Upper Los Angeles River Area Watermaster

City of Los Angeles VS. City of San Fernando, ET AL

Case No. 650079 - County of Los Angeles

GROUND WATER
PUMPING AND SPREADING PLAN

1998-2003 Water Years

UPPER LOS ANGELES RIVER AREA WATERMASTER

CITY OF LOS ANGELES VS. CITY OF SAN FERNANDO, ET AL
CASE NO. 650079 - COUNTY OF LOS ANGELES

P.O.Box 51111, Room 1311
Los Angeles, CA 90051-0100

GROUNDWATER PUMPING AND SPREADING PLAN FOR THE UPPER LOS ANGELES RIVER AREA LOS ANGELES COUNTY

1998-2003 WATER YEARS

ULARA WATERMASTER
Melvin L. Blevins, P.E.

ASSISTANT WATERMASTER
Richard A. Nagel, P.E.

WATERMASTER ADMINISTRATOR
Patricia T. Kiechler

WATERMASTER STAFF

Mario Acevedo, P.E.	Report Consultant
Andy J.V. Agra	Groundwater Modeler/GIS Analyst
Paula L. Giles	Senior Clerk
Hadi S. Jonny, P.E.	Groundwater Modeler
Mark Mackowski, CEG	Consulting Geologist
Tina C. Wilson, P.E.	Report Investigator
Billie Washington	Clerk

Copies of this report may be purchased for $40.00 (including shipping).
Call 213/367-0921 to order.

JULY 1999

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

As Watermaster for the Upper Los Angeles River Area (ULARA), I am pleased to submit the 1999 ULARA Pumping and Spreading Plan. This report is prepared for compliance with Section 5.4, revised February 1998, of the ULARA Watermaster's Policies and Procedures. This section established the Watermaster's responsibility for water quality management in the ULARA groundwater basins. This includes plans submitted by the five major water rights holders, which might incorporate changes in recharge, such as spreading, changes in pumping, or changes in pumping patterns, especially in relation to the present and future plans for groundwater cleanup.

The Pumping and Spreading Plans for the 1998-2003 Water Years feature the January 3, 1996 activation of the Phase I Burbank Operable Unit (OU) and also reflects the plant shutdown from December 1997 to December 1998. Glendale's North and South OUs have been delayed, but terms of an Agreement between City of Glendale, the U.S. Environmental Protection Agency (USEPA), and the respondents was signed in the Spring of 1999. Glendale has limited pumping capacity in the Verdugo Basin. San Fernando can pump all its groundwater rights from the Sylmar Basin, and Crescenta Valley Water District (CVWD) is pumping all its assigned water rights from the Verdugo Basin, and, on an interim basis continues to increase its groundwater pumping activities until Glendale has the ability to pump its full water right. This increase is subject to an annual review and approval by the Watermaster and Administrative Committee. At the encouragement of the Watermaster, Los Angeles will pump approximately 30,000 acre-feet (AF) more than its average pumping for the past two decades. This will begin to lower some of Los Angeles' basin storage, which is close to 300,000 AF.

Currently, there are five groundwater cleanup plants in operation: the City of Los Angeles' North Hollywood OU, the City of Burbank's Granular Activated Carbon (GAC) Treatment Plant, the Burbank OU, CVWD's Glenwood Nitrate Removal Plant, and the Pollock Wells Treatment Plant. The Glendale North and South OU is expected to be on-line by the end of 1999. An Initial Study/Negative Declaration for the City of Los Angeles' Headworks Well Field Remediation Project was certified in August 1998.

The Watermaster will continue to address the capacity limitations, in above-average runoff years, for the Hansen and Tujunga Spreading Grounds. Mitigation plans have been developed and will be implemented this year. The groundwater model this year simulates the effect on groundwater elevations of projected pumping in the San Fernando Basin (SFB) for the next five years. The most significant feature is the pumping cone of depression formed in Layer I (Upper Zone) as a result of the Burbank OU pumping.

I wish to acknowledge and express appreciation to the parties who have provided information and data, which were essential to the completion of this report.

MELVIN L. BLEVINS
ULARA Watermaster

II. INTRODUCTION

As a result of the groundwater contamination that was discovered in the SFB, the ULARA Watermaster and Administrative Committee, jointly with the Regional Water Quality Control Board (RWQCB), revised the ULARA Watermaster's Policies and Procedures in July 1993, in order to prevent further degradation of the groundwater quality and to limit the spread of contamination in the ULARA basins. The Policies and Procedures were revised again in February 1998 to organize the material into a more accessible and complete document.

Section 5.4 of the Policies and Procedures details the responsibility for this annual Pumping and Spreading Plan that any party who produces groundwater is required to submit to the ULARA Watermaster annually (on or before May 1 of the current Water Year), a Groundwater Pumping and Spreading Plan. This plan should include projected groundwater pumping and spreading amounts, recent water quality data on each well, and facility modification plans. In order to obtain the information needed to project future groundwater contamination levels, a monitoring program should also be included in the plan.

The ULARA Watermaster is required to evaluate and report on the impact of the combined pumping and spreading of each party as it relates to the implementation of the ULARA Judgment (January 26, 1979) and groundwater management, and make the needed recommendations. The Watermaster's evaluation and recommendations are to be included in a Groundwater Pumping and Spreading Plan for ULARA, and that the Administrative Committee is to review and approve by July of the current Water Year.

This is the July 1999 Groundwater Pumping and Spreading Plan for ULARA, prepared following the revisions of the Policies and Procedures (July 1993 and February 1998). This report provides guidance to the Administrative Committee for use in protecting the water quality within ULARA, improving basin management, and providing overall protection for each party's water rights.

III. PLANS FOR THE 1998-2003 WATER YEARS

A. Projected Groundwater Pumping for 1998-99 Water Year

The total 1998-99 ULARA pumping is projected at 139,256 AF, approximately 45,000 AF above the 19-year average (1979-98). The estimated pumping for 1999-2000 is 163,0843 AF, a 69,000 AF increase above the historical average. (Appendices A-E).

In 1998-99, the City of Burbank plans to pump 9,400 AF, an increase of 2,200 AF as compared to its past five years pumping, and overall, nearly a 351 percent increase (4,500 AF) from its historical 19-year average. This increase is due to the startup of Phase I of the Burbank OU. As of October 1, 1998, Burbank has a storage credit of 57,543 AF. Burbank's annual return water credit is approximately 4,500 AF and its right to physical solution water is 4,200 acre-feet per year (AF/yr). Consent Decree II was entered on June 22, 1998. The anticipated plant capacity is 9,000 gpm (14,500 AF/yr). Pumping in excess of Burbank's annual return water and physical solution right can come from its banked storage, or from the City of Los Angeles by purchasing a portion of Los Angeles' stored water, similar to the Physical Solution Provision covered in Sections 9.1 and 9.4 of the ULARA Judgment.

CVWD plans to pump 3,600 AF, which is an increase of about 1,100 AF compared to its average pumping since 1979. The larger number reflects pumping a portion of Glendale's allocation of the Verdugo Basin safe yield, which Glendale is currently unable to pump. This additional pumping was approved by the Watermaster and the Administrative Committee. Pumping beyond the CVWD's prescriptive right of 3,294 AF will still require the Watermaster's annual approval.

The City of Glendale will not resume significant pumping from the SFB until the Glendale North and South OUs come on-line. Its annual SFB extraction rights are approximately 5,500 AF. Glendale plans to extract 2,700 AF from the Verdugo Basin in 1998-99, an increase of about 450 AF greater than its historical average, and 900 AF more than the average over the past five years. Glendale anticipates pumping the same amount for 1999-2000. Glendale had storage credit of 64,983 AF as of October 1, 1998.

The City of Los Angeles plans to pump about 116,240 AF this year, approximately 36,988 AF above its 1979-98 annual average and about 49,000 AF more than the past five-year average (1993-98). A total of 3,741 AF of groundwater will be pumped from the Sylmar Basin, about a

773 AF increase as compared to the 1979-98 average and 1,250 AF more than the last five years (1993-98). The amount of Los Angeles' pumping is dependent upon the availability of imported water supplies, particularly, from the two Los Angeles Aqueducts. In 1999-2000, Los Angeles plans to pump 131,278 AF from the SFB, an increase of 65 percent compared to its average pumping. As of October 1, 1998, Los Angeles has a storage credit of 298,067 AF in the SFB and 4,371 AF in the Sylmar Basin.

In 1998-99 the City of San Fernando plans to pump 3,550 AF from the Sylmar Basin, 450 AF above its normal pumping for the past five years and 640 AF above the past 19-year average. San Fernando has storage credit of 2,264 AF as of October 1, 1998.

Estimated capacities of ULARA well fields are provided in Table 3-1. Actual and projected amounts of pumping and spreading by the major parties during 1998-99 are given in Tables 3-1A, 3-1B, and 5-1.

B. Constraints on Pumping as of 1998-99

SAN FERNANDO BASIN

City of Burbank - In January 1996, a portion of Burbank's pumping capability was restored when the Lockheed-Burbank Operable Unit (OU) was activated under Phase I of the Consent Decree with the USEPA. The Lockheed-Burbank OU was pumping at about 7,000 gpm. The facility was shutdown for a year beginning in mid-December 1997 to change the Liquid Phase GAC contactors to a downward flow system. A problem was discovered by the Department of Health Services (DHS) that caused delays in re-activating the facility. Burbank plans to use the production and treatment facilities of the USEPA project at flow rates from 3,000 gpm to 9,000 gpm during the second half of the 1998-99 Water Year. In the SFB, Burbank accumulates return flow credits from the water delivered to the hill, mountain and valley floor areas, and receives storage credits for the return water rights that it is unable to pump. In addition, Burbank has the right to purchase from Los Angeles up to 4,200 AF/yr as physical solution water. When Phase II of the Burbank OU commences total average annual deliveries will reach to 9,000 gpm or approximately 14,500 AF/yr.

City of Glendale - Essentially, all of Glendale's pumping has been curtailed due to groundwater contamination by TCE and PCE. At present, Glendale is unable to pump its water rights to return waters (recharge from delivered water), physical solution waters, or stored water credits from the SFB. However, Glendale continues to accumulate 20 percent return water credit for water delivered to the hill, mountain and valley floor areas of the SFB. The unpumped water rights are added to storage credits. In addition, Glendale has the right to purchase from Los Angeles up to 5,500 AF/yr of physical solution water. Under the Record of Decision (ROD) for the Glendale North and South OUs, many new facilities will be constructed. The major agreements between Glendale, the Potentially Responsible Parties (PRP) and the USEPA are near closure. The PRPs have retained CDM Consulting Engineers (CDM) to design and construct the required facilities. Construction is to be completed in 2000. CDM has also recently been selected to operate and maintain the facility when it is completed

City of Los Angeles - Several of the well fields within the SFB can not be fully utilized because of groundwater contamination, primarily from volatile organic contaminants (VOCs), such as TCE and PCE. The well fields that have been most impacted are the Crystal Springs Well Field, which has been completely abandoned and taken out-of-service, and the Pollock and Headworks Well Fields. The Pollock Well Field was restored when the Pollock Wells Treatment Plant was dedicated March 17, 1999. The Headworks Well Field Remediation Project (Headworks Project) will restore four wells in the Headworks Well Field by treating groundwater at a rate of approximately 13,000 gpm. The Negative Declaration for the Headworks Project was completed in October 1998. The Tujunga Well Field has also experienced low levels of TCE and is undergoing a contaminant evaluation phase.

SYLMAR BASIN

City of San Fernando - All of San Fernando's groundwater rights are pumped from the Sylmar Basin, where there are no limitations related to contamination.

City of Los Angeles - The number of wells at the Mission Well Field has been reduced from six to three, because of the age and condition of these wells. In late 1997, a new flow meter was installed and main line work was conducted. The Mission wells will be pumped throughout the year at about 311 AF per month.

VERDUGO BASIN

Crescenta Valley Water District - All of Crescenta Valley's groundwater rights are in the Verdugo Basin. Contamination from VOCs is minimal, however, nitrate contamination is widespread. High nitrate levels are reduced by sending a portion of the pumped groundwater through a nitrate removal plant and blending with Metropolitan Water District (MWD) water to meet drinking water standards. Crescenta Valley was given permission by the Watermaster and Administrative Committee to pump in excess of its prescriptive right, on an annual basis until the City of Glendale is able to pump its entire prescriptive right. CVWD will seek approval from the Watermaster and the Administrative Committee for continued pumping in excess of its prescriptive right.

City of Glendale - The City of Glendale currently does not have the capability of pumping its entire adjudicated right from the Verdugo Basin. Glendale is in the process of studying and evaluating various alternatives to increase its pumping capacity. Limitations in pumping are caused by pump capacity and availability, rather than a chemical contaminant problem.

TABLE 3-1: ESTIMATED CAPACITIES OF ULARA WELL FIELDS

Party/Well Field	Number Inactive Wells	Number Active/Standby Wells	Estimated Capacity (cfs)
		SAN FERNANDO BASIN	
City of Los Angeles			
Aeration	1	7	3
Erwin	3	6	10
North Hollywood	7	30	129
Pollock		3	6
Rinaldi-Toluca		15	126
Tujunga		12	117
Verdugo	4	5	13
Whitnall	4	6	15
City of Burbank	3	10	24
City of Glendale		0	0
TOTAL:	22	94	443
		SYLMAR BASIN	
City of Los Angeles		3	9
City of San Fernando		4	9
TOTAL:		7	18
		VERDUGO BASIN	
CVWD		11	18
City of Glendale		5	15
TOTAL:		16	33

TABLE 3-1A: 1998-99 ACTUAL AND PROJECTED GROUNDWATER EXTRACTIONS

(acre-feet)

		1998			1999								
Party/Well Field	Total	Oct.	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
						SAN FERNANDO BASIN							
City of Los Angeles													
AERATION	2,191	210	213	192	215	159	202	0	200	200	200	200	200
ERWIN	1,293	134	126	96	29	130	118	110	110	110	110	110	110
HEADWORKS	-	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	27,054	2285	2268	889	241	1655	1716	3000	3000	3000	3000	3000	3000
POLLOCK	1,047	0	0	0	0	106	41	150	150	150	150	150	150
RINALDI-TOLUCA	44,512	1	1	0	3459	5328	4523	5200	5200	5200	5200	5200	5200
TUJUNGA	33,929	4282	2457	11	2045	2696	2638	3300	3300	3300	3300	3300	3300
VERDUGO	2,087	201	206	148	42	198	212	180	180	180	180	180	180
WHITNALL	4,130	428	418	323	88	379	394	350	350	350	350	350	350
TOTAL:	116,243	7,541	5,689	1,659	6,119	10,651	9,844	12,290	12,490	12,490	12,490	12,490	12,490
City of Burbank	1800	286	241	80	15	15	53	278	166	166	166	166	166
City of Glendale	425	49	29	14	11	7	13	20	56	56	56	56	56
Lockheed	7,602	18	43	569	842	590	740	830	794	794	794	794	794
TOTAL:	126,070	7,894	6,002	2,322	6,987	11,263	10,650	13,418	13,510	13,506	13,506	13,506	13,506
						SYLMAR BASIN							
City of Los Angeles	3,741	462	452	380	41	337	269	300	300	300	300	300	300
City of San Fernando	3,550	312	254	226	228	224	244	342	344	344	344	344	344
TOTAL:	7,291	774	706	606	269	561	513	642	644	644	644	644	644
						VERDUGO BASIN							
Crescenta Valley Water District	3,600	372	288	235	286	243	287	260	326	326	326	326	325
City of Glendale	2,700	204	250	156	238	210	236	236	234	234	234	234	234
TOTAL:	6,300	576	538	391	524	453	523	496	560	560	560	560	559
ULARA TOTAL:	139,661	9,244	7,246	3,319	7,780	12,277	11,686	14,556	14,714	14,710	14,710	14,710	14,709

TABLE 3-1B: HISTORICAL AND PROJECTED PUMPING

(acre-feet)

Party/Wellfield	Historical Average Pumping		Projected Groundwater Pumping				
			SAN FERNANDO BASIN				
City of Los Angeles	1979-98(A)	1993-98(B)	1998-99	1999-00	2000-2001	2001-02	2002-03
AERATION	621	1435	2190	1990	1990	1990	1990
ERWIN	5212	1809	1292	1300	1300	1300	1300
HEADWORKS	2183	0	0	0	0	0	5430
No HOLLYWOOD	32883	16677	27054	34788	32888	31088	23358
POLLOCK	884	0	1047	2400	2400	2400	2400
RINALDI-TOLUCA	19619	26964	44513	50000	50000	50000	50000
TUJUNGA	5089	16396	33928	36200	36200	3800	40000
VERDUGO	5354	1895	2086	2100	2100	2100	2100
WHITNALL	7407	1987	4130	2500	2500	2500	2500
TOTAL City of Los Angeles	**79252**	**67163**	**116240**	**131278**	**129378**	**95178**	**129078**
City of Burbank (C)	1421	2426	1800	1300	1300	1300	1300
LOCKHEED BOU (D)	1251	4752	7600	9464	14517	14525	14525
City of Glendale (C)	1488	362	25	7700	7700	7700	7700
TOTAL San Fernando Basin	**83412**	**74703**	**125665**	**149742**	**152895**	**118703**	**152603**
			SYLMAR BASIN				
City of Los Angeles	2968	2485	3741	3492	3492	3492	3492
City of San Fernando	2913	3094	3550	3550	3100	3200	3200
TOTAL Sylmar Basin	**5881**	**5579**	**7291**	**7042**	**6592**	**6692**	**6692**
			VERDUGO BASIN				
Crescenta Valley Water District	2554	3470	3600	3600	3500	3400	3300
City of Glendale	2247	1796	2700	2700	2700	2700	2700
TOTAL Verdugo Basin	**4801**	**5266**	**6300**	**6300**	**6200**	**6100**	**6000**
TOTAL ULARA	94094	85548	139256	163084	165687	131495	165295

(A) All wellfields divided by 19 yrs, even if not active.
(B) Average values for most recently in active service of the past five years. Well field start up: Tujunga 92/93; R-T 87/88. Wellfield shut down: Crystal Springs 87/88; Headworks 87/88; Pollock 90/91.
(C) Includes Valhalla for Burbank and Forest Lawn for Glendale.
(D) Started up 4/94

IV. GROUNDWATER PUMPING FACILITIES

A. Well Fields

There are 12 production well fields located in the SFB, two in the Sylmar Basin, and three in the Verdugo Basin. The locations of the well fields are shown in Plate 1, and their estimated capacities are given on Table 3-1. The City of Burbank's Well No. 10 (Lockheed WP-180) was connected to the Lockheed-Burbank OU treatment plant and became operable January 20, 1998. Lockheed Martin has provided new pumping equipment and the connection for Phase II of the Burbank Consent Decree during the Water Year 1998-99. Under the terms of the Second Consent Decree, Burbank will take over the Lockheed-Burbank OU treatment plant as the long-term primary operator. This decree goes into affect two years and 60 days after the plant is up and running under Phase II and will last for 18 years.

B. Active Groundwater Pumping and Treatment Facilities

Lockheed-Burbank OU

The remediation of groundwater contamination in the SFB has been significantly enhanced by the startup of the Lockheed-Burbank OU on January 3, 1996. The Lockheed-Burbank OU, consisting of air-stripping towers followed by liquid and gaseous phase GAC polishers, will produce from 3,000 to 9,000 gpm. The USEPA Consent Decree Project was removed from production on December 15, 1997 for plant modifications required under Consent Decree II. Due to problems in obtaining a new operating permit from the DHS, the treatment plant did not resume operations until December 1998. Only testing water was produced during the outage.

North Hollywood OU (Aeration Facility) - City of Los Angeles

This facility is designed to treat by air-stripping up to 2,000 gpm of groundwater. The treated water is delivered to Los Angeles' water distribution system. In April 1999 the facility was out of service for about one month due to the change out of the vapor phase GAC.

GAC Treatment Plant - City of Burbank

This facility has been operated by the City of Burbank since November 1992. Two wells (Nos. 7 and 15) have been reactivated to deliver water to a GAC plant for removal of VOCs. The treated water is delivered to the Burbank distribution system and supplements the Lockheed-Burbank OU water. The plant will be operated in the parallel configuration. Burbank plans to use the production and GAC Treatment Plant at the following flow rates during the 1998-99 Water Year:

October – December	1,800 gpm
January – March	0 gpm
April – September	1,800 gpm

Glenwood Nitrate Removal Plant - CVWD

Groundwater in the wells of the CVWD is high in nitrates. A portion of the pumped groundwater is treated in an anion-exchange process and blended with untreated water or purchased water to result in acceptable nitrate levels.

Pollock Wells Treatment Plant

Pollock Wells Treatment Plant, treating 3,000 gpm of groundwater, began operating in March 1999. This project is being funded by the City of Los Angeles. The Pollock Project's main focus is to reduce rising groundwater flowing past gaging station F-57C-R and to enhance the overall groundwater cleanup program in the Los Angeles River Narrows area of the SFB. The groundwater is processed through liquid-phase GAC vessels intended for VOC removal, followed by blending of the chlorinated groundwater to reduce nitrate levels. The processed water is delivered to Los Angeles Department Water and Power's (LADWP) distribution system.

TREATED GROUNDWATER IN THE SAN FERNANDO VALLEY
TABLE 4.1 ACTUAL GROUNDWATER TREATMENT

Water Year	Burbank GAC	Lockheed Aqua Detox	Lockheed BOU	CVWD Glenwood Nitrate Removal Plant	Los Angeles Aeratiion Facility	Annual Total AF
1985-86		1				1
1986-87		1				1
1987-88		1				1
1988-89		924				924
1989-90		1,108			1,148	2,256
1990-91		747			1,438	2,185
1991-92		917		847	786	2,550
1992-93	1,205	692		337	1,279	3,513
1993-94	2,395	425	378	1,550	726	5,474
1994-95	2,590		462	1,626	1,626	6,304
1995-96	2,295		5,737	1,419	1,182	10,633
1996-97	1,620		9,280	1,562	1,448	13,910
1997-98	1,384		2,580	1,391	2,166	7,521
Total AF	**11,489**	**4,815**	**18,437**	**8,732**	**11,799**	**55,272**

TABLE 4.2 PROJECTED GROUNDWATER TREATMENT								
	Burbank GAC	Lockheed BOU	CVWD Glenwood Nitrate Removal Plant	Los Angeles Aeratiion Facility	Glendale North/South OUs	Los Angeles' Pollock Wells Treatment Plant	Los Angeles' Headworks Well Field Remediation Project	Annual Total AF
1997-98	1,384	2,580	1,391	2,166		-		7,521
1998-99	1,500	7,600	1,400	2,190		1,047		13,737
1999-2000	1,000	9,464	1,400	1,990	3,600	2,400		19,854
2000-01	1,000	14,517	1,400	1,990	7,200	2,400	-	28,507
2001-02	1,000	14,525	1,400	1,990	7,200	2,400	-	28,515
2002-03	1,000	14,525	1,400	1,990	7,200	2,400	5,430	33,945
Total AF	**6,884**	**63,211**	**8,391**	**12,316**	**25,200**	**10,647**	**5,430**	**132,079**

C. Projected Groundwater Pumping and Treatment Facilities

Glendale North and South OU

Under the Record of Decision for the Glendale North and South OUs, many new facilities will be constructed consisting of: shallow extraction wells, a combined 5,000 gpm water treatment plant, piping to convey the untreated water from the wells to the treatment plant, a conveyance system from the treatment plant to Glendale's potable distribution system, a facility to blend the treated groundwater with water from the MWD to reduce nitrate levels, and a disinfection facility. The proposed site of the treatment facility was selected for an animation studio constructed by DreamWorks, Inc. The treatment plant site was relocated to city property at the Glendale Recycling Center approximately 500 feet from the previously proposed location. DreamWorks, Inc., completed its construction in December 1997. The major Agreements between City of Glendale, the Potentially Responsible Parties (PRPs), and the USEPA were signed during 1999. The PRPs have retained CDM to design and construct the required facilities. To date, construction is ongoing and should be completed in the 1999-2000 period.

Headworks Well Field Remediation Project

The Headworks Well Field Remediation Project is intended to restore the use of the well field by pumping and treating the groundwater for VOCs from four wells with a combined flow of approximately 13,000 gpm. An alternative study using Advanced Oxidation Process was conducted during April and May of 1999. This process uses ozone and hydrogen peroxide under a revised system to optimize treatment for control of bromate formation in the source water.

Present plans call for the construction of three new supply wells and retrofitting one existing well by March 2000. A Negative Declaration was certified in August 1998.

D. Groundwater Remediation Projects

Many privately owned facilities in the SFB have been found to have groundwater contamination, and are under Clean-up and Abatement Orders from the RWQCB. Each facility has numerous monitoring wells and most have pumping wells and treatment plants. The RWQCB is in the process of evaluating and closing a great number of cases in the underground tank program

E. Dewatering Operations

Metropolitan Transit Authority (MTA)

As part of the planned transportation system in Los Angeles County, the MTA is constructing the Universal City Subway Station. This activity requires temporary groundwater dewatering. The Watermaster is currently evaluating a request for an additional 700 AF of dewatering through May 2000. During these past four years, about 1700 AF have been discharged to storm drains which flow into the Los Angeles River under an existing National Pollutant Discharge Elimination System permit. The dewatering activities are subject to review by the Watermaster and Administrative Committee, until the project is completed.

Walt Disney Company

The Walt Disney Company met with the Watermaster to discuss dewatering during construction of its Riverside building and underground parking structure. Since construction began more than 2,576 AF have been removed from the site. Construction should be completed by December 1999.

MWD - Sepulveda Feeder Pipeline Construction Repairs

In August 1998, MWD requested approval to operate temporary groundwater pumps to discharge groundwater in order to facilitate repairs of MWD's buried pipeline in Granada Hills. The Sepulveda Feeder pipeline provides potable water from the Joseph Jensen Filtration Plant to the western region of MWD's service area. A routine inspection revealed that the pipeline leaks were caused by the 1994 Northridge Earthquake. The repairs were completed and a total of 40 AF were dewatered.

Permanent Dewatering Operations

Many facilities along the southern and western boundaries of the SFB have deep foundations in the areas of high water tables that require a dewatering program. These activities are subject to approval by the affected Administrative Committee party and subject to a replacement cost of the water. The water is subtracted from the affected party's stored water account. The amount of groundwater pumped are required to be reported to the Watermaster on a monthly basis.

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS

A. Existing Spreading Operations

There are six spreading facilities located in the SFB. The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima Spreading Grounds. The City of Los Angeles operates the Headworks Spreading Grounds. The LACDPW in cooperation with the City of Los Angeles operates the Tujunga Spreading Grounds. The spreading facilities are used primarily for spreading native and imported water. There are no plans for modifications of existing spreading grounds, or for the construction of new facilities in the 1997-98 Water Year. Estimated capacities are shown in Table 5-1.

B. Future Spreading Operations

The East Valley Water Recycling Project (EVWRP) will take tertiary-treated water from the Tillman Water Reclamation Plant for spreading at the Hansen Spreading Grounds. The RWQCB, DHS, and the ULARA Watermaster have approved a Phase IA Demonstration Project that allows for the spreading of 10,000 AF/yr during a three-year demonstration period that is anticipated to begin July 1999. Twelve monitoring wells were installed in the EVWRP study area to identify the nature of groundwater quality associated with the spreading of recycled water. The monitoring will provide an evaluation of the impact of the saturated and unsaturated zones on the concentrations of total organic compounds and nitrogen compounds, as well as the expected rate of movement, under known and predicted groundwater gradients. If the results of the Demonstration Project are favorable, the spreading of recycled water may be increased up to 35,000 AF/yr.

C. Actual and Projected Spreading

Table 5-1 shows the actual and projected spread volumes for the 1998-99 Water Year. Estimated capacity of each basin is detailed on Table 5-2. As shown in Table 5-1, the 1998-99 Water Year will experience below average recharge activities. Overall, approximately 16,654 AF will be spread as compared to the historical average of 35,290 AF, and as compared to the past five-year average of 38,925 AF. Rainfall precipitation on the valley fill is estimated at six inches for 1998-99 as compared to the long-term average of 17.86 inches per year and the previous five-year average of 22.07 inches per year. 1998-99 is turning into one of the driest years on record.

TABLE 5-1A: 1998-99 SPREADING OPERATIONS

(acre-feet)

	Operated by:						
	LACDPW				LADWP	LACDPW and LADWP	
Month	Branford	Hansen	Lopez	Pacoima	Headworks	Tujunga	Total
Oct-98	49	1,370	0	0	0	0	1,419
Nov-98	129	955	34	44	0	310	1,472
Dec-98	34	1,430	94	55	0	0	1,613
Jan-99	73	1,260	0	276	0	108	1,717
Feb-99	33	1,670	56	206	0	12	1,977
Mar-99	70	1,440	181	0	0	65	1,756
Apr-99	0	0	0	0	0	1,700	1,700
May-99	0	0	0	0	0	0	0
Jun-99	0	0	0	0	0	0	0
Jul-99	0	0	0	0	0	0	0
Aug-99	0	0	0	0	0	0	0
Sep-99	0	5,000	0	0	0	0	5,000
TOTAL	388	13,125	365	581	0	2,195	16,654
1969-98 Average	509	15,311	570	7,296	2,479	9,388*	35,553
1993-1998 Average	490	19,672	547	9,647	0	9,569*	39,925

Table 5-1B: HISTORICAL PRECIPITATION

(inches per year)

1969-98 Average	1993-98 AV	1993-94	1994-95	1995-96	1996-97	1997-98**	1998-99**
17.86	22.07	10.19	33.36	12.03	15.17	33.6	6

* - Includes native and imported waters.

** - Estimated.

Big Tujunga: Water available for spreading in storage not including recession flows equals 1,210AF. Current inflow as of 6/4/98 is 97cfs.

Pacoima: Water available for spreading in storage not including recession flows equals 968 AF. Current inflow as of 6/4/98 is 61 cfs.

TABLE 5-2: ESTIMATED CAPACITIES OF ULARA SPREADING GROUNDS

Spreading Ground	Type	Total Wetted Area (acres)	Capacity (acre-feet/year)
	Operated by the LACDPW		
Branford	Deep basin	8	1,000
Hansen	Shallow basin	105	54,000
Lopez	Shallow basin	13	5,000
Pacoima	Med. depth basin	111	29,000
	Operated by LADWP		
Headworks	Shallow basin	28	22,000
	Operated by LACDPW and LADWP		
Tujunga	Shallow basin	130	28,000
	TOTAL:	395	139,000

D. Hansen and Tujunga Spreading Grounds Task Force

During the 1997-98 Water Year, precipitation in ULARA was 225 percent of a normal year. This resulted in an above-average volume of stormwater runoff that could be captured in upstream reservoirs and diverted into ULARA spreading grounds. In April 1998, the Watermaster's Office received a phone call from the LACDPW indicating that spreading at both the Hansen and Tujunga Spreading Grounds would be temporarily suspended. The basis for curtailing spreading was that the groundwater table had risen to a level that threatened environmental conditions to the Bradley-East Landfill near the Hansen Spreading Grounds and the Sheldon-Arleta landfills adjacent to the Tujunga Spreading Grounds. At that time, the Los Angeles County's reservoirs were entirely full, meaning that thousands of acre-feet of runoff would be spilled and lost to the ocean. The suspended spreading activities spanned over one month.

In response to this undesirable condition, the Watermaster's Office in May 1998 formed the Tujunga and Hansen Spreading Grounds Task Force. The task force was comprised of representatives from the LACDPW, LADWP, Los Angeles Bureau of Sanitation and the

Watermaster's Office. After a series of meetings, the task force developed preliminary mitigation measures to improve the utilization of both spreading grounds, particularly during years of above-normal runoff.

- Hansen Spreading Grounds Mitigation Plan

Above-average recharge at the Hansen Spreading Grounds is affected by the Bradley-East Landfill, located approximately 3,000 feet downgradient. The RWQCB and the Watermaster's Office prohibit groundwater inundation of the landfill. The groundwater table is allowed to rise to a designated level, and then spreading is temporarily suspended until the groundwater table falls back down to a safe level. This occurs only in years when above-average runoff is available. To assure this, an alert groundwater level, with a 10-foot buffer zone, was established in the late 1980s. The Hansen Spreading Grounds Mitigation Plan simply established a new location to record the groundwater levels – 1,000 feet further and downgradient from its existing location. This new monitoring well location is also adjacent to the existing Bradley-East Landfill. The Watermaster's Office estimates that this change should improve the volume of groundwater recharge by at least 25 percent or approximately 7,000 AF.

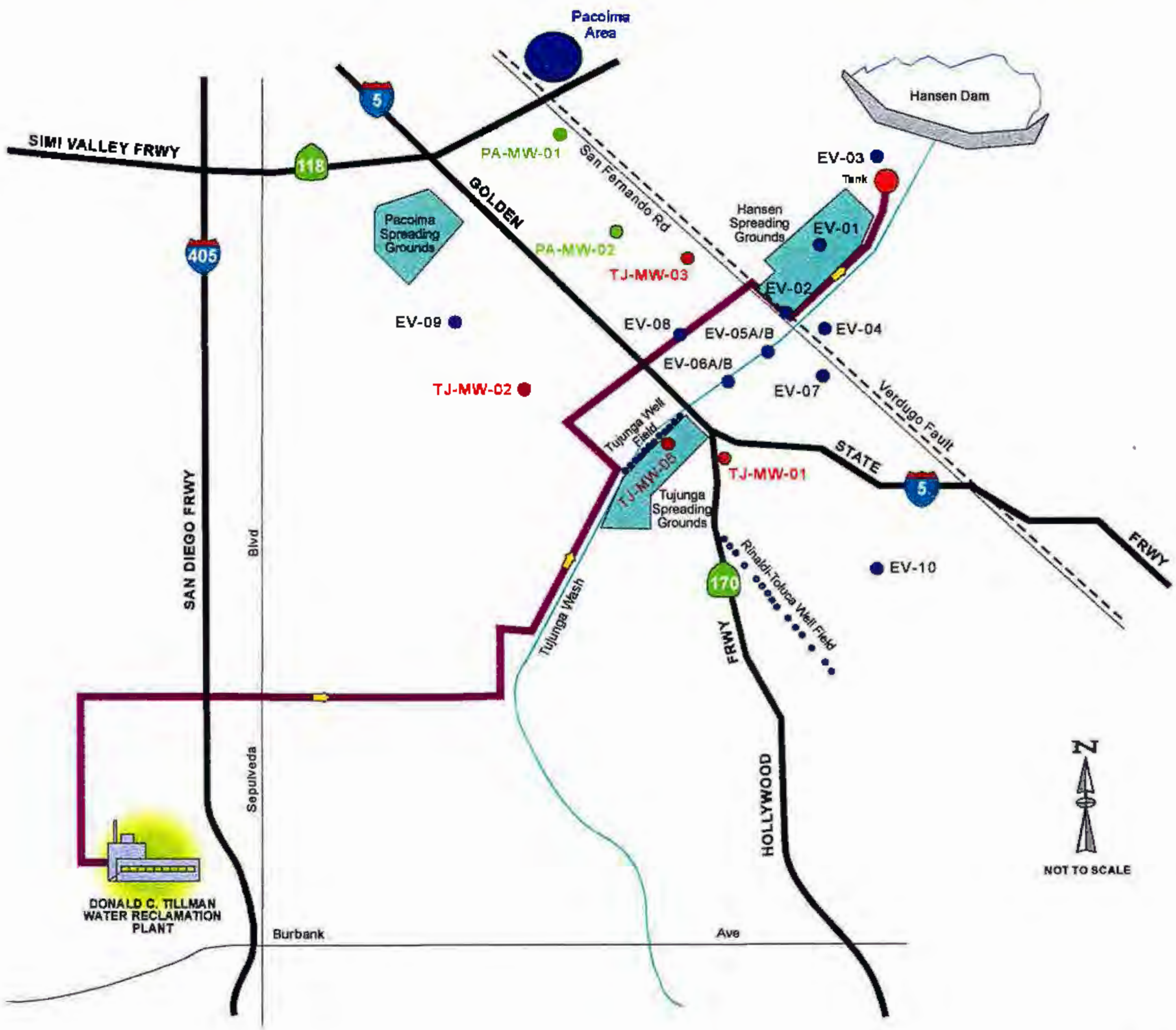
- Tujunga Spreading Grounds Mitigation Plan

The Tujunga Spreading Grounds are located immediately upgradient to the Sheldon-Arleta Landfill. Methane gas has been commercially produced from the landfill since the early 1990s, which has been the source of the environmental concern.

As is typical in the spreading of surface water, water moves through the soil column and displaces the air voids contained in the soil matrix. A significant migration of air mass has the potential to displace methane gas out of the landfill. In years when above-average volumes of water are spread, the methane has migrated and caused elevated methane gas levels at a nearby high school, and in at least one instance, forced an evacuation of the school grounds. In order to avoid these episodes, a methane gas monitoring system was constructed. When methane gas is detected at specific concentrations, the spreading activities are suspended, resulting in local runoff lost to the ocean.

The Tujunga Spreading Grounds Mitigation Plan consists of continuous operation of the perimeter methane gas flare system, situated around the landfill, prior to spreading surface water. In concept, this should contain the methane gas within the landfill, and halt its migration out of the landfill. The plan requires close coordination between the Los Angeles Bureau of Sanitation, the operators of the existing perimeter flare system, and the LACDPW. Anticipating an above-average runoff year for 1999-00, this plan will be fully implemented and evaluated. The goal is to contain methane gas within the landfill and improve the spreading capacity by at least 25 percent.

FIGURE 5-1: EAST VALLEY MONITORING WELL LOCATIONS



EVWELLS.CDR - 3/98

VI. BASIN MANAGEMENT ACTIVITIES AND INVESTIGATIONS

A. Groundwater Investigation Programs

Pacoima Area Groundwater Investigation

The Pacoima Groundwater Investigation Group (PGIG) met on June 16, 1997, October 15, 1997, and February 25, 1998 to discuss the Pacoima Area groundwater contamination. The PGIG is comprised of the regulatory lead agency - State Department of Toxics Substance Control (DTSC), the RWQCB, the ULARA Watermaster, Los Angeles Bureau of Sanitation - Industrial Waste Division, and LADWP.

PGIG's objective is to address the nature and extent of groundwater contamination near the intersection of San Fernando Road and the Simi Valley Freeway (Hwy 118) in the Pacoima Area. This area is located approximately 2.5 miles north and upgradient of the LADWP's Tujunga Well Field. Groundwater samples at one of the sites, Holchem, Inc., have been collected beginning in 1989. The ULARA Watermaster and LADWP were informed of these site investigations beginning in January 1996 by the RWQCB personnel. Concentrations of TCE were found to be as high as 24,000 ppb at this site, which is the highest levels found in the San Fernando Valley. Figure 5-1 provides a map.

There are four primary VOCs present in the groundwater beneath the Pacoima area: PCE, TCE, 1,1-TCA and 1,1 DCE. To help characterize the extent of contaminant migration, LADWP installed two monitoring wells, PA-01, approximately one half mile downgradient and PA-02 approximately one and one quarter mile downgradient of the site. PA-01 was sampled on March 11, 1998 and more constituents were found than the three detected last April 1997. The VOCs detected: 1,1-DCA (~0.7 μg/L), PCE (~24 μg/L), TCE (~5.3 μg/L), 1,1, DCE (~13 μg/L), Cis-1,2,-DCE (~1.5 μg/L), 1,1,1-TCA (~9.3 μg/L), Toluene (~1.3 μg/L). PA-02 was installed one-half mile downgradient of PA-01 and was sampled on March 11, 1998. PCE was detected (~ 1.1 μg/L).

DTSC is in the process of coming to closure on a Consent Order with the property lessee, Holchem, Inc., and the property owner Mr. Herman Benjamin. DTSC has also submitted site screening data to the USEPA for the Price Pfister site, and will continue its evaluation of any other potential source sites.

In addition, DTSC has issued Holchem, Inc., a letter to initiate on-site soil vapor and an air sparging remediation system, without the consummation of the Consent Order. The Watermaster's Office is pleased that immediate corrective action will be implemented to begin cleaning up the chemicals contained in the unsaturated zone.

VII. ULARA WATERMASTER MODELING ACTIVITIES

A. Introduction

The purpose of the groundwater modeling study presented herein is to evaluate the effects of groundwater pumping in the SFB, as projected over a five-year period. The projected pumping values were extracted from the 1999 "Pumping and Spreading Plans" as submitted by each party pursuant to the provisions established in the revised February 1998 Policies and Procedures. The groundwater flow model used for this study is a comprehensive three-dimensional computer model that was developed for the USEPA to incorporate data, characterizations, and findings during the Remedial Investigation Study of the San Fernando Valley (December 1992).

The model code, "Modular Three-Dimensional Finite-Difference Groundwater Flow Model," commonly called MODFLOW, was developed by the U.S. Geological Survey (McDonald-Harbaugh) and was used to develop the San Fernando Basin Goundwater Flow Model. This model consists of 64 rows, 86 columns, and four layers to reflect the varying geologic and hydrogeologic characteristics of the SFB as a function of depth. In the deepest portion of the SFB the model is subdivided into four layers, each layer characterizing a specific zone. The model is created with a variable grid that range from 1,000 by 1,000 feet near the southeastern SFB to 3,000 by 3,000 feet in the northwestern SFB (Figure 7-1) or where less relevant data are available. The model is actively updated.

B. Model Input

The five-year study begins with the Fall 1998 and ends in the Fall 2003. Projected pumping values for each well field were derived from the "Pumping and Spreading Plans" submitted by each party. The projected 'Well Field' values (Table 7-1) were then used to assign pumping to individual wells. Each well was then assigned a percentage of pumping to each model layer, based on the percentage of the wells' perforations contained in each layer.

Normal or average rainfall and recharge conditions were assumed over the five-year study period except for 1998-99 where actual values for the first half of the Water Year were known and the total was projected for the remainder of the year. Initial head values (groundwater elevations) were derived from previous simulations for the 1997-98 Water Year. At the close of every Water Year, Watermaster staff updates the model's input files with the actual basin recharge and extraction data. This activity covers the period from 1980-1998.

C. Simulated Groundwater Contours

After running the model for five stress periods (1998-2003), each 365 days in length, groundwater contours and horizontal flow direction were generated from the MODFLOW output file (data file).

- The simulated groundwater contour results for Model Layer 1 (water table) are shown on Plate 1, and for Layer 2, on Plate 2.

- Additionally, the change in groundwater elevation was a calculated data file between the stress period (Fall 1998 – Fall 2003) and is shown on Plate 3 for Layer 1 and Plate 4 for Layer 2.

- The horizontal flow directions of groundwater movement is shown on Plate 5 for Layer 1 and Plate 6 for Layer 2.

- Finally, Plates 7-9 depict the most recent TCE, PCE and NO^3 contaminant plumes that are superimposed onto the Layer 1 horizontal groundwater flow direction.

D. Evaluation of Model Results

Plate 1: Simulated Groundwater Contour Model Layer 1 – Fall 2003

- The most noticeable feature is the cone of depression (pumping cone) that has developed around the Burbank OU. These extractions are derived primarily from Layer 1, although Layer 2 does provide some recharge to Layer 1. The OU pumping increases to 14,500 AF/yr by the 1998-99 Water Year. The radius of influence extends as far as 6,000 feet in the downgradient (southeasterly) direction.

- In a more subtle manner, Plate 1 illustrates the pumping influence (pumping cone) of the Glendale OU and Headworks Wells.

Plate 2: Simulated Groundwater Contour Model Layer 2 – Fall 2003

- The most significant features are the cones of depression near the Rinaldi-Toluca (R-T), North Hollywood (NH), Burbank OU and Headworks Well Field (HW) areas. Except for the Burbank OU, over 75 percent of the R-T (46,000 AF/yr), NH (23,290 AF/yr), and HWs (11,000 AF/yr) pumping, is derived from Layers 2-4.

Plate 3: Change in Groundwater Elevation Model Layer 1 – Fall 1998 to Fall 2003

- As shown in Plate 3, the basinwide trend is a decline in the groundwater elevations over the five-year study period, with the exception of the area near the Hansen Spreading Grounds.

- The 'big picture' reason for the decline in water levels is that basin extractions are projected to exceed recharge by 112,500, over the 5-year study period.

- The water table near the Rinaldi-Toluca Well Field declines by about 64 feet and approximately 56 feet near the Burbank OU. The area near the Burbank OU is substantially impacted because extractions increase to 14,500 AF/yr beginning in 2000-01, which is a 10,000 AF/yr increase since the 1993-98 period and an almost 600 percent increase as compared to the long term average (1979-98).

- The water table near the Glendale North OU wells will decline between 10 to 20 feet and approximately 40 feet near the South OU Wells. Full-scale operation of the OU plant is expected to begin by the 1999-00 Water Year. The North OU Wells will deliver 4,320 AF/yr and the South OU Wells 2,880 AF/yr.

- The area near the Tujunga, North Hollywood, Erwin, and Whitnall Well Fields will experience a 40 to 60 foot depression in the water table. Of a lesser magnitude, the water table near the Verdugo Well Field will recede 30 feet and close to 5 feet near the Pollock Well Field.

- The water table will rise as much as 20 feet near the Hansen Spreading Grounds, primarily due to the 10,000 AF/yr increase from the EVWRP, beginning in 1999.

Plate 4: Change in Groundwater Elevation Model Layer 2 – Fall 1998 to Fall 2003

- The most impressive feature is the 64-foot depression near the Rinaldi-Toluca Well Field. Los Angeles projects pumping 46,000 AF/yr from the Rinaldi-Toluca Well Field, which is approximately 42 percent of Los Angeles' total pumping and 34 percent of the San Fernando basinwide total.

- The Headworks Well Field is planned for reactivation in 2002-03. This well field has been out-of-service since 1987. The inactivity has contributed to a rise in the water table and an increase in groundwater storage in this area. The reactivation of the well field (11,000 AF/yr) will significantly influence pumping and groundwater flow patterns. The shift to reactivate and pump the Headworks Wells, will be offset by a reduction in pumping the lower River Supply Conduit Wells, consisting of the Erwin, Whitnall and Verdugo Well Fields. The Headworks Well Field pumping will also substantially contribute to balancing basinwide groundwater storage.

Plate 5: Simulated Groundwater Flow Direction Model Layer 1 – Fall 2003

- This plate consists of superimposed groundwater flow direction arrows to illustrate the general movement of groundwater flow in Layer 1 (water table).

- The Rinaldi-Toluca and Burbank OU Well Fields and the Hansen Spreading Grounds cause the most pronounced effect on the direction of groundwater involvement. In particular, the Burbank OU creates such a significant pumping cone that groundwater flows toward the well field from all directions (radial flow).

- One observation is that a groundwater divide apparently develops just north of the Verdugo and Burbank Public Service Department (PSD) wells and south of the Whitnall, Erwin, and Burbank OU wells. This is primarily due to the 'pumping trough' formed by the Burbank OU extractions.

Plate 6: Simulated Groundwater Flow Direction Model Layer 2 – Fall 2003

- Similar to Plate 5, a groundwater divide forms between the Verdugo and Burbank PSD wells and the Burbank OU, Erwin and Whitnall wells. The effect of the Rinaldi-Toluca and Burbank OU pumping create the most significant impact to the natural direction of groundwater movement.

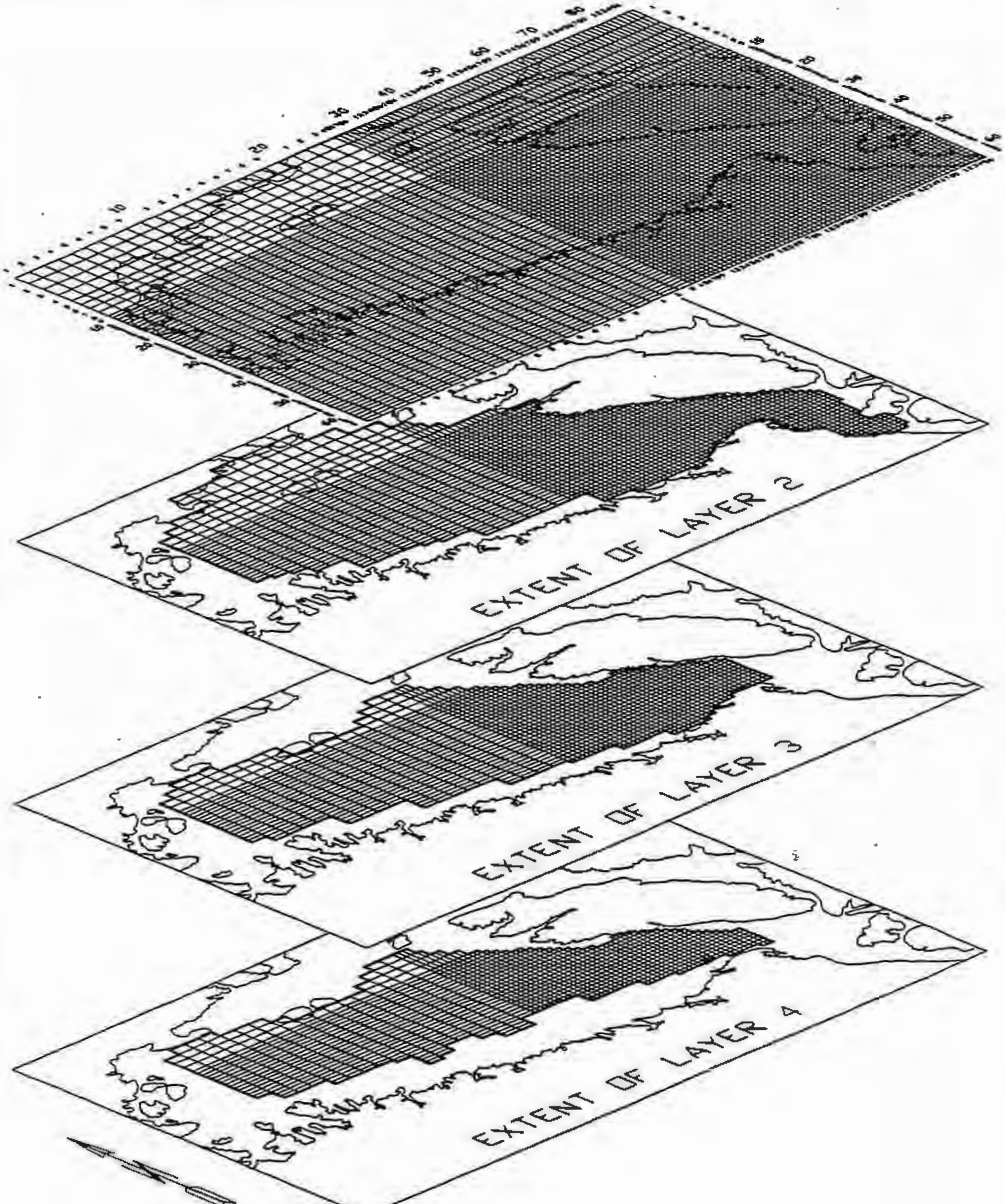
Plates 7 – 9: Simulated Groundwater Flow Direction and TCE, PCE and NO^3 Contamination Model Layer 1 – Fall 2003

- Plates 7-9 depict the most recent TCE, PCE and NO^3 contaminant plumes that are superimposed onto the interpolated horizontal direction of groundwater movement for Layer 1, Fall 2003. The Burbank OU appears to contain the >5,000 µg/L TCE and PCE plumes and a portion of the 1,000-5,000 µg/L TCE and PCE plumes. The uncaptured portion of these plumes will migrate in the direction of the Los Angeles River Narrows Area (southeasterly) and towards the Glendale OU and Headworks wells.

- The Burbank OU pumping (14,500 AF/yr) tends to flatten the horizontal gradient in a southeasterly direction and slow the natural movement of groundwater southeasterly of the Burbank OU area plume.

- The Glendale North and South OU Wells (7,200 AF/yr) and the Pollock Wells (2,400 AF/yr) have a less pronounced effect on Layer 1, in part because 25 percent of the Glendale OU pumping is from Layer 2 and 75 percent of the Pollock pumping originates from Layer 2.

- Plate 9 (NO_3 contamination) indicates that Layer 1 extractions by the Burbank and Glendale OU facilities may be impacted by NO_3 contamination above 45 mg/L.



NOTE:
LAYER SURFACES ARE SHOWN IN TWO DIMENSIONS FOR THE PURPOSE OF THIS ILLUSTRATION ONLY. ACTUAL MODEL LAYER THICKNESS VARIES BY NODE.

REMEDIAL INVESTIGATION
of Groundwater Contamination
in the San Fernando Valley

FIGURE 7-1
MODEL LAYER CONFIGURATION

MODEL INPUT

TABE 7-1

Pumping and Spreading Scenario

Water Years 1998 - 2003

	BASIN RECHARGE (AF/Y)																	
	RAINFALL (IN/Y)		PERCOLATION (A)			H&M (B)	SPREADING GROUNDS (B)							SUB-SURFACE INFLOW (B)				
WATER YEAR	VALLEY	HILL & MTN	VALLEY FILL	RETURN WATER	SUB TOTAL	HILL & MTN	BRANFORD	HANSEN	HW	LOPEZ	PACOIMA	TUJUNGA	SUB-TOTAL	PACOIMA	SYLMAR	VERDUGO	SUB-TOTAL	TOTAL RECHARGE
1998-99	6.00	8.00	4,168	67,000	**71,168**	**1,366**	388	13,125	-	365	581	7,651	**22,110**	350	400	70	**820**	**95,464**
1999-00	18.57	23.06	12,900	61,525	**74,425**	**3,939**	352	23,252	-	566	5,000	7,651	**36,821**	350	400	70	**820**	**116,005**
2000-01	18.57	23.06	12,900	61,525	**74,425**	**3,939**	352	23,252	-	566	5,000	7,651	**36,821**	350	400	70	**820**	**116,005**
2001-02	18.57	23.06	12,900	61,525	**74,425**	**3,939**	352	23,252	-	566	5,000	7,651	**36,821**	350	400	70	**820**	**116,005**
2002-03	18.57	23.06	12,900	61,525	**74,425**	**3,939**	352	23,252	-	566	5,000	7,651	**36,821**	350	400	70	**820**	**116,005**

	BASIN EXTRACTION (AF/Y)																		
	LADWP (C)										BURBANK (C)			GLENDALE (C)			OTHERS (C)		
WATER YEAR	AE	EW	HW	NH	PO	RT	TJ	VD	WH	TOTAL LADWP	BURBANK PSD	LOCKHEED	NON-BURBANK (VMP)	CITY OF GLENDALE	GL-NORTH	GL-SOUTH	TOTAL NON-LADWP	TOTAL NON GLENDALE (F. LAWN & SEARS)	TOTAL EXTRACTION
1998-99	-2,190	-1,292	0	-27,054	-1,047	-44,513	-33,928	-2,086	-4,130	**-116,240**	-550	-14,517	-300	-25	-2,160	-1,440	-1,465	-624	**-137,321**
1999-00	-1,990	-1,300	0	-22,390	-2,400	-50,000	-25,000	-2,100	-2,500	**-107,680**	-550	-14,517	-300	-25	-4,320	-2,880	-1,465	-624	**-132,361**
2000-01	-1,990	-1,300	0	-24,090	-2,400	-50,000	-25,000	-2,100	-2,500	**-109,380**	-550	-14,517	-300	-25	-4,320	-2,880	-1,465	-624	**-134,061**
2001-02	-1,990	-900	0	-24,350	-2,400	-50,000	-25,000	-2,100	-2,500	**-109,240**	-550	-14,517	-300	-25	-4,320	-2,880	-1,465	-624	**-133,921**
2002-03	-1,990	0	-11,000	-23,290	-2,400	-46,000	-25,000	0	0	**-109,680**	-550	-14,517	-300	-25	-4,320	-2,880	-1,465	-624	**-134,361**

NOTES: (A) Model Recharge Package (Aerial)
(B) Model Well Package (Source)
(C) Model Well Package (Sink)

PROJECT: *WATERMASTER*
PROJECT NO.: *PS98-99*
DATE: 5/25/96

VIII. WATERMASTER'S EVALUATION AND RECOMMENDATIONS

The Watermaster is encouraged by the five year projected pumping and spreading plan because of the progress of the groundwater cleanup program which has, in effect, restored Burbank's groundwater pumping capability, and will restore Glendale's San Fernando Basin pumping capability by the end of 1999.

City of Los Angeles

The Watermaster approves of Los Angeles' projected average annual pumping for 1998-99 to 2002-03 of approximately 120,230 AF/yr. This is approximately 41,000 AF/yr more than their pumping over the period 1979-98 and 53,000 AF/yr more than the last five years (1993-98). As of October 1, 1998, Los Angeles' accumulated stored water credit is 298,067 AF. This increased pumping will reduce Los Angeles' stored water account by approximately 106,000 AF, primarily because of the additional 10,000 AF/yr of groundwater recharge from the EVWRP which will begin by the end of 1999. In addition, the loss of Los Angeles' Headworks, Crystal Springs and Pollock Wells has contributed to rising of the basin's water levels in the Los Angeles River Narrows area, resulting in a build-up in groundwater storage and an increase in rising groundwater outflow from the San Fernando Basin. For this reason the Watermaster is pleased with Los Angeles' efforts to begin operating the Pollock Wells Treatment Plant and the continued progress towards reactivating the Headworks Wells.

City of Burbank

The Watermaster is particularly encouraged that Burbank's groundwater pumping capability has been fully restored through the activation of the Lockheed-Burbank OU. Over the past eleven years, Burbank's reduction in groundwater pumping has contributed to an increase in its stored water credit from 29,386 AF (October 1, 1986) to 57,543 AF (October 1, 1998). The projected Lockheed-Burbank OU extractions of 7,600 AF/yr, beginning 1998-99, is approximately 3,000 AF more than its annual return flow credit. The annual amount of pumping will increase during the next three years finally reaching 14,500 AF. Without the use of physical solution water, Burbank's stored water bank will be depleted within six years, unless additional physical solution water is taken from Los Angeles' stored water.

City of Glendale

Glendale's reduction in groundwater pumping due to groundwater contamination has contributed to an increase in their stored water credit from 19,841 AF (October 1, 1987) to 64,983 AF (October 1, 1998). Reinstitution of Glendale's pumping ability through the North and South

OUs, will provide 7,200 AF/yr of groundwater supply. This is in excess of their average annual return flow credit of 5,400 AF. Glendale can make up the difference from either banked storage or purchasing up to 5,500 AF/yr as physical solution water from Los Angeles. The Glendale OU could be operated for at least 30 years before depletion of Glendale's stored water bank.

Model Simulations

The model simulations demonstrate that a significant portion of the "hot spot" TCE and PCE contamination in the Burbank area will be captured by the Burbank OU Wells. However, the remaining uncaptured portion will migrate towards the Los Angeles River Narrows area. Reactivation of the Headworks Wells, the Glendale North and South OUs and the Pollock Wells Treatment Plant should intercept much of this remaining contaminated groundwater. However, timely implementation of each one of these projects is important from not only a groundwater cleanup aspect but also from managing basin storage and groundwater quality in this area.

The change in groundwater elevation contours illustrates that over the next five years, a 50 foot drawdown in water levels can be anticipated near the Rinaldi-Toluca Well Field, and as much as a 56 foot drawdown near the Burbank OU Wells, with an average of about 40 feet. The Tujunga and North Hollywood Well Fields could also experience a 40 foot drawdown of water levels. There is little decline in water levels near the Headworks and Pollock Wells in the upper zone (Layer 1), however, a significant cone begins to develop in Layer 2 near the Headworks Wells, approximately 30 feet of drawdown. A radius of influence exists, but in a less pronounced manner, near the Glendale North and South OU Wells. The model demonstrates that the radius of influence for the Burbank OU extends to approximately 6,000 feet downgradient and that the combined pumping of the Burbank OU, Rinaldi-Toluca, and North Hollywood Wells, tends to lessen the horizontal gradient and movement of groundwater within the contaminant plumes south of the Burbank OU.

Pacoima Area Contamination

The Pacoima Area groundwater investigation is of particular concern to the Watermaster because the contamination is upgradient of all the well fields in the SFB and is only 2.5 miles upgradient of Los Angeles' Tujunga Well Field. The Watermaster will continue to take an active role, along with the lead regulatory agency, DTSC, RWQCB, and LADWP. The Watermaster will support extensive actions to define the nature and extent of contamination, and if necessary, support additional activities to control and contain contaminant migration. In response to the contamination, LADWP should be commended for installing two monitoring wells downgradient of the Holchem, Inc., site. The first well, PA-01, is approximately half a mile south of the site and has detected levels of TCE, PCE, 1,1, DCE, and 1,1,1-TCA between 5-25 µg/L. PA-02, located 1.25 miles south of Holchem, Inc., has shown 1.1 µg/L for PCE. The Watermaster will continue to track and be involved in the progress of the cleanup efforts.

Hansen and Tujunga Spreading Grounds

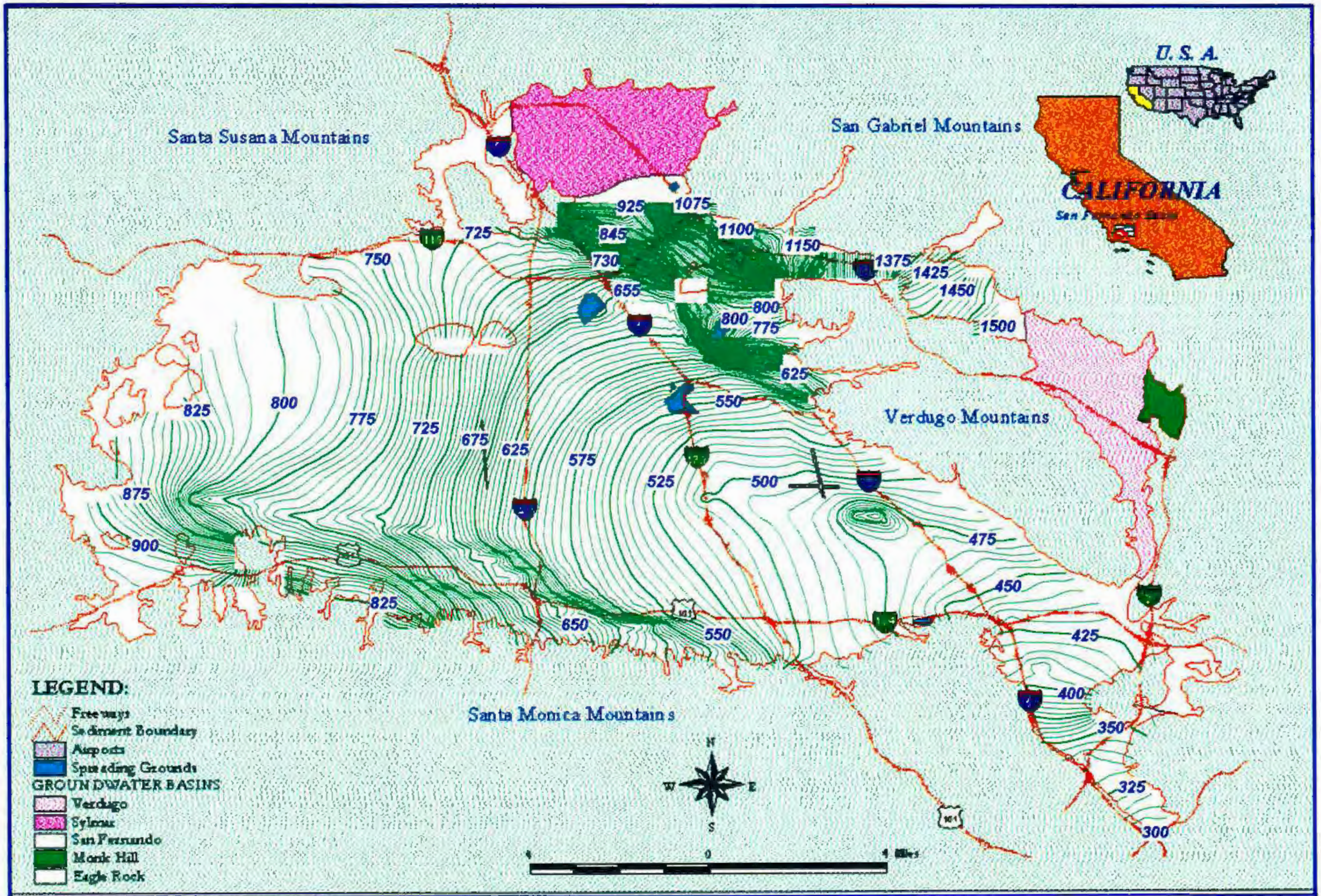
The Watermaster will continue to take an active lead in solving the landfill problems near both the Hansen and Tujunga Spreading Grounds. The Watermaster will write a letter to Waste Management, Inc., and the RWQCB to change the location of the monitoring wells readings to 1,000 downgradient of the existing location and adjacent to the Bradley-East Landfill. This should provide an additional 7,000 AF of storage for the Hansen Spreading Grounds.

The Watermaster will continue to monitor the proposed mitigation plan to address methane gas at the Sheldon-Arleta Landfill, which is downgradient of the Tujunga Spreading Grounds. The goal is to improve the capacity of the spreading grounds by 25 percent.

Verdugo Basin

The Watermaster also supports CVWD's increased pumping in the Verdugo Basin until Glendale has the ability to utilize its full water right. The Watermaster will continue to provide support in Glendale's pursuit to utilize all of its water rights in the Verdugo Basin. The Watermaster applauds Crescenta Valley Water District's continued operation of the Glenwood Nitrate Removal Plant in the Verdugo Basin.

PLATES



Upper Los Angeles River Area

WATERMASTER

PUMPING & SPREADING REPORT

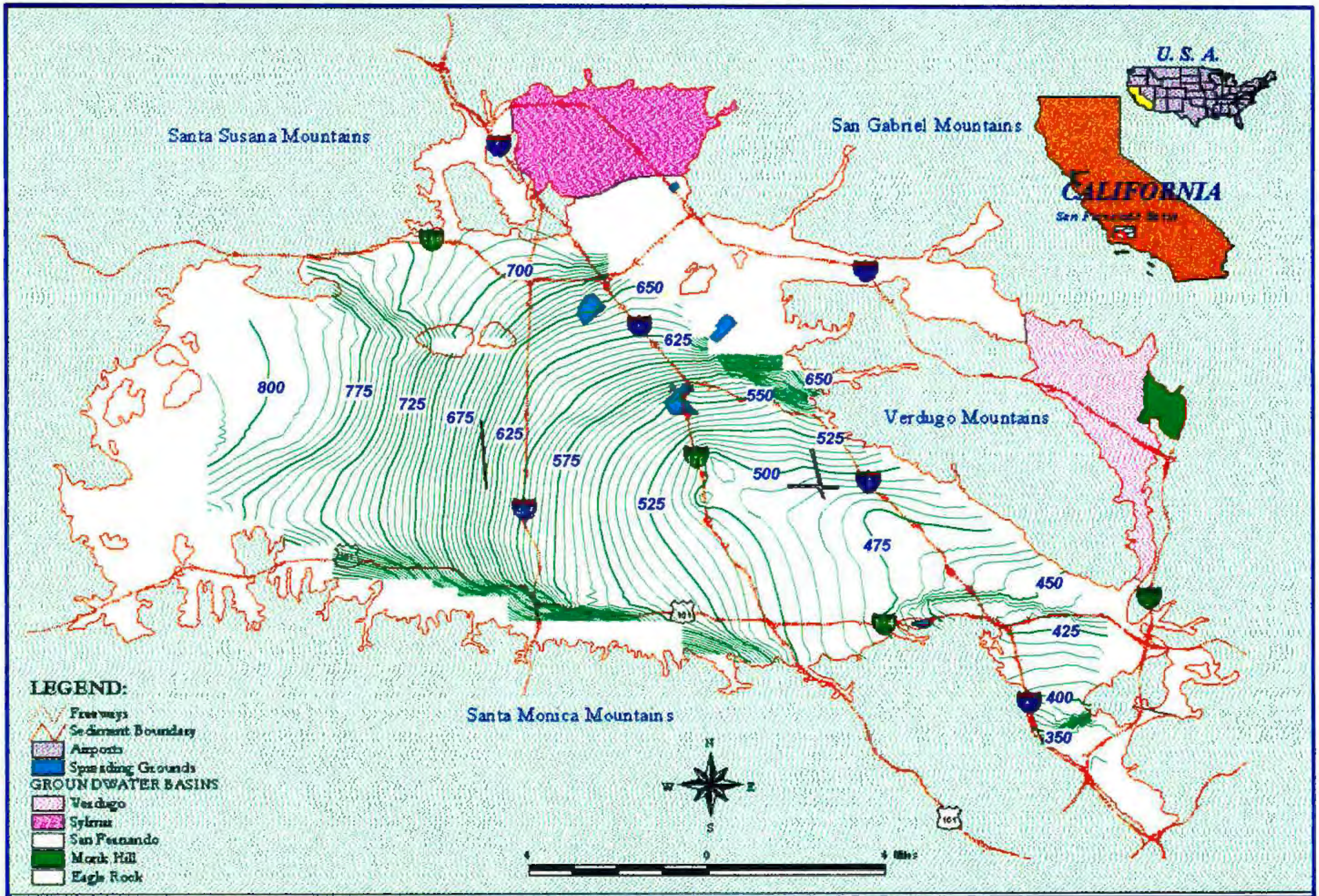
1998-2003 WATER YEARS

Simulated Groundwater Contour - Model Layer 1

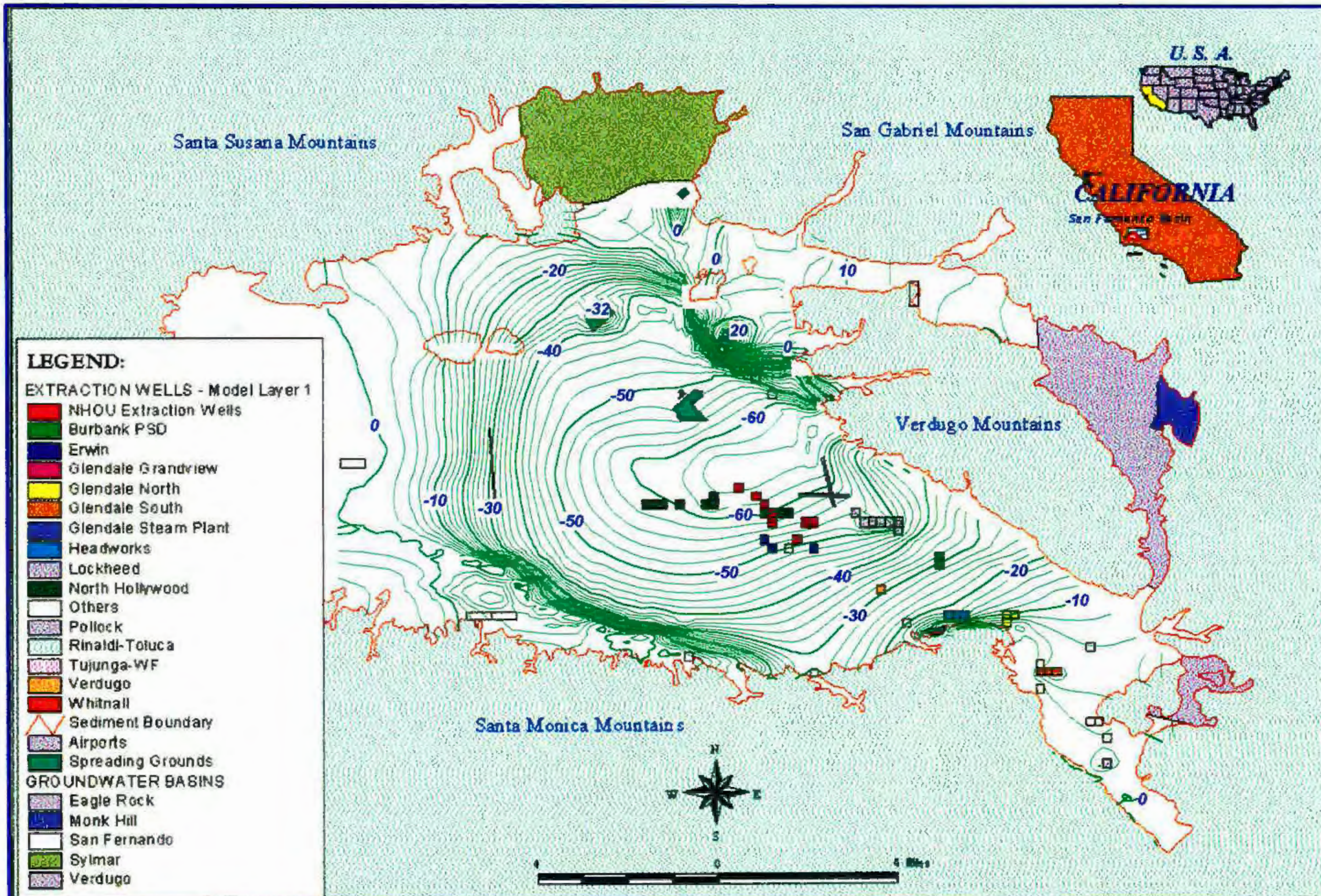
FALL 2003

PLATE

1



Upper Los Angeles River Area WATERMASTER PUMPING & SPREADING REPORT 1998-2003 WATER YEARS	**Simulated Groundwater Contour - Model Layer 2** **FALL 2003**	PLATE **2**



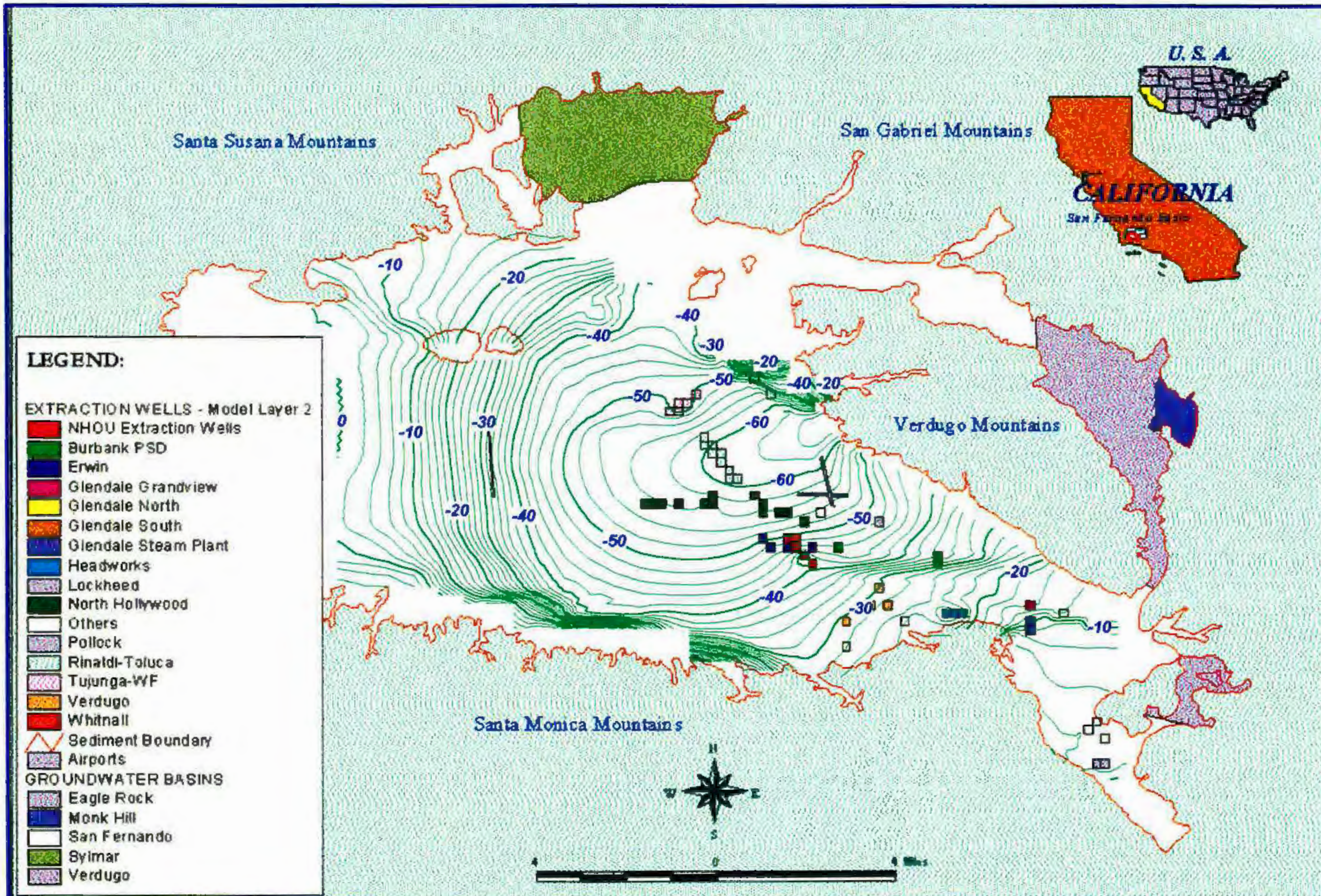
Upper Los Angeles River Area
WATERMASTER
PUMPING & SPREADING REPORT
1998-2003 WATER YEARS

Change in Groundwater Elevation - Model Layer 1

Fall 1998 - Fall 2003

PLATE

3

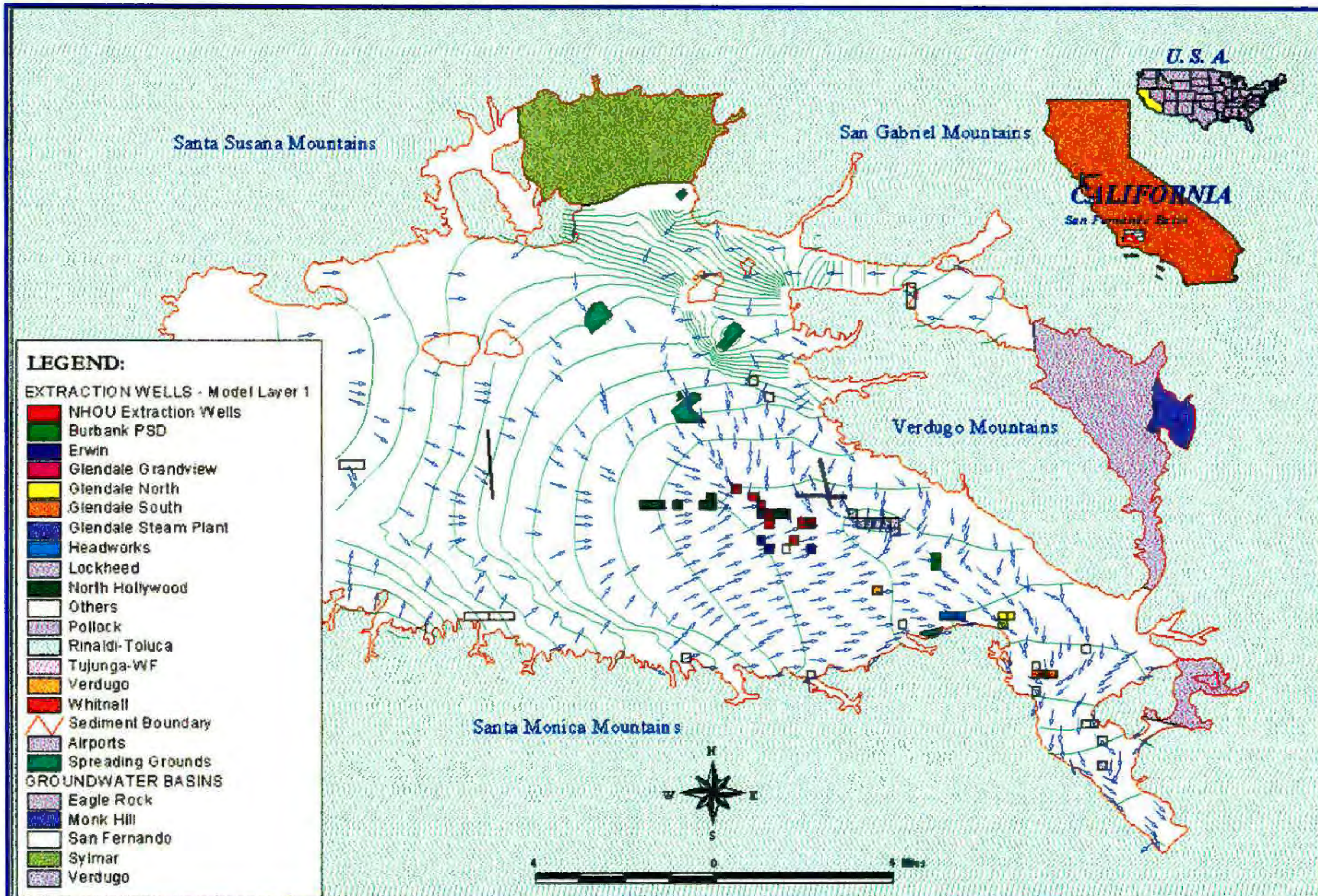


Upper Los Angeles River Area
WATERMASTER
PUMPING & SPREADING REPORT
1998-2003 WATER YEARS

Change in Groundwater Elevation - Model Layer 2

Fall 1998 - Fall 2003

PLATE
4



Upper Los Angeles River Area
WATERMASTER

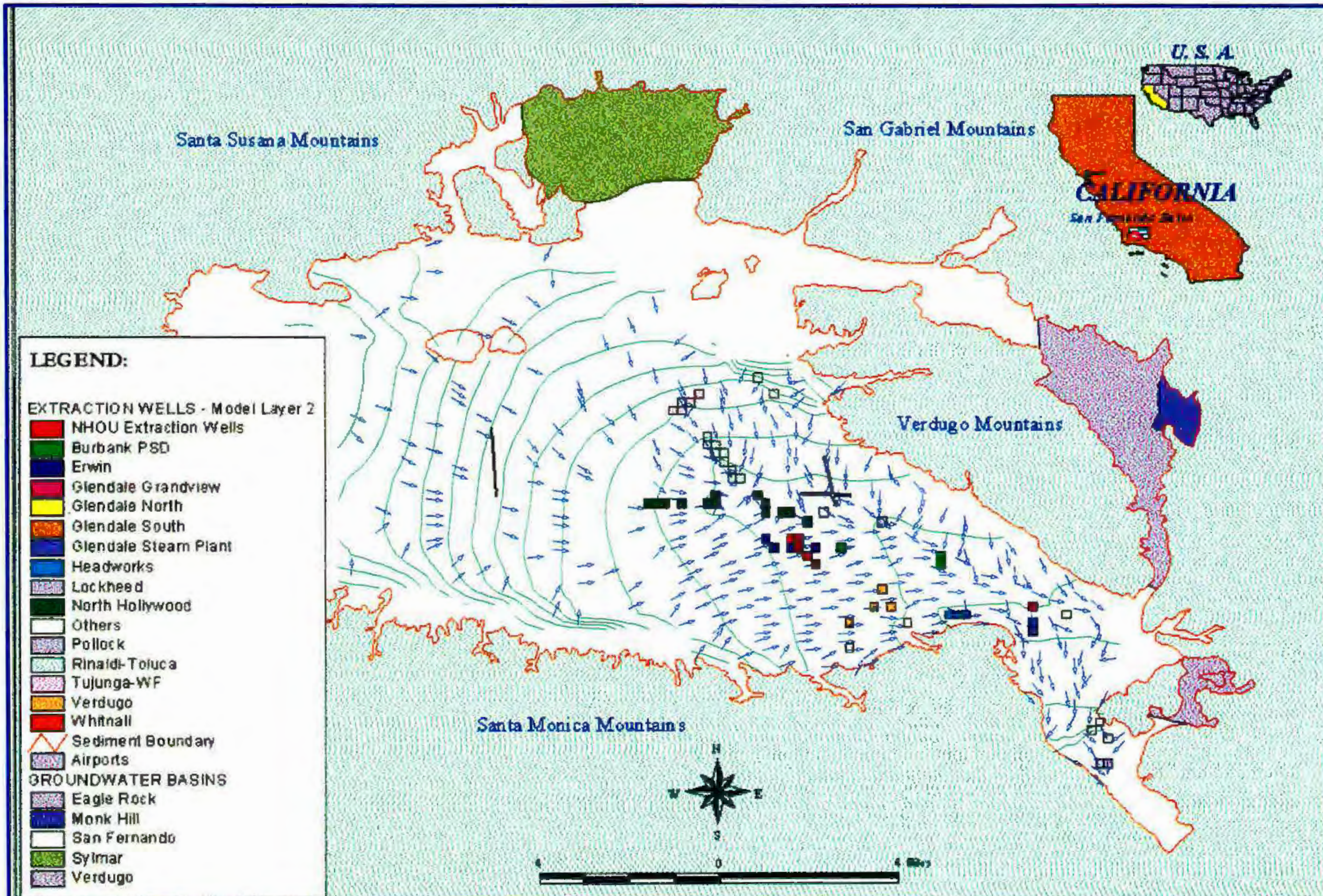
PUMPING & SPREADING REPORT
1998-2003 WATER YEARS

Simulated Groundwater Flow Direction - Model Layer 1

Fall 2003

PLATE

5



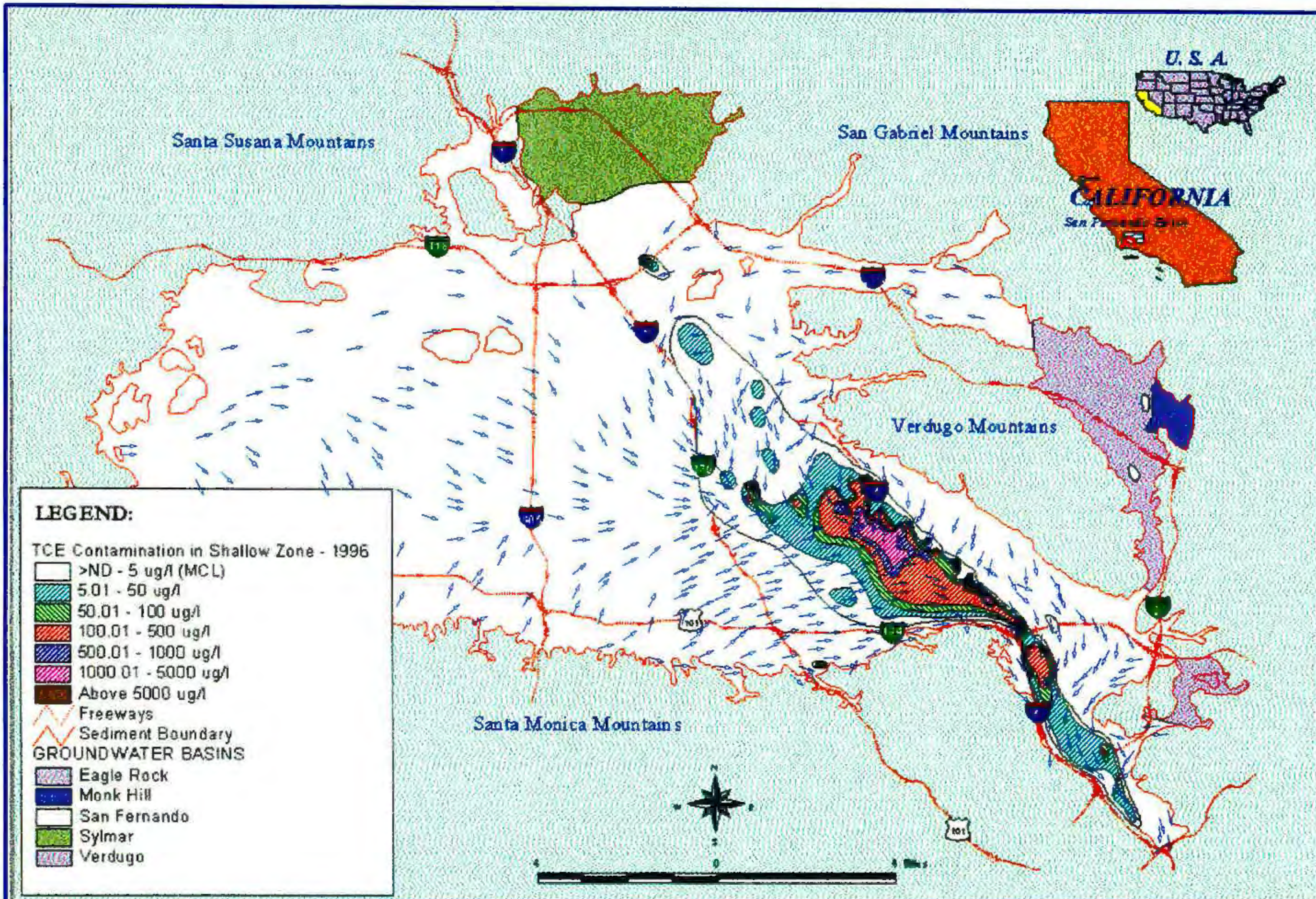
Upper Los Angeles River Area
WATERMASTER

PUMPING & SPREADING REPORT
1998-2003 WATER YEARS

Simulated Groundwater Flow Direction - Model Layer 2

Fall 2003

PLATE
6



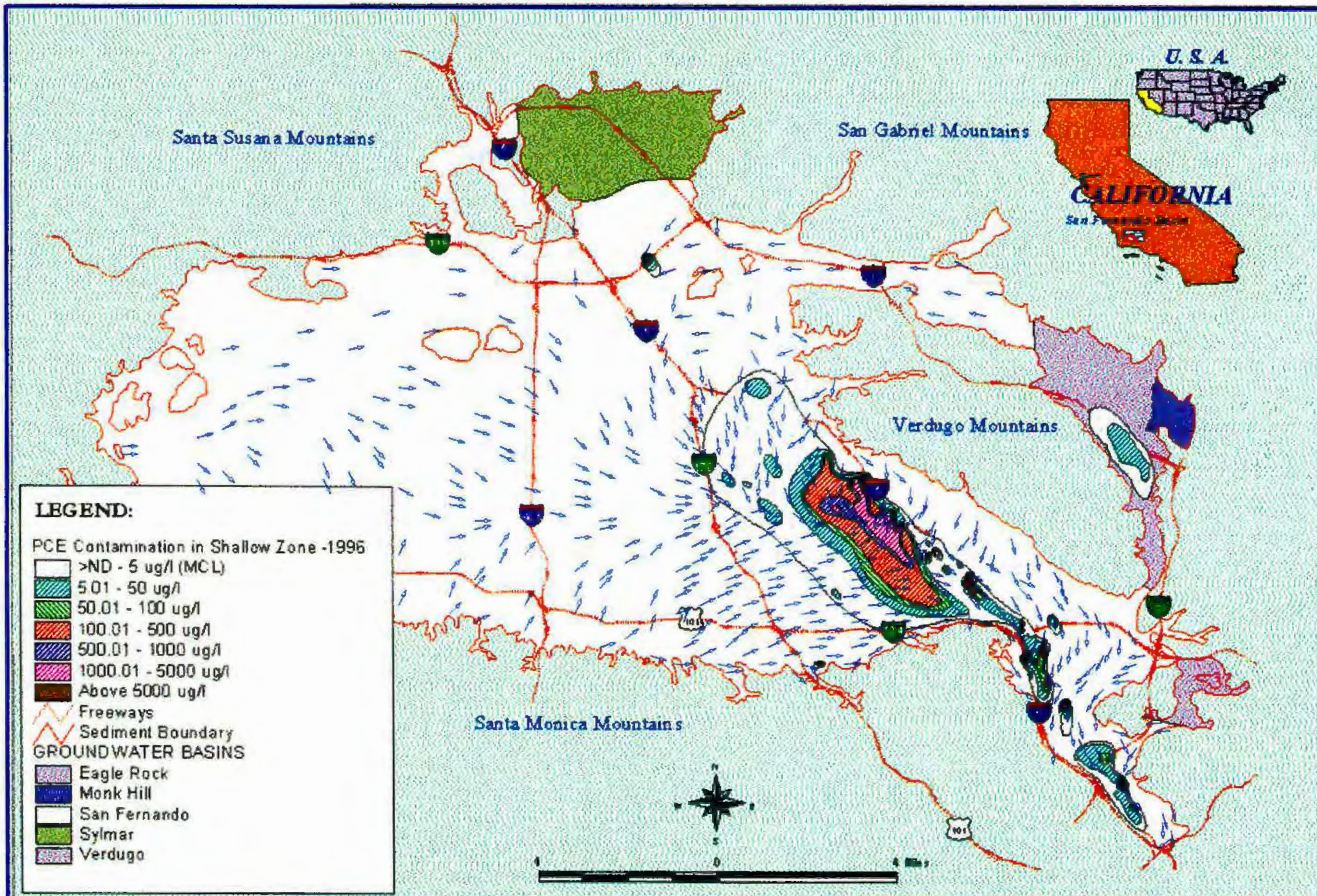
Upper Los Angeles River Area
WATERMASTER
PUMPING & SPREADING REPORT
1998-2003 WATER YEARS

Simulated Groundwater Flow Direction and TCE Contamination

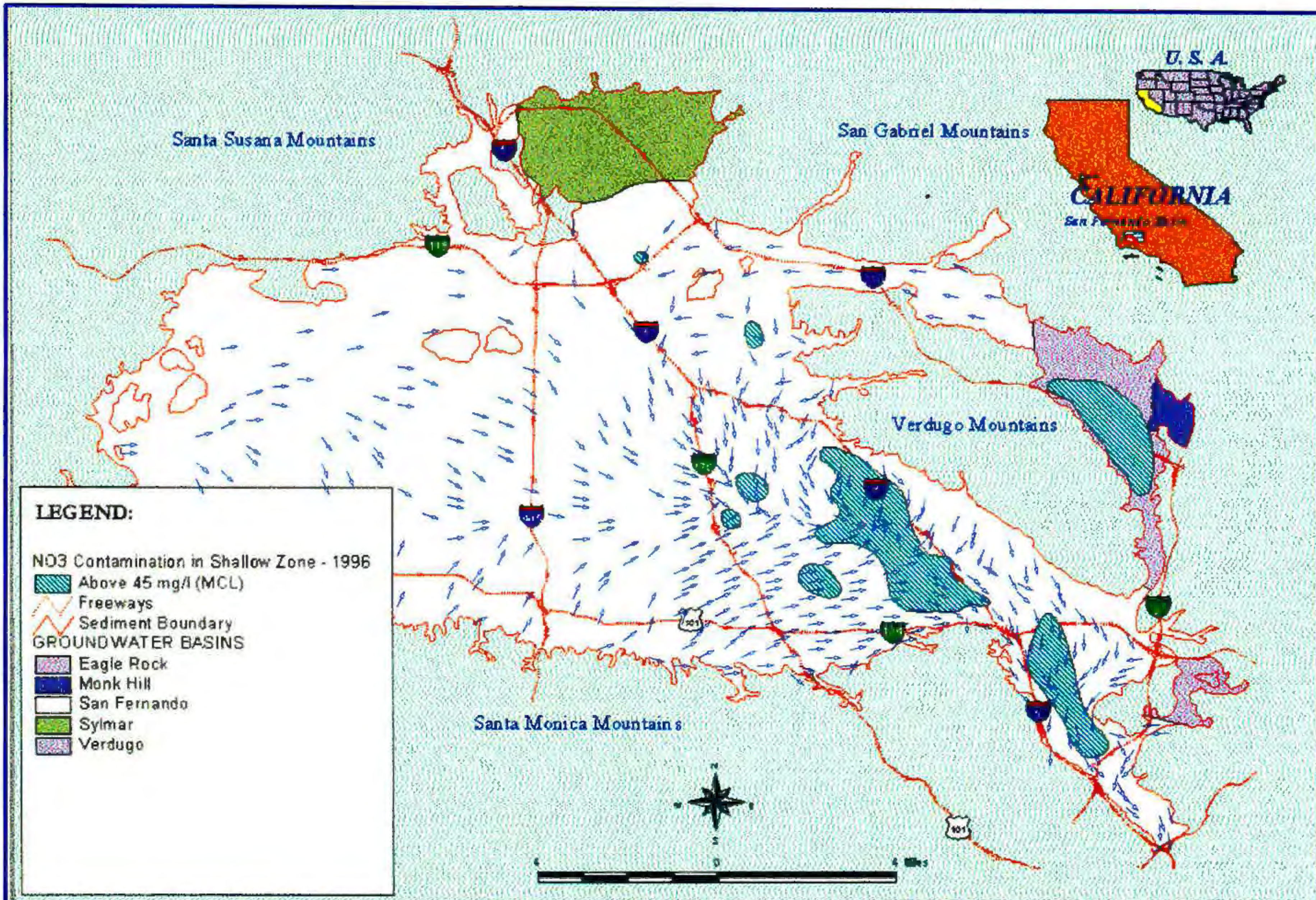
Model Layer 1 - Fall 2003

PLATE

7



Upper Los Angeles River Area WATERMASTER PUMPING & SPREADING REPORT 1998-2003 WATER YEARS	**Simulated Groundwater Flow Direction and PCE Contamination** **Model Layer 1 - Fall 2003**	PLATE **8**



Upper Los Angeles River Area

WATERMASTER

PUMPING & SPREADING REPORT

1998-2003 WATER YEARS

Simulated Groundwater Flow Direction and NO3 Contamination

Model Layer 1 - Fall 2003

PLATE

9

APPENDIX A

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

1998-2003 Water Years

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR THE 1998-2003 WATER YEARS

MAY 1999

Prepared by:
Groundwater Group
Watermaster Business Team
WATER RESOURCES BUSINESS UNIT
Los Angeles Department of Water and Power

TABLE OF CONTENTS

Introduction

The water rights in the Upper Los Angeles River Area (ULARA) were set forth in a Final Judgment, entered on January 26, 1979, ending litigation that lasted over 20 years. The ULARA Watermaster's Policies and Procedures give a summary of the decreed extraction rights within ULARA, together with a detailed statement describing the ULARA Administrative Committee operations, reports to and by the Watermaster and necessary measuring tests and inspection programs. The ULARA Policies and Procedures have been revised several times since the original issuance, to reflect current groundwater management thinking.

In Section 5.4 of the ULARA Policies and Procedures as amended in February 1998, it is stated that:

"...all parties or non-parties who pump groundwater are required to submit annual reports by May 1 to the Watermaster that include the following:

- *A 5-year projection of annual groundwater pumping rates and volumes.*
- *A 5-year projection annual spreading rates and volumes.*
- *The most recent water quality data for each well."*

This report constitutes Los Angeles' 1999 Groundwater Pumping and Spreading Plan for the Water Years 1998 - 2003.

Section 1: Facilities Description

This section describes facilities that influence groundwater conditions in ULARA and relate to Los Angeles.

a. Spreading Grounds: There are six spreading ground facilities that can be used for groundwater recharge of native water in ULARA. The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima spreading grounds; the City of Los Angeles Department of Water and Power (LADWP) operates the Headworks spreading grounds. LACDPW and LADWP operate the Tujunga spreading grounds cooperatively. Estimated capacities for these are shown in Table 1-1.

Table 1-1

Estimates Capacities of ULARA Spreading Grounds			
Spreading Ground	Type	Total wetted area [ac]	Capacity [ac-ft/yr.]
Operated by LACDPW			
Branford	Deep basin	7	1,000
Hansen	Shallow basins	105	54,000*
Lopez	Shallow basins	12	5,000
Pacoima	Med. depth basins	107	29,000
Operated by LADWP			
Headworks	Shallow basins	28	22,000
Operated by LACDPW and LADWP			
Tujunga	Shallow basins	100*	43,000*
TOTAL:			154,000

*Assumes no environmental limitations due to nearby landfills.

b. Extraction Wells: The LADWP has nine well fields in the San Fernando Basin, and one in the Sylmar Basin. The estimated capacity of the well fields are shown in Table 1-2. The listed capacities are approximate and may vary depending on the water levels and maintenance schedule of the available pumping equipment.

Table 1-2

Estimated Capacities of LADWP Well Fields in ULARA		
Well field	Number of wells Active and standby	Estimated Initial Capacity [cfs]
San Fernando Basin		
Aeration	7	3
Crystal Springs (A)	---	---
Erwin	6	10
Headworks	6	25
North Hollywood	30	129
Pollock	3	7
Rinaldi-Toluca	15	126
Tujunga	12	117
Verdugo	5	13
Whitnall	6	15
Sylmar Basin		
Mission	3	9
TOTAL:	92	434

(A) Wellfield has been abandoned pursuant to sale of property to DreamWorks, Inc.

c. <u>Groundwater Treatment Facilities</u>: The LADWP operates three groundwater treatment facilities. Water treated at these facilities is delivered to the water distribution system for consumption.

<u>Advanced Oxidation Process Plant</u>: This plant is designed to process up to 4,000 gallons per minute (gpm) of groundwater by employing an ozone and hydrogen peroxide treatment method to remove volatile organic compounds (VOCs) from the water. The plant is presently inactive due to low VOC levels in the supply wells.

<u>North Hollywood Operable Unit</u>: This plant is designed to process up to 2,000 gpm of groundwater containing VOCs by using aeration technology for the liquid phase and granular activated carbon for off-gas treatment.

Pollock Wells Treatment Plant: This plant was dedicated March 17, 1999. It is a 3,000 gpm facility which uses two restored Pollock production wells and treats the groundwater with Liquid Phase Granular Activated Carbon (GAC).

Section 2: Annual Pumping And Spreading Projections

a. Pumping Projections for the 1998-99Water Year: The supply to the City of Los Angeles has three components. The most preferred source of water is Los Angeles Aqueduct supply imported from the Owens Valley/Mono Basin area, secondly, groundwater supply from the Central, San Fernando, and Sylmar Basins, and finally, purchased water from the Metropolitan Water District of Southern California (MWD). The MWD sources of supply are the State Water Project and the Colorado River Aqueduct. Use of groundwater fluctuates depending on the availability of imported water which varies due to climatic and operational constraints.

Table 2-1 shows the amount of groundwater extractions that is expected during the 1998-99 Water Year from the San Fernando and Sylmar Basins. Appendix B provides groundwater extraction projections from 1999 to 2003. These projections are based upon assumed demand and Los Angeles Aqueduct flows and are subject to yearly adjustments.

Table 2-1

CITY OF LOS ANGELES PUMPING PROJECTION FOR WY 98-99
(Acre-Feet)
San Fernando Basin

	TOTAL	Oct-98	Nov-98	Dec-98	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99
AERATION	2,190	210	213	192	215	159	202	0	200	200	200	200	200
ERWIN	1,292	134	126	96	29	130	118	110	110	110	110	110	110
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	27,054	2285	2268	889	241	1655	1716	3000	3000	3000	3000	3000	3000
POLLOCK	1047	0	0	0	0	106	41	150	150	150	150	150	150
RINALDI-TOLUCA	44,513	1	1	0	3459	5328	4523	5200	5200	5200	5200	5200	5200
TUJUNGA	33,928	4282	2457	11	2045	2696	2638	3300	3300	3300	3300	3300	3300
VERDUGO	2,086	201	206	148	42	198	212	180	180	180	180	180	180
WHITNALL	4,130	428	418	323	88	379	394	350	350	350	350	350	350
TOTAL:	116,241	7,541	5,689	1,657	6,119	10,650	9,844	12,290	12,490	12,490	12,490	12,490	12,490
Sylmar Basin													
MISSION	3,741	462	452	380	41	337	269	300	300	300	300	300	300
ULARA TOTAL:	119,981	8,004	6,141	2,037	6,160	10,987	10,113	12,590	12,790	12,790	12,790	12,790	12,790

b. Spreading Projections for the 1998-99 Water Year: Native groundwater recharge from captured storm runoff occurs primarily as a result of the use of man-made spreading grounds. Spreading grounds operations are primarily controlled by the LACDPW. Table 2-2 represents the anticipated spreading volumes for 1998-99. The East Valley Water Recycling Project in Phase IA will add recycled water to the Hansen Spreading Grounds beginning in mid-1999 with an amount anticipated at 10,000 AFY. Phase IB will carry recycled water to the Pacoima Spreading Grounds.

Table 2-2

Projected Spreading of Acre-Feet in ULARA Spreading Grounds in 1998-99							
Operated by:							
	LACDPW				LADWP	LACDPW and LADWP	Monthly Total
Month	Branford	Hansen	Lopez	Pacoima	Headworks (A)	Tujunga	
Oct-98	49	1370	0	0	0	0	1419
Nov-98	129	955	34	44	0	310	1472
Dec-98	34	1430	94	55	0	0	1613
Jan-99	73	1260	0	276	0	108	1717
Feb-99	33	1670	56	206	0	12	1977
Mar-99	70	1440	181	0	0	65	1756
Apr-99	0	0	0	0	0	1700	1700
May-99	0	0	0	0	0	0	0
Jun-99	0	0	0	0	0	0	0
Jul-99	0	0	0	0	0	0	0
Aug-99	0	0	0	0	0	0	0
Sep-99	0	0	0	0	0	0	0
Recycled (B)		5000					5000
TOTAL:	388	13125	365	581	0	2195	16654

(A) The Headworks Spreading Grounds has not been operated since the early 1980s due to DHS water quality constraints.

(B) Recycled water anticipated to be spread beginning June 1999.

Section 3: Water Quality Monitoring Program Description

All of LADWP's 91 active wells in ULARA are sampled at least once every three years. State regulations require the following types of sampling regimens:

1. Inorganic monitoring
2. Organic monitoring
3. Phase II and V Initial monitoring
4. Radiological monitoring
5. Quarterly Organics monitoring

Every three years, each well is monitored for a full range of inorganic and organic compounds. Phase II and V Initial monitoring involves analysis for newly regulated organic compounds at all wells. Each well must be sampled for four consecutive quarters within a three-year period. Quarterly organics monitoring involves organic compound analysis four times a year for each well where organic compounds have been detected. A complete list of the parameters that must be tested for is contained in Title 22 of the California Code of Regulations.

The 91 wells are divided into clusters each consisting of three to six wells. The clusters are organized in three sampling groups to allow for efficient sample collection. Appendix A contains the most recent TCE, PCE, and nitrate data that are representative of each cluster.

Section 4: Groundwater Treatment Facilities Operations Summary

North Hollywood Operable Unit (NHOU): The NHOU was out of service during November 1998 for six days to repair influent water flowmeter. A summary of facility operations is provided below.

	Aeration Well No.							Average Flow to Facility	Influent to Facility TCE/PCE	Effluent from Facility TCE/PCE
Mon/Yr	2	3	4	5	6	7	8	(gpm)	(in ug/L)	(in ug/L)
4/98	156	293	263	114	284	291	73	1442	75.8/19.5	1.5/ND
5/98	158	290	264	136	285	297	317	1267	63.6/22.6	ND/ND
6/98	159	299	0	137	287	298	316	1520	51.6/13.6	0.9/ND
7/98	157	296	266	134	285	303	311	1508	74/17.1	1.3/0.5
8/98	157	296	268	133	285	288	315	1289	89.9/15.3	2.2/ND
9/98	160	299	269	133	276	296	318	1625	74.7/18	0.97/ND
10/98	141	296	267	128	284	290	312	1632	82.4/13.6	1.0/ND
11/98	150	295	263	126	283	394	312	1667	78.7/16.4	1.0/ND
12/98	152	298	254	131	283	290	311	1698	77.2/16.8	1.0/ND
1/99	154	300	256	140	291	298	318	1607	88.5/16.1	1.6/ND
2/99	135	257	159	94	203	284	224	1530	87.9/14.6	1.4/ND
3/99	154	296	272	102	281	293	313	1809	78.7/14.8	1.4/ND

Section 5: Plans For Facilities Modifications

This section describes any plans for modifications to existing facilities, or plans to construct new facilities in the 1998-99 Water Year, as of the printing of this report (May 1999).

a. Spreading Grounds: There are plans for modifications that would change the capacity of existing spreading grounds in the 1998-99 Water Year. There are plans to maximize the capacity of the Tujunga Spreading Grounds by spreading water constantly and evenly throughout the rainy season.

b. Extraction Wells: The capacity of the existing wells will be modified by the activation of the Pollock Wells. The treatment plant was dedicated in March 1999. There are no plans for modifications that would significantly change the zone of extraction of any existing wells in the 1998-99 Water Year.

c. Groundwater Treatment Facilities:

Pollock Wells Treatment Plant. The Pollock Wells Treatment Plant construction began in April 1997. The project consists of four liquid-phase GAC vessels plus a pumping and chlorination station that will treat 3,000 gpm. The facility became operational in February 1999. The well field has been out-of-service since 1989.

Headworks Well Field Remediation. The Headworks well field was taken out of service in the mid 1980s due to contamination of TCE and PCE. Plans to restore the well field are underway. The present scope of work recommends a groundwater treatment facility be built in the Headworks Spreading Grounds. The facility will treat up to 30 cfs of groundwater supply to remove TCE and PCE contamination and then pump the water back into distribution at the River Supply Conduit (RSC).

An additional alternative treatment technology is being validated during a month long study in the Spring of 1999. The technology consists ofa modified Advanced Oxidation Process (hydrogen peroxide and ozone) system. Present plans call for the construction of three new supply wells and the retrofitting of one existing well by March 2000. A Negative Declaration was certified in August 1998.

The Department purchased 100 pressure transducers with the iutention of dedicating the units to key monitoring wells throughout the basin. These instruments will enhance the understanding of the groundwater system's response to the basin's pumping and spreading activities. To date, 81 transducers have been installed.

Pursuant to the East Valley Water Recycling Project, the Department has completed a 10 mile pipeline and the Balboa Pumping Station to convey recycled water from the Tillman Reclamation Plant to the Hansen Spreading Grounds. Phase I of the EVWRP is a three-year demonstration project that features the delivery of 10,000 acre-feet per year of recycled water at the Hansen Spreading Grounds beginning in mid-1999. The Department installed twelve monitoring wells which will help to monitor groundwater quality and groundwater levels.

In addition the Department installed two monitoring wells upgradient of the Tujunga well field and one upgradient of the Headworks well field and to enhance the characterization of the nature and extent of the contamination near these well fields.

APPENDIX A:
1997-98 Water Quality Sampling Results

Number	Owner Name	Well Name	Well	Date	PCE	TCE	NO3
1	NHE-1	3800E	NH AERATION WELL-001	6/17/98	3.66	240	
2	NHE-2	3810U	NH AERATION WELL-002	1/26/99	5.62	417	36.7
3	NHE-3	3810V	NH AERATION WELL-003	1/26/99	4.54	39.8	33.4
4	NHE-4	3810W	NH AERATION WELL-004	1/26/99	8.56	29	31.6
5	NHE-5	3820H	NH AERATION WELL-005	1/26/99	33.8	35.5	45.2
6	NHE-6	3821J	NH AERATION WELL-006	1/26/99	8.21	18.6	27.7
7	NHE-7	3830P	NH AERATION WELL-007	1/26/99	2.57	34.9	24
8	NHE-8	3831K	NH AERATION WELL-008	1/26/99	43.3	70.4	37.3
9	EW-1	3831H	ERWIN-001	10/22/97	0.72	-99	
10	EW-2	3821G	ERWIN-002	5/4/95	4.3	13.2	
11	EW-3	3831G	ERWIN-003	7/30/96	1.4	24	14.66
12	EW-4	3821F	ERWIN-004	4/7/97	0.6	8.1	4.43
13	EW-6	3821H	ERWIN-006	4/14/98	-99	-99	2.66
14	EW-10	3811F	ERWIN-010	1/15/99	-99	-99	15.4
15	M-5	4840J	MISSION-005	10/14/98	-99	4.71	25.3
16	M-6	4840K	MISSION-006	6/26/97			8.42
17	M-7	4840S	MISSION-007	8/10/98	-99	-99	16.3
18	NH-02	3800	NORTH HOLLYWOOD-002	12/15/98	0.94	9.4	15.73
19	NH-04	3780A	NORTH HOLLYWOOD-004				
20	NH-07	3770	NORTH HOLLYWOOD-007	1/27/99	-99	-99	10.81
21	NH-11	3810	NORTH HOLLYWOOD-011	12/8/97	18.1	51.4	46.07
22	NH-15	3790B	NORTH HOLLYWOOD-015				
23	NH-16	3820D	NORTH HOLLYWOOD-016	5/23/96	12.6	2.7	16.3
24	NH-17	3820C	NORTH HOLLYWOOD-017	12/9/97	6.16	1.65	11.92
25	NH-18	3820B	NORTH HOLLYWOOD-018	12/9/97	5.95	47.8	35.26
26	NH-20	3830C	NORTH HOLLYWOOD-020	10/17/97	2.54	8.2	43.37
27	NH-21	3830B	NORTH HOLLYWOOD-021				
28	NH-22	3790C	NORTH HOLLYWOOD-022	7/20/98	-99	-99	18.92
29	NH-23	3790D	NORTH HOLLYWOOD-023	5/7/98	-99	-99	24.68
30	NH-25	3790F	NORTH HOLLYWOOD-025	1/9/98	-99	-99	19.8
31	NH-26	3790E	NORTH HOLLYWOOD-026	10/14/98	-99	-99	26.45
32	NH-27	3820F	NORTH HOLLYWOOD-027	12/10/97	20.2	12.2	25.65
33	NH-28	3810K	NORTH HOLLYWOOD-028	12/8/97	7.11	16.1	28.66
34	NH-30	3800D	NORTH HOLLYWOOD-030	10/6/98	1.31	16.4	15.86
35	NH-32	3770C	NORTH HOLLYWOOD-032	7/30/97	-99	-99	4.03
36	NH-33	3780C	NORTH HOLLYWOOD-033	1/26/99	-99	-99	6.11
37	NH-34	3790G	NORTH HOLLYWOOD-034	1/26/99	-99	1.62	25.56
38	NH-35	3830N	NORTH HOLLYWOOD-035	12/15/97	1.18	-99	12.09
39	NH-36	3790H	NORTH HOLLYWOOD-036	6/8/98	-99	1.7	17.81
40	NH-37	3790J	NORTH HOLLYWOOD-037	1/28/99	-99	1.3	15.5
41	NH-38	3810M	NORTH HOLLYWOOD-038				
42	NH-39	3810N	NORTH HOLLYWOOD-039				
43	NH-40	3810P	NORTH HOLLYWOOD-040	7/28/95	-99	4.6	
44	NH-41	3810Q	NORTH HOLLYWOOD-041	1/15/98	4.5	123	21.49
45	NH-42	3810R	NORTH HOLLYWOOD-042	1/15/98	4.8	242	29.77
46	NH-43A	3790K	NORTH HOLLYWOOD-043A	6/8/98	-99	-99	19.67
47	NH-44	3790L	NORTH HOLLYWOOD-044	9/1/98	-99	-99	12.94

NOTE: ND = non-detect
— = not tested (refer to p.8)
[shaded box] = above MCL

ULARA WELLS

Number	Owner Name	Well Name	Well	Date	PCE	TCE	NO3
48	NH-45	3790M	NORTH HOLLYWOOD-045	9/1/98	-99	-99	5.05
49	P-4	3959E	POLLOCK-004				
50	P-6	3958H	POLLOCK-006				
51	P-7	3958J	POLLOCK-007				
52	RT-1	4909E	RINALDI-TOLUCA-001	1/25/99	-99	3.1	15.46
53	RT-2	4898A	RINALDI-TOLUCA-002	1/22/99	-99	-99	15.06
54	RT-3	4898B	RINALDI-TOLUCA-003	4/2/98	-99	1.09	
55	RT-4	4898C	RINALDI-TOLUCA-004	1/25/99	-99	0.91	9.97
56	RT-5	4898D	RINALDI-TOLUCA-005	1/25/99	-99	1.33	26.18
57	RT-6	4898E	RINALDI-TOLUCA-006	1/28/99	-99	1.19	
58	RT-7	4898F	RINALDI-TOLUCA-007	10/8/97	-99	0.56	15.37
59	RT-8	4898G	RINALDI-TOLUCA-008	3/4/98	-99	-99	11.08
60	RT-9	4898H	RINALDI-TOLUCA-009	7/14/97	-99	-99	12.23
61	RT-10	4909G	RINALDI-TOLUCA-010	11/16/98	-99	-99	11.61
62	RT-11	4909K	RINALDI-TOLUCA-011	1/26/99	-99	0.72	11.21
63	RT-12	4909H	RINALDI-TOLUCA-012	1/22/99	-99	-99	18.78
64	RT-13	4909J	RINALDI-TOLUCA-013	6/18/98	-99	-99	14.18
65	RT-14	4909L	RINALDI-TOLUCA-014	11/16/98	-99	-99	9.7
66	RT-15	4909M	RINALDI-TOLUCA-015	1/26/99	-99	4.96	8.37
67	TJ-01	4887C	TUJUNGA-001	1/27/99	-99	-99	14.71
68	TJ-02	4887D	TUJUNGA-002	1/22/99	-99	-99	15.99
69	TJ-03	4887E	TUJUNGA-003	1/22/99	-99	1.16	20.91
70	TJ-04	4887F	TUJUNGA-004	1/25/99	0.8	7.07	28.5
71	TJ-05	4887G	TUJUNGA-005	1/25/99	1.48	10.8	37.3
72	TJ-06	4887H	TUJUNGA-006	12/15/98	0.73	-99	40.58
73	TJ-07	4887J	TUJUNGA-007	1/25/99	0.5	4.47	35
74	TJ-08	4887K	TUJUNGA-008	1/27/99	-99	3.97	37
75	TJ-09	4886B	TUJUNGA-009	1/27/99	-99	-99	9.57
76	TJ-10	4886C	TUJUNGA-010	1/27/99	-99	-99	18.25
77	TJ-11	4886D	TUJUNGA-011	7/27/98	1.3	7.1	17.68
78	TJ-12	4886E	TUJUNGA-012	1/27/99	-99	-99	14.88
79	V-1	3863H	VERDUGO-001	1/28/99	-99	8.04	7.18
80	V-2	3863P	VERDUGO-002	8/18/98	-99	33	34.73
80	V-2	3853F	VERDUGO-002	8/18/98	-99	33	26.8
81	V-4	3863J	VERDUGO-004	1/13/98	6.47	17.9	1.916667
82	V-11	3863L	VERDUGO-011	1/15/99	-99	2.57	11.3
83	V-13	3853G	VERDUGO-013				
84	V-24	3844R	VERDUGO-024	1/28/99	-99	-99	2.3
85	WH-4	3821D	WHITNALL-004	1/28/99	1.54	4.28	12.63
86	WH-5	3821E	WHITNALL-005	1/28/99	1.35	5.17	30.43
87	WH-6A	3831J	WHITNALL-006A	1/15/99	-99	3	6.69
88	WH-7	3832K	WHITNALL-007	1/15/99	-99	10.1	8.37
89	WH-8	3832L	WHITNALL-008	10/22/96	4.6	10.2	
90	WH-9	3832M	WHITNALL-009				

NOTE: ND = non-detect

--- = not tested (refer to p.8)

[shaded box] = above MCL

APPENDIX B:
Groundwater Extraction Projections 1998-2003

CITY OF LOS ANGELES PUMPING PROJECTION FOR WY 98-99
(Acre-Feet)
San Fernando Basin

	TOTAL	Oct-98	Nov-98	Dec-98	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99
AERATION	2,190	210	213	192	215	159	202	0	200	200	200	200	200
ERWIN	1,292	134	126	96	29	130	118	110	110	110	110	110	110
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	27,054	2285	2268	889	241	1655	1716	3000	3000	3000	3000	3000	3000
POLLOCK	1047	0	0	0	0	106	41	150	150	150	150	150	150
RINALDI-TOLUCA	44,513	1	1	0	3459	5328	4523	5200	5200	5200	5200	5200	5200
TUJUNGA	33,928	4282	2457	11	2045	2698	2636	3300	3300	3300	3300	3300	3300
VERDUGO	2,086	201	206	148	42	198	212	180	180	180	180	180	180
WHITNALL	4,130	428	418	323	88	379	394	350	350	350	350	350	350
TOTAL:	116,241	7,541	5,689	1,657	6,119	10,650	9,844	12,290	12,490	12,490	12,490	12,490	12,490
Sylmar Basin													
MISSION	3,741	462	452	380	41	337	269	300	300	300	300	300	300
ULARA TOTAL:	119,981	8,004	6,141	2,037	6,160	10,987	10,113	12,590	12,790	12,790	12,790	12,790	12,790

PUMPING PROJECTIONS (AF) BY WELL FIELD
SAN FERNANDO BASIN
WATER YEARS 1999-2000 THROUGH 2002-03

San Femando Basin Well Fields	1999-00	2000-01	2001-02	2002-03
Aeration	1,990	1,990	1,990	1,990
Erwin	1,300	1,300	900	0
Headworks	0	0	0	11,000
N. Hollywood	22,390	24,090	24,350	23,290
Pollock	2,400	2,400	2,400	2,400
Rinaldi-Toluca	50,000	50,000	50,000	46,000
Tujunga	25,000	25,000	25,000	25,000
Verdugo	2,100	2,100	2,100	0
Whitnall	2,500	2,500	2,500	0
Total S.F.B	107,680	109,380	109,240	109,680
SYLMAR BASIN				
Mission	3,492	3,492	3,492	3,492

APPENDIX B

CITY OF BURBANK

PUMPING AND SPREADING PLAN

1998-2003 Water Years

GROUNDWATER PUMPING PLANT

AND

SPREADING PLAN

WATER YEAR
OCTOBER 1, 1998 TO SEPTEMBER 30, 2003

Prepared by

PUBLIC SERVICE DEPARTMENT
WATER DIVISION
CITY OF BURBANK

MAY 1999

JWL:AP:RBD:jg
jg:\LANTZ\Groundwater 98-03.doc

TABLE OF CONTENTS

TABLES

FIGURE

APPENDIX

I. INTRODUCTION

The groundwater rights of the City of Burbank are defined by the JUDGEMENT in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et. al., Defendants". The Final Judgement was signed on January 26, 1979.

In 1993, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Section 2.9, Groundwater Quality Management. This addition has been made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup and limiting the spread of contamination in the San Fernando Valley. This report is in response to Section 2.9.4, Groundwater Pumping and Spreading Plan.

The Groundwater Pumping and Spreading Plan is based on the water year, October 1 to September 30. The Draft Plan for Burbank will be submitted in May to the Watermaster for the current water year.

II. WATER DEMAND

The annual total water demand for the last ten years and the projected annual water demand for the next five years is shown in Table 2.1.

Water demand during 1990 to 1993 was affected by drought conditions in California. The City of Burbank imposed mandatory conservation from April, 1991 to April, 1992. Voluntary conservation was in effect prior to, and since, this period. Significant "hard conservation" in the form of retrofit showerheads and ultra-low flush toilet installations has been made.

Projected water demands for the next five years is expected to increase only slightly from the 1989-90 base year. The increase is not from residential growth, but as a rebound from the drought conditions and re-establishment of commercial-industrial demand. The projected water demand may vary significantly due to weather conditions, economic conditions and/or social conditions in the Burbank area. A variance of $\pm 5\%$ can be expected.

III. WATER SUPPLY

The water supply for the City of Burbank is composed of purchased water from the Metropolitan Water District of Southern California (MWD), locally produced and treated groundwater, and reclaimed water from the Burbank Water Reclamation Plant.

A. MWD

The amount of treated water purchased from the MWD has been reduced as the result of bringing several water resource projects on line. Burbank may purchase additional quantities of untreated water for basin replenishment. See

Section IV. Historic and projected use of MWD water is shown in Table 3.1

B. GAC TREATMENT PLANT

The City placed a granular activated carbon (GAC) Treatment Plant in service in November 1992. Historic and proposed production from this plant is shown in Table 3.2. The GAC Treatment Plant will be taken out of service periodically for carbon change-out of the contactors. Mechanical maintenance will be performed when the plant is out of service. The GAC Treatment Plant uses the groundwater production of Well No. 7 and Well No. 15.

C. EPA CONSENT DECREE

The EPA Consent Decree project became operational January 3, 1996. The source of water is wells operated by Lockheed Martin. Consent Decree II was entered on June 22, 1998. The plant was shut down from December 15, 1997 to December 13, 1998. The anticipated plant capacity is 9,000 gpm. Projected use of EPA Consent Decree water produced by Lockheed Martin is shown in Table 3.3.

D. RECLAIMED WATER

The City has used reclaimed water for its power plant cooling since 1967. An expansion of the reclaimed water system was completed in 1996. Historic and proposed use of reclaimed water is shown in Table 3.4.

E. PRODUCTION WELLS

The City has six wells that are mechanically and electrically operable. Three wells are on “Active” status and three are on "Inactive" status with the DHS. Four others have had equipment pulled. We do not plan to operate the inactive wells unless an emergency develops in the 1998-99 water year. Lockheed Martin will utilize the capacity of Wells No. 7 and 15 to augment the wells in the basin to deliver an average of 9,000 gpm. Lockheed Martin will pay operation and maintenance cost of the GAC.

Active Wells	Inactive Wells		Well Casings	
No. 7	No. 6	No. 13A	No. 11	No. 14
No. 15	No. 18*		No. 12	No. 17
No. 10 (V08)				

*No transformer, cannot be operated.

IV. JUDGEMENT CONSIDERATIONS

A. PHYSICAL SOLUTION

The City has a physical solution right of 4,200 acre-feet per year in addition to its extraction rights and use of stored water credits. The City will charge the following physical solution right holders for water used and claim the extractions against the City's rights:

Physical Solution Producers	
Valhalla	300 Acre-feet
Lockheed	25 Acre-feet

Table 3.3 lists the past and projected extractions by Lockheed. Table 4.1 lists the past and projected extractions by Valhalla.

Walt Disney Imagineering is pumping groundwater for dewatering during construction of their Riverside office building. Extractions are projected to be

2,750 acre-feet for Water Year 1998-99. Table 4.2 lists the extractions by Disney.

B. STORED WATER CREDIT

The City has a stored water credit of 57,543 acre-feet as of October 1, 1998.

C. ALLOWANCE FOR PUMPING

The extraction right for the 1998-99 water year is 4,489 acre-feet. This amount is exclusive of additional extractions allowed due to the City's stored water credits, physical solution right or pumping for groundwater clean-up. Estimated allowable future pumping, based on 20,000 acre-feet of delivered water, will be 4,000 acre-feet per year.

D. SPREADING OPERATIONS

The City has purchased water for basin replenishment since 1989. The water has been typically spread at the Pacoima Spreading Grounds by L.A. County Public Works Department with the assistance of the L.A.D.W.P. The L.A.D.W.P. water pipelines to the Pacoima Spreading Ground were damaged during the 1994 Northridge earthquake. Replenishment water, beginning in water year 1994-95, has been taken "in lieu" through the L.A. Treatment Plant. The historic and projected spreading water is shown in Table 4.3.

V. CAPITAL IMPROVEMENTS

A. WELLS

BURBANK

No capital improvements or modifications are planned for the Burbank water wells. We plan to continue the use of Well No. 7 and No. 15 for the GAC Treatment Plant.

MAINTENANCE ACTIVITY

Well Nos. 17 and 18. Both of these wells will be abandoned in accordance with County standards. All above-ground equipment will be removed and the casings filled and sealed.

Well No. 10. Lockheed Martin provided new pumping equipment and connection to the treatment plant for Phase II of the Burbank Consent Decree during Water Year 1998/99. The well produces approximately 1,500 GPM with a drawdown of about 20 feet. The well was placed into active production status on May 1, 1998.

LOCKHEED-MARTIN

Lockheed operates eight wells for the production capability of the EPA Consent Decree Project. See Figure 5.1. The well field will produce from 3,000 GPM to 9,000 GPM during water year 1998/99. An additional well (Burbank No. 10/Lockheed WP-180) became operable on January 20, 1998. Production capacity of the Lockheed Martin facilities will become a nominal 9,000 GPM. Lockheed Martin will perform normal operating well maintenance.

B. GROUNDWATER TREATMENT FACILITIES

EPA PROJECT

The EPA Consent Decree Project became fully operational on January 3, 1996. Production and treatment of 3,000 GPM to 8,000 GPM was performed through mid-September 1996. Burbank plans to use the production and treatment facilities of the EPA Project at flow rates from 3,000 GPM to 9,000 GPM during the 1998/99 Water Year.

The EPA Consent Decree Project was removed from production on December 15, 1997 for plant modifications required under Consent Decree II. Due to problems in obtaining a new operating permit from the Department of Health Services, the treatment plant did not resume operations until December 1998. Only testing water was produced during the outage.

GAC TREATMENT PLANT

Burbank plans to use the production and GAC Treatment Plant at the following flow rates during the 1998/99 Water Year:

October	- December	1,800 GPM
January	- May	0 GPM
June	- September	1,800 GPM

The plant will be operated in the parallel configuration.

TABLE 2.1
FIVE-YEAR PROJECTED WATER DEMAND

WATER YEAR	ACRE-FEET
88-89	23,863
89-90	23,053
90-91	20,269
91-92	20,930
92-93	21,839
93-94	24,175
94-95	22,541
95-96	23,124
96-97	24,888
97-98	22,447
98-99*	23,843
99-00*	24,645
00-01*	24,346
01-02*	24,549
02-03*	24,682

* Projected

NOTE:

(1) Water demand equals the total delivered water. (Extractions (GAC & EPA), MWD, Reclaimed, Valhalla extractions).

(2) The last five year average water demand was 23,435 acre-feet.

TABLE 3.1
FIVE-YEAR PROJECTED USE OF MWD TREATED WATER

WATER YEAR	ACRE-FEET
88-89	22,936
89-90	22,397
90-91	17,773
91-92	18,830
92-93	18,005
93-94	18,074
94-95	17,173
95-96	12,937
96-97	10,525
97-98	16,972
98-99*	12,443
99-00*	11,881
00-01*	7,029
01-02*	7,224
02-03*	7,357

* Projected

NOTES:

(1) All values shown above are for treated water.

TABLE 3.2
FIVE-YEAR PROJECTED USE OF GAC TREATED WATER

WATER YEAR	ACRE-FEET
92-93	1,205
93-94	2,395
94-95	2,590
95-96	2,295
96-97	1,620
97-98	1,348
98-99*	1,500
99-00*	1,000
00-01*	1,000
01-02*	1,000
02-03*	1,000

* Projected

NOTES:

(1) The GAC Treatment Plant has a treatment capacity of 2,000 GPM.

(2) Wells No. 7 and No. 15 are the source of supply for the GAC Treatment Plant. Proposed production rates are as follows:

Well No. 7 1050 GPM
Well No. 15 850 GPM

(3) GAC Treatment Plant production was reduced beginning in water year 1996-97 to accept the required flows from the EPA Consent Decree project.

TABLE 3.3
FIVE-YEAR PROJECTED EXTRACTIONS OF GROUNDWATER BY LOCKHEED

WATER YEAR	ACRE-FEET
93-94	803 (3)
94-95	462 (6)
95-96	5,737 (6)
96-97	9,280
97-98	2,102
98-99*	7,600
99-00*	9,464
00-01*	14,517
01-02*	14,525
02-03*	14,525

* Projected

NOTES:

(1) Burbank includes extractions by Lockheed in its pumping rights.

(2) Lockheed has Physical Solution right of 25 AF/year.

(3) Lockheed stopped its operation of the Aqua Detox Treatment System in June 1994. (BOU378 + AD450 - 25) = 803

(4) Re-injected water has been excluded from the above values.

(5) During the water years 1993-94, 1994-95 and 1995-96 Lockheed-Martin produced water for testing of the EPA Consent Decree Project. See Appendix C.

1993-94	378 Acre-feet	1996-97	320 Acre-feet
1994-95	462 Acre-feet	1997-98	477.5 Acre-feet
1995-96	34 Acre-feet, Dec thru Oct		

The Watermaster will not charge Burbank for these amounts.

(6) Beginning January of water year 1995-96, all extractions are treated for VOC removal and beneficially used by Burbank. GAC flushing and treatment bypass will be accounted for separately.

(7) The City of Burbank is currently using water from Lockheed under an Interim Operation Permit from the California Department of Health Services.

TABLE 3.4
FIVE-YEAR PROJECTED USE OF RECLAIMED WATER

WATER YEAR	ACRE-FEET
88-89	927
89-90	656
90-91	1,234
91-92	2,100
92-93	2,629
93-94	3,706
94-95	2,480
95-96	1,880
96-97	3,120
97-98	1,744
98-99*	2,000
99-00*	2,000
00-01*	1,500
01-02*	1,500
02-03*	1,500

* Projected

NOTES:

(1) The source of reclaimed water is the Burbank Water Reclamation Plant.

(2) The Upper and Lower landfill areas were provided reclaimed water service in water year 1994-95.

(3) The DeBell Golf Course and Par-3 Course were provided reclaimed water service in water year 1995-96. McCambridge Park landscaping was added to the reclaimed water system in 1996-97.

(3) The Burbank Nature Center was provided reclaimed water service in water year 1998-99.

(5) The PSD Power Plant reduced its reclaimed water use beginning water year 1996-97 to 7/12 of the prior amounts. It will be reduced to 5/12 in water year 1999-2000 and to 3/12 in water year 2000-01.

TABLE 4.1
FIVE-YEAR PROJECTED EXTRACTIONS OF GROUNDWATER BY VALHALLA

WATER YEAR	ACRE-FEET
89-90	293
90-91	239
91-92	376
92-93	391
93-94	391
94-95	298
95-96	339
96-97	300
97-98	281
98-99*	300
99-00*	300
00-01*	300
01-02*	300
02-03*	300

* Projected

NOTES:

(1) Burbank includes extractions by Valhalla in its pumping rights.

(2) Valhalla has Physical Solution right of 300 AF/year.

TABLE 4.2
EXTRACTION OF GROUNDWATER BY DISNEY

WATER YEAR	ACRE-FEET
98-99*	2,750

* Projected

NOTES:

(1) 359.85 acre-feet extraction charged to L.A.D.W.P. in Water Year 1998-99 not shown in the above total.

TABLE 4.3
FIVE-YEAR PROJECTED BURBANK SPREADING OPERATIONS

WATER YEAR	ACRE-FEET
88-89	0
89-90	378 (1)
90-91	504 (1)
91-92	503 (1)
92-93	500 (2)
93-94	0 (3)
94-95	4,200 (4)
95-96	2,000 (4)
96-97	1,500 (4)
97-98	0
98-99*	0
99-00*	0
00-01*	0
01-02*	0
02-03*	1,000

* Projected

NOTES:

(1) MWD water spread at the Pacoima Spreading Grounds.

(2) MWD water taken at the Los Angeles Treatment Plant (LA-35). In-lieu credit to Burbank by the L.A.D.W.P.

(3) The Maclay pipeline was damaged in the 1994 Northridge earthquake. Deliveries to the Pacoima Spreading Grounds are precluded until repaired by the L.A.D.W.P.

(4) The City exercised its Physical Solution right in water years 1994-95, 1995-96, and 1996-97 for basin replenishment.

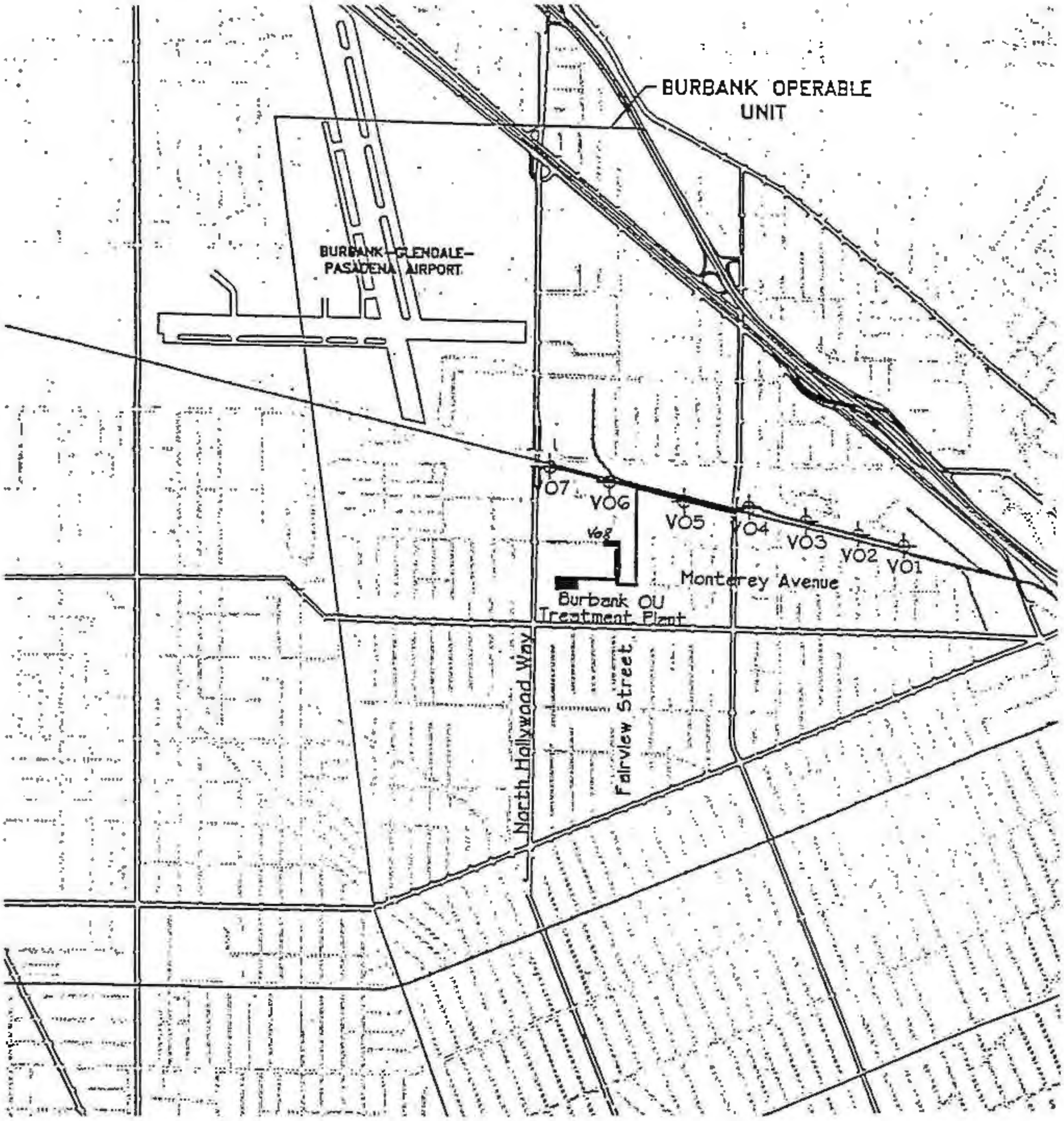


FIGURE 5.1
EPA PHASE II EXTRACTION WELLS

APPENDIX A

WATER QUALITY DATA

The 1998 Annual Water Quality Report is attached for information. Water Quality monitoring and testing of supply sources is not included with this report.

CITY OF BURBANK 1998 WATER QUALITY TABLE (a)

	State MCL	Federal MCLG (State PHG)	IMPORTED WATER: Weymouth Plant	IMPORTED WATER: Jensen Plant	LOCAL GROUNDWATER: Valley Plant	LOCAL GROUNDWATER: GAC Plant	Overall Range
PRIMARY STANDARDS—Mandatory Health-Related Standards							
MICROBIOLOGICAL (b)							
Total Coliform	5.0%	0	Percent of Positive Samples = 0.33%				0 - 2.1%
Fecal Coliform/ E. coli	(b)	0	No Acute Violations				ND
ORGANIC CHEMICALS (mg/L)							
Disinfection By-products							
Haloacetic Acids	NS	NS	0.02	0.02	NA	NA	0.01 - 0.03
Total Trihalomethanes (THMs) (c)	0.10	NS	Distribution System Average = 0.05				0.02 - 0.07
INORGANIC CHEMICALS (mg/L)							
Aluminum	1(#0.2)	NS	0.13	0.05	NA	NA	0.03 - 0.21
Arsenic	0.05	NS	0.002	0.002	NA	NA	0.001 - 0.003
Barium	1	2	0.085	0.027	NA	NA	0.026 - 0.089
Chromium	0.05	0.1	ND	ND	0.011	0.009	ND - 0.016
Copper	(l) (#1.0)	(0.17)	ND	ND	NA	NA	ND - 0.013
Fluoride (d)	1.4-2.4	(1.0)	0.20	0.24	NA	NA	0.18 - 0.35
Nickel	0.1	NS	0.002	ND	NA	ND	ND - 0.002
Nitrate (as N)	10 (e)	(10)	0.22	0.48	6.04	NA	0.14 - 6.49
Nitrate + Nitrite (as N)	10	(10)	0.22	0.48	NA	NA	0.14 - 6.47
RADIONUCLIDES (pCi/L) Analyzed every four years; data based on latest tests							
Gross Alpha	15	NS	6.6	3.0	2.51	7.0	ND - 9.2
Gross Beta	50	NS	6.8	5.7	5.02	5.7	ND - 10.3
Radium-226 (f)	5	NS	ND	1.0	0.85	NA	ND - 2.9
Radium-228 (f)	5	NS	1.0	ND	NA	NA	ND - 1.6
Radon-222	NS	NS	ND	ND	NA	NA	ND - 91
Strontium-90	8	NS	ND	ND	0.22	NA	ND - 2.0
Tritium	20,000	NS	ND	ND	NA	NA	ND
Uranium	20	NS	4.9	2.3	6.03	4.5	ND - 8.38

THE FOLLOWING CONSTITUENTS WERE TESTED AND NOT DETECTED

ORGANIC CHEMICALS

Pesticides/PCBs

2,4-D; Carbofuran; Diquat; Heptachlor; Oxamyl; Thiobencarb; 2,4,5-TP (Silvex); Chlordane; Endothall; Heptachlor epoxide; Pentachlorophenol; Toxaphene; Alachlor; Dalapon; Endrin; Lindane; Picloram; Atrazine; Dibromochloropropane (DBCP); Ethylene Dibromide (EDB); Methoxychlor; Polychlorinated Biphenyls (PCB); Bentazon; Dinoseb; Glyphosate; Molinate; Simazine

Volatile Organic Compounds

Benzene; 1,2-Dichloroethane; 1,2-Dichloropropane; 1,1,2,2-Tetrachloroethane; 1,1,1-Trichloroethane; Carbon Tetrachloride; 1,1-Dichloroethylene; 1,3-Dichloropropene; Tetrachloroethylene; 1,1,2-Trichloroethane; 1,2-Dichlorobenzene; cis-1,2-Dichloroethylene; Ethylbenzene; Toluene; Trichlorofluoromethane; 1,4-Dichlorobenzene; trans-1,2-Dichloroethylene; Monochlorobenzene; 1,2,4-Trichlorobenzene; 1,1,2-Trichloro-1,2,2-trifluoroethane; 1,1-Dichloroethane; Dichloromethane; Styrene; Trichloroethylene (TCE); Vinyl chloride

Semi-Volatile Organic Compounds

Benzo(a)pyrene; Di(2-ethylhexyl) phthalate; Hexachlorocyclopentadiene; Di(2-ethylhexyl) adipate; Hexachlorobenzene; 2,3,7,8-TCDD (Dioxin)

INORGANIC CHEMICALS (mg/L)

Antimony; Beryllium; Cyanide; Mercury; Selenium; Asbestos; Cadmium; Lead; Nitrite (as N); Thallium

	State MCL	Federal MCLG (State PHG)	Weymouth Plant	Jensen Plant	Valley Plant	GAC Plant	Overall Range
SECONDARY STANDARDS—Aesthetic Standards							
CHEMICAL PARAMETERS							
Chloride (mg/L)	**250	NS	76	49	NA	NA	44 - 86
Color (units)	15	NS	2	2	NA	NA	1 - 3
Corrosivity	noncorrosive	NS	(g)	(g)	NA	NA	(g)
Odor Threshold (units)	3	NS	(h)	(h)	NA	NA	(h)
pH (units)	NS	NS	8.06	8.29	NA	NA	8.01 - 8.31
Specific Conductance (µmho/cm)	**900	NS	883	518	NA	NA	493 - 995
Sulfate (mg/L)	**250	NS	210	81	NA	NA	71 - 250
Total Dissolved Solids (mg/L)	**500	NS	542	302	NA	NA	264 - 622
Turbidity (NTU)	5	NS	0.07	0.05	NA	NA	0.05 - 0.08

THE FOLLOWING WERE TESTED AND NOT DETECTED: (mg/l)

Iron; Manganese; MBAS (Foaming Agents); Methyl tert-butyl-ether (MTBE); Silver; Zinc

	State MCL	Federal MCLG (State PHG)	Weymouth Plant	Jensen Plant	Valley Plant	GAC Plant	Overall Range
ADDITIONAL PARAMETERS							
Alkalinity as $CaCO_3$ (mg/L)	NS	NS	115	94	NA	NA	86 - 124
Calcium (mg/L)	NS	NS	64	34	NA	NA	31 - 75
Hardness as $CaCO_3$ (mg/L) (k)	NS	NS	260	146	NA	NA	130 - 301
Heterotrophic Plate Count (CFU/mL) (i)	NS	NS	<1	<1	NA	NA	<1 - 130
Magnesium (mg/L)	NS	NS	24.5	14.5	NA	NA	10.5 - 28
Perchlorate (µg/L) (m)	NS	NS	4	ND	NA	NA	ND - 6
Potassium (mg/L)	NS	NS	4	2.8	NA	NA	2.7 - 4.6
Sodium (mg/L)	NS	NS	82	46	NA	NA	44 - 93
Total Organic Carbon (mg/L)	NS	NS	2.33	2.45	NA	NA	2.15 - 2.64

FOOTNOTES AND ABBREVIATIONS

(a) Data shown are annual averages and ranges.
(b) Total coliform MCLs are based on distribution system monthly sampling averages. No more than 5.0% of the monthly samples may be total coliform positive. For 1998, 1,206 samples were analyzed with no MCL violations.
(c) Compliance is based on a running annual average of 4 quarterly distribution system samples, which was 0.050 mg/L for 1998.
(d) State MCL is dependent upon air temperature.
(e) State MCL is 45 mg/L as Nitrate, which equals 10.16 mg/l as N.
(f) Standards are for Radium-226 and -228 combined.
(g) Corrosivity is measured by the Langelier Stability Index. A positive index, indicating non-corrosivity, was maintained at the plant effluents.
(h) MWD has developed a flavor-profile analysis method that can more accurately detect odor occurrences.
(i) Pour plate technique, 48-hour incubation at 35°C, monthly averages.
(j) Data is for blended water.
(k) Hardness conversion: 17.1 mg/L = 1 grains/gallon.
(l) The Federal and State standard for lead and copper are treatment techniques requiring agencies to optimize corrosion control.
(m) The State Action Level is 0.018 mg/L.

MWD = Metropolitan Water District of Southern California
MCL = Maximum Contaminant Level
NA = Not Analyzed
ND = None Detected. Detection limits available upon request
NS = No Standard
NTU = Nephelometric Turbidity Units: a measure of the suspended material in water
mg/L = milligrams per liter (parts per million)
pCi/L = picoCuries per liter
CFU/mL = colony forming units per milliliter
µmho/cm = micromhos per centimeter
** = recommended level
# = secondary standard

The Federal and State standards for acrylamide and epichlorohydrin are treatment techniques with which MWD complies.

APPENDIX B

WATER TREATMENT FACILITIES

LAKE STREET GAC TREATMENT PLANT

320 LAKE STREET
BURBANK CA 91503

OPERATOR:

CITY OF BURBANK
PUBLIC SERVICE DEPARTMENT, WATER DIVISION

ALBERT LOPEZ, WATER PRODUCTION/OPERATIONS SUPERINTENDENT

QUANTITY TREATED (10/1/97 THROUGH 10/1/98):

1,348 Acre-Feet

WATER QUALITY:

Contaminant VOC'S: TCE, PCE, 1,2-DCE, 1,2-DCA

DISPOSAL:

Burbank Water System
Potable Water

EPA CONSENT DECREE PROJECT

2030 N. HOLLYWOOD WAY
BURBANK CA 91505

OPERATOR:

CITY OF BURBANK
PUBLIC SERVICE DEPARTMENT, WATER DIVISION

ALBERT LOPEZ, WATER PRODUCTION/OPERATIONS SUPERINTENDENT

QUANTITY TREATED (10/1/97 THROUGH 10/1/98):

2,102 ACRE-FEET FOR DOMESTIC USE.

WATER QUALITY:

CONTAMINANTS: VOCs, NITRATE, CHROMIUM

DISPOSAL:

(1) TEST WATER - WASTE

(2) BURBANK WATER SYSTEM
Potable water after blending

CITY OF BURBANK
PUBLIC SERVICES DEPARTMENT
WATER DIVISION

BURBANK'S STORED GROUNDWATER

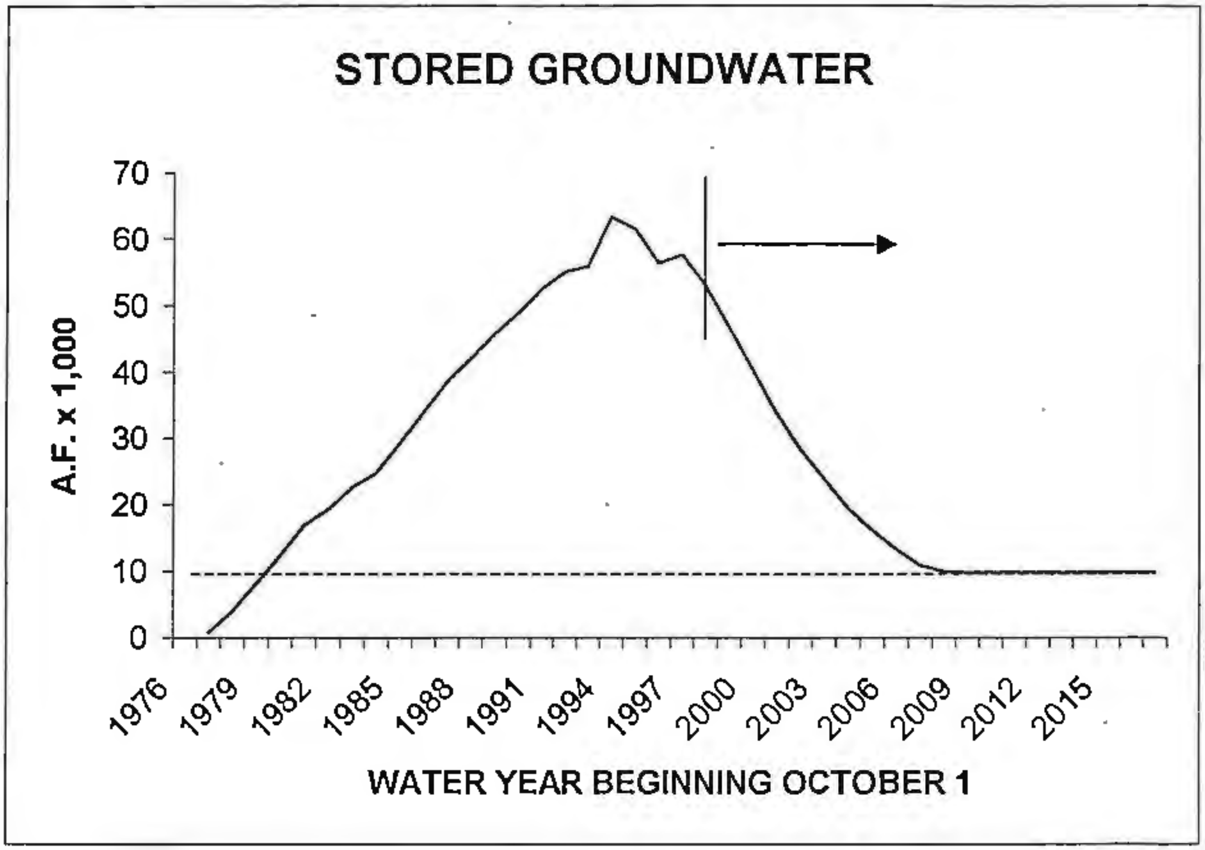
1976/77 - 2017/18

WATER YEAR	DELIVERED WATER AF	RETURN FLOW CREDIT AF	SPREAD WATER AF	PUMPED GROUNDWATER AF	STORED WATER CREDIT AF
1976-77	22,743	4,549			
1977-78	22,513	4,503		3,767	(1) 782
1978-79	24,234	4,847		1,358	(2) 3,947
1979-80	24,184	4,837		677	8,117
1980-81	25,202	5,040		595	12,359
1981-82	22,120	4,424		523	16,876
1982-83	22,118	4,424		2,002	19,298
1983-84	24,927	4,985		1,063	22,659
1984-85	23,641	4,728		2,863	24,781
1985-86	23,180	4,636		123	29,386
1986-87	23,649	4,730		0	34,022
1987-88	23,712	4,742		253	38,498
1988-89	23,863	4,773		1,213	42,027
1989-90	23,053	4,611	378	1,401	45,777
1990-91	20,270	4,054	504	2,032	48,860
1991-92	20,930	4,186	503	938	52,479
1992-93	21,839	4,368	500	* 2,184	54,981
1993-94	24,566	4,913	0	* 3,539	55,810
1994-95	22,541	4,508	5,380	2,888	63,215
1995-96	23,124	4,625	2,000	8,308	61,415
1996-97	24,888	4,977	1,500	11,243	56,297
1997-98	22,447	4,489	0	3,731	57,543
1998-99	23,000	4,600	0	9,000	53,032
1999-2000	23,000	4,600	0	11,000	46,632
2000-01	23,000	4,600	0	11,000	40,232
2001-02	23,000	4,600	0	11,000	33,832
2002-03	23,000	4,600	1,000	11,000	28,432
2003-04	23,000	4,600	2,000	11,000	24,032
2004-05	23,000	4,600	2,000	11,000	19,632
2005-06	23,000	4,600	3,000	11,000	16,232
2006-07	23,000	4,600	3,500	11,000	13,332
2007-08	23,000	4,600	4,000	11,000	10,932
2008-09	23,000	4,600	5,500	11,000	10,032
2009-10	23,000	4,600	6,200	11,000	9,832
2010-11	23,000	4,600	6,400	11,000	9,832
2011-12	23,000	4,600	6,400	11,000	9,832
2012-13	23,000	4,600	6,400	11,000	9,832
2013-14	23,000	4,600	6,400	11,000	9,832
2014-15	23,000	4,600	6,400	11,000	9,832
2015-16	23,000	4,600	6,400	11,000	9,832
2016-17	23,000	4,600	6,400	11,000	9,832
2017-18	23,000	4,600	6,400	11,000	9,832

NOTES: SHADED AREAS OF TABLE ARE PROJECTED VALUES .

(1) STORED WATER AS OF OCTOBER 1, 1978.
(2) STORED WATER AS OF OCTOBER 1, 1979.
COLUMNS (1) THROUGH (5) - FROM ULARA WATERMASTER
REPORTS - SFB EXTRACTION RIGHTS AND STORED WATER TABLES
COLUMN (2) = 20% OF COL. (1)
COLUMN (5) = COL.(2) PREV. YR. - COL.(4) CUR. YR. + COL.(5) PREV. YR. + COL.(3) CUR. YR.
COLUMN (5) = EXTRACTIONS OF NEXT YEAR
PUMPED GROUNDWATER INCLUDES VALHALLA, LOCKHEED, & DISNEY.
*EXCLUDES 150 A.F. OF PUMPING FOR TESTING.

Grdwtr.xls 6/8/99



NOTES:

- 10,000 AF RECOMMENDED AS BASIN BALANCE. THIS EQUATES TO ABOUT ONE YEAR OF DOMESTIC SYSTEM PRODUCTION IF REPLENISHMENT NOT AVAILABLE FROM MWD
- DRAW DOWN STORED WATER BY FULL RETURN FLOW CREDIT OF PRIOR YEARS (~4,600 AF) PLUS PRODUCTION BALANCE (~4,400AF)
- GROUNDWATER PRODUCTION EQUALS GAC (~1,000 AF), EPA (~9,000AF) AND VALHALLA (~300 AF)
- ADDITIONAL SPREADING WATER WILL BE NEEDED BEGINNING 2004 TO MAINTAIN BASIN BALANCE.

APPENDIX C

CITY OF GLENDALE

PUMPING AND SPREADING PLAN

1998-2003 Water Years

GROUNDWATER PUMPING
AND
SPREADING PLAN

WATER YEAR
October 1, 1998 to September 30, 2003

Prepared By
GLENDALE WATER & POWER

DECEMBER 1998

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The City of Glendale has developed a plan to reduce the City's dependence on imported water supplies from northern California and the Colorado River via the Metropolitan Water District (Metropolitan) by using more local resources. This trend in local water resource development is occurring throughout the southern California water community.

Fundamentally, it is imprudent for a city of 193,500 people to be almost totally dependent on water supplies (85 percent of demands) originating hundreds of miles away that Glendale has little control over. The purpose of this document is to discuss the City's Water Resource Plan designed to develop more local water resources. The implementation of this plan will cost about $50 million. Of this amount, $25 million has been spent by the City with another $25 million by the industry group responsible for contaminating the Glendale's water supplies.

This report discusses existing water supplies available to Glendale, future water demands in Glendale, and alternative sources of local water available to reduce dependence on imported water. This information is needed by a wide group of individuals and organizations including Glendale's City Manager and Council Members, regulatory agencies, and others interested in Glendale's water resource future.

EXISTING WATER SOURCES

The City has four sources of water available to meet demands. Each of these sources is described below, as well as the quantity of water available. The location of these sources is shown in Figure 1. Over the past 10-years, there has been a significant change in the mix of supplies used to meet water demands in the City. These changes are discussed in the next section of this report.

San Fernando Basin - The City's right to San Fernando Basin supplies is defined in "The City of Los Angeles vs. The City of San Fernando, et. al. (1979) (Judgement) and consists of a return flow credit, which is a water right. Additionally, there is a secondary right to produce additional water subject to a payment obligation to the City of Los Angeles based primarily on the cost of Metropolitan supplies. This right to produce water in excess of the return flow credit is a significant factor in relation to the proposed U. S. Environmental Protection Agency (EPA) Superfund treatment facility in Glendale, discussed later in this report. The various San Fernando Basin supplies are:

Return Flow Credit - Glendale is entitled to a return flow credit of 20 percent of all delivered water (including recycled water) in the San Fernando Basin and its tributary hill and mountain area. It is calculated by determining the amount of total water used in the City less 105 percent of total sales by Glendale to Verdugo Basin and its tributary hills. This credit ranges from about 5,000 acre-feet per year (AFY) to 5,400 AFY depending on actual water use. This is the City's primary water right in the San Fernando Basin.

Physical Solution Water - Glendale has limited rights to extract water chargeable to the rights of the City of Los Angeles upon payment of specified charges generally tied to Metropolitan's water rates. Glendale's physical solution right is 5,500 AFY.

Pumping for Groundwater Cleanup - Section 2.5 of the Upper Los Angeles River Area's Policies and Procedures, dated July, 1993, provides for the unlimited extraction of basin water for SUPERFUND activities, subject to payment of specified charges similar to physical solution water. This right will be a significant factor with the proposed EPA treatment facility.

Carry-Over Extractions - In addition to current extractions of return flow water and stored water (discussed later), Glendale may, in any one year, extract from the San Fernando Basin an amount not to exceed ten percent (10%) of its last annual credit for import return water, subject to an obligation to replace such over-extraction by reduced extraction during the next water year. This provides an important year-to-year flexibility in meeting water demands.

For the San Fernando Basin, the rights describe above give the City the right to extract from a practical point of view, subject to certain conditions and payment in some cases, any quantity of water anticipated to be needed for the City's future water resource program. Each water right used to produce from the San Fernando Basin has its own costs and availability.

Verdugo Basin - The Judgement described above gave Glendale the right to extract 3,856 AFY from the Verdugo Basin. Crescenta Valley Water District also has water rights and is the only other entity allowed to extract water from the Verdugo Basin.

Metropolitan Water District - As a member agency of the Metropolitan Water District, Glendale has the right to purchase, without limitation, but subject to supply availability and cost factors, any amount of water. The Metropolitan water delivered to Glendale is delivered through three service connections. The service connection number and capacity are summarized in Table 1.

TABLE 1 METROPOLITAN CONNECTIONS AND CAPACITY	
Service Connection Number	Capacity (cfs)
G-1	48
G-2	10
G-3	12

Recycled Water - The City has been delivering recycled water from the Los Angeles/Glendale Water Reclamation Plant (LAGWRP) since the late 1970's. The first deliveries of recycled water were to the Glendale Power Plant for use in the cooling towers and to Caltrans for irrigation of a portion of Route 134 Freeway. In 1992, the City began delivering recycled water for irrigation purposes to Forest Lawn Memorial Park. The total delivery to these existing users was about 1,250 AFY in 1998. By the end of 1998, recycled water was served to thirty-seven (37) service connections. These include two (2) golf courses, a landfill, six (6) park sites, two (2) high schools, one (1) elementary school and other irrigation areas. Also, two (2) high rise buildings and a college are dual plumbed for using recycled water for sanitary flushing purposes. To the extent recycled water is used, there is a corresponding reduction in the amount of water purchased from Metropolitan. The capacity of LAGWRP is 20 MGD with indefinite plans for expansion to 50 MGD, and Glendale is entitled to 50 percent of any effluent produced at the plant.

Summary of Supplies - The current use of local resources available to the City is substantially less than rights primarily because of water quality problems (discussed later herein). A general summary of the City's rights to local water resources compared to the amount currently being used is shown on Table 2.

TABLE 2 LOCAL WATER USE (AFY)			
Potential Source	Right	Current Use	Future Use
San Fernando Basin[1]	5,000-5,400	100 AFY	5,000
Verdugo Basin	3,856	2,500 AFY	3,856
Recycled Water	10,000	900 AFY	3,000

In order to develop the "Potential Future Use," significant capital expenditures are required primarily for water treatment, extraction, and distribution facilities.

(1) Return flow credit only.

PAST WATER USE TRENDS

The water quality problems in the San Fernando and Verdugo Basins and ground water levels in the Verdugo Basin have severely impacted the ability of the City to produce water from the Basins. Glendale has not been able to fully utilize its rights to these water supplies for many years. The U. S. Environmental Protection Agency (EPA) has designated the San Fernando Basin as a Superfund site and will begin clean-up operations in Glendale within the next two years.

The City currently has three active production wells in the Verdugo Basin (Glorietta Wells). The Grandview Wells in the San Fernando Basin have been essentially abandoned because some wells were installed prior to 1920 and need replacement.

Historically, the City used ground water to meet a varying portion of its water demand. In the 1940's and 1950's essentially all of the City's water needs were obtained from the San Fernando and the Verdugo Basins with limited supplies from Metropolitan. In the 1960's, production from the San Fernando Basin reached a peak of about 17,000 acre-feet per year (AFY). The Grandview well water collection system in the San Fernando Basin and the Grandview Pumping Plant has a peak capacity of about 24,000 gpm (34.6 million gallons per day-MGD) to pump San Fernando Basin water supplies into the potable water system.

In the mid-1970's, the City limited production from the San Fernando Basin to about 12,000 AFY as part of a court decree arising from a lawsuit by the City of Los Angeles. In 1975, the California Supreme Court judgement in the City of Los Angeles vs. the City of San Fernando further limited the City's production right. The current right is about 5,000 to 5,400 AFY based on a return flow credit right and water use.

Other limitations to ground water use occurred in the late 1970's, when production from the Verdugo Pick-up System in the Verdugo Basin was discontinued because of possible water quality problems.

In late 1979, Assembly Bill 1803 required that all water agencies using ground water must conduct tests for the presence of certain industrial solvent. The tests indicated that "volatile organic compounds" (VOC's) such as trichlorethylene (TCE) and perchloroethylene (PCE) were present in the San Fernando Basin ground water supplies in concentrations exceeding State Health Department maximum contaminant levels (MCL). Both chemicals were used extensively in the past as degreasers in manufacturing. At that time, the hazards to the water supplies were not known. As a result, Glendale had to further limit its use of San Fernando Basin supplies. Currently, the City has almost totally suspended production from the basin because of the difficulty of producing supplies meeting the MCL's for the VOC's. Except for a small quantity used at the Glendale Power Plant for cooling tower make-up water, no San Fernando Valley water is currently used in Glendale.

The historic and projected water use from the various sources is plotted on Figure 2 and shows the significant reduction in production from the San Fernando Basin and corresponding increase in imported water supplies from Metropolitan. The annual water use in Glendale for fiscal year 1997-98 was 29,740 AFY. In 1989-90, the use was about 32,600 AFY. The recent drought and many water conservation measures have resulted in reduced water use in Glendale. Also, 1997-98 was not a normal year since water usage had been affected by the very heavy rain (El Nino) during the first half of 1998. Water consumption dropped 25% compared with the previous year. Rainfall in 1997-98 was 2.3 times the previous FY. The 29,740 AFY is equivalent to an average daily use of 26.5 million gallons per day (MGD).

PROJECTED WATER DEMANDS

Projection Methodology - Metropolitan has calibrated the U.S. Army Corps of Engineers IWR-MAIN (Municipal and Industrial Needs) water demand forecasting system for 51 of the larger cities in Metropolitan's service area, which includes Glendale. The model is used to project water demands incorporating a wide range of economic, demographic, and climatic factors. The specific date includes projected population, housing mix, household occupancy, housing values, weather conditions, and conservation measures. The forecasts generate expected demands during a year of normal weather conditions. This modeling is considered the state-of-the-art approach in projecting demands and is being used by an increasing number of major cities in the country for water demand forecasting. The model calibrated for use in Metropolitan's service area is called MWD-MAIN, a water demand forecasting model.

Projected Water Use - The projected water demand using MWD-MAIN calibrated for Glendale shows a year 2000 demand of 32,003 AFY and a year 2010 demand of 33,140 AFY. These figures were based on incorporating projected population, housing, and employment data into the MWD-MAIN water demand forecasting model for Glendale along with a weather variable. The year 2010 demand reflects a modest increase over current use. These projections incorporate the 1981 and 1992 California plumbing codes changes requiring ultra-low flush toilets beginning in 1992, along with a continuation of current drought oriented public education and information programs. As additional conservation measures are carried out, there could be still more reductions in projected use.

Future Water Sources - The basic objective of the plan is to develop more local supplies and the facilities required to increase the use of local resources thereby reducing the need for imported water. The cost of these new facilities is estimated to be $50 million. Currently, about 85 percent of the potable water used in the City comes from Metropolitan. With the proposed supplies and facilities, the goal is to reduce dependence on Metropolitan to 60 percent of demand. This will be accomplished by building new facilities for expanding production from the San Fernando and Verdugo Basins, and increased recycled water use.

PROPOSED WATER FACILITIES

The various features to be constructed as part of this water resource plan are shown on Figure 3 and described below.

San Fernando Basin/EPA Treatment Facility - San Fernando Basin production is currently limited because of the volatile organic compounds in the groundwater. The entire San Fernando Valley is part of a federal SUPERFUND clean-up program with many proposed water treatment plants constructed or to be constructed in the basin. Now the Environmental Protection Agency (EPA) is focusing on the construction of cleanup facilities in Glendale. The treated water from these facilities will be conveyed to the Glendale potable water system.

Under the Record of Decision (ROD) for the South Glendale and North Glendale Operable Units, many new facilities will be constructed consisting of: seven shallow extraction wells and one deep well, a 5,000 gpm water treatment plant, piping to convey the untreated water from the wells to the treatment plant, a conveyance system from the treatment plant to Glendale potable distribution system, a facility to blend the treated groundwater with water from the Metropolitan Water District to reduce nitrate levels, and a disinfection facility. A general layout of all proposed facilities associated with the San Fernando Project is shown on Figure 4.

The major agreements between Glendale, the Responsible Parties (PRP's), and the EPA were signed recently. The PRPs have retained CDM Consulting Engineers to design and construct the required facilities. To date, construction is on going and should be completed in the 1999-2000 period.

The City's basic water right of approximately 5,400 AFY will meet about 18 percent of projected near-term water demands based on the City's annual consumption of 30,000 AFY. It is anticipated that the clean-up facilities will treat a much greater annual amount of groundwater using the accumulated water storage credits.

Verdugo Basin - Historically, the City's use of these supplies has been limited because of water quality problems, water levels, and extraction capacity. The City has completed construction of the Verdugo Park Water Treatment Plant (VPWTP) and this facility is operational. This facility has a capacity of 1,150 gpm and will treat water from the two new low capacity wells (referred to as Glorietta Wells A & B) and from the water supplies in the old Verdugo Pickup horizontal infiltration system. Early operation indicates that flows closer to 550 gpm are likely from these sources. The three existing wells and the Verdugo Park Water Treatment Plant alone will not utilize the City's entire water rights to the basin supplies. Additional extraction capacity in the Verdugo Basin will be required. The existing wells and VPWTP will produce about 2,700 AFY with the remaining 1,000 AF coming from other basin sources not currently identified. It is anticipated that the City will be looking at other sources of supply in the Verdugo Basin. If the City were able to utilize its full rights to these supplies, about 12 percent of demands could be met from this Basin.

Recycled Water - The City has been using recycled water from the Los Angeles/Glendale Water Reclamation Plant for the past 10 years at the Glendale Power Plant for make-up water use in the cooling towers and along the Route 134 Freeway in the City for irrigation. In 1992, the City began delivering recycled water to Forest Lawn Memorial Park in Glendale for irrigation.

The City has completed constructing a "backbone" distribution system consisting of pipelines, pumping plants, and storage tanks to deliver recycled water to many new users in and outside the City. The objective is to increase the use of recycled water to meet 10 percent of demands.

The specific features of this program are shown in more detail on Figure 5. The users from the various recycled water projects are tabulated on Figure 6. This will give the reader a general idea of the scope of the expansion program. The expected deliveries from the various projects are shown on Table 3.

TABLE 3
RECYCLED WATER USE (AFY)

PROJECTS	1995	2000	2005	2010
Brand Park	0	80	170	170
Forest Lawn Pipeline	292	350	350	350
Power Plant Pipeline	377	400	450	450
Verdugo-Scholl Pipeline	217	832	935	1,054
Other Potential Projects	0	0	0	0
TOTAL	886	1,662	1,905	2,024

Metropolitan Water District - The City currently has three treated water connections to the Metropolitan water system in the City. The cities of Los Angles, Burbank and Glendale have looked at 150 cfs, equally divided, untreated water connection on the San Fernando Tunnel to percolate water into the San Fernando Basin. With this additional water delivered intó groundwater storage, the City would be entitled to produce more water from the San Fernando Basin. Also, the water could be delivered at a lower cost because it is untreated compared to the current sources. Also, it may be possible to purchase this water under a different pricing program by taking advantage of special pricing for Metropolitan supplies that are periodically available (seasonal storage). The replenishment water would be taken generally during the wetter years for a storage credit in the basin and extracted in later years during drought conditions when treated Metropolitan supplies are limited. It is anticipated that about 3,000 AFY will be replenished from this source on the average. Work on this new connection is on hold.

TABLE 4
HISTORIC AND PROJECTED WATER USE IN GLENDALE (AF)

Water Year	San Fernando Basin	Verdugo Basin	Recycled Water	MWD Water	Total
1989-90	2,041	1,635	333	28,848	32,857
1990-91	2,932	1,132	432	25,354	29,850
1991-92	1,577	732	551	23,003	25,863
1992-93	447	904	770	25,905	28,026
1993-94	554	1,226	625	27,043	29,448
1994-95	441	1,667	574	26,215	28,897
1995-96	496	2,059	886	27,906	31,347
1996-97	467	2,569	1,158	28,154	32,348
1997-98	266	2,696	1,087	25,629	29,678
1998-99	425	2,700	1,748	26,991	31,864
1999-00	4,025	2,700	1,662	23,616	32,003
2004-05	7,625	3,356	1,905	19,665	32,551

SUMMARY OF WATER SUPPLIES

The above information describes the many projects proposed for construction in the City at a cost of $50 million. The money will come from City sources, others benefiting from these facilities, and the parties responsible for groundwater contamination in the San Fernando Basin through the SUPERFUND Clean-Up Program.

RELATED INFORMATION ON WATER USE

Detailed information on historic and projected water use in Glendale is shown on Table B-1. From a practical sense, water use in the water year is equivalent to water use in a fiscal year. Table 4 is a tabular version of Table B-1.

A:\RAY\WRP\GPSP9803F.WD
JANUARY 1999

GLENDALE WATER SUPPLY AND DEMAND (AF/YR)

(Use MWD Direct Deliveries for Blending)

TABLE B - 1

	Fiscal Year	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2005	2010
(1)	**Water Demands (a)**	31,953	32,857	29,850	25,863	28,026	29,448	28,897	31,347	32,302	29,678	31,864	32,003	32,551	33,140
	Water Supplies:														
(2)	*San Fernando Basin*														
(3)	Water Rights	5,591	5,771	5,170	4,373	4,805	5,090	4,979	5,535	5,555	5,575	5,588	5,601	5,725	5,843
(3A)	Physical Solution Pmts (LADWP)														
	Water Production														
(4)	City Production	1,411	1,564	2,445	1,080	78	140	65	35	25	22	25	25	25	25
(5)	EPA Treat. Plant (b)												3,600	7,200	7,200
(6)	Physical Solution	467	477	487	497	369	414	376	461	442	244	400	400	400	400
(7)	**Total:**	1,878	2,041	2,932	1,577	447	554	441	496	467	266	425	4,025	7,625	7,625
	Verdugo Basin														
(8)	Wells 3,4, & 6	2,287	1,635	1,132	732	904	1,226	1,667	2,059	2,116	1,981	2,200	2,200	2,200	2,200
(9)	VPWTP								0	453	715	500	500	500	500
(10)	Other Production												0	656	656
(11)	**Total:**	2,287	1,635	1,132	732	904	1,226	1,667	2,059	2,569	2,696	2,700	2,700	3,356	3,356
	Recycled Water														
	Brand Park Project									32	63	155	80	170	170
	Forest Lawn Project					348	299	280	292	344	239	350	350	350	350
	Power Plant Project	233	333	432	551	422	326	260	377	264	306	450	400	450	450
	Verdugo-Scholl Project							34	217	472	479	793	832	935	1,054
	Other Potential Project														
(12)	**Total:**	233	333	432	551	770	625	574	886	1,112	1,087	1,748	1,662	1,905	2,024
	Metropolitan Water														
(13)	Direct Deliveries (G1, G2, & G3)	27,555	28,848	25,354	23,003	25,905	27,043	26,215	27,906	28,154	25,629	26,991	23,616	19,665	20,135
(15)	Replenishment Deliveries (G4)														
(16)	**Total:**	27,555	28,848	25,354	23,003	25,905	27,043	26,215	27,906	28,154	25,629	26,991	23,616	19,665	20,135
(17)	**Total Water Supplies**	**31,953**	**32,857**	**29,850**	**25,863**	**28,026**	**29,448**	**28,897**	**31,347**	**32,302**	**29,678**	**31,864**	**32,003**	**32,551**	**33,140**

3) [(1) - 4,000 AF] * 20% return flow

5) 5,000 gpm @ 90%

6) Forest Lawn, et.al.

13) (1) - (7) - (11) - (12)

3A) (7) - (3) - (15)

16) (1) - (7) - (11) - (12)

(a) Projected demands from MWD

(b) Assume operational date January, 2000

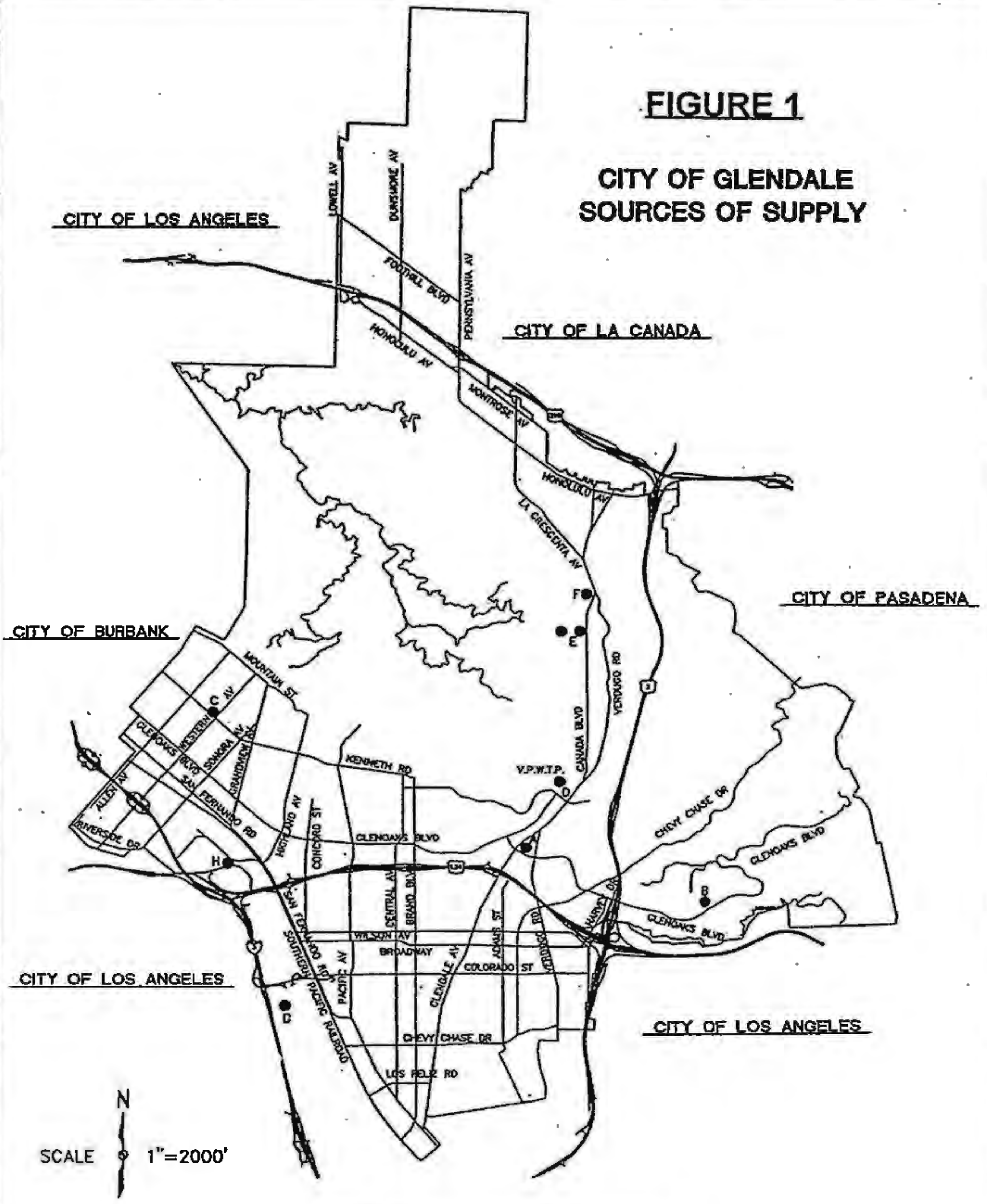
A:\RAY\WRP\WTRSDMN.XLS]
FEBRUARY 22, 1999]

Updated[02/10/99]

FIGURES

FIGURE 1

CITY OF GLENDALE SOURCES OF SUPPLY



LEGEND:

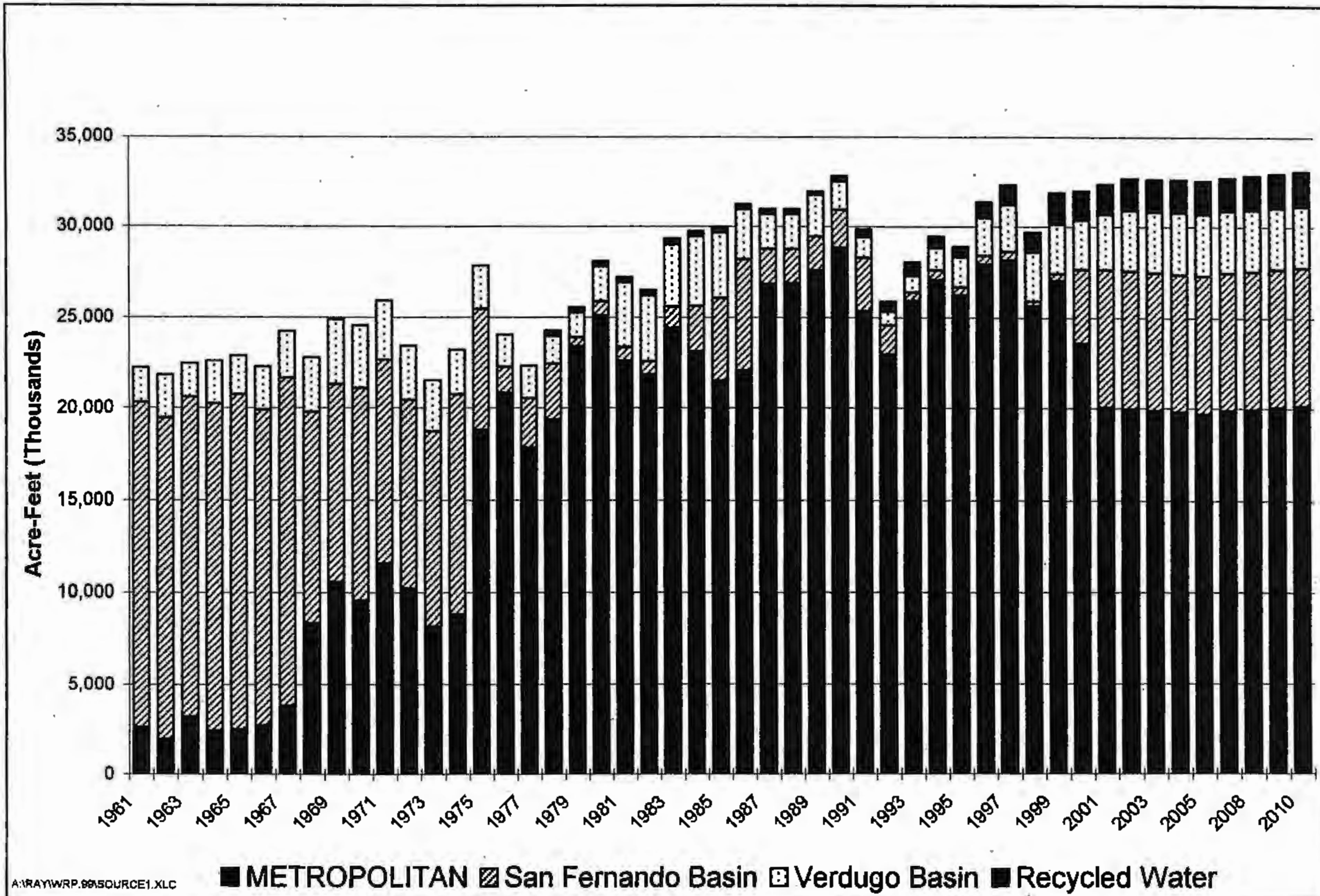
- ● WATER ENTRY POINTS
- A MWD G-1
- B MWD G-2
- C MWD G-3
- D VERDUGO PARK WATER TREATMENT PLANT
- E GLORIETTA 3 & 4
- F GLORIETTA 6
- G LAGWRP-RW TREATMENT PLANT
- H SUPERFUND TREATMENT PLANT (FUTURE)

Prepared: RAY HOTARDO
Drawn: PHONG NGO
Date: February 18, 1997

CITY OF GLENDALE

SOURCES OF WATER SUPPLY

FIGURE 2



City of Glendale Water Resource Plan

FIGURE 3

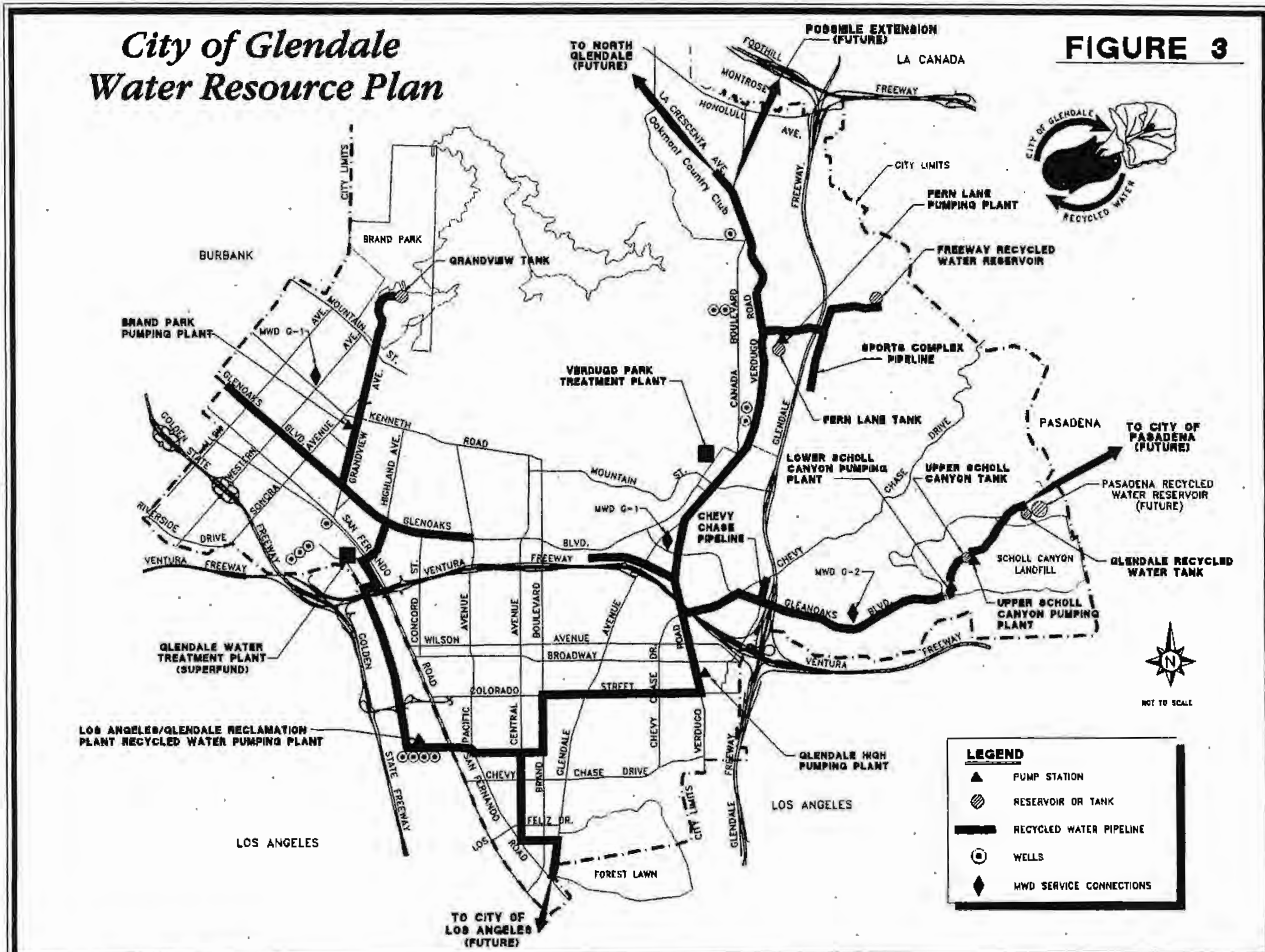
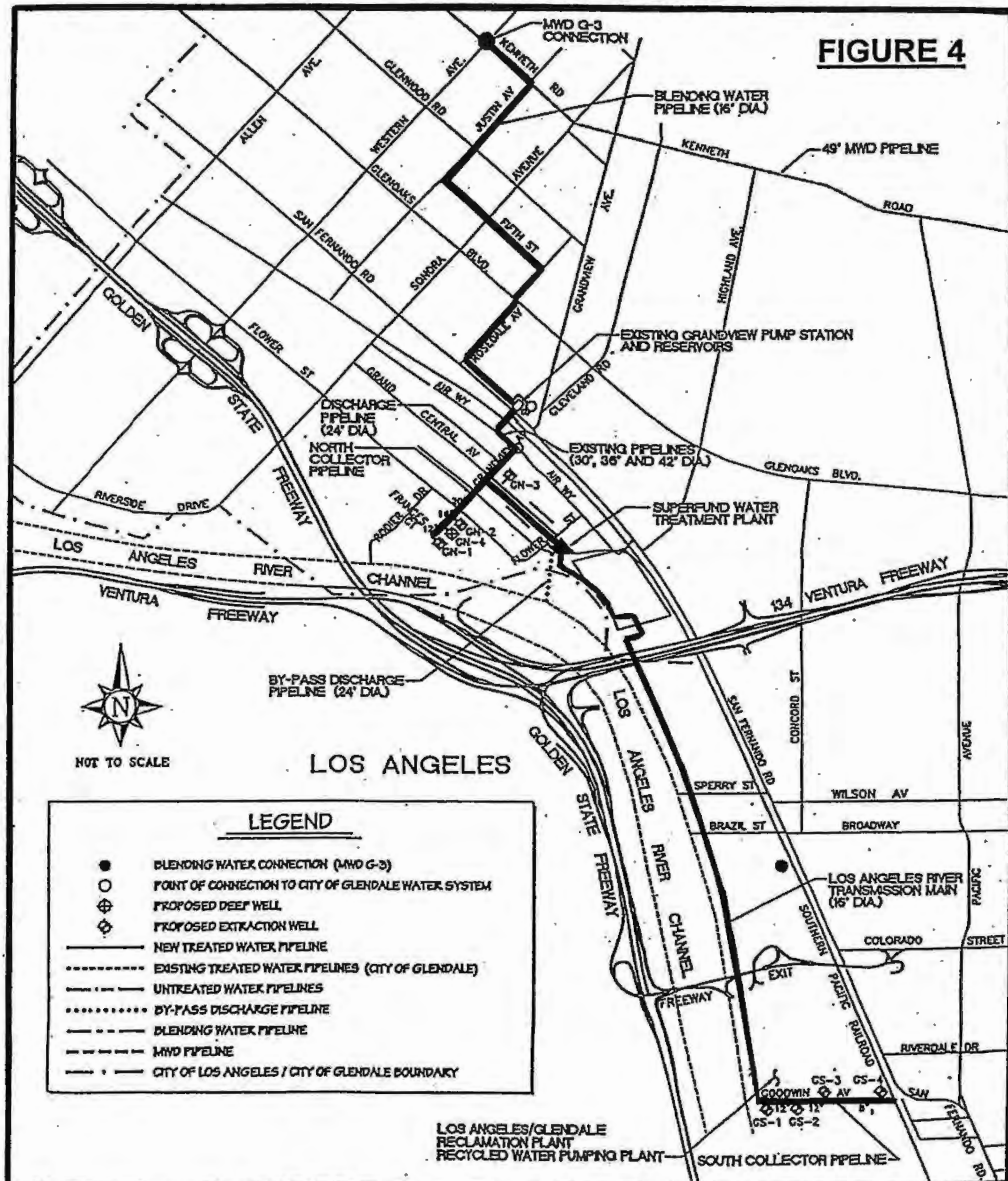


FIGURE 4



CITY OF GLENDALE PUBLIC SERVICE DEPARTMENT	SUPERFUND RELATED FACILITIES	DATE: 12-02-97	
			4646-A

CITY OF GLENDALE REGIONAL RECYCLED WATER PROGRAM

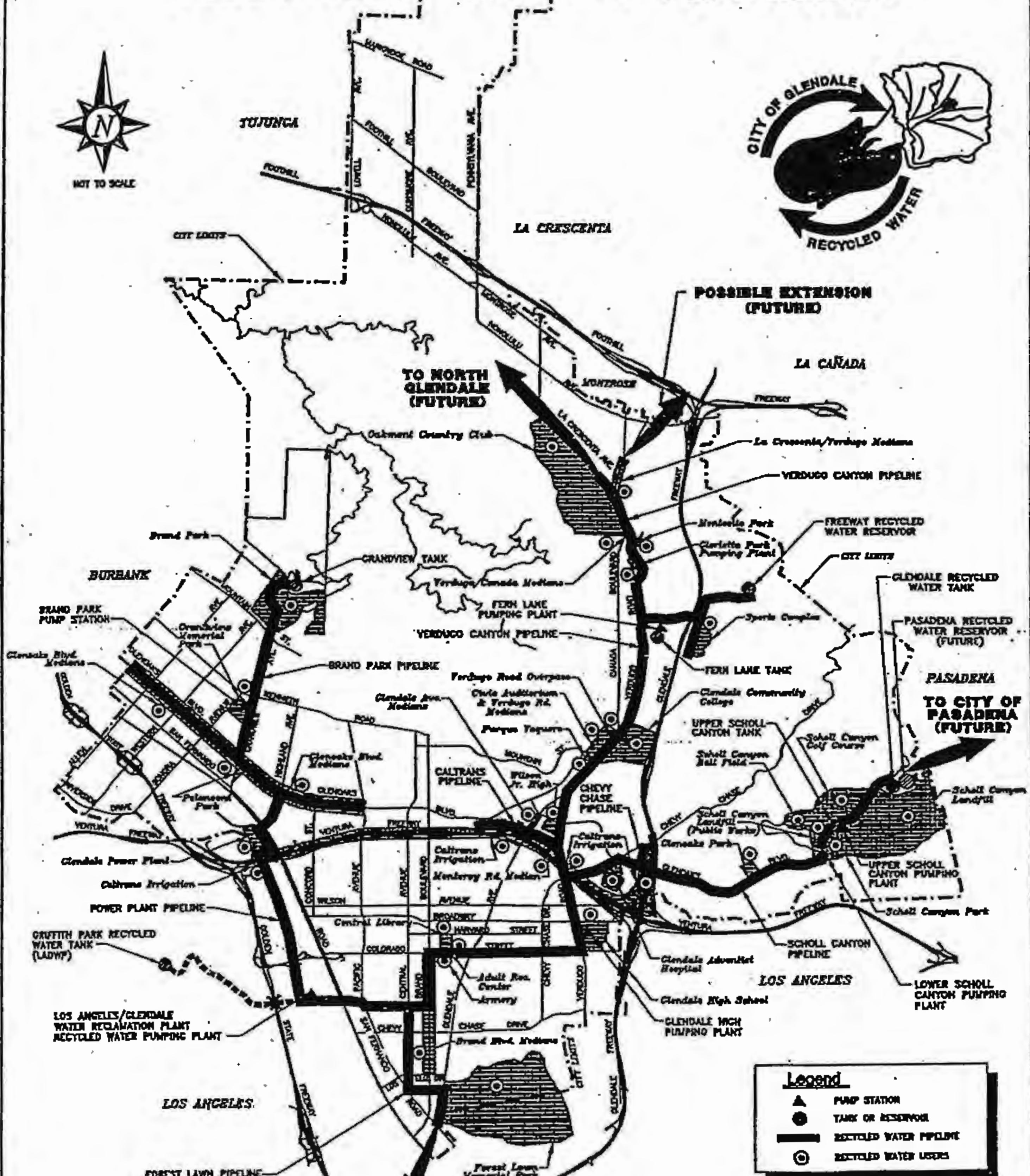


FIGURE 5

CITY OF GLENDALE

RECYCLED WATER USER STATUS - SN 1990008

FIGURE 6

As of MARCH 1999

LOC. NO.	RECYCLED WATER USER PROJECT	Actual/Anticipated Delivery Date	User	Quantity A.F./year	Type of Use
	FOREST LAWN PROJECT				
1	Forest Lawn Memorial Park	1992	YES	300-500	Irrigation
2	1600 South Brand Median	1995	YES	2	Irrigation
	POWER PLANT PROJECT				
7	Caltrans - 943 West Doran Street	1978	YES	40-60	Irrigation
8	Glendale Grayson Power Plant	1978	YES	300-400	Cooling Towers
	VERDUGO SCHOLL PROJECT				
	PARKS and RECREATION - City of Glendale				
4	Adult Recreation Center	1995	YES	10	Irrigation
3	Armory	1996	YES	4	Irrigation
35	Carr Park	Planning Stage	NO		Irrigation
5	Central Library	1995	YES	4	Irrigation
34	City of Glendale - Fern Lane	1997	YES	2.5	Irrigation
24	Civic Auditorium	1996	YES	15	Irrigation
37	Colorado Boulevard - Parkway Irrigation	1997	YES	3	Irrigation
31	North Verdugo Road Median/La Cresenta Avenue	1998	YES	10	Irrigation
17	Glenoaks Park	1995	YES	4	Irrigation
28	Glorietta Pump Station	1997	NO		Irrigation
	Mayor's Park (Proposed)	Unknown	NO	6	
29	Montecito Park	1995	YES	1	Irrigation
14	Monterey Road Median - WJH	1996	NO	1	Irrigation
13	701 North Glendale Avenue - Median @ Monterey Road	1995	YES	12	Irrigation
	Park Site C (Proposed)	Unknown	NO	54	
	Park Site A (Proposed)	Unknown	NO	69	
2	741 S Brand Median	1995	YES	3	Irrigation
23	Parque Vaquero	1996	YES	2	Irrigation
20	Scholl Canyon Ballfield	1997	YES	17	Irrigation
18	Scholl Canyon Park	1996	YES	12	Irrigation
27	Sports Complex (Nearing Completion)	1999	NO	99	Irrigation
25	Verdugo Rd/Canada (South) Overpass	1995	YES	0.5	Irrigation
30	Verdugo Rd/Canada (North Median)	1996	YES	1.5	Irrigation
	CALTRANS (5 Meters):				
7A	1970 E Glenoaks Boulevard (E/S)	1995	YES	10	Irrigation
7A-1	1970 E Glenoaks Boulevard (W/S #2)	1995	YES	12	Irrigation
7B	406 N Verdugo Road @ Chevy Chase	1995	YES	40	Irrigation
7C	709 Howard Street @ Monterey Road	1995	YES	12	Irrigation
7D	2000 E Chevy Chase Drive @ Harvey	1995	YES	8	Irrigation
	GLENDALE UNIFIED SCHOOL DISTRICT:				
6	Glendale High School	1995	YES	15	Irrigation
36	Glenoaks Elementary School	1998	YES	1	Irrigation
15	Wilson Junior High School	1995	YES	7	Irrigation
	OTHERS:				
16	Glendale Adventist Memorial Hospital	1997	YES(Partially)	8	Irrigation
32	Oakmont Country Club	1996	YES	200	Irrigation
21	Scholl Canyon Golf Course	1998	YES	100	Irrigation
22	Scholl Canyon Landfill (LACSD)	1997	YES	100	Dust Control/Soil Compaction
19	Scholl Canyon Landfill (PW)	1996	YES		Irrigation/Soil Compaction
18	Upper Scholl Pump Station	1996	YES		Irrigation
	Dual Plumbing:				
26	Glendale Community College	1996	YES(Partially)	25	Irrigation/Flushing Toilets
38	Glendale Plaza - 655 N Central Avenue	Completed	NO		Flushing Toilets
39	Building - 400 N Brand	Completed	NO		Flushing Toilets
41	Building - 450 N Brand	Planning Stage	NO		Flushing Toilets
42	Police Building - Isabel Street	Planning Stage	NO		Flushing Toilets
40	Building - 611 N Brand	Planning Stage	NO		Flushing Toilets
33	*PUBLIC WORKS - City of Glendale*	1978	YES	1.5	Street Cleaning
	BRAND PARK PROJECT				
12	Brand Park	1997	YES	60	Irrigation
9	Glenoaks Median (9 Meters)	1996	YES	4	Irrigation
11	Grand View Memorial Park	1999	NO	50	Irrigation
10	Pelanconi Park	1996	YES	8	Irrigation
	TOTAL CURRENT METERS	39		1,650-2,070	

A:\RAYM\RPRWUSTAT3.XLS
JANUARY [illegible]

APPENDIX D

CITY OF SAN FERNANDO

PUMPING AND SPREADING PLAN

1998-2003 Water Years

CITY OF SAN FERNANDO

GROUNDWATER PUMPING AND SPREADING PLAN

OCTOBER 1, 1998 TO SEPTEMBER 30, 2003

1998-99 Water Year

Prepared by:

Public Works Department

Engineering Division

117 Macneil Street

San Fernando, California 91340

APRIL 1999

TABLE OF CONTENTS

I. INTRODUCTION

The ground water rights of the City of San Fernando were defined by the JUDGMENT in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs City of San Fernando, et.al., Defendants." The Final Judgment was signed on January 26, 1979.

On August 26, 1983, the Watermaster reported to the court pursuant to Section 10.2 of the Judgment that the Sylmar Basin was in condition of overdraft. On October 1, 1984, San Fernando and Los Angeles were assigned equal rights to pump the safe yield of the Basin (6,120 acre-feet) thus, San Fernando and Los Angeles were each allowed to pump approximately 3,105 acre-feet per year. Thereafter, on October 1, 1996, the safe yield of the Basin was determined to be 6,510 acre-feet per year. Therefore, San Fernando and Los Angeles are now allowed to each pump approximately 3,255 acre-feet per year.

In 1993, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Section 2.9, Groundwater Quality Management. This addition has been made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup and limiting the spread of contamination in the San Fernando Valley. This report is in response to Section 2.9.4, Groundwater Pumping and Spreading Plan.

The Groundwater Pumping and Spreading Plan is based on the water year, October 1 to September 30. The Draft Plan for San Fernando will be submitted in April to the Watermaster for the current water year.

II. WATER DEMAND

The annual total water demand for the last five years and the projected annual water demand for the next five years is shown on Table 2.1.

Water demand during the early 1990's was affected by drought conditions in the Southern California region. However, the City of San Fernando did impose voluntary conservation since 1977.

Projected water demands for the next five years is expected to slightly increase from the 1992-93 base year since public opinion is that drought conditions no longer exist and conservation habits will undoubtedly regress. The increase is therefore not from residential growth, but from a rebound of drought conditions and a re-establishment of commercial and industrial demand.

The projected water demand may vary significantly due to weather conditions, economic conditions and/or social conditions in the San Fernando area. A variance of $\pm$ 10 percent can be expected.

III. WATER SUPPLY

The water supply for the City of San Fernando is composed of locally produced and treated groundwater. Supplemental water is purchased from the Metropolitan Water District of Southern California (MWD). In case of emergency, there is an existing 6-inch water connection to the City of Los Angeles (DWP) water system at 12900 Dronfield Avenue, in Sylmar.

A. MWD The amount of treated water purchased from the MWD has been changed beginning in 1997-1998 through 2003 as reflected in the Historic and projected use of MWD water as shown in Table 2.1.

B. Production Wells The City of San Fernando owns and operates four (4) wells that are on "active status" with the Department of Health Services as indicated below:

1. ***Well 2A***
   Location: 14060 Sayre Street, Sylmar
   Capacity: 2100 GPM

2. ***Well 3***
   Location: 13003 Borden Avenue, Sylmar
   Capacity: 1250 GPM

3. ***Well 4A***
   Location: 12900 Dronfield Avenue, Sylmar
   Capacity: 500 GPM

4. ***Well 7A***
   Location: 13180 Dronfield Avenue, Sylmar
   Capacity: 900 GPM

C. Quantity (Acre-Feet) of Water Pumped From Each Well (1997-98)

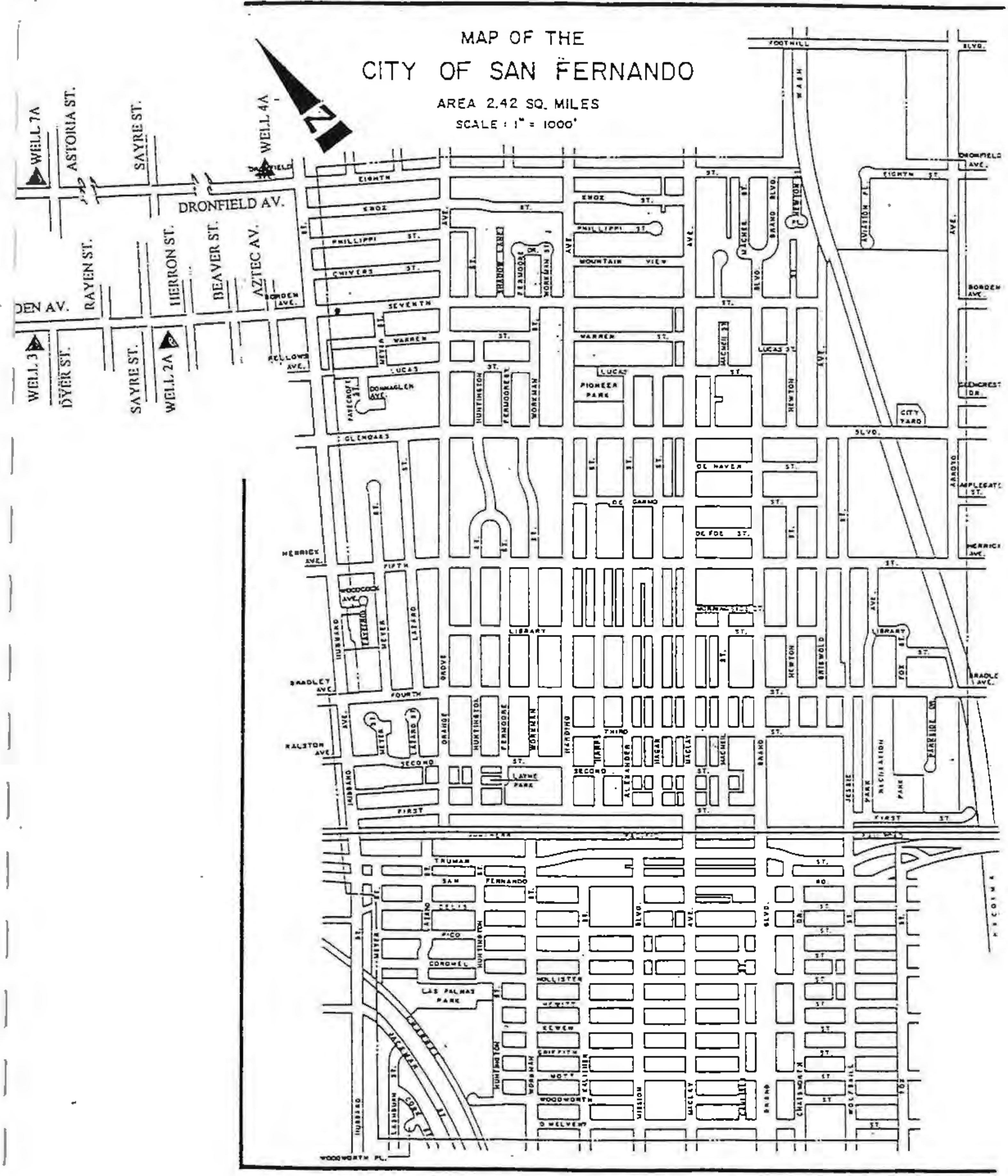
1.	Well 2A	1,443.80
2.	Well 3	970.91
3.	Well 4A	328.60
4.	Well 7A	564.60
	Total	3,307.91

D. Wells Groundwater Level Data

1.	Well 2A	1119.5'	Taken 10/98
2.	Well 3	1064.0'	Taken 10/98
3.	Well 4A	1029.0'	Taken 10/98
4.	Well 7A	1063.1'	Taken 10/98

E. Well Locations
See next page

LOCATION MAP



IV JUDGMENT CONSIDERATIONS

A. Native and Imported Return Water

The safe yield of the Sylmar Basin is 6,510 acre-feet and the cities of San Fernando and Los Angeles have equal rights to pump from this basin. After subtracting the overlaying pumping rights of two private parties, San Fernando and Los Angeles are each allowed to pump approximately 3,255 acre-feet per year.

B. Stored Water Credit

San Fernando and Los Angeles each have the right to store water in the Sylmar Basin and the right to extract equivalent amounts.

As of September 30, 1998 the City of San Fernando has a stored water credit of 2308.81 acre-feet accumulated during previous years through the 97-98 water year.

TABLE 2.1
FIVE-YEAR HISTORIC AND PROJECTED WATER DEMAND
PUMPED AND IMPORTED WATER
CITY OF SAN FERNANDO

(Acre-Feet)

DEMAND FY	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000-2001	2001-2002	2002-2003
WELLS	2,145.00	3,398.00	3411.47	2985.12	3258.59	3307.91	3550	3550	3100	3200	3200
MWD	1,285.00	93.00	9.53	614.50	315.59	0	0	0	500	500	500
TOTAL	3,430.00	3,491.00	3,421.00	3599.62	3574.18	3307.91	3550	3550	3600	3700	3700
	ACTUAL						PROJECTED				

F:\PubWks\Water\Pump&SpreadPlan\1999Plan1.doc 5

117 MACNEIL ST. • SAN FERNANDO, CALIFORNIA 91340-2993

City of San Fernando

Water Quality Report 1998

CUSTOMER SERVICE

The "WATER QUALITY SECTION" receives inquires from customers on a regular basis. We respond to these inquires as quickly as possible. In most cases, our experienced and knowledgeable staff can provide answers to your questions over the phone. However, in some cases, we may need to research your question and return your call at a later date. Specific problems may require a visit to customer's home or business, collection and testing of water samples, and other investigative actions. All inquires are handled as quickly as possible. The City of San Fernando is proud to present to you this year's annual "Water Quality Report 1998". The City has met all State and Federal standards for drinking water. As in the past, for ease of comparing the range of concentrations, we have arranged all constituents on this form showing maximum levels that exist in our water at this time. During 1998 the City did not deem it necessary to supplement its water supply by purchasing imported water from Metropolitan Water District. The public's ongoing water conservation efforts over the past several years have not gone unnoticed and we truly appreciate your continuing support. Under the State Health Department's and Environmental Protection Agency's (EPA) mandated Lead and Copper Sampling Program, the City of San Fernando did not exceed the action levels set forth by the EPA. This information and all water related data is open to the public and copies of earlier reports or any additional water quality can be obtained by calling:

Harold Tighe or Jose (Tony) Salazar

(818) 898-1299 or (818) 898-1298

Se Habla Español

ANNUAL WATER QUALITY REPORT 1998

DISTRIBUTION SYSTEM MONITORING

CONSTITUENTS	STATE MCL	MCLG or (PHG)	UNITS	RANGE
Coliform Bacteria	Less Than 2	0	P/A (Each Month)	ND
Acute Violations-Coliform	NA	NA	No. of Violations	0
Total Trihalomethanes	0.1	NA	mg/L	ND-0.0058
Turbidity	5.0	NA	NTU	ND-0.1
Color	15	NA	Color Units	ND
Odor Threshold	3	NA	Odor Units	1.0
Asbestos	7	7	MFL	0.10

SOURCE MONITORING

CONSTITUENTS	STATE MCL	MCLG or (PHG)	UNITS	WELL 2A	WELL 3	WELL 4A	WELL 7A	RANGE
PRIMARY DRINKING WATER STANDARDS								
INORGANIC CHEMICALS								
Aluminum	1.	NA	mg/L	ND	ND	ND	ND	ND
Antimony	0.006	(0.020)	mg/L	ND	ND	ND	ND	ND
Arsenic	0.05	NA	mg/L	ND	ND	0.002	ND	ND-0.002
Barium	1.	2	mg/L	0.150	0.170	ND	0.120	ND-0.170
Beryllium	0.004	0.004	mg/L	ND	ND	ND	ND	ND
Cadmium	0.005	(0.00007)	mg/L	ND	ND	ND	ND	ND
Chromium	0.05	(0.0025)	mg/L	ND	ND	ND	ND	ND
Cyanide	0.2	(0.15)	mg/L	ND	ND	ND	ND	ND
Fluoride	2.	(1.0)	mg/L	0.35	0.38	0.22	0.39	0.22-0.39
Mercury	0.002	(0.0012)	mg/L	ND	ND	ND	ND	ND
Nickel	0.1	0.1	mg/L	ND	ND	ND	ND	ND
Nitrate (as NO3)*	45.	(45)	mg/L	30.36	36.9	17.16	32.56	17.16-36.96
Nitrite (as nitrogen)	1.	(1)	mg/L	ND	ND	ND	ND	ND
Nitrate + Nitrite (sum as nitrogen)	10.	(10)	mg/L	5.6	6.9	3.0	7.9	3.0-7.9
Selenium	0.05	0.05	mg/L	ND	ND	ND	ND	ND
Thallium	0.002	(0.0001)	mg/L	ND	ND	ND	ND	ND
RADIONUCLIDES (Values are based on the averages of up to four most recent quarters)								
Gross Alpha particle activity	15	0	pCi/L	3.07	2.0	3.29	1.9	1.9-3.29
Gross Beta	50	NA	pCi/L	4.12	3.29	5.96	2.31	2.31-5.96
Radium-226	**	0	pCi/L	0.53	0.27	0.88	NT	0.27-0.88
Radium-228	***	0	pCi/L	NT	NT	2.62	NT	2.62
Uranium	20	NA	pCi/L	<1	<1	3.51	NT	<1-3.51
VOLATILE ORGANIC CHEMICALS (VOCs)								
Benzene	0.001	0	mg/L	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.0005	0	mg/L	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	0.6	(0.6)	mg/L	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	0.005	(0.006)	mg/L	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.005	None	mg/L	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.0005	(0.0004)	mg/L	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.006	(0.01)	mg/L	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.006	0.07	mg/L	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	0.01	0.1	mg/L	ND	ND	ND	ND	ND
Dichloromethane	0.005	0	mg/L	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.005	0.0005	mg/L	ND	ND	ND	ND	ND

CONSTITUENTS	STATE MCL	MCLG or (PHG)	UNITS	WELL 2A	WELL 3	WELL 4A	WELL 7A	RANGE
1,3-Dichloropropene	0.0005	(0.0002)	mg/L	ND	ND	ND	ND	ND
Ethylbenzene	0.7	(0.3)	mg/L	ND	ND	ND	ND	ND
Monochlorobenzene	0.07	0.1	mg/L	ND	ND	ND	ND	ND
Styrene	0.1	0.1	mg/L	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.001	NA	mg/L	ND	ND	ND	ND	ND
Tetrachloroethylene (PCE)	0.005	0	mg/L	ND	ND	0.001	ND	ND-0.001
Toluene	0.15	(0.15)	mg/L	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.07	(0.005)	mg/L	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.200	0.200	mg/L	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	0.005	0.003	mg/L	ND	ND	ND	ND	ND
Trichloroethylene (TCE)	0.005	(0.0008)	mg/L	ND	ND	ND	ND	ND
Trichlorofluoromethane (Freon 11)	0.15	(0.70)	mg/L	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	1.2	(4.0)	mg/L	ND	ND	ND	ND	ND
Vinyl Chloride	0.0005	0	mg/L	ND	ND	ND	ND	ND
Total Xylenes	1.750	(1.800)	mg/L	ND	ND	ND	ND	ND

NON-VOLATILE SYNTHETIC ORGANIC CHEMICALS (SOCs)

Atrazine	0.003	(0.00015)	mg/L	ND	ND	ND	ND	ND
Chlordane	0.0001	(0.00003)	mg/L	ND	ND	ND	ND	ND
2,4-D	0.07	(0.07)	mg/L	ND	ND	ND	ND	ND
Dibromochloropropane (DBCP)	0.0002	(0.0000017)	mg/L	ND	ND	ND	ND	ND
Diquat	0.02	0.02	mg/L	ND	ND	ND	ND	ND
Simazine	0.004	0.004	mg/L	ND	ND	ND	ND	ND
Glyphosate	0.7	(1.0)	mg/L	ND	ND	ND	ND	ND
Ethylene Dibromide (EDB)	0.00005	0	mg/L	ND	ND	ND	ND	ND

SECONDARY STANDARDS

Aluminum	0.2	NA	mg/L	ND	ND	ND	ND	ND
Copper	1.0	(0.17)	mg/L	ND	ND	ND	ND	ND
Corrosivity****	Non-Corrosive	NA	Langelier Index	0.3	0.2	0.3	0.2	0.2-0.3
Foaming Agents (MBAS)	0.5	NA	mg/L	ND	ND	ND	ND	ND
Iron	0.3	NA	mg/L	ND	ND	ND	ND	ND
Manganese	0.05	NA	mg/L	ND	ND	ND	ND	ND
Odor	3	NA	Units	1.0	1.0	1.0	1.0	1.0
Silver	0.1	NA	mg/L	ND	ND	ND	ND	ND
Zinc	5.0	NA	mg/L	ND	ND	ND	ND	ND
Turbidity	5	NA	NTU	ND	ND	ND	ND	ND
Total Dissolved Solids (a)	500	NA	mg/L	334	366	268	314	268-366
Specific Conductance, (a)	900	NA	umho/cm	530	585	425	505	425-585
Chloride (a)	250	NA	mg/L	19	27	14	18	14-27
Sulfate (a)	250	NA	mg/L	51	66	48	41	41-66

ADDITIONAL PARAMETERS

Alkalinity as calcium carbonate	NS	NA	mg/L	185	190	150	175	150-190
Bicarbonate	NS	NA	mg/L	225	232	183	213	183-232
Calcium	NS	NA	mg/L	65	62	50	59	50-65
Carbonate	NS	NA	mg/L	0.58	0.48	0.75	0.44	0.44-0.75
Hardness as calcium carbonate	NS	NA	mg/L	236	253	162	221	162-253
Hydroxide	NS	NA	mg/L	0.007	0.005	0.011	0.005	0.005-0.011
Lead	NA	(0.002)	mg/L	ND	ND	ND	ND	ND
Magnesium	NS	NA	mg/L	18	24	9.1	18	9.1-24
Perchlorate	NS	NA	mg/L	ND	ND	ND	ND	ND
pH	NS	NA	Units	7.6	7.5	7.8	7.5	7.5-7.8

CONSTITUENTS	STATE MCL	MCLG or (PHG)	UNITS	WELL 2A	WELL 3	WELL 4A	WELL 7A	RANGE
Potassium	NS	NA	mg/L	3.3	2.6	4.2	3.3	2.6-4.2
Sodium	NS	NA	mg/L	25	30	31	22	22-31
Bromobenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
Bromodichloromethane	NS	NA	mg/L	ND	ND	ND	ND	ND
Bromoform	NS	NA	mg/L	ND	ND	ND	ND	ND
Bromomethane	NS	NA	mg/L	ND	ND	ND	ND	ND
Chlorodibromomethane	NS	NA	mg/L	ND	ND	ND	ND	ND
Chloroethane	NS	NA	mg/L	ND	ND	ND	ND	ND
Chloroform	NS	NA	mg/L	ND	ND	0.001	0.0007	ND-0.001
Chloromethane	NS	NA	mg/L	ND	ND	ND	ND	ND
2-Chlorotoluene	NS	NA	mg/L	ND	ND	ND	ND	ND
4-Chlorotoluene	NS	NA	mg/L	ND	ND	ND	ND	ND
Dibromomethane	NS	NA	mg/L	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
Dichlorodifluoromethane	NS	NA	mg/L	ND	ND	ND	ND	ND
1,3-Dichloropropane	NS	NA	mg/L	ND	ND	ND	ND	ND
2,2-Dichloropropane	NS	NA	mg/L	ND	ND	ND	ND	ND
1,1-Dichloropropene	NS	NA	mg/L	ND	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	NS	NA	mg/L	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	NS	NA	mg/L	ND	ND	ND	ND	ND
Bromochloromethane	NS	NA	mg/L	ND	ND	ND	ND	ND
n-Butylbenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
sec-Butylbenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
tert-Butylbenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
Diazinon	NS	NA	mg/L	ND	ND	ND	ND	ND
Diuron	NS	NA	mg/L	ND	ND	ND	ND	ND
Hexachlorobutadiene	NS	NA	mg/L	ND	ND	ND	ND	ND
Isopropylbenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
p-Isopropyltoluene	NS	NA	mg/L	ND	ND	ND	ND	ND
Methyl-Tert-Butyl Ether (MTBE)	NS	NA	mg/L	ND	ND	ND	ND	ND
1-Phenylpropane	NS	NA	mg/L	ND	ND	ND	ND	ND
n-Propylbenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	NS	NA	mg/L	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	NS	NA	mg/L	ND	ND	ND	ND	ND

KEY TO ABBREVIATIONS AND IMPORTANT DEFINITIONS

P/A	Presence/Absence Test for Coliform	Umho/cm	Micromhos Per Centimeter
NA	Not Applicable or Not Available Yet	DLR	Detection Limit For Reporting Purposes
NT	Not tested	MF/L	Million Fibers Per Liter (Counting those longer than 10 Microns)
ND	Not Detected	*	Values based on the highest numbers from recent quarterly testing.
NS	No Standard in 1998.	**	In compliance If Radium 226 is < 3. If > 3, Radium 228 is tested.
mg/L	Milligrams Per Liter(Parts Per Million)	***	In Compliance if (Radium 226 + Radium 228) < 5.
(a)	Recommended Level	****	Values listed indicate non-corrosive water.
		NTU	Nephelometric Turbidity Unit--a measure of suspended solids.

PHGs are Public Health Goals. These are Shown in Parentheses.	The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency
MCLGs are Maximum Contaminant Level Goals. These are Used When PHGs are not yet established.	The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.
MCLs are Maximum Contaminant Levels	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the PHGs and MCLGs as is economical or technologically feasible.
Primary Drinking Water Standards	Primary MCLs, specific treatment techniques adopted in lieu of Primary MCLs, and monitoring and reporting requirements for MCLs that are specified in regulations.

APPENDIX A

WATER QUALITY DATA

SEE ATTACHED WATER QUALITY REPORT, 1998

CITY OF SAN FERNANDO

- WELL NO. 3
- WELL NO. 4A
- WELL NO. 2A
- WELL NO. 7A

WATERMASTER SERVICE

UPPER LOS ANGELES RIVER AREA

POLICIES AND PROCEDURES

February 1998

APPENDIX E

CRESCENTA VALLEY WATER DISTRICT

PUMPING AND SPREADING PLAN

1998-2003 Water Years

GROUNDWATER PUMPING

PLAN

WATER YEARS
OCTOBER 1, 1998 TO SEPTEMBER 30, 2003

Prepared by
CRESCENTA VALLEY
WATER DISTRICT

APRIL 1999

TABLE OF CONTENTS

TABLES

I. INTRODUCTION

The ground water rights of the Crescenta Valley Water District (CVWD) were defined by the JUDGEMENT in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et. al., Defendants". The Final Judgement was signed on January 26, 1979.

In 1993 and in February 1998, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Sections or Groundwater Quality Management and various new reports and appendices. This addition has been made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup and limiting the spread of contamination in the San Fernando Valley. This report is in response to Section 5.4, Groundwater Pumping and Spreading Plan. Since no groundwater spreading has been performed or is planned at this time by the CVWD, only plans/projections for groundwater pumping and treatment are discussed in this report.

The Groundwater Pumping Plan is based on the water year, October 1 to September 30. The Draft Plan for CVWD will be submitted in March or April to the Watermaster for the current water year.

II. WATER DEMAND

The annual total water demand for the last five years and the projected annual water demand for the next five years is shown in Table 2.1.

Water demand during the last five years has been affected by both dry and wet conditions in California. The CVWD has voluntary water conservation and an emergency water shortage ordinance on file and the District's Board of Directors can enact its provisions at any time deemed necessary. Moderate "hard conservation" in the form of retrofit "low flow" showerhead giveaways and an ultra-low flush toilet program has been or is currently being provided.

The 1997-98 base year again saw a sizable decrease compared to the prior two years due to the wet winter and spring. In any case, the water demands appear to be trending back up again for 1998-99.

Projected water demand is expected to decrease in 1999-2000 but then increase only slightly (0.5%) thereafter. The increase is expected mainly from residential growth. However, it is seen from Table 2.1 that water use has generally increased from 1993-94 and probably due to consumer's habits returning to less-water conserving, pre-drought consumption patterns.

The projected water demand seems to vary significantly due to weather conditions, in the CVWD service area mainly attributed to the residential character of the District and the large percentage of water consumption for outdoor landscaping. A variance of ±10% can be expected.

III. WATER SUPPLY

The water supply for the CVWD is composed of locally produced and treated groundwater and water from the Metropolitan Water District of Southern California (MWD) purchased on a wholesale basis from the Foothill Municipal (FMWD).

A. PRODUCTION WELLS

The CVWD has eleven wells that are currently in operation. Historic and projected production from these wells is shown in Table 3.1 The CVWD wells produce water which contains nitrate concentrations above the 45mg/L maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) and State of California Department of Health Services (DHS). As a result, an ion exchange process, the Glenwood Nitrate Removal Plant, is used to treat a portion of the produced water. Untreated water and water treated at the Glenwood Plant are blended to produce water with less than the nitrate MCL. The blended water is distributed by the CVWD system.

B. GLENWOOD NITRATE REMOVAL PLANT

The Glenwood ion exchange nitrate removal plant began operation in January 1990. The plant has been out of operation for extended periods in 1992-93 and in 1997 when repairs were necessary. In the past year, the plant was in full operation continuously. The historic and projected production from the Glenwood Plant is shown in Table 3.2.

C. PICKENS GRAVITY TUNNEL PRODUCTION

A small portion of the total CVWD demand is supplied by the Pickens Gravity Tunnel. Historic and projected production from Pickens Tunnel is shown in Table 3.3.

D. MWD

The amount of treated water purchased from the MWD via FMWD is expected to increase slightly over the next five years. Historic and projected use of MWD water is shown in Table 3.4.

IV. JUDGEMENT CONSIDERATIONS

The allowable pumping for CVWD's share of the Verdugo Basin is 3,294 acre-feet annually. Estimated future pumping is expected to realize this adjudicated quantity assuming continued full operation of District wells and the Nitrate Removal Plant as well as relatively stable levels of Verdugo Basin Groundwater. For the past four water years the Watermaster, with approval from the ULARA Administrative Committee, has allowed CVWD to over-pump their rights in the Basin, as shown in Table 3.1. This should continue for 1998-99. Future consideration for excess pumping in the Verdugo Basin is now addressed in the February 1998 "Policies and Procedures", Section 2.3.4. Either party, Glendale or CVWD, may pump in excess of their adjudication as long as total production does not exceed 7150 AF/year, as reviewed by the Watermaster. There is no projection of excess pumping beyond 2002-2003 for CVWD as it is assumed the City of Glendale will eventually develop their full prescriptive right in the Verdugo Basin.

TABLE 2.1
HISTORIC AND PROJECTED WATER DEMAND

(Acre-Feet)

93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000 2001	2001 2002	2002-2003
4806	4686	5346	5483	4991	5400	5300	5325	5350	5380
ACTUAL					PROJECTED				

TABLE 3.1
HISTORIC AND PROJECTED COMBINED WELL AND TUNNEL GROUNDWATER PRODUCTION

(Acre-Feet)

93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000 2001	2001 2002	2002-2003
3631	3707	3702	3672	3747	3600	3600	3500	3400	3300
ACTUAL					PROJECTED				

TABLE 3.2
HISTORIC AND PROJECTED GLENWOOD NITRATE REMOVAL PLANT PRODUCTION BEFORE BLENDING

(Acre-Feet)

92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000-2001	2001-2002	2002-2003
337	1550	1626	1419	1562	1391	1400	1400	1400	1400	1400
ACTUAL						PROJECTED				

NOTES:

(1) The Glenwood Treatment Plant has a capacity of 2.7 MGD of blended water.

(2) The Glenwood Treatment Plant began operation January 1990.

TABLE 3.3
HISTORIC AND PROJECTED PICKENS TUNNEL WATER PRODUCTION

(Acre-Feet)

93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000 2001	2001 2002	2002-2003
67	65	42	6	62	60	60	60	60	60
ACTUAL					PROJECTED				

TABLE 3.4
HISTORIC AND PROJECTED USE OF MWD TREATED WATER

(Acre-Feet)

92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000-2001	2001-2002	2002-2003
1694	1175	979	1644	1811	1244	1800	1700	1825	1950	2080
ACTUAL						PROJECTED				

NOTES:

(1) All values shown above are for treated water.