prepared by the Sanitation Districts of Los Angeles County, April 2005.
(c) Obtained from documentation and phone calls provided by RCSD in May 2005 and a RCSD fax received in August 2005.

Although Table 6-2 provides the volumes of recycled water available, actual use of recycled water is limited to demand. Table 6-3 provides the projections of recycled water demand for an average water year. The projections are based on a recycled water market assessment and are generally for agricultural irrigation, landscape irrigation, and wildlife habitat. District No. 40 recycled water demands were determined from the addition of the City of Lancaster and City of Palmdale demands from the Facilities Plan. Although no specific users have been identified for QHWD, they plan on connecting to the backbone system in the future and using recycled water in-lieu of groundwater pumping. Use of recycled water would be encouraged through the use of financial incentives (i.e., recycled water would be available at a lower cost than the existing potable water supply).

TABLE 6-3
PROJECTED FUTURE USE OF RECYCLED WATER IN THE STUDY AREA (AFY)

	2010	2015	2020	2025	2030
District No. 40	2,700	5,400	8,200	10,900	13,600
Percent of Total Supply	3	6	8	10	11
Rosamond CSD	1,000	1,000	1,000	1,000	1,000
Percent of Total Supply	9	7	6	5	4
Quartz Hill WD	0	0	0	0	0
Percent of Total Supply	0	0	0	0	0
Study Area	3,700	6,400	9,200	11,900	14,600
Percent of Total Supply	3	5	7	8	9

Note: All numbers rounded to the nearest 100 AF.

6.6.1.3 Water Quality

The current and projected water quality of the treated wastewater at LWRP, PWRP and RWWTP that will be used for recycled water purposes is expected to meet tertiary treated standards as defined in California Water Code Title 22 regulations. Furthermore, the use of recycled water would allow for more potable water to available with the same water quality as existing sources. Furthermore, it is expected that use of recycled water will improve receiving water quality by reducing the quantity of effluent being discharged to land disposal and reducing the need for fertilizer due to the nutrients levels in the recycled water.

It is expected that the Antelope Valley recycled water project as proposed will improve receiving water quality by reducing the quantity of effluent being discharged to land disposal. Groundwater impacts are expected to be negligible since recycled water will be applied at agronomic rates. Nutrients are expected to be taken up by vegetation reducing the need for fertilizer applications.

6.6.1.4 Recommended Backbone Recycled Water Facilities

The backbone system service area for recycled water will be developed in four phases. Figure 6-1 displays the Antelope Valley planned recycled water system by phase. The backbone system is still being refined as part of the Facilities Plan and may be modified. However, it will still follow the same general concept of a community wide backbone system to deliver recycled water over a large area. The initial phase will construct the backbone pipeline from LWRP to the proposed Reservoir No. 3, in the direction of the majority of the existing potential recycled water users. This area was chosen for Phase 1 due to the LWRP being expanded and constructed before the PWRP and to correlate with the City of Lancaster's recycled water project. The Phase 2 service area constructs the backbone pipeline from PWRP in the direction of the majority of the existing potential recycled water users. The recycled water pipeline routes in Phase 3 are designed to provide reservoir storage and distribute to large potential recycled water users in areas not yet served. The Phase 4 service area provides reservoir storage and connects the Phase 1 backbone pipelines from the LWRP to the PWRP to provide redundancy for recycled water delivery.

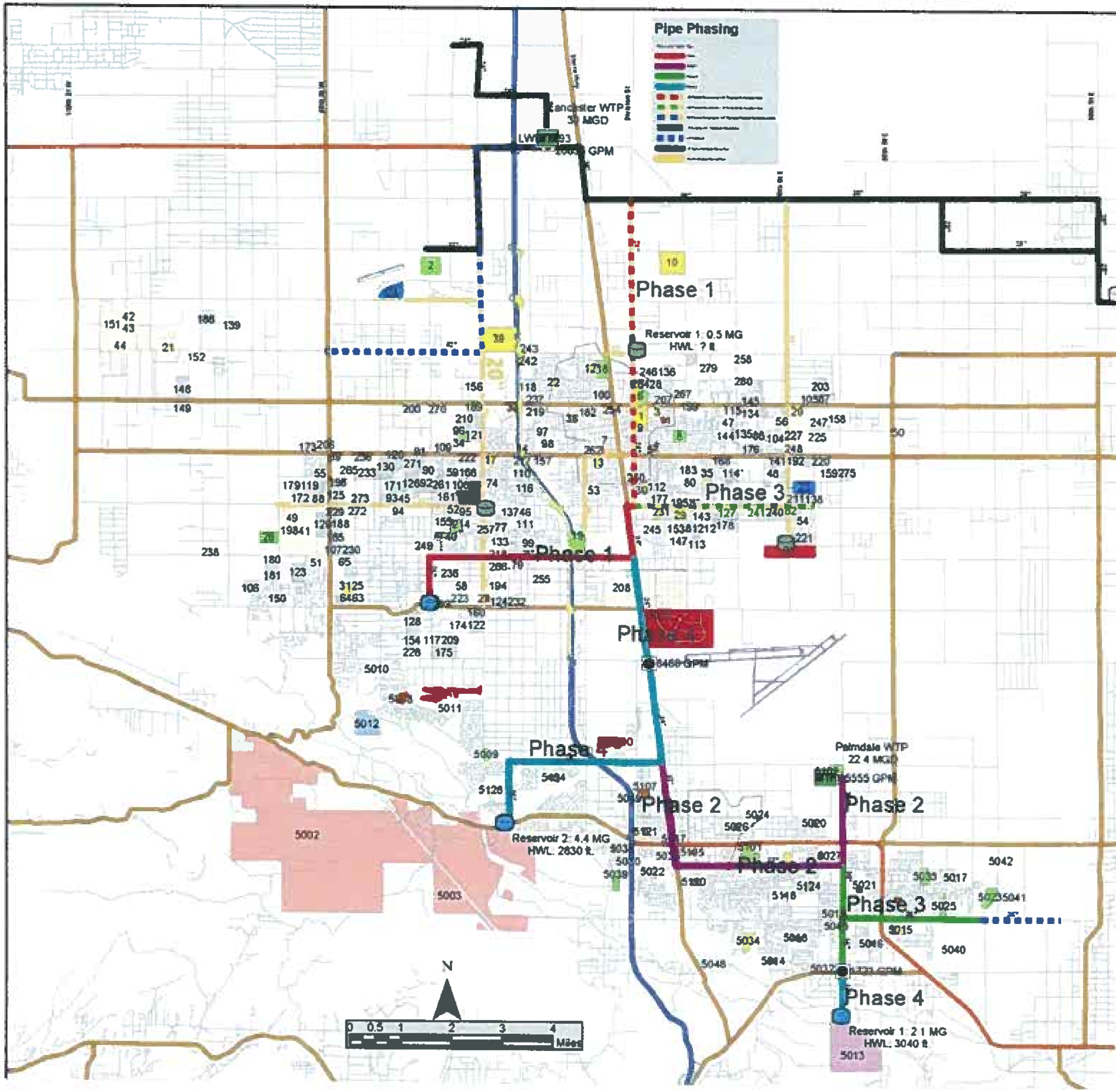
6.6.2 Expansion of Treatment Facilities

As previously mentioned, additional water from AVEK is a key element in the majority of the water supply strategies available to the Study Area. AVEK's current treatment capacity to District No. 40 is 65 mgd (73,000 AFY). However, in order for District No. 40 to utilize all of AVEK's additional water for water banking or ASR they would need to receive around 98,000 AFY. Thus there is a significant need for expansion of the Quartz Hill Water Treatment Plant to meet District No. 40's needs. It is anticipated that an expansion to 97 mgd should be sufficient to meet District No. 40's future demand (District No. 40 Draft 1999 WSMP).

Planned District No. 40 facility improvements include new wells, reservoirs and pipelines throughout its system to meet current and projected water supply requirements. Additional connections with AVEK will be needed to maximize use of available imported water.

RCSD will need new wells, a reservoir and additional transmission mains to meet projected demands (RCSD 2004 MP). Additionally, RCSD will need to expand their imported water facilities to account for their significant increase in the use of SWP water.

As discussed in Section 2, QHWD plans to enlarge existing wells or drill new wells to meet additional demands. This will become increasingly more important as QHWD utilizes more groundwater to meet projected demands.



Kennedy/Jenks Consultants

2005 Integrated UWMP for the Antelope Valley

Recommend Recycled Water Backbone System

K/J 0589015

Figure No. 6-1

6.6.3 Stormwater Management

According to the USGS (1994), stormwater runoff is a viable water resource for the Antelope Valley. Stormwater drains from the hillsides and flashes down to the valley floor and an impervious clay layer. Water is then eventually lost to evaporation. The rate of evaporation could potentially be a significant problem. However, recharge could be enhanced with the addition of well placed retention facilities. Additionally, stormwater re-use would improve flood management while providing some non-point source pollution control by minimizing the amount of and force of run-off through the valley.

The QHWD is currently pursuing a study to define the amount of stormwater flow into the basin, determine the amount lost to evaporation and percolation, evaluate the water quality, and estimate treatment costs. The study will concentrate on a 15 acre stormwater basin within the district. Results from the study, if favorable, could lead to an expanded study of the Antelope Valley as a whole. Actual volumes of potential supply and associated operation costs have yet to be determined.

6.6.4 Groundwater Management

Groundwater management is already utilized by the water purveyors in the Antelope Valley through optimization of supplies. All water purveyors maximize their use of imported water during rainy seasons when SWP is readily available and save groundwater use for times when SWP deliveries are low. This practice provides the most efficient use of the sources available to the water purveyors. Furthermore the adjudication process has begun which will outline the most efficient use of groundwater to maintain the safe yield of the basin and improve future reliability for this source.

6.6.5 Desalination

Due the proximity of the Antelope Valley from the ocean, there are currently no cost-effective means for brine disposal from a desalination facility. The water purveyors in the Antelope Valley could participate in seawater desalination and receive water in exchange but specific opportunities could not be identified. Thus at this time, desalination is not a viable option for the Antelope Valley.

6.6.6 Others

Other water supply strategies that were considered but determined not be feasible at this time due to the more pressing issue of meeting future demand include recreation and public access, wetlands enhancement and creation, and habitat protection and improvement. However, the current practice of utilizing wastewater effluent at the habitat impoundment could be expanded the recycled water supply continually exceeds anticipated demand.

6.7 Evaluation of Water Supply Alternatives

Because the terms of participation in the available banks in the Antelope Valley have not been specifically defined and additionally technically studies regarding feasibility and economics are needed, it is recommended that the Antelope Valley water purveyors initiate a detailed evaluation of the long-term water banking opportunities in the Antelope Valley to determine which is the most viable. The cost of this evaluation is estimated to be $200,000. Furthermore, it is recommended that the water purveyors initiate negotiations for potential water banking opportunities outside of the Antelope Valley. In addition, it is recommended that the Antelope Valley water purveyors continue to develop a recycled water system and pursue ASR and stormwater recharge opportunities. The estimated capital cost of a recycled water backbone system is approximately $73 million. District No. 40's ASR project is estimated to have a capital cost of approximately $9 million.

6.8 Relation to Statewide Priorities

Implementation of the water supply strategy as discussed above is consistent with all seven Statewide Priorities as discussed below.

6.8.1 Reduce the Conflict Between Water Users or Resolve Water Rights Disputes, Including Interregional Water Rights Issues

As discussed in further detail in Section 2, the Antelope Valley Groundwater Basin is currently in the adjudication process. Once complete, management of the basin will be better regulated and water rights may be assigned, reducing the potential for water rights disputes among the water purveyors and local farmers.

Potable water demands are largely met with SWP water. SWP entitlements and policies are structured and imported water entitlement issues should be minimal due to the contracts already in place.

However, water supply and quality remain challenging issues in the Study Area, as they are in all of Southern California. Reducing dependence on imported water in dry years and more efficiently managing local resources would help avoid or reduce any future water resource conflicts. In particular, the Study Area faces challenges associated with competing interests (agricultural, municipal and industrial, and environmental) and groundwater allocations.

6.8.2 Implementation of Total Maximum Daily Loads That Are Established or Under Development

The Integrated UWMP is supportive of this statewide priority. As discussed in Section 2, in response to recent regulatory changes concerning nitrate in the basin, the PWRP must eliminate their existing practice of land application and agricultural irrigation above agronomic rates. Implementation of the recycled water project could aid PWRP in meeting this requirement by allowing for an alternative use of the effluent. Furthermore, increased use of recycled water would reduce the overall salt loading to the Basin and thereby improve salt management and removal operations.

6.8.3 Implementation of Regional Water Quality Control Board Watershed Management Initiative Chapters, Plans, and Policies

The Integrated UWMP has been prepared in coordination with the Los Angeles RWQCB WMI. The recommended water supply strategy supports this statewide priority in that it considers the service areas of the three water purveyors and the LACSD as a region and addresses water supply, water quality, and habitat issues on a holistic Study Area-wide basis. Furthermore, the water supply strategy includes projects, such as ASR and recycled water, to implement TMDLs that would improve management of salts and other constituents to improve water quality in the entire Watershed.

6.8.4 Meet Delta Water Quality Objectives

As a result of Study Area's current dependence on imported surface water from the SWP (and the Delta) , increased development of the ASR project, recycled water supply and water banking options within the Antelope Valley would reduce dependence on the SWP, particularly in times of drought and other water shortages. By reducing the Study Area's dependence on the SWP during dry years, additional supplies would remain within the Delta by which to better meet Delta Water Quality Objectives.

6.8.5 Implementation of Recommendations of the Floodplain Management Task Force, Desalination Task Force, or Recycling Task Force

The California Department of Water Resources has led the formation and implementation of task forces for floodplain management, desalination, and recycled water. Each task force has prepared reports documenting the results of its efforts. The recommended water supply strategy includes recycled water and elements of stormwater management to help achieve this statewide priority.

6.8.6 Address Environmental Justice Concerns

The implementation of the recommended water supply strategy is not limited to the more affluent areas of the Study Area, nor does it disproportionately burden the less affluent areas. Therefore, while the projects are not targeted at disadvantaged communities, very few of which exist in the Study Area based of the definition in the Guidelines, the water supply strategy has broadly distributed benefits to the entire Study Area and all of its residents.

6.8.7 Assist In Achieving One or More Goals of the CALFED Bay-Delta Program

The water purveyors of the Antelope Valley have, in the development of this Integrated UWMP, demonstrated their commitment to undertake local projects (such as ASR, stormwater management, and recycled water) that reduce Southern California's dependence on SWP water during dry years and address salts issues in the Study Area. These activities are consistent with three of CALFED's primary objectives and are critical to the success of the program. The four CALFED objectives are:

1. Ecosystem Quality
2. Water Supply
3. Water Quality
4. Levee System Integrity

The recommended water supply strategy meets the first three objectives by reducing the use of imported water during dry years which improves both ecosystem and water quality in the Bay-Delta and provides additional water supply for the state.

The recommended water supply strategy, through the implementation of recycled water and ASR, represents a CALFED solution that is physically outside of the Bay-Delta, but one that results in positive ecological, water supply, and water quality benefits to the Bay-Delta system. Furthermore, it meets the CALFED Watershed Program Objectives of facilitating coordination/collaboration and integration with other CALFED elements.

Section 7: Water Shortage Contingency Analysis

This water shortage contingency analysis is based on water shortages that arise not only from drought, but shortages resulting from earthquakes, fires, system failures, and water quality contamination as well. Recent drought-related water management experiences for water agencies in California have revealed the complexity of coping with a water supply shortage. These experiences are well-documented and ready for implementation in the future by most agencies. Various water shortage scenarios may require similar drought-related actions, but may involve different complications that must be taken into account to address the shortage.

7.1 Minimum Water Supply

As such, each water purveyor's three-year minimum water supply is provided in Table 7-1. The normal water year was set as 2005. Three-year minimum supply was determined to occur for the base years 2006, 2007 and 2008. This period was selected due to the limited availability of banked water (since the banking program would have just begun and the water purveyors would not yet have had sufficient time to store the required volumes), limited availability of recycled water (since the backbone system would just be beginning implementation), and the potential limited availability of groundwater from the adjudication process. Furthermore, the reduction in overall water demand from the implementation of the DMMs discussed in Section 5 would yet to have reached its maximum.

TABLE 7-1
THREE-YEAR MINIMUM WATER SUPPLY (AF)

Area	Source	2006	2007	2008	Normal
District No. 40	Groundwater	0	0	0	20,000
	ASR	0	0	0	0
	Imported Water	17,800	17,800	17,800	69,800
	Recycled Water	500	1,100	1,600	2,700
	Total	18,300	18,900	19,400	92,500
RCSD	Groundwater	0	0	0	2,000
	Imported Water	2,000	2,000	2,100	8,700
	Recycled Water	500	600	800	1,000
	Total	2,500	2,600	2,900	11,700
QHWD	Groundwater	0	0	0	5,000
	Imported Water	1,700	1,700	1,600	6,200
	Recycled Water	0	0	0	0
	Total	1,700	1,700	1,600	11,200
Study Area	Groundwater	0	0	0	27,000
	ASR	0	0	0	0
	Imported Water	21,500	21,500	21,500	84,700
	Recycled Water	1,000	1,700	2,400	3,700
	Total	22,500	23,200	23,900	115,400

Notes: All numbers rounded to the nearest 100 AF.
(a) A conservative assumption of zero groundwater availability was utilized due to uncertainty in the adjudication process.

(b) A 18 percent delivery reliability was assumed for the SWP as determined for a three-year dry period.
(c) Recycled water availability was assumed at 90 percent of the projected recycled water demand for 2006, 2007, and 2008.
(d) Base year 2010 was selected as the Normal year.

7.2 Coordinated Planning

Coordination among the three water purveyors and other purveyors within the Antelope Valley is essential when planning for a loss of supply. This is especially true since all three water purveyors share the same water sources and will be equally affected when a loss occurs. It is also essential for planning to be coordinated with AVEK, the wholesale water supplier, since AVEK will need to take similar actions for each water purveyor in the time of need.

7.3 Drought Conditions

Being located within an arid region of Southern California, the Antelope Valley is highly susceptible to drought conditions. Thus it is important for the water purveyors to have a plan in place to ease the impacts to the water supply during times of drought. The DMMs discussed in Section 5 will play an essential role in limiting water use during drought times, but further measures are often incorporated in a water shortage contingency plan, as discussed below.

7.4 Earthquakes or Other Natural Disaster

The Antelope Valley is located in an earthquake zone. In the event of an earthquake or natural disaster, the Antelope Valley has the potential of losing its SWP supply. According to the California Division of Mines and Geology, a displacement along the San Andreas Fault could rupture the two aqueduct systems importing water to southern California, resulting in a potential delay of three to six weeks in SWP water delivery. Additional delays may occur due to damage to pumping facilities. DWR estimates a four month delay if a major break should occur.

If such a delay occurs, each water purveyor could temporarily increase its groundwater production and utilize its emergency storage to meet water demands until the aqueduct was repaired. In the event of a prolonged absence of SWP water, the water purveyors could implement their established "No Waste" Ordinances and Water Shortage Contingency Plan Stages to substantially reduce demands until SWP supply is restored. Both of these measures are discussed below.

7.4.1 SWP Emergency Outage Scenarios

Following is a discussion of three possible scenarios for an outage of SWP water due to earthquake, power outage, or other event. In past years, slippage of side panels, flood events, and subsidence repairs were handled by DWR without interruption in delivery. This is mainly due to a key design feature of the aqueduct which allows isolation of various sections. Thus DWR can repair the damaged section without interrupting operation of another. However, three potential scenarios that would result in a loss of delivery to the Study Area are described below. They include a levee breach near the Sacramento-San Joaquin Delta, loss of the San Joaquin Valley transverse due to flood or earthquake, and loss of the East Branch due to earthquake.

The water purveyors' ability to meet demands during the worst of these scenarios is also presented.

7.4.1.1 Levee Breach near Banks Pumping Plant

The Delta plays an essential role in the SWP operation. Water from the Delta is diverted to the SWP's main pumping facility, the Banks Pumping Plant located in the southern Delta, into the California Aqueduct. If a major levee breach were to occur near this facility, the freshwater in the Delta may become displaced with saltwater rushing in from the San Francisco Bay. Pumping from the Delta would cease until the water quality was restored. Depending on the time of the breach, the necessary fresh water inflows required to restore the Delta may not be available.

Historically levee breaks, such as the Jones Tract break, may take several months to completely restore. Assuming that the Banks Pumping Plant was down for six months, DWR could utilize water stored in the San Luis Reservoir to continue delivery of some SWP water to southern California. However, availability of supply will vary depending on the time of the breach. An occurrence in late summer early fall, would result in minimal delivery due to the typically low levels in San Luis Reservoir during this period. In addition to supply from San Luis Reservoir, the water purveyors could utilize storage from the DAWN facilities (as discussed in Section 2) or temporarily pump additional groundwater until the Delta is restored. The water purveyors could also utilize any water previously stored in groundwater banks.

7.4.1.2 Complete Disruption of the California Aqueduct in the San Joaquin Valley

As demonstrated by the past flood event at Arroyo Pasajero, which resulted in the temporary loss of the Edmund G Pat Brown portion of the California Aqueduct, the SWP facilities are vulnerable to flood. If a similar incident were to occur due to flood or earthquake, loss of deliveries from the San Luis Reservoir could result. DWR anticipates an outage of up to four months should a loss in this portion of the California Aqueduct occur. If delivery were prevented from the San Luis Reservoir, the water purveyors could receive water through the DAWN facilities or temporarily pump additional groundwater until the supply is restored. Additionally, the water purveyors could utilize any water previously banked.

7.4.1.3 Complete Disruption of the East Branch of the California Aqueduct

The East Branch of the California Aqueduct begins at a bifurcation of the aqueduct south of the Edmonston Pumping Plant. The East Branch conveys water through the Alamo Power Plant to the Pearblossom Pumping plant, which pumps the water 540 feet uphill. The water is then conveyed in an open cannel into the Mojave Siphon Powerplant and into Lake Silverwood. When needed, water is discharged to the Devil's Canyon Powerplant and its two afterbays. The Santa Ana Pipeline then conveys the water 28 miles underground to the Aqueduct's terminus at Lake Perris.

If a portion of the East Branch were damaged due to a major earthquake, deliveries to the water purveyors could be interrupted depending on the location of the break. It is assumed that a single-location break occurred north of the Pearblossom Pumping Plant and prevented delivery of water stored in the DAWN facilities. The water purveyors could temporarily pump additional groundwater or utilize water stored in groundwater banks until SWP delivery resumed.

Of the three scenarios, the disruption of the East Branch of the California Aqueduct would result in the worst-case scenario for the water purveyors of the Antelope Valley since it would prevent any delivery of SWP. In this case, the water purveyors would rely on local groundwater and water stored in groundwater banks. An assessment of water supply and demand for a six-month SWP interruption are presented in Table 7-2. Water Supplies are assumed to be one half of the volumes available in a single dry-year with the exception of recycled water. Recycled water was assumed to be available at a reduced rate of 10 percent due to a reduction in waste discharge from voluntary conservation measures.

Table 7-2 shows that with increased groundwater pumping and utilization of banked water within the Antelope Valley, the DMMs described in Section 5 are sufficient in the event of a six-month interruption in imported supply. Thus no additional conservation is required. However, if the water purveyors elect to conserve groundwater supplies and banked water for more severe dry year conditions, additional conservation efforts could be utilized to minimize demand.

TABLE 7-2
PROJECTED SUPPLIES AND DEMAND DURING A SIX-MONTH DISRUPTION IN IMPORTED SUPPLY

	2010	2015	2020	2025	2030
Study Area Existing Supply					
Groundwater	16,400	16,400	16,400	16,400	16,400
ASR	15,800	15,800	15,800	15,800	15,800
Imported Water	4,200	4,200	4,200	4,200	4,200
Total Existing Supply	36,400	36,400	36,400	36,400	36,400
Study Area Planned Supply					
Groundwater Banking/New Supply	6,200	11,900	18,400	25,000	32,500
Recycled Water	1,900	3,200	4,600	6,000	7,300
Total Planned Supply	8,100	15,100	23,000	31,000	39,800
Total Existing and Planned Supply	44,500	51,500	59,400	67,400	76,200
Study Area Demand (w/o Conservation)	43,000	52,600	62,600	73,100	84,600
Conservation	900	2,100	3,800	5,800	8,400
Study Area Demand w/Conservation)	42,100	50,500	58,800	67,300	76,200
Additional Conservation Required	0	0	0	0	0
Additional Conservation as a Percent of Demand	0	0	0	0	0

7.5 Power Outages

In the event of a power outage, the water purveyors would follow their established Emergency Response Procedures (ERPs). ERPs for a power outage include ensuring back-up power supply for all water supply facilities to continue supplying water to customers, communicating with the power company, activating emergency connections with adjacent water systems, continuing water quality monitoring, and issuing boil water advisories as necessary.

7.6 Contamination

Contamination of water supply can result from a number of different events including, a reduction in water supply, water main break, cross-connection condition, water source pollution or covert action. Water supplies for the Study Area are generally of good quality and no foreseeable permanent contamination issues are anticipated. In the event of a toxic spill or major contamination, the water purveyors would follow their ERPs to isolate the problem and reduce the impact to the water supply. Once the problem has been isolated, the contamination would be cleaned up using the outlined chlorination or other necessary procedures and the water supply returned to service as soon as possible. In the meantime, emergency storage or alternative supply would be used to meet demand. Implementation of additional demand management measures could also be utilized if the outage is anticipated to be of longer consequence.

The recent detection of arsenic, as discussed in Section 2, provided the water purveyors with the opportunity to verify the sufficiency of their ERPs. The contaminated wells were isolated and shut-down until corrective actions (such as wellhead treatment and varying pumping depth) were implemented. Extended pumping of non-contaminated wells and imported water were utilized to meet demand and cover the potential loss in supply.

7.7 Stages of Action

All three water purveyors have adopted individual Water Shortage Contingency Plans for their service areas. Each of these is described in more detail below and copies are provided in Appendix G.

7.7.1 District No. 40

District No. 40 has implemented a Phased Water Conservation Plan (PWCP) comprised of nine stages or "Phases" that call for the reduction in water use in order to meet a conservation target. Table 7-3 summarizes the shortage stages and conditions. Implementation of a Phase requires determination of a shortage from the County of Los Angeles Board of Supervisors. Water shortages could result from reduced availability of AVEK water, main breaks, natural disasters, or earthquakes. Once a shortage is determined, a public hearing is held to determine which Phase should be implemented.

TABLE 7-3
DISTRICT NO. 40 STAGES OF ACTION

Phase	1	2	3	4	5	6	7	8	9
Anticipated Shortage that Triggers Phase	10%	15%	20%	25%	30%	35%	40%	45%	50%
Conservation Target	90%	85%	80%	75%	70%	65%	60%	55%	50%
Type of Rationing	Voluntary	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory

In addition to the PWCP, District No. 40 has recently developed an internal Water Shortage Contingency Plan (WSCP). The WSCP, in contrast to the PWCP, does not specifically state the measures that will take effect in a given stage. Instead, it will assist District No. 40 in the decision making process and identify the necessary actions to be taken prior to a recommendation to the Board of Supervisors.

7.7.1.1 Prohibitions, Consumption Reduction Methods and Penalties

There is no "No Waste" Ordinance currently in effect for the Los Angeles County. However, District No. 40's Phased Conservation Plan and WSCP incorporate prohibitions similar to those normally outlined in such an ordinance. Table 7-4 provides a summary of the likely consumption methods and the stages in which they would take effect.

TABLE 7-4
DISTRICT NO. 40 CONSUMPTION REDUCTION METHODS

Consumption Reduction Methods	Stages Method Takes Effect
Demand reduction program	All stages
Restrict building permits	3,4,5,6,7,8,9
Use prohibitions	All Stages
Water shortage pricing	All stages
Voluntary rationing	1
Mandatory rationing	2,3,4,5,6,7,8,9
Education program	All stages
Percentage reduction by customer type	All Stages

Penalties imposed for the various stages are as described in the Phasing Plan. The conservation target is a percentage of the quantity used during a "base" billing period set by the Board of Supervisors. To discourage wasteful or unreasonable water use, a conservation surcharge of $3.00 per hundred cubic feet (hcf) is imposed for water use beyond the target goals. The baseline quantity is equal to the customer's actual water usage during the "base" billing period or the District No. 40 average, which ever is higher. For water use in excess of the baseline quantity, an additional conservation surcharge of $6.00 per hcf is applied.

7.7.1.2 Revenue and Expenditure Impacts

The implementation of the Phased plan could potentially result in revenue losses ranging between 10 and 50 percent. There are four sources of funding availability to District No. 40 to cover these losses: service charge, facility surcharge, water quantity charge, and standby charges. The service charge is a fixed connection charge based on the size of the meter. The facility surcharge and water quantity charge are based on the actual quantity of water used each month. Standby charges are assessed on all property. Thus a reduction in water use will only affect the facility surcharge and water quantity charges. In order to reduce the impact of these losses, District No. 40 can utilize the following measures: use extra revenues contributed by the conservation surcharge, delay capital improvement projects, and increase water rates.

7.7.1.3 Reduction Measuring Mechanism

In order to monitor the reduction in water use during a water shortage stage, supply and demand data is reported on a monthly basis with excess use violations reported to the County and to the customer. Bi-monthly water meter readings are collected and compiled to determine if the water usage meets the target goal.

7.7.2 RCSD and QHWD

RCSD and QHWD have both adopted a four stage WSCP which is summarized in Table 7-5. The Stages were designed to provide a minimum of 50 percent of normal supply during a water shortage event. Table 7-6 provides a description of the triggers for the rationing stages.

TABLE 7-5
RCSD/QHWD STAGES OF ACTION

Phase	1	2	3	4
Anticipated Shortage that Triggers Phase	Up to 15%	15 to 25%	25 to 35%	35 to 50%
Conservation Target	85%	75%	65%	50%
Type of Rationing	Voluntary	Mandatory	Mandatory	Mandatory

TABLE 7-6
RCSD/QHWD TRIGGERING MECHANISMS

Phase	1	2	3	4
Current Supply	85 to 90% of normal supply	75 to 85% of normal supply	65 to 75% of normal supply	Less than 65% of normal supply
Future Supply	Insufficient supply to provide 80% for next two years	Insufficient supply to provide 75% for next two years	Insufficient supply to provide 65% for next two years	Insufficient supply to provide 50% for next two years
Groundwater	No excess groundwater pumped	First year excess groundwater pumped	Second year excess groundwater pumped	No excess groundwater available
Water Quality	Loss of 10% from contamination	Loss of 20% from contamination	Loss of 30% from contamination	
Disaster Loss				Disaster Loss

7.7.2.1 Prohibitions, Consumption Reduction Methods and Penalties

The "No Waste" Ordinance adopted by both water purveyors outlines the mandatory prohibition on water wasting and describes the excessive use penalties enforced by both districts. A copy of the ordinance is provided in Appendix F. Table 7-7 provides a summary of the consumption methods and the stages in which they take effect.

TABLE 7-7
RCSD/QHWD CONSUMPTION REDUCTION METHODS

Consumption Reduction Methods	Stages Method Takes Effect
Demand reduction program	All stages
Flow restriction	4
Restrict building permits	2, 3, 4
Use prohibitions	All stages
Water shortage pricing	All stages
Voluntary rationing	1
Mandatory rationing	2, 3, 4
Education program	All stages
Percentage reduction by customer type	2, 3, 4

7.7.2.2 Revenue and Expenditure Impacts

Both water purveyors use all surplus revenues collected during the stages to fund a Rate Stabilization Fund, conservation, recycling, and capital improvements. The fund will be maintained at 75 percent of the normal water revenue and will be used to stabilize rates during periods of water shortage or disaster to minimize the need to adjust rates during the shortage. However, during prolonged shortages, rates may need to be increased. The water purveyors estimate the following percent increases for the given phases:

- Stage 1: No increase
- Stage 2: 25 percent increase
- Stage 3: 50 percent increase
- Stage 4: 100 percent increase

After a shortage ends, rates will be increased by 15 percent of the pre-shortage rate for one-year.

7.7.2.3 Reduction Measuring Mechanism

In order to monitor the reduction in water use during a water shortage stage, daily production figures are recorded. During Stage 1 and 2, weekly production will be compared to the target weekly production. These weekly reports will be forwarded to the General Manager and Water Shortage Response Team. If goals are not met, the Board of Directors is notified so corrective action can be taken. During Stage 3 and 4, the procedures are the same with the General Manager receiving the daily reports as well as the weekly reports.

Appendix A

Urban Water Management Plan Act

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384, Costa, 2002
SB 1518, Torlakson, 2002
AB 105, Wiggins, 2004
SB 318, Alpert, 2004

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in

its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS
Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall 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.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department 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.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

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.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(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, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.

(M) Water waste prohibition.

(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) 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 supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

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

(k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) 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.

(c) 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.

(d) 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.

(e) 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.

(f) Penalties or charges for excessive use, where applicable.

(g) 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.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of 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.

(b) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(d) 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 pursuant to this subdivision.

(e) A description of 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.

(f) 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.

(g) 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.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5 Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare 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. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the 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. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities

Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

Appendix B-1

District No. 40 Notice of Public Hearing and Adoption Resolution

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
www.ladpw.org

DONALD L. WOLFE, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE
REFER TO FILE: W-0

October 20, 2005

The Honorable Board of Supervisors
County of Los Angeles
383 Kenneth Hahn Hall of Administration
500 West Temple Street
Los Angeles, CA 90012

Dear Supervisors:

PUBLIC HEARING FOR THE URBAN WATER MANAGEMENT PLANS FOR LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 29, MALIBU, AND THE MARINA DEL REY WATER SYSTEM, AND THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 40, ANTELOPE VALLEY
SUPERVISORIAL DISTRICTS 3, 4, AND 5
3 VOTES

IT IS RECOMMENDED THAT YOUR BOARD AFTER THE PUBLIC HEARING, AS THE GOVERNING BODY OF THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 29, MALIBU, AND THE MARINA DEL REY WATER SYSTEM, AND THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 40, ANTELOPE VALLEY:

1. Adopt the enclosed Resolution (Enclosure A) approving the 2005 Urban Water Management Plan for the Los Angeles County Waterworks District No. 29, Malibu, and the Marina del Rey Water System.

2. Adopt the enclosed Resolution (Enclosure B) approving the 2005 Integrated Urban Water Management Plan for the Antelope Valley for the Los Angeles County Waterworks District No. 40, Antelope Valley.

PURPOSE/JUSTIFICATION OF RECOMMENDED ACTION

The purpose of the recommended actions is to adopt the 2005 Urban Water Management Plans for the Los Angeles County Waterworks District No. 29, Malibu, and the Marina del Rey Water System, and for the Los Angeles County Waterworks District No 40, Antelope Valley, as required by the Urban Water Management Planning Act.

Implementation of Strategic Plan Goals

These actions are consistent with the County Strategic Plan Goal of Service Excellence by approving urban water management plans that meet the requirements of the Urban Water Management Planning Act.

FISCAL IMPACT/FINANCING

There will be no impact to the County's General Fund.

FACTS AND PROVISIONS/LEGAL REQUIREMENTS

The Act (California Water Code §10610 through 10657) requires every water supplier with more than 3,000 service connections, or supplying more than 3,000 acre-feet of water annually, to prepare and adopt an urban water management plan every five years. The Los Angeles County Waterworks District No. 29, Malibu, and the Marina del Rey Water System have approximately 7,300 service connections, and the Los Angeles County Waterworks District No. 40, Antelope Valley, has approximately 49,600 service connections.

Prior to adoption of an urban water management plan, California Water Code §10642 requires that the water supplier make the plan available for public inspection and hold a public hearing. Notice of the time and place of the hearing must be published pursuant to Government Code §6066, which states that the publication of the notice shall be once a week for two successive weeks with at least five intervening days. The notice must also be provided to any city within which the supplier provides water supplies.

The public hearing is being held pursuant to California Water Code §10642. Notice of the time and place of the hearing (Enclosure C and D) was published pursuant to Government Code §6066 and has been provided to the Cities of Malibu, Lancaster, and Palmdale.

County Counsel has reviewed and approved the proposed Resolutions and Notices of Public Hearing as to form.

ENVIRONMENTAL DOCUMENTATION

The California Environmental Quality Act does not apply to the preparation and adoption of Urban Water Management Plans pursuant to §10652 of the California Water Code.

IMPACT ON CURRENT SERVICES (OR PROJECTS)

There will be no negative impact on current County services or projects.

CONCLUSION

Upon approval, please return three adopted copies of this letter and three copies of each signed Resolution to Public Works, Waterworks and Sewer Maintenance Division.

Respectfully submitted,

DONALD L. WOLFE
Director of Public Works

KA:nm
BDL2203

Enc.

cc: Chief Administrative Office
County Counsel

ENCLOSURE A

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF LOS ANGELES, CALIFORNIA, APPROVING THE 2005 URBAN WATER MANAGEMENT PLAN FOR THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 29, MALIBU, AND THE MARINA DEL REY WATER SYSTEM

WHEREAS, the Urban Water Management Planning Act (Division 6 of the California Water Code) requires each water supplier with more than 3,000 customers (service connections), or annually supplying more than 3,000 acre-feet of water, to prepare and adopt an Urban Water Management Plan; and

WHEREAS, Los Angeles County Waterworks District No. 29, Malibu, and the Marina del Rey Water System (District) is considered one system; and

WHEREAS, the District has approximately 7,300 service connections, and is therefore required to prepare and adopt an Urban Water Management Plan; and

WHEREAS, the District's 2005 Urban Water Management Plan (Attachment E) meets the requirements of the Urban Water Management Planning Act.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Supervisors of the County of Los Angeles, as the Board of Directors of Los Angeles County Waterworks District No. 29, Malibu, and the Marina del Rey Water System, hereby adopts the District's 2005 Urban Water Management Plan.

The foregoing Resolution was on the ___ day of ___, 2005, adopted by the Board of Supervisors of the County of Los Angeles as the governing body of the Los Angeles County Waterworks District 29, Malibu and Marina del Rey Water System.

VIOLET VARONA-LUKENS,
Executive-Officer of the
Board of Supervisors of
the County of Los Angeles

By: ________________________
Deputy

APPROVED AS TO FORM:

RAYMOND G. FORTNER, JR.
County Counsel

By: ________________________
Deputy

ENCLOSURE B

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF LOS ANGELES, CALIFORNIA, APPROVING THE 2005 INTEGRATED URBAN WATER MANAGEMENT PLAN FOR THE ANTELOPE VALLEY FOR THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 40, ANTELOPE VALLEY

WHEREAS, the Urban Water Management Planning Act (Division 6 of the California Water Code) requires each water supplier with more than 3,000 customers (service connections), or annually supplying more than 3,000 acre-feet of water, to prepare and adopt an Urban Water Management Plan; and

WHEREAS, Los Angeles County Waterworks District No. 40, Antelope Valley (District), has approximately 49,600 service connections, and is therefore required to prepare and adopt an Urban Water Management Plan; and

WHEREAS, the District's 2005 Integrated Urban Water Management Plan for the Antelope Valley (Attachment F) meets the requirements of the Urban Water Management Planning Act.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Supervisors of the County of Los Angeles, as the Board of Directors of Los Angeles County Waterworks District No. 40, Antelope Valley, hereby adopts the 2005 Integrated Urban Water Management Plan for the Antelope Valley.

The foregoing Resolution was on the ___ day of ___, 2005, adopted by the Board of Supervisors of the County of Los Angeles as the governing body of the Los Angeles County Waterworks District No. 40, Antelope Valley.

VIOLET VARONA-LUKENS,
Executive-Officer of the
Board of Supervisors of
the County of Los Angeles

By: ______________________
Deputy

APPROVED AS TO FORM:

RAYMOND G. FORTNER, JR.
County Counsel

By: ______________________
Deputy

ENCLOSURE C

INSTRUCTION SHEET FOR PUBLISHING
LEGAL ADVERTISEMENTS

TO: Executive Officer
Board of Supervisors
County of Los Angeles

FROM: Department of Public Works
Waterworks and Sewer Maintenance Division

NOTICE OF HEARING
2005 URBAN WATER MANAGEMENT PLAN FOR THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 29, MALIBU, AND THE MARINA DEL REY WATER SYSTEM

Publishing

That the Executive Officer of the Board of Supervisors shall cause notice of the public hearing, in the form and manner specified in Section 6066 of the Government Code, to be published once a week for two consecutive weeks in the Argonaut, Malibu Times, and Surfside News, these newspapers are published and circulated in the County of Los Angeles, which is hereby designated for that purpose, such publication to be completed not less than 10 days prior to the date of said hearing. Copies of this plan will be available for review in all Public Libraries in the District's service areas. The plan will also be available for review on the District's website at http://ladpw.org/wwd/conservation/index.

Forward five reprints of the attached advertisement to the County of Los Angeles Department of Public Works, Waterworks and Sewer Maintenance Division, P.O. Box 1460, Alhambra, California 91802-1460 and to the City of Malibu, 23815 Stuart Ranch Road, Malibu, California 93534-24618.

Should there be any questions regarding this matter, please contact Mr. Manuel del Real, of this office, at (626) 300-3300, Monday through Thursday, 7 a.m. to 5:45 p.m.

ENCLOSURE C

NOTICE OF PUBLIC HEARING FOR ADOPTION OF THE 2005 URBAN WATER MANAGEMENT PLAN FOR THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 29, MALIBU, AND THE MARINA DEL REY WATER SYSTEM

The County of Los Angeles Board of Supervisors, as the governing body of the Los Angeles County Waterworks District No. 29, Malibu, and the Marina del Rey Water System, will hold a public hearing on November 22, 2005, at 9:30 a.m., in Room 381, Kenneth Hahn Hall of Administration, 500 West Temple Street, Los Angeles, California, 90012, in the matter of adopting an Urban Water Management Plan for the District.

The plan has been prepared in compliance with the Urban Water Management Planning Act and includes a water-shortage contingency plan, an explanation of existing water conservation practices, the projection of future water demands, and identification of sufficient water supplies to meet projected water demands.

Copies of the plan are available for public review at the Malibu Library located at 23519 West Civic Center Way, at the Waterworks field office located at 23533 West Civic Center Way, and at the Marina del Rey Library located at 4533 Admiralty Way in Marina del Rey.

The Board of Supervisors will consider and may approve the plan as recommended by the Director of Public Works. For further information regarding this matter, please call (626) 300-3351.

Si no entiende esta noticia y necesita mas informacion, favor de llamar a este numero (626) 300-3345.

ENCLOSURE D

INSTRUCTION SHEET FOR PUBLISHING
LEGAL ADVERTISEMENTS

TO: Executive Officer
Board of Supervisors
County of Los Angeles

FROM: Department of Public Works
Waterworks and Sewer Maintenance Division

NOTICE OF HEARING
2005 URBAN WATER MANAGEMENT PLAN FOR THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 40, ANTELOPE VALLEY

Publishing

That the Executive Officer of the Board of Supervisors shall cause notice of the public hearing, in the form and manner specified in Section 6066 of the Government Code, to be published once a week for two consecutive weeks in the Antelope Valley Press, a newspaper published and circulated in the County of Los Angeles, which is hereby designated for that purpose, such publication to be completed not less than 10 days prior to the date of said hearing. Copies of this plan will be available for review in all Public Libraries in the District's service areas. The plan will also be available for review on the District's website at http://ladpw.org/wwd/conservation/index.

Forward five reprints of the attached advertisement to the County of Los Angeles Department of Public Works, Waterworks and Sewer Maintenance Division, P.O. Box 1460, Alhambra, California 91802-1460, City of Lancaster, 44933 North Fern Avenue, Lancaster, California 93534-2461, and City of Palmdale, 38300 North Sierra Highway, Palmdale, California 93550-4798.

Should there be any questions regarding this matter, please contact Mr. Manuel del Real, of this office, at (626) 300-3300, Monday through Thursday, 7 a.m. to 5:45 p.m.

ENCLOSURE D

LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 40, ANTELOPE VALLEY NOTICE OF PUBLIC HEARING FOR ADOPTION OF THE 2005 INTEGRATED URBAN WATER MANAGEMENT PLAN FOR THE ANTELOPE VALLEY

The County of Los Angeles Board of Supervisors, as the governing body of the Los Angeles County Waterworks District No. 40, Antelope Valley, will hold a public hearing on November 22, 2005, at 9:30 a.m., in Room 381, Kenneth Hahn Hall of Administration, 500 West Temple Street, Los Angeles, California, 90012, in the matter of adopting the Integrated Urban Water Management Plan for the Antelope Valley.

The plan has been prepared in compliance with the Urban Water Management Planning Act and includes a water-shortage contingency plan, an explanation of existing water conservation practices, the projection of future water demands, and identification of sufficient water supplies to meet projected water demands.

The plan has been prepared cooperatively by the Los Angeles County Waterworks District No. 40, Antelope Valley, Rosamond Community Services District, Quartz Hill Water District, and the County Sanitation District of Los Angeles County District Nos. 14 and 20. Copies of the plan are available for public review at the County libraries located in Lake Los Angeles, Lancaster, Littlerock, and Quartz Hill, and at the Waterworks field office located at 260 East Avenue K8 in Lancaster.

The Board of Supervisors will consider and may approve the plan as recommended by the Director of Public Works. For further information regarding this matter, please call (626) 300-3351.

Si no entiende esta noticia y necesita mas informacion, favor de llamar a este numero (626) 300-3345.

ENCLOSURE B

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF LOS ANGELES, CALIFORNIA, APPROVING THE 2005 INTEGRATED URBAN WATER MANAGEMENT PLAN FOR THE ANTELOPE VALLEY FOR THE LOS ANGELES COUNTY WATERWORKS DISTRICT NO. 40, ANTELOPE VALLEY

WHEREAS, the Urban Water Management Planning Act (Division 6 of the California Water Code) requires each water supplier with more than 3,000 customers (service connections), or annually supplying more than 3,000 acre-feet of water, to prepare and adopt an Urban Water Management Plan; and

WHEREAS, Los Angeles County Waterworks District No. 40, Antelope Valley (District), has approximately 49,600 service connections, and is therefore required to prepare and adopt an Urban Water Management Plan; and

WHEREAS, the District's 2005 Integrated Urban Water Management Plan for the Antelope Valley (Attachment F) meets the requirements of the Urban Water Management Planning Act.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Supervisors of the County of Los Angeles, as the Board of Directors of Los Angeles County Waterworks District No. 40, Antelope Valley, hereby adopts the 2005 Integrated Urban Water Management Plan for the Antelope Valley.

The foregoing Resolution was on the 22nd day of November, 2005, adopted by the Board of Supervisors of the County of Los Angeles as the governing body of the Los Angeles County Waterworks District 29, Malibu and Marina del Rey Water System.

VIOLET VARONA-LUKENS,
Executive-Officer of the
Board of Supervisors of
the County of Los Angeles

By: ______________________
Deputy

APPROVED AS TO FORM:

RAYMOND G. FORTNER, JR.
County Counsel

By: ______________________
Deputy

MINUTES OF THE BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

Violet Varona-Lukens, Executive Officer
Clerk of the Board of Supervisors
383 Kenneth Hahn Hall of Administration
Los Angeles, California 90012

Director of Public Works

At its meeting held November 22, 2005, the Board acting as the Governing Body of the Los Angeles County Waterworks District No. 29, Malibu and the Marina del Rey Water System and the Los Angeles County Waterworks District No. 40, Antelope Valley, took the following action:

5

At the time and place regularly set, notice having been duly given, the following item was called up:

> Hearing on adoption of the 2005 Urban Water Management Plans for County Waterworks District No. 29, Malibu, the Marina del Rey Water System, and County Waterworks District No. 40, Antelope Valley, as required by the Urban Water Management Planning Act, which includes a water-shortage contingency plan, and explanation of existing water conservation practices, the projection of future water demands, and identification of sufficient water supplies to meet projected water demands (3, 4 and 5), as further described in the attached letter dated October 20, 2005 from the Director of Public Works.

Opportunity was given for interested persons to address the Board. No interested persons addressed the Board. No correspondence was presented.

On motion of Supervisor Knabe, seconded by Supervisor Antonovich, unanimously carried, the Board acting as the Governing Body of the Los Angeles County Waterworks District No. 29, Malibu and the Marina del Rey Water System and the Los Angeles County Waterworks District No. 40, Antelope Valley, closed the hearing and took the following actions:

1. Adopted the attached resolution approving the 2005 Urban Water Management Plan for the Los Angeles County Waterworks District No. 29, Malibu and Marina Del Rey Water System; and

(Continued on Page 2)

5 (Continued)

2. Adopted the attached resolution approving the 2005 Integrated Urban Water Management Plan for the Antelope Valley for the Los Angeles County Waterworks District No. 40, Antelope Valley.

03112205_5

Attachments

Copies distributed:
Each Supervisor
Auditor-Controller
Chief Administrative Officer
County Counsel

Appendix B-2

RCSD Notice of Public Hearing and Adoption Resolution

Rosamond Community Services District

December 15, 2005

Kennedy/Jenks Consultants
Attn: Roxanne Nagle
1000 Hill Road, Suite 200
Venture, CA 93003

Re: Urban Water Management Plan

Dear Roxanne:

Enclosed please find a certified copy of our Resolution adopting the "2005 Integrated Urban Water Management Plan". This was approved at our regular board meeting held on December 14, 2005.

If you have any questions, please call our office.

Best regards,

Rosamond Community Services District

Sharon L. Welker
Secretary/Treasurer

Encl;

3179 35th Street West, Rosamond, California 93560
(661) 256-3411 FAX (661) 256-2557
E-mail: rcsd@qnet.com

RESOLUTION 2006-20

RESOLUTION OF THE BOARD OF DIRECTORS
OF THE ROSAMOND COMMUNITY SERVICES DISTRICT
KERN COUNTY, CALIFORNIA, APPROVING THE
2005 INTEGRATED URBAN WATER MANAGEMENT PLAN
FOR THE ROSAMOND COMMUNITY SERVICES DISTRICT
~~AND QUARTZ HILL WATER DISTRICT~~

WHEREAS, the Urban Water Management Planning Act (Division 6 of the California Water Code) requires each water supplier with more than 3,000 customers (service connections), or annually supplying more than 3,000 acre-feet of water to prepare and adopt an Urban Water Management Plan; and

WHEREAS, the Rosamond Community Services District has approximately 5,000 service connections and is therefore required to prepare and adopt an Urban Water Management Plan; and

WHEREAS, the District's 2005 Integrated Urban Water Management Plan for the Rosamond Community Services District (Attachment A) meets the requirements of the Urban Water Management Planning Act.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the Rosamond Community Services District hereby adopts the 2005 Integrated Urban Water Management Plan for the Rosamond Community Services District and Quartz Hill Water District.

The foregoing Resolution, on the 14th day December, 2005, was adopted by the Board of Directors of the Rosamond Community Services District as the governing body of the Rosamond Community Services District.

By ____________________
Daniel Landsgaard, President
Board of Directors

ATTEST:

By ____________________
Sharon L. Welker, Secretary
Board of Directors

APPROVED AS TO FORM:

By ____________________
Dean Derleth, General Counsel

CERTIFICATION

I, SHARON L. WELKER, Secretary of the Board of Directors of Rosamond Community Services District, do hereby certify that the foregoing Resolution was adopted by the Board of Directors of said District at a regular meeting of said Board duly held on the 14th day of December 2005 by the following vote:

AYES: Spoor, Glennan, Scherer, Landsgaard

NOES: None

ABSENT: Wood

ABSTAINED: None

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the Rosamond Community Services District this 15th day of December 2005

Sharon L. Welker
Sharon L. Welker
Secretary of the Board of Directors

(SEAL)

...OF THE 2005 URBAN ...ANAGEMENT PLANT ... ROSAMOND COMMU-...RVICES DISTRICT.

...samond Community Servic-...trict Board of Directors, as the ...erning body of the Rosamond ...mmunity Services District will ...ld a public hearing on December ...4, 2005, at 7:00 p.m. at the office of Rosamond Community Services District, 3179 35th Street West, Rosamond, California, 93560, together with Quartz Hill Water District, in the matter of adopting an Urban Water Management Plan for the District.

The plan has been prepared in compliance with the Urban Water Management Planning Act and includes a water shortage contingency plan, an explanation of existing water conservation practices, the projection of future water demands, and identification of sufficient water supplies to meet projected water demands.

Copies of the plan are available for public review at the Rosamond Library located at 3611 Rosamond Blvd. and the District Office located at 3179 35th Street West, Rosamond, CA.

The Board of Directors will consider and may approve the plan as recommended by District's General Manager. For further information regarding this matter, please call (661) 256-3411.

MOJAVE DESERT NEWS

Since 1938

AFFIDAVIT OF PUBLICATION

County of Kern

State of California

Barbara Schultheiss

...ounty, being duly sworn says that he or she is over ...f eighteen (18) years; that he or she is associated ... publication of The Mojave Desert News, an ...ted weekly newspaper printed, published, and circulated in the said County and State.

The notice, of which the annexed is a true printed copy, was published in the above-named newspaper on the following dates to wit:

November 24

December 1

I declare under penalty of perjury (under the laws of the State of California) that the above is a true and correct copy

Barbara Schultheiss

RECEIVED
RCSD
2005 DEC -5 PM 2:...

PROOF OF PUBLICATION

(2015.5 C.C.P.)

RECEIVED
RCSD

2005 DEC -5 PM 2:41

STATE OF CALIFORNIA }
County of Los Angeles } ss

The space above for filing stamp only

Notice Type: NOTICE OF PUBLIC HEARING

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer of the **Antelope Valley Press**, a newspaper of general circulation, printed and published **daily** in the city of **Palmdale**, County of Los Angeles, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California, under date of October 24, 1931, Case Number 328601; Modified Case Number 657770 April 11, 1956; also operating as the Ledger-Gazette, adjudicated a legal newspaper June 15, 1927, by Superior Court decree No. 224545; also operating as the Desert Mailer News, formerly known as the South Antelope Valley Foothill News, adjudicated a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California on June 15, 1967, Case Number NOC564 and adjudicated a newspaper of general circulation for the City of Lancaster, State of California on January 26, 1990; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

November 24, December 1, 2005

I certify (or declare) under penalty of perjury that the fore-going is true and correct.

Alissa Adams
Signature

Dated: December 1, 2005
Executed at Palmdale, California

NOTICE OF PUBLIC HEARING FOR ADOPTION OF THE 2005 URBAN WATER MANAGEMENT PLANT FOR THE ROSAMOND COMMUNITY SERVICES DISTRICT

The Rosamond Community Services District Board of Directors, as the governing body of the Rosamond Community Services District will hold a public hearing on December 14, 2005 at 7:00 p.m. at the office of Rosamond Community Services District, 3179 35th Street West, Rosamond, California 93560, together with Quartz Hill Water District, in the matter of adopting an Urban Water Management Plan for the District.

The plan has been prepared in compliance with the Urban Water Management Planning Act and includes a water shortage contingency plan, an explanation of existing water conservation practices, the projection of future water demands, and identification of sufficient water supplies to meet projected water demands.

Copies of the plan are available for public review at the Rosamond Library located at 3611 Rosamond Blvd. and the District Office located at 3179 35th Street West, Rosamond, CA.

The Board of Directors will consider and may approve the plan as recommended by District's General Manager. For further information regarding this matter, please call (661) 256-3411.
Published: 11/24, 12/1, 2005

ANTELOPE VALLEY PRESS
37404 SIERRA HWY., PALMDALE CA 93550
Telephone (661)267-4112/Fax (661)947-4870

Appendix B-3

QHWD Notice of Public Hearing and Adoption Resolution

PROOF OF PUBLICATION

(2015.5 C.C.P.)

STATE OF CALIFORNIA
} ss
County of Los Angeles

The space above for filing stamp only

Notice Type: NOTICE OF PUBLIC HEARING

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer of the **Antelope Valley Press**, a newspaper of general circulation, printed and published **daily** in the city of **Palmdale**, County of Los Angeles, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California, under date of October 24, 1931, Case Number 328601; Modified Case Number 657770 April 11, 1956; also operating as the Ledger-Gazette, adjudicated a legal newspaper June 15, 1927, by Superior Court decree No. 224545; also operating as the Desert Mailer News, formerly known as the South Antelope Valley Foothill News, adjudicated a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California on June 15, 1967, Case Number NOC564 and adjudicated a newspaper of general circulation for the City of Lancaster, State of California on January 26, 1990; that the notice, of which the annexed is a printed copy (set in type not smaller than nonpareil), has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

November 15, 22, 2005

I certify (or declare) under penalty of perjury that the fore-going is true and correct.

Karen Hauser
Signature

Dated: November 22, 2005
Executed at Palmdale, California

Notice of Public Hearing
Hearing for adoption of the 2005 Urban Water Management Plan for Quartz Hill Water District and Rosamond Community Services District.
Quartz Hill Water District and Rosamond Community Services District will hold a public hearing [illegible], December [illegible], 2005 at [illegible] p.m. The hearing will be at [illegible] Street West, Rosamond, CA [illegible] in the matter of adopting an Urban Water Management Plan for both Districts.
This plan has been prepared in compliance with the Urban Water Management Planning Act and includes a water shortage contingency plan, an explanation of existing water conservation practices, the projection of future water demands, and identification of sufficient water supplies to meet projected water demands.
Copies of the plan are available for public review at both Water Districts and the Lancaster, Palmdale and Quartz Hill libraries. For further information regarding this matter, please call 661-256-3411 (R.C.S.D.) or 661-943-[illegible] (Q.H.W.D.).
Published: [illegible] 15, 22, 2005

ANTELOPE VALLEY PRESS
37404 SIERRA HWY., PALMDALE CA 93550
Telephone (661)267-4112/Fax (661)947-4870

MINUTES OF SPECIAL MEETING OF THE BOARD OF DIRECTORS OF QUARTZ HILL WATER DISTRICT AT ROSAMOND COMMUNITY FACILITIES DISTRICT

A special meeting of the Board of Directors was held at 7:00 p.m., December 14, 2005, 3179 35th Street West, Rosamond, CA California pursuant to notice duly given.

ITEM 1. <u>ROLL CALL</u>

President Allen Flick called the meeting to order for Quartz Hill Water District and President Dan Landsgard called the meeting to order for Rosamond Community Facilities District.

Present were President Allen Flick, Vice President Dr. James D. Powell, Directors Ben Harrison Jr., Frank Tymon, General Manager Dave Meraz, Four (4) Members of the Board of Directors for Rosamond Community Facilities District, General Manager Sherry DeLano, Secretary Sharon Welker and Attorney Dean Derleth.

Absent Director Peggy Powell.

Members of the public present Antelope Valley Press and three (3) unidentified members of the public.

ITEM 2. <u>PLEDGE OF ALLEGIANCE TO THE FLAG</u>

A Director of Rosamond Community Facilities District led the Pledge of Allegiance.

ITEM 3. <u>INTRODUCTION OF THE QUARTZ HILL WATER DISTRICT BOARD MEMBERS BY GENERAL MANAGER DAVE MERAZ.</u>

ITEM 4. <u>PUBLIC HEARING</u>

For the Board of Directors of Quartz Hill Water District and Rosamond Community Facilities District to consider the Urban Water Management Plan.

Quartz Hill Water District had a joint hearing with Rosamond Community Facilities District. There were some discussion and questions on the Urban Water Management Plan.

ITEM 5. ADOPTION OF AGENDA

On motion by Director frank Tymon second by Director Ben Harrison Jr. and carried 4-0, the agenda was adopted.

ITEM 6. ACTION ITEMS

A. ACTION CALENDAR

1. Consideration and possible action to adopt the Urban Water Management Plan of 2005.

   On motion by Director Frank Tymon second by Director Ben Harrison Jr. and carried 4-0, the Urban Water Management Plan of 2005 was approved.

   Rosamond Community Facilities District adopted Resolution 2006-20 approving the Urban Water Management Plan of 2005.

ITEM 7. PUBLIC COMMENT

None

ITEM 8. ADJOURNMENT

There being no further business, on motion by Director Frank Tymon second Director Ben Harrison Jr. and carried 4-0, meeting was adjourned 8:50 p.m.

Approved:	Attested:
________________	________________
Allen Flick, President	Dave Meraz, Acting Secretary

Appendix C

RCSD AB 3030 Groundwater Management Plan

RESOLUTION NO. 95-1

Adopted January 11, 1995

RESOLUTION OF THE BOARD OF DIRECTORS OF THE ROSAMOND COMMUNITY SERVICES DISTRICT, COUNTY OF KERN, STATE OF CALIFORNIA, APPROVING AND ADOPTING A GROUNDWATER MANAGEMENT PLAN PURSUANT TO THE PROVISIONS OF SECTION 10750 ET. SEQ. OF THE CALIFORNIA WATER CODE; AND MAKING CERTAIN FINDINGS AND DETERMINATIONS IN CONNECTION THEREWITH.

WHEREAS, this Board of Directors ("Board" herein) of the Rosamond Community Services District ("District" herein) as heretofore taken proceedings under the provisions of Section 10750 et. seq. of the California Water Code for the consideration of the adoption of a groundwater management plan; and

WHEREAS, the District Manager has caused a draft groundwater management plan to be presented to this Board; and

WHEREAS, this Board has directed the Secretary to cause notice of a hearing on the adoption of such plan to be given by publication in accordance with the applicable provisions of law; and

WHEREAS, the Secretary has caused said publication to be made; and

WHEREAS, this Board has duly conducted a public hearing in connection with the approval and adoption of a groundwater management plan; and

WHEREAS, there were not protests filed by the owners of the majority of the assessed value of land within the District against the approval and adoption of such plan; and

WHEREAS, the Board finds that it is in the best interest of the District, its residents, property owners and water users that such plan be approved;

NOW, THEREFORE, the Board of Directors of the Rosamond Community Services District, County of Kern, State of California DOES HEREBY FIND, RESOLVE, DETERMINE AND ORDER as follows:

<u>Section 1.</u> That the recitals set forth herein above are true and correct.

<u>Section 2.</u> That said groundwater management plan, together with such amendments or modifications as may have been ordered by this Board during the course of said public hearings be and the same is hereby approved and is adopted as the groundwater

management plan of the District.

Section 3. That the Secretary is hereby directed to file said groundwater management plan in the District records together with a certificate setting forth the fact that such groundwater management plan has been duly approved and adopted by this Board on this date and that such plan is entitled to all the rights, privileges and priorities afforded by Sections 10750 et. seq. of the California Water Code.

ADOPTED, SIGNED AND APPROVED this 11th day of January, 1995.

Barbara Speed

President, Rosamond Community Services District and of the Board of Directors Thereof

ATTEST:

Sarah L. Wecker

Secretary, Rosamond Community Services District and of the Board of Directors Thereof

wp/95-1.res

CERTIFICATION

STATE OF CALIFORNIA)
) SS
COUNTY OF KERN)

I, Sharon L. Welker, Secretary of the Board of Directors of the Rosamond Community Services District, do hereby certify that the foregoing action was duly adopted by the Board of Directors of said District at a scheduled regular meeting of said Board held on the 11th day of January, 1995 and that it was so adopted by the following vote:

AYES: Loomis, Speed, Pauley, MacKay, Pengilley

NAYS: None

NOT PRESENT: None

ABSTAIN: None

Sharon L. Welker

Secretary, Rosamond Community Services District
and the Board of Directors thereof

wp/cert

ROSAMOND COMMUNITY SERVICES DISTRICT

GROUNDWATER MANAGEMENT PLAN

In accordance with AB 3030

Under California Water Code
Sections 10750 Et Seq.

Adopted January 11, 1995

TABLE OF CONTENTS

EXHIBIT "D" Groundwater Management Plan, Rules and Regulations to Implement the Groundwater Management Plan of Rosamond Community Services District

GROUNDWATER MANAGEMENT PLAN

I. INTRODUCTION

A. General

Rosamond Community Services District ("District") was formed in 1968 under the Community Services District Law, Division 3, Section 61000, of Title 6 of the Government Code of the State of California. The district provides water, sewer and lighting services for the residents of the unincorporated town of Rosamond. For the purposes of this report only water management issues will be discussed. The District covers 32 square miles in the northeasterly area of the Antelope Valley in Kern County, California (EXHIBIT "A"). At this time the District provides water service to over 3,600 residences and 13 residences outside the District. The water provided comes from 5 active District owned wells and 3 treated surface water turnouts from Antelope Valley East Kern Water Agency. This District currently has over 65 miles of water distribution lines in service and has 5 water storage tanks with the capacity to store 6.5 million gallons of water. Consumption of water varies during the year with the peak delivery being 3.4 million gallons per day. Although well capacity exists to provide water to customers throughout the year, the District adopted a resolution on February 12, 1994 to use as much treated surface water in hopes to retain a reliable groundwater source in the event that surface water is not available. With continued growth in the District more water is required to meet the needs of the customers, it is very important to take all necessary steps to save the water sources for the future.

Historically, the District had a shallow water table. In the early 1900's, the distance from the ground surface to the groundwater was ten feet with numerous natural springs around the area. With each successive drought period resulting in an increase in the agricultural groundwater pumping, the water table has dropped as much as 200 feet from 1915 to 1988 (USGS 1994). As agricultural land was abandoned either from costly pumping or urbanization, the competition for control of water resources among urban and municipal interests has significantly increased throughout the Antelope Valley. Rosamond has a very limited agricultural base, with urbanization being the most prevalent.

B. Purpose and Goals

The Rosamond Community Services District has long recognized the importance of groundwater to the area. It has become more critical now as the District has grown from 900 customers in the early 1900's to early 1990 when the District began to grow rapidly to well over 3,600 customers to date. With the new State Legislation, AB 3030, (Part 2.75 of Division 6, Section 10750, et seq. California Water Code), an opportunity available to the District to prepare and implement a Groundwater Management Plan ("Plan") on a local basis in-lieu of a mandated plan administered by the State of California Department of Water Resources. There is common use of the groundwater resource in the Valley, but with this Plan it is proposed that the District protect itself against competing interests using the groundwater resources available to the District.

In the best interest of the residents, property owners, and water customers of the District, the District intends to implement the Plan for the purposes of establishing a groundwater management program in order to protect adequate groundwater supplies in the future and to ensure the safe production and quality of such water. The proposed Plan recognizes that the conjunctive use of the water supplies within the District must be continued. To achieve this delicate hydrological balance requires the management of both District acquired surface water and groundwater supplies. The long term continuation of this balance will be the benefit derived from the Plan. Retaining all existing surface water, groundwater and eventaully reclaimed water supplies within the District is critical to maintaining this delicate balance. The principal action item in the Plan will be gathering and evaluating additional data concerning the quality and quantity of the groundwater. Action items will be devlaoped to enhance the valuable groundwater resource by promoting those actions necessary to reduce the long-term groundwater level decline in the District. Many of the action items are currently being conducted or will begin with the adoption of the Plan. Other action items will require further study prior to implementation.

The Plan will be flexible allowing updates to be made as needed, based on the additional information that is gathered through the monitoring programs.

The Plan preparation is being funded entirely by the District. Future activities required to fully implement the Plan may require funds derived by other means. AB 3030 allows for the levying of groundwater assessments or fees under certain circumstances and according to specific procedures. Prior to instituting any assessments or fees, the District must hold an election on whether or not to proceed with the enactment of the assessments. A majority of the votes cast at the election will be required to implement an additional funding assessment.

C. Institutional Requirements

Historically, the use of groundwater within the State of California has not been regulated except in a few basins where the rights have been adjudicated by the courts or special management districts have been authorized by the state legislature. Groundwater accounts for approximately one-third of the water used within the state. With the continued increasing demand being placed on the limited water supplies of the state, groundwater usage is being scrutinized to a much greater extent.

II. EXISTING CONDITIONS

A. Groundwater Basin

The District overlies a portion of a larger groundwater basin designated as the Antelope Valley Basin which is comprised of two primary aquifers; 1) the principal aquifer and 2) the deep aquifer. Separated from the principal aquifer by clay layers, the deep aquifer is generally considered to be confined. In general, the principal aquifer is thickest in the southern portion of the valley near the San Gabriel Mountains, while the deep aquifer is thickest in the vicinity of the dry lakes on Edwards Air Force Base. The Antelope Valley Basin is divided into twelve subunits consisting of Finger Buttes, West Antelope, Neenach, Willow Springs, Gloster, Chaffee, Oak Creek, Pearland, Buttes, Lancaster, North Muroc, and Peerless. The District overlays the Lancaster, Neenach, and Willow Springs subunits, with the largest area in the Lancaster subunit (EXHIBIT "B"). Studies performed by the USGS and the State Department of Water Resources (DWR) indicate that the groundwater levels appear to be generally dropping in the eastern areas of the basin and rising in the western areas.

The District has been monitoring groundwater levels in the Rosamond area for at least the last thirty-four years. The results have shown a gradual decline in the groundwater elevations within the District, with the average being 2 to 3 feet per year. Over the last two years there has been a gradual increase in the groundwater levels due to the increased usage of surface water and decreased groundwater pumping. Most increases have occurred in the wells that have been off for one year or longer. The average increase is approximately 1 to 2 feet per year.

B. Geology

The District is located within the western edge of the Mojave Desert Geomorphic Province. The province is bounded by the Basin and Range, and Sierra Nevada Province on the north, the Coast Range and Transverse Ranges Province on the west, and the Mojave Desert to the south. The Mojave Desert Province forms a block between the San Andreas and Garlock Faults. This province is characterized by semi-parallel mountain ranges separated by broad alluvial or playa deposits. Northwest-trending faulting is common, and the topography of the range fronts indicate they are fault controlled. The District lies mostly within the Antelope Valley, a broad alluvial-filled valley. This wide valley floor is broken by numerous major and minor island-like buttes composed of pretertiary rocks which are primarily plutonic in origin; the 400-foot-high hill at Tropico Mine and the hills north of Rosamond are examples of these buttes. These outcrops are probably the isolated tops of mountains buried by alluvial valley fill. Soil conditions vary considerably within the District with more fertile conditions in the southwesterly parts of the District. A portion of these lands were in agriculture previously and in most areas permeable soils are present. These soils have been classified as slightly to moderately susceptible to erosion which occurs from intense winds which periodically blow across the region and seasonal runoff from periodic rainstorms. Basically, soils within the area are considered to be subject to various amounts of collapse and/or subsidence upon saturation. In the easterly part of the District surface soils consists of mostly clay which has relatively low permeability. The low permeability of soils in this area of the District has in the past caused problems for percolation in septic tank installations. The northerly part of the District is generally hilly with mostly consolidated rock that is very non-water bearing.

C. Hydrology

The water table within the District is unconfined and typically flows in a southeasterly direction towards the center of the valley due to the cone of depression created by over pumping. Groundwater extractions are made for municipal and some slight industrial purposes. These extractions are very significant during periods when there is little surface water available to augment the water needs within the District. The groundwater levels, during those periods, experience a decline. During the years when surface water is abundant and pumping can be curtailed, the groundwater level has been positively affected. Groundwater recharge in the District is principally by deep percolation of precipitation and runoff from the mountains to the north of the District. The amount of recharge is unknown and only occurs during very wet years. Very little or no recharge results from rainfall on the valley floor as such rainfall is lost through transpiraton or evaporation. Groundwater is stored chiefly in the unconsolidated pleistoncene alluvial deposits. Based on the District's 1993 groundwater measurements, the average groundwater level was 121 feel below ground.

D. Climate

The District is classifed as desert which results in hot, dry summers and cool dry winters. Humidity is generally low causing an arid condition. The average rainfall is approximately 7.15 inches of rain per year. The majority of the rainfall occurs from November through April, with an occasional thunderstorm during the summer months. With the long hot summers which occur in the District there is about 7 feet of evaporation per year with the majority of that evaporation during the months of May through September. The winds in the area are principally from the west to southwest with some easterly winds in the winter.

E. Surface Water Supply

In September of 1970, the District signed an agreement with Antelope Valley East Kern Water Agency (AVEK) to purchase treated surface water. The water provided by AVEK is removed form the California Aqueduct near the Kern County/Los Angeles County line southwest of Rosamond and is brought into Kern County in 36 inch pipelines and carried to the AVEK Rosamond Water Treatment plant located at 35th Street West and Felsite Avenue. Following treatment, water is delivered to the District (AVEK does not deliver directly to domestic consumers.) In the District, treated surface water is blended with District well water and stored or delivered to District customers throughout the year.

III. WATER QUALITY

A. Groundwater Quality

Overall, the quality of the groundwater in the District is very good. Annual and tri-annual water quality tests have always been below the Maximum Contaminant Level (MCL) for all constituents tested for, other than Fluoride at Well #6, which is .2 milligrams per liter higher than the MCL. The District's groundwater, like most of the groundwater in the valley is moderately hard due to the large amounts of minerals in the groundwater. The District has also encountered bacteriological contamination at Well #2 which was probably caused by lack of an adequate annular seal and the location of the well. After the problems with contamination were identified, the District installed dry pellet chlorinators on District wells to ensure that bacteriological contamination is kept to a minimum within the service area. The chlorinators also ensure that the District maintain a residual of .2 parts per million of chlorine throughout our system as required the State when surface water is used to supplement well water.

Groundwater wells are prevalent throughout the District. The wells are mainly used by individual homeowners and small water service companies. With the many water production wells, there is a risk of aquifer contamination due to the improper abandonment of old wells or improper sealing of new wells. Therefore, it is necessary that proper sealing of new wells and abandonment of old wells is always accomplished. At a minimum the water well standards of Kern County must be met, not only by the District but by the other water purveyors in the District. In addition, it may be advantageous for the District to be present at both new well installations and old well abandonments to ensure that all requirments are met. It would also benefit the District to map the well locations of all old, new and abandoned wells within the District. With the continual raising of standards for drinking water, maintaining the quality of groundwater becomes ever more important.

B. Surface Water Quality

Conditions of the treated surface water quality is the responsibility of AVEK. AVEK is required under state law to test their water and provide the results of such tests to the District on an annual basis. As a whole, the quality of water received form AVEK is good, other than some problems with Trihalomethanes (THMs). The THMs have been monitored quarterly by AVEK and have been below the MCL for each quarter for the Rosamond area.

C. Water Quality Requirements/Objectives

A primary objective of the Plan is to maintain the water quality within the District. This is of extreme importance because the District customers need a dependable high quality water supply. A reduction in the quality of the groundwater is tantamount to the loss of water supply, since the quality problem may require some type of treatment facilities in the future.

As monitoring the groundwater for contamination is the best method available to ensure groundwater quality is maintained within the District, the District may want to increase the testing from tri-annual to annual on some of the chemical type contaminants. The District may also want to work closer with AVEK on the quality of their water to ensure that cross contamination does not occur as the quality of both surface and groundwater within the District must be maintained. The Plan provides a mechanism that will help achieve those long-term goals. The initial action of increasing the amount of monitoring will provide the additional data need to proceed with future programs to maintain water quality.

D. Wastewater Reclamation

Wastewater reclamation and distribution will play a very important role in the quantity of water needed in the future. When the District completes the wastewater treatment facilities, new goals should be set for the use and delivery of such water. As we may be years away from providing treated wastewater, we should be planning ahead to formulate rules and regulations for distribution of the water.

IV. GROUNDWATER CONDITIONS

A. Groundwater Mapping

The District has been monitoring the groundwater levels in the area for over thirty-four years. This is accomplished through water level measurements taken yearly. A map of the District showing the well locations has been attached (EXHIBIT "C"). From these readings, groundwater logs have been made depicting both the water elevations and changes in the groundwater levels. These logs indicate an overall trend of declining groundwater levels in the District. The District is in the process of mapping all private wells in the District at this time. It is our hope that some, if not all, of the well owners will allow the District to monitor and record the levels of these wells. If this can be accomplished, the District can prepare a groundwater contour map, which would allow the District to track the groundwater levels in our area, giving the District a better understanding of the groundwater conditions. This is an important water management tool that is useful in developing long-term planning decisions.

B. Groundwater Recharge

As it is very unlikely that an area within the District would have the soil characteristics needed for groundwater recharge, the District may want to research other avenues of recharge. Other means of recharge could be direct injection, or a joint effort recharge or injection program by all of the large water purveyors in the valley. This is an action item and will be discussed in more depth.

V. ACTION ITEMS

A. Groundwater Management Program

There have been seven (7) action items identified for the Plan and those items will be implemented according to the Rules and Regulations (EXHIBIT "D"), as amended from time to time. To have a successful Plan, it is not necessary to implement all of the action items identified. It is important that all the potential action items be identified and contingency plans be developed in case any one of them becomes necessary. It is recommended that items one (1) through five (5) be implemented immediately. Investigations into items six (6) through seven (7) should begin upon approval of the Plan with a staff report regarding their status provided within one year. If funding is necessary to implement a portion of the Plan, then an election will be required prior to instituting an assessment. It is felt that through management activities listed in the Plan, the District can preserve the groundwater resource and avoid the drastic steps identified in the last action item.

1. Water Monitoring

The District will start to monitor the District owned well levels every six months and privately owned wells (with the owner permission_ within the District on an annual basis. In addition, water quality testing will continue as required by the State unless test results indicate more frequent testing be completed. Further, the District will prepare maps depicting the information gathered through the monitoring phase, as well as continuing the reports quantifying the water demands, surface water and groundwater supplies. These summaries will assist the District in evaluating the effectiveness of various elements of the program. The migration of contaminants can de detected earlier through the monitoring process allowing additional time for plans to be developed and implemented before additional portions of the

District are impacted. Potential contamination from areas outside the District should also be monitored as well.

2. Indirect/In-Lieu Recharge

Indirect recharge only occurs during wet winter months as the runoff from the Rosamond hills travels to the valley floor. Indications of this have been found east of the freeway just below Tank #1. The amount of this recharge is not known at this time. Further studies should be conducted to locate other recharge areas along with plans to protect these areas from future building developments. With the continued purchase of AVEK treated water, The District can reduce the amount of groundwater pumping, resulting in an effective in-lieu recharge. The District may want to explore the possibility of purchasing untreated AVEK water through abandoned agricultural turnouts, which could be used to provide water from construction purposes. The continued utilization of surface water ore reclaimed water when available will only enhance the District's in-lieu recharge program.

3. Water Conservation - Water Regulations

The District already has a water conservation plan in the District's ordinances (Title VII, Article 25) which provides certain general requirements for the District. This plan needs to be re-evaluated and adopted to ensure that all concepts on conservation are incorporated to include, but are not limited to, public education, conservation practices and utilization of reclaimed water. The Plan should also incorporate a set of water regulations which would enable the District to set certain laws or ordinances dealing with the waste or abuse of water, especially during drought periods.

4. No Exportation of Groundwater

As the District is located within an overdrafted basin it is necessary that the District make every attempt to prevent the extraction and removal of groundwater from the District's boundaries and sphere of influence. The District now provides a very minimal supply of water to customers outside the District. This should not ve considered as exportation as mentioned above. The District has allowed water exportation on a case by case basis. This type of exportation should be reconsidered in the future. The District has responsibility to ensure that we monitor the groundwater extractions from within our boundaries and surrounding areas if this Plan is to succeed. The District should also take all steps necessary to stop the extraction and exportation of groundwater in close proximity to the District as the District may take responsibility for these areas in the future.

5. Well Drilling and Abandonment

Contamination of the groundwater can be contributed in most cases to improper well installation or abandonment of old wells. Therefore, the District should work more closely with the County to ensure that both new and old wells are constructed per the County specifications. There shall also be a District inspector present to ensure that the specifications are adhered to to reduce the potential for aquifer contamination.

6. Groundwater Banking

With the scarcity of suitable indirect recharge sites within the District, the Rosamond Community Services District may want to look outside of the District boundaries for suitable recharge areas. It is possible that a group of water purveyors in the valley could fund the recharge of groundwater through injection in areas suitable for such a project. The Los Angeles County Water Department, AVEK and the USGS completed an injection test in 1994 near the Lancaster area which proved that a project of this type is viable. This type of project would require that each purveyor or agency contribute to the cost of construction, water to be used for injection and monitoring of the progress. If the project was to succeed the groundwater could be replenished and water banked for the future. There would have to be agreements made between all participants as to the use of the water once banked. The District benefits since it has few areas suitable for indirect recharge and the participating purveyors or agencies receive the benefits of reduced pumping lifts during the time the water is banked. Even if the above mentioned project cannot be completed, the District may want to investigate a similar direct injection project within the District. This would require the injection of a suitable water source in the winter months and then removing the banked water during the summer months.

7. Additional Water Supply

The generation of additional water supplies would enhance the local groundwater. Enlargements of existing AVEK turnouts or additional turnouts would be a reasonable additional water supply but there are limitations to this supply. The use of reclaimed sewage water would also play an important role in the quest for other water supplies. The District may consider the purchase of properties outside the District boundaries which have shown a dramatic increase in groundwater levels for future supplies but additional water supplies will most likely come through conservation efforts.

EXHIBIT "C"

R.C.S.D. WELL #1 STATISTICS

Date Drilled: August 1935
Depth of Well: 250'
Depth to Water: 50' (In 1935)
Size of Well: 8"
Size of Pump: 15 HP Submersible
90 GPM

Sounding Dates:

Date of Test:	Standing Levels:	Running Levels:
10-60	73.6'	93'
11-62	77.6'	93.7'
11-63	79.0'	96.2'
10-64	82.6'	98.8'
12-65	92.8'	106.9'
12-66	90.0'	103.0'
11-67	89.4'	106.2'
12-69	94.6'	110.0'
4-71	95.6'	109.3'
8-72	99.0'	109.9'
9-73	102.7'	132.6'
8-76	105.8'	130.1'
11-80	110.6'	136.3'
5-81	111.4'	141.0'
5-84	110.2'	134.8'
8-91	119.0'	143.0'
3-92	119.0'	139.0'
4-93	122.0'	147.0'

8-6-93 Well was adandoned

R.C.S.D. WELL #2 STATISTICS

Date Drilled: October 1959
Depth of Well: 275'
Depth to Water 25' (In 1959)
Size of Well: 8 ¾"
Size of Pump: 15 HP
130 GPM

Sounding Dates:

Date of Test:	Standing Levels:	Running Levels:
9-60	71.6'	94.7'
11-62	74.0'	97.5'
11-63	77.5'	109.7'
9-64	80.0'	114.2'
2-66	78.6'	108.4'
12-66	82.2'	108.0'
11-67	87.0'	110.0'
1-69	90.8'	113.9'
4-71	95.4'	119.6'
8-72	95.2'	142.8"
9-73	100.9'	161.0'
8-76	100.5'	146.3'
9-78	107.4'	162.6'
11-80	110.3'	168.3'
5-84	112.6'	182.5'
3-92	120.0'	186.0'
4-93	120.0'	187.5'
11-94	119.0'	Off in 93

R.C.S.D. WELL #4 STATISTICS

Date Drilled: February 1965
Depth of Well: 315'
Depth of Water: 75' (In 1965)
Size of Well: 10"
Size of Pump: 10 HP Submersible
50 GPM

Sounding Dates:

Date of Tests:	Standing Levels:	Running Levels:
12-69	102.6'	137.8'
4-71	110.0'	151.2'
8-72	107.4'	151.6'
9-73	109.4'	158.9'
8-76	111.2'	167.2'
10-78	112.0'	164.0'
5-81	113.0'	163.6'
5-84	123.5'	161.8'
3-91	112.0'	146.1'
3-92	112.0'	147.0'
4-93	117.0'	Off in 93 Standby

R.C.S.D. WELL #5 STATISTICS

Date Drilled: June 1969
Depth of Well: 222'
Depth of Water: 85' (In 1969)
Size of Well: 12"
Size of Pump: 40 HP
310 GPM

Sounding Dates:

Date of Test:	Standing Levels:	Running Levels:
7-70	86.0'	102.7'
5-71	88.0'	112.1'
8-72	91.0'	118.2'
9-73	97.0'	112.4'
8-76	97.9'	124.9'
10-78	96.8'	125.0'
5-81	102.5'	130.8'
5-84	103.0'	131.0'
3-91	112.1'	146.1
3-92	112.3'	147.3'
4-93	115.0'	131.0'
11-94	110.0'	134.0'

R.C.S.D. WELL #6 STATISTICS

Date Drilled: June 1984
Depth of Well: 400'
Depth of Water: 91' (In 1984)
Size of Well: 12"
Size of Pump: 50 HP
250 GPM

Sounding Dates:

Date of Test:	Standing Levels:	Running Levels:
7-85	118.3'	205.9'
3-91	116.1'	190.1'
3-92	116.3'	192.3'
4-93	116.4'	194.0'
11-94	116.3'	188.0'

R.C.S.D. WELL #7 STATISTICS

Date Drilled: December 1987
Depth of Well: 223.'
Depth to Water: 96' (In 1987)
Size of Well: 12"
Size of Pump: 25 HP
260 GPM

Sounding Dates:

Date of Test:	Standing Levels:	Running Levels:
3-91	110.0'	143.0'
3-92	106.1'	145.0'
4-93	115.0'	146.0'
11-94	1153'	145.0'

R.C.S.D. WELLL #8 STATISTICS

Date Drilled: April 8, 1993
Depth of Well: 527'
Depth to Water: 140'
Size of Well: 15 ¾"
Size of Pump: 200 HP
1200 GPM (2500 MAX)

Sounding Dates:

Date of Test:	Standing Levels:	Running Levels:
4-7-93	140.'	187'
5-5-94	140.'	196'

EXHIBIT "D"

GROUNDWATER MANAGEMENT PLAN

RULES AND REGULATIONS

TO IMPLEMENT THE

GROUNDWATER MANAGEMENT PLAN

OF THE

ROSAMOND COMMUNITY SERVICES DISTRICT

1. Water Monitoring:

(a) Groundwater level measurement: At lease twice per year, the District will measure the depth of standing water on all District owned wells and sewer monitoring wells. All privately owned wells (with the owners permission) will be checked annually. The District will record and prepare maps as required by the Plan.

(b) Water Quality Sampling and Testing: The District shall continue to monitor District owned wells as required by the State and conduct further tests if required. The District shall also work closely with AVEK to ensure that all monitoring on their part is conducted. The District shall record all monitoring results and prepare reports as required to ensure that the water quality in the District is maintained.

2. Indirect/In-Lieu Recharge: As indirect recharge only occurs in wet winter months and only in a few areas, the District shall conduct further studies to locate other recharge areas of this type. Also, the District shall continue to purchase as much AVEK water as possible to decrease groundwater pumping which results in an effective in-lieu recharge. The District shall investigate the options to obtain other sources of surface water as outlined in the Plan.

3. Water Conservation – Water Regulations: The District's Policies and Procedures should promote the beneficial use of water. All policies or ordinances that deal with conservation of water should be re-evaluated to ensure all concepts of water conservation are entailed in the District's policies and ordinances. The District shall adopt water regulations that will deal with the waste and abuse of water within the District as mentioned in the Plan.

4. No Exportation of Groundwater: The District shall make every attempt to prevent the extraction and exportation of water from within and around the District's boundaries as provided by the Plan.

5. Well Drilling and Abandonment: Contamination of groundwater can be contributed mostly to the improper installation and abandonment of wells. The District shall ensure that all new well installations and old well abandonments are completed in accordance with all Kern County specifications.

6. Groundwater Banking: The District shall endeavor to explore all the options provided in the Plan for groundwater banking.

7. Additional Water Supplies: The District shall investigate additional water supplies as mentioned in the Plan.

Adopted by a unanimous vote of the Rosamond Community Services District's Board of Directors on January 11, 1995