CLWA Draft Report, Recycled Water Master Plan, May 2002
and CLWA Resolution Regarding Availability of Recycled Water,
Approved May 28, 2003

DRAFT REPORT
Recycled Water Master Plan

CASTAIC LAKE WATER AGENCY

May 2002
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Kennedy/Jenks Consultants

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Draft
Recycled Water Master Plan

May 2002

Prepared for

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List of Acronyms and Abbreviations

AF/yr	acre-feet per year
ASR	Aquifer Storage and Recovery
AWWA	American Water Works Association
BOD	Biochemical Oxygen Demand
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act

CIP	Capital Improvement Program
CLWA	Castaic Lake Water Agency
COD	Chemical Oxygen Demand
COP	Certificates of Participation
CWA	Clean Water Act
DHS	California Department of Health Services
DOE	Department of Energy
DOSH	California Division of Occupational Safety and Health
DWR	California Department of Water Resources
EHA	Essential Habitat Area
EIR	Environmental Impact Report
EMA	Essential Management Area
ESA	Endangered Species Act
GIS	Geographic Information System
gpm	gallons per minute
HMX	octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetrazocine
IWRP	Integrated Water Resources Plan
LACDHS	Los Angeles County Department of Health Services
LACDRP	Los Angeles County Department of Regional Planning
LACSD	Sanitation Districts of Los Angeles County
LACWD	Los Angeles County Waterworks District
LF	Lineal Feet
M&I	Municipal and Industrial
MCL	Maximum Contaminant Level
mg	million gallons
mgd	million gallons per day
NCWD	Newhall County Water District
NDMA	Nitrosodimethylamine
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permits
psi	pounds per square inch
PVC	Polyvinyl Chloride
RDX	Hexahydro-1,3,5-Trinitro-1,3,5-Triazine
RO	Reverse Osmosis
RWQCB	Regional Water Quality Control Board
SAR	Sodium Absorption Ratio
SCWD	Santa Clarita Water Division
SDWA	Safe Drinking Water Act
SEA	Significant Ecological Areas
SWP	State Water Project

SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds
VWC	Valencia Water Company
WRP	Water Reclamation Plant
WDR	Waste Discharge Requirements

Section 1: Executive Summary

To be provided with Final Recycled Water Master Plan.

Section 2: Introduction

A Reclaimed Water System Master Plan for the Castaic Lake Water Agency (CLWA) was completed in 1993. This section summarizes the significant developments that have occurred since the preparation of the earlier plan, discusses the objectives of this Master Plan, and provides a brief overview of the methodology.

2.1 Background

CLWA has a contract with the State of California to purchase water from the State Water Project (SWP) and wholesale it to four domestic water purveyors in the Santa Clarita Valley. The imported water is delivered to Castaic Lake through SWP facilities. From Castaic Lake, which serves as the terminal reservoir of the SWP's West Branch, it is treated at CLWA's Earl Schmidt Filtration Plant or Rio Vista Filtration Plant and delivered to the domestic water purveyors through transmission lines owned and operated by CLWA.

The four water purveyors primarily serve municipal and industrial (M&I) customers. In normal years, approximately 50 percent of the M&I demand within CLWA's service area is met with imported water. However, the reliability of the SWP supply is subject to the availability of the water (i.e., precipitation and snowpack of the present and past years) and deliveries can be curtailed. When sufficient imported water is not available, the balance is met with local groundwater provided by the purveyors.

While the available groundwater is limited, it is anticipated that water demands will continue to increase. Accordingly, additional reliable sources of water are necessary to meet projected water demands. CLWA recognizes that recycled water is an important and reliable source of additional water.

The Sanitation Districts of Los Angeles County (LACSD) own and operate two water reclamation plants, Saugus Water Reclamation Plant (WRP) and Valencia WRP, within the CLWA service area. The water is treated to tertiary standards and discharged to the Santa Clara River. The Newhall Ranch development is also planning to construct a water reclamation facility, and non-potable water from this source may be incorporated into the CLWA recycled water system. Additionally, Berry Petroleum has expressed interest in treating oil field produced water for sale to CLWA for non-potable uses. Oil field produced water is a by-product of petroleum extraction. Also, treated perchlorate-contaminated groundwater may serve as a temporary source of non-potable water during the 1 to 2 year California Department of Health Services (DHS) demonstration period for the treatment facility. By utilizing the effluent from the WRPs, oil field produced water, and treated perchlorate-contaminated groundwater for irrigation and other non-potable purposes, CLWA can more efficiently allocate its potable water and increase the reliability of water supplies in the Santa Clarita Valley.

2.2 Significant Developments

Since the preparation of the previous Master Plan, the CLWA service area has experienced substantial growth. In addition to the changes in population and development in the Santa Clarita Valley, the following major developments have changed the assumptions for the Master Plan, necessitating this update:

- The use of treated effluent from the Saugus and Valencia WRPs is subject to the instream water use requirements of critical habitat along the Santa Clara River. Accordingly, it is assumed that only the portion of the effluent attributable to growth will be used, unless a habitat analysis indicates that use of a greater quantity of the effluent will not create adverse impacts.

- Oil field produced water from Placerita Canyon has been identified as a potential source of water for recycled water use.

- Several wells near the South Fork of the Santa Clara River have been identified as being contaminated with perchlorate. A centralized treatment facility is planned that will provide potable quality water. During the demonstration period required by DHS, the treated water may be available for recycled water use.

- The proposed Newhall Ranch development includes a wastewater reclamation plant and recycled water system. It would be desirable to integrate these facilities into CLWA's recycled water system.

- In addition to considering large aboveground reservoirs for seasonal storage, the concept of aquifer storage and recovery (ASR) is evaluated.

2.3 Objective

The primary objective of the Recycled Water Master Plan is to update the 1993 Reclaimed Water Master Plan to consider the significant developments affecting recycled water sources, supplies, users, and demands so that CLWA can develop a cost-effective recycled water system.

2.4 Development of the Plan

The information developed in this Master Plan update is largely drawn from the 1993 Master Plan, supplemented with contacts with CLWA, LACSD, local water purveyors, the City of Santa Clarita, the County of Los Angeles, oil company representatives, and potential water users. Additionally, analysis and computer modeling were performed.

Potential existing and future recycled water users were identified from the 1993 Master Plan and updated through contacts with the local purveyors and the City of Santa Clarita. Water demand characteristics, including time-of-use, were assessed through discussions with potential users. Through data analysis and computer modeling, the Master Plan was updated with a revised cost-effective recycled water system. Construction costs were estimated and a construction schedule was prepared.

2.5 Master Plan Organization

This report is organized as follows:

- Section 1, Executive Summary, summarizes the contents of the Recycled Water Master Plan.

- Section 2, Introduction, provides background information, introduces the report, and explains its structure.

- Section 3, Land Use, discusses the existing and projected land uses within the CLWA service area.

- Section 4, Existing and Projected Potable Water Supply and Demand, discusses the existing and projected water supply and demand for potable purposes, which necessitates the need for recycled water to serve non-potable demands.

- Section 5, Regulatory Requirements, discusses the federal, state, and local regulations addressing recycled water production, discharge, distribution, and use to protect public health. There are additional regulations that are relevant to oil field produced water, use of impaired waters, such as treated perchlorate-contaminated groundwater, and ASR.

- Section 6, Recycled Water Sources, presents an overview of water recycling facilities, flow, and quality in the Santa Clarita Valley. It also covers other potential sources of water for the recycled water system, including treated perchlorate-contaminated groundwater and treated oil field produced water.

- Section 7, Potential Recycled Water Constraints, provides a brief discussion of the issues that limit the usage of recycled water in the CLWA service area. Issues addressed include Santa Clara River hydrology, the riparian habitat, the endangered species, potential impacts of the proposed recycled water project on stream flows, and water rights issues.

- Section 8, Market Assessment for Recycled Water, identifies potential recycled water users within the CLWA service area and estimates annual demand, peak monthly demand, peak daily demand, and the hourly distribution of water demand during peak months.

- Section 9, Seasonal Storage Opportunities, examines alternatives for addressing the variations in seasonal supply and demand of recycled water, including ASR and aboveground storage.

- Section 10, Recommended Recycled Water System, discusses the planning criteria for system components, presents the recommended infrastructure of the recycled water system, and describes the modeling process used to size facilities. Costs are also presented in this section.

- Section 11, Permits and Approvals, focuses on permit requirements, other institutional issues, and the requirements of the California Environmental Quality Act (CEQA).

- Section 12, Funding and Financing Opportunities, presents a plan for financing the proposed recycled water system. Discussion of financing options, water rate policy, and connection fees is included.

- Section 13, Implementation Plan, presents a plan for implementing the recommended system, including phasing and implementation schedule.

Section 3: Land Use

To identify an appropriate service area for the recycled water distribution system, information regarding land use is important. This section describes the planning documents that govern land use in the Santa Clarita Valley and presents information regarding the existing and projected land uses within the CLWA service area.

3.1 General and Specific Plans

The CLWA service area encompasses approximately 195 square miles within the upper Santa Clara River Basin, much of which is known as the "Santa Clarita Valley," as shown in Figure 3-1. The majority of the CLWA service area is in Los Angeles County, but approximately 20 square miles in the westerly part of the service area extends into an unincorporated area of Ventura County. As shown on Figure 3-2, the CLWA service area includes the City of Santa Clarita and the unincorporated communities of Castaic, Valencia, Saugus, Canyon Country, Newhall, and Mint Canyon, among others.

General Plans have been prepared by the City of Santa Clarita, Los Angeles County and Ventura County, which outline the ultimate land use development anticipated for their respective planning areas. There are also several Specific Plans governing land use in portions of the CLWA service area. The City of Santa Clarita General Plan was adopted in 1991, with some of the elements updated more recently. The land use element has not been updated since 1991. Los Angeles County amended its General Plan for the unincorporated areas of the County in 1993. The Ventura County General Plan includes an Area Plan for the Piru Area of Interest, which was amended in 1992. This Area Plan serves as the land use plan for the Piru area, a portion of which is in the CLWA service area. In the near future, a City of Santa Clarita/Los Angeles County Valleywide General Plan for the entire Santa Clarita Valley will be prepared by the City and the County of Los Angeles for lands within their jurisdictions.

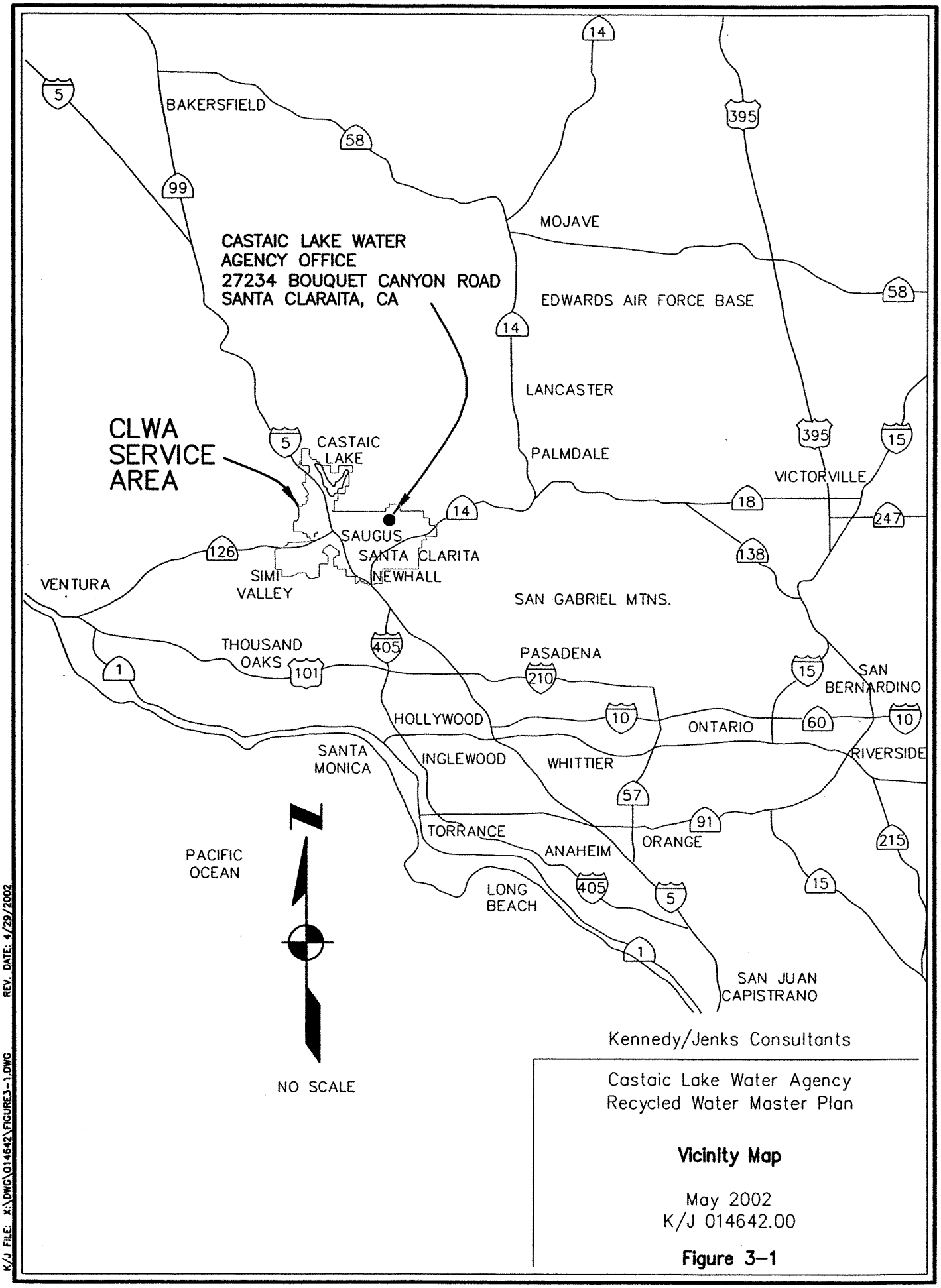
In addition to the General Plans, the following Specific Plans have been developed for areas within the CLWA service area:

- Newhall Ranch Specific Plan
- Northlake Specific Plan
- Canyon Park Specific Plan (now Fairbanks Ranch)
- Porta Bella Specific Plan
- North Valencia II Specific Plans
- Stevenson Ranch Specific Plans (Community Contracts)

Specific plans provide detailed land use information for a certain area.

3.2 Existing and Projected Land Uses

The Santa Clarita Valley includes a variety of residential, commercial, industrial, institutional, agricultural, and open space uses. A large portion of the valley is not suitable for development due to steep terrain, flooding potential or federal jurisdiction (Angeles National Forest). However, rapid residential, commercial, and industrial development of portions of the valley floor and canyons has occurred due to growth influences from the Los Angeles metropolitan area



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Recycled Water Master Plan

Vicinity Map

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Figure 3-1

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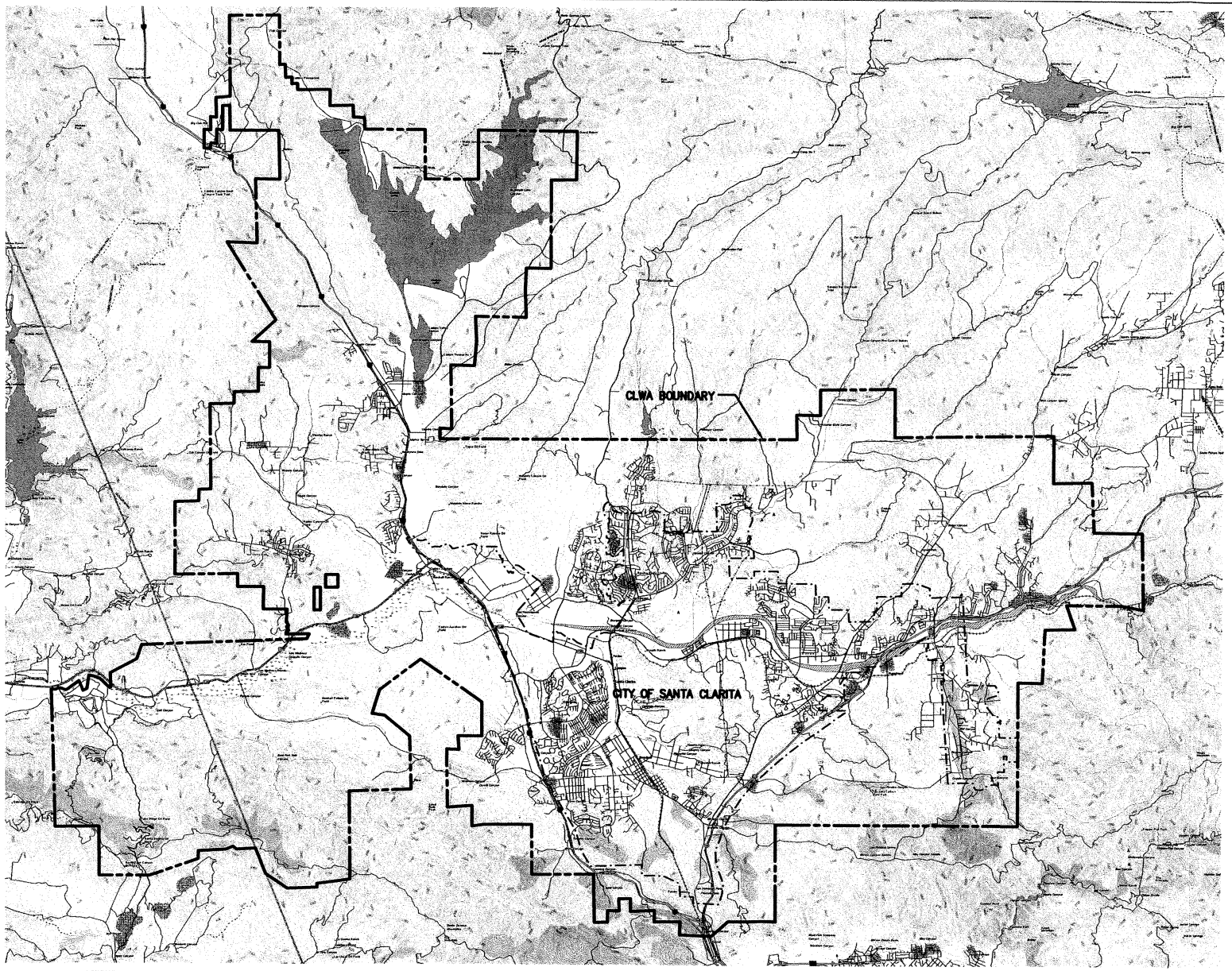

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Castaic Lake Water Agency
Recycled Water Master Plan

CLWA Service Area

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Figure 3-2

and the presence of three major highways (U.S. Interstate 5/the Golden State Freeway, State Highway 14/the Antelope Valley Freeway, and State Highway 126).

In 1995, the Los Angeles County Department of Regional Planning (LACDRP) digitized the projected land use within the CLWA service area using a geographic information system (GIS) and prepared a series of reports and maps for CLWA. The land use planning data was incorporated into the land parcel database maintained for CLWA. Table 3-1 summarizes the future acreage of each land use type, as contained in the database. This table represents the expected ultimate distribution of land use as defined in the General Plans.

There are a number of development projects underway and seeking approval in the Santa Clarita Valley. Two significant land use types that could be developed in the future, assuming adoption of the necessary General Plan amendments or Specific Plans, are the nearly 40,000 acres designated Hillside Management in Los Angeles County and almost 8,500 acres of agriculture and open space lands in the Ventura County portion of the CLWA service area.

TABLE 3-1
SUMMARY OF CURRENT DESIGNATED LAND USE

Land Use Type	Plan Code	Number of Parcels	Acreage[a]
Commercial	C	2,090	3,130
Hillside Management	HM	4,845	39,674
Industrial	M	1,503	6,167
Municipal	MU	10	136
Non-Urban Residential (0.5 DU/Ac)	N1	3,735	7,622
Non-Urban Residential (1.0 DU/Ac)	N2	369	3,021
National Forest	NF	155	9,090
Open Space and Agriculture[b]	O	599	21,435
Public Service Facilities	P	125	2,852
Public Service Facilities	PF	2	32
Resort Recreational	RR	91	592
Transportation Corridor	TC	31	54
Urban Residential (1.1-3.3 DU/Ac)	U1	37,944	17,022
Urban Residential (3.4-6.6 DU/Ac)	U2	4,782	2,824
Urban Residential (6.7-15.0 DU/Ac)	U3	120	473
Urban Residential (15.1-40.0 DU/Ac)	U4	3,505	491
Floodway/Floodplain	W	743	3,866
Undefined	-	23	27
Total		60,672	118,508

Source: Montgomery-Watson, 1998.
Notes:
(a) Acreage excludes streets and roads for developed areas.
(b) Includes areas in Ventura County, which are currently designated as Agriculture (<1 dwelling unit per 40 acres) and Open Space (<1 dwelling unit per 80 acres). Much of this land is currently used for agriculture.

Section 4: Existing and Projected Potable Water Supply and Demand

In order to evaluate the need for recycled water, potable water supplies and demand projections are briefly summarized. This section describes the existing and future potable water supplies, demands, and facilities within the CLWA service area.

4.1 Existing Water Supply, Demand, and Facilities

4.1.1 Water Supply

Water demands in the Santa Clarita Valley are currently met by two sources: SWP and local groundwater supplies. According to the Upper Santa Clarita Valley Water Committee, the total available water supply for the CLWA service area, including SWP water, groundwater, and recycled water sources, is approximately 96,000 to 151,900 AF/yr.[1] CLWA purchases SWP water and wholesales it to three domestic water purveyors: Los Angeles County Waterworks District (LACWD) No. 35, the Newhall County Water District (NCWD), and the Valencia Water Company (VWC). CLWA acquired the Santa Clarita Water Company in 1999; these areas are now served by the CLWA's Santa Clarita Water Division (SCWD). The approximate boundaries of the water purveyors are shown on Figure 4-1. The three retail purveyors plus CLWA comprise the Upper Santa Clarita Valley Water Committee.

4.1.1.1 Imported Water

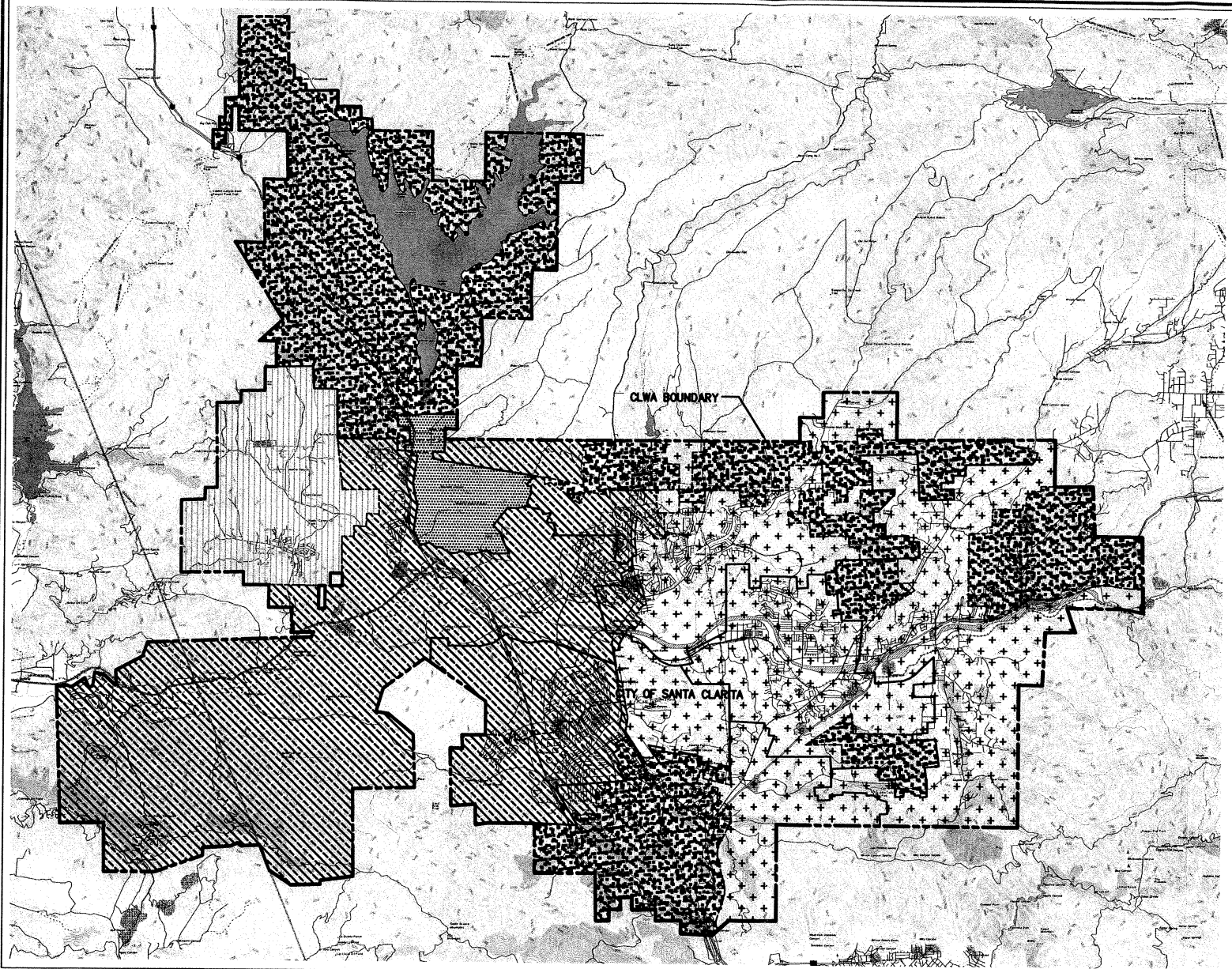
The SWP is managed by the California Department of Water Resources (DWR). CLWA is one of 29 agencies holding long-term contracts with the State of California for SWP water. SWP water originates from rainfall and snowmelt in northern and central California. Runoff is stored in Lake Oroville, then released down the Feather River to the Sacramento River and the Sacramento-San Joaquin Delta. Water is diverted into the Clifton Court Forebay, then pumped into the 444-mile long California Aqueduct. Prior to delivery to CLWA, SWP supplies are stored in Castaic Lake at the end of the West Branch of the California Aqueduct. In 1999, CLWA purchased an additional 41,000 AF/yr from the SWP, bringing its total entitlement to 95,200 AF/yr for M&I uses.

4.1.1.2 Groundwater

In addition to imported water, local groundwater supplies have been developed by domestic water purveyors and by agricultural water users. Two freshwater bearing aquifers, the Alluvial and Saugus aquifers, underlie CLWA's boundaries and form the Eastern Groundwater Basin of the Santa Clara River Valley Basin.

The Alluvial aquifer lies above the Saugus aquifer and is comprised of the alluvial sediments along the river and its major tributaries. The maximum thickness of the alluvium is about 200 feet. A large number of wells penetrate this upper aquifer and historically, most water extracted from the groundwater basin has been from the Alluvial aquifer. The perennial yield of the aquifer is considered to be 31,600 to 32,600 AF/yr, a portion of which is used for agricultural

[1] Upper Santa Clarita Valley Water Committee, "Draft Santa Clarita Valley Water Report, 2001," April 2002.



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LEGEND

- CASTAIC LAKE WATER AGENCY BOUNDARY
- LOS ANGELES COUNTY WATERWORKS DISTRICT No. 36
- NEWHALL COUNTY WATER DISTRICT
- SANTA CLARITA WATER DIVISION
- VALENCIA WATER COMPANY
- LOS ANGELES COUNTY WAYSIDE HONOR RANCHO (AGRICULTURAL ONLY)

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Recycled Water Master Plan

Water Purveyor Service Areas

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Figure 4–1

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uses. As agricultural land is developed for urban use, an increasing portion of this yield becomes available for M&I use. There is no evidence of any historic or recent trend toward permanent water level or storage decline. Additionally, historic operating results indicate that the aquifer is in good operating condition and can support pumpage above the annual perennial yield of 32,600 AF for one or more years without adverse effects, such as a long-term water level decline or degradation of groundwater quality.

The Saugus aquifer has an estimated storage capacity of 1.4 million AF of usable groundwater. A determination of the annual perennial yield has not been made due to the limited information available. Historically, few wells penetrated the Saugus aquifer. However, as water demands in the Santa Clarita Valley have increased, more wells have been drilled into the aquifer. Presently, about one-third of the supply in the Saugus aquifer has been tapped. Pumpage has averaged about 7,400 AF/yr since 1980. Agricultural use of the Saugus aquifer is considered to be less than 100 AF/yr. The anticipated annual aquifer recharge ranges from a minimum of 11,000 AF/yr in dry years to a minimum of 22,000 AF/yr in wet years. Groundwater levels in the aquifer have remained essentially constant over the last 35 to 40 years. The Saugus aquifer is capable of producing on the order of 40,000 AF/yr for short-term periods.

4.1.2 Water Demand

The three purveyors that purchase imported water from CLWA generally do not serve agricultural water users. Therefore, only M&I demands are included in the total demands for CLWA. In 2001, the existing water demand from all purveyors was 60,678 AF/yr.[2] Peak water demands occur from May through October.

4.1.3 Facilities

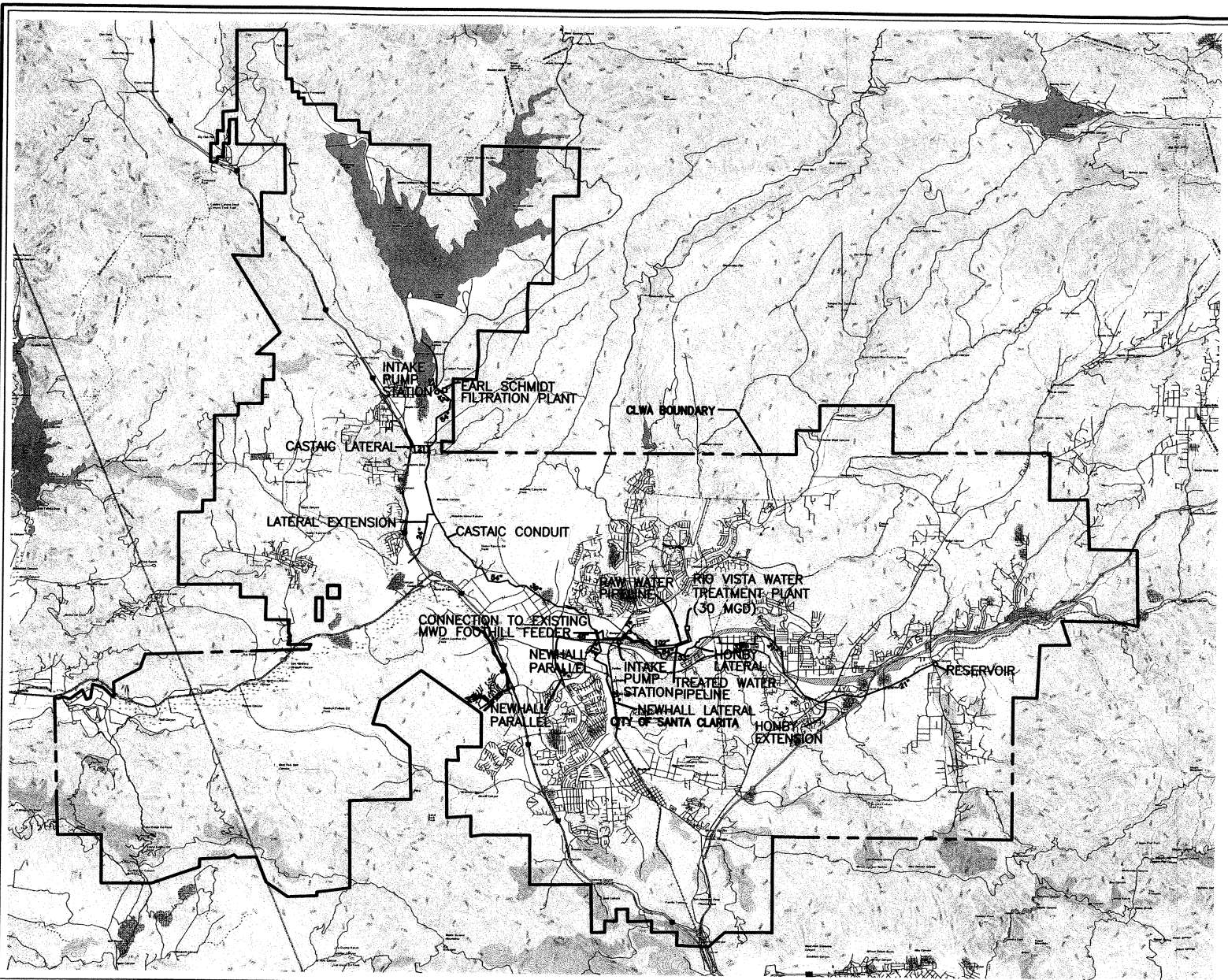
Currently, CLWA treats the imported water stored in Castaic Lake at either the Earl Schmidt Filtration Plant or the Rio Vista Water Treatment Plant and delivers it to the water purveyors through a transmission system. CLWA has a capacity to treat 58 million gallons per day (mgd). The main transmission line, the Castaic Conduit, is located east of the Golden State Freeway, generally paralleling the Freeway and Magic Mountain Parkway from Castaic Lake to a point just north and west of Bouquet Junction where two laterals begin. The Honby Lateral roughly follows the north side of the Santa Clara River to the east, where it crosses to the south to serve Saugus. Headed in a southerly direction, the Newhall Lateral parallels San Fernando Road to serve Newhall and Valencia. The conduit system is shown on Figure 4-2. At the present time, CLWA delivers water to the purveyors through 11 turnouts, including those to its SCWD.

4.2 Projected Water Supply, Demand, and Facilities

4.2.1 Water Supply

CLWA's future water supply will continue to come from two main sources: the SWP and groundwater. CLWA is pursuing an additional 20,000 AF/yr in addition to the current entitlement of 95,200 AF/yr to bring the total entitlement to 115,200 AF/yr. When rainfall and snowmelt provide an adequate amount of water, CLWA can obtain water from SWP up to their full entitlement. However, during dry years, there may not be enough water to provide CLWA and other SWP contractors with their full water delivery requests. Under existing water supply and

[2] *Ibid.*



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LEGEND

CASTAIC LAKE WATER AGENCY BOUNDARY

EXISTING CASTAIC CONDUIT SYSTEM

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Recycled Water Master Plan

Existing CLWA Major Infrastructure

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Figure 4–2

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demand conditions, CLWA is expected to receive approximately 37,900 AF per calendar year, approximately 10 percent of the time, and, if CLWA requested 100 percent of the entitlement, could receive approximately 56,800 AF per calendar year approximately 50 percent of the time.

CLWA has completed an Integrated Water Resources Plan (IWRP) that addresses programs for enhancing water supply reliability during such occurrences. A $300 million capital improvement program has been established to provide facilities and additional water supplies needed to firm up imported water supplies during times of drought. Planned supplies include new wells in the Saugus Formation, stormwater, water banking, water transfers, and desalination. Projected water supplies are summarized in Table 4-1.

The sources of groundwater available to users within the CLWA service area will continue to be the alluvial and Saugus aquifers. From the alluvial aquifer, the safe yield is anticipated to be 32,500 AF/yr, a portion of which will be used for agricultural purposes and, therefore, is not available for M&I use. The Saugus aquifer production is anticipated to be 21,000 to 22,000 AF/yr, of which 20,000 AF/yr is assumed to be allocated for use by M&I users within the CLWA service area and 2,000 AF/yr is utilized by other water users.

TABLE 4-1
PROJECTED WATER SUPPLIES IN THE CLWA SERVICE AREA

Source	Supply (AF/yr)	
	Average Year	Dry Year
Alluvial Basin	30,000 - 40,000	30,000 - 35,000
Saugus Formation	7,500 - 15,000	11,000 - 15,000
Saugus New Wells[(a)]	–	10,000 - 20,000
Stormwater Runoff[(a)]	–	–
Recycled Water[(a)]	1,700 - 17,000	1,700 - 17,000
SWP Supplies	56,800 - 95,200	37,900 - 75,800
Groundwater Bank[(a)]	–	105,000
Water Transfer[(a)]	5,500 - 9,200	3,700 - 7,300
Desalination[(a)]	2,000 - 5,000	2,000 - 5,000
Total	103,200 - 181,400	201,100 - 279,000

Source: CLWA, "Urban Water Management Plan," 2000.
Note: (a) Planned programs for future implementation.

4.2.2 Water Demand

In preparing the 2000 Urban Water Management Plan, several methods of projecting future water demands were examined, including those based on population projections, historic connection data, and econometric models. Table 4-2 summarizes the projected water demands for the CLWA service area. It is anticipated that these projected demands can be met using the water supplies described above, in both wet and dry years.

TABLE 4-2
PROJECTED NORMAL/AVERAGE YEAR WATER USAGE

Land Use	Water Demand (AF/yr)			
	2005	2010	2015	2020
Low-Density Residential	32,500	35,400	39,300	41,000
Medium to High Density Residential	18,200	24,400	32,300	42,100
Commercial	3,100	3,500	4,000	4,500
Industrial	5,100	5,700	6,400	7,100
Recreational	3,600	3,800	4,200	4,500
Institutional	3,100	3,400	3,600	3,900
Miscellaneous Urban Water Use	1,000	1,500	2,100	2,900
Irrigated Agricultural	15,100	12,400	9,800	7,100
Increased Conservation Savings	6,600	7,700	9,100	10,600
Total Projected Water Use	75,100	82,400	91,600	102,500

Section 5: Regulatory Requirements

Production, discharge, distribution, and use of recycled water are subject to federal, state, and local regulations, the primary objectives of which are to protect public health. There are additional regulations that are relevant to oil field produced water, use of impaired waters, such as treated perchlorate-contaminated groundwater, and ASR. This section describes the regulatory requirements and their administration.

5.1 Federal Requirements

Two federal acts regulate the discharge and use of recycled water or wastewater: the Clean Water Act and the Safe Drinking Water Act.

5.1.1 Clean Water Act

Federal requirements relevant to the discharge of recycled water, or wastewater, and any other liquid wastes to "navigable waters" are contained in the 1972 amendments to the Federal Water Pollution Control Act of 1956, commonly known as the federal Clean Water Act (CWA) (Public Law 92-500). The CWA created the U.S. Environmental Protection Agency (USEPA) and established the National Pollutant Discharge Elimination System (NPDES), a permit system for discharge of contaminants to navigable waters. NPDES requires that all municipal and industrial dischargers of liquid wastes apply for and obtain a permit prior to initiating discharge.

5.1.2 Safe Drinking Water Act

Federal requirements relevant to the use of recycled water for groundwater recharge are contained in the 1986 amendments to the Safe Drinking Water Act (SDWA) of 1974 (Public Law 93-523). The SDWA focuses on regulation of drinking water and control of public health risks by establishing and enforcing maximum contaminant levels (MCLs) for various compounds in drinking water. The 1986 amendments also established requirements for protection of groundwater supplies through wellhead protection programs and regulation of underground injection of wastes.

5.1.3 Administration

In the State of California, the administration and enforcement of the NPDES and SDWA programs have been delegated to the state.

5.2 State Requirements

State requirements for production, discharge, distribution, and use of recycled water are contained in the California Water Code, Division 7-Water Quality, Sections 1300 through 13999.16 (Water Code); the California Administrative Code, Title 22-Social Security, Division 4-Environmental Health, Chapter 3-Reclamation Criteria, Sections 60301 through 60475 (Title 22); and the California Administrative Code, Title 17-Public Health, Chapter 5, Subchapter 1, Group 4-Drinking Water Supplies, Sections 7583 through 7630 (Title 17). In addition, guidelines for production, distribution, and use of recycled water have been prepared or endorsed by state agencies administering the recycled water regulations.

5.2.1 Water Code

The Water Code contains requirements for the production, discharge, and use of recycled water. The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code), which was promulgated in 1969, established the State Water Resources Control Board (SWRCB) as the state agency with primary responsibility for the coordination and control of water quality, water pollution, and water rights (Division 7, Chapter 1).

Nine Regional Water Quality Control Boards (RWQCB) were established to represent the SWRCB regionally and carry out the enforcement of water quality and pollution control measures (Division 7, Chapter 4). In addition, each RWQCB was required to formulate and adopt water quality control plans and establish requirements for waste discharge to waters of the state. In 1972, Chapter 5.5 was added to Division 7 to provide the RWQCBs with the authority to carry out the provisions of the federal CWA. The Los Angeles RWQCB has jurisdiction over the Santa Clarita Valley.

Division 7, Chapter 7-Water Reclamation, was included in the Porter-Cologne Water Quality Control Act in 1969. Subsequent amendments required DHS to establish water reclamation criteria, gave the RWQCB the responsibility of prescribing specific water reclamation requirements for water which is used or proposed to be used as recycled water, provided for the regulation of injection of waste into the ground, and required the use of recycled water, if available, rather than potable water for irrigation of greenbelt areas.

In addition to Division 7, Chapter 7, Sections 1210 through 1212 of the Water Code, added in 1980, focus on the ownership of treated wastewater and require that the owner of a wastewater treatment plant obtain approval from the SWRCB prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater.

5.2.2 Title 22

In 1975, Title 22 was prepared by DHS in accordance with the requirements of Division 7, Chapter 7 of the Water Code. In 1978, Title 22 was revised to conform with the 1977 amendment to the federal CWA. The requirements of Title 22, as revised in 1978, 1990, and 2001, regulate production and use of recycled water in California. Title 22 requirements are summarized in Figure 5-1.

Title 22 establishes the quality and/or treatment processes required for an effluent to be used for a specific non-potable application. The following categories of recycled water are identified:

- Disinfected tertiary recycled water
- Disinfected secondary-2.2 recycled water[3]
- Disinfected secondary-23 recycled water[4]
- Undisinfected secondary recycled water
- Disinfected tertiary recycled water with conventional treatment
- Disinfected tertiary recycled water without conventional treatment

[3] The 2.2 refers to the coliform count requirement for the water – 2.2 MPN/100 mL.
[4] The 23 refers to the coliform count requirement for the water – 23 MPN/100 mL.

Title 22, Article 3 - Uses of Recycled Water

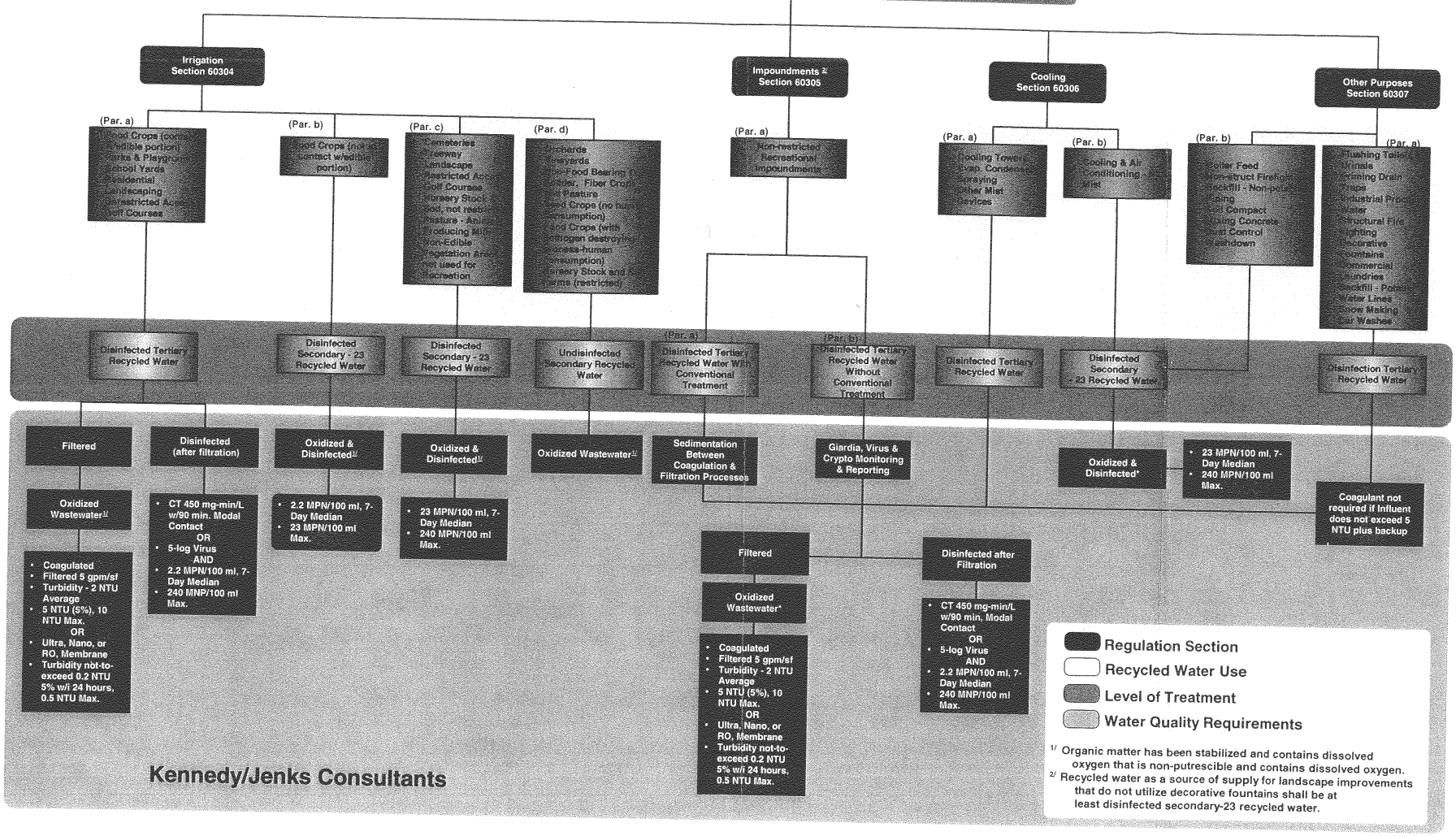

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Figure 5-1

In addition to recycled water uses and treatment requirements, Title 22 addresses sampling and analysis requirements at the treatment plant, preparation of an engineering report prior to production or use of recycled water, general treatment design requirements, reliability requirements, and alternative methods of treatment.

A draft regulation issued 23 April 2001 specifically addresses Groundwater Recharge Reuse. The regulations address requirements for the engineering report and monitoring and reporting for projects that use recycled water for groundwater recharge.

5.2.3 Title 17

The focus of Title 17 is protection of drinking (potable) water supplies through control of cross-connections with potential contaminants, including non-potable water supplies such as recycled water. Title 17, Group 4, Article 2 - Protection of Water System, Table 1, specifies the minimum backflow protection required on the potable water system for situations in which there is potential for contamination to the potable water supply.

Recycled water is addressed as follows:

- An air-gap separation is required on "Premises where the public water system is used to supplement the recycled water supply."
- A reduced pressure principle backflow prevention device is required on "Premises where recycled water is used...and there is no interconnection with the potable water system."
- A double-check valve assembly may be used for "Residences using recycled water for landscape irrigation as part of an approved dual plumbed use area established pursuant to sections 60313 through 60316 unless the recycled water supplier obtains approval for the local public water supplier, or [DHS] if the water supplier is also the supplier of the recycled water, to utilize an alternative backflow prevention plan that includes an annual inspection and annual shutdown test of the recycled water and potable water systems pursuant to subsection 60316(a)."

5.2.4 Guidelines

To assist in compliance with Title 22, DHS has prepared a number of guidelines for production, distribution, and use of recycled water. Additionally, DHS recommends use of guidelines prepared by the California-Nevada Section of the American Water Works Association (AWWA). These guidelines are summarized below.

Guideline for the Preparation of an Engineering Report on the Production, Distribution, and Use of Recycled Water. According to Title 22, prior to implementation of a water reclamation project (production, distribution, or use) an engineering report must be prepared and submitted to DHS. This guideline, prepared by DHS and dated March 2001, specifies the contents of an engineering report. The report should describe the production process, including the treated (effluent) water quality, the raw water quality, the treatment process, the plant reliability features the supplemental water supply, the monitoring program, and a contingency plan to prevent distribution of inadequately treated water. The report should include maps of the distribution system and describe how the system will comply with DHS and AWWA guidelines and Title 17. The report should include maps of proposed use areas and should describe the use areas, the

types of uses proposed, the people responsible for supervising the uses, the design of the user systems, and the proposed user inspection and monitoring programs.

Manual of Cross Connection Control/Procedures and Practices. This manual, dated July 1981, focuses on establishing a cross-connection control program to protect the public against backflow and back-siphonage of contamination. Main elements of the manual include areas where protection is required; causes of backflow; approved backflow preventers; procedures, installation, and certification of backflow preventers; and water shutoff procedures (for conditions which pose a hazard to the potable water supply).

Guidelines for the Distribution of Nonpotable Water. These guidelines were prepared by the California-Nevada Section of AWWA in 1992. The purpose of these guidelines is to provide guidance for planning, designing, constructing, and operating non-potable water systems, including recycled water systems. Distribution lines, storage and supply, pumping, on-site (user) applications, and system management are discussed. DHS guidelines reference these guidelines.

Guidelines for the On-Site Retrofit of Facilities Using Disinfected Tertiary Recycled Water. The California-Nevada Section of AWWA prepared these guidelines in 1997 to provide guidance on modifying existing on-site facilities for conversion to use of recycled water, including recommendations for signage, backflow prevention, and separation standards, for landscape irrigation, agricultural irrigation, industrial uses, and impoundments.

5.2.5 Oil Field Produced Water-Related Regulations

In California, there are no regulations addressing the use of treated oil field produced water for non-potable purposes. However, certain aspects of the reclamation standards and design criteria for treatment of domestic wastewater for a direct beneficial reuse or a controlled use that would not otherwise occur are applicable. For example, the water must meet the Basin Plan standards.

5.2.6 Treated Perchlorate-Contaminated Groundwater-Related Regulations

In California, there are no regulations addressing the use of treated perchlorate-contaminated groundwater for non-potable purposes. However, certain aspects of the reclamation standards and design criteria for treatment of domestic wastewater for a direct beneficial reuse or a controlled use that would not otherwise occur are applicable. For example, the water must meet the Basin Plan standards and applicable NPDES or Waste Discharge Requirements (WDR).

5.2.7 Administration

In the State of California, reclamation requirements are administered by the SWRCB, the individual RWQCBs, and DHS. The direct involvement of each agency in water recycled is summarized below:

SWRCB

1. Issue loans in accordance with the Water Code.

2. Approve petitions for the change in place and purpose of use of treated wastewater in accordance with the Water Code.

RWQCB

1. Prepare or revise reclamation requirements in accordance with the Water Code.
2. Review and approve engineering report required under Title 22.
3. Review and approve recharge projects using recycled water in accordance with the Water Code.

DHS

1. Review and approve engineering report as requested by RWQCB.
2. Review and approve final plans for cross connection control and pipeline separations in accordance with Title 17, and inspect distribution system prior to operation.
3. In conjunction with local health agencies, review and approve final on-site (user) system plans for cross connection control in accordance with Title 17, and inspect system prior to operation.

The DHS has delegated a portion of its administrative duties to local health agencies and becomes more involved at the request of the local health agencies.

5.3 Local Requirements

Local requirements focus on the distribution and use of recycled water and, primarily, the onsite (user) systems, with emphasis on cross-connection control. State regulations and guidelines discussed above are the governing requirements. The Los Angeles County Department of Health Services (LACDHS) Cross-Connection and Water Pollution Control Program establishes more specific requirements for the separation and construction of potable and recycled water lines, guidelines for on-site (user) systems, and identification of recycled water facilities.

The local requirements are also administered by LACDHS as follows:

1. Review as-built drawings of user's potable water system.
2. Perform an onsite survey of the user's water system.
3. Guide users in methods of identifying potable and recycled water systems.
4. Review and approve design drawings of user's recycled water systems.
5. Inspect user's potable and recycled water systems following construction.

Section 6: Recycled Water Sources

The extent of the recycled water system is dependent on the amount of water available, as well as the quality of this water. This section presents an overview of sources of recycled water, flow, and quality in the Santa Clarita Valley. It also covers other potential sources of water for the recycled water system, including treated perchlorate-contaminated groundwater and treated oil field produced water.

6.1 Sources of Recycled Wastewater

now only 1 District

LACSD provides wastewater collection, treatment, and disposal services to residents of two sanitation districts in the Santa Clarita Valley: District Nos. 26 and 32. District No. 26 serves the eastern portion of the valley, and District No. 32 serves the western portion. The majority of the two districts' service areas lie within the City of Santa Clarita.

6.1.1 Existing and Planned Wastewater Treatment Facilities

6.1.1.1 Existing Facilities

LACSD operates two wastewater treatment facilities in the Santa Clarita Valley: Saugus and Valencia WRPs. The two treatment facilities operated independently until 1980, at which time the two plants were linked by a bypass interceptor. The interceptor was installed to transfer a portion of flows received at the Saugus WRP to the Valencia WRP. In order to improve operating efficiencies and because a shortage of space at the Saugus WRP limits future expansion of wastewater facilities in District No. 26, a joint powers agreement was enacted in 1984, creating the Santa Clarita Valley Joint Sewerage System. Through use of wastewater and sludge connecting lines, future expansions of treatment works, including sludge handling and disposal operations, will be provided at the larger Valencia WRP.

The primary sources of wastewater to the Saugus and Valencia WRPs are domestic. Both plants are tertiary treatment facilities and produce high quality effluent. Currently, the effluent from the two WRPs discharges to the Santa Clara River. The Saugus WRP effluent outfall is located approximately 400 feet downstream (west) of Bouquet Canyon Road. Effluent from the Valencia WRP is discharged to the Santa Clara River at a point approximately 2,000 feet downstream (west) of The Old Road Bridge.

Together, the Valencia and Saugus WRPs have a design capacity of 20 mgd (22,410 AF/yr). In calendar year 2001, they produced an average of 16.89 mgd. However, none of the effluent was used as recycled water during this period. Monthly flow data for both WRPs is shown in Table 6-1. During fiscal year 1999-2000 the WRPs produced 16.25 mgd (18,262 AF/yr) of recycled water available for reuse. As the 2001 data was not available at the time the recycled water analysis was initiated, the 16.25 mgd flow was used for this Recycled Water Master Plan.

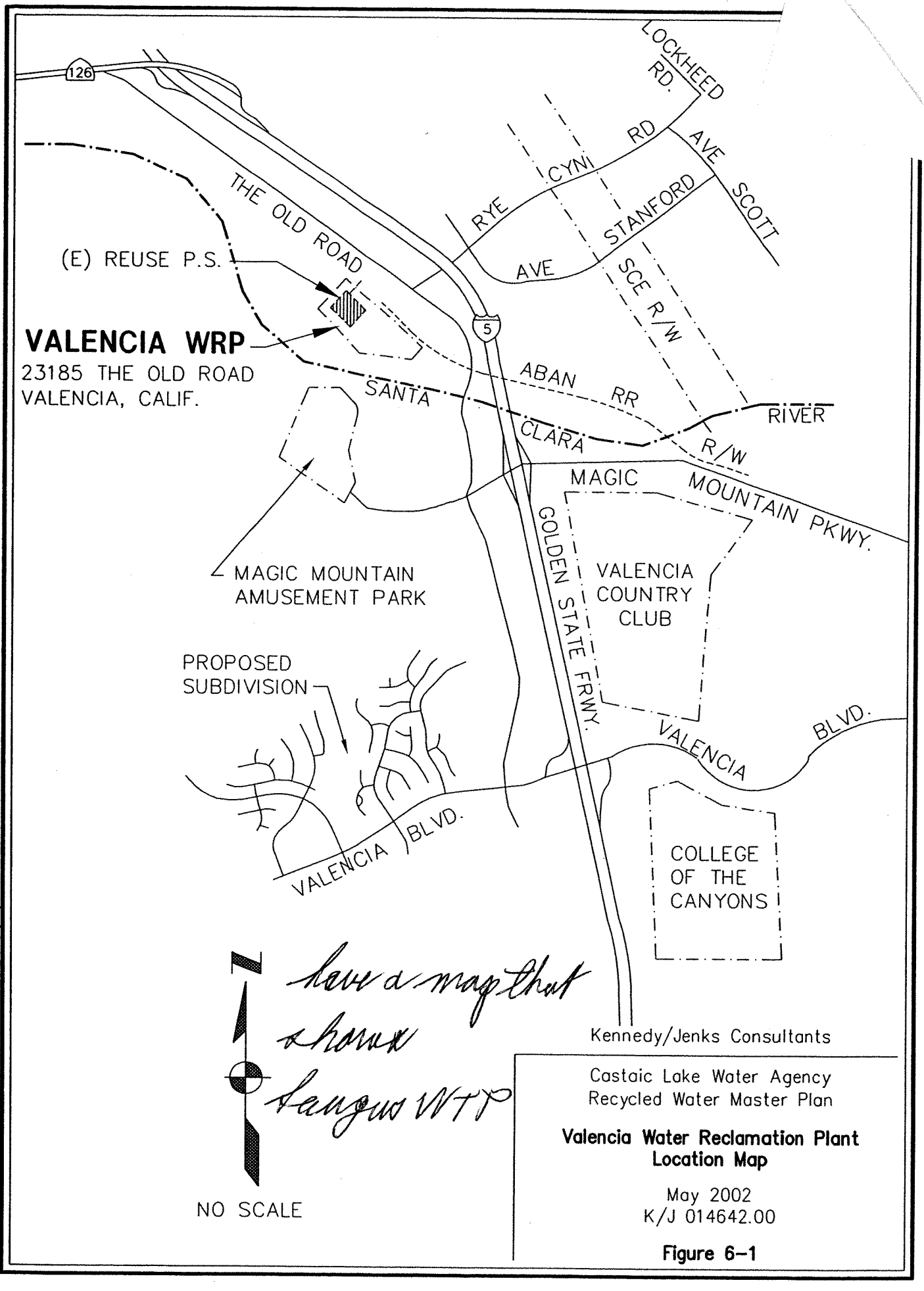
TABLE 6-1
MONTHLY EFFLUENT FLOW FROM VALENCIA AND SAUGUS WRPs - CALENDAR YEAR 2001

Month	Saugus WRP Flow (mgd)	Valencia WRP (mgd)	Total Flow (mgd)
January	6.22	10.13	16.35
February	6.18	10.65	16.83
March	6.01	10.97	16.98
April	5.54	11.00	16.54
May	5.26	11.36	16.62
June	5.32	11.39	16.71
July	5.10	11.77	16.87
August	5.46	11.61	17.07
September	5.54	11.50	17.04
October	5.54	11.63	17.17
November	6.01	11.44	17.45
December	5.89	11.17	17.06
Annual Average	5.67	11.22	16.89

Source: LACSD.

Located within District No. 26, the Saugus WRP is southeast of the intersection of Bouquet Canyon Road and Soledad Canyon Road and was completed in 1962. Two subsequent expansions and flow equalization facilities brought its current design capacity to 6.5 mgd. The treatment process was brought up to a tertiary level with the addition of dual-media pressure filters in 1987. However, no future expansions are possible due to space limitations at the site. In 2001, the Saugus WRP produced an average effluent flow of 5.67 mgd (6,350 AF/yr). Use of recycled water from this facility is permitted under RWQCB Order No. 87-49; however, LACSD staff has expressed concern about diverting these discharges due to potential impacts to downstream habitat. The habitat implications of effluent diversion are discussed in greater detail in Section 7. Until more detailed habitat investigations are conducted, it is assumed that only recycled water from the Valencia WRP will be used.

The Valencia WRP is located within District No. 32 and is on The Old Road near Magic Mountain Amusement Park, as shown in Figure 6-1. A schematic of the Valencia WRP's processes is presented on Figure 6-2. The Valencia WRP was completed in 1967. Following two subsequent expansions, construction of a 4.4 million gallon flow equalization tank in February 1995 and the Stage 4 expansion completed in June 1996, it now has a design capacity of 13.5 mgd. In 2000, the Valencia WRP produced an average effluent flow of 11.22 mgd (12,600 AF/yr). Use of recycled water from the Valencia WRP is permitted under RWQCB Order No. 87-48. On 24 July 1996, CLWA executed an agreement with LACSD to purchase up to 1,600 AF/yr of recycled water from the Valencia WRP. CLWA has been constructing the facilities to utilize this supply and expects to initiate deliveries in 2002. Recycled water from Valencia WRP has been used in the past by the City of Santa Clarita for landscape irrigation and by Pacific Pipeline and Oberg Construction for construction applications. These deliveries were made via tanker truck. In April 2000, a contract was signed with TransCoast Financial for use of up to 20,000 gpd for dust control at a nearby composting facility. The recycled water will be transported via tanker truck.



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Valencia Water Reclamation Plant Location Map

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Figure 6-1

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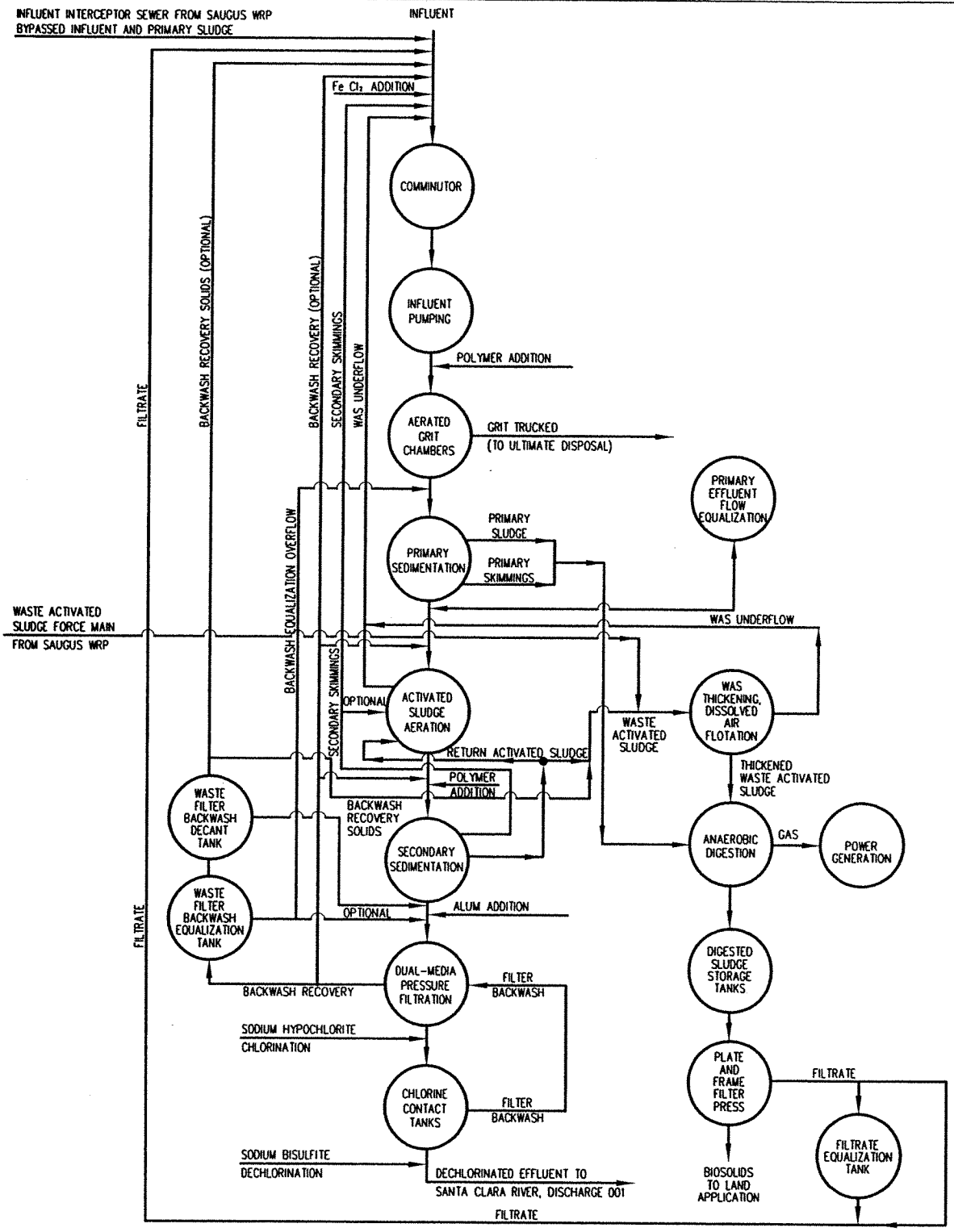

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Valencia Water Reclamation Plant Process Schematic

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Figure 6-2

SOURCE: LACSD

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6.1.1.2 Planned Improvements and Expansions

To accommodate anticipated growth in the Santa Clarita Valley and to ensure compliance with discharge requirements from the RWQCB, LACSD plans to expand the Valencia WRP. The ultimate capacity of the WRP is planned to be 22 mgd, bringing the ultimate total for both WRPs to 27.6 mgd. No expansion is planned at the Saugus WRP. Construction is expected to occur in 3 mgd increments. Table 6-2 and Figure 6-3 present the projected expansion and flow scenario for the combined Valencia and Saugus WRP planning area.

TABLE 6-2
HISTORIC AND PROJECTED CAPACITY AT VALENCIA AND SAUGUS WRPs

Year	Capacity (mgd)
1971	6.5
1976	9.5
1987	12.5
1991	13.1
1995	17.5
1996	19.1
2002	28.1
2010	34.1

Source: County Sanitation Districts of Los Angeles County, "2015 Santa Clarita Valley Joint Sewerage System Facilities Plan and EIR, Draft," July 1997.

6.1.1.3 Newhall Ranch Water Reclamation Plant

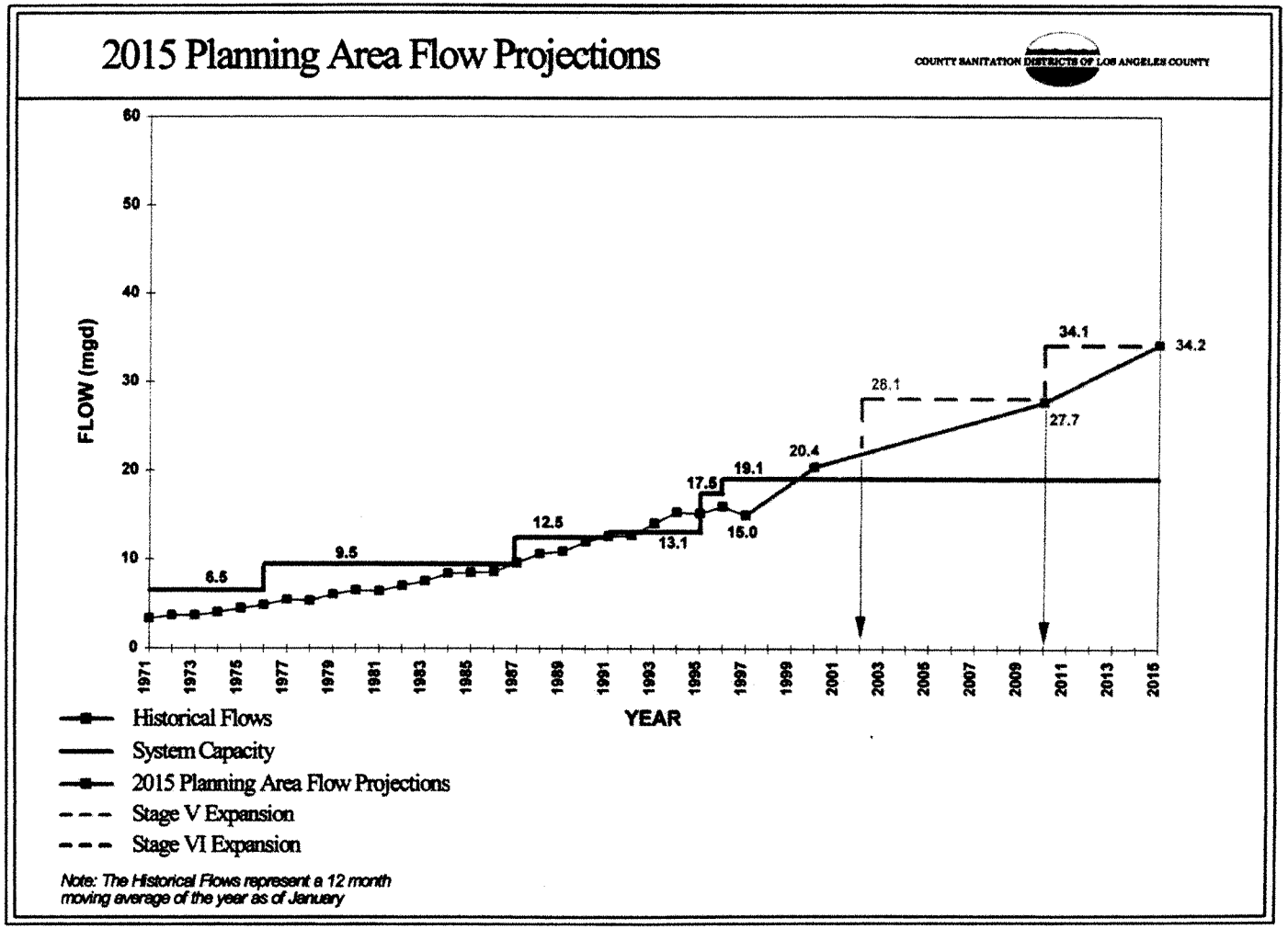
A third reclamation plant for the Santa Clarita Valley is proposed as part of the Newhall Ranch project. This proposed facility would be located near the western edge of the development project along the south side of State Route 126. The plant will be constructed in stages, with an ultimate capacity of 7.7 mgd. Effluent from the proposed water reclamation plant will be used to meet non-potable water demand within the development area. According to the Newhall Ranch Draft Additional Analyses, this plant is projected to produce 5,344 AF/yr on average. During the dry months, all of the recycled water will be used for non-potable uses within Newhall Ranch, supplemented by additional recycled water from CLWA. During the wet winter months when demands are low, the Newhall Ranch WRP will have approximately 286 AF/yr excess recycled water. In order for the WRP to be non-discharging, this recycled water will be transferred into the CLWA recycled water system for use and/or storage.

6.1.2 Water Quality

6.1.2.1 Recycled Water Quality Requirements

Effluent quality from the Valencia and Saugus WRPs is regulated by the RWQCB. Discharge permits specifying the wastewater quality requirements for effluent discharged to the Santa Clara River have been issued for each plant. Each plant also has a reclamation permit specifying wastewater quality requirements for recycling of effluent; however, as discussed previously, small quantities of recycled water have only been used intermittently and have been transported via tanker truck.

Depending on the place and purpose of the recycled water use, the necessary treatment processes and the maximum allowable concentrations vary. These variations are addressed in the reclamation permits. Recycled water uses are limited to those identified in the permits. The



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Projected Flow and Capacity of Valencia and Saugus WRPs

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Figure 6-3

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permits specify that recycled water used as a source of supply in a non-restricted recreational impoundment (use subject to the most stringent requirements) must be adequately disinfected, oxidized, coagulated, clarified, filtered wastewater.

The wastewater quality limitations specified in the reclamation permits conform to the reclamation criteria contained in the California Administrative Code, DHS, Title 22, Division 4, Chapter 3, "Reclamation Criteria." In addition, because the groundwater in the Santa Clarita Valley is beneficially used for domestic supply and other purposes, the reclamation permits stipulate that recycled water cannot contain trace constituents and other substances in excess of the limits set forth in the current edition of the State Drinking Water Standards (California Administrative Code, DHS, Title 22, Division 4, Chapter 15, "Domestic Water Quality and Monitoring.") The maximum constituent concentration limitations for recycled water are listed in Table 6-3.

The reach of the Santa Clara River to which the Valencia WRP discharges (Reach 7) is listed in the 1998 303(d) list of impaired water bodies for ammonia, chloride, and nitrite. The RWQCB has recently issued a draft total maximum daily load (TMDL) of 90 mg/l of chloride for the Valencia and Saugus WRPs. This requirement, if adopted, would require desalination of the effluent prior to discharge or reuse. Potential future limitations on ammonia, nitrate, and nitrite are expected to be met by denitrification.

6.1.2.2 Effluent Quality

The quality of effluent from the Valencia WRP has consistently been in compliance with the recycled water requirements specified in its reclamation permit. Average concentrations of effluent constituents measured during fiscal year 1999-2000 for each plant are listed in Table 6-3. Additionally, the tertiary-treated wastewater is "adequately disinfected, oxidized, coagulated, clarified, filtered wastewater" as specified for use of recycled water in non-restricted recreational impoundment, the use subject to the most stringent requirements in the permits.

The effluent from the WRPs continues to comply with the discharge requirements, as well. During fiscal year 1999-2000, at the Valencia WRP, the $BOD_{5,30}$ measured was approximately 7 mg/l, and suspended solids concentrations averaged <2 mg/l.

TABLE 6-3
EFFLUENT QUALITY AND WATER RECLAMATION REQUIREMENTS FOR VALENCIA WRP

Constituent	Effluent Quality[a]	Maximum Limitation[b]
pH	7.19	6.0 - 9.0
Turbidity (NTU)	1.0	2
Total Coliform (org./100mL)	<1	2.2
Temperature (° F)	76	–
Suspended Solids (mg/l)	<2	–
Settleable Solids (mg/l)	<0.1	–
Total Dissolved Solids (mg/l)	739	1,000
Total Chemical Oxygen Demand (COD) (mg/l)	28	–
Total BOD (mg/l)	<7	–
Ammonia Nitrogen (mg/l)	<17.9	–
Organic Nitrogen (mg/l)	1.6	–
Nitrate Nitrogen (mg/l)	3.22	–

Constituent	Effluent Quality[a]	Maximum Limitation[b]
Nitrite Nitrogen (mg/l)	1.61	–
Phosphate (mg/l)	2.2	–
Fluoride (mg/l)	0.41	1.6
Cyanide (mg/l)	<0.01	–
Chloride (mg/l)	170	300
Sulfate (mg/l)	135	450
Total Alkalinity (mg/l)	240	–
Total Hardness (mg/l)	241	–
Calcium (mg/l)	57.0	–
Magnesium (mg/l)	19.8	–
Antimony (mg/l)	0.0010	–
Arsenic (mg/l)	<0.0010	0.05
Barium (mg/l)	<0.01	1.0
Beryllium (mg/l)	<0.0025	–
Boron (mg/l)	0.91	–
Cadmium (mg/l)	<0.002	0.010
Total Chromium (mg/l)	<0.01	0.05
Copper (mg/l)	<0.01	1.0
Iron (mg/l)	0.10	–
Lead (mg/l)	0.04	0.05
Manganese (mg/l)	0.04	–
Mercury (mg/l)	<0.0002	0.002
Nickel (mg/l)	<0.02	–
Potassium (mg/l)	18.7	–
Selenium (mg/l)	<0.0010	0.01
Silver (mg/l)	<0.01	0.05
Sodium (mg/l)	149	–
Thallium (mg/l)	<0.00100	–
Zinc (mg/l)	0.05	5.0
Total Identifiable Chlorinated Hydrocarbons (µg/l)	0.02	NS
Phenols (mg/l)	<0.010	1.0
Detergents (MBAS) (mg/l)	0.23	–
Oil and Grease (mg/l)	<3.7	–
Sodium Adsorption Ratio	4.31	–
Conductivity (umhos/cm)	1368	–
Nitrate + Nitrite (mg/l)	4.83	10
Radioactivity (pCi/l) (gross alpha + gross beta)	–	65

Notes:

(a) Arithmetic mean of effluent analytical data from LACSD, "Eleventh Annual Status Report on Reclaimed Water Use," Fiscal Year 1999-2000. Frequency of analyses varies among constituents; frequency specified in the Monitoring and Reporting Programs outlined in RWQCB-LA Order Nos. 87-48 and 87-49.

(b) Recycled water limitations specified in RWQCB-LA Order No. 89-129 (Valencia WRP). Trace constituent concentration limits obtained from California Department of Health Services, California Administrative Code, Title 22, Division 4, Chapter 15, "Domestic Water Quality and Monitoring" (1989).

NS: Not Specified
mg/l: milligrams per liter
MPN/100 ml: Most probable number per 100 milliliters
NTU: Nephelometric Turbidity Units
pCi/l: picocuries per liter
µg/l: micrograms per liter

6.2 Perchlorate Contaminated Wells

The Whittaker-Bermite site in Santa Clarita has historically been used for the manufacture of solid rocket propellants, munitions, and fireworks. Improper use or disposal of the chemical compounds and waste products has resulted in soil and groundwater contamination of the site. Preliminary compounds of potential concern for groundwater include ammonium perchlorate, octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetrazocine (HMX), Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX),and nitrosodimethylamine (NDMA).

Production wells in both the alluvium and Saugus aquifers have been sampled to determine whether contamination from the Whittaker-Bermite site has affected them. None of the production wells sampled in the alluvium (Stadium, V-U4, V-T2, V-4, and V-U2) contained detectable concentrations of perchlorate, NDMA, HMX, and RDX. Groundwater samples from nine production wells screened in the Saugus aquifer have been analyzed for the constituents of concern. Perchlorate was detected in groundwater samples from four of the nine Saugus wells sampled (NC-11, Saugus 1, Saugus 2, and V-157), at concentrations ranging from 14 to 45 µg/l. Groundwater samples collected from Saugus production wells NC-11, Saugus 1, Saugus 2, and V-157 were also analyzed for NDMA, HMX, RDX, and volatile organic compounds (VOCs). NDMA, HMX, and RDX were not detected in the groundwater samples. TCE was detected in Saugus 1, Saugus 2, and V-157 at concentrations less than the MCL.[5]

There is currently a remediation effort underway to address the perchlorate contamination. While the Remedial Action Plan has not been prepared, the most likely scenario is that contaminated groundwater will be pumped from four production wells and treated to potable standards at a centralized treatment facility near the wells. The location of the facility and the treatment technologies remain to be determined. The treatment capacity may be as high as 8,700 gpm (13,750 AF/yr). If DHS requires a demonstration period for the facility (approximately 1 to 2 years), the treated water could be beneficially used in the recycled water system. The earliest the facility will be on-line is 2003.

6.3 Oil Field Produced Water

Oil field produced water is a by-product of oil production generated when oil is pumped out of the reservoir. It is generally of poor water quality and unsuitable for potable, industrial, or irrigation use without treatment. Oil companies are finding that oil production may improve if the oil field produced water is disposed of on the surface rather than through reinjection. However, because of the water quality, reinjection has often been the most cost-effective disposal option.

Treatment processes can produce potable quality water; however, because of the poor initial water quality and the organic constituents, it is often more appropriate for treated oil field produced water to be used for irrigation or industrial purposes to offset potable water demand. Pilot studies performed at the Placerita Oil Field have indicated that even with reverse osmosis (RO) treatment, some organic compounds such as naphthalene, 2-butanone, and ethylbenzene, can be detected in the RO effluent.

The economics of oil production are market-driven and are different from those of drinking water supplies. As oil prices rise or drop, oil fields go into and out of production depending on the

[5] Hargis + Associates Inc., "Field Sampling Plan Technical Memorandum Reconnaissance Groundwater Investigation (Operable Unit 7), Operable Units 2 and 3," 21 April 2000.

costs of production. Therefore, the reliability of oil field produced water should be considered as a long-term, but not a permanent supply.

Studies of the potential reuse of treated oil field produced water from the Placerita Oil Field have indicated that approximately 44,000 barrels per day (1.8 mgd) of treated oil field produced water may be available. For irrigation reuse, the produced water would need to be cooled and treated to remove hardness, silica, total dissolved solids (TDS), boron, ammonia, and total organic carbon (TOC). Water quality for the Placerita Oil Field produced water is summarized in Table 6-4.

TABLE 6-4
PLACERITA OIL FIELD PRODUCED WATER QUALITY

Parameter	Untreated	Treated
TDS	~6,000 mg/l	145 mg/l
Temperature	150-175°F	90°F
Boron	~16 mg/L	1-2 mg/l
Ammonia	9.3 mg/l	2-11 mg/l
Silica	~10 mg/l	<1 mg/l
Hardness	1-5 mg/l	<1 mg/l
TOC	120 mg/l	2 mg/l

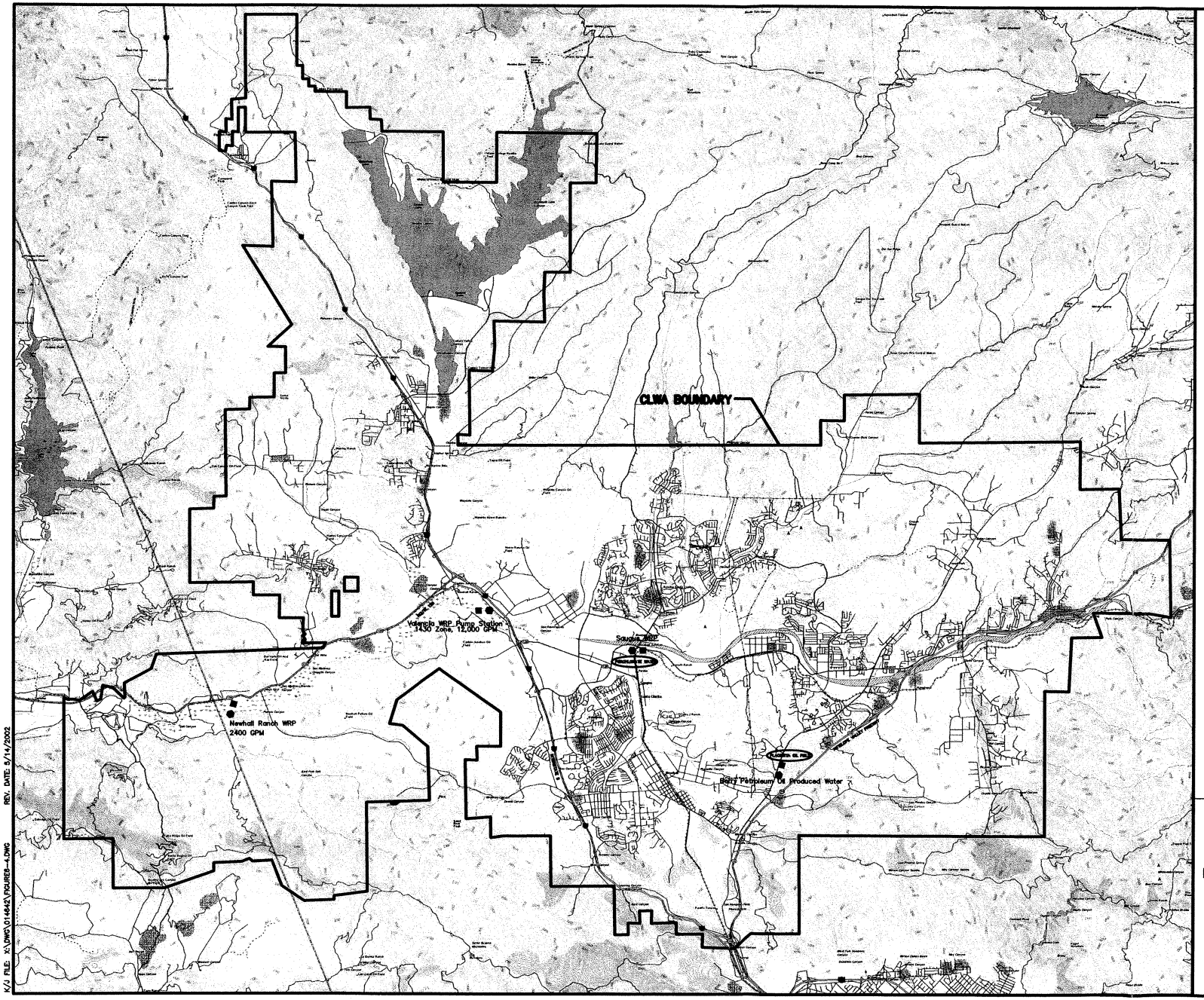
6.4 Summary of Available Source Water Flows

As discussed previously, there are four potential sources of water for the non-potable water system. The flows projected to be available are shown in Table 6-5. The sources of non-potable water are presented in Figure 6-4.

TABLE 6-5
SUMMARY OF AVAILABLE SOURCE WATER FLOWS

Source	Current Flow	Projected Flow	Available for Non-Potable Use
Valencia WRP	10.84 mgd	27.6 mgd	19,995 AF/yr
Saugus WRP	5.41 mgd	6.5 mgd	0 AF/yr
LACSD Total	16.25 mgd	34.1 mgd	19,995 AF/yr
Oil Field Produced Water	0 mgd	1.8 mgd	1,980 AF/yr
Treated Perchlorate Contaminated Water[(a)]	0 mgd	12.5 mgd	11,000 AF/yr
Newhall Ranch WRP	0 mgd	4.78 mgd	5,344 AF/yr
		Total Without Treated Perchlorate Contaminated Water	27,319 AF/yr
		With Perchlorate Contaminated Water	38,319 AF/yr

Note: (a) Treated perchlorate contaminated water will only be available during the DHS demonstration period (1-2 years) for the planned treatment facility.



indicate generally location of conn. perch TP

Kennedy/Jenks Consultants

Castaic Lake Water Agency
Recycled Water Master Plan

Potential Sources of Non-Potable Water

May 2002
K/J 014642.00

Figure 6-4

K/J FILE: X:\DWG\014642\FIGURE6-4.DWG
REV. DATE: 5/14/2002

6.5 Water Quality Requirements for Irrigation

Landscape irrigation appears to be the primary potential use for recycled water. Table 6-6 lists guidelines for irrigation water quality standards and compares the quality of the recycled water available from the Valencia WRP, treated perchlorate-contaminated groundwater, and treated oil field produced water to the standards. Table 6-6 also presents the recommended maximum concentrations in irrigation water and compares the quality of the potential recycled water sources to the recommendations.

From the guidelines, sodium and chloride levels for unblended recycled water are relatively high and may prove toxic to some plants after repeated sprinkler irrigation. If sensitive plants are to be irrigated with recycled water, application of the water by a drip irrigation system or surface system should be considered. In addition, ammonia and nitrate concentrations and boron concentrations fall into the "increasing problems" range and could prove toxic to sensitive plants over a period of time. Salinity of the recycled water also falls into the "increasing problems" range; however, plants vary widely in tolerance to salinity. Provision of adequate soil drainage will help to alleviate any potential problems due to salinity.

Table 6-6 does not list the adjusted sodium adsorption ratios (SAR) of the water sources. The adjusted SARs are related to carbonate and bicarbonate concentrations were not available. However, the unadjusted SAR of the recycled water is below 10, which classifies it as low-sodium water. In addition, the residual sodium bicarbonate levels of the recycled water are relatively low. Because the SAR and residual bicarbonate levels are low, the potential for reducing soil drainage is low. The nutrient composition (nitrogen and phosphorus) of the effluent appears beneficial for irrigation and may result in a reduction in fertilizer use.

Table 6-7 focuses on trace element water quality from Valencia WRP, which would be the largest source of water for the recycled water system. As shown in Table 6-7, the recycled water from Valencia WRP does not exceed any of the recommended values for trace elements in irrigation water. Inadequate data are available on trace element concentrations in oil field produced water and treated perchlorate-contaminated groundwater.

TABLE 6-6
COMPARISON OF AVAILABLE WATER QUALITY TO IRRIGATION QUALITY STANDARD GUIDELINES

Potential Irrigation Problem	Parameter	Units	Degree of Restriction on Use			Recycled Water from Valencia WRP	Treated Oil Field Produced Water	Treated Perchlorate Contaminated Groundwater[(a)]
			None	Slight to Moderate	Severe			
Salinity - Affects plant water availability	EC_w	dS/m	<0.7	0.7-3.0	>3.0	1.15	0.23	0.76 - 1.20
	TDS	mg/l	<450	450-2000	>2000	739	145	490 - 767
Infiltration – SAR and EC_w affect infiltration rate of water into the soil.	SAR = 0-3 and EC_w	dS/m	>0.7	0.7-0.2	<0.2	–	–	–
	SAR = 3-6 and EC_w	dS/m	>1.2	1.2-0.3	<0.3	1.15	–	–
	SAR = 6-12 and EC_w	dS/m	>1.9	1.9-0.5	<0.5	–	–	–
	SAR = 12 - 20 and EC_w	dS/m	>2.9	2.9-1.3	<1.3	–	–	–
	SAR = 20-40 and EC_w	dS/m	>5.0	5.0-2.9	<2.9	–	–	–
Specific Ion Toxicity - Affects sensitive plants	Sodium - Root Absorption	SAR	<3	3-9	>9	4.31	–	–
	Sodium - Root Absorption	me/l	<3	>3		0.19	–	–
	Sodium - Foliar Absorption	mg/l	<70	>70		149	–	53.6 - 153
	Chloride - Root Absorption	mg/l	<70	70-355	>355	170	–	35.5 - 90.5
	Chloride - Foliar Absorption	mg/l	<100	>100		170	–	35.5 - 90.5
	Boron	me/l	<1.0	1.0-2.0	>2.0	0.23	0.25-0.5	–
Miscellaneous Effects - Affects susceptible plants	Bicarbonate	mg/l	<90	90-500	>500	–	–	–
	pH	pH units	6.5-8.4	higher or lower	–	7.19	–	7.19 - 8.41
	Residual Chlorine	mg/l	<1.0	1-5	>5	–	–	–

Source: AWWA - CA/NV Section, "Guidelines for the On-Site Retrofit of Facilities using Disinfection Tertiary Recycled Water," 1997.
Note: (a) Values based on range of values for groundwater extracted by VWC, SCWD, and NCWD. Treatment for perchlorate may affect these values.

TABLE 6-7
RECOMMENDED MAXIMUM CONCENTRATIONS OF TRACE ELEMENTS IN IRRIGATION WATER

Element	Recommended Maximum Concentration (mg/l)[a]	Valencia WRP	Remarks
Aluminum (Al)	5.0	NA	Can cause non-productivity in acid (pH < 5.5), but more alkaline soils at pH > 7.0 will precipitate the ion and eliminate any toxicity.
Arsenic (As)	0.10	<0.0010	Toxicity to plants varies widely, ranging from 12 mg/l for Sudan grass to less than 0.05 mg/l for rice.
Beryllium (Be)	0.10	<0.0025	Toxicity to plants varies widely, ranging from 5 mg/l for kale to 0.5 mg/l for bush beans.
Cadmium (Cd)	0.01	<0.002	Toxic to beans, beets, and turnips at concentrations as low as 0.1 mg/l in nutrient solutions. Conservative limits recommended to its potential for accumulation in plants and soils to concentrations that may be harmful to humans.
Cobalt (Co)	0.05	NA	Toxic to tomato plants at 0.1 mg/l in nutrient solution. Tends to be inactivated by neutral and alkaline soils.
Chromium (Cr)	0.10	<0.01	Not generally recognized as an essential growth element. Conservative limits recommended due to lack of knowledge on its toxicity to plants.
Copper (Cu)	0.20	<0.01	Toxic to a number of plants at 0.1 to 1.0 mg/l in nutrient solutions.
Fluoride (F)	1.0	0.41	Inactivated by neutral and alkaline soils.
Iron (Fe)	5.0	0.10	Not toxic to plants in aerated soils, but can contribute to soil acidification and loss of availability of essential phosphorus and molybdenum. Overhead sprinkling may result in unsightly deposits on plants, equipment, and buildings.
Lithium (Li)	2.5	NA	Tolerated by most crops to 5 mg/l; mobile in soil. Toxic to citrus at low concentrations (<0.075 mg/l). Acts similarly to boron.
Manganese (Mn)	0.20	0.04	Toxic to a number of crops at a few tenths to a few mg/l, but usually only in acid soils.
Molybdenum (Mo)	0.01	NA	Not toxic to plants at normal concentrations in soil and water. Can be toxic to livestock if forage is grown in soils with high concentrations of available molybdenum.
Nickel (Ni)	0.20	<0.02	Toxic to a number of plants at 0.5 to 1.0 mg/l; reduced toxicity at neutral or alkaline pH.
Lead (Pb)	5.0	0.04	Can inhibit plant cell growth at very high concentrations.

Element	Recommended Maximum Concentration (mg/l)[(a)]	Valencia WRP	Remarks
Selenium (Se)	0.02	<0.0010	Toxic to plants at concentrations as low as 0.025 mg/l and toxic to livestock if forage is grown in soils with high concentrations of added selenium. An essential element to animals, but in very low concentrations.
Tin (Sn) Titanium (Ti) Tungsten (W)	–	NA	Effectively excluded by plants; specific tolerance unknown.
Vanadium (V)	0.10	NA	Toxic to many plants at relatively low concentrations.
Zinc (Zn)	2.0	0.05	Toxic to many plants at widely varying concentrations; reduce toxicity at pH > 6.0 and in fine textured or organic soils.

Source: CA/NV Section of AWWA, "Guidelines for the On-Site Retrofit of Facilities Using Disinfected Tertiary Recycled Water," 1997.

Note: (a) The maximum concentration is based on a water application rate which is consistent with good irrigation practices (10,000 m^3 per hectare per year). If the water rate greatly exceeds this, the maximum concentration should be adjusted downward accordingly. No adjustment should be made for application rates less than 10,000 m^3 per hectare per year. The values given are for water used on a continuous basis at one site.

Section 7: Potential Recycled Water Constraints

This section provides a brief overview of the constraints on the use of recycled water in the CLWA service area, including environmental considerations and water rights issues.

7.1 Environmental Considerations

Effluent from the Valencia and Saugus WRPs is currently discharged to the Santa Clara River, supplementing ephemeral flows. Because effluent discharges from the WRPs flow through riparian habitat of several endangered species, assessment of the potential impact of a recycling project on the habitat is important.

7.1.1 Hydrology of the Santa Clara River

Beginning in the San Gabriel Mountains east of Santa Clarita, the Santa Clara River flows approximately 84 miles westward to the Pacific Ocean. Surface flow typically occurs during the rainy or snowmelt seasons; however, portions of the river have surface flow year round. Natural "rising water," agricultural runoff, and other miscellaneous flow contribute to the year-round flow.

In the Santa Clarita Valley, the Valencia and Saugus WRPs contribute to the river flow year-round. Typically, there is year-round surface flow in the river from the Valencia WRP to the vicinity of Piru. In summer months, it appears that the effluent from the WRPs comprises a significant portion of the river flow. An analysis was performed to estimate the current effluent contribution from the two WRPs to the total average stream flow on a monthly basis. The analysis was based on 10 years of stream flow data from Stream Gauge F92C-R provided by the County of Los Angeles Department of Public Works and effluent flow data for the Saugus and Valencia WRPs from LACSD. Stream gauge F92C-R is located on the Union Pacific Railroad bridge, which crosses the Santa Clara River and runs adjacent to Interstate 5. Stream gauge F92C-R has been given several names throughout its forty-year existence, including "Santa Clara River at Railroad Bridge" and "Old Road Bridge". Based on the available data, combined effluent flows from both treatment facilities contribute more than 90 percent of the total river flow from July through October. Table 7-1 summarizes this analysis.

7.1.2 Riparian Habitat

The Santa Clara River is one of the few major drainages of the San Gabriel Mountains that remains predominantly unchannelized. It includes freshwater marshes and woodland communities. These habitat types are rapidly disappearing and are important to the local wildlife, as described in numerous biological resource assessments. Such assessments have assisted the Department of Regional Planning, Los Angeles County, in designating Significant Ecological Areas (SEAs) within the county. The original SEA study was completed in 1972, with the second following in 1976. The existing 61 SEAs reflect the findings from the 1976 study. To date, the river plain from the vicinity of the Valencia WRP downstream to the Ventura/Los Angeles County line is designated a SEA by Los Angeles County. However, the increase in population and developed land within the Los Angeles County has created the need to re-evaluate the existing SEA program as part of the next General Plan amendment. The 2001 proposed Santa Clara SEA encompasses the entire Los Angeles County reach of the Santa Clara River, primarily within unincorporated areas of Los Angeles County.

TABLE 7-1
PERCENTAGE OF CURRENT STREAM FLOW AS EFFLUENT

Month	1990-2000 F92C-R Reading (mgd)[a]	2000 Valencia WRP Flow (mgd)	2000 Saugus WRP Flow (mgd)	Natural River Flow (mgd)[b]	Total River Flow (mgd)[c]	Effluent % of Flow
January	110	10.62	5.19	104.81	120.62	13%
February	115	10.74	5.47	109.53	125.74	13%
March	28	10.8	5.27	22.73	38.8	41%
April	18	11.02	5.32	12.68	29.02	56%
May	17	11.21	5.29	11.71	28.21	58%
June	9	11.69	5.17	3.83	20.69	81%
July	6	12.08	4.81	1.19	18.08	93%
August	4	11.98	5.35	0	15.98	100%
September	4	10.95	6.35	0	14.95	100%
October	7	11.31	5.84	1.16	18.31	94%
November	12	11.21	5.58	6.42	23.21	72%
December	24	10.62	6.26	17.74	34.62	49%

Notes:
(a) Average based on 10 years of stream flow data, 1990-2000, from Los Angeles County Department of Public Works Stream Gauge F92C-R.
(b) Stream gauge F92C-R less the upstream Saugus WRP flow.
(c) Stream gauge F92C-R monthly average plus downstream Valencia WRP flow.

7.1.3 Endangered Species

The Santa Clara River supports numerous sensitive biological resources, including habitats and individual species, which have been afforded special recognition by federal, state, or local conservation agencies and organizations as endangered, threatened, rare, or otherwise of concern. Table 7-2 presents the habitats as well as plant and animal species present, or potentially present within the Santa Clara River that have been afforded special recognition as described in the 2001 Draft Biological Resource Assessment of the Proposed Santa Clara River SEA. The species in Table 7-2 have been recorded within the SEA as well as those reasonably expected to occur. The location of each species reflects observations, records in the California Natural Diversity Database, or reported in previous documentation as observed within or in the immediate vicinity of the proposed SEA.

TABLE 7-2
SENSITIVE SPECIES OCCURRING OR POTENTIALLY OCCURRING WITHIN THE PROPOSED SANTA CLARA RIVER SEA

Scientific Name	Common Name	Agency Listing Status[a]	Preferred Habitat	Location
FISH				
Gasterosteus aculeatus williamsoni	unarmored threespine stickleback	FE, SE, SFP	Fresh water rivers and streams in the L.A. basin; low flow areas.	Common in Santa Clara River, Arrastre Creek
Catostomus santaanae	Santa Ana sucker	FE, CSC	Sand, rubble, boulder bottoms; cool, clear water; feed on algae.	Santa Clara River
AMPHIBIANS				
Bufo microscaphus californicus	arroyo southwestern toad	FE, CSC, SP	Washes/streams, sandy banks, grown to willows, cottonwoods or sycamores; riparian habitats of semi-arid areas, small cobbly streambeds.	One individual recorded along the Santa Clara River; San Francisquito Cyn.; Castaic Creek (above dam)
REPTILES				
Clemmys marmorata pallida	southwestern pond turtle	FSC, CSC, SFP	Ponds, marshes, rivers, streams, irrigation ditches.	Ben Cyn.; Vasquez Rocks; one individual in Santa Clara River, Newhall Ranch
Cnemidophorus tigris multiscutatus	coastal western whiptail	FSC	Arid and semi-arid desert to open woodlands, where vegetation is sparse.	Santa Clara River and San Francisquito Creek; Common in SEA
Diadophis punctatus modoestus	San Bernardino ring-neck snake	FSC	Open, relatively rocky areas, within valley-foothill, mixed chaparral, and annual grass habitats.	Placerita Cyn; Santa Clara River
BIRDS				
Ixobrychus exilis hesperis	western least bittern	CSC	Emergent wetlands of cattails and tules.	Santa Clara River
Accipiter cooperi	Cooper's hawk	CSC	Open woodlands especially riparian woodland.	Santa Clara River nesting records; foraging over Newhall Ranch; San Francisquito Creek, common in SEA
Buteo swainsoni	Swainson's hawk	ST	Plains, ranges, open hills, sparse trees.	Occasional along Santa Clara River; Newhall (100 birds in 2000)
Elanus leucurus	white-tailed kite	SFP	Grasslands with scattered trees, near marshes, along hwys.	Nesting in woodlands along Santa Clara River, Live Oak Springs Cyn., Placerita Cyn.; near Pico Cyn.; common locally
Coccyzus americanus occidentalis	western yellow-billed cuckoo	SE	Riverine woodlands, thickets, and farms.	Record from Santa Clara River near Magic Mountain Park (Newhall Ranch; 1974)

Scientific Name	Common Name	Agency Listing Status[a]	Preferred Habitat	Location
Empidonax traillii extimus	southwestern willow flycatcher	FE	Low elevation sites: Riparian woodlands that contain water and low growing willow thickets. High elevation sites: Large, flat, wet meadows that contain patches of willow trees.	One individual observed in mature riparian woodlands of Santa Clara River; nests near Lang, approx. 6 mi. E of Newhall
Lanius ludovicianus	loggerhead shrike	FSC, CSC	Open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	4 pairs near agricultural fields/open chaparral near San Francisquito Creek; near Santa Clara River at County line; common locally in SEA
Vireo bellii pusillus	least Bell's vireo	FE, SE	Perennial and intermittent streams with low, dense riparian scrub and riparian woodland habitats below 2,000 feet elevation; nests primarily in willows and forages in the riparian and occasionally in adjoining upland habitats.	Small population recorded in Santa Clara River riparian woodland and scrub zone along the Ventura-LA county border; Castaic Creek at Santa Clara River
Dendroica petechia brewsteri	yellow warbler	CSC	Riparian woodlands, montane chaparral, and mixed conifer habitats.	Several pairs recorded nesting in Nat'l Forest near Francisquito Creek; occasionally nests along Santa Clara River
Icteria virens	yellow-breasted chat	CSC	Riparian woodlands with a thick understory.	One individual recorded in San Francisquito Creek near Santa Clara River
Piranga rubra	Summer tanager	CSC	Cottonwood-willow woodland and riparian scrub.	Santa Clara River near Lang
MAMMALS				
Antrozous pallidus	pallid bat	CSC	Nests in dry, rocky habitats/caves, crevices in rocks, arid habitats including deserts, chaparral, and scrublands.	Historic records in Santa Clara River watershed, Soledad Cyn., and Castaic Creek; common locally
Neotoma lepida intermedia	San Diego desert woodrat	FSC, CSC	Chaparral, coastal sage scrub, and pinyon-juniper woodland.	Adjacent to Santa Clara River, Newhall Ranch; common in SEA

Note: (a) FE Federally Listed as Endangered
FSC Federally Special Concern Species
SE State Listed as Endangered
SP State Protected
SFP State Fully Protected
CSC California Special Concern Species

7.1.4 Potential Impact of the Recycled Water System on Instream Flows

Because effluent from the Saugus and Valencia WRPs comprises a majority of the flow in the Santa Clara River during summer months, it is important to consider the effect of expanding the recycled water system on the total river flow. In the future, the Santa Clara River may be affected by the Saugus and Valencia WRPs regardless as to what extent the recycled water system is implemented. If the proposed expansion of the recycled water system is not implemented, the effluent from the Saugus and Valencia WRPs would continue to be discharged and average annual discharges to the river would increase by more than 100 percent by the year 2015.

In 1988, CLWA approved a programmatic Environmental Impact Report (EIR) that included a recycled water element. This element included development of 1,700 AF/yr of recycled water and the minimum effluent discharged to the river in 1988 was assumed to be 9.72 mgd for the month of March. This flow was determined by the EIR to have no impact on the environment. Until additional habitat studies are conducted, it is assumed that for the purpose of this Master Plan, the 2000 baseline flow of 16.25 mgd (from Valencia and Saugus WRPs) minus the 1.5 mgd (1,700 AF/yr) currently under development would be discharged to the river. Consequently, future flows above 14.75 mgd would be available for irrigation use.

The impacts on the river habitat and the endangered species from diverting WRP effluent to reuse are beyond the scope of this report. It is recommended that a detailed habitat study be conducted and the minimum flow necessary to maintain the existing habitat be evaluated. Based on this evaluation, additional recycled water diversions may be possible.

7.2 Water Rights Considerations

The ability of CLWA to use recycled water is also constrained by their rights to use the water available. The water rights issues are different for recycled water from the WRPs, oil field produced water, and treated perchlorate-contaminated water.

7.2.1 Recycled Water from LACSD

A determination of rights to treated wastewater is required prior to long-term project expenditures. Ownership of the rights to wastewater is addressed in three separate state laws or codes:

- Clean Water and Water Bond Law of 1978
- California Department of Fish and Game Code, Section 1600
- Water Code, sections 1210, 1211, and 1702

The Clean Water and Water Bond Law of 1978 established that treated wastewater was the property of the treatment facility that produced it and that the producer could sell or transfer its rights to the treated wastewater. In addition, the rights of the treatment facility allowed the treated wastewater to be used for beneficial purposes regardless of the detriment to downstream users. However, the advice of legal counsel for individual determinations and the development of most equitable and least detrimental projects to all affected parties are recommended.

The California Department of Fish and Game Code Section 1600 requires that "any project which will divert, obstruct or change the natural flow or bed, channel or bank of any river, stream or lake designated by the department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit" be modified sufficiently "for the protection and continuance of the fish or wildlife resources." On the Santa Clara River, there are users of river water downstream of both the Saugus and Valencia WRPs, as well as SEAs that support endangered species. Potential impacts to these users and the habitat should be addressed in the environmental documents to be prepared for this proposed recycled water project.

Water Code section 1210 provides that "the owner of a wastewater treatment plant has the exclusive right to treated wastewater as against anyone who has supplied the water to the treatment plant, except as otherwise provided by agreement." However, section 1210 expressly provides that this provision does not affect the treatment plant owner's obligations to any legal user of the discharged treated wastewater. Thus, if downstream or secondary appropriators of wastewater flow are considered to be legal users, the right of producers to recycled water could be limited. Such instances have occurred, most recently in Victor Valley (*Victor Valley Wastewater Reclamation Authority, Order WR 2001-Draft)* in which a treated wastewater change petition was denied on the account of injury to third party water right holders.

Water Code section 1211 requires the SWRCB to review a proposed change in point of discharge, place of use, or purpose of use of treated wastewater in the same manner as the SWRCB would review a proposed change to an appropriative water right. As both sections 1210 and 1211 make clear, however, the Legislature did not intend to affect any rights that downstream users may have to the treated wastewater discharge under the common law. Therefore, Water Code section 1702 provides that before granting permission to make a change, the SWRCB must find "that the change will not operate to the injury of any legal user of the water involved." The statutory "no injury" rule set forth in Water Code section 1702 codifies that common law no injury rule and therefore should be interpreted consistent with case law that interprets and applies the common law rule. Generally, the common law no injury rule precludes a change in the exercise of a water right if, among other things, the change would alter the pattern or rate of return flow to the detriment of downstream water right holders (*Scott v. Fruit Growers' Supply Co., 1972).*

An important limitation to the no injury rule is that downstream water right holders are protected from injury only to the extent that the source of the return flow is "native water," as opposed to "foreign water." Native water is that water that under natural conditions would contribute to a given stream or other body of water (surface water or percolating groundwater). When the source of return flow to a stream is native water, the return flow is considered part of the natural flow of the stream to which riparian and appropriative water rights may attach. The no injury rule does not protect downstream water right holders when the source of the return flow is "foreign water." A common example of foreign water is imported water, or SWP water. Riparian right holders have no right to use return flow from foreign water because riparian rights extend only to the natural flow of the stream.

Groundwater extracted from and used in the Santa Clarita Valley and then discharged to the Santa Clara River as wastewater effluent may be considered a "native water" in the river; however, SWP water imported into and used in the Santa Clarita Valley and then discharged to the Santa Clara River as wastewater effluent is clearly a "foreign water." Furthermore, while it could be argued that the existing discharges have a permanent public use (i.e., habitat), only the "foreign water" percentage within the effluent flows could be diverted for recycling purposes.

In the year 2000, Santa Clarita Valley's water supply consisted of approximately 46 percent groundwater and 53 percent imported water. Projected water demand for the year 2015 is approximately 91,600 AF, 50 percent derived from foreign water and 50 percent derived from native sources. The projected recycled water component would consist of approximately 45 percent of projected wastewater generation. Table 7-3 presents a water supply analysis for the CLWA service area through the year 2015. The table projects the ratio of annual recycled water use to annual imported water use. The maximum recycled water use projected for 2015 is equivalent to approximately 40 percent of the total foreign water projected for that year.

TABLE 7-3
USE OF NATIVE WATER VS. FOREIGN WATER

	Native Water (AF/yr)	Foreign Water (AF/yr)[(a)]	Recycled Water (AF/yr)	Total (AF/yr)	Wastewater Flow (AF/yr)	Wastewater as a Percentage of Water Use	Foreign Water Portion of Wastewater (AF/yr)
Existing	28,409	32,579	1,700	62,688	18,685	30%	9,973
Future	30,800	47,600	19,000	95,400	38,200	40%	19,000

Note: (a) Foreign water includes SWP water, water transfers, and desalination.

7.2.2 Oil Field Produced Water

Oil field produced water at the Berry Petroleum oil fields is produced during petroleum extraction operations by Berry Petroleum. The rights for water produced with petroleum are generally considered to be subject to the rule of capture and, as such, are owned by the owner of the mineral rights. Thus, water rights to the oil field produced water lies with Berry Petroleum who has the right to sell the oil field produced water to CLWA for beneficial uses.

7.2.3 Perchlorate-Contaminated Water

Perchlorate contamination of four wells was detected in 1997. These wells are located within the Santa Clarita Valley, owned and operated by three separate purveyors: NCWD, SCWC, and VWC. Within the non-adjudicated basin, each purveyor is the owner and operator of their wells, and has an appropriative right to the pumped groundwater. Each purveyor has the right to sell the pumped contaminated groundwater to CLWA for beneficial use.

7.3 Recycled Water Supply Availability

Based on the potential environmental and water rights constraints, a recycled water supply of 15,000 to 19,000 AF/yr appears available if sufficient demand can be developed. According to a target capacity of 17,000 AF/yr is recommended. A market assessment for recycled water is presented in Section 8. If a habitat evaluation indicates that increased diversions of recycled water can be allowed without adverse impacts, additional recycled water development is recommended.

Section 8: Market Assessment for Recycled Water

In this section, potential recycled water users within the CLWA service area are identified. For each potential user, estimates are provided for annual demand, peak monthly demand, peak daily demand, and the hourly distribution of water demand during peak months. The requirements for potential users to convert their existing water potable systems to recycled water are also discussed.

8.1 Potential Users

Potential recycled water users were identified through a number of sources including:

- 1993 Recycled Water Master Plan
- Water consumption records for LACWD No. 36, NCWD, SCWD, and VWC.
- Land use maps.
- General Plans and Specific Plans for the City of Santa Clarita and County of Los Angeles.
- Discussions with City, County, water purveyor, and land developer staff.
- "Windshield" survey of the CLWA service area.

In order to be considered as a potential recycled water user, the user had to be located within the CLWA service area and have a potential non-potable water demand of at least 4 AF/yr. A preliminary list of potential users and their recycled water demand is included in Appendix A, with their locations shown in Figure 8-1. A total potential demand of 33,249 AF/yr was identified.

Potential users with existing water demands ("existing users") include Six Flags Magic Mountain Amusement Park, several golf courses, freeway and roadway median landscaping, the Civic Center, residential and industrial development, and several schools and parks. Potential users with future water demands ("future users") include additional residential and industrial development, as well as additional golf courses. Table 8-2 summarizes the potential demands attributable to existing and future recycled water users.

TABLE 8-2
EXISTING VS. FUTURE RECYCLED WATER USERS

Type of User	Projected Demand (AF/yr)
Existing	8,375
Future	9,064
Total	17,441

The initial list of potential recycled water users was reduced by evaluating the potential users that it would be most expensive to serve until potential uses were approximately 17,000 AF/yr. The cost per acre-foot to serve each user was calculated using the capital costs for pipelines, reservoirs, and pump stations as well as operational costs for pumping. The areas that were retained for recycled water service had costs per acre-foot ranging from $120 to $5,000. Areas that were eliminated from service had costs as high as $13,000/AF. The resulting recycled

water service area centers on Valencia and encompasses a large portion of the CLWA service area.

Table 8-1 presents the final list of potential users to be served by the recycled water system. The locations of the users are shown in Figure 8-2. The user numbers in Figure 8-2 correspond with the user numbers in Table 8-1.

8.2 Potential Recycled Water Demand

Potential annual demands for recycled water were estimated from historical water use records for existing users and the proposed irrigated area and expected water user per acre for future users. Demands for recycled water are seasonal, with the highest demands occurring during the hot, dry summer months when irrigation requirements are greatest. Peak monthly irrigation demands for existing users were assessed based on available historical data. To approximate peak monthly demand for future users, a peak monthly usage factor was calculated for the CLWA service area by dividing the combined peak monthly demand of the existing users by the combined average monthly demand. The peaking factor calculated was approximately 2.25. Peak monthly demands were then estimated by applying the peak monthly factor to each future user's average monthly demand.

Peak daily demands and peak hourly demands for existing potential users were either provided by the user, or estimated based on the number of irrigation days per month and the irrigation hours per day. For future potential users, peak daily demands and peak hourly demands were estimated based on irrigation days and hours provided by existing potential user of the same type (e.g., golf course, school, park).

The estimated annual, peak monthly, peak daily, and peak hourly demands for the recycled water users are shown in Table 8-1. The total annual recycled water demand is approximately 17,441 AF/yr. Total peak monthly demand is estimated to be 3,071 AF and total peak daily demand is estimated to be 101 AF.

During the peak month, recycled water demand is anticipated to be highest between the hours of midnight and 6:00 a.m., as most irrigation customers irrigate at night. This is due partly to water efficiency and horticultural benefits, but is also a requirement of DHS to limit public contact. Demand during the peak demand period is expected to be 65,230 gpm.

8.3 Conversion Requirements

DHS and the California/Nevada Section of AWWA have prepared guidelines for use of recycled water, which are based on the reclamation criteria set forth in Title 22 and discussed in Section 5.3.2. The guidelines address the steps that should be taken in converting potable water systems to recycled water systems. Two primary goals of the guidelines are to prevent potable water systems from being contaminated by recycled water and to make the public aware that recycled water is being used.

For users with separate irrigation and potable water systems, the primary requirement will be to disconnect the irrigation system from the potable water service and connect it to the recycled water service. Reduced pressure principle backflow prevention devices will need to be installed on the potable service immediately downstream of the meter. For those users with irrigation systems that tie to their potable water systems at several locations, the systems will have to be separated. Additionally, hose bibbs will need to be eliminated from the irrigation systems.

TABLE 8-1
PROPOSED RECYCLED WATER USERS

Map Location #	User Name	Address	Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
5	Live Oak Elementary	27715 Saddleridge Road, Castaic	21	6.00	0.20	64.3	179
6	**Newhall School District** Office	25375 Orchard Village Rd, Valencia	6	1.00	0.03	10.7	30
9	Valencia Valley Elementary	23601 Carrizo Drive, Valencia	18	3.00	0.10	32.2	89
11	Newhall SD Transp/Maintenance	26501 Golden Valley, SCTA	4	1.00	0.03	10.7	30
13	Cedar Creek Elementary	27792 Camp Plenty, CC	12	3.00	0.10	32.2	89
14	Emblem Elementary	22685 Espuella, Saugus	13	3.00	0.10	32.2	89
16	Helmers Elementary	27300 Grandview Drive, Valencia	5	1.00	0.03	10.7	30
17	Highlands Elementary	27332 Catala, Saugus	18	4.00	0.13	42.9	119
19	Rio Vista Elementary	20417 Cedarcreek, CC	23	6.00	0.20	64.3	179
20	Rosedell Elementary	27583 Urbandale Ave, Saugus	21	5.00	0.16	53.6	149
21	Santa Clarita Elementary	27177 Seco Canyon Rd, Saugus	13	2.00	0.07	21.4	60
25	Valencia High	27801 Dickason Drive, Valencia	100	26.00	0.86	278.7	774
26	Arroyo Seco Jr. High	22171 Vista Delgado, Saugus	60	11.25	0.37	120.6	335
27	Sierra Vista Jr. High	19425 Stillmore Street, CC	55	10.31	0.34	110.6	307
28	Canyon High	19300 Nadal Street, CC	110	20.63	0.68	221.1	614
29	Bowman High	21508 Redview Drive, SCTA	9	1.69	0.06	18.1	50
30	La Mesa Jr. High	26623 May Way, SCTA	55	10.31	0.34	110.6	307
31	Magic Mountain Resort Golf Course		429	80.44	2.65	862.3	1,597
32	Magic Mountain Amusement Park	26101 Magic Mountain Pkwy, Valencia	476	89.25	2.94	956.8	1,595
33	Valencia Interchange	Valencia Blvd & MM Pkwy	6	1.13	0.04	12.1	34
34	Valencia Country Club/Golf Course	27330 Tourney Rd, SC	590	76.10	2.50	815.8	1,511
35	Honor Rancho Golf Course		450	84.38	2.78	904.5	1,675
36	Santa Clarita Sports Complex	26407 Golden Valley Road, SCTA	50	9.38	0.31	100.5	168
39	North River Industrial		105	19.69	0.65	211.1	586
40	North River High School		135	25.31	0.83	271.4	754
41	North River Jr. High School		60	11.25	0.37	120.6	335
42	North River Golf Course		600	112.50	3.70	1206.0	2,233
43	North River Commercial		45	8.44	0.28	90.5	251
44	Lago de Valencia - Commercial	McBean/Newhall Ranch Rd(E corner), N Valencia	29	5.44	0.18	58.3	162
45	Lago de Valencia - Elementary School	North Valencia Phase II	16	3.05	0.10	32.7	91
46	Lago de Valencia - park/rec	Newhall Ranch Rd/N SC River, Valencia	46	8.63	0.28	92.5	154
48	Bouquet South - Commercial	Bouquet Canyon Rd/Newhall Ranch Rd, N Valenc	48	9.00	0.30	96.5	268
49	Pony League - Pony League Ballfields	Valencia Blvd/SC & S Fork River, N Valencia	43	8.06	0.27	86.4	144
50	Pony League - Commercial	Valencia Blvd/SC & S Fork River, N Valencia	33	6.19	0.20	66.3	184
51	South River Village - Commercial	NW corner McBean Pkwy & MM Pkwy, N Valencia	44	8.25	0.27	88.4	246
52	Valencia Industrial Center	24800 block of Tibbetts Avenue, N Valencia	27	5.06	0.17	54.3	151
53	Civic Center		4	0.75	0.02	8.0	22
54	Saugus High	21900 Centurion Way, Saugus	110	20.63	0.68	221.1	614
55	Rio Vista Center		300	56.25	1.85	603.0	1,675
56	Panhandle Commercial		15	2.81	0.09	30.2	84
57	City Civic Center		125	23.44	0.77	251.3	698
58	City Center Commercial		10	1.88	0.06	20.1	56
59	City Center Commercial		5	0.94	0.03	10.1	28
60	Westridge Golf Course		880	165.00	5.43	1768.9	3,276
61	Vista Valencia Golf Course	24700 W Trevino Dr, SC	36	6.75	0.22	72.4	134
63	Old Orchard Elementary	25141 Avenue Rondel, Newhall	17	3.00	0.10	32.2	89
64	Old Orchard Park (City)	25023 Avenida Rotella, Valencia	24	4.00	0.13	42.9	71

Map Location #	User Name	Address	Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
65	Orchard Village Road Tree Farm		6	1.13	0.04	12.1	34
66	Henry Mayo Hospital	23845.5 McBean Pkwy, Valencia	153	23.00	0.76	246.6	685
67	College of the Canyons/Academy of the Canyons	25455 N. Rockwell Canyon Rd, Valencia	213	39.94	1.31	428.1	1,189
68	Newhall Elementary	24607 Walnut Street, Newhall	63	11.81	0.39	126.6	352
69	William S. Hart Park (City)	24151 N. San Fernando Rd, Newhall	707	132.56	4.36	1421.1	2,369
70	College of the Masters (Masters College)	21726 Placerita Canyon Rd, Valencia	24	5.00	0.16	53.6	149
71	Hart High School	24825 Newhall Avenue, Newhall	31	14.00	0.46	150.1	417
72	H.M. Newhall Memorial Park (City)	24923 Newhall Avenue, Newhall	49	8.00	0.26	85.8	143
73	Placerita Jr. High/Learning Post	25015 Newhall Avenue, Newhall	53	9.94	0.33	106.5	296
74	Valencia Glenn City Park	23750 Via Gavola, Valencia	29	5.00	0.16	53.6	89
76	Peachland Elementary	24800 Peachland Avenue, Newhall	30	5.63	0.19	60.3	168
78	Tract 32365 Common Area (Palmer)		108	20.25	0.67	217.1	603
79	Valencia Meadows Elementary	25577 Fedala Rd, Valencia	16	3.00	0.10	32.2	89
80	Valencia Meadows Park (City)	25671 Fedala Rd, Valencia	6	1.00	0.03	10.7	18
84	Friendly Valley Golf Course	19345 W. Avenue of the Oaks, Newhall	107	20.06	0.66	215.1	398
94	Summit Common Area (N & S)		157	29.44	0.97	315.6	877
95	Ridgedale Common Area		214	40.13	1.32	430.2	1,195
98	Golden Oak Ranch	19802 Placerita Canyon Road, Newhall	632	118.50	3.90	1270.4	3,529
99	Almendra Park (City)	23420 Alta Madera Drive, SCTA	11	2.02	0.07	21.6	36
100	Driving Range		24	4.50	0.15	48.2	89
101	North Oaks Park (City)	27824 Camp Plenty Road, SCTA	6	1.08	0.04	11.6	19
102	Santa Clarita Park (City)	27285 Seco Canyon Road, Saugus	19	3.52	0.12	37.7	63
104	Hasley Canyon Park (County)	28700 W. Quincy Street, Castaic	17	3.19	0.10	34.2	57
108	Canyon Country Park (City)	17615 Soledad Canyon Road, CC	43	8.06	0.27	86.4	144
113	North River Commercial		24	4.50	0.15	48.2	134
125	Central Park (City)	27150 Bouquet Canyon Rd, Saugus	140	26.25	0.86	281.4	469
126	Creekview Park (City)	22200 Park Street, SCTA	13	2.44	0.08	26.1	44
127	Bridgeport Park (City)	23520 Bridgeport Lane, SCTA	44	8.25	0.27	88.4	147
128	Circle J Park (City)	22651 Via Princessa, SCTA	15	2.81	0.09	30.2	50
132	Northbridge Park	Grandview Drive, E of McBean Pkwy	22	4.13	0.14	44.2	74
136	Apple Park	24829 Apple Street-Z, Newhall	7	1.00	0.03	10.7	18
139	Park - Adjacent to Valencia Valley Elem?	23645 Carrizo Drive, Valencia	11	2.00	0.07	21.4	36
141	Santa Clarita Christian School (k-12)	27249 Luther Drive, SCTA	6	1.13	0.04	12.1	34
143	Legacy Academy	North Valencia Phase II	16	3.05	0.10	32.7	91
144	Valencia Vista HOA	Nandina&Valle Del Oro Irrigation, Newhall	10	2.00	0.07	21.4	60
145	Valencia Vista HOA	Valle Del Oro @ Pool, Newhall	9	1.00	0.03	10.7	30
146	Valencia Vista HOA	Valle Del Oro, Newhall	11	2.00	0.07	21.4	60
147	Valencia Vista HOA	Leonard Tree Irrigation, Newhall	15	2.00	0.07	21.4	60
149	Valencia Vista HOA	Valle Del Oro, Newhall	21	3.00	0.10	32.2	89
150	Valencia Vista HOA	Valle Del Oro, Newhall	9	2.00	0.07	21.4	60
161	Lantana Hills HOA	23818.5 Oakhurst Dr, Newhall	26	6.00	0.20	64.3	179
162	Lantana Hills HOA	23804.5 Oakhurst Dr, Newhall	17	4.00	0.13	42.90	119
163	Lantana Hills HOA	23800.5 Oakleaf Cyn Dr, Newhall	18	4.00	0.13	42.9	119
165	Lantana Hills HOA	21101.5 Oakriver Ln, Newhall	7	2.00	0.07	21.4	60
166	Lantana Hills HOA	23712.5 Oakhurst Dr., Newhall	6	2.00	0.07	21.4	60
167	Lantana Hills HOA	21100.5 Oakleaf Cyn Dr, Newhall	12	4.00	0.13	42.9	119
168	Peachland Owners Assoc	25003-39 Peachland, Newhall	26	4.00	0.13	42.9	119
197	The Terrace (Apts?)	21421 Plane Tree Dr, Newhall	7	1.00	0.03	10.7	30
198	The Terrace (Apts?)	Grape Lily (Irigtn), Newhall	8	1.00	0.03	10.7	30
199	The Terrace (Apts?)	Valle Del Oro, Newhall	15	4.00	0.13	42.9	119

Map Location #	User Name	Address	Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
200	The Terrace (Apts?)	Valle Del Oro, Newhall	16	4.00	0.13	42.9	119
201	The Terrace (Apts?)	Bottletree (Irigtn), Newhall	11	2.00	0.07	21.4	60
202	The Terrace (Apts?)	Ficus 21211-21-24334 Choke Cherry, Newhall	9	1.00	0.03	10.7	30
203	The Terrace (Apts?)	Ficus (Irigtn), Newhall	6	1.00	0.03	10.7	30
204	The Terrace (Apts?)	Fern Drive, Newhall	9	1.00	0.03	10.7	30
208	Coastal Meadowridge	23645 Meadowridge S/S Co, Newhall	14	4.00	0.13	42.9	119
234	Canyon Springs Elementary	19059 Vicci Street, CC	8	1.50	0.05	16.1	45
235	Leona Cox Elementary	18643 Oakmoor Street, CC	8	1.50	0.05	16.1	45
237	Mitchell Elementary	16821 Goodvale Road, CC	8	1.50	0.05	16.1	45
251	City of Santa Clarita	Newhall & San Fern S/W Crn, Newhall	32	6.00	0.20	64.3	179
252	City of Santa Clarita	24242 Railroad Ave, Newhall	165	24.00	0.79	257.3	715
253	City of Santa Clarita	22200 Park St., Newhall	1614	277.00	9.11	2969.5	8,249
254	City of Santa Clarita	27285 Seco Canyon Rd	28	5.25	0.17	56.3	156
256	City of Santa Clarita Park	Meadow Drive	25	4.69	0.15	50.3	140
257	Sierra Heights Lndscp Maintnc Dist (LMD)	Canvas Street	4	0.75	0.02	8.0	22
258	Sunset Hills LMD	19500 Via Princessa	34	6.38	0.21	68.3	190
262	Area Wide District LMD	N Newhall Ranch Rd	11	2.06	0.07	22.1	61
263	Area Wide District LMD	Btwn McBean Pkwy&Bouquet Canyon on river	11	2.06	0.07	22.1	61
264	Area Wide District LMD	Near Henry Mayo Hospital	11	2.06	0.07	22.1	61
265	Area Wide District LMD	Blackbird Lane	11	2.06	0.07	22.1	61
266	Old Orchard	23600 Lyons Ave	13	2.44	0.08	26.1	73
267	Valencia Hills	23000 Wiley Canyon Rd	19	3.56	0.12	38.2	106
268	Valencia Meadows	S 25500 McBean Pkwy	6	1.13	0.04	12.1	34
269	Valencia Glen	N Orchard Village Rd	10	1.88	0.06	20.1	56
270	South Valley HOA	25700 McBean Pkwy	6	1.00	0.03	10.7	30
271	Central & North Valley	26500 McBean Pkwy	35	6.56	0.22	70.4	195
272	Valencia Summit	Rockwell Canyon&McBean Pkwy (center)	252	47.25	1.55	506.5	1,407
273	Corporate Center	Sprinfield Court	4	0.75	0.02	8.0	22
278	American Beauty	Fanchon Lane	13	2.44	0.08	26.1	73
279	Shangri-La	Shangri-La Drive	40	7.50	0.25	80.4	223
280	Circle J Ranch	Circle J Rd	74	13.88	0.46	148.7	413
281	Circle J Ranch	Circle J Rd	21	3.94	0.13	42.2	117
282	Northbridge	24000 Newhall Ranch Rd	373	69.94	2.30	749.8	2,083
292	Institutional (Porta Bella Dvlpmt)	Via Princessa & Santa Clarita Pkwy	10	1.88	0.06	20.1	56
293	Porta Bella Park	Santa Clarita Pkwy	55	10.31	0.34	110.6	184
294	Porta Bella Park	S of Santa Clarita Pkwy	9	1.69	0.06	18.1	30
295	Porta Bella Park	San Fernando Rd	13	2.44	0.08	26.1	44
296	Porta Bella Recreational	Soledad Canyon Rd	14	2.63	0.09	28.1	47
297	Porta Bella Recreational	S of Soledad Canyon Rd	14	2.63	0.09	28.1	47
298	Porta Bella Town Center	N. San Fernando Rd	62	11.63	0.38	124.6	346
299	Porta Bella-Soledad Community Center	Soledad Canyon Rd	31	5.81	0.19	62.3	173
300	Porta Bella-Neighborhood Community Center	Via Princessa & Santa Clarita Pkwy	21	3.94	0.13	42.2	117
301	Porta Bella Office Park	Soledad Canyon Rd	14	2.63	0.09	28.1	78
302	Porta Bella Office Park	Soledad Canyon Rd	12	2.25	0.07	24.1	67
303	Porta Bella Office Park	San Fernando Rd	19	3.56	0.12	38.2	106
304	Porta Bella Business Park	Soledad Canyon Rd	30	5.63	0.19	60.3	168
305	Porta Bella Business Park	S of Soledad Canyon Rd	14	2.63	0.09	28.1	78
306	Porta Bella Business Park	S of Soledad Canyon Rd	10	1.88	0.06	20.1	56
307	Porta Bella Business Park	S of Soledad Canyon Rd	14	2.63	0.09	28.1	78
308	North Valencia Jr HS	undetermined	50	9.38	0.31	100.5	279

Map Location #	User Name	Address	Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
309	North Valencia Eastcreek Community Park	McBean & Newhall Ranch Rd	40	7.50	0.25	80.4	134
310	N Valencia Decoro Park-Business Park	Dickason Dr	247	46.31	1.52	496.5	1,379
311	Golden Valley Ranch Commercial		113	21.19	0.70	227.1	631
312	Golden Valley Ranch Elementary School	Golden Valley Rd	27	4.97	0.16	53.3	148
313	Golden Valley Ranch Park	Golden Valley Rd & Placerita Canyon Rd	25	4.69	0.15	50.3	84
314	North Valencia Village Center (Eastcreek)	Decoro Dr & McBean	9	1.69	0.06	18.1	50
315	North Valencia Eastcreek County Park	McBean Pkwy	9	1.69	0.06	18.1	30
316	N Valencia Decoro Park-Commercial	Newhall Ranch Rd & Copper Hill Dr	5	0.94	0.03	10.1	28
317	North Valencia Decoro Park Private Park	Copper Hill Drive	4	0.75	0.02	8.0	13
319	Northpark School	27300 Grandview, SC	5	1.00	0.03	10.7	30
320	LA Co Parks and Rec	14519 Stoneridge - Slope	15	2.00	0.07	21.4	36
321	LA Co Parks and Rec	Grand Canyon (across from Lot 40)	9	2.00	0.07	21.4	36
322	LA Co Parks and Rec	29364 Canyon Rim (across Street)	5	1.00	0.03	10.7	18
323	Sulfur Springs USD District Office	24930 Ave Stanford, SC	4	1.03	0.03	11.0	31
325	Golden Valley Ranch Commercial		113	21.19	0.70	227.1	631
329	City of Santa Clarita	23647 Carrizo Dr	14	2.75	0.09	29.5	82
332	Newhall Ranch		3691	692.06	22.77	7419.2	5,152
333	Hasley Canyon Golf Course		450	3.91	0.13	41.9	78
334	Panhandle Golf Course		440	3.91	0.13	41.9	78
335	SunCal/Tesoro, LLC Development	Copperhill and Avenida Rancho Tesoro	375	79.38	2.61	850.9	1,576
336	Santa Clarita Post Office	Franklin Pkwy	15	2.81	0.09	30.2	56
	Total		17,441	3,071	101	32,920	65,230

Public areas, such as golf courses, parks, and schools, will need to post signs warning the public that recycled water is being used for irrigation. Parks, schools, and other users with exposed drinking fountains near landscaped areas will have to provide shields to prevent recycled water from coming into contact with the drinking fountains.

The cost of these conversion requirements are assumed to be incurred by the users; however, CLWA may adopt a policy to assist with onsite conversion costs. In general, the costs are anticipated to be relatively low. Costs will vary from user to user because the cost will depend on meter size and complexity of the irrigation system.

Section 9: Seasonal Storage Opportunities

As discussed in Section 7, effluent from both the Saugus and Valencia WRPs is currently discharged to the Santa Clara River. Implementation of the proposed recycled water system would reduce effluent discharged to the river. As recycled water demand is highest in the summer and lowest in the winter, seasonal storage may mitigate potential impacts to the river flow and enable additional recycled water supply to be available during high water use months.

9.1 Seasonal Supply and Demand Balance

Due to the need to maintain flow in the Santa Clara River, differences in the monthly production and use of recycled water affect total annual use. The Valencia WRP produces recycled water at a more or less uniform rate throughout the year. Oil field produced water and treated perchlorate-contaminated water are also produced throughout the year. CLWA would receive recycled water from Newhall Ranch WRP only during winter months. However, since most recycled water is used for irrigation, demand peaks during the summer months and is significantly less during the winter months. As a result, recycled water production may not be adequate to meet demands in summer months, while in winter months, surplus effluent may exist. To meet peak summer demands, either potable water must be used to supplement the non-potable supply or seasonal storage for recycled water must be provided.

In 2000, approximately 12.08 mgd was discharged to the Santa Clara River from the Valencia WRP and 4.81 from the Saugus WRP during the peak irrigation month (July). Peak day demands for the recycled water system are anticipated to total 32 mgd. If served by recycled water, these demands would not allow for any recycled water to be discharged to the river from the Valencia WRP during the peak irrigation months. Projected recycled water demand and available supply are shown on Table 9-1 and in Figure 9-1. The recycled water demand pattern was estimated based on evapotranspiration data from DWR.

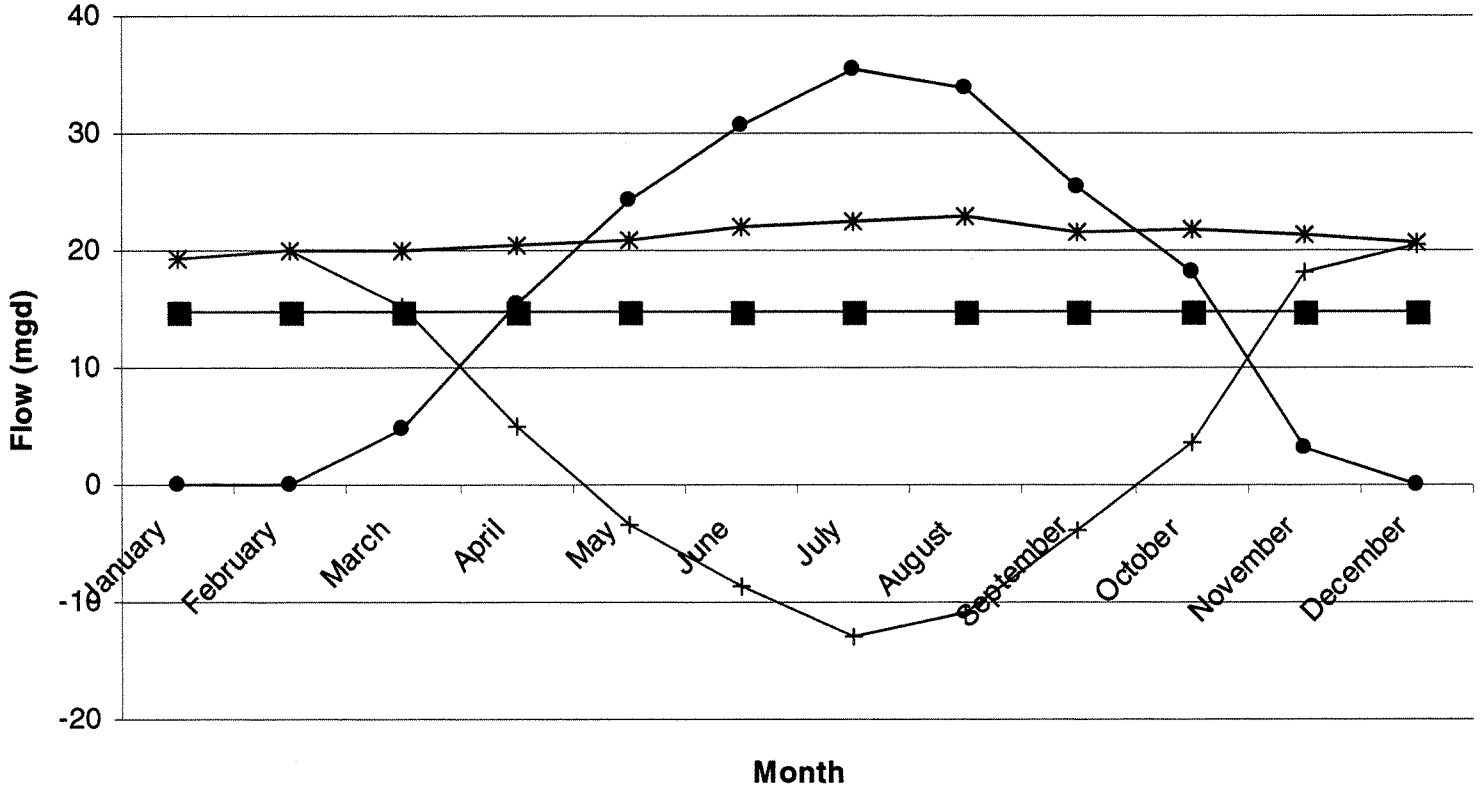
Based on this analysis, it would be desirable to provide seasonal storage to optimize recycled water utilization. The feasibility of seasonal storage is addressed in the following section.

9.2 Seasonal Storage Options

The 1993 Reclaimed Water Master Plan addressed two potential seasonal storage options: Charlie Canyon and Oak Spring Canyon sites for open aboveground reservoirs. In addition to aboveground reservoirs, aquifer storage and recovery (ASR) appears to be a potential approach to providing seasonal storage.

9.2.1 Aboveground Seasonal Storage

The 1993 Reclaimed Water Master Plan addressed the feasibility of seasonal storage in an aboveground reservoir. The list of potential sites was narrowed down to two, Charlie Canyon and Oak Spring, based on proximity to existing and planned development, to existing faults, or to the proposed recycled water system. These two sites are shown on Figure 9-2.



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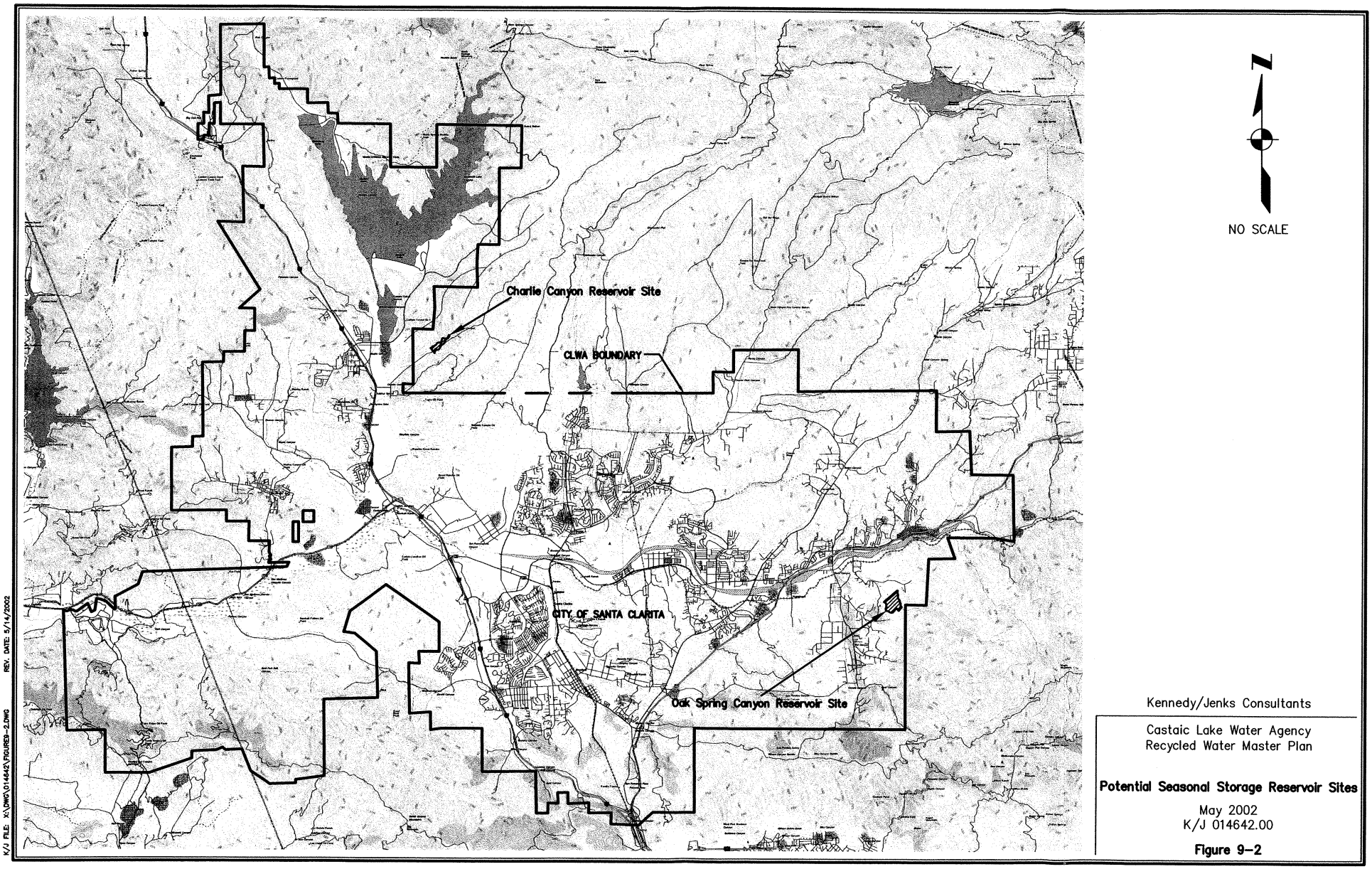
Castaic Lake Water Agency
Recycled Water Master Plan

Seasonal Recycled Water Supply vs. Demand

May 2002
K/J 014642.00

Figure 9-1



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Kennedy/Jenks Consultants

Castaic Lake Water Agency
Recycled Water Master Plan

Potential Seasonal Storage Reservoir Sites

May 2002
K/J 014642.00

Figure 9-2

TABLE 9-1
PROJECTED RECYCLED WATER DEMAND VS. SUPPLY FOR YEAR 2010

Month	Required Baseline Flow (mgd)	Available Supply (mgd)[(a)]	User Demand (mgd)	Excess (+) / Deficit (-) (mgd)
January	14.75	19.40	0.00	+19.40
February	14.75	20.02	0.00	+20.02
March	14.75	19.94	4.74	+15.20
April	14.75	20.54	15.55	+4.98
May	14.75	20.97	24.41	-3.44
June	14.75	22.01	30.75	-8.73
July	14.75	22.55	30.75	-12.88
August	14.75	22.94	33.94	-11.00
September	14.75	21.58	25.39	-3.81
October	14.75	21.87	18.18	+3.69
November	14.75	21.31	3.19	+18.12
December	14.75	20.66	0.10	+20.56
Average	14.75	21.15	17.42	+3.78

Note: (a) Available supply is total supply minus required baseline flow.

9.2.1.1 Reservoir Capacity

The Charlie Canyon site can provide up to 6,300 AF of water storage. The Oak Spring Canyon can provide up to 12,500 AF of additional water storage. Reservoir capacity should provide storage for maintenance of the minimum target river flow as well as for evapotranspiration. The reservoir should also have a minimum pool, which can equal up to one-third of the total capacity of the reservoir.

9.2.1.2 Reservoir Operation

The two reservoir sites selected allow for two approaches to mitigate potential impacts to the river habitat. The Charlie Canyon site would allow excess supply to the discharged directly to the Santa Clara River. Water from the reservoir released to Castaic Creek would supplement the discharge from the WRPs during May through October, maintaining the target flow for the river beginning at the confluence of Castaic Creek and the Santa Clara River.

The Oak Spring Canyon site would allow for pumping of excess supply up to Oak Spring Canyon, where it would be discharged and supplemented with water from the reservoir released to Oak Spring Creek. The minimum target flow would be maintained beginning at the confluence of Oak Spring Creek and the Santa Clara River.

Reservoir operation would generally follow this pattern:

- Deliver recycled water to reservoir for 5 months each year (November through March).
- Release water from reservoir for 6 months each year (May through October).

9.2.1.3 Facility Requirements and Preliminary Cost Estimates

Preliminary cost estimates for the two alternative reservoir sites, including the cost of necessary distribution system improvements, are presented in Table 9-2. Reservoir costs assume an

earthfill dam. As shown, the Charlie Canyon Reservoir is estimated to cost approximately $11.6 million. The Oak Spring Canyon reservoir is estimated to cost approximately $29.4 million. These estimates are conceptual and only represent estimated capital costs; additional detailed study would be required to further evaluate the feasibility of these reservoirs, including environmental studies, necessary documents for CEQA compliance, watershed investigations, hydrogeologic studies, geotechnical investigations, and seismic investigations.

TABLE 9-2
PRELIMINARY CAPITAL COST ESTIMATES FOR SEASONAL STORAGE RESERVOIR ALTERNATIVES

Component	Estimated Cost (2002 Dollars)	
	Charlie Canyon	Oak Spring Canyon
Reservoir	$5,259,000	$6,959,000
Additional Piping to Reservoir	$285,000	$1,748,000
System Upgrades	$0	$5,320,000
System Flushing/Testing	$10,000	$61,000
Subtotal	$5,554,000	$14,087,000
Mobilization/Demobilization (10%)	$555,000	$1,409,000
Taxes (8.25%)	$504,000	$1,278,000
Contractor OH&P (18%)	$846,000	$2,147,000
Design Allowance (20%)	$1,492,000	$3,784,000
Engineering (10%)	$895,000	$2,271,000
Legal/Admin (2%)	$197,000	$500,000
Construction Management (5%)	$502,000	$1,274,000
Contingency (10%)	$1,055,000	$2,675,000
Total Cost	$11,601,000	$29,425,000

Note: Cost estimates were prepared by adjusting the cost estimates for the 1993 Reclaimed Water Master Plan by the appropriate ENR factor. Property acquisition and additional studies are not included.

9.2.1.4 Advantages and Disadvantages of Aboveground Seasonal Storage

Aboveground seasonal storage of recycled water is difficult to implement because sites must be close to the proposed recycled water system, but sufficiently distant from existing and planned development and faults. The canyon sites that often offer the best topography for storage often involve environmental obstacles that are difficult to overcome. Permitting can also be a substantial challenge. The construction of aboveground storage reservoirs is generally expensive.

In addition, the retail water purveyors have wells along the river that draw water from the alluvial aquifer, downstream of the WRPs discharges. If recycled water is released to the river upstream of these wells, DHS may consider the water to be a potential source of waterborne contamination for the wells and may require disinfection under the Surface Water Treatment Rule, which applies to groundwater under the influent of surface water, or the Groundwater Rule. The potential impact on the retail water purveyors should be evaluated.

Finally, aboveground seasonal storage reservoirs offer operational challenges. During the many months when the reservoir is full, algae have the opportunity to grow, creating water quality problems. Disinfection or other treatment becomes necessary, further increasing both capital and operational costs.

9.2.2 Aquifer Storage and Recovery

Instead of storing recycled water in aboveground seasonal storage reservoirs, ASR could be used. During the wet winter months, when recycled water production is at its peak, but demand is low, recycled water could be injected into the Saugus Formation north of the San Gabriel Fault where potable water wells would be separated from recycled water ASR facilities by a fault. During the dry summer months, when demand is highest, the recycled water would be extracted and delivered to customers. ASR avoids the significant siting issues associated with aboveground seasonal storage. Additionally, there is no evapotranspiration loss.

9.2.2.1 Regulatory Requirements

The Draft Groundwater Recharge Regulations discussed in Section 5 apply to planned groundwater recharge projects using recycled water and located in a groundwater basin identified designated in the Basin Plan as a source or potential source of domestic water supply. All of the subbasins of the Eastern Groundwater Basin are designated as being an existing source of domestic water supply. When the regulations are finalized and adopted, any ASR project using recycled water would be subject to these regulations and their requirements for monitoring and reporting. However, based on the definition of recycled water contained in the regulations, an ASR project that only involved treated oil field produced water may not be considered recycled water.

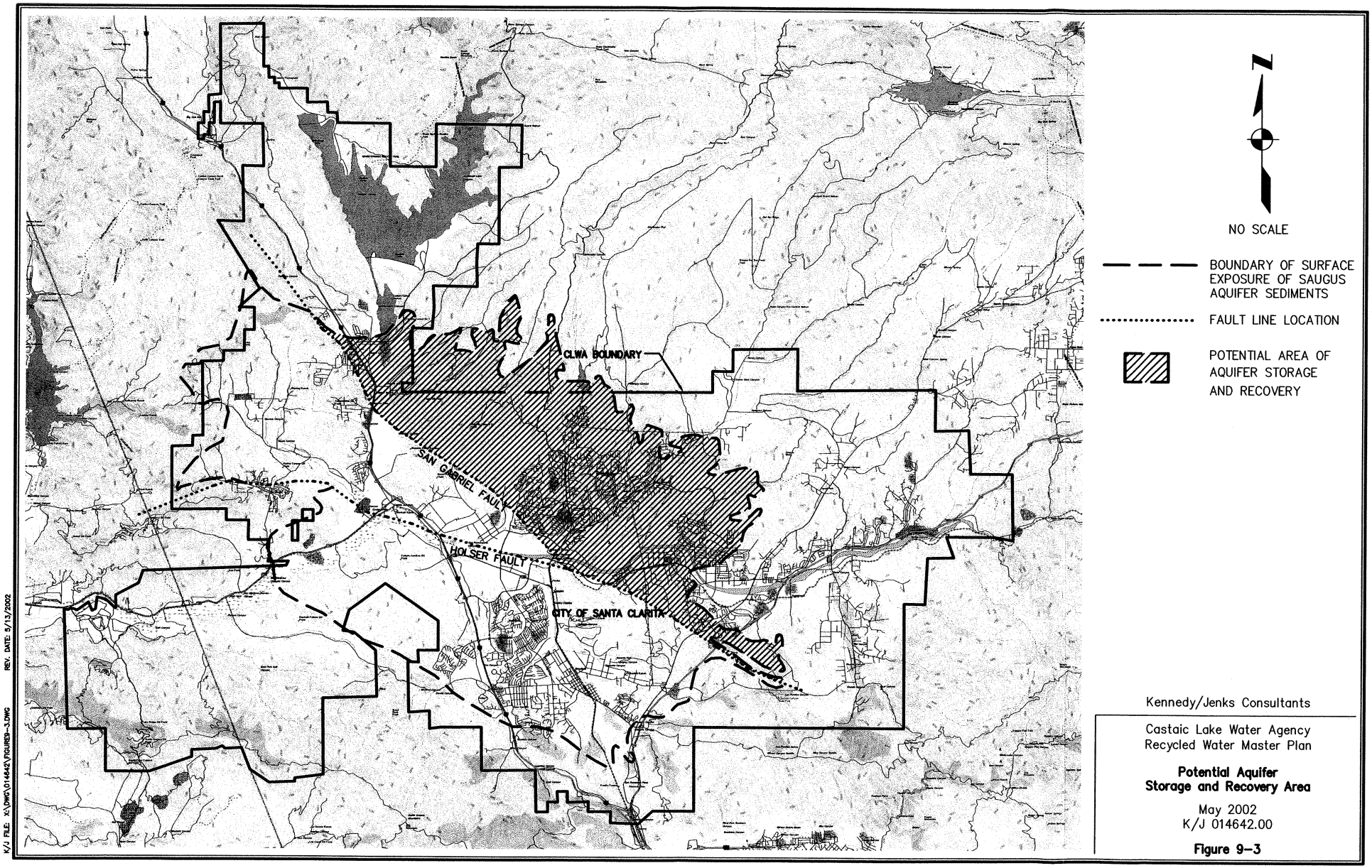
9.2.2.2 Hydrogeology North of the San Gabriel Fault

As discussed in Section 4.1.1.2, there are two freshwater bearing aquifers, the Alluvial and Saugus aquifers, within the CLWA service area. In 1990, the use of the Saugus Formation for conjunctive use was evaluated. At that time, the idea was to inject SWP water during wet years and withdraw it during dry years, when SWP deliveries are curtailed. Subsequently, the VWC demonstrated the feasibility of ASR in an area south of the San Gabriel Fault. Many of the conclusions of these evaluations are also applicable to aquifer storage and recovery of recycled water.

The Saugus Formation underlies approximately 53 square miles of the Santa Clarita Valley in Los Angeles County, and combined with the alluvial deposits from the Santa Clara River and its tributaries, comprises the water-bearing sediments of the Eastern Groundwater Basin. The CLWA boundaries encompass the aquifer almost in its entirety.

Two faults cross the Saugus Formation, dividing it into three parts, each with different characteristics. The San Gabriel Fault traverses the Saugus Formation in a northwesterly direction, while the Holser Fault extends westerly across the aquifer from the San Gabriel Fault. Generally, the aquifer characteristics are best between the two faults and worst north of the San Gabriel Fault. Due to the poor aquifer characteristics north of the San Gabriel Fault, this area is not generally used for the production of drinking water, making it the best location for aquifer storage and recovery of recycled water. Figure 9-3 presents the area where ASR is most likely to be feasible.

The Saugus Formation is comprised of layers of water-bearing deposits. The maximum thickness of the Saugus deposits bearing fresh water varies from 1,500 feet north of the San Gabriel Fault, to 5,000 feet south of the Holser Fault, to 5,500 feet between the two faults. Of the fresh water-bearing deposits, a portion is fine-grained strata, such as siltstones and shales and, therefore, is unsuitable for groundwater storage and extraction. The remaining sand and gravel deposits are potentially usable water-bearing strata for ASR. The maximum combined



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Castaic Lake Water Agency
Recycled Water Master Plan

Potential Aquifer Storage and Recovery Area

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Figure 9-3

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thickness of these strata between the depths of 500 feet and 2,500 feet are 400 feet north of the San Gabriel Fault. The 500-foot minimum depth ensures no interference of groundwater from the alluvium and the 2,500-foot maximum depth recognizes the increased costs of pumping at deeper depths.

The Saugus Formation is a confined aquifer, resulting in piezometric water surface elevations in wells as high as several hundred feet above the top of the well perforations. Transmissivity through the aquifer, a measure of the rate water is transmitted through a unit width of aquifer ranges from 80,000 to 160,000 gpd/ft.

9.2.2.3 Water Quality Requirements

Groundwater in the Saugus Formation is generally of calcium bicarbonate or calcium-magnesium sulfate character. In the region north of the San Gabriel Fault, most of the area has theoretical TDS values of more than 800 ppm.

Table 9-3 presents the water quality objectives for the Santa Clara-Bouquet and San Francisquito Canyons portion of the Eastern Groundwater Basin according to the Basin Plan.

TABLE 9-3
BASIN PLAN WATER QUALITY OBJECTIVES

Constituent (units)	Basin Plan Objective	Recycled Water (Valencia WRP)	Oil Field Produced Water	Treated Perchlorate-Contaminated Water[(a)]
TDS (mg/l)	700	739	145	1,000
Sulfate (mg/l)	350	135	NA	250
Chloride (mg/l)	150	170	NA	250
Boron (mg/l)	1.0	0.91	1 - 2	NA

NA - Not Available

Notes: Values are dependent upon the treatment processes ultimately selected.
(a) Assumes that treated perchlorate-contaminated groundwater will meet primary and secondary MCLs.

9.2.2.4 Facility Requirements and Preliminary Cost Estimate

Implementation of ASR would require the construction of the following:

- Wells that can be used for both injection and withdrawal of recycled water.
- Pipeline connecting the wells to the recycled water system.
- Booster pumping station improvements.

Other investigations and studies that should be conducted in order to determine the feasibility of the ASR seasonal storage alternative and to estimate the costs more accurately include the following:

- Environmental studies, including necessary documents for CEQA compliance.
- Hydrogeologic studies.
- Aquifer investigation.
- Water quality/compatibility investigation.

A preliminary cost estimate for ASR seasonal storage, including the cost of necessary distribution system improvements, is presented in Table 9-4. The cost estimate is based on the assumption that fifteen 1,000-gpm wells will be constructed, for a total maximum supplemental seasonal capacity of 15,000 gpm. The cost estimate does not include the cost of the additional studies. As shown, the ASR project is estimated to cost approximately $4.5 million.

TABLE 9-4
PRELIMINARY CAPITAL COST ESTIMATE FOR ASR SEASONAL STORAGE ALTERNATIVE

Component	Cost (2002 Dollars)
Wells	$2,000,000
BPS Upgrades	$250,000
Distribution Pipelines Upgrades	$1,620,000
System Flushing/Testing	$5,000
Subtotal	$3,875,000
Mobilization/Demobilization (10%)	$387,500
Taxes (8.25%)	$351,656
Contractor OH&P (18%)	$590,612
Design Allowance (20%)	$1,040,954
Engineering (10%)	$624,572
Legal/Admin (2%)	$137,406
Construction Management (5%)	$350,385
Contingency (10%)	$735,808
Total Cost	$8,093,893

Note: Property acquisition and additional studies are not included.

9.3 Recommended Seasonal Storage Option

Due to the cost, difficulty in siting, permitting, and obtaining approvals, and the operational difficulties of aboveground reservoirs for recycled water storage, it is recommended that CLWA defer further evaluation of aboveground storage and initiate a feasibility study of recycled water ASR north of the San Gabriel Fault.

Section 10: Recommended Recycled Water System

This section discusses the development of the recommended recycled water system based on the established planning criteria and the system modeling techniques used to confirm its viability. The planning criteria are the concepts and assumptions that ultimately form the service criteria for the system. In addition, the recommended recycled water system is described.

10.1 Planning Criteria

Planning criteria were established for each component of the recycled water system, including the recycled water supply, recycled water pump stations, storage reservoirs, distribution system, and booster pump stations. These criteria are summarized in Table 10-1 and described below. The criteria are generally based on the 1993 Master Plan.

TABLE 10-1
SUMMARY OF RECYCLED WATER SYSTEM DEVELOPMENT CRITERIA

System Component	Criteria
Recycled Water Supply	1. Projected production of recycled water sources (Valencia WRP, oil field produced water, treated perchlorate-contaminated groundwater) determine construction phasing. 2. Assume WRP equalized effluent flow.
Recycled Water Pump Stations	1. Valencia Pump Station limited to 12,000 gpm. 2. Oil field produced water pump station to supply 1,250 gpm. 3. Pumps will operate during peak demand periods.
Storage Reservoirs	1. Provide storage for approximately 75% of the peak day demand. 2. Reservoir elevations should be adequate to provide consistent delivery pressures to most users.
Distribution System	1. Size to meet the peak hour demands. 2. Maximum design velocity is 6 fps. 3. Maximum system pressure is 185 psi. 4. Optimum delivery pressure is 55 to 150 psi. 5. All buried piping is "purple" high-pressure PVC up to 24-inch and steel or ductile iron pipe is used for larger sizes.
Booster Pump Station	1. Size for peak day demands. 2. Size in order to operate during off-peak electrical hours in order to minimize energy costs.

10.1.1 Recycled Water Supply

Recycled water would be supplied to the recycled water system by the Valencia WRP. If available, oil field produced water and treated perchlorate-contaminated water would also be used in the non-potable system. Effluent from Newhall Ranch WRP would be transferred to the system during the wet winter months.

10.1.2 Recycled Water Pump Station

A 4,000-gpm recycled water pump station has been constructed at the Valencia WRP as described in Section 10.2.1. The recycled water pump station capacity is dependent upon plant production and effluent flow patterns, as well as recycled water demand. The ultimate pump station capacity at Valencia WRP is planned to be 12,000 gpm. A 1,250-gpm recycled water pump station would be constructed to pump oil field produced water into the system

Storage capacity would provide reductions in the required reuse pump station capacity by allowing peak hour demands to be met with a combination of pumped water and water from storage reservoirs. The recycled water pump stations would be controlled by water surface elevations in the storage reservoirs.

10.1.3 Storage Reservoirs

The storage capacity to be provided for the recycled water system is equivalent to approximately 75 percent of the peak day demand. Reservoir elevations would be determined by the required system and delivery pressures as discussed later in this section.

10.1.4 Distribution System

Distribution system design is dependent upon flow, velocity, and pressure criteria. The distribution system would be sized to handle the peak hour demands. High velocities, which may reduce the useful life of the pipeline and increase energy requirements to delivery water, are not desirable. Maximum design flow velocity in the system would be 6 feet per second.

Two pressure criteria were considered in the planning of the system. Defined as the pressure at any point within the distribution system, system pressure is dependent upon reservoir levels, recycled water demands, and pumping conditions. The maximum system pressure would be 185 pounds per square inch (psi). Delivery pressure refers to the pressure at which recycled water is delivered to the users. Optimum delivery pressure ranges from 55 psi to 150 psi.

10.1.5 Booster Pump Stations

The function of the booster pump stations is to boost the system pressure from a lower zone to a higher zone. The stations should be designed to meet the peak day demand of the higher zones. They should also be sized large enough to operate during off-peak electrical hours. The criteria for system pressure and delivery pressure discussed in the previous section also apply to design of the booster pump stations.

10.2 Existing Recycled Water Infrastructure

Based on the Reclaimed Water Master Plan prepared in 1993, CLWA has constructed or is in the process of constructing several improvements as described below and shown in Figure 10-1.

10.2.1 Recycled Water Pump Station

The recycled water pump station is located at the Valencia WRP. It has a capacity of 4,000 gpm and connects to the existing chlorine contact basin. The recycled water pump station will pump into pipeline IA-2.

10.2.2 Pipeline

Recycled water pipeline IA-2 is currently under construction. It includes 15,600 LF of 20- and 24-inch ductile iron pipe from the Valencia WRP recycled water pump station to recycled water reservoir no. 1.

10.2.3 Reservoir

Recycled water reservoir no. 1 is now under construction. It is a 1.5 mg aboveground steel reservoir located near the proposed Westridge Golf Course.

10.3 Recommended Service Policies

To develop the recommended recycled water system, key service policies must be considered. Because specific service policies have not been established by CLWA, policies necessary for the development of a recycled water system are recommended. Among the recommended service policies upon which the recommended recycled water system is based are:

1. Although retail service by CLWA is limited to areas prescribed by statute, CLWA would provide the facilities to deliver recycled water to individual existing and future users identified as each implementation phase is developed.

2. For new development tracts which plan or are conditioned to utilize recycled water, CLWA would provide the facilities to deliver recycled water to the boundary of the tract or to a location reasonably near the tract.

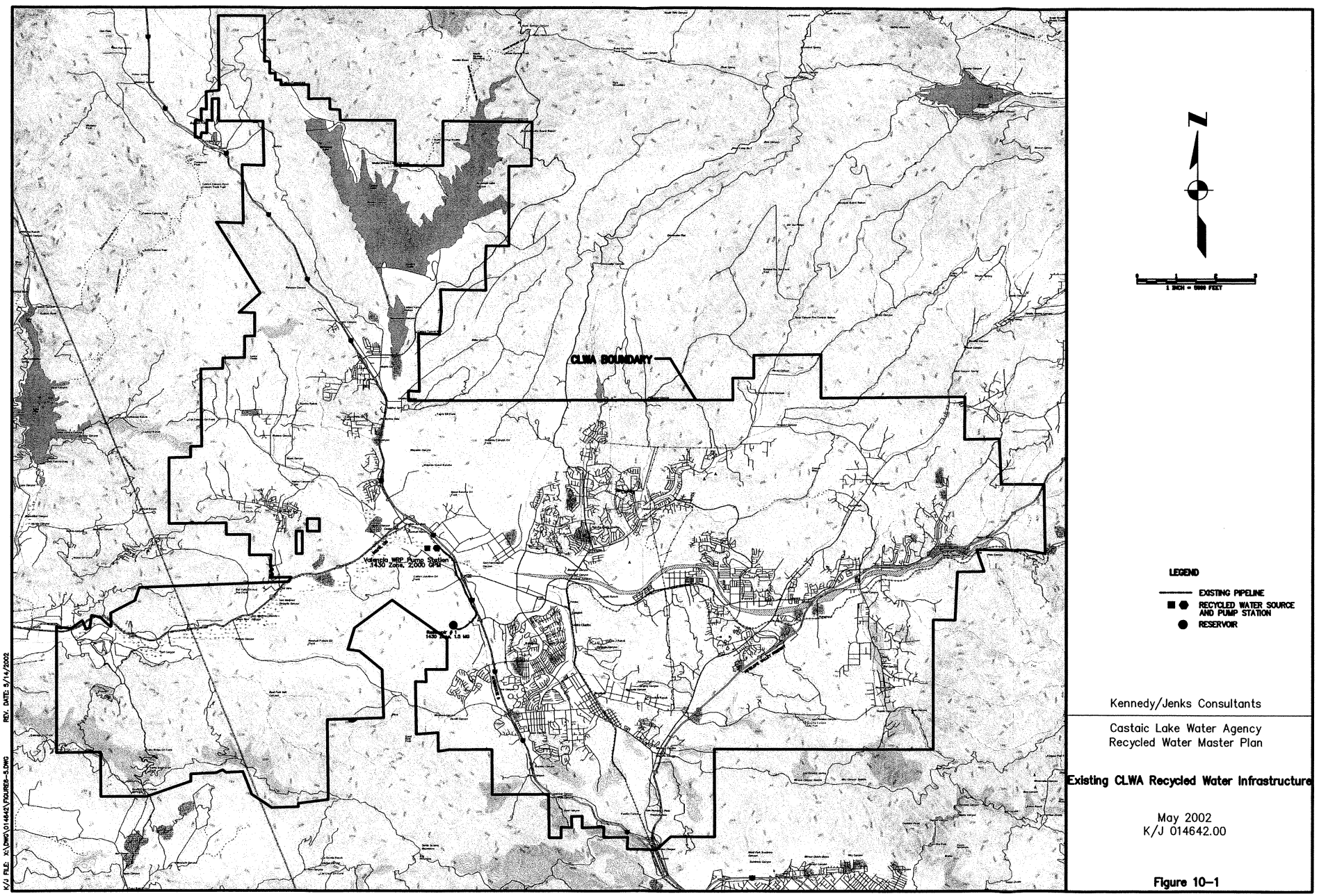
3. Facilities located within planned public right-of-way of new development tracts must be dedicated to CLWA or the retail service provider.

4. At CLWA's convenience and discretion, CLWA may construct transmission facilities through new development tracts.

5. Onsite facilities for new or existing users will be provided by the user. However, CLWA may develop an incentive program to fund onsite retrofits.

10.4 Components of the Recommended Plan

Serving approximately 168 users, the recommended recycled water system is divided into two service zones based on the topography of the service area. Each of the zones would contain



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Recycled Water Master Plan

Existing CLWA Recycled Water Infrastructure

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Figure 10-1

storage reservoirs, distribution system piping, and booster pump stations. The reuse pump station is located at Valencia WRP, the main source of recycled water supply. A second source water pump station would be located at the oil field produced water facility. The proposed layout of the recycled water system is shown in Figure 10-2. Flow and storage information for each of the zones is presented in Table 10-2. Figure 10-3 shows the extents of the 1430 and 1680 pressure zones.

TABLE 10-2
FLOW AND STORAGE DATA BY ZONE

Service Zone	Peak Day Demand (mgd)	Peak Hour Demand (gpm)	Storage Volume (mg)
1430	22.9	43,812	17.5
1680	9.0	22,870	6.75
Total	31.9	66,682	24.25

Note: (a) Assumes recycled water pump stations operate 24 hours per day.

10.4.1 Recycled Water Supply

Recycled water would be supplied to the system from the Valencia WRP, as well as the Placerita oil field and the perchlorate removal treatment plant (temporarily). During periods of peak demand, water would also be supplied from ASR facilities.

At the Valencia WRP, treated wastewater is diverted from the chlorine contact tank via an overflow weir to the reuse pump station. The total system demand for recycled water is approximately 17,441 AF/yr, most of which would be used from May through October.

The recycled water supply from the Valencia WRP would be slightly reduced during filter backwashing. Valencia WRP has 14 filters, which are backwashed throughout the day (20 minutes per filter ever 1.7 hours). When filters are backwashing, the system would still be supplied from the storage reservoirs, oil field produced water, and ASR facilities, and a portion of the Valencia WRP flow would still be available.

10.4.2 Recycled Water Pump Stations

The recycled water pump station is located near the chlorine contact tank at the Valencia WRP and would be used to transport the recycled water to the storage reservoirs in each zone. It is currently sized for 4,000 gpm. Assuming constant flow rate and total daily flow equivalent to the peak day demand, the ultimate capacity of the reuse pump station is 12,000 gpm.

A second recycled water pump station would need to be constructed at the oil field produced water facility. The capacity would be 1,250 gpm and the pump station would be located at the Placerita oil field in the 1680 zone.

10.4.3 Storage Reservoirs

The recommended plan includes construction of 8 recycled water storage reservoirs. Each zone would have at least one reservoir. The storage capacity in each zone would be equal to 75 percent of the peak day demand. The reservoirs are assumed to be aboveground steel tanks and would range in size from 1.5 mg to 3.5 million gallons. Total storage capacity for the system is 24.5 million gallons. Recycled water entering and exiting the storage reservoirs would

be controlled by two-way flow altitude valves. Storage reservoir locations are shown in Figure 10-1 and reservoir capacities listed in Table 10-3. The reservoir elevations are determined by the system and delivery pressures and are also listed in Table 10-3.

TABLE 10-3
RESERVOIR VOLUMES AND ELEVATIONS

Reservoir Number	Service Zone	Volume (mg)	Maximum Water Surface Elevation (ft)
1[(a)]	1430	1.5	1430
2	1430	3.0	1430
3	1430	3.25	1430
4	1430	3.0	1430
5	1430	3.5	1430
6	1430	3.25	1430
7	1680	3.5	1680
8	1680	3.25	1680

Note: (a) Under construction.

10.4.4 Distribution System

The proposed pipeline routes for the recycled water system are shown in Figure 10-1. The routes are located along existing public rights-of-way and planned roadways, where possible, to maintain accessibility and minimize the costs of acquiring pipeline easements. The distribution system consists of approximately 275,000 lineal feet (LF) of pipe ranging from 8 to 36 inches in diameter. The lengths and diameters of the pipeline segments for each zone are presented in Table 10-4. High-pressure polyvinyl chloride pipe (PVC) pipe is the primary pipe type used throughout the system. In addition, steel pipe is required at bridge crossings and ductile iron pipe (DIP) at pump stations and reservoirs.

TABLE 10-4
PIPELINE DIAMETERS AND LENGTHS

Diameter (in.)	Material	Length (LF)
36	Steel	64,182
24	PVC	34,696
20	PVC	40,718
18	PVC	15,008
16	PVC	10,946
14	PVC	31,752
12	PVC	20,190
10	PVC	22,501
8	PVC	44,935

Note: Only includes new pipelines. Pipeline 1A-2 is not included.

The proposed system crosses the Santa Clara River in three locations: McBean Parkway, The Old Road, and Sierra Highway. It is recommended that the pipelines be supported from existing bridge crossings. It is also recommended that the pipeline be supported from existing bridge crossings across freeways. Pipelines cross the I-5 at Rye Canyon Rd. and Valencia Blvd. and State Route 14 (Antelope Valley Freeway) at Placerita Canyon Rd. Air release valves would be

installed at the high points of the distribution system to remove trapped air, and blow off valves would be installed at the low points of the distribution system to remove sediment.

10.4.5 Booster Pump Stations

The recommended plan includes one booster pump station in addition to the recycled water pump stations located at Valencia WRP and the oil field produced water facility. The booster pump station is needed in the 1680 service zone to increase system and delivery pressures. The existing Honby Pump Station is planned to be taken out of potable water service within the next few years. This pump station could be modified to provide recycled water service. Its location is shown in Figure 10-1 and capacity information is listed in Table 10-5.

In addition, users with pressures less than 55 psi may require independent booster pumps stations.

TABLE 10-5
BOOSTER PUMP STATION CAPACITY

Booster Pump Station Number	Zones Served	Capacity (gpm)
1	1680	5,000

10.5 System Modeling

After the demands were identified (as described in Section 8) and preliminary layout and sizing of pipelines, reservoirs, and pump stations was performed, the system was modeled. Computer modeling was performed using H2ONET version 3.1, which runs as a module to AutoCAD 2000.

10.5.1 Model Construction

The model accurately represents the proposed model system geometry and major facilities. Because CLWA has very few existing recycled water facilities, the location and characteristics of each feature (e.g., pipe, junction, reservoir) were developed using the planning criteria was manually drawn in AutoCAD. H20Net creates and manages databases to store the input information such as pipe diameters, pipe length, loss coefficients, node demands, and other operating parameters.

Pressure zones were developed based on the topography of the area. Individual demands or geographically close groupings of demand were each assigned to a node. Nodal elevations were determined from a topographic map. Pipelines were located to connect the demand nodes with each other and with the recycled water sources. Pipelines were located in existing and planned streets wherever possible.

Reservoirs were sited for each zone in areas of the appropriate elevation and where land may be available for their construction. Pump stations were sited as needed to maintain adequate pressures throughout the system.

10.5.2 System Evaluation

Flow analysis of the system was performed for the ultimate projected peak hour demands of the customers. Most irrigation customers irrigate at night, which is when the peak hour demand would likely occur. Modeling was performed using a Hazen-Williams coefficient of C = 145.

Velocities, headloss, pressures, and reservoir elevation were tracked throughout the simulated operation period so that the critical or limiting conditions of the system could be identified and corrections made. H2ONET has the ability to display simulation results not only in tabular form, but also in graphical form to aid in rapidly identifying system deficiencies by geographic region or pressure zone. H2ONET can display all nodes that fail to exceed a minimum required pressure under any system demand and can display color-coded directional arrows to identify the lines of major flow in the system.

The recommended recycled water was successfully modeled, meeting all of the planning criteria.

10.6 Cost Estimates

The costs of the recycled water system include both capital costs and O&M costs.

10.6.1 Capital Costs

Table 10-6 presents the criteria used in estimating capital costs for the components of the recycled water system. Cost estimates presented in this report are order-of-magnitude type estimates expected to be accurate within ± 25 percent. The cost estimates were developed from general cost curves, information suppliers, other studies, and Kennedy/Jenks Consultants' previous experience.

Reservoir construction costs include costs for grading, materials, and construction. Pipeline construction costs assume in-street construction with a moderate degree of utility crossings and include such items as valves, traffic control, and road resurfacing. Booster pump station costs consist of costs for all materials, equipment, construction, and testing; costs were halved for modifications to existing pump stations. The Santa Clara River and freeway crossings assume supporting of the pipelines on the bridges. System flushing and testing costs assume that approximately 1,000 feet of pipe will be tested per day. The costs do not include pipeline easements and pump station/reservoir property costs.

The estimated capital cost of the recycled water system is approximately $68 million. Table 10-7 summarizes these costs. Capital costs include mobilization and demobilization, taxes, mark up for contractor overhead and profit, legal/administration, engineering, design allowance, construction management, and a contingency.

The cost estimates were developed to provide a reference for financial planning. The actual construction cost and project cost will depend on the final project scope, the schedule for construction, and market conditions at the time of construction. Feasibility of the project and funding needs must be considered and reviewed thoroughly in order to select the proper option and to provide adequate funding.

TABLE 10-6
COST CRITERIA

Component	Unit Cost[a]
Reuse Pump Stations[b]	Based on curve
Reservoirs[b,c]	Based on curve
Pipelines	
36-inch Steel	$405/LF
24-inch PVC	$165/LF
20-inch PVC	$148/LF
18-inch PVC	$129/LF
16-inch PVC	$112/LF
14-inch PVC	$95/LF
12-inch PVC	$91/LF
10-inch PVC	$80/LF
8-inch PVC	$65/LF
Santa Clara River Crossings	$6.15/diameter-inch/LF
Freeway Crossings	$6.15/diameter-inch/LF
Booster Pump Stations	Based on curve
System Flushing and Testing	$1.25/LF

Notes:

(a) All unit costs represent installed costs, including taxes (8.25% on materials only), contractor overhead and profit (18%), design allowance (20%), engineering (10%), legal/administration (2%), construction management (5%), and contingency (20%). Costs do not include land acquisition or right-of-way.

(b) Costs are based on curves developed for typical reservoir and pump station costs. Reservoir costs were estimated based on $/MG and pump station costs on $/gpm.

(c) Includes tank, foundation, appurtenances, excavation, paving, fencing, landscaping, and telemetry.

TABLE 10-7
PRELIMINARY ESTIMATE OF CAPITAL COST

Component	Estimated Cost (2002 Dollars)
Recycled Water Pump Stations	
Expansion of Valencia to 12,000 gpm	$930,000
Oilfield-Produced Water Pump Station	$437,500
Reservoirs	
1	Under Construction
2	$960,000
3	$980,000
4	$960,000
5	$980,000
6	$975,000
7	$980,000
8	$975,000
Distribution Pipelines	
36-inch Steel	$25,994,000
24-inch PVC	$5,725,000
20-inch PVC	$6,026,000
18-inch PVC	$1,936,000
16-inch PVC	$1,226,000

Component	Estimated Cost (2002 Dollars)
14-inch PVC	$3,016,000
12-inch PVC	$1,837,000
10-inch PVC	$1,800,000
8-inch PVC	$2,921,000
Booster Pump Stations	
Modify Existing Honby Pump Station	$1,043,000
Santa Clara River Crossings	$267,000
Castaic Creek Crossing	$52,000
Freeway Crossings	$246,000
System Flushing and Testing	$350,000
Seasonal Storage (ASR)	$8,093,000
Total	$68,710,000

10.6.2 Operating and Maintenance Costs

An economic analysis was performed for the proposed recycled water system. In order to calculate the unit cost, the annualized capital cost was added to the estimated annual operations and maintenance (O&M) cost. The total annual cost (annualized capital and O&M) was then divided by the estimated recycled water demand for each phase to obtain the unit cost. Water purchase costs are discussed in Section 10.6.3.

Annualized capital costs were calculated based on a 20-year period at a 6 percent interest rate. Annual O&M costs were estimated by combining estimated pumping costs, parts cost, and labor costs. Pumping costs were estimated based on 82 percent pump efficiencies, 95 percent motor efficiencies, and an electricity cost of $0.12 per kilowatt-hour. Parts costs were estimated to be 1 percent of construction costs of pump stations and 0.1 percent of construction cost of reservoirs and pipelines. Labor costs were estimated based on 3 man-days per month per phase at $40 per hour.

The total average annual unit cost (2002 dollars), including annualized capital, after implementation of the completed recycled water system is $818 per acre-foot. Because CLWA can utilize available revenue sources funds to repay such debt service, it will not be necessary to recover capital costs through recycled water rates although CLWA may opt to do so. Therefore, the average unit operating cost of recycled water is $59 per acre-foot, excluding the cost of acquiring recycled water supplies.

10.6.3 Water Purchase Costs

The cost of purchasing water from Newhall Ranch WRP, the perchlorate-contaminated groundwater treatment facility, Berry Petroleum, and LACSD would be different. Costs of obtaining seasonal excess recycled water from the Newhall Ranch WRP would need to be negotiated with Newhall Ranch. Treated perchlorate groundwater may be available during the 1-2 year DHS demonstration period; there may be a charge for taking this water or it may be available for free. The costs of purchasing oil field produced water would be negotiated with Berry Petroleum. The costs of purchasing recycled water from LACSD are governed by an agreement dated July 1996. The cost of purchasing recycled water from LACSD for the first three years "shall be the greater of:

(a) $5.00 per acre-foot; or

(b) one-half the result determined by subtracting the Castaic Water Reuse Project Costs, as defined below, during the fiscal year divided by the total amount of reclaimed water delivered during the fiscal year, from the Water Rate, as defined below provided that deficits, if any, determined by adding the price to the amount determined by the above calculation may be carried over and considered as part of the Castaic Water Reuse Project's Cost in the next fiscal year."

At the end of the first three years, the cost of purchasing recycled water from LACSD "shall be the greater of:

(a) one fifth of the unit cost...of operation and maintenance of the Water Reclamation Plans, during the fiscal year in which the recycled water was received, rounded to the nearest cent, or

(b) the value determined by the method prescribed in (method b for the first three years)."

Section 11: Permits and Approvals

A number of permits will be required to implement each phase of the recommended plan. These permits are in addition to environmental review requirements under the California Environmental Quality Act (CEQA) or National Environmental Policy Act (NEPA). Because the permitting process can be lengthy, permitting requirements may affect the implementation schedule of the recycled water system. A summary of the permitting requirements is provided in Table 11-1.

11.1 Federal

Implementation of the Master Plan may require several federal permits, specifically from the U.S. Army Corps of Engineers (USACE) and U.S. Fish and Wildlife Services (USFWS).

11.1.1 U.S. Army Corps of Engineers Nationwide Permit

USACE permit authority derives from the Rivers and Harbors Act of 1899 (Section 10), Clean Water Act (Section 404), and Marine Protection, Research, and Sanctuaries Act (Section 103). These regulations give USACE jurisdiction over all navigable waters within the U.S. Approval by USACE is required for construction of structures or work in or work affecting navigable waters of the U.S. Navigable waters include ocean and fresh waters, bays, streams, wetlands, marshes, swamps, and diked lands. USACE has jurisdiction over all of the above even though selected areas may not be navigable.

A Section 10 Permit covers construction, excavation, or deposition of materials in, over, or under such waters, or any work which would effect the course, location, condition, or capacity of those waters. The river crossings proposed as part of the Master Plan would be accomplished by suspending pipelines under existing bridges or boring and jacking under the riverbed. Because some construction activity may occur within the Santa Clara Riverbed, a Section 10 permit would be required.

The USACE issues nationwide permits (NWP), which authorize discharges of dredge and fill material to waters of the U.S. for activities with minimal environmental impacts. The NWP applies to projects of 1/2 acre of impact or less. USACE must be notified of any impacts over 1/10 of an acre. If these thresholds are exceeded, an individual Section 404 permit may be required.

11.1.2 Endangered Species Act Permits

In addition, a biological evaluation may be required to comply with the Endangered Species Act (ESA). Section 7 of the ESA requires all federal agencies to use their authority to conduct conservation programs and to consult with National Marine Fisheries Service (NMFS) or USFWS concerning the potential effects of their actions on any species listed under the ESA. Consultations occur with federal action agencies under Section 7 of the ESA to avoid, minimize, or mitigate the impacts of their activities on listed species. USFWS and NMFS also review non-federal activities which may affect species listed under the ESA and issues permits under Section 10 for the incidental take of those species and for scientific research and enhancement purposes. If endangered species are found within the proposed areas of construction, the Section 10 issuance criteria requires NMFS or USFWS to issue an Incidental Take Permit.

TABLE 11-1
SUMMARY OF PERMITTING REQUIREMENTS

	Agency	Type of Approval	Requirements	Typical Review Period	Comments
Federal Permits	United States Army Corps of Engineers	Nationwide Permit	Needed if affect 1/10 to 1/2 acre of riverbed. Notify USACE of activities.	30-60 Days	Notify USACE of activities
	United States Army Corps of Engineers	Section 10 Permit	Needed if affect course, location, condition, or capacity of river.		
	United States Army Corps of Engineers	Individual Section 404 Permit	Unlikely to be required.		
State Permits	California Department of Fish and Game	Lake or Streambed Alteration Agreement	Construction plans with application	30 Days	Avoid nesting season April through September
	California Department of Fish and Game	Incidental Take Permit	Application	30-120 days	Onsite inspection may be required
	California Department of Transportation	Encroachment Permit	Six sets of construction plans with application	4-8 weeks	Inspection required during construction
	California Department of Health Services	Cross connection control	Construction plans with specifications	Not applicable	Project must conform to Title 22, DHS and AWWA Guidelines
	California Occupational Safety and Health Agency	Trenching and Excavation Permit	Complete plans and specifications	1-2 weeks	Required by contractor
	Regional Water Quality Control Board	NPDES Construction Activity Permit	Application (NOI) before construction starts	60 Days	Required for project area greater than 5 acres
	Regional Water Quality Control Board	Reclamation Permit	Application, Letter, plans, user maps, quantities	6-9 months	LACSD will take lead
	Regional Water Quality Control Board	Engineering Report Requirements	Application, Letter, plans, user maps, quantities	6-9 months	LACSD will take lead
	State Water Resources Control Board	Petition for change in place purpose of use	Petition	Varies	LACSD will take lead

	Agency	Type of Approval	Requirements	Typical Review Period	Comments
Local Permits	City of Santa Clarita	Encroachment Permit	Construction plans with permit application	60 Days	LACSD will take lead
	Los Angeles County Department of Public Works	Excavation Permit	Construction plans with permit application	3-6 weeks	Inspection required throughout construction
	Los Angeles County Flood Control District	Encroachment Permit	Six sets of construction plans with application	60 Days	Inspection required following construction
	Los Angeles County Department of Health Services	Distribution system design & construction approval	Construction plans and specifications	Depends on project	Inspection required following construction, prior to operation
	Los Angeles County Department of Health Services	Onsite (cross connection control) (user) facilities approval	As-built of onsite facilities	Not applicable	Onsite inspection following construction

The decision to grant or deny a permit is dependent upon a public interest review of the probable impacts of the proposed activity and its intended use. Benefits and detriments are balanced by considering effects on conservation, economics, wetlands, wildlife, flood hazards, navigation, water quality, and the needs and welfare of the public. Guidelines restrict discharges into aquatic areas when there are less environmentally damaging, practicable alternatives. Reasonable and practicable mitigation of unavoidable impacts will be required. A permit will be granted unless the project is found to be contrary to the public interest or fails to comply with the guidelines. USACE is required to consult with state and federal wildlife agencies regarding any impacts of a project on aquatic habitats.

11.1.3 U.S. Fish and Wildlife Service Permits

USFWS as part of the Department of the Interior, reviews proposals for work and activities in or affecting navigable waters that are licensed, assisted, or conducted by the federal government, pursuant to the National Environmental Policy Act (NEPA), Estuary Protection Act, Department of Transportation Act, Airport and Airway Development Act of 1970, Watershed Protection and Flood Protection Act, Endangered Species Act, Fish and Wildlife Coordination Act, and other federal legislation and regulations. In addition, USFWS reviews permit applications pursuant to Section 10 of the Rivers and Harbors Act, and Sections 208, 402, and 404 of the Clean Water Act, and other Federal legislation for enhancement of fish and wildlife resources. USFWS staff will identify potential adverse impacts and will propose compensation for irretrievable losses.

USFWS may require the preparation of supplemental biological assessments to determine effects of the proposed project on any federally endangered or threatened fish and wildlife species in or adjacent to the project area. USFWS must evaluate the project and comment prior to the construction and operation of the project. In general, USFWS project review may take 60 to 180 days to respond depending on project complexity and staffing issues.

11.2 State

The following state agencies may require permits and/or approvals for the recycled water system:

- California Department of Fish and Game (CDFG)
- California Department of Transportation (Caltrans)
- California Department of Health Services (DHS)
- State Water Resources Control Board (SWRCB)
- Regional Water Quality Control Board (RWQCB)
- California Division of Occupational Safety and Health (DOSH)

11.2.1 California Department of Fish and Game

CDFG manages California's fish, wildlife, and plant resources, and the habitats upon which they depend, for ecological values and for public use and enjoyment. The CDFG is responsible for issuance of Incidental Take Permits and a Lake or Streambed Alteration Agreement.

11.2.1.1 Incidental Take Permit

Sections 2080 and 2081 of the Fish and Game Code prohibits within the State of California, export out of this State or take, possess, purchase, or sell within this State, any endangered species, threatened species, or species designated as a candidate species under Section 2074.2 of the Fish and Game Code if the Commission has issued notice under Section 2074.4. An Incidental Take Permit must be issued for any projects involving the above stated species. A permit application must be submitted to the Regional Manager. A permit may only be issued if the Director finds that (1) the take authorized by the permit will be incidental to an otherwise lawful activity, (2) the applicant will minimize and fully mitigate the impacts of the take authorized under the permit, (3) the permit will be consistent with any regulations adopted pursuant to Fish and Game Code Sections 2112 and 2114, and/or (4) the applicant has ensured adequate funding to implement the measures required under the permit to minimize and fully mitigate the impacts of the taking, and to monitor compliance with, and the effectiveness of, the measures. On-site inspections may be required prior to a final decision by the Director. The permitting process can take up to 120 days, including a 30-day review period and a 90-day approval/denial period.

11.2.1.2 Lake or Streambed Alteration Agreement

Section 1603 of the Fish and Game Code requires any person who proposes a project that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake or use materials from a streambed to notify CDFG prior to implementation. Notification to CDFG can be accomplished through the submittal of a Notification of Lake and Stream Alteration form (FG 2023) and Project Questionnaire form (FG 2024), along with any other required documents and applicable fees to CDFG. Notification is required for any projects that will take place in or in the vicinity of a river, stream, lake, or other tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. Based on the submitted notification, and a possible site visit, CDFG will determine if the proposed project may impact fish or wildlife resources. If CDFG concludes that the proposed project would have a substantially adverse affect on existing fish or wildlife resources, a Lake or Streambed Alteration Agreement from CDFG will be required and reviewed in accordance with CEQA.

11.2.2 California Department of Transportation

An encroachment permit from Caltrans will be required for any work done within the state of right-of-way. This includes installation of a pipeline in a roadway crossing under a highway, support of a pipeline on a bridge crossing over a highway, and activities that impact on-ramp and off-ramp traffic. The proposed system has two pipeline crossings over Interstate 5: McBean Parkway and Valencia Boulevard. A permit application along with six sets of final plans and specifications will be required to be submitted for review and approval. Typical review period is 4 to 8 weeks.

11.2.3 California Department of Health Services

DHS's primary concerns with respect to the recycled water system are cross connections, separation of pipelines, and any activity that has the potential to result in contamination of drinking water. DHS will review plans and specifications prior to construction.

11.2.4 State Water Resources Control Board and Regional Water Quality Control Board

The SWRCB was created by Legislation in 1967 to ensure the highest reasonable quality for waters of the State. Under the SWRCB, there are nine RWQCBs that assist in the implementation of state and federal laws and regulations. The RWQCB regulates the source and the end use of recycled water. Its main involvement in the recycled water system will be through LACSD to modify the reclamation permit to include the specific recycled water users and to review the Engineering Report describing treatment and distribution facilities and users. CLWA's responsibility will be to assist LACSD with preparation of necessary information. In addition, CLWA will need to obtain a NPDES Construction Activity Permit. This permit is required for stormwater runoff from construction projects impacting an area of 5 acres or more. An application (Notice of Intent) must be submitted before construction starts. The review period averages 60 days.

Approval of a Petition for Change of Place and Purpose of Use from the SWRCB is required for any change in discharge location or quantity of wastewater. In 1993, the SWRCB approved a petition for change for the Valencia WRP; however, the amount requested will change according to more recent demand data. In addition, if LACSD pursues the rights to the effluent, review and approval is the responsibility of SWRCB. In either case, LACSD would be the lead agency, requiring assistance from CLWA. SWRCB may also be a potential source of loan or grant funding, as discussed in Section 12.

11.2.5 California Division of Occupational Safety and Health

A Trenching and Excavation Permit from DOSH is required by the contractor for the construction of recycled water pipelines that require trenching deeper than 5 feet. Complete plans and specifications are required along with $50 review and approval fee.

11.3 Local Permits

This section summarizes the anticipated permits and approvals required from local authorities, including Los Angeles County and the City of Santa Clarita.

11.3.1 Los Angeles County Department of Health Services

Plan review and inspection of the distribution system and onsite user facilities to address concerns with drinking water contamination (cross connection control) are required by the Los Angeles County Department of Health Services. LACDHS coordinates with RWQCB and DHS.

11.3.2 Encroachment Permits

Encroachment permits are required for all construction work done within local right-of-way from the City of Santa Clarita, the Los Angeles County Department of Public Works (Excavation Permit) and the Los Angeles County Flood Control District. Two sets of final plans and specifications need to be submitted to the County for encroachments. Fees are based on size of excavation in the right-of-way and on the estimated job costs. Review period averages between 1 to 2 weeks.

11.4 National Environmental Policy Act

Compliance with NEPA would be required if federal funding is acquired. Typically, compliance with NEPA is achieved by preparing an appropriate document evaluating the potential impacts of the proposed project, such as an Environmental Impact Statement or Environmental Assessment. This documentation is similar to that required by CEQA and can be prepared jointly with CEQA documentation.

11.5 California Environmental Quality Act

Preparation of appropriate CEQA documentation will be necessary. CLWA's "Final Program EIR for the Capital Program and Water Plan," including "Acquisition of Supplemental Water and Proposed Second Plant Site," included use of 1,700 acre-feet of recycled water. CLWA's "Site Specific Mitigated Negative Declaration for Construction of a Reclaimed Water Distribution System" included the Phase 1 facilities. It may be desirable to prepare a programmatic environmental document for the Master Plan as well as site-specific CEQA documentation for each implementation phase. The CEQA documentation may be prepared jointly with the NEPA documentation, if NEPA documentation is required.

11.6 Other Institutional Issues

Before providing recycled water service, it will be necessary to secure agreements between the following entities:

- LACSD and CLWA: A contract between LACSD and CLWA is required for sale of recycled water to CLWA and construction and operation of facilities on LACSD property
- Berry Petroleum and CLWA: A contract between Berry Petroleum and CLWA is required for the purchase and use of oil field produced water at the Berry Petroleum oil fields southeast of the City of Santa Clarita.
- Respective purveyors and CLWA: An agreement for temporary use of perchlorate-contaminated groundwater from three local groundwater wells is required between CLWA and the purveyors (NCWD, SCWD, and VWC).
- CLWA and purveyors: Contracts between CLWA and local water purveyors will establish the basis for retail operation of the system and sale of the recycled water.
- Purveyors and users: The agreement between purveyors and users (customer service agreement) will establish the requirements for use of the recycled water and will specify that the users understand the regulations controlling the use of recycled water.

Section 12: Funding and Financing Opportunities

To construct the recycled water system, sufficient capital funds must be secured by CLWA. This section presents a plan for financing the proposed recycled water system. Discussions on financing options, water rate policy, economic analysis and connection fees are included.

12.1 Funding and Financing Alternatives

To finance the construction cost of the proposed facilities, CLWA can obtain capital through the following funding sources:

- Capital Reserves
- Grants
- Low interest Loans
- Certificates of Participation

These potential funding sources are listed in Table 12-1 and discussed in detail below.

12.1.1 Capital Reserves

CLWA receives revenues from facility capacity fees, 1 percent property taxes, water rates and interest on investments. It also has the authority to levy standby charges but has, thus far, not exercised this authority. To the extent that these revenues have exceeded operational expenses, existing debt, and capital expenditures, substantial capital reserves have accumulated. A portion of these reserves is utilized as security for the repayment of certificates of participation. The remainder is available for operating expenses or CLWA's Capital Improvement Program (CIP) in which the recycled water program is included.

12.1.2 Grants and Low Interest Loans

Both the federal and state governments have policies to encourage recycled water projects. These policies have led to several grant and low interest loan programs. Available funds for grants and low interest loans are dependent upon legislative approval and available monies. Those listed in Table 12-1 reflect Fiscal Year 2000-2001 allocations and are likely to be altered in Fiscal Year 2001-2002.

TABLE 12-1
GRANT AND LOAN SUMMARY

	Sponsoring Agency	Funding Authority	Eligible Projects	Total Funds Available	2000-2001 Funds Available/Interest Rate	Applicant Funding Limitations	Grant or Loan
Water Reclamation and Reuse Program	US Bureau of Reclamation	Reclamation Wastewater and Groundwater Study and Facilities Act of 1992 (Title XVI)	Water reuse projects: that reclaim and reuse municipal, industrial, domestic or agricultural wastewater, or naturally impaired groundwater and/or surface waters		25% of total project cost	$20,000,000	Grant
Water Recycling Facilities Planning Grant	SWRCB	Proposition 204	Feasibility studies for water recycling projects	$60,000,000	50% of study costs, not to exceed funding limits	$75,000	Grant
Water Recycling Construction Program	SWRCB	Proposition 204	Wastewater treatment, recycled water storage facilities, pump stations, and recycled water distribution pipelines	$105,000,000	25% of eligible cost	$5,000,000	Grant
Water Recycling Loan Program	SWRCB	Proposition 204	Water recycling projects	$60,000,000	50% of the interest rate paid by the State on the most recent sale of State General Obligation Bonds at a 20-year payback rate	$15,000,000	Loan

	Sponsoring Agency	Funding Authority	Eligible Projects	Total Funds Available	2000-2001 Funds Available/Interest Rate	Applicant Funding Limitations	Grant or Loan
Water Conservation Loan Program	DWR	Proposition 13	Construction of water reclamation storage and distribution facilities, or the purchase of land and land easements for replacement of existing potable water supply		50% of the interest rate paid by the State on the most recent sale of State General Obligation Bonds at a 20-year payback rate	$5,000,000	Loan
Local Water Supply Loan Program	DWR	Proposition 13	Construction of water reclamation facilities to communities for the purpose of supplying additional new local water supplies		50% of the interest rate paid by the State on the most recent sale of State General Obligation Bonds at a 20-year payback rate	$5,000,000	Loan
Agricultural and Urban Water Conservation Loan Program	DWR	Proposition 13	Agricultural and Urban Water Conservation Projects	$16,000,000 for Agriculture $13,000,000 for Urban		None	Loan
Infrastructure State Revolving Loan Program	CA Technology, Trade and Commerce Agency		Water treatment and distribution		Monthly basis	$20,000,000	Loan
Focused Research in Air Quality and Produced Water Management in Oil and Gas Exploration and Production	Department of Energy		Oil field produced water management research	$7,000,000	Maximum 80% of estimated project costs for 1 to 3 years	$1,500,000	Grant

12.1.2.1 U.S. Bureau of Reclamation

The U.S. Bureau of Reclamation's water reclamation and reuse grant program was developed via the Reclamation Wastewater and Groundwater Study and Feasibility Act of 1992 (Title XVI of Public Law [P.L.] 102-575, as amended). This program investigates and identifies opportunities for reclamation and reuse of municipal, industrial, domestic, and agricultural wastewater, and naturally impaired ground and surface waters, for the design and construction of demonstration and permanent facilities to reclaim and reuse wastewater, and to conduct research, including desalting, for the reclamation of wastewater and naturally impaired ground and surface water. The Act also provides a program for federal participation (through cost sharing) of specific water reuse projects up to certain amounts specified in the Act. Construction funds can be provided only for projects specifically authorized by Congress pursuant to Title XVI.

CLWA is currently attempting to obtain Congressional authorization for its recycled water program. Authorization is currently included in HR 1245 (McKeon) and HR 2404 (Miller), which were introduced in the 107th Congress; however, this legislation appears inactive until the CALFED reauthorization bills (S 1768 [Feinstein] and HR 3208 [Calvert]) are addressed. The CALFED bills also include expanded federal programs for recycled water.

12.1.2.2 U.S. Department of Energy National Energy Technology Laboratory

The U.S. Department of Energy (DOE) National Energy Technology Laboratory is currently soliciting applications for cost-shared research projects that address produced water management issues of the oil and gas industry under its Focused Research in Air Quality and Produced Water Management in Oil and Gas Exploration and Production program. The goal of the program is to provide solutions to issues that are limiting domestic production, such as reinjecting oil field produced water. DOE is seeking applicants who can develop technologies to allow the economic beneficial use of produced water, such as landscape irrigation, so as to avoid disposing or reinjecting produced water. DOE is currently anticipating that it will award three to seven projects for a period ranging from one to three years. They are planning approximately $7 million in funding over a 3-year period for this solicitation. Project awards will range from $100,000-$500,000 per year. The minimum required cost share by the project proponents is twenty percent.

12.1.2.3 State Water Resources Control Board

The March 2000 approval of Proposition 13 (2000 Water Bond) provided funds to be allocated by SWRCB for local water-related projects. Roughly $763.9 million was allocated to be available through various bond programs.

The Water Recycling Financial Assistance Program provides grants and low-interest loans for design and construction of water recycling facilities, grants for water recycling facilities planning studies, and grants for recycling research and studies. A total of $53.2 million is available for grants for construction of facilities, $49.5 million in loans for facilities and grants for planning, and $3.2 million for research and studies. The program provides both low-interest loans and grants to local agencies to construct water recycling facilities, provides grants up to $75,000 to local agencies for planning of water recycling facilities, and provides funds for research and studies. Proposition 13 rolls the funds for water recycling from the 1988 Bond Law and 1996 Bond Law into a new Proposition 13 subaccount. Proposition 13 also requires that 60 percent of the funds for design and construction of facilities be allocated to projects in the Counties of

Riverside, Ventura, Los Angeles, San Diego, Orange, or San Bernardino, and that 40 percent of the funds be allocated to projects in the remaining counties. The 1984 Bond Law remains separate, provides low-interest loans up to $10 million for design and construction of facilities, and has no geographic restrictions. Loan applications are supported by facilities planning report demonstrating that the proposed project is cost effective. Loans may be for a period of up to 20 years with an interest rate of 50 percent of the interest rate paid by the state on the most recent sale of State General Obligation Bonds. There is a $15 million limit per project on loans.

12.1.2.4 California Department of Water Resources

DWR has several grant programs available to assist in funding local studies, programs, and projects to better manage California's water resources. It is the primary intent of these programs to fund local activities that will enhance water supply reliability and increase the beneficial use of existing supplies.

The Proposition 13 Water Conservation Program provides low interest loans and grants for construction projects, and grants for feasibility studies to public agencies and incorporated mutual water companies. The Proposition 204 Local Projects program provides low interest loans and grants to local public agencies for water supply construction projects and feasibility studies. The Proposition 82 Local Water Supply program provides only loans for construction projects and feasibility studies.

The Urban and Agricultural Water Conservation Program provides loans to public agencies, and incorporated mutual water companies to finance feasible, cost effective water conservation projects or programs to improve water use efficiency. Projects involving construction of recycled water distribution systems for reuse in lieu of existing potable water supplies are eligible for funding under this program.

The Local Water Supply Construction Loan Program provides loans for the construction of water reclamation facilities to communities for the purpose of supplying additional new local water supplies. Construction of water reclamation storage and distribution facilities, as well as the purchase of land and land easements, is eligible for funding. The maximum loan is $5 million and the interest rate is equal to the most recent California General Obligation Bond sale.

12.1.2.5 California Technology, Trade and Commerce Agency

The Infrastructure State Revolving Fund Program provides low-cost financing to public agencies in amounts ranging from $250,000 to $20,000,000, with a term of up to 30 years. This program supports a variety of projects, including water treatment and distribution.

12.1.3 Certificates of Participation

Certificates of Participation (COP) have been previously utilized to finance capital improvement projects. With a COP, the public entity is not the immediate owner of the facility, but rather becomes the lessee. Another public or private entity may be identified to function as the lessor. The lessor will arrange the financing and construction of the project and then lease it to CLWA. The government unit (such as CLWA) which proposes to occupy or to use the facility initiates the process by agreeing in principle to enter into a contract to lease certain specified property (either real or personal) from lessor. The contract provides the terms and circumstances under which the purchase is divided into periodic installment payments. The payments will include an interest component which may be made annually, semi-annually, or more frequently. To

finance the lease, the lessor may then assign to a third party (trustee) its right to receive the installment payments, and the trustee, in turn, provides the financing. The trustee then carves the lease into smaller interests (represented by the certificates) which are underwritten by investment bankers and sold to investors.

The COPs represent (or certify) each investor's percentage ownership in the lease and the entitlement to receive his/her portion of principal and interest payments. Most frequently, certificates are issued in $5,000 denominations. The public agency (lessee) is obligated under the agreement to make the lease payments from lawfully available annual appropriations. Neither the full faith and credit nor taxing power of the lessee is pledged; however, the lease agreement provides that the lessee shall take action each year to include rental payments in its budget. If CLWA is to consider and become a lessee under this type of financing, it must address the source and flow of annual revenues to make rental payments. Installments due under a lease for the facilities would be payable from gross revenues of CLWA. These can include operating revenues, facility capacity fees, and property taxes.

12.1.4 Revenue Sources for Loan/Debt Service Repayment

Capital costs and debt services associated with CLWA's capital improvement program are allocated to existing users and new growth. Costs attributable to existing users are funded by operating revenues and their proportion of the 1 percent property tax, interest on investment, reserves, and standby charges, if levied. Costs attributable to new growth are funded by facility capacity fees and its proportion of the 1 percent property tax interest on investment, reserves, and standby charges if levied.

12.1.5 Recommended Alternative

Due to the numerous grant options and low interest loan programs, CLWA should consider maintaining its accumulated reserves for other purposes and finance the recycled water project through available grant monies and loan programs. It should be noted that a close review of project planning and construction documents is conducted upon application for existing grant and loan programs. Such programs require that the most cost-effective alternative be utilized. The loan programs and majority of grant programs are not retroactive; therefore, the sponsoring agency must approve the project prior to the applicable phase (e.g., feasibility study, planning, construction). It is recommended that coordination with each sponsoring agency listed in Table 12-1 occur immediately following project approval.

12.2 Water Rate Policy

To encourage its use, recycled water should be available at a lower rate to users than potable water. Because recycled water is a reliable source of supply, this cost differential should provide potential customers with the necessary encouragement to use recycled water. The wholesale rate of potable water currently averages $145 per acre-foot among the three purveyors. The retail rate of potable water in the Santa Clarita Valley is approximately double the wholesale rate. The principal wholesale rate strategies for recycled water are discussed below.

12.2.1 Rates Based on Costs of Service

The wholesale recycled water rate could be set at a level to recover costs of furnishing the recycled water. The estimated annualized capital and operating cost of the recycled water system in 2002 dollars is approximately $818 per acre-foot, which is significantly greater than the $145 per acre-foot wholesale or current retail rate for potable water.

Regardless of the program utilized to finance the recycled water system, the basic source of funds is the facility capacity fees, standby charges, property taxes, and water rates currently collected by CLWA. Therefore, it is not necessary to include annualized capital in the cost of service since the capital costs do not need to be recovered. The estimated cost for the recycled water system excluding annualized capital costs is approximately $48 per acre-foot (2002 dollars), which is actually lower than the current wholesale rate for potable water.

12.2.2 Rates Based on Percentage of Potable Water Rate

Although the wholesale recycled water rate should reflect the actual cost of providing service, it may be preferable for CLWA to base its recycled water rate on a percentage of the potable water rate. This is desirable when a straightforward method of calculation is preferred. Often, this method is necessary because the rate based upon costs of service exceeds the potable water rate. Based on the need to provide an incentive to utilize recycled water, a recycled water rate of 70 to 90 percent of the potable water rate is typical.

12.2.3 Rates by User Class

A method used by some water agencies for setting recycled water rate is to establish different rates for various user categories. For example, the Irvine Ranch Water District charges a rate for commercial/landscape users, including homeowner associations, that is approximately nine percent greater than the rate charged for the larger/agricultural users. Because the cost of furnishing recycled water would not differ substantially between types of customers, it seems appropriate for users of CLWA's recycled water system to be initially charged at the same rate. However, a rate surcharge may be appropriate for users of high-pressure water since pumping costs are higher.

12.2.4 Recommended Rate Policy

It is recommended that CLWA utilize a wholesale recycled water rate equivalent to the potable water rate of $145 per acre-foot and that the water purveyors utilize a retail recycled water rate equivalent to the potable water rate. The estimated cost of service for the recycled water system is $818 per acre-foot (2002 dollars) as discussed in Section 10. Utilizing the potable rate for recycled water allows CLWA to recover the cost of recycled water service while avoiding potential problems that investor-owned water companies may face when presenting a recycled water rate case to the Public Utilities Commission and while assuring that the water purveyors experience no loss in revenue.

In order to provide an incentive to recycled water users, it is recommended that the CLWA issue a monthly rebate directly to each recycled water user. The recommended initial rebate is $60 per acre-foot. Based on existing retail potable water rates, the rebate would result in a cost incentive for recycled water users of 20 to 25 percent over potable water rates.

Section 13: Implementation Plan

Section 10 identified recommended infrastructure improvements for a recycled water system in the CLWA service area. This section presents a plan for implementing the recommended system. The discussion focuses on the implementation plan, permit requirements, other institutional issues and the implementation schedule.

13.1 Implementation Considerations

In order to implement each phase, several development activities need to occur and issues need to be addressed. Many of the implementation elements apply to all the phases; however, some issues are unique to individual phases or facilities. The following is a listing of the major activities and issues to be addressed which are common to all phases. The activities are generally listed in order of occurrence; however, most would require concurrent effort through the duration of implementation.

- Customer Development - Verify demands, customer commitment, connection locations, retrofit requirements, and DHS approvals.

- Preliminary Design/Engineering Feasibility - Evaluate alternative pipeline routes, collect detailed utility and traffic information, prepare updated cost estimates, and update with new information from customer development activities. Preliminary design can be initiated following initial verification of customer information, provided updated customer information does not identify other significant issues.

- Regulatory Approvals - Identify required permits and regulatory approvals, including DHS, RWQCB, CEQA, and construction permits. Develop management plan and schedule to obtain regulatory approvals, considering appropriate review periods for regulatory agencies. Regulatory activities should be initiated concurrently with preliminary design and continue through implementation and operation.

- Design/Construction - Incorporate any updated customer information, regulatory requirements, and community concerns. Reevaluate economics with updated information and design level cost estimate. Design and construction efforts can begin immediately following preliminary design.

- Training – Provide training and guidance to the site supervisors assigned by each recycled water user. Educate site supervisors on the proper use of recycled water, recycled water regulations, and basic principles of backflow prevention and cross-connection control.

13.2 Phasing Plan

WRP production is not anticipated to be adequate to meet the total demands of the system. However, as potable water demands increase and, consequently, recycled water production increases, the water available to meet system demands would also increase. Therefore, it is recommended that construction of the recycled water system be phased to utilize the increases in plant production.

Oil field produced water and treated perchlorate contaminated water would also not be available immediately, nor would they be available as permanent sources of supply. Instead, these alternative water sources will be used as interim supplies when inadequate recycled water is available from Valencia WRP. Oil field produced water is anticipated to be available as a long-term supply – approximately 20 years – and perchlorate contaminated water for only 2 to 3 years. The phasing considers when these water sources would be available.

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

- A number of the potential recycled water users are future users that do not yet need recycled water.
- The current flow of the Valencia WRP is not adequate to meet the total demands of the recycled water users.
- Capital requirements would be spread over CLWA's current planning period.
- Oil field produced water and treated perchlorate-contaminated water are not immediately available.
- Newhall Ranch is anticipated to have an initial increase in demand, peaking in 2015, then decreasing and leveling off.

The recycled water system is divided into implementation phases based primarily on service zone boundaries.

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

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

The implementation phases are prioritized based on the status of the users (existing or future), the anticipated construction schedule of future users, and the proximity of the users to the non-potable water source (e.g., Valencia WRP, Placerita Oil Field, perchlorate treatment plant). It is recommended that the recycled water system be implemented as shown in Table 13-1.

The phasing sequence shown in Table 13-1 is a recommendation based on existin and current information. Actual development of future users may necessitate modi phasing sequence.

TABLE 13-1
IMPLEMENTATION PHASES

Phase	Zone	Year	Water Demand (AF/yr)[(a)]
1A	1430	Existing/In Progress	880
1B	1430	2003	3,862
2	1430	2003	1,236
3	1430	2004	4,644
4	1430	2005	401
5	1680	2006	658
6	1680	2007	722
7	1430	2008	3,892
8	1430	2008	171
9	1680	2009	351
10	1680	2010	227
11	1430	2011	399
	Total		17,441

Note: (a) Demands by phase include both existing and future demands. Not all future demands would be on-line when the phase is implemented.

Implementation phases are delineated on Figure 13-1 and described in the following sections. Recycled water users and facility requirements with preliminary capital and O&M cost estimates for each phase are summarized in Tables 13-2, 13-3, and 13-4.

13.2.1 Phase 1A

Phase 1A is ~~currently in progress~~ and includes the proposed Westridge Golf Course located in the vicinity of the Valencia WRP.

Based on the Reclaimed Water Master Plan prepared in 1993, CLWA has constructed ~~or is in the process of constructing~~ the Phase 1 improvements, including a 4,000 gpm recycled water pump station at the Valencia WRP, 15,600 LF of 20- and 24-inch ductile iron pipe from the Valencia WRP recycled water pump station to recycled water reservoir no. 1 (Recycled water pipeline IA-2), and recycled water reservoir no. 1, a 1.5 mg aboveground steel reservoir located near the proposed Westridge Golf Course.

Environmental documentation for Phase 1 was completed in 1991 and consisted of two primary documents:

- CLWA's "Final Program EIR for the Capital Program and Water Plan including Acquisition of Supplemental Water and Proposed Second Plant Site."
- CLWA's "Site Specific Mitigated Negative Declaration for Construction of a Reclaimed Water Distribution System."

Construction of Phase 1 improvements is anticipated to be completed in 2002.

TABLE 13-2
POTENTIAL RECYCLED WATER USERS BY PHASE

Existing Phase 1A

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
60	Westridge Golf Course		880	165.00	5.43	1768.9	3,276
	Total		**880**	**165**	**5**	**1,769**	**3,276**

Phase 1B

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
31	Magic Mountain Resort Golf Course		429	80.44	2.65	862.3	1,597
32	Magic Mountain Amusement Park	26101 Magic Mountain Pkwy, Valencia	476	89.25	2.94	956.8	1,595
16	Helmers Elementary	27300 Grandview Drive, Valencia	5	1.00	0.03	10.7	30
25	Valencia High	27801 Dickason Drive, Valencia	100	26.00	0.86	278.7	774
34	Valencia Country Club/Golf Course	27330 Tourney Rd, SC	590	76.10	2.50	815.8	1,511
36	Santa Clarita Sports Complex	26407 Golden Valley Road, SCTA	50	9.38	0.31	100.5	168
39	North River Industrial		105	19.69	0.65	211.1	586
40	North River High School		135	25.31	0.83	271.4	754
41	North River Jr. High School		60	11.25	0.37	120.6	335
42	North River Golf Course		600	112.50	3.70	1206.0	2,233
43	North River Commercial		45	8.44	0.28	90.5	251
44	Lago de Valencia - Commercial	McBean/Newhall Ranch Rd(E corner), N Valencia	29	5.44	0.18	58.3	162
51	South River Village - Commercial	NW corner McBean Pkwy & MM Pkwy, N Valencia	44	8.25	0.27	88.4	246
52	Valencia Industrial Center	24800 block of Tibbetts Avenue, N Valencia	27	5.06	0.17	54.3	151
113	North River Commercial		24	4.50	0.15	48.2	134
262	Area Wide District LMD	N Newhall Ranch Rd	11	2.06	0.07	22.1	61
263	Area Wide District LMD	Btwn McBean Pkwy&Bouquet Canyon on river	11	2.06	0.07	22.1	61
273	Corporate Center	Sprinfield Court	4	0.75	0.02	8.0	22
282	Northbridge	24000 Newhall Ranch Rd	373	69.94	2.30	749.8	2,083
308	North Valencia Jr HS	undetermined	50	9.38	0.31	100.5	279
309	North Valencia Eastcreek Community Park	McBean & Newhall Ranch Rd	40	7.50	0.25	80.4	134
310	N Valencia Decoro Park-Business Park	Dickason Dr	247	46.31	1.52	496.5	1,379
314	North Valencia Village Center (Eastcreek)	Decoro Dr & McBean	9	1.69	0.06	18.1	50
315	North Valencia Eastcreek County Park	McBean Pkwy	9	1.69	0.06	18.1	30
316	N Valencia Decoro Park-Commercial	Newhall Ranch Rd & Copper Hill Dr	5	0.94	0.03	10.1	28
317	North Valencia Decoro Park Private Park	Copper Hill Drive	4	0.75	0.02	8.0	13
319	Northpark School	27300 Grandview, SC	5	1.00	0.03	10.7	30
335	SunCal/Tesoro, LLC Development	Copperhill and Avenida Rancho Tesoro	375	79.38	2.61	850.9	1,576
	Total		**3,862**	**536**	**18**	**5,750**	**16,273**

Phase 2

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
33	Valencia Interchange	Valencia Blvd & MM Pkwy	6	1.13	0.04	12.1	34
6	Newhall School District Office	25375 Orchard Village Rd, Valencia	6	1.00	0.03	10.7	30
9	Valencia Valley Elementary	23601 Carrizo Drive, Valencia	18	3.00	0.10	32.2	89
61	Vista Valencia Golf Course	24700 W Trevino Dr, SC	36	6.75	0.22	72.4	134
63	Old Orchard Elementary	25141 Avenue Rondel, Newhall	17	3.00	0.10	32.2	89
64	Old Orchard Park (City)	25023 Avenida Rotella, Valencia	24	4.00	0.13	42.9	71
65	Orchard Village Road Tree Farm		6	1.13	0.04	12.1	34
66	Henry Mayo Hospital	23845.5 McBean Pkwy, Valencia	153	23.00	0.76	246.6	685
67	College of the Canyons/Academy of the Canyons	25455 N. Rockwell Canyon Rd, Valencia	213	39.94	1.31	428.1	1,189
71	Hart High School	24825 Newhall Avenue, Newhall	31	14.00	0.46	150.1	417
72	H.M. Newhall Memorial Park (City)	24923 Newhall Avenue, Newhall	49	8.00	0.26	85.8	143
73	Placerita Jr. High/Learning Post	25015 Newhall Avenue, Newhall	53	9.94	0.33	106.5	296
74	Valencia Glenn City Park	23750 Via Gavola, Valencia	29	5.00	0.16	53.6	89
76	Peachland Elementary	24800 Peachland Avenue, Newhall	30	5.63	0.19	60.3	168
79	Valencia Meadows Elementary	25577 Fedala Rd, Valencia	16	3.00	0.10	32.2	89
80	Valencia Meadows Park (City)	25671 Fedala Rd, Valencia	6	1.00	0.03	10.7	18
94	Summit Common Area (N & S)		157	29.44	0.97	315.6	877
99	Almendra Park (City)	23420 Alta Madera Drive, SCTA	11	2.02	0.07	21.6	36
136	Apple Park	24829 Apple Street-Z, Newhall	7	1.00	0.03	10.7	18
139	Park - Adjacent to Valencia Valley Elem?	23645 Carrizo Drive, Valencia	11	2.00	0.07	21.4	36
168	Peachland Owners Assoc	25003-39 Peachland, Newhall	26	4.00	0.13	42.9	119
264	Area Wide District LMD	Near Henry Mayo Hospital	11	2.06	0.07	22.1	61
266	Old Orchard	23600 Lyons Ave	13	2.44	0.08	26.1	73
267	Valencia Hills	23000 Wiley Canyon Rd	19	3.56	0.12	38.2	106
268	Valencia Meadows	S 25500 McBean Pkwy	6	1.13	0.04	12.1	34
269	Valencia Glen	N Orchard Village Rd	10	1.88	0.06	20.1	56
270	South Valley HOA	25700 McBean Pkwy	6	1.00	0.03	10.7	30
272	Valencia Summit	Rockwell Canyon&McBean Pkwy (center)	252	47.25	1.55	506.5	1,407
329	City of Santa Clarita	23647 Carrizo Dr	14	2.75	0.09	29.5	82
	Total		**1,236**	**230**	**8**	**2,466**	**6,508**

Phase 3

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
5	Live Oak Elementary	27715 Saddleridge Road, Castaic	21	6.00	0.20	64.3	179
35	Honor Rancho Golf Course		450	84.38	2.78	904.5	1,675
104	Hasley Canyon Park (County)	28700 W. Quincy Street, Castaic	17	3.19	0.10	34.2	57
332	Newhall Ranch		3691	692.06	22.77	7419.2	5,152
333	Hasley Canyon Golf Course		450	84.38	2.78	904.5	1,508
336	USPS Regional Processing and Distribution Center	28201 Franklin Pkwy.	15	1.25	0.04	13.4	56
	Total		**4,644**	**871**	**29**	**9,340**	**8,626**

Phase 4

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
11	Newhall SD Transp/Maintenance	26501 Golden Valley, SCTA	4	1.00	0.03	10.7	30
19	Rio Vista Elementary	20417 Cedarcreek, CC	23	6.00	0.20	64.3	179
29	Bowman High	21508 Redview Drive, SCTA	9	1.69	0.06	18.1	50
49	Pony League - Pony League Ballfields	Valencia Blvd/SC & S Fork River, N Valencia	43	8.06	0.27	86.4	144
50	Pony League - Commercial	Valencia Blvd/SC & S Fork River, N Valencia	33	6.19	0.20	66.3	184
53	Civic Center		4	0.75	0.02	8.0	22
57	City Civic Center		125	23.44	0.77	251.3	698
59	City Center Commercial		5	0.94	0.03	10.1	28
271	Central & North Valley	26500 McBean Pkwy	35	6.56	0.22	70.4	195
296	Porta Bella Recreational	Soledad Canyon Rd	14	2.63	0.09	28.1	47
299	Porta Bella-Soledad Community Center	Soledad Canyon Rd	31	5.81	0.19	62.3	173
301	Porta Bella Office Park	Soledad Canyon Rd	14	2.63	0.09	28.1	78
302	Porta Bella Office Park	Soledad Canyon Rd	12	2.25	0.07	24.1	67
303	Porta Bella Office Park	San Fernando Rd	19	3.56	0.12	38.2	106
304	Porta Bella Business Park	Soledad Canyon Rd	30	5.63	0.19	60.3	168
	Total		**401**	**77**	**3**	**827**	**2,169**

Phase 5

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
45	Lago de Valencia - Elementary School	North Valencia Phase II	16	3.05	0.10	32.7	91
46	Lago de Valencia - park/rec	Newhall Ranch Rd/N SC River, Valencia	46	8.63	0.28	92.5	154
48	Bouquet South - Commercial	Bouquet Canyon Rd/Newhall Ranch Rd, N Valencia	48	9.00	0.30	96.5	268
56	Panhandle Commercial		15	2.81	0.09	30.2	84
58	City Center Commercial		10	1.88	0.06	20.1	56
127	Bridgeport Park (City)	23520 Bridgeport Lane, SCTA	44	8.25	0.27	88.4	147
132	Northbridge Park	Grandview Drive, E of McBean Pkwy	22	4.13	0.14	44.2	74
143	Legacy Academy	North Valencia Phase II	16	3.05	0.10	32.7	91
334	Panhandle Golf Course		440	5.04	0.17	54.0	100
	Total		**658**	**46**	**2**	**491**	**1,064**

Phase 6

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
14	Emblem Elementary	22685 Espuella, Saugus	13	3.00	0.10	32.2	89
17	Highlands Elementary	27332 Catala, Saugus	18	4.00	0.13	42.9	119
20	Rosedell Elementary	27583 Urbandale Ave, Saugus	21	5.00	0.16	53.6	149
21	Santa Clarita Elementary	27177 Seco Canyon Rd, Saugus	13	2.00	0.07	21.4	60
26	Arroyo Seco Jr. High	22171 Vista Delgado, Saugus	60	11.25	0.37	120.6	335
54	Saugus High	21900 Centurion Way, Saugus	110	20.63	0.68	221.1	614
55	Rio Vista Center		300	56.25	1.85	603.0	1,675
102	Santa Clarita Park (City)	27285 Seco Canyon Road, Saugus	19	3.52	0.12	37.7	63
125	Central Park (City)	27150 Bouquet Canyon Rd, Saugus	140	26.25	0.86	281.4	469
254	City of Santa Clarita	27285 Seco Canyon Rd	28	5.25	0.17	56.3	156
	Total		**722**	**137**	**5**	**1,470**	**3,729**

Phase 7

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
98	Golden Oak Ranch	19802 Placerita Canyon Road, Newhall	632	118.50	3.90	1270.4	3,529
68	Newhall Elementary	24607 Walnut Street, Newhall	63	11.81	0.39	126.6	352
69	William S. Hart Park (City)	24151 N. San Fernando Rd, Newhall	707	132.56	4.36	1421.1	2,369
70	College of the Masters (Masters College)	21726 Placerita Canyon Rd, Valencia	24	5.00	0.16	53.6	149
78	Tract 32365 Common Area (Palmer)		108	20.25	0.67	217.1	603
126	Creekview Park (City)	22200 Park Street, SCTA	13	2.44	0.08	26.1	44
144	Valencia Vista HOA	Nandina&Valle Del Oro Irrigation, Newhall	10	2.00	0.07	21.4	60
145	Valencia Vista HOA	Valle Del Oro @ Pool, Newhall	9	1.00	0.03	10.7	30
146	Valencia Vista HOA	Valle Del Oro, Newhall	11	2.00	0.07	21.4	60
147	Valencia Vista HOA	Leonard Tree Irrigation, Newhall	15	2.00	0.07	21.4	60
149	Valencia Vista HOA	Valle Del Oro, Newhall	21	3.00	0.10	32.2	89
150	Valencia Vista HOA	Valle Del Oro, Newhall	9	2.00	0.07	21.4	60
161	Lantana Hills HOA	23818.5 Oakhurst Dr, Newhall	26	6.00	0.20	64.3	179
162	Lantana Hills HOA	23804.5 Oakhurst Dr, Newhall	17	4.00	0.13	42.90	119
163	Lantana Hills HOA	23800.5 Oakleaf Cyn Dr, Newhall	18	4.00	0.13	42.9	119
165	Lantana Hills HOA	21101.5 Oakriver Ln, Newhall	7	2.00	0.07	21.4	60
166	Lantana Hills HOA	23712.5 Oakhurst Dr., Newhall	6	2.00	0.07	21.4	60
167	Lantana Hills HOA	21100.5 Oakleaf Cyn Dr, Newhall	12	4.00	0.13	42.9	119
197	The Terrace (Apts?)	21421 Plane Tree Dr, Newhall	7	1.00	0.03	10.7	30
198	The Terrace (Apts?)	Grape Lily (Irigtn), Newhall	8	1.00	0.03	10.7	30
199	The Terrace (Apts?)	Valle Del Oro, Newhall	15	4.00	0.13	42.9	119
200	The Terrace (Apts?)	Valle Del Oro, Newhall	16	4.00	0.13	42.9	119
201	The Terrace (Apts?)	Bottletree (Irigtn), Newhall	11	2.00	0.07	21.4	60
202	The Terrace (Apts?)	Ficus 21211-21-24334 Choke Cherry, Newhall	9	1.00	0.03	10.7	30
203	The Terrace (Apts?)	Ficus (Irigtn), Newhall	6	1.00	0.03	10.7	30
204	The Terrace (Apts?)	Fern Drive, Newhall	9	1.00	0.03	10.7	30
208	Coastal Meadowridge	23645 Meadowridge S/S Co, Newhall	14	4.00	0.13	42.9	119
251	City of Santa Clarita	Newhall & San Fern S/W Crn, Newhall	32	6.00	0.20	64.3	179
252	City of Santa Clarita	24242 Railroad Ave, Newhall	165	24.00	0.79	257.3	715
253	City of Santa Clarita	22200 Park St., Newhall	1614	277.00	9.11	2969.5	8,249
311	Golden Valley Ranch Commercial		113	21.19	0.70	227.1	631
312	Golden Valley Ranch Elementary School	Golden Valley Rd	27	4.97	0.16	53.3	148
313	Golden Valley Ranch Park	Golden Valley Rd & Placerita Canyon Rd	25	4.69	0.15	50.3	84
325	Golden Valley Ranch Commercial		113	21.19	0.70	227.1	631
	Total		**3,892**	**703**	**23**	**7,532**	**19,259**

Phase 8

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
100	Driving Range		24	4.50	0.15	48.2	89
292	Institutional (Porta Bella Dvlpmt)	Via Princessa & Santa Clarita Pkwy	10	1.88	0.06	20.1	56
293	Porta Bella Park	Santa Clarita Pkwy	55	10.31	0.34	110.6	184
294	Porta Bella Park	S of Santa Clarita Pkwy	9	1.69	0.06	18.1	30
297	Porta Bella Recreational	S of Soledad Canyon Rd	14	2.63	0.09	28.1	47
300	Porta Bella-Neighborhood Community Center	Via Princessa & Santa Clarita Pkwy	21	3.94	0.13	42.2	117
305	Porta Bella Business Park	S of Soledad Canyon Rd	14	2.63	0.09	28.1	78
306	Porta Bella Business Park	S of Soledad Canyon Rd	10	1.88	0.06	20.1	56
307	Porta Bella Business Park	S of Soledad Canyon Rd	14	2.63	0.09	28.1	78
	Total		**171**	**32**	**1**	**344**	**736**

Phase 9

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
278	American Beauty	Fanchon Lane	13	2.44	0.08	26.1	73
13	Cedar Creek Elementary	27792 Camp Plenty, CC	12	3.00	0.10	32.2	89
27	Sierra Vista Jr. High	19425 Stillmore Street, CC	55	10.31	0.34	110.6	307
28	Canyon High	19300 Nadal Street, CC	110	20.63	0.68	221.1	614
101	North Oaks Park (City)	27824 Camp Plenty Road, SCTA	6	1.08	0.04	11.6	19
108	Canyon Country Park (City)	17615 Soledad Canyon Road, CC	43	8.06	0.27	86.4	144
141	Santa Clarita Christian School (k-12)	27249 Luther Drive, SCTA	6	1.13	0.04	12.1	34
234	Canyon Springs Elementary	19059 Vicci Street, CC	8	1.50	0.05	16.1	45
235	Leona Cox Elementary	18643 Oakmoor Street, CC	8	1.50	0.05	16.1	45
237	Mitchell Elementary	16821 Goodvale Road, CC	8	1.50	0.05	16.1	45
256	City of Santa Clarita Park	Meadow Drive	25	4.69	0.15	50.3	140
257	Sierra Heights Lndscp Maintnc Dist (LMD)	Canvas Street	4	0.75	0.02	8.0	22
279	Shangri-La	Shangri-La Drive	40	7.50	0.25	80.4	223
321	LA Co Parks and Rec	Grand Canyon (across from Lot 40)	9	2.00	0.07	21.4	36
323	Sulfur Springs USD District Office	24930 Ave Stanford, SC	4	1.03	0.03	11.0	31
	Total		**351**	**67**	**2**	**719**	**1,866**

Phase 10

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
30	La Mesa Jr. High	26623 May Way, SCTA	55	10.31	0.34	110.6	307
84	Friendly Valley Golf Course	19345 W. Avenue of the Oaks, Newhall	107	20.06	0.66	215.1	398
258	Sunset Hills LMD	19500 Via Princessa	34	6.38	0.21	68.3	190
265	Area Wide District LMD	Blackbird Lane	11	2.06	0.07	22.1	61
320	LA Co Parks and Rec	14519 Stoneridge - Slope	15	2.00	0.07	21.4	36
322	LA Co Parks and Rec	29364 Canyon Rim (across Street)	5	1.00	0.03	10.7	18
	Total		**227**	**42**	**1**	**448**	**1,010**

Phase 11

Map Location #	User Name	Address	Chosen Annual Demand (AF/Yr)	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
298	Porta Bella Town Center	N. San Fernando Rd	62	11.63	0.38	124.6	346
95	Ridgedale Common Area		214	40.13	1.32	430.2	1,195
128	Circle J Park (City)	22651 Via Princessa, SCTA	15	2.81	0.09	30.2	50
280	Circle J Ranch	Circle J Rd	74	13.88	0.46	148.7	413
281	Circle J Ranch	Circle J Rd	21	3.94	0.13	42.2	117
295	Porta Bella Park	San Fernando Rd	13	2.44	0.08	26.1	44
	Total		**399**	**75**	**2**	**802**	**2,165**

TABLE 13-3
FACILITY REQUIREMENTS AND COST BY PHASE

	Pipelines				Reservoirs			Pump Stations			Freeway or River Crossings		Total Costs	
Phase 1A	**Material**	**Diameter (in.)**	**Length (Ft.)**	**Cost ($)**	**Number**	**Volume**	**Cost**	**Pump Station**	**Flow Rate**	**Cost**	**Crossing**	**Cost**		
Existing	Steel	20	11,577		1	1.5 mg	$731,000.00	Valencia WRP	2000 gpm	$1,093,000.00			Total Costs*	$3,690,320.00
	Steel	24	3,991										*Not included in Grand Total	
	DIP	36	90											
		Subtotal	15658	$1,866,320										
Phase 1B	PVC	8	8,110	$527,150	2	3.0 mg	$960,000.00				Rye. Cyn. Rd.	$73,779.00	Subtotal	$4,379,507
	PVC	14	6,441	$611,895									Flush/Disinfec.	$35,375
	PVC	20	8,106	$1,199,688									**Total**	**$4,414,882**
	PVC	24	6,103	$1,006,995										
		Subtotal	28760	**$3,345,728**										
Phase 2	PVC	10	9,014	$721,097	3	3.5 mg	$980,000.00	Valencia WRP	Up to 10,000 gpm	$465,000.00	Valencia Blvd.	$110,668.00	Subtotal	$10,257,998
	PVC	14	5,386	$511,650									Flush/Disinfec.	$50,763
	PVC	24	14,222	$2,346,609									**Total**	**$10,308,761**
	Steel	36	12,649	$5,122,975										
		Subtotal	41271	**$8,702,330**										
Phase 3	PVC	8	11,569	$751,985	4	3.0 mg	$960,000.00	Valencia WRP	Up to 12,000 gpm	$465,000.00	Old Road/ S.C. River	$73,779.00	Subtotal	$8,731,503
	PVC	10	4,382	$350,560							Old Road/Castaic Creek	$51,645.00	Flush/Disinfec.	$76,959
	PVC	12	5,337	$485,667									**Total**	**$8,808,462**
	PVC	14	1,935	$183,825										
	PVC	16	4,032	$451,584										
	PVC	18	15,008	$1,936,032										
	PVC	20	19,347	$2,863,356										
	PVC	24	958	$158,070										
		Subtotal	62568	**$7,181,079**										
Phase 4	PVC	8	1,170	$76,050	5	3.5 mg	$980,000.00						Subtotal	$12,398,465
	PVC	24	2,506	$413,490									Flush/Disinfec.	$37,713
	Steel	36	26,985	$10,928,925									**Total**	**$12,436,178**
		Subtotal	30661	**$11,418,465**										
ASR								ASR	13500 gpm	$8,093,893			**Total**	**$8,093,893**
Phase 5	PVC	16	6,914	$774,368							McBean Pkwy.	$132,802.00	Subtotal	$1,684,365
	Steel	36	1,919	$777,195									Flush/Disinfec.	$10,865
		Subtotal	8833	**$1,551,563**									**Total**	**$1,695,230**
Phase 6	PVC	8	12,575	$817,375	6	3.25 mg	$975,000.00						Subtotal	$4,545,878
	PVC	12	8,068	$734,188									Flush/Disinfec.	$35,259
	PVC	24	5,125	$845,625									**Total**	**$4,581,137**
	PVC	36	2,898	$1,173,690										
		Subtotal	28666	**$3,570,878**										
Phase 7	PVC	12	6,786	$760,032	7	3.5 mg	$980,000.00	Berry Petroleum	1250 gpm	$437,500.00	Placerita Cyn. Rd./ 14	$61,482	Subtotal	$8,958,959
	PVC	20	13,265	$1,963,220									Flush/Disinfec.	$39,109
	PVC	36	11,745	$4,756,725									**Total**	**$8,998,069**
		Subtotal	31796	**$7,479,977**										
Phase 8	PVC	8	7,093	$461,045				Honby	5000 gpm	$1,042,500.00			Subtotal	$5,271,005
	PVC	24	3,236	$533,940									Flush/Disinfec.	$22,525
	Steel	36	7,984	$3,233,520									**Total**	**$5,293,530**
		Subtotal	18313	**$4,228,505**										
Phase 9	PVC	8	4,420	$287,300	8	3.25 mg	$975,000.00				Sierra Hwy.	$60,253.00	Subtotal	$1,742,643
	PVC	24	2,546	$420,090									Flush/Disinfec.	$8,568
		Subtotal	6966	**$707,390**									**Total**	**$1,751,211**
Phase 10	PVC	14	17,990	$1,709,050									Subtotal	$1,709,050
			Subtotal	**$1,709,050**									Flush/Disinfec.	$22,128
													Total	**$1,731,178**
Phase 11	PVC	10	9,106	$728,480									Subtotal	$728,480
			Subtotal	**$728,480**									Flush/Disinfec.	$11,200
													Total	**$739,680**
													Grand Total	**$68,852,210**

Note: ASR is not included in these cost figures.

TABLE 13-4
O&M COST ESTIMATES BY IMPLEMENTATION PHASE

Phase	Recycled Water Demand (AF/yr)	Annualized Capital Cost 1	Annual O&M Cost				Including Annual Capital Cost		Excluding Annual Capital Cost	
			Pumping Cost 2	Parts Cost 3	Labor Cost 4	Total O&M Cost	Total Annual Cost	Cost Per AF	Total Annual Cost	Cost Per AF
1A	880	$380,000	$11,611	$13,527	$11,520	$36,659	$416,659	$473	$36,659	$42
1B	3862	$399,000	$50,958	$4,306	$11,520	$66,784	$465,784	$121	$66,784	$17
2	1236	$903,000	$16,309	$14,332	$11,520	$42,161	$945,161	$765	$42,161	$34
3	4644	$784,000	$61,276	$12,791	$11,520	$85,588	$869,588	$187	$85,588	$18
4	401	$1,086,000	$5,291	$12,398	$11,520	$29,210	$1,115,210	$2,781	$29,210	$73
5	658	$150,000	$8,682	$1,552	$11,520	$21,754	$171,754	$261	$21,754	$33
6	722	$402,000	$9,527	$4,546	$11,520	$25,592	$427,592	$592	$25,592	$35
7	3892	$798,000	$107,279	$12,835	$11,520	$131,634	$929,634	$239	$131,634	$34
8	171	$462,000	$7,636	$14,654	$11,520	$33,809	$495,809	$2,899	$33,809	$198
9	351	$154,000	$15,673	$1,682	$11,520	$28,876	$182,876	$521	$28,876	$82
10	227	$152,000	$10,136	$1,709	$11,520	$23,365	$175,365	$773	$23,365	$103
11	399	$66,000	$5,265	$728	$11,520	$17,513	$83,513	$209	$17,513	$44
Total	**17443**	**$5,736,000**	**$309,644**	**$95,061**	**$138,240**	**$542,945**	**$6,278,945**	**$818**	**$542,945**	**$59**

Notes:

1. Adds the capital cost of ASR as a function of the AF/Yr of water used ($42.63/AF-Yr.).
2. Assumes 20 year period at 6% interest rate.
3. Assumes 82% pump efficiency, 95% motor efficiency, and electricity cost of $0.12 per KWH.
4. Assumes annual parts cost to be 1% of construction costs of pumping stations, plus 0.1% of construction costs of storage reservoirs and pipelines.
5. Assumes 3 man-days per month at $40 per hour.
6. Does not include water cost
7. Capital costs for phase plus ASR portion (determined by AF used) annualized over 20 years
8. Pumping Costs for Phase plus ASR pumping costs (determined by AF used) annualized over 20 years

13.2.2 Phase 1B

Phase 1B is consistent with the phasing presented in the 1993 Reclaimed Water Master Plan, although potential additional users have been identified within the Phase 1B area. Potential recycled water users to be served as part of Phase 1B include Magic Mountain Amusement Park and proposed Magic Mountain Gold Course, as well as schools and parks in the North River and North Valencia areas. Phase 1B would also serve the proposed Suncal/Tesoro development.

Phase 1B improvements include a 3.0 mg reservoir and 29,000 LF of pipelines ranging in size from 10 to 24 inches. Phase 1B would be implemented in 2003 at an estimated total cost of $4.4 million in 2002 dollars.

13.2.3 Phase 2

Phase 2 includes a variety of recycled water uses in the existing developed area between the I-5 Freeway and the Valencia City Center. Potential users primarily include parks, schools, and homeowner's associations.

Phase 2 improvements include a 6,000 gpm expansion of the existing Valencia recycled water pump station, a 3.5 mg reservoir, and 62,000 LF of pipelines, ranging in size from 8 to 36 inches. Phase 2 would be implemented in 2003. The total cost of Phase 2 is estimated to be $10.3 million in 2002 dollars.

13.2.4 Phase 3

The largest potential user identified for Phase 3 is the proposed Newhall Ranch development. Newhall Ranch anticipates that its ultimate recycled water requirements from CLWA (Newhall Ranch would also have its own WRP) would be 3,691 AF/yr. However, its recycled water demands would increase to a peak in 2019, and subsequently level off. Other users identified as part of Phase 3 include two golf courses (one existing, one future), a park, and a school. The total projected Phase 3 demand is 4,644 AF/yr.

Planned improvements for Phase 3 include more than 50,000 LF of pipeline, ranging from 8 to 24 inches, a new 3.0 mg reservoir, and expansion of the Valencia WRP pump station to 12,000 gpm. Newhall Ranch plans to develop their own daily storage facilities within their boundaries. Recycled water would be delivered to Newhall Ranch at three connection points. Phase 3 would be implemented in 2004. The total cost of Phase 3 is estimated to be $8.8 million in 2002 dollars.

13.2.5 Phase 4

Phase 4 proposes to provide recycled water to a mix of existing and planned users in the Civic Center and Porta Bella areas. Potential users include schools, playing fields, commercial and office park landscaping, and the civic center itself. A total demand of 401 AF/yr has been identified.

Planned improvements for Phase 4 include almost 30,000 LF of 8-, 20- and 36-inch pipeline and a new 3.5 mg reservoir. The total cost of Phase 4 is estimated to be $12.4 million in 2002 dollars. Phase 4 is planned to be implemented in 2005.

13.2.6 Phase 5

Phase 5 would serve a variety of existing and planned users in the north-central part of the CLWA service area, including the "panhandle" area. Potential users include schools, commercial development, parks, a golf course, and City of Santa Clarita landscape management districts.

Phase 5 would be implemented in 2006, with 8,800 LF of pipeline ranging from 8 to 24 inches. The total cost of Phase 5 is estimated to be $1.7 million in 2002 dollars.

13.2.7 Phase 6

Phase 6 would serve a variety of existing and planned users in the North Valencia area, including schools, parks, and a golf course. Phase 6 would be implemented in 2007. Improvements for Phase 6 include 29,000 LF of pipeline ranging from 8 to 36 inches and a 3.5 MG reservoir. The total cost of Phase 6 is estimated to be $4.6 million in 2002 dollars.

13.2.8 Phase 7

In 2008, the Placerita Canyon Oil Field Produced Water Treatment Facility is projected to come on-line. This new source of recycled water would help serve Phase 7, which includes a mix of existing and planned users in the southern part of the CLWA service area near the 14 Freeway and the Placerita Canyon Oil Field. Potential users include schools, parks, homeowners' associations, and commercial development at Golden Valley Ranch.

Phase 7 improvements include a pump station for the 1,250-gpm oil field produced water treatment facility, a 3.25 mg reservoir, and 31,800 LF of pipeline ranging from 8 to 36 inches. The total cost of Phase 7 is estimated to be $9.0 million in 2002 dollars.

13.2.9 Phase 8

Phase 8 primarily includes future users in the Porta Bella development, which would be completed by Phase 8 implementation in 2008. Phase 8 improvements include 18,000 LF of pipeline ranging from 8 to 36 inches, and the modification of Honby pump station to provide 5,000 gpm of booster pumping capacity. The total cost of Phase 6 is estimated to be $5.3 million in 2002 dollars.

13.2.10 Phase 9

Phase 9 includes schools, parks, and landscaping in the Canyon Country area toward the eastern end of the CLWA service area. Proposed Improvements include 7,000 LF of 8- to 24-inch pipeline and one 3.25 MG reservoir. Phase 9 would be implemented in 2009. The total cost of Phase 9 is estimated to be $1.8 million.

13.2.11 Phase 10

Phase 10 includes parks, schools, a golf course, and several landscape maintenance districts for a total demand of 227 AF/yr. Improvements for Phase 10 include 18,000 LF of 14-inch pipe, with a total estimated cost of $1.7 million in 2002 dollars. Phase 10 would be implemented in 2010.

13.2.12 Phase 11

Phase 11 would serve users such as the Circle J and portions of the Porta Bella area. Phase 11 improvements include 9,100 LF of 10-inch PVC pipe for a total estimated cost of $0.7 million. Phase 11 would be implemented in 2011.

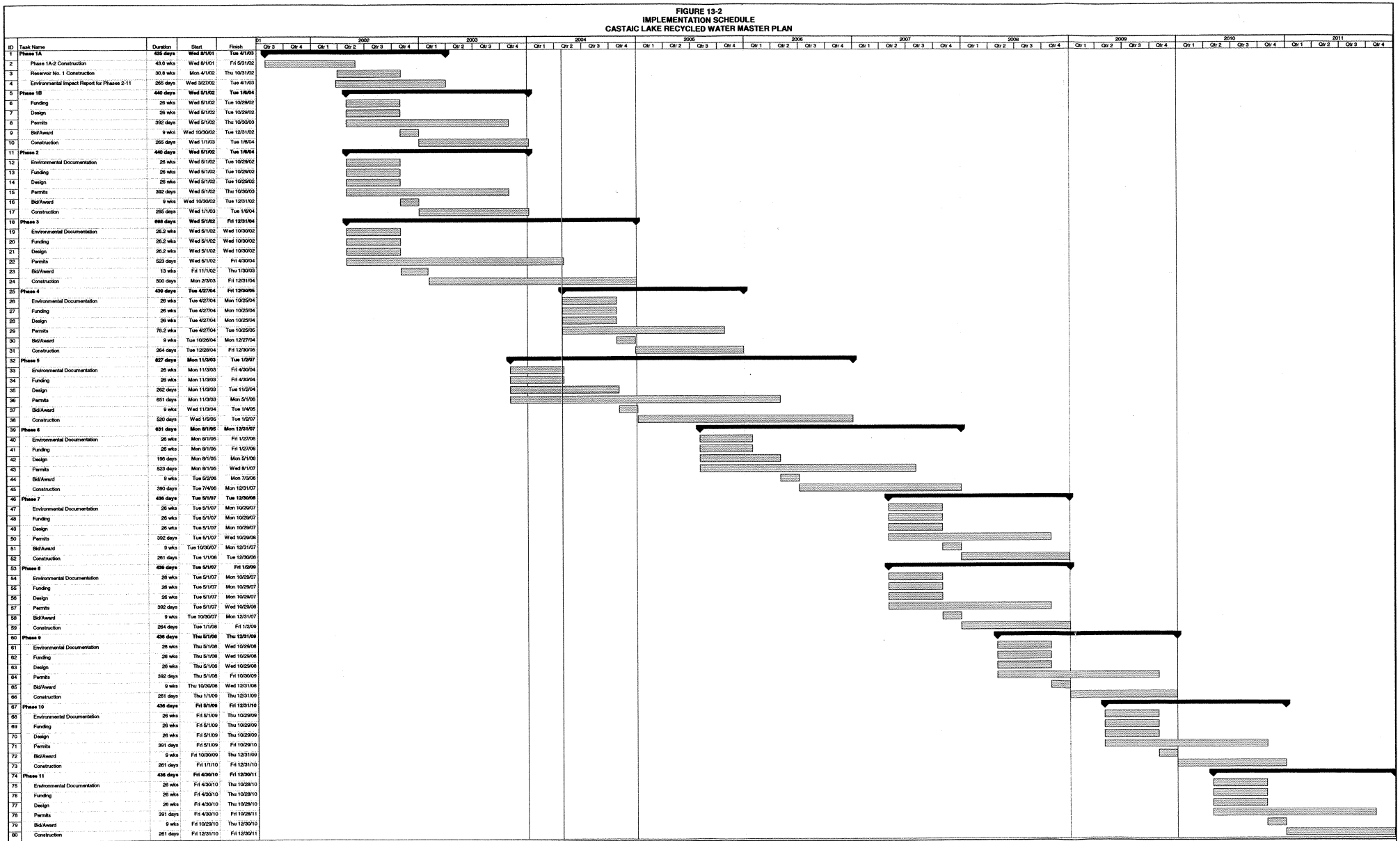
13.3 Implementation Schedule

To encourage the development of recycled water systems within new development, a 10-year implementation schedule is recommended. Under the Water Recycling in Landscaping Act (SB 2095, Johnson), once a recycled water producer determines that they will produce recycled water within the boundaries of a local agency, the local agency is required to adopt and enforce a recycled water ordinance. The ordinance must condition new development to utilize recycled water for landscaping purposes.

Implementation of the eleven recycled water phases described previously would occur from the present through 2011. The implementation schedule is presented in Figure 13-2.

2014

FIGURE 13-2
IMPLEMENTATION SCHEDULE
CASTAIC LAKE RECYCLED WATER MASTER PLAN



ID	Task Name	Duration	Start	Finish
1	**Phase 1A**	**435 days**	**Wed 8/1/01**	**Tue 4/1/03**
2	Phase 1A-2 Construction	43.6 wks	Wed 8/1/01	Fri 5/31/02
3	Reservoir No. 1 Construction	30.8 wks	Mon 4/1/02	Thu 10/31/02
4	Environmental Impact Report for Phases 2-11	265 days	Wed 3/27/02	Tue 4/1/03
5	**Phase 1B**	**440 days**	**Wed 5/1/02**	**Tue 1/6/04**
6	Funding	26 wks	Wed 5/1/02	Tue 10/29/02
7	Design	26 wks	Wed 5/1/02	Tue 10/29/02
8	Permits	392 days	Wed 5/1/02	Thu 10/30/03
9	Bid/Award	9 wks	Wed 10/30/02	Tue 12/31/02
10	Construction	265 days	Wed 1/1/03	Tue 1/6/04
11	**Phase 2**	**440 days**	**Wed 5/1/02**	**Tue 1/6/04**
12	Environmental Documentation	26 wks	Wed 5/1/02	Tue 10/29/02
13	Funding	26 wks	Wed 5/1/02	Tue 10/29/02
14	Design	26 wks	Wed 5/1/02	Tue 10/29/02
15	Permits	392 days	Wed 5/1/02	Thu 10/30/03
16	Bid/Award	9 wks	Wed 10/30/02	Tue 12/31/02
17	Construction	265 days	Wed 1/1/03	Tue 1/6/04
18	**Phase 3**	**698 days**	**Wed 5/1/02**	**Fri 12/31/04**
19	Environmental Documentation	26.2 wks	Wed 5/1/02	Wed 10/30/02
20	Funding	26.2 wks	Wed 5/1/02	Wed 10/30/02
21	Design	26.2 wks	Wed 5/1/02	Wed 10/30/02
22	Permits	523 days	Wed 5/1/02	Fri 4/30/04
23	Bid/Award	13 wks	Fri 11/1/02	Thu 1/30/03
24	Construction	500 days	Mon 2/3/03	Fri 12/31/04
25	**Phase 4**	**439 days**	**Tue 4/27/04**	**Fri 12/30/05**
26	Environmental Documentation	26 wks	Tue 4/27/04	Mon 10/25/04
27	Funding	26 wks	Tue 4/27/04	Mon 10/25/04
28	Design	26 wks	Tue 4/27/04	Mon 10/25/04
29	Permits	78.2 wks	Tue 4/27/04	Tue 10/25/05
30	Bid/Award	9 wks	Tue 10/26/04	Mon 12/27/04
31	Construction	264 days	Tue 12/28/04	Fri 12/30/05
32	**Phase 5**	**627 days**	**Mon 11/3/03**	**Tue 1/2/07**
33	Environmental Documentation	26 wks	Mon 11/3/03	Fri 4/30/04
34	Funding	26 wks	Mon 11/3/03	Fri 4/30/04
35	Design	262 days	Mon 11/3/03	Tue 11/2/04
36	Permits	651 days	Mon 11/3/03	Mon 5/1/06
37	Bid/Award	9 wks	Wed 11/3/04	Tue 1/4/05
38	Construction	520 days	Wed 1/5/05	Tue 1/2/07
39	**Phase 6**	**631 days**	**Mon 8/1/05**	**Mon 12/31/07**
40	Environmental Documentation	26 wks	Mon 8/1/05	Fri 1/27/06
41	Funding	26 wks	Mon 8/1/05	Fri 1/27/06
42	Design	196 days	Mon 8/1/05	Mon 5/1/06
43	Permits	523 days	Mon 8/1/05	Wed 8/1/07
44	Bid/Award	9 wks	Tue 5/2/06	Mon 7/3/06
45	Construction	390 days	Tue 7/4/06	Mon 12/31/07
46	**Phase 7**	**436 days**	**Tue 5/1/07**	**Tue 12/30/08**
47	Environmental Documentation	26 wks	Tue 5/1/07	Mon 10/29/07
48	Funding	26 wks	Tue 5/1/07	Mon 10/29/07
49	Design	26 wks	Tue 5/1/07	Mon 10/29/07
50	Permits	392 days	Tue 5/1/07	Wed 10/29/08
51	Bid/Award	9 wks	Tue 10/30/07	Mon 12/31/07
52	Construction	261 days	Tue 1/1/08	Tue 12/30/08
53	**Phase 8**	**439 days**	**Tue 5/1/07**	**Fri 1/2/09**
54	Environmental Documentation	26 wks	Tue 5/1/07	Mon 10/29/07
55	Funding	26 wks	Tue 5/1/07	Mon 10/29/07
56	Design	26 wks	Tue 5/1/07	Mon 10/29/07
57	Permits	392 days	Tue 5/1/07	Wed 10/29/08
58	Bid/Award	9 wks	Tue 10/30/07	Mon 12/31/07
59	Construction	264 days	Tue 1/1/08	Fri 1/2/09
60	**Phase 9**	**436 days**	**Thu 5/1/08**	**Thu 12/31/09**
61	Environmental Documentation	26 wks	Thu 5/1/08	Wed 10/29/08
62	Funding	26 wks	Thu 5/1/08	Wed 10/29/08
63	Design	26 wks	Thu 5/1/08	Wed 10/29/08
64	Permits	392 days	Thu 5/1/08	Fri 10/30/09
65	Bid/Award	9 wks	Thu 10/30/08	Wed 12/31/08
66	Construction	261 days	Thu 1/1/09	Thu 12/31/09
67	**Phase 10**	**436 days**	**Fri 5/1/09**	**Fri 12/31/10**
68	Environmental Documentation	26 wks	Fri 5/1/09	Thu 10/29/09
69	Funding	26 wks	Fri 5/1/09	Thu 10/29/09
70	Design	26 wks	Fri 5/1/09	Thu 10/29/09
71	Permits	391 days	Fri 5/1/09	Fri 10/29/10
72	Bid/Award	9 wks	Fri 10/30/09	Thu 12/31/09
73	Construction	261 days	Fri 1/1/10	Fri 12/31/10
74	**Phase 11**	**436 days**	**Fri 4/30/10**	**Fri 12/30/11**
75	Environmental Documentation	26 wks	Fri 4/30/10	Thu 10/28/10
76	Funding	26 wks	Fri 4/30/10	Thu 10/28/10
77	Design	26 wks	Fri 4/30/10	Thu 10/28/10
78	Permits	391 days	Fri 4/30/10	Fri 10/28/11
79	Bid/Award	9 wks	Fri 10/29/10	Thu 12/30/10
80	Construction	261 days	Fri 12/31/10	Fri 12/30/11

Project: Figure12-2_V2
Date: Fri 4/23/04

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

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Appendix A

Potential Recycled Water Users

APPENDIX A
POTENTIAL RECYCLED WATER USERS

Map Location #	User Name	Address	Annual Demand (AF/Yr)	Average Monthly Demand	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
1	High Desert Jr. High	3620 Antelope Woods Rd, Acton						
2	Vasquez High	3620 Antelope Woods Rd, Acton						
3	Castaic Middle	28900 Hillcrest Pkwy, Castaic	8	0.64	2.00	0.07	21.4	119
4	Castaic Elementary	30455 Park Vista Drive, Castaic	29	2.20	7.00	0.23	75.0	417
5	Live Oak Elementary	27715 Saddleridge Road, Castaic	21	1.81	6.00	0.20	64.3	357
7	Stevenson Ranch Elementary-North	26995 Poe Pkwy, SR	10	0.80	2.00	0.07	21.4	119
8	Stevenson Ranch Elementary-Central	25820 Carroll Lane, SR	18	1.39	3.00	0.10	32.2	179
9	Valencia Valley Elementary	23601 Carrizo Drive, Valencia	18	1.34	3.00	0.10	32.2	179
10	Park (Newhall School District)	26239 Faulkner Drive, SR	14	1.10	3.00	0.10	32.2	107
11	Transp/Maintenance	26501 Golden Valley, SCTA	4	0.39	1.00	0.03	10.7	60
12	Bouquet Canyon Elementary	28110 Wellston, Saugus	8	0.85	2.00	0.07	21.4	119
13	Cedar Creek Elementary	27792 Camp Plenty, CC	12	1.20	3.00	0.10	32.2	179
14	Emblem Elementary	22685 Espuella, Saugus	13	1.35	3.00	0.10	32.2	179
15	James Foster Elementary	22500 Pamplico, Saugus	17	1.67	4.00	0.13	42.9	238
16	Helmers Elementary	27300 Grandview Drive, Valencia	5	0.51	1.00	0.03	10.7	60
17	Highlands Elementary	27332 Catala, Saugus	18	1.82	4.00	0.13	42.9	238
18	Mountain View Elementary	22201 Cypress Place, Saugus	31	2.82	5.00	0.16	53.6	298
19	Rio Vista Elementary	20417 Cedarcreek, CC	23	2.31	6.00	0.20	64.3	357
20	Rosedell Elementary	27583 Urbandale Ave, Saugus	21	2.10	5.00	0.16	53.6	298
21	Santa Clarita Elementary	27177 Seco Canyon Rd, Saugus	13	1.30	2.00	0.07	21.4	119
22	Skyblue Mesa Elementary	28040 Hardesty, CC	7	0.75	3.00	0.10	32.2	179
23	Plum Canyon Elementary	28360 Alfred Way, SCTA	15	1.58	3.00	0.10	32.2	179
24	Sulphur Srpings Elementary	16628 Lost Canyon Road, CC	10	0.83	1.13	0.04	12.1	67
25	Valencia High	27801 Dickason Drive, Valencia	100	7.76	26.00	0.86	278.7	1,549
26	Arroyo Seco Jr. High	22171 Vista Delgado, Saugus	60	5.00	9.38	0.31	100.5	558
27	Sierra Vista Jr. High	19425 Stillmore Street, CC	55	4.58	3.94	0.13	42.2	235
28	Canyon High	19300 Nadal Street, CC	110	9.17	19.69	0.65	211.1	1,173
29	Bowman High	21508 Redview Drive, SCTA	9	0.75	11.25	0.37	120.6	670
30	La Mesa Jr. High	26623 May Way, SCTA	55	4.58	112.50	3.70	1206.0	6,700
31	Magic Mountain Resort Golf Course		429	35.75	0.92	0.03	9.9	37
32	Magic Mountain Amusement Park	26101 Magic Mountain Pkwy, Valencia	476	39.67	1.88	0.06	20.1	67
33	Valencia Interchange	Valencia Blvd & MM Pkwy	6	0.50	0.70	0.02	7.5	42
34	Valencia Country Club/Golf Course	27330 Tourney Rd, SC	590	49.17	76.10	2.50	815.8	3,022
35	Honor Rancho Golf Course		450	37.50	1.17	0.04	12.5	46
36	Santa Clarita Sports Complex	26407 Golden Valley Road, SCTA	50	4.17	20.06	0.66	215.1	717
37	Lagoon Landscape		180	15.00	0.63	0.02	6.8	38
38	Northlake Development	32115.5 N Ridge Route, Castaic	21	1.75	4.50	0.15	48.2	268
39	North River Industrial		105	8.75	7.50	0.25	80.4	447
40	North River High School		135	11.25	5.44	0.18	58.3	324
41	North River Jr. High School		60	5.00	3.05	0.10	32.7	181
42	North River Golf Course		600	50.00	0.88	0.03	9.4	35
43	North River Commercial		45	3.75	13.88	0.46	148.7	826
44	Lago de Valencia - Commercial	McBean/Newhall Ranch Rd(E corner), N Valencia	29	2.42	3.94	0.13	42.2	235
45	Lago de Valencia - Elementary School	North Valencia Phase II	16	1.35	8.63	0.28	92.5	514
46	Lago de Valencia - park/rec	Newhall Ranch Rd/N SC River, Valencia	46	3.83	0.94	0.03	10.1	34
48	Bouquet South - Commercial	Bouquet Canyon Rd/Newhall Ranch Rd, N Valenci	48	4.00	69.94	2.30	749.8	4,165
49	Pony League - Pony League Ballfields	Valencia Blvd/SC & S Fork River, N Valencia	43	3.58	4.69	0.15	50.3	168
50	Pony League - Commercial	Valencia Blvd/SC & S Fork River, N Valencia	33	2.75	1.78	0.06	19.1	106
51	South River Village - Commercial	NW corner McBean Pkwy & MM Pkwy, N Valencia	44	3.67	0.61	0.02	6.5	36
52	Valencia Industrial Center	24800 block of Tibbetts Avenue, N Valencia	27	2.25	5.63	0.19	60.3	335
53	Civic Center		4	0.33	2.06	0.07	22.1	123
54	Saugus High	21900 Centurion Way, Saugus	110	9.17	33.75	1.11	361.8	2,010
55	Rio Vista Center		300	25.00	1.50	0.05	16.1	89

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56	Panhandle Commercial		15	1.25	1.31	0.04	14.1	78
57	City Civic Center		125	10.42	1.31	0.04	14.1	78
58	City Center Commercial		10	0.83	1.31	0.04	14.1	78
59	City Center Commercial		5	0.42	1.88	0.06	20.1	112
60	Westridge Golf Course		880	73.33	1.17	0.04	12.5	46
61	Vista Valencia Golf Course	24700 W Trevino Dr, SC	36	3.00	1.42	0.05	15.2	56
62	Wiley Canyon Elementary	24240 La Glorita Circle, Newhall	62	5.17	3.13	0.10	33.5	186
63	Old Orchard Elementary	25141 Avenue Rondel, Newhall	17	1.25	3.00	0.10	32.2	179
64	Old Orchard Park (City)	25023 Avenida Rotella, Valencia	24	1.83	4.00	0.13	42.9	143
65	Orchard Village Road Tree Farm		6	0.50		0.00	0.0	0
66	Henry Mayo Hospital	23845.5 McBean Pkwy, Valencia	153	12.74	23.00	0.76	246.6	1,370
67	College of the Canyons/Academy of the Canyons	25455 N. Rockwell Canyon Rd, Valencia	213	17.75	56.25	1.85	603.0	3,350
68	Newhall Elementary	24607 Walnut Street, Newhall	63	5.25	0.88	0.03	9.4	52
69	William S. Hart Park (City)	24151 N. San Fernando Rd, Newhall	707	58.92	6.75	0.22	72.4	241
70	College of the Masters (Masters College)	21726 Placerita Canyon Rd, Valencia	24	1.88	5.00	0.16	53.6	298
71	Hart High School	24825 Newhall Avenue, Newhall	31	2.41	14.00	0.46	150.1	834
72	H.M. Newhall Memorial Park (City)	24923 Newhall Avenue, Newhall	49	3.87	8.00	0.26	85.8	286
73	Placerita Jr. High/Learning Post	25015 Newhall Avenue, Newhall	53	4.42	25.31	0.83	271.4	1,508
74	Valencia Glenn City Park	23750 Via Gavola, Valencia	29	2.22	5.00	0.16	53.6	179
75	California Institute of the Arts	24700 McBean Pkwy, Valencia	76	6.33	23.44	0.77	251.3	1,396
76	Peachland Elementary	24800 Peachland Avenue, Newhall	30	2.50	3.02	0.10	32.3	180
77	McBean Interchange	McBean Pkwy & I5	6	0.50	1.24	0.04	13.3	74
78	Tract 32365 Common Area (Palmer)		108	9.00	1.40	0.05	15.0	83
79	Valencia Meadows Elementary	25577 Fedala Rd, Valencia	16	1.22	3.00	0.10	32.2	179
80	Valencia Meadows Park (City)	25671 Fedala Rd, Valencia	6	0.47	1.00	0.03	10.7	36
81	Valencia Marketplace		30	2.50	1.69	0.06	18.1	101
82	S.R Phase I Slopes		190	15.83	1.69	0.06	18.1	101
83	Valley View Elementary	19414 W. Sierra Estates Drive, Newhall	7	0.58	110.63	3.64	1185.9	6,589
84	Friendly Valley Golf Course	19345 W. Avenue of the Oaks, Newhall	107	8.92	1.22	0.04	13.0	48
85	1st Financial Park/Schools		90	7.50	1.13	0.04	12.1	40
86	1st Financial Multi Family		80	6.67	2.57	0.08	27.5	153
87	1st Financial Commercial		30	2.50	2.44	0.08	26.1	145
88	S.R. Phase I Park		50	4.17	1.69	0.06	18.1	101
89	S.R. Phase II Slopes		350	29.17	0.94	0.03	10.1	56
90	S.R. Phase II Park		88	7.33	0.75	0.02	8.0	45
91	S.R. Phase II School		25	2.08	1.10	0.04	11.8	66
92	Lyons Interchange		6	0.50	2.68	0.09	28.7	159
94	Summit Common Area (N & S)		157	13.08	2.70	0.09	28.9	161
95	Ridgedale Common Area		214	17.83	1.85	0.06	19.8	110
96	Sunset Point Common Area		33	2.75	1.58	0.05	16.9	94
97	S.F. Mortgage Common Area		35	2.92	1.04	0.03	11.1	62
98	Golden Oak Ranch	19802 Placerita Canyon Road, Newhall	632	52.67	0.81	0.03	8.7	48
99	Almendra Park (City)	23420 Alta Madera Drive, SCTA	11	0.90	28.67	0.94	307.3	1,024
100	Driving Range		24	2.00	0.70	0.02	7.5	28
101	North Oaks Park (City)	27824 Camp Plenty Road, SCTA	6	0.48	39.94	1.31	428.1	1,427
102	Santa Clarita Park (City)	27285 Seco Canyon Road, Saugus	19	1.56	11.81	0.39	126.6	422
103	Bouquet Canyon Park (City)	28127 Wellston Drive, Saugus	28	2.29	132.56	4.36	1421.1	4,737
104	Hasley Canyon Park (County)	28700 W. Quincy Street, Castaic	17	1.42	4.23	0.14	45.3	151
105	Val Verde Park (County)	30300 W. Arlington Street, Val Verde	14	1.17	5.42	0.18	58.1	194
106	Pamplico Drive Park (City)	22444 Pamplico Drive, SCTA	15	1.25	8.71	0.29	93.3	311
107	Plum Canyon Park (County)	28222 N Via Joyce Drive, SCTA	33	2.75	9.94	0.33	106.5	355
108	Canyon Country Park (City)	17615 Soledad Canyon Road, CC	43	3.58	5.00	0.16	53.5	178
109	Camino Del Valle Park (County)	28201 W. Sloan Canyon, Castaic	27	2.08	4.70	0.15	50.4	168

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110	Begonias Lane Park (City)	14911 Begonias Lane, SCTA	24	1.84	4.00	0.13	42.9	143
111	Oak Spring Canyon Park (City)	Oak Spring Canyon Rd and Aida, CC (FY 02)	13	1.08	1.13	0.04	12.1	40
112	Windmill Hilltop Tree Farm		54	4.50		0.00	0.0	0
113	North River Commercial		24	2.00	2.63	0.09	28.1	156
114	North River Commercial		15	1.25	2.63	0.09	28.1	156
115	S.R. Phase V Golf Course		450	37.50	1.55	0.05	16.6	92
116	S.R. Phase V Community Park	1 mi W of I5 & Pico Canyon Rd, SR	40	3.33	0.83	0.03	8.9	50
118	S.R. Phase V Multi Family		95	7.92	0.88	0.03	9.4	52
119	S.R. Phase V Public Facilities		20	1.67	0.77	0.03	8.2	46
120	S.R. Phase IV Slopes		225	18.75	2.57	0.08	27.5	153
121	S.R. Phase V Slopes		225	18.75	21.19	0.70	227.1	1,262
122	Pan Pacific Golf Course		465	38.75	0.99	0.03	10.6	39
124	Valley Gateway		78	6.50	11.63	0.38	124.6	692
125	Central Park (City)	27150 Bouquet Canyon Rd, Saugus	140	11.67	20.25	0.67	217.1	724
126	Creekview Park (City)	22200 Park Street, SCTA	13	1.08	2.75	0.09	29.4	98
127	Bridgeport Park (City)	23520 Bridgeport Lane, SCTA	44	3.67	1.06	0.03	11.3	38
128	Circle J Park (City)	22651 Via Princessa, SCTA	15	1.25	5.63	0.19	60.3	201
129	Robinson Ranch Mtn Golf Course	27734 Sand Canyon Rd, SCTA	430	35.83	1.04	0.03	11.1	41
130	Castaic Lake State Recreation Area	32132 Ridge Route Rd, Castaic	6222	518.50	35.63	1.17	381.9	1,273
131	Castaic Sports Complex	31320 N Castaic Rd, Castaic	63	5.25	1.31	0.04	14.1	47
132	Northbridge Park	Grandview Drive, E of McBean Pkwy	22	1.83	16.88	0.56	180.9	603
134	Richard Rio Memorial Park	26233 W Faulkner Drive, SR	40	3.33	15.00	0.49	160.8	536
136	Apple Park	24829 Apple Street-Z, Newhall	7	0.57	1.00	0.03	10.7	36
138	MRCA LA River Center	23801.5 The Old Road, Newhall	7	0.55	3.00	0.10	32.2	107
139	Park - Adjacent to Valencia Valley Elem?	23645 Carrizo Drive, Valencia	11	0.81	2.00	0.07	21.4	71
141	Santa Clarita Christian School (k-12)	27249 Luther Drive, SCTA	6	0.50	9.00	0.30	96.5	536
143	Legacy Academy	North Valencia Phase II	16	1.35	8.06	0.27	86.4	480
144	Valencia Vista HOA	Nandina&Valle Del Oro Irrigation, Newhall	10	0.73	2.00	0.07	21.4	119
145		Valle Del Oro @ Pool, Newhall	9	0.69	1.00	0.03	10.7	60
146		Valle Del Oro, Newhall	11	0.87	2.00	0.07	21.4	119
147		Leonard Tree Irrigation, Newhall	15	1.15	2.00	0.07	21.4	119
149		Valle Del Oro, Newhall	21	1.59	3.00	0.10	32.2	179
150		Valle Del Oro, Newhall	9	0.70	2.00	0.07	21.4	119
151	Pacific Bay Homes	29352.5 Mammoth Ln, Newhall	4	0.31	1.00	0.03	10.7	60
152		14278.5 Sequoia Rd, Canyon Country	17	1.34	3.00	0.10	32.2	179
153		14272.5 W. Sequoia Rd, Canyon Country	17	1.27	3.00	0.10	32.2	179
154		14410 Grandifloras Lot 36, CC	12	0.90	2.00	0.07	21.4	119
155	California Canyon HOA	Jasmine Vly & Sunrose, Canyon Country	24	1.83	4.00	0.13	42.9	238
156		30541 Jasmine Vly-Just L, CC	3			0.00	0.0	0
157	Collage West HOA	14830 Willow Glen R/C of L, CC	20	1.52	3.00	0.10	32.2	179
158		30015 Sunridge Pl R/C of L, CC	10	0.76	1.00	0.03	10.7	60
159		29940.5 Grandifloras L/S, CC	10	0.77	1.00	0.03	10.7	60
160	Northlake HOA	32115.5 N Ridge Route, Castaic	21	1.62	4.00	0.13	42.9	238
161	Lantana Hills HOA	23818.5 Oakhurst Dr, Newhall	26	2.00	6.00	0.20	64.3	357
162		23804.5 Oakhurst Dr, Newhall	17	1.27	4.00	0.13	42.9	238
163		23800.5 Oakleaf Cyn Dr, Newhall	18	1.39	4.00	0.13	42.9	238
165		21101.5 Oakriver Ln, Newhall	7	0.53	2.00	0.07	21.4	119
166		23712.5 Oakhurst Dr., Newhall	6	0.44	2.00	0.07	21.4	119
167		21100.5 Oakleaf Cyn Dr, Newhall	12	0.93	4.00	0.13	42.9	238
168	Peachland Owners Assoc	25003-39 Peachland, Newhall	26	2.00	4.00	0.13	42.9	238
169	Newhall Hdn Vly HOA	Thornewood Crn of Lot 26&35, Newhall	5	0.36	1.00	0.03	10.7	60
170		Sagebrush Crn of Lot 65, Newhall	5	0.41	1.00	0.03	10.7	60
173		Maple & Windcrest Lot 66, Newhall	8	0.61	2.00	0.07	21.4	119

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174		Maple Crn of Lot 4, Newhall	7	0.52	1.00	0.03	10.7	60
175		Windcrest btwn Lot 10 & 11, Newhall	5	0.39	1.00	0.03	10.7	60
177	Oaks At Newhall HOA	Valley Oak & Calgrove Corner, Newhall	7	0.52	1.00	0.03	10.7	60
178		Calgrove & White Oak, Newhall	5	0.63	1.00	0.03	10.7	60
182		White Oak Ct Btwn Lots 26&27, Newhall	7	0.54	1.00	0.03	10.7	60
185		Ebelden Btwn Lots 25 & 26, Newhall	4	0.31	1.00	0.03	10.7	60
187	Hidden Vly HOA	Crestview Corner of lot 69, Newhall	6	0.44	1.00	0.03	10.7	60
188		Calgrove & Creekside S/E Crn, Newhall	6	0.46	3.00	0.10	32.2	179
189		24260 Creekside Dr, Newhall	15	1.14	3.00	0.10	32.2	179
192		Briardale N/S of Rd to #8 Tank, Newhall	4	0.31	1.00	0.03	10.7	60
193		Mentry At Lot 71, Newhall	4	0.28	1.00	0.03	10.7	60
197	The Terrace	21421 Plane Tree Dr, Newhall	7	0.55	1.00	0.03	10.7	60
198		Grape Lily (Irigtn), Newhall	8	0.62	1.00	0.03	10.7	60
199		Valle Del Oro, Newhall	15	1.19	4.00	0.13	42.9	238
200		Valle Del Oro, Newhall	16	1.20	4.00	0.13	42.9	238
201		Bottletree (Irigtn), Newhall	11	0.82	2.00	0.07	21.4	119
202		Ficus 21211-21-24334 Choke Cherry, Newhall	9	0.70	1.00	0.03	10.7	60
203		Ficus (Irigtn), Newhall	6	0.46	1.00	0.03	10.7	60
204		Fern Drive, Newhall	9	0.66	1.00	0.03	10.7	60
206	Castaic CDC Partners	28409.5 Oak Valley Rd, Castaic	4	0.29	1.00	0.03	10.7	60
208	Coastal Meadowridge	23645 Meadowridge S/S Co, Newhall	14	1.07	4.00	0.13	42.9	238
234	Canyon Springs Elementary	19059 Vicci Street, CC	8	0.67	20.63	0.68	221.1	1,228
235	Leona Cox Elementary	18643 Oakmoor Street, CC	8	0.67	1.69	0.06	18.1	101
236	Mint Canyon Elementary	16400 Sierra Hwy, CC	7	0.58	10.31	0.34	110.6	614
237	Mitchell Elementary	16821 Goodvale Road, CC	8	0.67	80.44	2.65	862.3	4,791
238	Pinetree Elementary	29156 Lotus Garden Drive, CC	7	0.58	89.25	2.94	956.8	5,316
239	Potrero Canyon Community Park	Potrero Village	303	25.25	29.44	0.97	315.6	1,052
240	Mesas Community Park	Mesas Village	63	5.25	40.13	1.32	430.2	1,434
241	Co LA Dist #36	Quail Valley Rd, Castaic	19	1.44	4.00	0.13	42.9	238
243	Co LA	29305.5 Mammoth Ln, Canyon Country	8	0.62	1.00	0.03	10.7	60
244	Co LA	100 N/O Soledad Cnyn, CC	7	0.52	1.00	0.03	10.7	60
245	Co LA	14324 Sequoia/NO S/O Lot, CC	30	2.34	4.00	0.13	42.9	238
246	Co LA	Yellowstone and Everglades btwn 44&45, CC	12	0.93	2.00	0.07	21.4	119
247	Co LA	14325.5 Sequoia Rd, CC	9	0.67	1.00	0.03	10.7	60
248	Co LA	Rushmore End of Culdesac, CC	31	2.35	7.00	0.23	75.0	417
249	Co LA	29452.5 Mammoth Ln, CC	9	0.69	2.00	0.07	21.4	119
250	Co LA	14433.5 Colorado Pl, CC	6	0.48	1.00	0.03	10.7	60
251	City of Santa Clarita	Newhall & San Fern S/W Crn, Newhall	32	2.49	6.00	0.20	64.3	357
252	City of Santa Clarita	24242 Railroad Ave, Newhall	165	12.68	24.00	0.79	257.3	1,429
253	City of Santa Clarita	22200 Park St., Newhall	1614	124.21	277.00	9.11	2969.5	16,497
254	City of Santa Clarita	27285 Seco Canyon Rd	28	2.33	5.27	0.17	56.4	314
255	City of Santa Clarita Park	Wellston Drive	25	2.08	4.68	0.15	50.2	279
256	City of Santa Clarita Park	Meadow Drive	25	2.08	4.14	0.14	44.4	247
257	Sierra Heights Lndscp Maintnc Dist (LMD)	Canvas Street	4	0.33	2.09	0.07	22.4	125
258	Sunset Hills LMD	19500 Via Princessa	34	2.83	1.51	0.05	16.2	90
259	Canyon Crest LMD	2800 Whites Canyon	12	1.00	5.29	0.17	56.7	315
260	Area Wide District LMD	N Rye Canyon Rd	67	5.58	1.55	0.05	16.6	92
261		McBean Pkwy & San Francisco Canyon Rd		0.00	1.08	0.04	11.6	64
262		N Newhall Ranch Rd		0.00	5.60	0.18	60.1	334
263		Btwn McBean Pkwy&Bouquet Canyon on river		0.00	28.53	0.94	305.9	1,699
264		Near Henry Mayo Hospital		0.00	279.47	9.19	2996.1	16,645
265		Blackbird Lane		0.00	5.25	0.17	56.3	313
266	Old Orchard	23600 Lyons Ave	13	1.08	4.69	0.15	50.3	279

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267	Valencia Hills	23000 Wiley Canyon Rd	19	1.58	4.69	0.15	50.3	279
268	Valencia Meadows	S 25500 McBean Pkwy	6	0.50	0.75	0.02	8.0	45
269	Valencia Glen	N Orchard Village Rd	10	0.83	6.38	0.21	68.3	380
270	South Valley HOA	25700 McBean Pkwy	6	0.33	1.00	0.03	10.7	60
271	Central & North Valley	26500 McBean Pkwy	35	2.92	2.25	0.07	24.1	134
272	Valencia Summit	Rockwell Canyon&McBean Pkwy (center)	252	21.00	12.56	0.41	134.7	748
273	Corporate Center	Sprinfield Court	4	0.33	0.00	0.00	0.0	0
274	Rainbow Glen	Golden Glen Court	9	0.75	0.00	0.00	0.0	0
275	Mountain View	N Seco Canyon Rd	192	16.00	0.00	0.00	0.0	0
276	Mountain View Condos	Banyan Place	25	2.08	0.00	0.00	0.0	0
277	Seco Villas	Copper Hill Drive	7	0.58	0.00	0.00	0.0	0
278	American Beauty	Fanchon Lane	13	1.08	2.44	0.08	26.1	145
279	Shangri-La	Shangri-La Drive	40	3.33	3.56	0.12	38.2	212
280	Circle J Ranch	Circle J Rd	74	6.17	1.13	0.04	12.1	67
281	Circle J Ranch	Circle J Rd	21	1.75	1.88	0.06	20.1	112
282	Northbridge	24000 Newhall Ranch Rd	373	31.08	0.74	0.02	8.0	44
283	Co LA/Castaic LLA District #40	Green Hill Dr, Castaic	10	0.79	1.00	0.03	10.7	60
284	Co LA/Castaic LLA District #40	Green Hill Dr, Castaic	4	0.27	0.50	0.02	5.4	30
285	LA District #36	30000 block of W Hasley Cyn Rd	30	2.50	0.75	0.02	8.0	45
287	LA District #36	30500 block of N Sloan Cyn Rd	11	0.92	1.69	0.06	18.1	101
288	LA District #36	30900 block of N Sloan Cyn Rd	8	0.67	36.00	1.18	385.9	2,144
289	LA District #36	31300 block of N Sloan Cyn Rd	7	0.58	4.69	0.15	50.3	279
290	LA District #36	30700 block of N Sloan Cyn Rd	7	0.58	1.31	0.04	14.1	78
291	LA District #36	30700 block of N Romero Cyn Rd	7	0.58	2.44	0.08	26.1	145
292	Institutional (Porta Bella Dvlpmt)	Via Princessa & Santa Clarita Pkwy	10	0.83	5.06	0.17	54.3	302
293	Porta Bella Park	Santa Clarita Pkwy	55	4.58	6.19	0.20	66.3	221
294	Porta Bella Park	S of Santa Clarita Pkwy	9	0.75	6.56	0.22	70.4	235
295	Porta Bella Park	San Fernando Rd	13	1.08	118.50	3.90	1270.4	4,235
296	Porta Bella Recreational	Soledad Canyon Rd	14	1.17	2.02	0.07	21.6	72
297	Porta Bella Recreational	S of Soledad Canyon Rd	14	1.17	4.50	0.15	48.2	161
298	Porta Bella Town Center	N. San Fernando Rd	62	5.17	5.81	0.19	62.3	346
299	Porta Bella-Soledad Community Center	Soledad Canyon Rd	31	2.58	3.94	0.13	42.2	235
300	Porta Bella-Neighborhood Community Center	Via Princessa & Santa Clarita Pkwy	21	1.75	2.63	0.09	28.1	156
301	Porta Bella Office Park	Soledad Canyon Rd	14	1.17	2.25	0.07	24.1	134
302	Porta Bella Office Park	Soledad Canyon Rd	12	1.00	3.56	0.12	38.2	212
303	Porta Bella Office Park	San Fernando Rd	19	1.58	5.63	0.19	60.3	335
304	Porta Bella Business Park	Soledad Canyon Rd	30	2.50	2.63	0.09	28.1	156
305	Porta Bella Business Park	S of Soledad Canyon Rd	14	1.17	1.88	0.06	20.1	112
306	Porta Bella Business Park	S of Soledad Canyon Rd	10	0.83	2.63	0.09	28.1	156
307	Porta Bella Business Park	S of Soledad Canyon Rd	14	1.17	9.38	0.31	100.5	558
308	North Valencia Jr HS	undetermined	50	4.17	0.75	0.02	8.0	45
309	North Valencia Eastcreek Community Park	McBean & Newhall Ranch Rd	40	3.33	3.52	0.12	37.7	126
310	N Valencia Decoro Park-Business Park	Dickason Dr	247	20.58	21.19	0.70	227.1	1,262
311	Golden Valley Ranch Commercial		113	9.42	4.97	0.16	53.3	296
312	Golden Valley Ranch Elementary School	Golden Valley Rd	27	2.21	20.63	0.68	221.1	1,228
313	Golden Valley Ranch Park	Golden Valley Rd & Placerita Canyon Rd	25	2.08	3.19	0.10	34.2	114
314	North Valencia Village Center (Eastcreek)	Decoro Dr & McBean	9	0.75	7.50	0.25	80.4	447
315	North Valencia Eastcreek County Park	McBean Pkwy	9	0.75	1.08	0.04	11.6	39
316	N Valencia Decoro Park-Commercial	Newhall Ranch Rd & Copper Hill Dr	5	0.42	46.31	1.52	496.5	2,758
317	North Valencia Decoro Park Private Park	Copper Hill Drive	4	0.33	5.16	0.17	55.3	184
319	Northpark	27300 Grandview, SC	5	0.49	1.00	0.03	10.7	60
320	LA Co Parks and Rec	14519 Stoneridge - Slope	15	1.14	2.00	0.07	21.4	71
321	LA Co Parks and Rec	Grand Canyon (across from Lot 40)	9	0.69	2.00	0.07	21.4	71

APPENDIX A
POTENTIAL RECYCLED WATER USERS

Map Location #	User Name	Address	Annual Demand (AF/Yr)	Average Monthly Demand	Peak Monthly Demand (AF/Mo)	Peak Daily Demand (AF)	Peak Daily Demand (1000 gls)	Peak Hourly Demand (GPM)
322	LA Co Parks and Rec	29364 Canyon Rim (across Street)	5	0.37	1.00	0.03	10.7	36
323	District Office	24930 Ave Stanford, SC	4	0.39	1.03	0.03	11.0	61
324	Park Entrance	25045 Ave Rotella	4	0.34	1.00	0.03	10.7	36
325	Golden Valley Ranch Commercial		113	9.42	4.69	0.15	50.3	279
326	Riverwood Community Park	Riverwood Village	320	26.67	1.13	0.04	12.1	40
328	Junior High (Newhall USD)	Oak Valley Village	50	4.17	6.19	0.20	66.3	369
329	City of Santa Clarita	23647 Carrizo Dr	14	1.06	2.75	0.09	29.5	164
330	Newhall Ranch		9035					
331	Newhall Ranch High School	Potrero Village	100	8.33	8.25	0.27	88.4	491
333	Hasley Canyon Golf Course		450	3.91	0.13	41.88	41.9	78
334	Panhandle Golf Course		440	3.91	0.13	41.88	41.9	78
335	SunCal/Tesoro, LLC Development	Copperhill and Avenida Rancho Tesoro	375	79.38	2.61	850.93	850.9	1,576
336	Santa Clarita Post Office	Franklin Pkwy	15	2.81	0.09	30.20	30.2	56
	Total		34,514	2,088	2,805	1,057	31,002	151,606

Please refer to map No. 4.10-A in the accompanying map box.

Please refer to map No. 4.10-B in the accompanying map box.

Please refer to map No. 4.10-C in the accompanying map box.

Please refer to map No. 4.10-D in the accompanying map box.

Please refer to map No. 4.10-E in the accompanying map box.