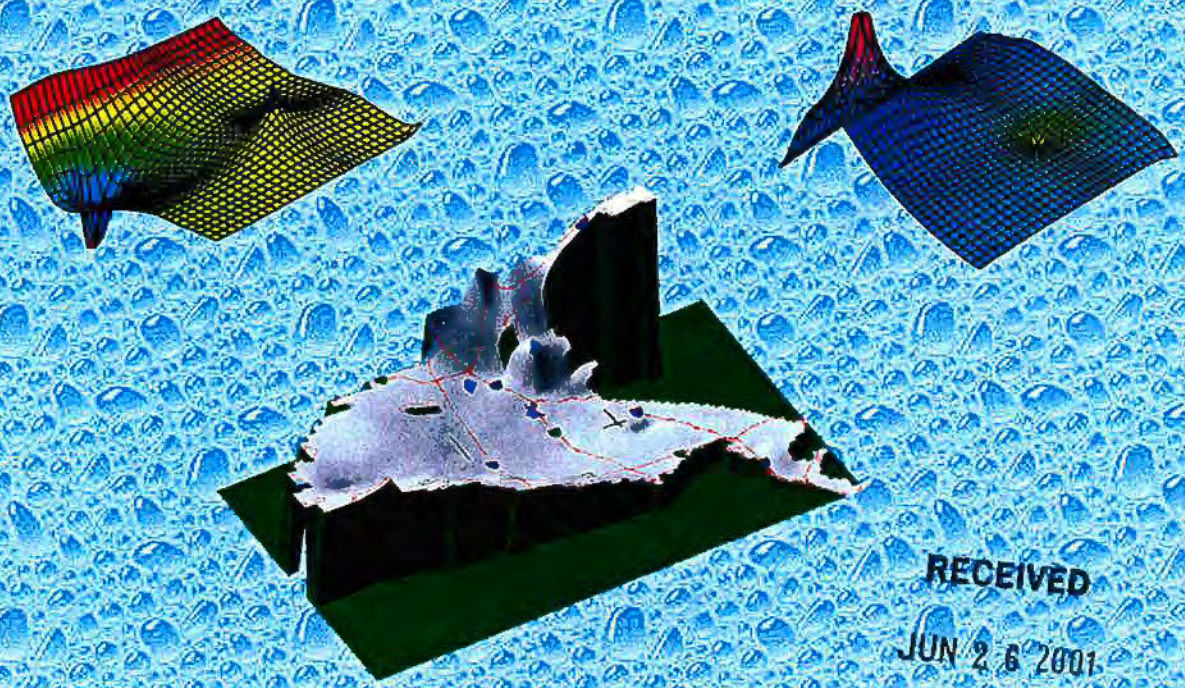
Upper Los Angeles River Area Watermaster

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

Case No. 650079 - County of Los Angeles

GROUND WATER
PUMPING AND SPREADING PLAN

2000-2005 Water Years



July 2001

Upper Los Angeles River Area Watermaster

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 1450
Los Angeles, CA 90051-0100

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

2000-2005 WATER YEARS

ULARA WATERMASTER
Melvin L. Blevins, P.E.

ASSISTANT WATERMASTER
Mark G. Mackowski, R.G., C.E.G.

WATERMASTER ADMINISTRATOR
Patricia T. Kiechler

GROUNDWATER HYDROLOGY/MODELING CONSULTANT
Hadi Jonny, P.E.

WATERMASTER STAFF

Andy J.V. Agra	Groundwater Modeler/GIS Analyst
Michael Hedvig	Management Assistant
Billie Washington	Clerk Typist

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

JULY 2001

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

II. INTRODUCTION

III. PLANS FOR THE 2000-05 WATER YEAR .....Pages 4 - 11
- A. Projected Groundwater Pumping for 2000-2001 Water Year
- B. Constraints on Pumping as of 2000-2001

IV. GROUNDWATER PUMPING FACILITIES.....Pages 12 -16
- A. Well Fields
- B. Active Groundwater Pumping and Treating Facilities
- C. Projected Groundwater Pumping and Treating Facilities
- D. Groundwater Remediation Projects
- E. Dewatering Operations

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS....Pages17-22
- A. Existing Spreading Operations
- B. Future Spreading Operations
- C. Actual and Projected Spreading Operations

VI. BASIN MANAGEMENT INVESTIGATIONS : PACOIMA AREA..Pages 23

VII. ULARA WATERMASTER MODELING ACTIVITIES.....Pages 24-31
- A. Introduction
- B. Model Input
- C. Simulated Groundwater Contours
- D. Evaluation of Model Results
- E. Groundwater Contaminant Plume Evaluation

VIII. WATERMASTER'S EVALUATION AND RECOMMENDATIONS..Page 32

IX. PLATES
1. Simulated Groundwater Contour - Model Layer 1 (Fall 2005)
2. Simulated Groundwater Contour - Model Layer 2 (Fall 2005)
3. Change in Groundwater Elevation - Model Layer 1 (Fall 2000 - Fall 2005)
4. Change in Groundwater Elevation - Model Layer 2 (Fall 2000 - Fall 2005)
5. Simulated Groundwater Flow Direction Model Layer 1- Fall 2005
6. Simulated Groundwater Flow Direction Model Layer 1 - Fall 2005

7. Simulated Groundwater Flow Direction and TCE Contamination Model Layer 1 - Fall 2005
8. Simulated Groundwater Flow Direction and PCE Contamination Model Layer 1 - Fall 2005
9. Simulated Groundwater Flow Direction and NO3 Contamination Model Layer 1 - Fall 2005
10. Burbank, Glendale, Los Angeles Operable Units and Chromium Contamination Plumes

X. TABLES

3-1 Estimated Capacities of ULARA Well Fields....Page 9
3-1A 2000-01 Groundwater Extractions....Page 10
3-1B Historical and Projected Pumping....Page 11
4-1 Actual Treated Groundwater....Page 14
4-2 Project Treated Groundwater....Page 14
5-1A 2000-01 Actual Spreading Operations....Page 19
5-1B Historical Precipitation....Page 19
5-2 Estimated Capacities of ULARA Spreading Grounds....Page 20
7-1 Model Input Summary....Page 29

XI. FIGURE

7-1 Model Layer Configuration....Page 30
7-2 Model Input....Page 31

XII. APPENDICES

A. City of Los Angeles - Plan 2000-2005
B. City of Burbank - Plan 2000-2005
C. City of Glendale - Plan 2000-2005
D. City of San Fernando - Plan 2000-2005
E. Crescenta Valley Water District - Plan 2000-2005

I. EXECUTIVE SUMMARY

As Watermaster for the Upper Los Angeles River Area (ULARA), I am pleased to submit the 2001 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 that established the Watermaster's responsibility for water quality management in the ULARA groundwater basins. The Pumping and Spreading Plan includes the individual plans submitted by the five major water rights holders, which incorporates changes in recharge, spreading, and pumping, or pumping patterns, especially in relation to the present and future plans for groundwater cleanup.

The Pumping and Spreading Plan for the 2000-2005 Water Years reports the impact of increased pumping at 9,000 gpm full-time by the City of Burbank's Operable Unit. There is discussion of the difficulty the City of Glendale has had in accepting the groundwater treated at its new Glendale North and South OU because of the presence of hexavalent chromium. Hexavalent chromium has presented a challenge to all the water purveyors in the San Fernando Basin (SFB) and will continue to impact pumping and water quality for the next several years. In the Verdugo Basin, Glendale has limited pumping capacity. The City of 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. Los Angeles is planning to pump its adjudicated amount.

Currently, there are six 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 has been in operation since September 26, 2000, but the treated water has been discharged to the Los Angeles River.

The Watermaster will continue to address the capacity limitations for the spreading grounds. Projected spreading is decreasing. This reduction in spreading lowers the water table. The Watermaster is working with the County and City of Los Angeles to find ways to maximize spreading in the Hansen and Tujunga Spreading Grounds and to explore spreading in new areas, possibly the Boulevard Pit. A mitigation plan for the Hansen Spreading Grounds has been developed but the rainfall pattern this past year did not permit implementation of the plan.

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 Tujunga and Rinaldi-Toluca wells of Los Angeles and the Burbank OU pumping (Plate 3).

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 assigns the responsibility for this annual Pumping and Spreading Plan to any party who produces groundwater. Each municipal pumper 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 the Administrative Committee is to review and approve the plan by July of the current Water Year.

This is the July 2001 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 of each party's water right.

III. PLANS FOR THE 2000-2005 WATER YEARS

A. Projected Groundwater Pumping for 2000-2005 Water Years

The total 2000-2001 ULARA pumping is projected at 120,583 AF (Table 3-1B), approximately 17,000 AF above the 21-year average (1979-2000). The estimated pumping for 2001-2002 is 115,185 AF, a 12,000 AF increase above the historical average. (Appendices A-E).

In 2000-01, the City of Burbank plans to pump 10,100 AF (Table 3-1A) from all its groundwater sources, an increase of 565 AF as compared to its past five years pumping, and overall, nearly a 51 percent increase (5,000 AF) from its historical 21-year average. This increase is due to the production by the Burbank OU. As of October 1, 2000, Burbank has a storage credit of 42,443 AF. Burbank's annual return water credit is approximately 4,500 AF and its right to purchase physical solution water from Los Angeles is 4,200 acre-feet per year (AF/yr). The Consent Decree II for the Burbank OU was entered on June 22, 1998. The 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, from the City of Los Angeles by purchasing a portion of Los Angeles' stored water, similar but not identical to the Physical Solution Provision covered in Sections 9.1 and 9.4 of the ULARA Judgment, or from the Metropolitan Water District of Southern California.

CVWD plans to pump 3,400 AF, which is an increase of about 800 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 requires the Watermaster's annual approval.

The City of Glendale resumed significant pumping from the SFB when the Glendale North and South OUs began operating in September 2000. In the SFB Glendale accumulates 20 percent return water credit for water delivered to its entire service area within the SFB. In addition, Glendale has the right to purchase from Los Angeles up to 5,500 AF/yr of physical solution water. Glendale had storage credit of 74,484 AF in the SFB as of October 1, 2000. Glendale plans to extract 2,700 AF from the Verdugo Basin in 2000-01, an increase of about 400 AF over its historical average, and 100 AF more than the average of the past five years.

The City of Los Angeles plans to pump about 90,210 AF this year from the San Fernando Basin, approximately 4,500 AF above its 1979-2000 annual average but about 5,000 AF less than the

past five-year average (1995-2000). A total of 3,620 AF of groundwater will be pumped from the Sylmar Basin, about a 600 AF increase as compared to the 1979-2000 average and 400 AF more than the average of the last five years (1995-2000). The amount of Los Angeles' pumping is dependent upon the availability of imported water supplies, particularly from the two Los Angeles Aqueducts and MWD. In 2001-2002, Los Angeles plans to pump 87,000 AF from the SFB, an increase of 2 percent compared to its 21-year average pumping. As of October 1, 2000, Los Angeles has a storage credit of 208,609 AF in the SFB and 3,711 AF in the Sylmar Basin.

In 2000-01 the City of San Fernando plans to pump 3,800 AF from the Sylmar Basin, 500 AF above its average pumping for the past five years and 900 AF above the past 21-year average. San Fernando has storage credit of 1,480 AF as of October 1, 2000.

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 2000-01 are given in Tables 3-1A, 3-1B, and 5-1A.

B. Constraints on Pumping as of 2000-2001

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 city assumed the 18-year operation of the facility on March 12, 2001 under provisions of the Second Consent Decree. Although the USEPA has turned over operating control of the facility to the City of Burbank, there are still continuing negotiations with Lockheed over several issues including the pumping capacity of the eight wells. In addition to mechanical and design problems discovered in some of the wells, Well VO-6 has been found to have high concentrations of 1,2,3-TCP that has spread to other nearby wells. The 1,2,3 TCP can be treated with GAC, but uses up the carbon beds at an accelerated rate. Well VO-6 was removed from service in late June 2000. The EPA and DHS agreed to an operating and monitoring plan for Well VO-6 that allows full use of the well beginning April 2001. Appendix B, P14, Figure 5.1 details the location of Burbank's wells

The Burbank City Council requested that use of Well VO-1 be mitigated because of hexavalent chromium. Burbank Water and Power made a formal proposal to the USEPA to substitute production from City Wells No. 11A and No. 12 for production from BOU

Well VO-1. The proposed substitution is intended to reduce the overall level of chromium in the Burbank water system, as Well VO-1 has singularly high chromium levels among the BOU wells. Overall production from the BOU will not change with the proposed substitution. The Burbank OU will pump about 8,800 acre-feet of groundwater during 2000-2001, a reduction from its maximum capacity of 14,000 acre-feet per year. Plate 10 maps the location of Burbank, Glendale and Los Angeles' operable units relative to the hexavalent chromium plumes and shows the location of Burbank Wells No. 11A and 12.

While these problems were being analyzed, Lockheed Martin invoked a "force majeure" provision of the Second Consent Decree in October 2001. Lockheed Martin claims the sustainable yield of the aquifer is 4,500 gpm, not 9,000 gpm, a problem beyond their control. However, Burbank has presented information indicating that changes in the water table have not affected the pumping capacity of the wells, and that the problems are due to well design and lack of proper maintenance. CH_2M Hill has been retained by the USEPA to study the yield of the aquifer, as well as the mechanical problems. The report is due in August 2001.

The Burbank GAC Treatment Plant is normally operated during the summer season from May to October. However, current plans are to keep the plant shut down until July 2002 or later because of chromium concerns.

City of Glendale – Glendale began operation of its long-awaited Glendale North/South Operable Unit on September 26, 2000. The Glendale Operable Unit was constructed to treat groundwater contaminated by TCE and PCE and to convey the treated water via the Grandview Pumping Station to the Glendale potable water system at a rate of 5,000 gpm, according to the terms of Glendale's 12-year Consent Decree with the USEPA.

Coincidental with the beginning of operation of the facility, hexavalent chromium became an issue. The treated water meets all MCLs for total chromium set by the State DHS at 50 ppb and by the USEPA 100 ppb. Three factors converged that created public concern: the Public Health Goal (PHG) for total chromium was set at 2.5 ppb; the movie "Erin Brockovich," that told the story of a community's perceived health risk from hexavalent chromium, enjoyed enormous box office success; and there is no MCL for hexavalent chromium.

The treated water has been discharged to the Los Angeles River since September 2000 while the City of Glendale, the USEPA, the Watermaster, and numerous elected officials gather information and seek a remedy. Wasting the water is clearly prohibited by State law. The results of scientific studies on mice to determine the health risk to humans from ingesting hexavalent chromium are several years away. The City of Glendale's annual delivery of treated water was anticipated to be about 7,200 AF/yr and would have met about 25 percent of projected water demands.

City of Los Angeles - Several of the well fields within the SFB cannot be fully utilized because of groundwater contamination, primarily from volatile organic compounds (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 removed from service, and the Pollock and Headworks Well Fields. The Pollock Well Field was partially restored when the Pollock Wells Treatment Plant was placed into service 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 13,500 gpm. The Tujunga Well Field has also experienced low levels of TCE, PCE, and nitrates and is being evaluated.

SYLMAR BASIN

City of San Fernando - All of San Fernando's groundwater is pumped from the Sylmar Basin, where there are no limitations related to contamination. However, nitrate levels have been rising for several years in San Fernando's wells.

City of Los Angeles - The number of wells at the Mission Well Field have been reduced from six to three because of their age and condition. In August 2000, Los Angeles began work to seal off the upper zone of the casing in Mission Well No. 5 in order to pump from the lower zones that have lower levels of nitrates than the upper aquifer. Old septic systems are the likely cause of the high nitrate levels. The City of Los Angeles Bureau of Sanitation is investigating the location of septic systems, identifying potential sewer connections, and attempting to obtain project funding. The Mission Wells will pump about 3,620 AF/yr during the 2000-2001 Water Year.

VERDUGO BASIN

Crescenta Valley Water District - All of CVWD'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 groundwater through the Glenwood Nitrate Removal Plant and blending the treated groundwater with untreated Metropolitan Water District (MWD) water to meet drinking water standards. The CVWD 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. CVWD is at the beginning of a ten year cycle to construct new wells to replace existing wells that are 50 to 75 years old. The first well was completed in April 2001, and a second well is scheduled to be constructed in early 2002.

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 the lack of wells, rather than a volatile organic contaminant problem. Additional extraction capacity in the Verdugo Basin may be developed.

TABLE 3-1: ESTIMATED CAPACITIES OF ULARA WELL FIELDS

Party/Well Field	Number Standby Wells	Number Active Wells	Estimated Capacity (cfs)
	SAN FERNANDO BASIN		
City of Los Angeles			
Aeration	---	7	4
Erwin	3	2	10
North Hollywood	8	21	129
Pollock	1	2	10
Rinaldi-Toluca	---	15	117
Tujunga	---	12	107
Verdugo	2	3	12
Whitnall	1	4	20
City of Burbank	3	10	24
City of Glendale		8	11
TOTAL:	18	84	444
	SYLMAR BASIN		
City of Los Angeles		3	9
City of San Fernando		4	9
TOTAL:		7	18
	VERDUGO BASIN		
CVWD		10	18
City of Glendale		5	15
TOTAL:		15	33

TABLE 3-1A: 2000-01 ACTUAL AND PROJECTED GROUNDWATER EXTRACTIONS
(acre-feet)

Party/Well Field	Total	2000			2001								
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
		SAN FERNANDO BASIN											
City of Los Angeles		Actual							Estimated				
AERATION	1,369	121	144	85	0	0	47	60	185	179	185	184	179
ERWIN	2,010	159	235	62	61	77	34	0	280	271	280	280	271
HEADWORKS	80	0	0	80	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	19,670	1695	1714	81	1194	2207	0	595	1292	2678	2768	2768	2678
POLLOCK	2,880	359	394	0	0	0	0	0	431	417	431	431	417
RINALDI-TOLUCA	21,745	0	0	0	1410	1578	0	0	966	4374	4521	4521	4375
TUJUNGA	35,171	3548	1068	903	2881	1129	10	4202	4342	4202	4342	4342	4202
VERDUGO	5,078	350	519	435	434	555	0	357	492	476	492	492	476
WHITNALL	2,288	141	204	165	163	199	0	232	240	232	240	240	232
TOTAL:	90,291	6,373	4,278	1,811	6,143	5,745	91	5,446	8,228	12,829	13,259	13,258	12,830
City of Burbank	1290	240	107	151	256	226	16	25	54	54	54	54	54
Lockheed/BOU	8,810	663	777	500	582	516	620	859	859	859	859	859	859
City of Glendale	6,672	595	588	587	597	538	527	540	540	540	540	540	540
TOTAL:	107,063	7,871	5,750	3,049	7,578	7,025	1,254	6,870	9,680	14,281	14,711	14,710	14,282
		SYLMAR BASIN											
City of Los Angeles	3,620	282	479	355	271	341	443	242	242	242	242	242	242
City of San Fernando	3,800	360	292	303	252	218	253	354	354	354	354	354	354
TOTAL:	7,420	642	771	658	523	559	696	595	595	595	595	595	595
		VERDUGO BASIN											
Crescenta Valley Water District	3,400	293	268	204	158	194	205	346	346	346	346	346	346
City of Glendale	2,700	212	206	186	184	155	193	261	261	261	261	261	261
TOTAL:	6,100	505	474	390	342	349	398	607	607	607	607	607	607
ULARA TOTAL:	120,583	9,018	6,995	4,097	8,443	7,933	2,348	8,072	10,883	15,484	15,914	15,913	15,485

TABLE 3-1B: HISTORICAL AND PROJECTED PUMPING
(acre-feet)

Party/Wellfield	Historical Average Pumping		Projected Groundwater Pumping				
			SAN FERNANDO BASIN				
City of Los Angeles	1979-2000(A)	1995-2000(B)	2000-01	2001-2002	2002-2003	2003-04	2004-05
AERATION	716	1505	1369	1300	1500	1500	1600
ERWIN	4868	1709	2010	2300	2200	2200	0
HEADWORKS	2079	0	80	0	0	5800	10000
No HOLLYWOOD	32088	23851	19670	19000	21800	23100	23600
POLLOCK	2081	2081	2880	2400	2400	2400	2400
RINALDI-TOLUCA	21839	36156	21745	21000	23400	24600	25900
TUJUNGA	9775	24329	35171	34000	37800	39800	40500
VERDUGO	5236	2725	5078	4900	5400	0	0
WHITNALL	7010	2797	2288	2100	2500	2600	0
TOTAL City of Los Angeles	**85692**	**95153**	**90291**	**87000**	**97000**	**102000**	**104000**
City of Burbank (C)	1411	1889	1290	300	1800	1800	1800
LOCKHEED BOU	3841	7646	8810	10140	12336	12336	12336
City of Glendale (C)	1416	430	6672	4025	4025	4025	4025
TOTAL San Fernando Basin	**92360**	**105118**	**107063**	**101465**	**115161**	**120161**	**122161**
			SYLMAR BASIN				
City of Los Angeles	3026	3212	3620	3620	3620	3620	3620
City of San Fernando	2985	3377	3800	3800	3900	3900	4000
TOTAL Sylmar Basin	**6011**	**6589**	**7420**	**7420**	**7520**	**7520**	**7620**
			VERDUGO BASIN				
Crescenta Valley Water District	2668	3724	3400	3600	3600	3650	3650
City of Glendale	2288	2596	2700	2700	2700	2700	2700
TOTAL Verdugo Basin	**4956**	**6320**	**6100**	**6300**	**6300**	**6350**	**6350**
TOTAL ULARA	103327	118027	120583	115185	128981	134031	136131

A. 21 year average.

B. 5 year average.

C. Includes Forest Lawn pumping for Glendale and Valhalla pumping for Burbank.

IV. GROUNDWATER PUMPING AND TREATMENT FACILITIES

A. Well Fields

There are ten production well fields located in the SFB, two in the Sylmar Basin, and two in the Verdugo Basin. The locations of the well fields are shown in Plate 4, and their estimated capacities are given in Table 3-1.

B. Active Groundwater Pumping and Treatment Facilities

Glendale OU

The Glendale OU is constructed and has been producing and treating groundwater for VOCs since September 2000. On April 23, 2001, the City of Glendale assumed operation of the Glendale Water Treatment Plant. The facility is comprised of a water treatment plant, piping to convey the untreated water from the wells to the treatment plant, a conveyance system to bring water from the treatment plant to Glendale's 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. The facility has the capacity to treat 5,000 gpm from the eight wells in the Glendale North Well Field and the Glendale South Well Field. Appendix C, Figure 5 details the facility.

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, produces 9,000 gpm or 14,000 AF annually. Under the terms of the Second Consent Decree, Burbank assumed operation of the Lockheed-Burbank OU treatment plant and eight wells as the long-term primary operator beginning March 12, 2001 for the next 18 years. Although the USEPA has turned over operating control of the facility to the City of Burbank, there are still continuing negotiations with Lockheed over several issues including the pumping capacity of the eight wells.

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. Between December 1999 and

March 2001 the facility was out of service due to a series of unrelated problems including a shut down of the North Hollywood Forebay for repairs.

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 the 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 operate the GAC Treatment Plant at the following flow rates during the 2000-2001 Water Year:

October – February	1,800 gpm
March - September	0 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 ion-exchange process and blended with untreated water or imported MWD water to reduce nitrate levels.

Pollock Wells Treatment Plant - City of Los Angeles

Pollock Wells Treatment Plant, treating 3,000 gpm of groundwater, began operating in March 1999. This project is funded by the City of Los Angeles. The Pollock Project's goals are 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 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	Glendale North/South OU	CVWD Glenwood Nitrate Removal Plant	North Hollywood Aeration Facility	Pollock Wells Treatment Plant	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
1998-99	1,555		9,184		1,281	1,515	1,513	15,048
1999-2000	1,096		11,451	979	1,137	1,213	1,851	17,727
Total AF	**14,140**	**4,815**	**39,072**	**979**	**11,150**	**14,527**	**1,513**	**88,047**

TABLE 4.2 PROJECTED GROUNDWATER TREATMENT

	Burbank GAC	Lockheed BOU	Glendale North/South OUs	CVWD Glenwood Nitrate Removal Plant	Los Angeles Aeration Facility	Los Angeles' Pollock Wells Treatment Plant	Los Angeles' Headworks Well Field Remediation Project	Annual Total AF
2000-01	990	8,810	6,672	1,200	1,369	2,880		21,921
2001-02	-	10,140	3,600	1,300	1,300	2,400		18,740
2002-03	1,500	12,336	3,600	1,400	1,500	2,400		22,736
2003-04	1,500	12,336	3,600	1,400	1,500	2,400	5,800	28,536
2004-2005	1,500	12,336	3,600	1,400	1,600	2,400	10,000	32,836
Total AF	**5,490**	**55,958**	**21,072**	**6,700**	**7,269**	**12,480**	**15,800**	**124,769**

C. Projected Groundwater Pumping and Treatment Facilities

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 13,500 gpm. The Conditional Use Permit was secured in March 2000. The original scope of work has been expanded to allow for accommodation of additional treatment facilities if currently unknown or undetected chemicals become regulated constitutents at some

future time. This facility is located near the Headworks Spreading Grounds and is scheduled to be in service in 2003.

D. Other Groundwater Remediation Projects

Many privately owned properties in the SFB have been found to have groundwater contamination, and are under Clean-up and Abatement Orders from the RWQCB. Each site typically has monitoring wells and some have extraction wells and treatment facilities. The RWQCB is in the process of evaluating and closing a significant number of cases in the underground tank program.

The RWQCB, funded in part with a grant from the USEPA, has undertaken an investigation of sites suspected of hexavalent chromium contamination. A database of sites in the San Fernando Superfund area with either confirmed chromium contamination or a history of chromium use has been created. The RWQCB is conducting inspections of these sites and will evaluate additional information provided by the California Department of Toxic Substances Control, the South Coast Air Quality Management District, and the Los Angeles County Department of Sanitation.

E. Dewatering Operations

Metropolitan Transit Authority (MTA)

As part of the planned transportation system in Los Angeles County, the MTA constructed the Universal City Subway Station and the associated rail lines. The construction project was completed in June 2000. To ensure the safe and continued operation of its rail system constructed into and below the water table at certain locations within ULARA the MTA must dispose of infiltrated groundwater. In March 2001 the City of Los Angeles, Los Angeles County MTA, and the ULARA Watermaster entered into an agreement allowing the MTA to discharge groundwater to protect the subway areas and to take "all reasonable efforts to beneficially use the water so removed." The discharged water is debited from Los Angeles' stored water and the MTA reimburses Los Angeles an agreed amount.

Other Permanent Dewatering Operations

Many facilities along the southern and western boundaries of the SFB have deep foundations in the areas of high groundwater 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 is required to be reported to the Watermaster on a monthly basis.

F. Unauthorized Pumping in the County

Unauthorized Pumping

There are a significant number of individuals, primarily within the unincorporated hill and mountain area, who are pumping groundwater without reporting the volume of production to the Watermaster. This groundwater has been adjudicated and is the property of the City of Los Angeles. The volume produced by each pumper is probably small, but the cumulative effect may be relatively large. The Watermaster enforces the Judgment at the direction of the Los Angeles Superior Court, and is investigating and conducting negotiations with the City of Los Angeles and Los Angeles County in an attempt to resolve the problem.

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS

A. Existing Spreading Operations

There are six spreading facilities located in the SFB (Plate 2). The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima 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 2000-2001 Water Year. There is an investigation and analysis being made by the County Department of Public Works-Flood Control Section and the City of Los Angeles Department of Water and Power to identify ways to maximize spreading. Estimated capacities are shown in Table 5-2.

B. Future Spreading Operations

East Valley Water Recycling Project

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. Twelve monitoring wells were installed in the EVWRP study area to identify the effect on 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.

Headworks Spreading Grounds

The Headworks Spreading Grounds project would restore San Fernando Basin recharge operations to this site. The diversion facilities in the Los Angeles River near Griffith Park would be rehabilitated, modified or replaced, earthwork would be reconfigured for the settling and spreading basins, and monitoring wells would be installed. The Headworks Spreading Grounds Stakeholders Group, working with the Los Angeles Department of Water and Power, have identified compatible multi-use programs for the site including nature trails, biking paths, and educational guides.

Boulevard Pit Spreading Facility

Vulcan Materials, CalMat Division, is currently mining sand and gravel from its Boulevard Pit, located between the existing Hansen and Tujunga Spreading Grounds. The City of Los Angeles, LACDPW, and the Watermaster are investigating the feasibility of ultimately acquiring the Boulevard Pit for conversion into a new stormwater retention and recharge facility.

C. Actual and Projected Spreading

Table 5-1A shows the actual and projected spread volumes for the 2000-2001 Water Year. As shown in Table 5-1A, the 2000-2001 Water Year will experience below average recharge activities. Overall, approximately 21,450 AF will be spread as compared to the 31-year historical average of 34,112 AF, and compared to the past five-year average of 29,974 AF. Rainfall precipitation on the valley fill is estimated at 20 inches for 2000-01 as compared to the long-term average of 18.43 inches per year and the previous five-year average of 17.78 inches per year.

TABLE 5-1A: 2000-2001 SPREADING OPERATIONS

(acre-feet)

	Operated by:						
	LACDPW				LADWP	LACDPW and LADWP	
Month	Branford	Hansen	Lopez	Pacoima	Headworks	Tujunga	Total
Oct-00	83	0	0	88	0	0	171
Nov-00	13	0	0	125	0	0	138
Dec-00	15	200	0	0	0	0	215
Jan-01	368	1,040	0	708	0	82	2,198
Feb-01	80	2,430	0	1,231	0	4,647	8,388
Mar-01	35	5,050	136	1,450	0	330	7,001
Apr-01	2	1,775	390	216	0	10	2,393
May-01	2	375	15	42	0	10	444
Jun-01	2	300	45	42	0	10	399
Jul-01	2	50	50	0	0	0	102
Aug-01	2	0	0	0	0	0	2
Sep-01	0	0	0	0	0	0	0
TOTAL	604	11,220	636	3,902	0	5,089	21,451
1969-2000 Average	509	14,621	569	6,953	2,324	9,136	34,112
1995-2000 Average	483	12,521	516	6,924	0	9,530	29,974

Table 5-1B: HISTORICAL PRECIPITATION ON THE VALLEY FILL

(inches per year)

1969-00 Average	1995-00 AV	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01**
18.43	17.78	12.03	15.17	37.04	9.81	14.84	20

* - Includes native and imported waters.

** - Estimated.

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	7	1,000
Hansen	Shallow basin	105	36,000
Lopez	Shallow basin	12	5,000
Pacoima	Med. depth basin	107	29,000
	Operated by LADWP		
Headworks	Shallow basin	28	22,000
	Operated by LACDPW and LADWP		
Tujunga	Shallow basin	83	43,000
	TOTAL:	342	136,000

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 to inundate the base of the Bradley-East Landfill near the Hansen Spreading Grounds and the Sheldon-Arleta Landfill adjacent to the Tujunga Spreading Grounds. At that time, 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 affects 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 recedes 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 established a new and improved location to record the groundwater levels – 1,000 feet further downgradient from its existing location and 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/yr.

- Tujunga Spreading Grounds Mitigation Plan

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

During the spreading of surface water, water moves through the soil column and displaces the air from voids contained in the soil matrix. A significant migration of air mass has the potential to displace methane gas out of the landfill. In recent years the methane has occasionally migrated and caused elevated 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 storm water runoff being 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 and during spreading of surface water. This may improve containment of 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.

The goal is to contain methane gas within the landfill and improve the spreading capacity by at least 25 percent.

Unfortunately, due to the lack of heavy storm runoff in 1998-99 or 1999-2000, this plan was not implemented. In the meantime, the Bureau of Sanitation and the City of Los Angeles Department of Water and Power are working with their consultant, GeoSyntec, who is conducting a full study to identify the most effective alternative to solve this problem. A recommendation is due in August 2001.

VI. BASIN MANAGEMENT ACTIVITIES AND INVESTIGATIONS

A. Groundwater Investigation Programs

Holchem Inc. - Pacoima Area Groundwater Investigation

A significant groundwater contaminant plume exists in the Pacoima area near the intersection of San Fernando Road and the Simi Valley Freeway (118 Freeway) 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 level found in the San Fernando Valley.

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 miles downgradient of the site. PA-01 was sampled on March 11, 1998 and the following constituents were 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), and Toluene (~1.3 µg/L). PA-02 was installed three-quarters mile downgradient of PA-01 and was sampled on March 11, 1998. PCE was detected (~ 1.1 µg/L).

In March 2001 the DTSC reported that it had approved a Removal Action Workplan (RAW) for the Holchem site. The RAW includes both soil vapor extraction and groundwater treatment activities.

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 "Year 2001 Pumping and Spreading Plans" 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 is a tool to estimate the future response to pumping and spreading in the San Fernando Basin for the next five years. Up-to-date groundwater elevations for specific locations can be obtained by contacting the Watermaster's Office at (213) 367-0921.

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 in three dimensions. In the deepest portion of the SFB the model is subdivided into four layers, each layer characterizing a specific zone. The model has a variable horizontal grid that ranges 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 data are available. The model is actively updated.

B. Model Input

The input data for this model is illustrated in Table 7-1. Table 7-1A is the Basin Recharge, which consists of precipitation, delivered water, hill and mountain runoff, spreading, and sub-surface inflow. Table 7-1B is the Basin Extraction of major producers such as the City of Los Angeles, City of Burbank, City of Glendale, the City of San Fernando, Crescenta Valley Water District, and other individual producers. Both tables represent a projected value for the five-year study, from Fall 2000 to Fall 2005 except for the first half of water year 2000-01 where the actual values were known.

In Table 7-1A, the percolation and spreading values were derived from the average or normal rainfall and recharge conditions over the five-year study period except for the first half of water year 2000-01 where actual values were known. The Los Angeles County Department of Public

Works estimated the spreading recharge for the second half of the water year. A significant fact is that anticipated spreading amounts are reduced. Reduced spreading impacts the level of the water table. The values of the sub-surface inflow from the adjacent basins are constant throughout the five-year study.

All Table 7-1A values were derived from the "Pumping and Spreading Plans" submitted by producers. Each well field's values were assigned to individual wells, then each well was assigned a percentage of pumping to each model layer based on the percentage of the well's perforations contained within each layer.

The model's initial head values (groundwater elevations) were derived from the actual data of Water Year 1999-2000. The Water Year 1999-00 experienced a continuous decline in groundwater elevation as a result of above average extractions combined with low precipitation and low artificial recharge. The valley floor precipitation for the same year was 86 percent of the 100-year mean. At the close of every Water Year, the Watermaster staff updates the model-input files with the actual Basin Recharge and Extraction data. This activity has been performed each year during the period from 1980 to 2000.

C: Simulated Groundwater Elevations and Flow Directions

After running the model for five stress periods (Water Years 2000-2005), each 365 days, the MODFLOW generated numerical data: the head (groundwater elevations), the drawdown (change in groundwater elevations), and the cell-by-cell flow (source of vector or flow directions data). These numerical data were used to develop the following figures or Plates.

- 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 contours were generated from the drawdown data from the Fall 2000 to Fall 2005 stress period 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 2005

- 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 Burbank OU pumping increases to 12,336 AF/yr beginning 2002 through 2005. The radius of influence extends as far as 6,445 feet in the downgradient (southeasterly) direction. An upgradient radius of influence is usually larger than the downgradient radius of influence.

- In a more subtle manner, Plate 1 illustrates the pumping influence (pumping cones) of the Glendale OU, and Headworks Wells, North Hollywood OU, North Hollywood West Wells, and Pollock Treatment Plant Wells.

Plate 2: Simulated Groundwater Contour Model Layer 2 – Fall 2005

- The most significant features are the cones of depression near the Rinaldi-Toluca (R-T), Tujunga (TJ), North Hollywood-West (NHW), Burbank OU and Headworks Well Field (HW) areas. Over 75 percent of the R-T (25,900 AF/yr), TJ (40,500AF/yr), NH (23,600 AF/yr), and HW (10,000 AF/yr) pumping is derived from Layers 2-4.

Plate 3: Change in Groundwater Elevation Model Layer 1 – Fall 2000 to Fall 2005

- As shown in Plate 3, there is a continuous basinwide decline in the groundwater elevations over the five-year study period, with the exception of the immediate areas near the Hansen and Pacoima Spreading Grounds.

- The primary reason for the decline in water levels is that basin extractions are projected to increase over the 5-year study period compared to the water year of 2000-01.

- The water table within the cone of depression at the Rinaldi-Toluca Well Field is lowered by about 10 feet due to pumping and the groundwater level is lowered approximately 26 feet at the lowest point in the pumping cone near the Burbank OU. The Burbank OU extractions increase to 12,330 AF/yr beginning in 2002-2003, which is a 3,500 AF/yr increase over the 2000-01 period.

- The water table near the Glendale North OU wells will decline between 2 to 4 feet and approximately 2 feet near the South OU Wells. Full-scale operation of the OU plant started at the beginning of the 2000-01 Water Year. The North OU Wells will pump 3,572 AF/yr and the South OU Wells 2,070 AF/yr.

- The area near the Tujunga and Rinaldi-Toluca Well Fields will experience about a 10 foot decline in the water table. The area near the North Hollywood, Erwin, Whitnall, Verdugo, and Headworks Well Fields will experience a 10 to 20 foot depression in the water table.

- The water table will rise as much as 100 feet near the Hansen Spreading Grounds, primarily due to the 10,000 AF/yr increase from the EVWRP, maybe beginning in the water year of 2001-02.

Plate 4: Change in Groundwater Elevation Model Layer 2 – Fall 2000 to Fall 2005

- The area near the Tujunga, Rinaldi-Toluca and West North Hollywood well fields will experience a 5 to 20 foot decline in the water table. The area near the East North Hollywood, Erwin, Whitnall and Verdugo Well Fields will experience a 5 to 20 foot depression in the water table.

- The Headworks Well Field is planned for reactivation in 2003-04. 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 (10,000 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 of 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. The total drawdown at the Headworks area will be almost 25 feet.

Plate 5: Simulated Groundwater Flow Direction Model Layer 1 – Fall 2005

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

- The Rinaldi-Toluca, North Hollywood, Headworks, Glendale OU, and Burbank OU Well Fields and the Hansen Spreading Grounds cause the most pronounced effect on the direction

of groundwater movement. In particular, the Burbank OU creates such a significant pumping cone that groundwater flows toward the well field from all directions (radial flow).

- A groundwater divide apparently develops just north of the Verdugo and Burbank Water and Power (BWP) 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. Another water divide develops between Headworks and the Glendale North OU wells primarily due to the pumping from the Headworks Well Field.

Plate 6: Simulated Groundwater Flow Direction Model Layer 2 – Fall 2005

- Similar to Plate 5, a groundwater divide forms between the Verdugo and Burbank PSD wells and the Burbank OU, Erwin and Whitnall wells and between Headworks and the Glendale North OU wells. The effect of the Rinaldi-Toluca, North Hollywood, Headworks, Glendale 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 2005

- 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 2005 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.

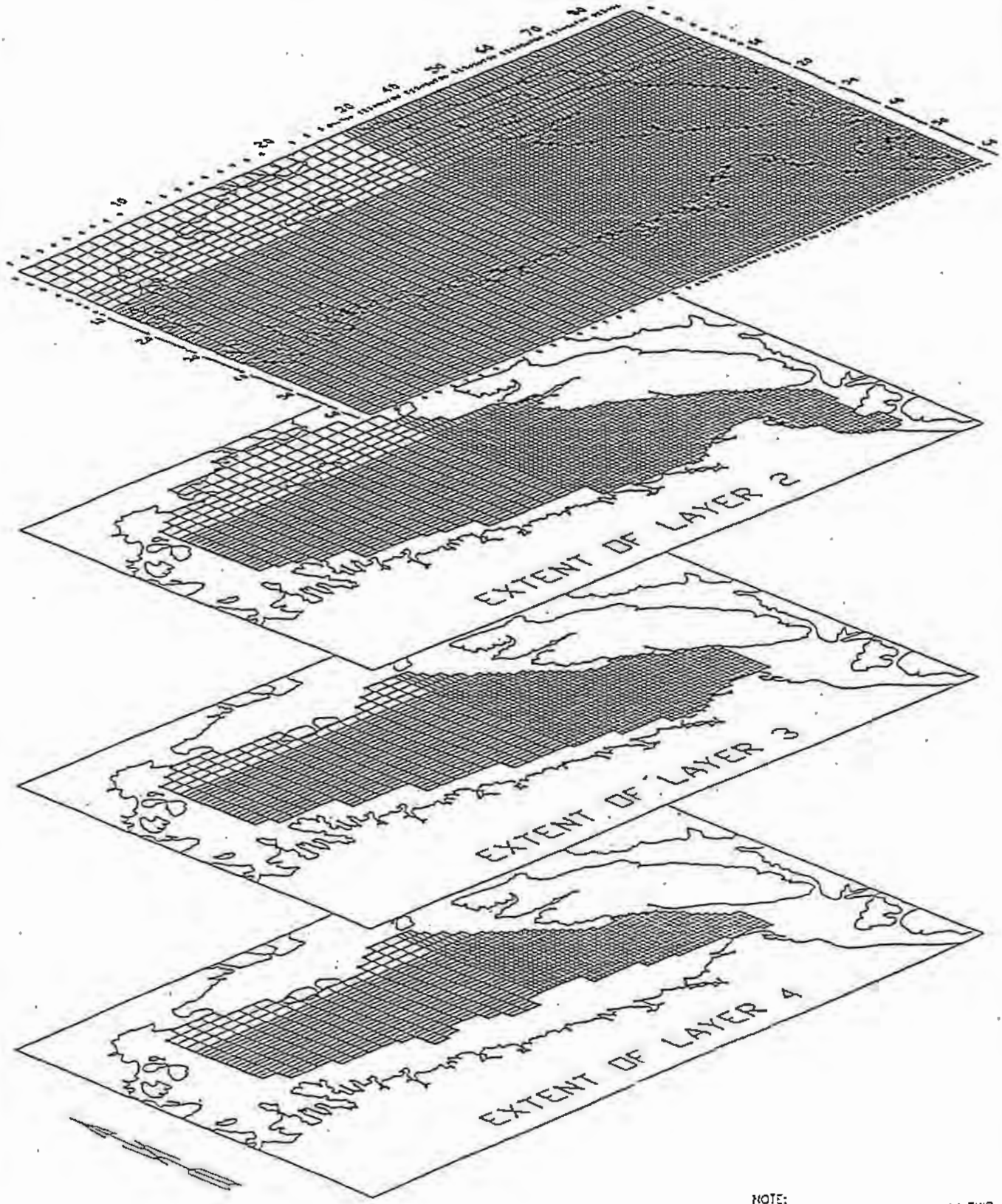
- The Burbank OU pumping (13,800 AF/yr) tends to flatten the horizontal gradient in a southeasterly direction and slows the natural movement of groundwater southeasterly of the Burbank OU area plume.

- The Headworks wells pumping tends to capture the major portion of the plumes uncaptured by Burbank OU wells.

- The Glendale North and South OU Wells (5,642 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.

- Plate 10 provides a view of areas detected with Chromium Concentrations in the San Fernando Valley Basin with the location of the EPA funded operable units.



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

MODFIGS RE. -/08/92

MODEL INPUT
Pumping and Spreading Scenario
Water Years 2000 - 2005

	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
2000-01	20.00	26.00	13,894	56,000	**69,894**	**4,440**	604	11,220	-	636	3,902	5,089	**21,451**	350	400	70	**820**	**96,605**
2001-02	18.57	23.06	12,874	61,525	**74,399**	**3,939**	438	22,973	-	579	6,127	6,696	**36,813**	350	400	70	**820**	**115,971**
2002-03	18.57	23.06	12,874	61,525	**74,399**	**3,939**	438	22,973	-	579	6,127	6,696	**36,813**	350	400	70	**820**	**115,971**
2003-04	18.57	23.06	12,874	61,525	**74,399**	**3,939**	438	22,973	-	579	6,127	6,696	**36,813**	350	400	70	**820**	**115,971**
2004-05	18.57	23.06	12,874	61,525	**74,399**	**3,939**	438	22,973	-	579	6,127	6,696	**36,813**	350	400	70	**820**	**115,971**

	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	OU-NORTH	OU-SOUTH	TOTAL NON-LADWP	TOTAL NON-GLENDALE (F. LAWN)	TOTAL EXTRACTION
2000-01	-1,369	-2,010	-80	-19,670	-2,880	-21,745	-35,171	-5,078	-2,288	**-90,291**	-1,000	-8,800	-300	-188	-3,572	-2,070	-2,975	-400	**-109,596**
2001-02	-1,300	-2,300	0	-19,000	-2,400	-21,000	-34,000	-4,900	-2,100	**-87,000**	0	-10,140	-300	-188	-2,062	-1,375	-2,975	-400	**-104,440**
2002-03	-1,500	-2,200	0	-21,800	-2,400	-23,400	-37,800	-5,400	-2,500	**-97,000**	-1,500	-12,336	-300	-188	-2,062	-1,375	-2,975	-400	**-118,136**
2003-04	-1,500	-2,200	-5,800	-23,100	-2,400	-24,600	-39,800	0	-2,600	**-102,000**	-1,500	-12,336	-300	-188	-2,062	-1,375	-2,975	-400	**-123,136**
2004-05	-1,600	0	-10,000	-23,600	-2,400	-25,900	-40,500	0	0	**-104,000**	-1,500	-12,336	-300	-188	-2,062	-1,375	-2,975	-400	**-125,136**

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

PROJECT: *WATERMASTER*
PROJECT NO.: *PS00-05*
DATE: 5/21/01

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 restored Burbank's and Glendale's groundwater pumping capability in the San Fernando Basin. Unfortunately, during the past year hexavalent chromium contamination has become an issue that may threaten the ability of the parties to put the water to beneficial use in the short-term. Senate Bill 2127 was signed into law and requires water purveyors in the San Fernando Valley to report on the occurrence and exposure to hexavalent chromium by January 1, 2002. The Watermaster is working closely with the parties and other agencies to comply with the new law.

City of Los Angeles

The Watermaster approves of Los Angeles' projected average annual pumping from the SFB of approximately 96,000 AF/yr for Water Years 2000-2001 to 2004-2005. This is approximately 10,000 AF/yr more than the 1979-2000 average but only 1,000 AF/yr more than average over the last five years (1995-2000). As of October 1, 2000 Los Angeles' accumulated stored water credit was 208,609 AF in the SFB.

The loss of Los Angeles' Headworks, Crystal Springs, and Pollock Well Fields due to VOC contamination has caused rising groundwater levels in the Los Angeles River Narrows area. The Watermaster is pleased by the partial restoration of pumping in this area by the construction of the Pollock Wells Treatment Plant, and encourages Los Angeles to operate this facility at least 2,000 AF/yr to minimize underflow and loss of water from ULARA. The Watermaster also looks forward to the construction of the Headworks Treatment Plant to further reduce this loss.

In the Sylmar Basin, Los Angeles plans to pump an average of 3,620 AF/yr for Water Years 2000-2001 through 2004-2005. This represents an increase over the long-term average (1979-2000) of 3,026 AF/yr, and is also higher than the average of 3,212 AF/yr during the past five years (1995-2000). As of October 1, 2000 Los Angeles' stored water credits were 3,711 AF in the Sylmar Basin.

City of Burbank

The Watermaster is pleased that Burbank's pumping capability has been restored through the construction of the Burbank Operable Unit. However, Burbank's stored water credit is showing the impact of this pumping, dropping from 50,771 AF on October 1, 1999 to 42,443 AF on

October 1, 2000. At current pumping rates Burbank's stored water will be depleted in 4-5 years, eventually requiring arrangements to purchase or replace extractions that are in excess of Burbank's return flow credits and physical solution purchase rights. The Watermaster encourages a cooperative spirit between Burbank and Los Angeles to promote the continued operation of the Burbank OU.

City of Glendale

The Watermaster congratulates Glendale on the completion of its Operable Unit. Since its start-up on September 26, 2000, the OU has pumped and treated approximately 4,200 AF from the SFB as of May 1, 2001. Unfortunately, all of this water was discharged into the Los Angeles River due to the perceived threat of hexavalent chromium. The Watermaster is currently seeking a solution that prevents this waste while addressing the concerns of Glendale and the USEPA. Glendale's stored water credits increased from 69,665 AF on October 1, 1999 to 74,484 AF on October 1, 2000. It is estimated that the facility can be operated for approximately 35 years before exhausting Glendale's stored water credits.

In the Verdugo Basin, Glendale expects to pump an average of 2,700 AF/yr for the next five years. The long-term average (1979-2000) is 2,288 AF/yr, and the five-year average (1995-2000) is 2,596 AF/yr.

City of San Fernando

San Fernando expects to pump an average of 3,880 AF/yr over the next five years from the Sylmar Basin. The long-term average (1979-2000) is 2,985 AF/yr, and the five year average (1995-2000) is 3,377 AF/yr. As of October 1, 2000 San Fernando's stored water credit was 1,439 AF in the Sylmar Basin.

Crescenta Valley Water District (CVWD)

The Watermaster supports CVWD's increased pumping in the Verdugo Basin until Glendale has the ability to pump its full right. CVWD expects to pump an average of 3,580 AF/yr during the next five years. The long-term average (1979-2000) is 2,668 AF/yr, and the five-year average (1995-2000) is 3,724 AF/yr.

Model Simulation

The model simulations indicate that a significant portion of the TCE and PCE contamination plumes in the Burbank area will be captured by the Burbank OU wells. The remaining uncaptured portion will migrate toward the Los Angeles River Narrows area. The Glendale OU and the Pollock Wells Treatment Plant will capture much of this remaining contamination, and the proposed Headworks Treatment Plant will further enhance the cleanup of the basin.

The change in groundwater elevation contours illustrates that over the next five years, there is an overall basinwide decline in groundwater levels, with the exception of the areas in the immediate vicinity of the Hansen and Pacoima Spreading Grounds. Specifically, the water table declines about 10 feet near the Tujunga and Rinaldi-Toluca Well Fields; up to 26 feet near the Burbank OU; 2 to 4 feet near the Glendale OU; and 10 to 20 feet near the North Hollywood, Whitnall, Erwin, Verdugo, and Headworks Well Fields. Near the Hansen and Pacoima Spreading Grounds the water table is expected to rise by approximately 100 feet due to the spreading of 10,000 AF/yr of recycled water for the EVWRP.

The model also demonstrates that the radius of influence of the Burbank OU extends to approximately 6,445 feet downgradient, and that the combined pumping of the Burbank OU, Rinaldi-Toluca, and North Hollywood Well Fields tends to flatten the horizontal gradient and slows the movement of the contaminant plumes south of the Burbank OU.

Nitrate contamination in excess of the 45 mg/L MCL will continue to affect the Burbank and Glendale OUs.

Pacoima Area Contamination

The Pacoima area groundwater contamination concerns the Watermaster because it is only 2.5 miles upgradient of the Tujunga Well Field. The Watermaster continues to urge the DTSC and RWQCB to expedite the investigation and cleanup of this VOC plume.

Tujunga Spreading Grounds

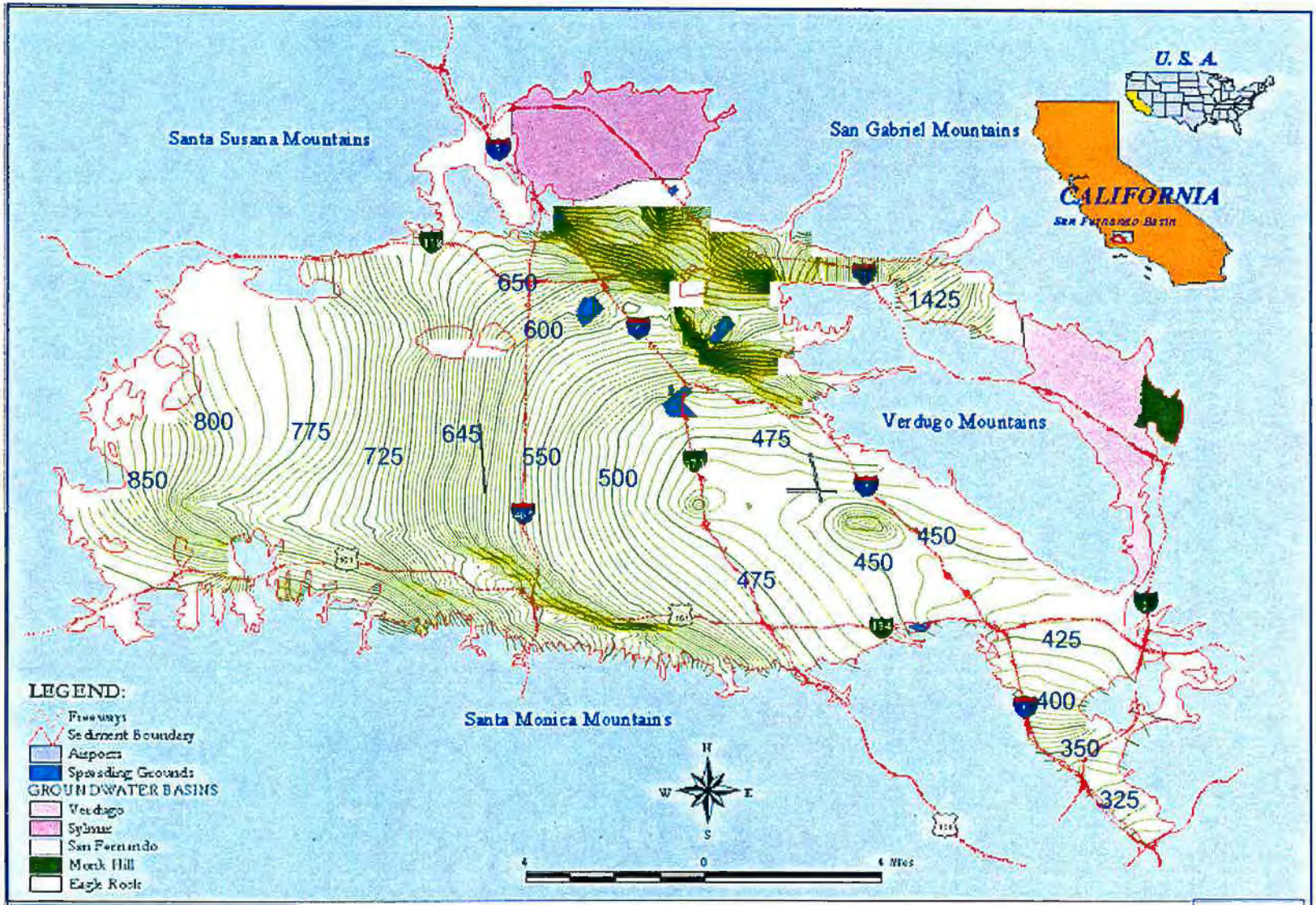
The Watermaster continues to take an active role in addressing the landfill gas migration problem at the Tujunga Spreading Grounds. The goal is to restore the full operation of the spreading grounds by preventing off-site methane gas migration during heavy spreading. Los Angeles has retained a consultant to help resolve this problem.

Boulevard Pit

The Boulevard Pit is owned by Vulcan Materials and is currently being mined for sand and gravel. The Watermaster has partnered with the City of Los Angeles and the Los Angeles County Department of Public Works to investigate the potential for obtaining this property and converting it into a spreading facility for native runoff. This facility may provide a significant new opportunity to enhance spreading for the City and provide additional flood control for the County.

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 and Glendale's groundwater pumping capability in the San Fernando Basin.

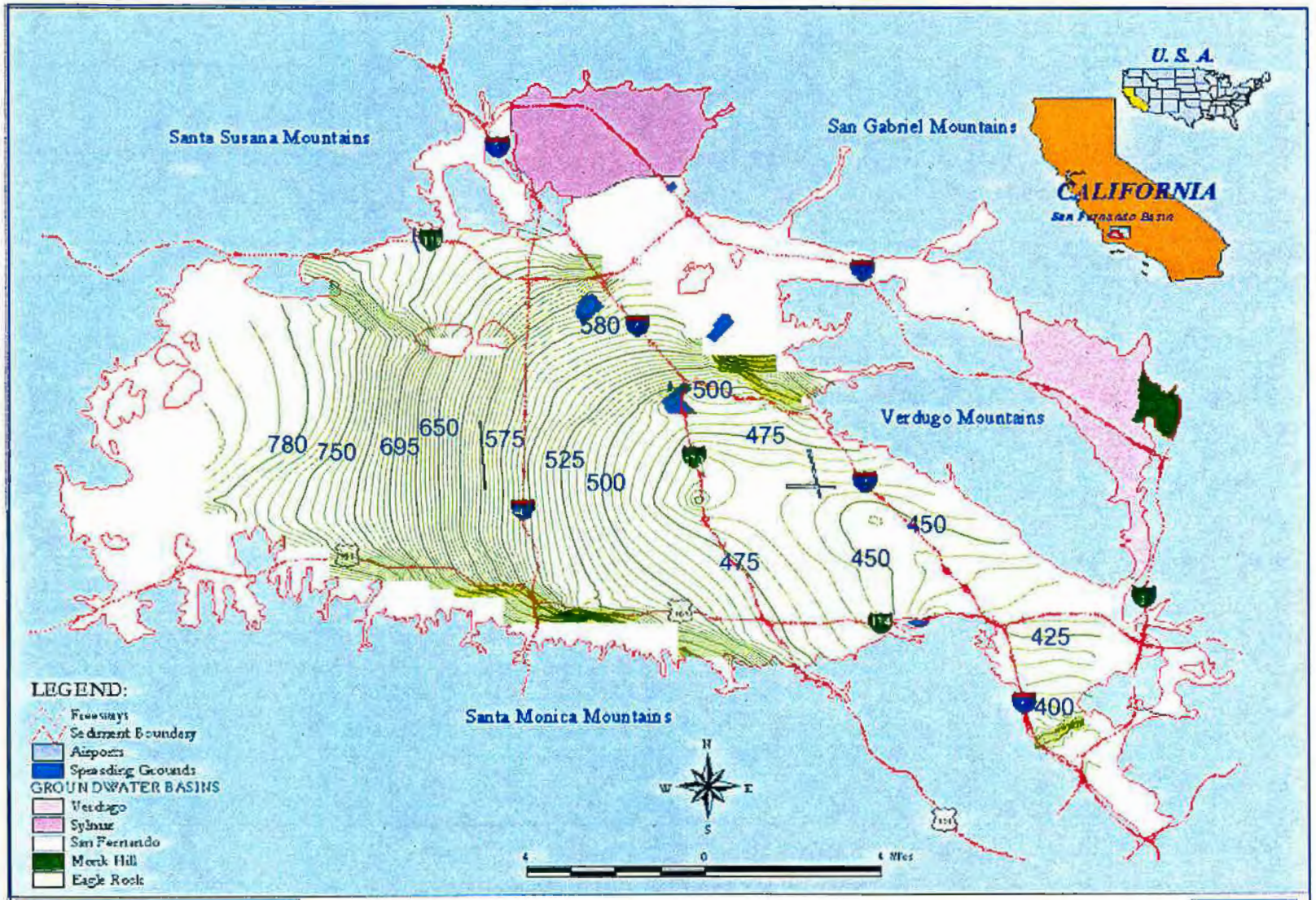
PLATES



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000-2005 WATER YEARS

Simulated Groundwater Contours - Model Layer 1
FALL 2005

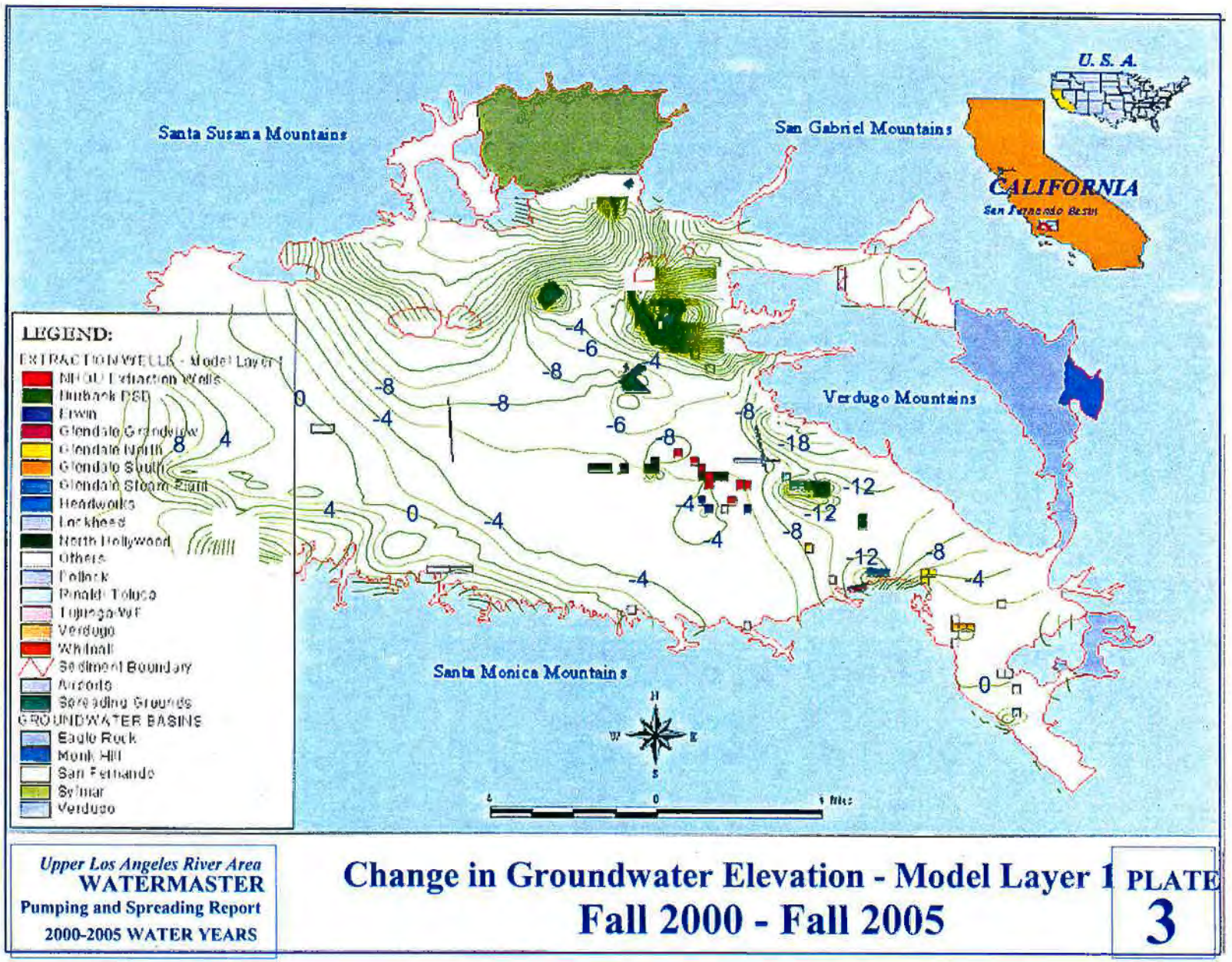
PLATE 1



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000-2005 WATER YEARS

Simulated Groundwater Contours - Model Layer 2
FALL 2005

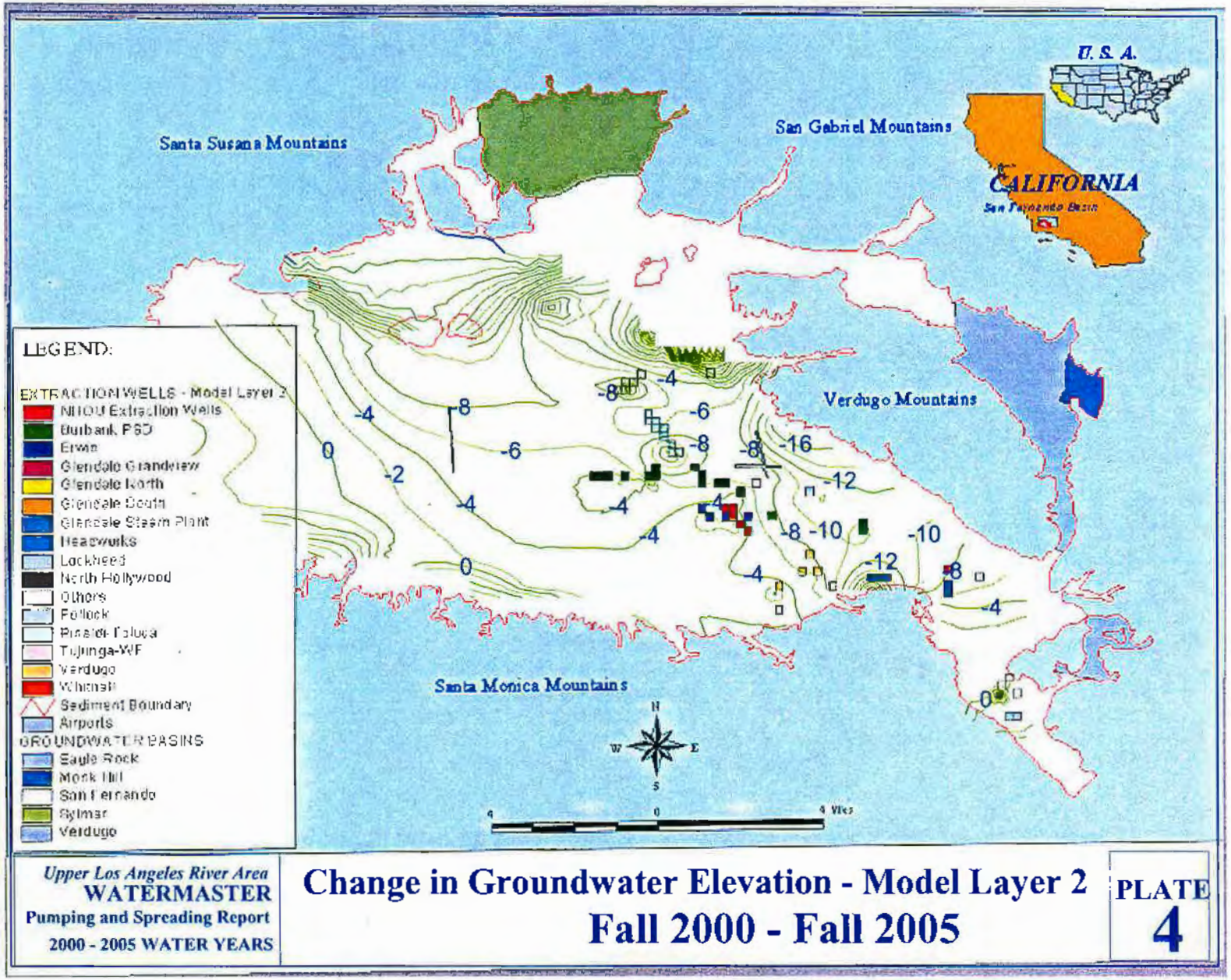
PLATE 2



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000-2005 WATER YEARS

Change in Groundwater Elevation - Model Layer 1
Fall 2000 - Fall 2005

PLATE 3

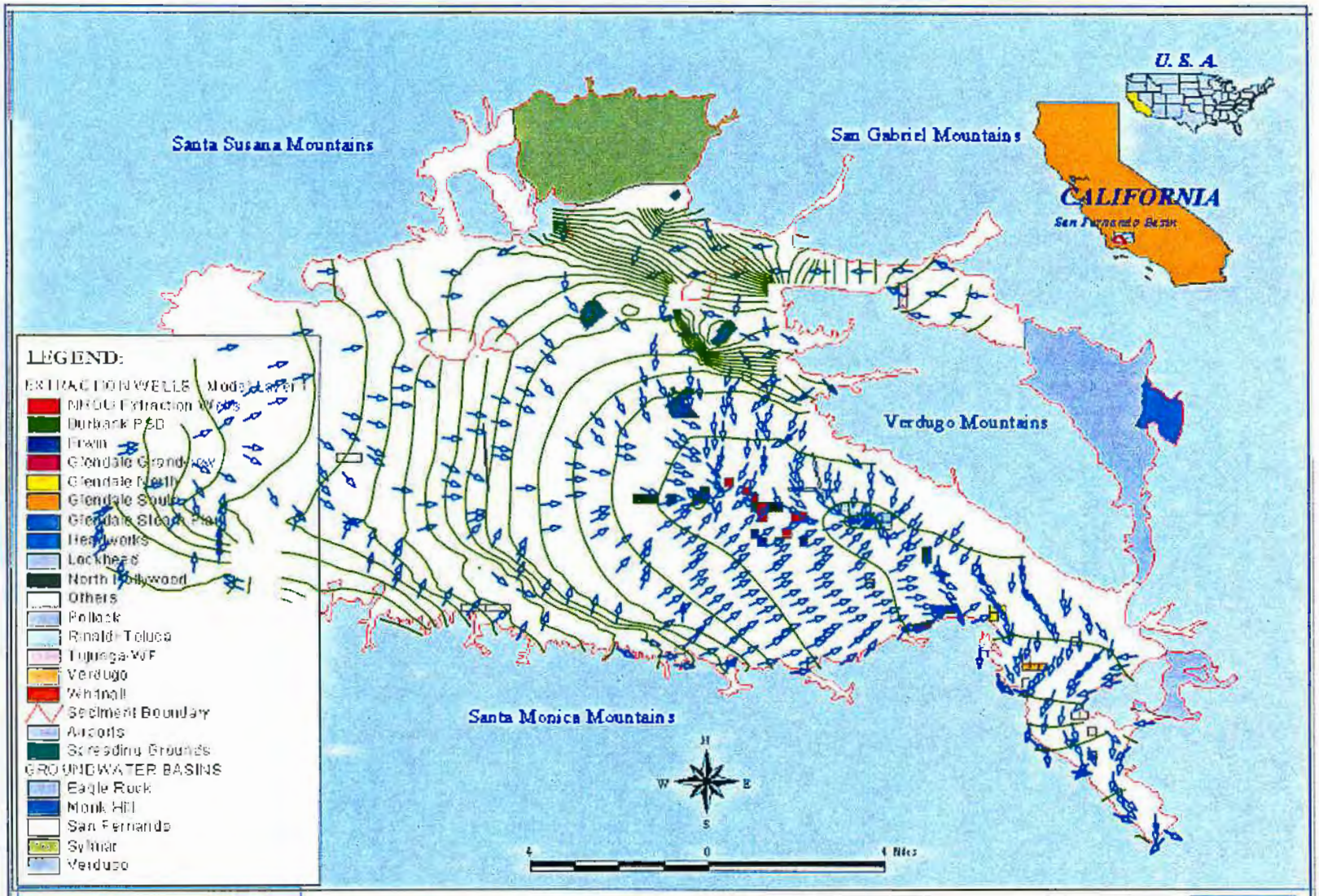


Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000 - 2005 WATER YEARS

Change in Groundwater Elevation - Model Layer 2
Fall 2000 - Fall 2005

PLATE 4

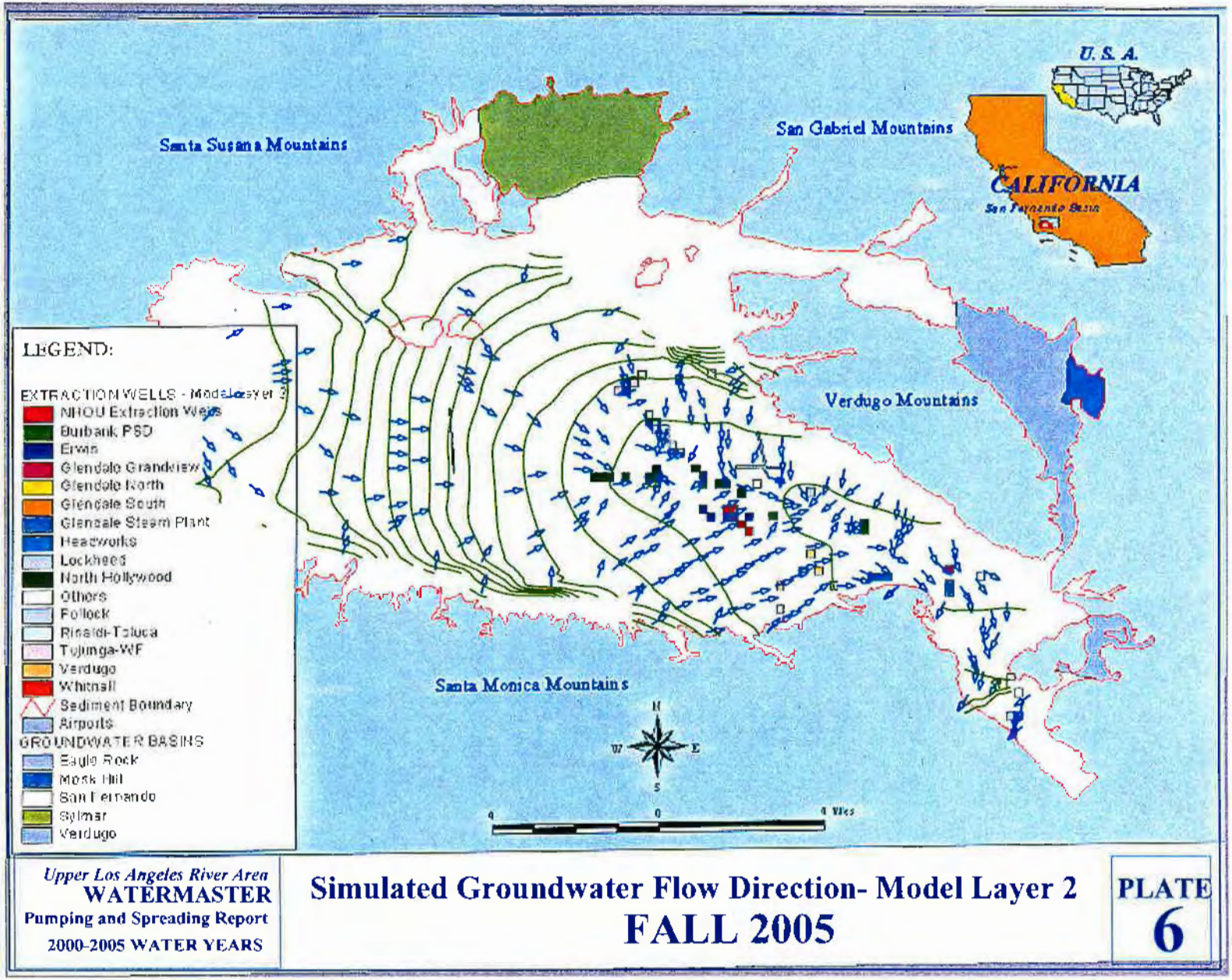
Y
Z
X



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000-2005 WATER YEARS

Simulated Groundwater Flow Direction - Model Layer 1
FALL 2005

PLATE
5

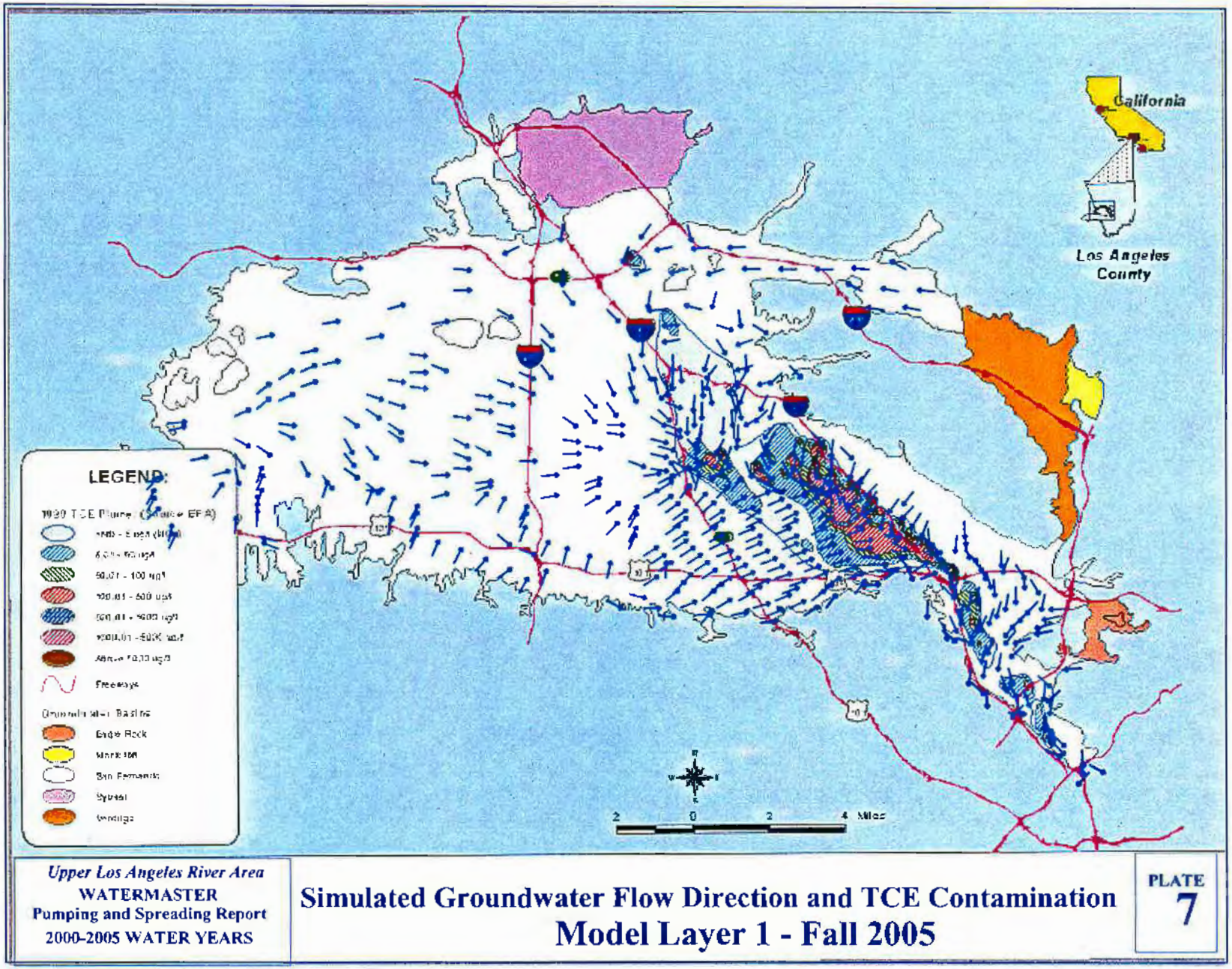


Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000-2005 WATER YEARS

Simulated Groundwater Flow Direction- Model Layer 2
FALL 2005

PLATE 6

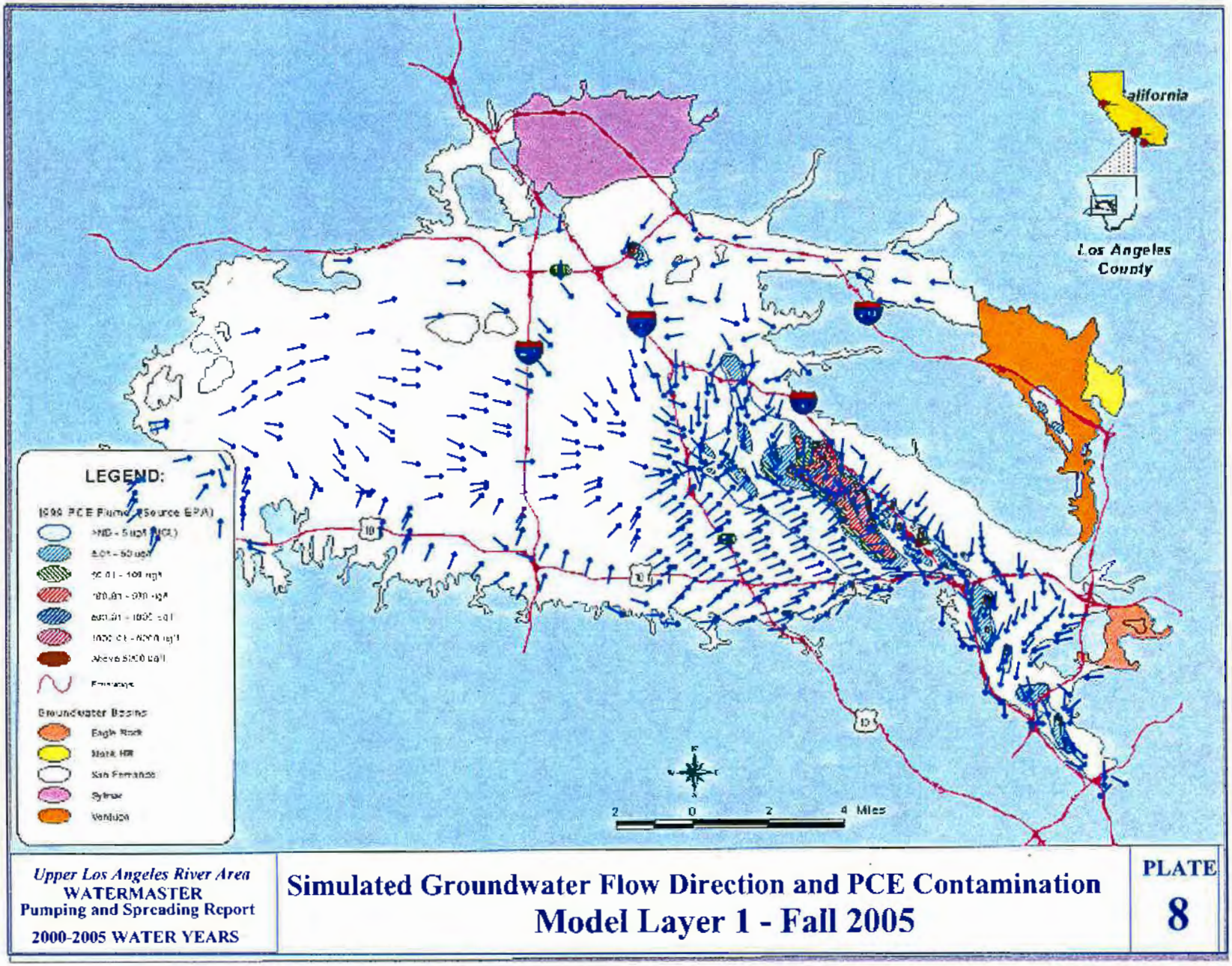
Y
Z
X



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000-2005 WATER YEARS

Simulated Groundwater Flow Direction and TCE Contamination Model Layer 1 - Fall 2005

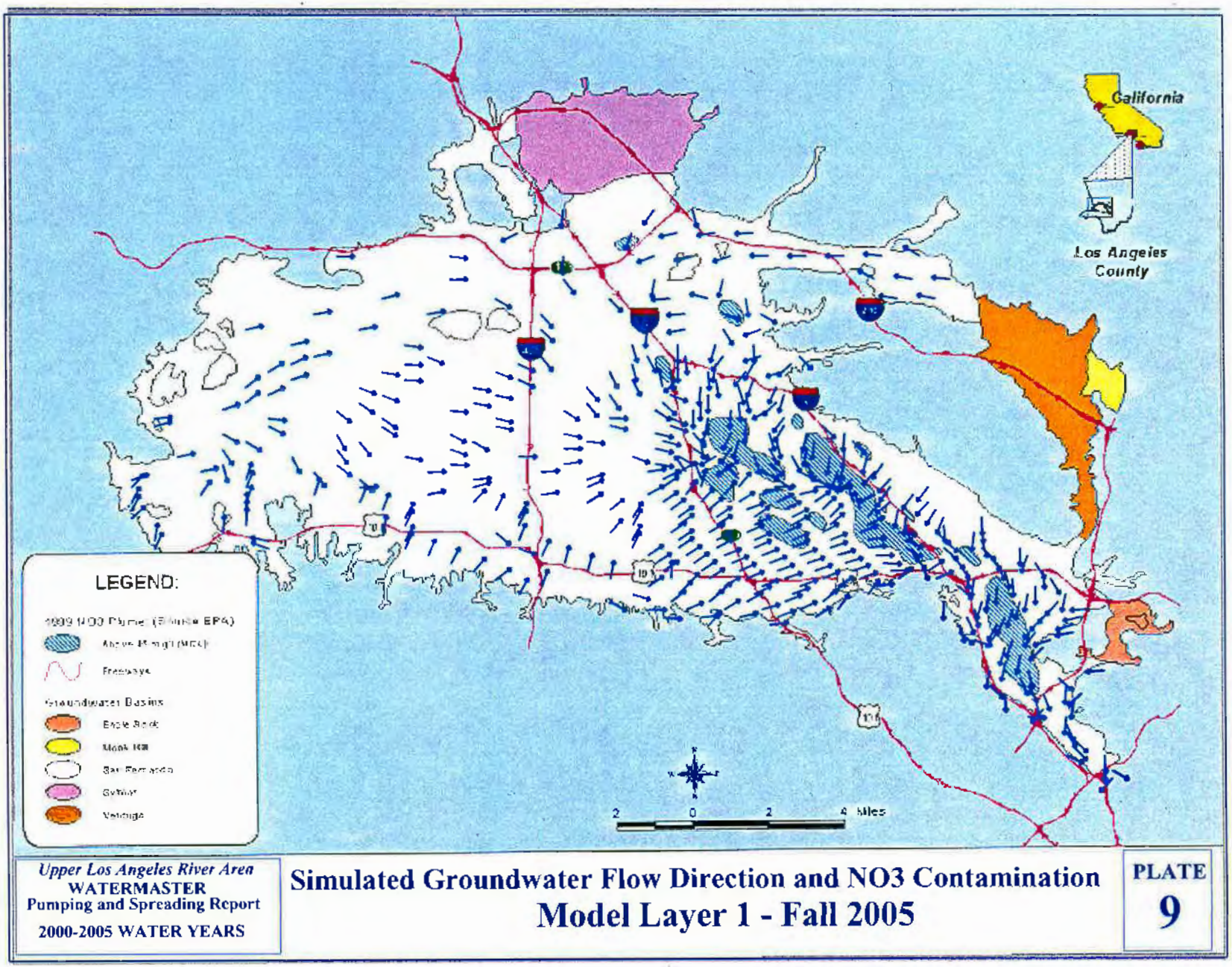
PLATE 7



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000-2005 WATER YEARS

Simulated Groundwater Flow Direction and PCE Contamination Model Layer 1 - Fall 2005

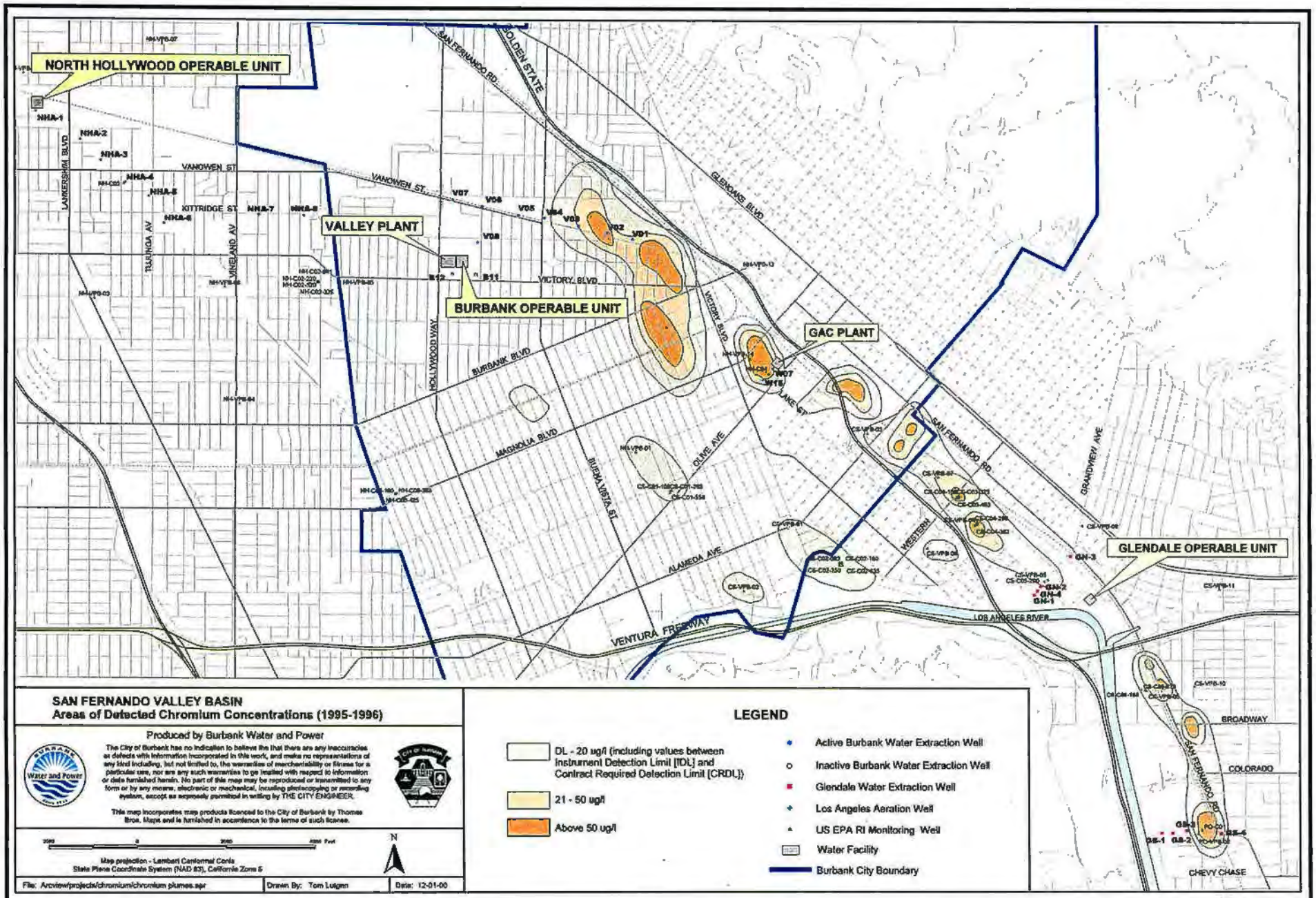
PLATE
8



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2000-2005 WATER YEARS

Simulated Groundwater Flow Direction and NO3 Contamination
Model Layer 1 - Fall 2005

PLATE
9



BURBANK/GLENDALE/LA - OPERABLE UNITS

PLATE 10

APPENDIX A

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

2000-2005 Water Years

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR THE 2000-2005 WATER YEARS

APRIL 2001

Prepared by:
City Groundwater Group
Water Resources Section
WATER RESOURCES BUSINESS UNIT
Los Angeles Department of Water and Power

TABLE OF CONTENTS

	Page No
Introduction	2
Section 1: Facilities Description	3
a. Spreading Grounds	
b. Extraction Wells	
c. Groundwater Treatment Facilities	
Section 2: Annual Pumping And Spreading Projections	5
a. Pumping Projections for the 2000-01 Water Year	
b. Spreading Projections for the 2000-01 Water Year	
Section 3: Water Quality Monitoring Program Description	8
Section 4: Groundwater Treatment Facilities Operations Summary	9
Section 5: Plans For Facilities Modifications	10
a. Spreading Grounds	
b. Extraction Wells	
c. Groundwater Treatment Facilities	
APPENDIX A: Latest Water Quality Sampling Results	12
APPENDIX B: Groundwater Extraction Projections 2000-2005	13

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' 2001 Groundwater Pumping and Spreading Plan for the Water Years 2000 - 2005.

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 and their locations are shown in Figure 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	36,000
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	83	43,000
TOTAL:			136,000

b. Extraction Wells: The LADWP has nine well fields in the San Fernando Basin, and one in the Sylmar Basin. The well fields are shown in Figure 1-1, and their rated capacities are shown in Table 1-2. The rated capacities are approximate as operating capacities vary depending on the water levels. Actual groundwater pumping is dependent on maintenance schedules and water quality for each well.

Table 1-2

Rated Capacities of LADWP Well Fields in ULARA				
Well Field	Number of Wells			Rated Capacity of All Wells (cfs)
San Fernando Basin	Active	Stand-by	Total	cfs
Aeration	7	---	7	4
Crystal Springs (A)	---	---	---	---
Erwin	2	3	5	10
Headworks			---	---
North Hollywood	21	8	29	129
Pollock	2	1	3	10
Rinaldi-Toluca	15	---	15	117
Tujunga	12	---	12	107
Verdugo	3	2	5	12
Whitnall	4	1	5	20
Sylmar Basin				
Mission	3	---	3	9
TOTALS	69	15	84	418

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

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

North Hollywood Groundwater Treatment Facility: This plant was placed into service in December 1989 to treat up to 2,000 gpm of groundwater to remove VOCs by using aeration with granular activated carbon (GAC) for off-gas treatment. This facility is a part of the North Hollywood Operable Unit which includes both a system of shallow wells and the treatment facility that is financed, in part, by the U.S. Environmental Protection Agency.

Pollock Wells Treatment Plant: This plant was placed into service in March 1999 to treat up to 3,000 gpm of groundwater to remove VOCs from the Pollock Well Field. The facility features the use of liquid-phase GAC, restores the use of these wells, and addresses the excessive rising water discharges from the San Fernando Basin into the Los Angeles River.

In addition, the LADWP has the North Hollywood Advanced Oxidation process (AOP) Demonstration Project that features the use of ozone and hydrogen peroxide to remove VOCs

from the groundwater at a rate of upto 4,000 gpm. This demonstration facility is not currently in operation.

Section 2: Annual Pumping And Spreading Projections

a. Pumping Projections for the 2000-2005 Water Year: The City of Los Angeles has the following three sources of water supply: 1. Los Angeles Aqueduct supply imported from the Owens Valley/Mono Basin area, 2. Local groundwater supply from the Central, San Fernando, and Sylmar Basins, 3. 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 San Fernando Basin groundwater can fluctuate annually depending on the availability of imported water which varies due to climatic and operational constraints.

The San Fernando Basin and Sylmar Basin provide most of the City's local groundwater supply. The City of Los Angeles has the following average annual water rights which comprise approximately 15% of the City's supply:

San Fernando Basin	87,000 AF
Sylmar Basin	3,600 AF

Table 2-1 shows the amount of groundwater extractions that are expected during the 2000-01 Water Year from the San Fernando and Sylmar Basins. Appendix B provides groundwater extraction projections from 2000 to 2005. 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 00-01
(Acre-Feet)
San Fernando Basin

	TOTAL	Oct-00	Nov-00	Dec-00	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01
AERATION	1,369	121	144	85	0	0	47	60	185	179	185	185	179
ERWIN	2,010	159	235	62	61	77	34	0	280	271	281	280	271
HEADWORKS	80	0	0	80	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	19,670	1695	1714	81	1194	2207	0	595	1292	2678	2768	2768	2678
POLLOCK	2880	359	394	0	0	0	0	0	431	417	431	431	417
RINALDI-TOLUCA	21,745	0	0	0	1410	1578	0	0	966	4375	4521	4521	4375
TUJUNGA	35,171	3548	1068	903	2881	1129	10	4202	4342	4202	4342	4342	4202
VERDUGO	5,078	350	519	435	434	555	0	357	492	476	492	492	476
WHITNALL	2,288	141	204	165	163	199	0	232	240	232	240	240	232
TOTAL:	90,291	6,372	4,278	1,811	6,141	5,744	91	5,446	8,228	12,830	13,260	13,259	12,830
Sylmar Basin													
MISSION	3,620	282	479	355	271	341	443	242	242	242	242	242	242
ULARA TOTAL:	93,911	6,653	4,757	2,166	6,412	6,085	534	5,688	8,470	13,072	13,501	13,501	13,072

b. Spreading Projections for the 2000-01 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 2000-01. The East Valley Water Recycling Project in Phase IA could add up to 10,000 acre-feet annually of recycled water to the Hansen Spreading Grounds. Phase IB will carry recycled water to the Pacoima Spreading Grounds.

Table 2-2

Actual and Projected Spreading in ULARA Spreading Grounds in 2000-01 (in acre-feet)							
Operated by:							
	LACDPW				LADWP	LACDPW and LADWP	Monthly Total
Month	Branford	Hansen	Lopez	Pacoima	Headworks (A)	Tujunga	
Oct-00	83	0	0	88	0	0	171
Nov-00	13	0	0	125	0	0	138
Dec-00	15	200	0	0	0	0	215
Jan-01	368	1040	0	708	0	82	2198
Feb-01	80	2430	0	1231	0	4647	8388
Mar-01	35	5050	136	1450	0	330	7001
Projected							
Apr-01	2	1775	390	216	0	10	2393
May-01	2	375	15	42	0	10	444
Jun-01	2	300	45	42	0	10	399
Jul-01	2	50	50	0	0	0	102
Aug-01	2	0	0	0	0	0	2
Sep-01	0	0	0	0	0	0	0
TOTAL:	604	11220	636	3902	0	5089	21451

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

Section 3: Water Quality Monitoring Program Description

All of LADWP's 69 active wells in ULARA are monitored in conformance with the requirements set forth in Title 22, California Code of Regulations. For all active wells, monitoring is required whether the well is in production or not. State regulations require the following types of monitoring regimens:

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

Each well, whether on active or standby status, is monitored every three years 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 compounds analysis monitoring are performed 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.

Section 4: Groundwater Treatment Facilities Operations Summary

North Hollywood Operable Unit (NHOU): The NHOU was out of service from November 2000 to March 2001 due to delays related to the change out of the granulated activated carbon. While the facility was shut down the water was not sampled. Provided below is a summary of facility operations.

	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)	(ug/L)	(ug/L)
4/00	136	102	155	---	262	268	293	1096	80.8/11.3	1.05/<.05
5/00	138	132	160	---	264	274	291	1159	69.3/11.2	0.9/<0.5
6/00	135	131	164	---	268	273	219	1161	88.6/13.8	0.6/<0.5
7/00	131	122	173	118	264	269	287	1059	79.9/11.9	<0.5/<0.5
8/00	127	146	184	111	275	274	287	1042	65.4/13.4	<0.5/<.5
9/00	110	134	201	303	267	274	248	945	62.6/12.9	<0.5/<0.5
10/00	---	126	---	13	269	274	303	971	67.7/15.1	<0.5/<0.5
11/00	---	117	---	14	255	273	301	993	18.2/34.2	<0.5/<0.5-
12/00	---	---	---	---	---	---	---	---	---	---
1/01	---	---	---	---	---	---	---	---	---	---
2/01	---	---	---	---	---	---	---	---	---	---
3/01	---	---	---	---	--	---	---	---	---	---

Section 5: Plans For Facilities Modifications

This section describes any plans for modifications to existing facilities, or plans to construct new facilities in the 2000-2001 Water Year, as of the printing of this report (May 2001).

a. Spreading Grounds:. There are plans to restore the full groundwater recharge capacity of the Tujunga Spreading Grounds by developing and implementing a mitigation action plan to control the methane gas migration from Sheldon-Arleta Landfill to the local neighborhood as a result of recharge.

b. Extraction Wells: There are no plans for modifications that would significantly change the well pumping capacity in the 2000-01 Water Year.

c. Groundwater Treatment Facilities:

Headworks Well Field Remediation. The Headworks Well Field was taken out of service in the mid 1980s due to contamination by TCE and PCE. Plans to restore the well field are underway. Headworks Wells Treatment Plant which will treat up to 30 cfs of groundwater supply to remove TCE and PCE is currently being designed. This facility, which is located with the Headworks Spreading Grounds is scheduled to be in service in 2003. Included in the project are four new Headworks Wells that have been constructed during 2000, to replace five obsolete wells that were destroyed. The LADWP completed the groundwater modeling to establish the 10-year capture zone of the Headworks Well Field for use in addressing DHS Policy 97-005.

East Valley Water Recycling Project. The LADWP has completed construction of the East Valley Water Recycling Project that features the spreading of up to 10,000 acre-feet per year of recycled water from the Tillman Water Reclamation Plant at the Hansen Spreading Grounds to supplement recharge to the San Fernando Basin under Phase I. Phase I is a three-year demonstration phase that will provide an opportunity to collect water quality data to verify the San Fernando Basin resonse to this recharge activity.

APPENDIX A:
2000-2001 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	240.00	
2	NHE-2	3810U	NH AERATION WELL-002	11/21/00	4.60	100.00	42.40
3	NHE-3	3810V	NH AERATION WELL-003	11/21/00	8.61	44.80	45.90
4	NHE-4	3810W	NH AERATION WELL-004	11/21/00	24.20	35.10	39.10
5	NHE-5	3820H	NH AERATION WELL-005	11/21/00	58.60	22.60	48.60
6	NHE-6	3821J	NH AERATION WELL-006	11/21/00	9.01	15.90	26.01
7	NHE-7	3830P	NH AERATION WELL-007	11/21/00	6.84	0.93	37.00
8	NHE-8	3831K	NH AERATION WELL-008	11/21/00	26.30	33.30	51.30
9	EW-1	3831H	ERWIN-001	10/22/97	0.72	-99.00	
10	EW-2	3821G	ERWIN-002	5/4/95	4.30	13.20	
11	EW-3	3831G	ERWIN-003	7/30/96	1.40	24.00	14.66
12	EW-4	3821F	ERWIN-004	4/7/97	0.60	8.10	4.43
13	EW-6	3821H	ERWIN-006	11/7/00	-99.00	-99.00	27.00
14	EW-10	3811F	ERWIN-010	1/11/01	-99.00	-99.00	11.16
15	M-5	4840J	MISSION-005	12/29/00	-99.00	7.77	
16	M-6	4840K	MISSION-006	7/20/00	-99.00	-99.00	9.00
17	M-7	4840S	MISSION-007	1/18/01	-99.00	2.14	14.13
18	NH-02	3800	NORTH HOLLYWOOD-002	9/28/99	5.06	38.50	32.40
19	NH-04	3780A	NORTH HOLLYWOOD-004	1/17/01	-99.00	-99.00	7.38
20	NH-07	3770	NORTH HOLLYWOOD-007	1/8/01	-99.00	-99.00	13.73
21	NH-11	3810	NORTH HOLLYWOOD-011	1/11/01	8.70	14.60	20.30
22	NH-15	3790B	NORTH HOLLYWOOD-015				
23	NH-16	3820D	NORTH HOLLYWOOD-016	5/23/96	12.60	2.70	16.30
24	NH-17	3820C	NORTH HOLLYWOOD-017	12/9/97	6.16	1.65	11.92
25	NH-18	3820B	NORTH HOLLYWOOD-018	11/10/99	8.18	83.70	36.90
26	NH-20	3830C	NORTH HOLLYWOOD-020	7/21/99	3.00	9.58	39.50
27	NH-21	3830B	NORTH HOLLYWOOD-021	3/9/00			12.20
28	NH-22	3790C	NORTH HOLLYWOOD-022	11/2/00	-99.00	-99.00	24.80
29	NH-23	3790D	NORTH HOLLYWOOD-023	12/6/00	-99.00	-99.00	28.85
30	NH-25	3790F	NORTH HOLLYWOOD-025	1/5/01	-99.00	-99.00	10.94
31	NH-26	3790E	NORTH HOLLYWOOD-026	11/17/00	12.40	19.60	30.78
32	NH-27	3820F	NORTH HOLLYWOOD-027	7/27/00	-99.00	-99.00	1.34
33	NH-28	3810K	NORTH HOLLYWOOD-028	1/11/01	8.33	15.80	19.62
34	NH-30	3800D	NORTH HOLLYWOOD-030	10/20/00			27.14
35	NH-32	3770C	NORTH HOLLYWOOD-032	1/8/01	-99.00	-99.00	4.50
36	NH-33	3780C	NORTH HOLLYWOOD-033	1/17/01	-99.00	-99.00	4.00
37	NH-34	3790G	NORTH HOLLYWOOD-034	1/17/01	-99.00	5.34	23.54
38	NH-35	3830N	NORTH HOLLYWOOD-035	1/18/01	1.90	-99.00	9.95
39	NH-36	3790H	NORTH HOLLYWOOD-036	1/5/01	-99.00	2.89	18.18
40	NH-37	3790J	NORTH HOLLYWOOD-037	1/5/01	0.68	4.65	19.94
41	NH-38	3810M	NORTH HOLLYWOOD-038				
42	NH-39	3810N	NORTH HOLLYWOOD-039				
43	NH-40	3810P	NORTH HOLLYWOOD-040	1/11/01	-99.00	-99.00	4.37
44	NH-41	3810Q	NORTH HOLLYWOOD-041	5/12/01	5.63	47.20	17.33
45	NH-42	3810R	NORTH HOLLYWOOD-042	5/12/99	5.73	88.50	24.50
46	NH-43A	3790K	NORTH HOLLYWOOD-043A	5/11/00	-99.00	-99.00	4.55
47	NH-44	3790L	NORTH HOLLYWOOD-044	1/5/01	-99.00	-99.00	10.35
48	NH-45	3790M	NORTH HOLLYWOOD-045	11/2/00	0.74	1.10	14.00

NOTE: -99 = non-detect

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

= above MCL

Number	Owner Name	Well Name	Well	Date	PCE	TCE	NO3
49	P-4	3959E	POLLOCK-004	11/3/00	5.04	10.20	35.20
50	P-6	3958H	POLLOCK-006	1/25/01	12.10	12.20	37.30
51	P-7	3958J	POLLOCK-007				
52	RT-1	4909E	RINALDI-TOLUCA-001	7/6/00	-99.00	-99.00	9.90
53	RT-2	4898A	RINALDI-TOLUCA-002	8/9/00	-99.00	-99.00	23.27
54	RT-3	4898B	RINALDI-TOLUCA-003	1/17/01	-99.00	-99.00	18.27
55	RT-4	4898C	RINALDI-TOLUCA-004	1/17/01	-99.00	-99.00	
56	RT-5	4898D	RINALDI-TOLUCA-005	7/6/00	-99.00	-99.00	12.51
57	RT-6	4898E	RINALDI-TOLUCA-006	1/23/01	-99.00	0.50	11.25
58	RT-7	4898F	RINALDI-TOLUCA-007	1/31/01	-99.00	0.73	14.63
59	RT-8	4898G	RINALDI-TOLUCA-008	7/19/99	-99.00	-99.00	8.73
60	RT-9	4898H	RINALDI-TOLUCA-009	1/31/01	-99.00	-99.00	10.85
61	RT-10	4909G	RINALDI-TOLUCA-010	1/23/01	1.56	2.80	20.34
62	RT-11	4909K	RINALDI-TOLUCA-011	1/12/01	-99.00	4.00	
63	RT-12	4909H	RINALDI-TOLUCA-012	1/23/01	-99.00	3.89	12.83
64	RT-13	4909J	RINALDI-TOLUCA-013	1/12/01	-99.00	10.40	
65	RT-14	4909L	RINALDI-TOLUCA-014	1/12/01	-99.00	2.14	
66	RT-15	4909M	RINALDI-TOLUCA-015	1/12/01	-99.00	0.59	
67	TJ-01	4887C	TUJUNGA-001	1/8/01	-99.00	1.04	24.48
68	TJ-02	4887D	TUJUNGA-002	1/8/01	-99.00	-99.00	20.30
69	TJ-03	4887E	TUJUNGA-003	1/8/01	-99.00	1.24	19.35
70	TJ-04	4887F	TUJUNGA-004	1/8/01	2.34	10.90	37.17
71	TJ-05	4887G	TUJUNGA-005	1/9/01	0.51	2.43	41.49
72	TJ-06	4887H	TUJUNGA-006	1/9/01	0.51	2.08	28.31
73	TJ-07	4887J	TUJUNGA-007	1/9/01	1.35	4.04	36.32
74	TJ-08	4887K	TUJUNGA-008	1/9/01	-99.00	6.01	34.43
75	TJ-09	4886B	TUJUNGA-009	1/9/01	1.31	5.62	38.39
76	TJ-10	4886C	TUJUNGA-010	1/9/01	-99.00	7.50	26.28
77	TJ-11	4886D	TUJUNGA-011	1/9/01	0.75	11.60	25.97
78	TJ-12	4886E	TUJUNGA-012	1/19/01	-99.00	2.50	12.60
79	V-1	3863H	VERDUGO-001	1/31/01	0.63	10.90	33.75
80	V-2	3863P	VERDUGO-002	10/26/00	-99.00	17.40	38.07
80	V-2	3853F	VERDUGO-002	8/18/98	-99.00	33.00	26.80
81	V-4	3863J	VERDUGO-004	1/13/98	6.47	17.90	1.92
82	V-11	3863L	VERDUGO-011	1/25/01	-99.00	2.63	13.28
83	V-13	3853G	VERDUGO-013				
84	V-24	3844R	VERDUGO-024	1/25/01	-99.00	-99.00	5.90
85	WH-4	3821D	WHITNALL-004	5/18/00	4.22	15.10	
86	WH-5	3821E	WHITNALL-005	1/18/01	2.77	12.90	23.81
87	WH-6A	3831J	WHITNALL-006A	1/18/01	0.51	2.31	6.84
88	WH-7	3832K	WHITNALL-007	1/18/01	-99.00	5.04	7.20
89	WH-8	3832L	WHITNALL-008	10/22/96	4.60	10.20	
90	WH-9	3832M	WHITNALL-009				

NOTE: -99 = non-detect
--- = not tested (refer to p.8)
= above MCL

APPENDIX B:
Groundwater Extraction Projections 2000-2005

PROJECTED PUMPING BY THE CITY OF LOS ANGELES IN THE SAN FERNANDO BASIN FOR THE NEXT 5 YEARS (IN ACRE-FEET)

WELL FIELD	WATER YEAR				
	2000-01	2001-02	2002-03	2003-04	2004-05
AERATION	1,369	1,300	1,500	1,500	1,600
ERWIN	2,010	2,300	2,200	2,200	0
HEADWORKS	80	0	0	5,800	10,000
NO HOLLYWOOD	19,670	19,000	21,800	23,100	23,600
POLLOCK	2,880	2,400	2,400	2,400	2,400
RINALDI-TOLUCA	21,745	21,000	23,400	24,600	25,900
TUJUNGA	35,171	34,000	37,800	39,800	40,500
VERDUGO	5,078	4,900	5,400	0	0
WHITNAL	2,288	2,100	2,500	2,600	0
TOTAL ACRE-FEET	90,291	87,000	97,000	102,000	104,000

Sylmar Basin	3,620	3,620	3,620	3,620	3,620

APPENDIX B

CITY OF BURBANK

PUMPING AND SPREADING PLAN

2000-2005 Water Years

GROUNDWATER PUMPING AND SPREADING PLAN

WATER YEARS
OCTOBER 1, 2000 TO SEPTEMBER 30, 2005

Prepared by

BURBANK WATER AND POWER
WATER DIVISION

May 2001

TABLE OF CONTENTS

		Page
I.	Introduction	1
II.	Water Demand	1
III.	Water Supply	1
	A. MWD	1
	B. GAC Treatment Plant	2
	C. EPA Consent Decree	2
	D. Reclaimed Water	2
	E. Production Wells	2
IV.	Judgement Considerations	3
	A. Physical Solution	3
	B. Stored Water Credit	3
	C. Allowance for Pumping	3
	D. Spreading Operations	3
V.	Capital Improvements	4
	A. Wells	4
	B. Groundwater Treatment Facilities	4

TABLES

2.1	Five- Year Projected Water Demand	6
3.1	Historic and Five-year Projected Use of MWD Treated Water	7
3.2	Historic and Five-Year Projected Use of GAC Treated Groundwater	8
3.3	Historic and Five-Year Projected Use of Valley/ BOU Treated Groundwater	9
3.4	Historic and Five-Year Projected Use of Reclaimed Water	10
4.1	Historic and Five-Year Projected Extractions of Groundwater by Valhalla	11
4.2	Historic and Five-Year Projected Burbank Spreading Operations	12

FIGURE

5.1 EPA Phase II Extraction Wells 13

APPENDICES

A. Water Quality Data
B. Water Treatment Facilities
C. Stored Groundwater

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 are 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 and/or economic conditions in the Burbank area. A variance of ±5% may 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 normally be operated during the summer season from May to October. This year, the schedule was extended until early March because of BOU production problems. However, current plans are to keep the plant shut down until July 2002 or later because of chromium concerns. Shutdowns for carbon change-out can be expected every two months. Mechanical maintenance will be performed when the plant is out of service during the winter season. The GAC Treatment Plant uses the groundwater produced from Well No. 7 and Well No. 15. The plant capacity is 2000 gpm. Lockheed Martin has arranged to utilize the capacity of the GAC Treatment Plant to augment the production of the Burbank Operable Unit (BOU) to reach the required annual average of 9,000 gpm. Lockheed Martin will pay a share of the operation and maintenance cost of the GAC in proportion with the volume of water which is credited toward the 9,000 gpm.

C. EPA CONSENT DECREE

The EPA Consent Decree project became operational January 3, 1996. The source of water is wells VO-1 through VO-8. The Second Consent Decree was entered on June 22, 1998. The plant was out of service from December 15, 1997 to December 13, 1998. The plant capacity is 9,000 gpm. Projected use of EPA Consent Decree water produced by the BOU 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 five wells that are mechanically and electrically operable, plus the eight wells of the BOU. Two wells are on "Active" status and three are on "Inactive" status with the Department of Health Services (DHS). Four others have had equipment pulled. We do not plan to operate the inactive wells unless an emergency develops in the 2000-2001 water year. The City has proposed using Wells 11A and 12 for the BOU (see Section V.A below).

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

*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 import return water 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 Martin	25 acre-feet

Table 3.3 lists the extractions by Lockheed Martin. Table 4.1 lists the extractions by Valhalla.

Walt Disney Imagineering pumped groundwater for dewatering during construction of their Riverside office building. Extractions of 2,336 acre-feet were charged to Burbank's water for water year 1998-99.

B. STORED WATER CREDIT

The City has a stored water credit of 42,443 acre-feet as of October 1, 2000.

C. ALLOWANCE FOR PUMPING

The import return water extraction right (20 percent of water delivered the prior year) for the 2000-2001 water year is 5,262 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 23,000 acre-feet of delivered water, will be 4,600 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 Los Angeles Department of Water and Power (LADWP). The LADWP 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 MWD service connection LA-35 at the L.A. Treatment Plant. The historic and projected spreading water is shown in Table 4.2.

V. CAPITAL IMPROVEMENTS

A. WELLS

Burbank: Burbank Water and Power (BWP) made a formal proposal on November 6, 2000 to substitute production from City Wells No. 11A and No. 12 for production from Well VO-1 in the BOU. The proposed substitution is intended to reduce the overall level of chromium in the Burbank water system as Well VO-1 has singularly high chromium levels among the BOU wells. Overall production from the BOU will not increase with the substitution. An EPA response to the proposal is expected in August 2001. If the proposal is approved by EPA, the pumps and necessary piping will be purchased and installed by January 2002.

We plan to continue the use of Wells No. 7 and No. 15 for the GAC Treatment Plant.

Maintenance Activity- Well Nos. 17 and 18: Both of these wells are planned to be abandoned in accordance with County standards during Fiscal Year 2001-2002. All above-ground equipment will be removed and the casings filled and sealed.

Burbank Operable Unit: Eight wells provide the production capability of the EPA Consent Decree Project. See Figure 5.1. The well field will normally produce 9,000 gpm. An additional well (VO-8/ Burbank No. 10) became operable on January 20, 1998.

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.

The EPA Consent Decree Project was removed from production on December 15, 1997 for plant modifications required under the Second Consent Decree.

Due to problems in obtaining a new operating permit from DHS, the treatment plant did not resume operations until December 12, 1998. Only testing water was produced during the outage. Production from December 1998 through September 1999 increased from 5,000 gpm to 9,000 gpm as the plant came fully on-line.

In late June 2000, the treatment plant went off-line due to a breakthrough of 1,2,3- trichloropropane (TCP) in the plant effluent. The plant did not return to service until DHS had approved an operation and sampling plan and the carbon was changed out in the wet phase contactors. Well VO-6 was removed from service at that time because it had high concentrations of 1,2,3-TCP. The overall production of the BOU was also reduced at this time due to general mechanical problems in the BOU, including the air phase GAC screens, the wearing of well

pumps/ motors and the failure of well level sensors. While these problems were being analyzed, Lockheed Martin invoked a "force majeure" provision of the Second Consent Decree in October 2001. Lockheed Martin claims the sustainable yield of the aquifer is 4,500 gpm, not 9,000 gpm. CH_2M Hill has been retained by EPA to study the yield of the aquifer, as well as the mechanical problems. The report is due in August 2001.

Local media coverage of chromium levels in groundwater led to a Burbank City Council request to mitigate the use of Well VO-1. The well has been used for water quality and aquifer testing and monitoring since October 2000. Well VO-6 was returned to service at half capacity in February 2001.The EPA and DHS agreed to a monitoring plan that allowed full use of VO-6 in April 2001. An ongoing sampling program has shown that 1,2,3-TCP has spread to adjacent wells.

The City has taken responsibility, through its contractor, United Water Services, for full operation of the BOU as of March 12, 2001.

GAC Treatment Plant: Burbank plans to use the production and treatment facilities of the GAC Treatment Plant at the following flow rates during the 2000-2001 water year:

October - February	1,800 gpm
March - September	0 gpm

The plant will be operated in the parallel configuration.

TABLE 2.1
FIVE-YEAR PROJECTED WATER DEMAND

Water Year	Acre - Feet
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	22,671
99-00	26,313
00-01*	26,125
01-02*	30,079
02-03*	30,421
03-04*	30,738
04-05*	31,056

* Projected

NOTES:

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

(2) The last five year average water demand was 23,889 acre-feet.

TABLE 3.1
FIVE-YEAR PROJECTED USE OF MWD TREATED WATER

Water Year	Acre-Feet
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	10,536
99-00	10,471
00-01*	12,525
01-02*	12,939
02-03*	9,585
03-04*	9,902
04-05*	10,220

*Projected

NOTES:

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

TABLE 3.2
FIVE-YEAR PROJECTED USE OF GAC TREATED GROUNDWATER

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	1,542
99-00	1,086
00-01*	990
01-02*	0
02-03*	1,500
03-04*	1,500
04-05*	1,500

*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	1,050 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 USE OF VALLEY/ BOU TREATED GROUNDWATER

Water Year	Acre-Feet
93-94	803 (3) (5)
94-95	462 (5)
95-96	5,737 (5)
96-97	9,280
97-98	2,102
98-99	9,042
99-00	11,345
00-01*	8,810
01-02*	10,140
02-03*	12,336
03-04*	12,336
04-05	12,336

*Projected

NOTES:

(1) Burbank includes BOU extractions in its pumping rights.

(2) Lockheed Martin has physical solution right of 25 AF/year.

(3) Lockheed Martin 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. The Watermaster did not charge Burbank for these amounts included in Table 3.3. Beginning January of water year 1995-96, all extractions shown in Table 3.3 are treated for VOC removal and beneficially used by Burbank. GAC flushing and treatment bypass are accounted for separately and charged to a 'basin account'.

Water Year	AF	Water Year	AF	Water Year	AF
1993-94	378	1996-97	320	1999-2000	107
1994-95	462	1997-98	478		
1995-96	34	1998-99	142		

(6) The City of Burbank is currently using water from the BOU under an Operation Permit, issued in October 2000, from the California Department of Health Services.

TABLE 3.4
FIVE-YEAR PROJECTED USE OF RECLAIMED WATER

Water Year	Acre-Feet
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	1,210
99-00	2,979
00-01*	3,500
01-02*	6,700
02-03*	6,700
03-04*	6,700
04-05*	6,700

*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 BWP Power Plant reduced its reclaimed water use beginning water year 1996-97 due to decreased local power generation. Beginning water year 2000-2001, power production and reclaimed water use will be high again.

TABLE 4.1
FIVE-YEAR PROJECTED EXTRACTIONS OF GROUNDWATER BY VALHALLA

Water Year	Acre- Feet
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	342
99-00	432
00-01*	300
01-02*	300
02-03*	300
03-04*	300
04-05*	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
FIVE-YEAR PROJECTED BURBANK SPREADING OPERATIONS

WATER YEAR	ACRE-FEET	
89-90	378	(1)
90-91	504	(1)
91-92	503	(1)
92-93	500	(2)
93-94	0	(3)
94-95	5,380	(4)
95-96	2,000	(4)
96-97	1,500	(4)
97-98	0	
98-99	2,000	
99-00	0	
00-01*	0	
01-02*	0	
02-03*	0	
03-04*	0	
04-05*	0	

*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 LADWP.

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

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

(5) Starting 1999-2000, combination of physical solution purchases and MWD water delivered to Los Angeles.

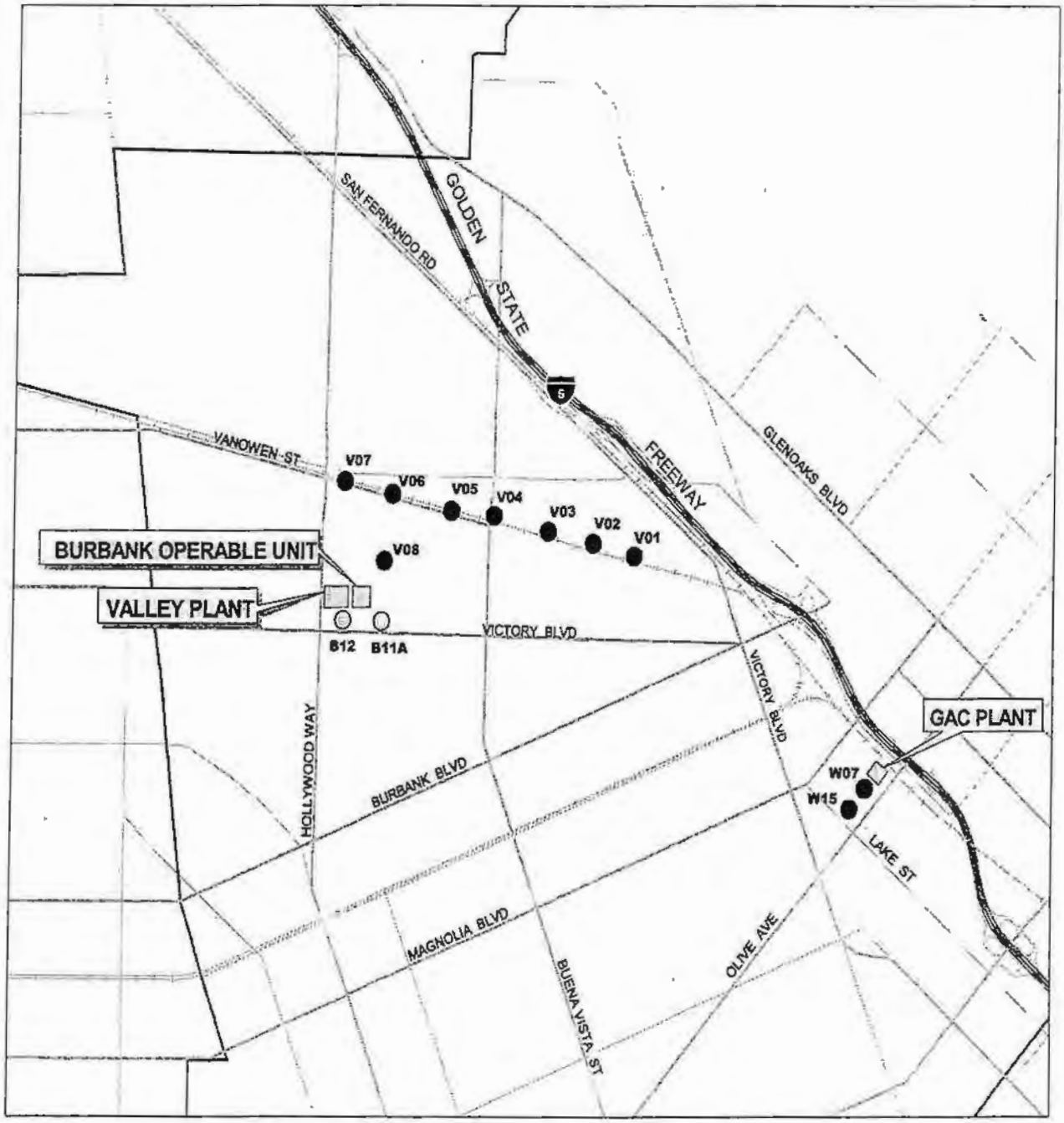


FIGURE 5.1
EPA PHASE II EXTRACTION WELLS

APPENDIX A

WATER QUALITY DATA

The 2000 Annual Water Quality Report is not yet available. Water Quality monitoring and testing of supply sources is not included with this report.

APPENDIX B

WATER TREATMENT FACILITIES

LAKE STREET GAC TREATMENT PLANT

320 Lake Street
Burbank CA 91502

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division

Albert Lopez, Water Production/ Operations Superintendent

QUANTITY TREATED (10/1/99 through 10/1/00):

1,086 Acre-Feet

WATER QUALITY:

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

DISPOSITION:

Burbank Water System
Potable Water

EPA CONSENT DECREE PROJECT – BURBANK OPERABLE UNIT

2030 North Hollywood Way
Burbank CA 91505

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division

Albert Lopez, Water Production/ Operations Superintendent

QUANTITY TREATED (10/1/99 through 10/1/00):

11,345 Acre-Feet for domestic use

WATER QUALITY:

Contaminants: VOCs, Nitrate, Chromium

DISPOSITION:

(1) Test Water- Waste

(2) Operation Water (backwash, etc.) - Waste

(3) Burbank Water System-
Potable water after blending

APPENDIX C

STORED GROUNDWATER

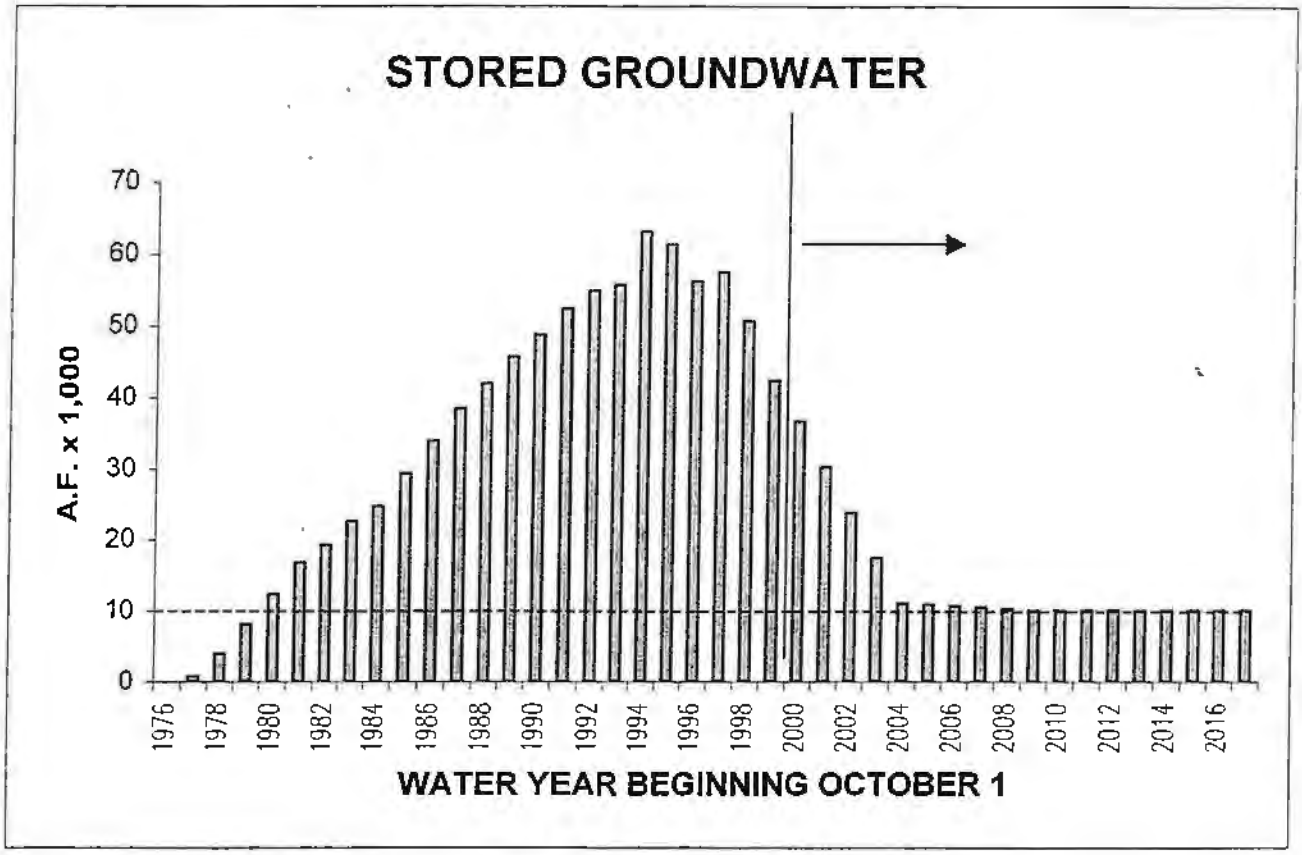
CITY OF BURBANK
PUBLIC SERVICE DEPARTMENT
WATER DIVISION

BURBANK'S STORED GROUNDWATER

70% EPA - No Ramp

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	22,671	4,534	2,000	13,262	50,770
1999-2000	26,312	5,262	0	12,862	42,442
2000-01	23,000	4,600	0	11,000	36,704
2001-02	23,000	4,600	0	11,000	30,304
2002-03	23,000	4,600	0	11,000	23,904
2003-04	23,000	4,600	0	11,000	17,504
2004-05	23,000	4,600	0	11,000	11,104
2005-06	23,000	4,600	6,200	11,000	10,904
2006-07	23,000	4,600	6,200	11,000	10,704
2007-08	23,000	4,600	6,200	11,000	10,504
2008-09	23,000	4,600	6,200	11,000	10,304
2009-10	23,000	4,600	6,200	11,000	10,104
2010-11	23,000	4,600	6,400	11,000	10,104
2011-12	23,000	4,600	6,400	11,000	10,104
2012-13	23,000	4,600	6,400	11,000	10,104
2013-14	23,000	4,600	6,400	11,000	10,104
2014-15	23,000	4,600	6,400	11,000	10,104
2015-16	23,000	4,600	6,400	11,000	10,104
2016-17	23,000	4,600	6,400	11,000	10,104
2017-18	23,000	4,600	6,400	11,000	10,104

NOTES:
(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. Y
COLUMN (5) = EXTRACTIONS OF NEXT YEAR
PUMPED GROUNDWATER INCLUDES CITY, VALHALLA, LOCKHEED, & DISNEY.
*EXCLUDES 150 A.F. OF PUMPING FOR TESTING.
SHADED AREAS OF TABLE ARE PROJECTED VALUES .



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 (~7,400AF)
- MINIMUM SPREAD WATER SHALL BE THE ESTIMATED GAC PRODUCTION. EXPENSE QUALIFIED UNDER G.R.P. WITH M.W.D.
- GROUNDWATER PRODUCTION EQUALS GAC (~1,000 AF), EPA (~12,000AF) 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

2000-2005 Water Years

CITY OF GLENDALE

GROUNDWATER PUMPING AND SPREADING PLAN

Prepared By

GLENDALE WATER & POWER

APRIL 2001

TABLE OF CONTENTS

Title	Page
Introduction	1
Existing Water Sources and Supplies	1
Past Water Use and Trends	9
Projected Water Demands and Sources	12
Recent Water Facilities	13
Related Information on Water Use	16

LIST OF TABLES

Number	Name	Page
1	Metropolitan Connections and Capacities	5
2	Recycled Water Use	7
3	Dual Plumbed	8
4	Local Water Use	8
5	Total Annual Water Demand	11
6	Historic and Projected Water Use in Glendale	16

LIST OF FIGURES

Figure Name	No.
Water Entry Points	1
Water Facilities	2
Recycled Water User Sites	3
Recycled Water Supply System	4
Glendale Water Treatment Plant & Facilities	5
Verdugo Park Water Treatment Plant & Facilities	6
Recycled Water Users	7
Glendale Water Supply & Demand	8

INTRODUCTION

The City of Glendale has recently developed many facilities 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 nearly 200,000 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 outlining our recent program to develop more local water resources. These local facilities have been completed at a cost about $50 million. Of this amount, the City has spent $25 million with another $25 million by the industry group responsible for contaminating Glendale's water supplies.

This report discusses historic water supplies available to Glendale, future water demands in Glendale, and new 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 AND SUPPLIES

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 sources and entry points in the Glendale water system for the various supplies are shown in Figure 1. Over the past 10-years, there has been a change in the mix of supplies used to meet water demands in the City. For the future, there are projected to be major changes in water supplies. These changes and sources are discussed below.

San Fernando Basin

The City's water right to San Fernando Basin supplies is defined by the judgment entitled "The City of Los Angeles vs. the City of San Fernando, et. al. (1979). It consists of a return flow credit, a type of water right based on the assumption that a percentage of water used in the City is returned to the groundwater basin. Additionally, the City has a right to accumulate its credits annually if its water rights are not used. The City now has a storage credit of about 75,000 AF within the basin. This represents water that the City was unable to pump from the basin but did not do so because of water quality problems with the main. Also, there is a right to produce excess water subject to a payment obligation to the City of Los Angeles based primarily on the cost of MWD alternative supplies. This right to produce water in excess of the return flow credit and the accumulated credits are significant factors in relation to the source of water to be used at the Glendale Water Treatment Plant (GWTP), which is part of a U. S. Environmental Protection Agency (EPA) Superfund clean-up project in Glendale. The project consists of a 5,000 gallon-per-minute (gpm) facility and the eight wells that supply the plant. It is expected that the facility will deliver about 7,200 AFY to the City and provide about 23 percent of the water needed in the City. 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 an agreement to extract excess water chargeable against the rights of the City of Los Angeles upon payment of specified charges generally tied to MWD'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 recently completed Glendale Water Treatment Plant (GWTP).

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 considerations.

Verdugo Basin

Historically, groundwater supplies from the Verdugo Basin provided a significant portion of the City's water supplies. This has been from wells and an underground water infiltration system. The Judgement in the Los Angeles lawsuit 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.

Use of these supplies has been limited over the past 10 years because of water quality problems, water levels, and limited extraction capacity. In order to increase the use of these supplies, the City completed construction of the Verdugo Park Water Treatment Plant (VPWTP) in 1996. This facility has a capacity of 1,150 gpm and

treats water from the two low capacity wells (referred to as Glorietta Wells A & B) and from the water supplies in the old Verdugo Pickup, horizontal infiltration system. Flows closer to 550 gpm are provided from these sources. The three existing wells referred to as Glorietta Wells 3, 4 and 6 and the VPWTP alone will not utilize the City's entire water rights to the Verdugo basin supplies and additional extraction capacity in the Verdugo Basin will be required to reach the water right capacity. The existing wells and VPWTP produce about 2,700 AFY. The City has been looking for siting additional extraction facilities. Being an urban area, there are many siting issues. If the City were able to utilize its full rights to these supplies, about 12 percent of demands could be obtained from this Basin.

Metropolitan Water District

The Metropolitan Water District of Southern California (Metropolitan) is a public agency organized in 1928 by a vote of the electorates of 13 Southern California cities that included Glendale. The first function of Metropolitan was building the Colorado River Aqueduct to import water from the Colorado River. Water deliveries through the aqueduct began in the early 1940's, and this imported water supplemented the local water supplies of the original 13 Southern California member cities. In 1972, to meet growing water demands in its service area, Metropolitan started receiving additional water supplies from the State Water Project. The State Water Project is owned and operated by the State of California Department of Water Resources (DWR). Metropolitan currently imports water from these two sources: (1) the Colorado River water via the Colorado River Aqueduct and (2) the State Water Project via the California Aqueduct. The location of these facilities is shown in Figure 2. Metropolitan's service area includes the Southern California coastal plain. It extends about 200 miles along the Pacific Ocean from the city of Oxnard on the north to the Mexican border on the south, and it reaches 70 miles inland from the coast. Metropolitan is currently composed of 27 member agencies, including 14 cities, 12 municipal water districts, and one county water authority.

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 - Since the late 1970's, the City of Glendale has been delivering recycled water from the Los Angeles/Glendale Water Reclamation Plant (LAGWRP). This is a 20 million gallon-per-day (MGD) facility that is owned by the Cities of Los Angeles and Glendale. Each City is entitled to one-half of the treated flows from the plant for recycled water deliveries. Effluent not used in the recycled water systems for Los Angeles and Glendale is discharged to the Los Angeles River and eventually reaches the ocean.

The City of Glendale has many recycled water projects designed to serve different parts of the City. Each is reviewed below.

Power Plant Project - Recycled water deliveries were first made to the Glendale Power Plant for use in the cooling towers and to Caltrans for irrigation along the 134 Freeway near the 5 Freeway in the late 1970's. A pipeline was constructed from the LAGWRP to the Glendale Power Plant. Recycled water is used as make-up water in the power plant cooling towers and for irrigation by Caltrans in the area of Freeways 5 and 134.

Forest Lawn Project – This project, completed in 1992, was a joint project with the City of Los Angeles. This facility, a 30-inch diameter pipeline project, was constructed to deliver recycled water for irrigation to Forest Lawn Memorial Park in south Glendale.

Recently, the City began deliveries to an irrigated street median on Brand Boulevard from Colorado Boulevard and Los Feliz Boulevard. Los Angeles proposes to extend the system from its South Glendale terminus into Elysian Park and into the downtown Los Angeles area.

Expansion Project - In the late 1980's, planning was initiated on expanding the recycled water system, and construction initiated in the early 1990's for the $16 million project. The system was extended in three phases to complete the backbone of the distribution system. The significance of this program was the regional involvement of the Cities of Los Angeles and Pasadena in the project. Each segment is discussed below:

Verdugo – Scholl Project – This project plus the Brand Park project were approved for construction by the City in the early 1990's at a cost of $16 million. The project was designed to deliver recycled water to the Oakmont Country Club for irrigation with another section in Glenoaks Canyon to deliver recycled water to the Scholl Canyon Golf Course for irrigation, and to the Scholl Canyon Landfill for dust control and irrigation. Another major user of this water is Caltrans for irrigation along the 134 and 2 Freeways. Additional users include schools, parks, and roadway media strips.

The portion of the project up to Scholl Canyon was a joint effort with the City of Pasadena. Pasadena provided funds for Glendale to increase the size of the facilities so deliveries could be made to Pasadena from the Scholl Canyon area. Pasadena continues to review the possibility to extend the system.

Brand Park Project – The Brand Park project consists of a pumping plant, storage tanks, and pipeline and connections to its pipeline serving the Glendale Power Plant and extending to a tank above Brand Park. This section delivers recycled water for irrigation to Brand Park, Grandview Cemetery and along the street medians on Glenoaks Boulevard.

RECYCLED WATER DELIVERY SYSTEM

The recycled water delivery system is now comprised of 20 miles of mains, 5 storage tanks, pumping plants and 42 customers currently using about 1,800 AFY. The specific features of this recycled water program are shown in more detail on Figure . The users from the various recycled water projects are tabulated on Figure 3 and schematic diagram of the recycled water system is shown on Figure 4. This will give the reader a general idea of the scope of the expansion program. Recycled water use has increased from 551 AF in 1991-92 to 1,740 AF in 1999-2000. The expected deliveries from the various projects are shown on Table 2. The objective is to increase the use of recycled water to meet 10 percent of demands. This will require a significant increase in users and expansion of the system.

TABLE 2

RECYCLED WATER USE (AFY)

PROJECTS	1999	2005	2010	2020
Brand Park	106	110	110	110
Forest Lawn Pipeline	200	350	350	350
Power Plant Pipeline	453	400	400	400
Verdugo-Scholl Pipeline	979	1,020	1,040	1,080
Other Potential Projects	0	0	0	0
TOTAL	**1,738**	**1,880**	**1,900**	**1,940**

HIGH-RISE OFFICE BUILDING

The City requires dual plumbing system in new high-rise office buildings so when recycled water becomes available, recycled water can be used for sanitary flushing purposes in the buildings without retrofitting. Developers of new buildings have accepted this requirement and it is routine to require this installation. A listing of office

PAST WATER USE AND 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 has designated several locations in the San Fernando Basin as Superfund sites and required construction of clean-up treatment facilities. The Glendale clean-up project is the last in a series of EPA required clean-up facilities and has been completed and awaits approval for operation.

The City currently has five active production wells and a pick-up system (infiltration galleries) in the Verdugo Basin. The Grandview Wells in the San Fernando Basin have been essentially abandoned because some wells were installed prior to 1920, need replacement, and also due to water quality concerns.

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 originally pumped a peak capacity of about 24,000 gpm (34.6 million gallons per day-MGD) from San Fernando Basin directly into the City's 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 5,500 AFY based on a Return Flow credit right from water use in the City.

building dual plumbed is provided on Table 3.

TABLE 3

Office Buildings Dual Plumbed to Use Recycled Water for Sanitary Programs

Location	Stories
655 N Central Avenue	24
400 N Brand Boulevard	15
450 N Brand Boulevard	15
Glendale Community College Classroom and Library	4

Summary of Supplies - The current use of local resources available to the City is substantially less than its water-rights primarily because of water quality problems. A general summary of the City's rights to local water resources compared to the amount currently being used is shown on Table 4.

TABLE 4

LOCAL WATER USE (AFY)

Potential Source	Right	Current Use	Future Use
San Fernando Basin[1]	5,000-5,400	500 AFY	7,600
Verdugo Basin	3,856	2,500 AFY	3,856
Recycled Water	10,000	1,700 AFY	3,000

(1) Return flow credit only.

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 solvents. The tests indicated that "volatile organic compounds" (VOC's) such as trichlorethylene (TCE) and perchloroethylene (PCE) were present in the San Fernando Basin groundwater supplies in concentrations exceeding State Department of Health Service 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 with other communities in the San Fernando Valley, had to further limit its use of San Fernando Basin supplies. The City 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 (about 400 ac-ft per year) used at the Glendale Power Plant for cooling tower make-up water and irrigation at Forest Lawn Memorial Park, no San Fernando Valley water is currently used in Glendale.

The water quality and water rights problems in the San Fernando area severely impacted the ability of the City to produce water from the Basin and made the City even more dependent of MWD water supplies. In the 1980's, the U. S. Environmental Protection Agency designated the San Fernando Basin as a Superfund site. After a decade of studies and facility design and construction, a water treatment plant and wells were completed in the summer of 2000 to begin the use of San Fernando Basin water supplies.

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.

Due to the increase in population, economic growth, decrease in availability of local water supply, water quality problems and diminished of water rights, Glendale's dependency on imported water from MWD increased to more than 90 percent of the total potable water need.

The historic and projected water use from the various sources is plotted on Figure 4 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 1998-99 was 31,230 AFY. In 1991-92, the use was about 25,180 AFY. Water use in FY 1997-98 was below normal because of the very heavy rain (El Nino) during the first half of 1998. However, with the below normal rainfall in FY 1998-99, water use was up significantly as shown on Table 5. The 31,230 AFY is equivalent to an average daily use of 28.0 million gallons per day (MGD).

TABLE 5

TOTAL ANNUAL WATER DEMAND

Fiscal Year	Demand	Comments
1991-92	25,180 AF	
1997-98	29,680 AF	Heavy Rainfall (El Nino)
1998-99	31,230 AF	Below Normal Rainfall
1999-00	33,560 AF	
2005	32,555 AF	Projected
2010	33,825 AF	Projected

PROJECTED WATER DEMANDS AND SOURCES

Projection Methodology - Metropolitan uses the U.S. Army Corps of Engineers IWR-MAIN (Municipal and Industrial Needs) water demand forecasting system modified for 51 of the larger cities in Metropolitan's service area including Glendale. The model (MWD-MAIN) 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.

Projected Water Use - The projected water demand using MWD-MAIN calibrated for Glendale shows the overall water demand for year 2005 of 32,554 AFY and for year 2020 a demand of 36,850 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 2020 demand reflects a modest increase over current use even though Glendale is essentially "built-out". 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. Currently, about 85 percent of the potable water used in the City comes from Metropolitan. With the recently constructed facilities and their operation, dependence on Metropolitan is reduced to 60 percent of demand. This was accomplished by building new facilities.

RECENT WATER FACILITIES

Various water facilities have been constructed over the past few years and they are 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 the EPA's SUPERFUND clean-up program and with many water treatment plants that have been constructed to pump and treat the groundwater. Recently, EPA has focused on the construction of clean-up facilities in Glendale. The Glendale Water Treatment Plant has been constructed to convey treated water via the Grandview Pumping Station to the Glendale potable water system.

Facilities consist 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 to bring water 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 these facilities is shown on Figure 5.

The major agreements between Glendale, Glendale Respondents Group (GRG), and the EPA have been signed. The PRPs retained CDM Consulting Engineers Inc. to design and construct the required facilities. To date, construction has been completed and waiting for the State-DOHS issuance of a permit to operate the facilities. It is anticipated the City will start receiving water from this facility in the middle part of year 2001.

The City's expected annual delivery of the treated water is about 7,200 AFY and will meet about 25 percent of projected near-term water demands.

Verdugo Basin - Historically, the City's use of these water sources has been limited because of water quality problems, groundwater levels, and extraction capacity. The City has completed construction of the Verdugo Park Water Treatment Plant and this facility is operational. This facility has a capacity of 1,150 gpm and will treat water from the two low capacity wells (referred to as Glorietta Wells A & B) and from the water supplies in the old Verdugo Pickup horizontal infiltration system. Experience indicates that flows closer to 550 gpm are likely from these sources. The three existing Glorietta 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 developed. 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 fully utilize its rights to these supplies, about 12 percent of demands could be met from this Basin. The treatment plant and wells are shown on Figure 6.

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

The City has completed construction of a "backbone" recycled water distribution system. It consists 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 City's total water demands. Recycled water use has increased from 551 AF in 1991-92 to 1,740 AF in 1999-00.

The specific features of this program and recycled water user sites are shown in more detail on Figure 7. 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 2. This expanded system will also be used to deliver recycled water to the cities of Pasadena and Los Angeles.

Metropolitan Water District - The City currently has three treated water connections to the Metropolitan water system in the City. At one time, the cities of Los Angeles, Burbank and Glendale have looked at 150 cfs, equally divided, untreated water connections on the San Fernando Tunnel to percolate water into the San Fernando Basin. With this additional water delivered into 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 6
HISTORIC AND PROJECTED WATER USE IN GLENDALE (AF)

Water Year	San Fernando Basin	Verdugo Basin	Recycled Water	MWD Water	Total
1991-92	1,577	732	551	22,316	25,176
1992-93	447	904	770	25,935	28,056
1993-94	554	1,226	625	26,977	29,382
1994-95	441	1,667	574	26,199	28,881
1995-96	496	2,059	886	27,905	31,346
1996-97	467	2,569	1,112	28,122	32,270
1997-98	267	2,696	1,087	25,628	29,678
1998-99	409	2,720	1,458	26,642	31,229
1999-00	516	2,451	1,738	28,851	33,556
2000-01	2,825	2,900	1,840	24,748	32,113
2001-02	4,025	2,700	1,850	23,648	32,223
2005	4,025	2,700	1,880	23,949	32,554
2010	7,625	2,700	1,900	21,599	33,824
2015	7,625	2,700	1,920	22,846	35,091
2020	7,625	2,700	1,940	24,556	36,821

RELATED INFORMATION ON WATER USE

Detailed information on historic and projected water use in Glendale is shown on Figure 8. From a practical sense, water use in the water year is equivalent to water use in a fiscal year. Table 6 is a tabular version of Figure 8.

A:\RAYNOTARIO\ZIP1-A\WRP\GWPSPFAPRIL2001F.WD
APRIL 2001

FIGURES

FIGURE 1

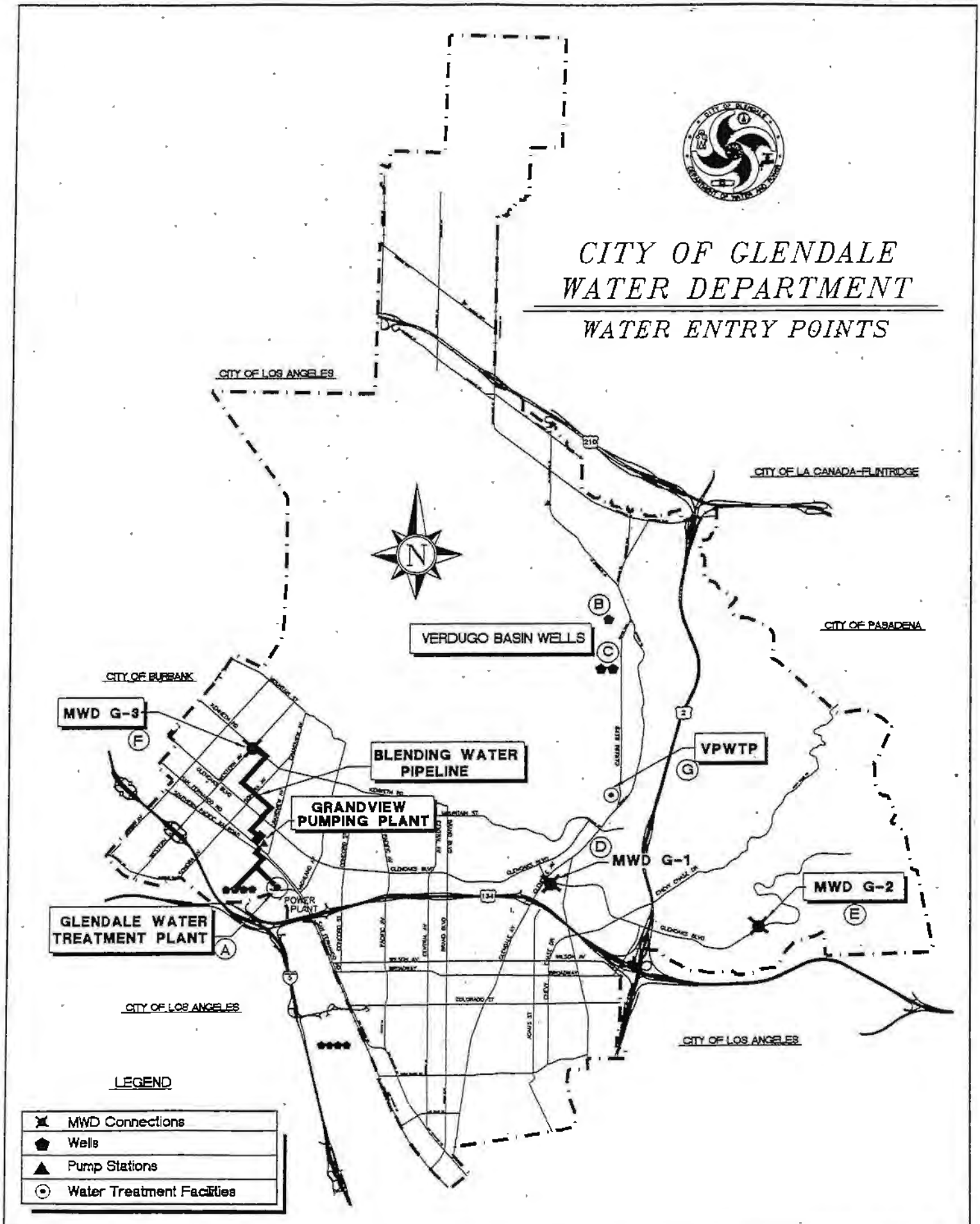
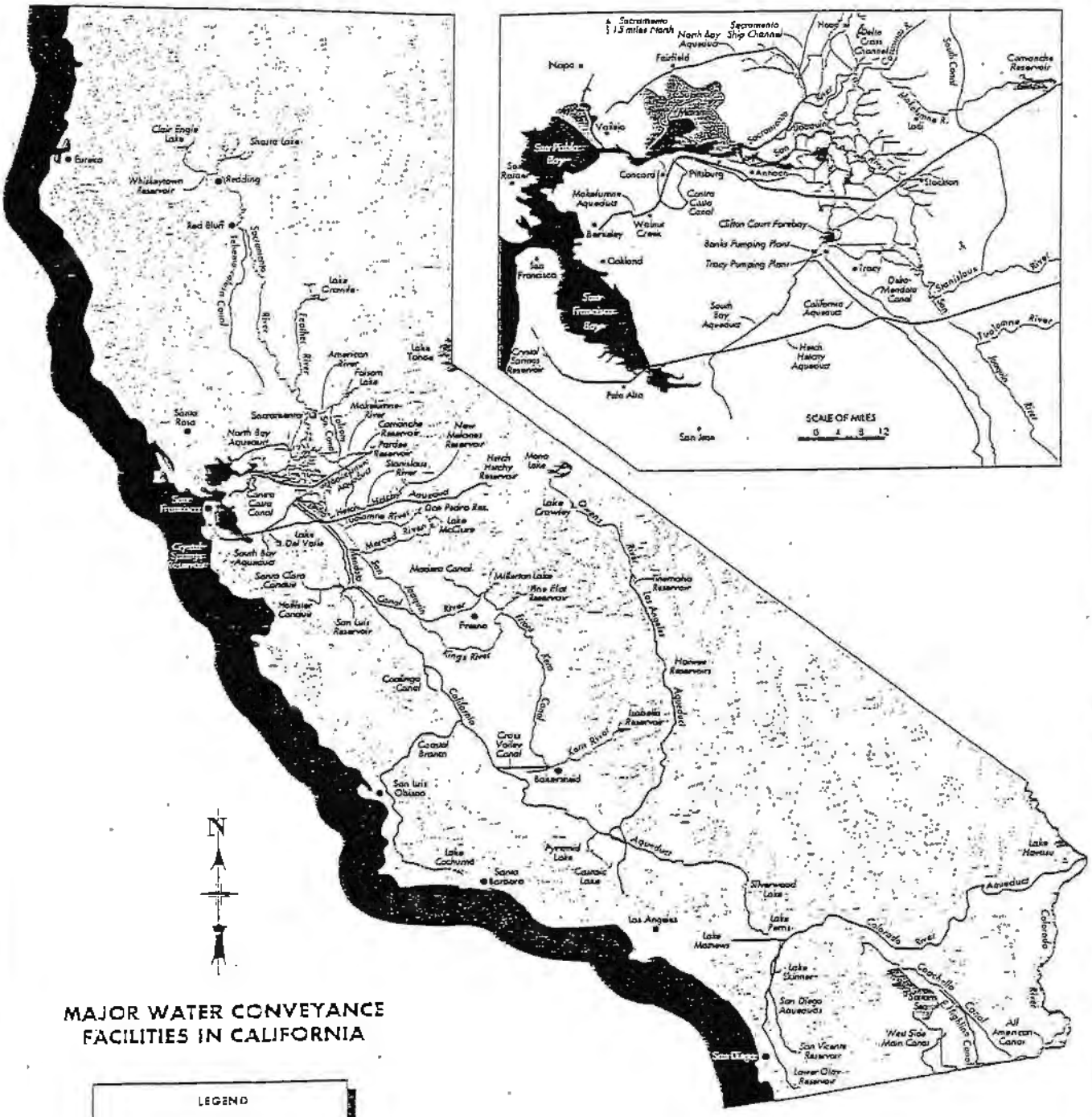

CITY OF GLENDALE
WATER DEPARTMENT
WATER ENTRY POINTS
CITY OF LOS ANGELES
CITY OF LA CANADA-FLINTRIDGE
CITY OF PASADENA
CITY OF BURBANK
VERDUGO BASIN WELLS
MWD G-3
BLENDING WATER PIPELINE
VPWTP
GRANDVIEW PUMPING PLANT
MWD G-1
MWD G-2
POWER PLANT
GLENDALE WATER TREATMENT PLANT
CITY OF LOS ANGELES
CITY OF LOS ANGELES
LEGEND
MWD Connections
Wells
Pump Stations
Water Treatment Facilities

FIGURE 2



MAJOR WATER CONVEYANCE FACILITIES IN CALIFORNIA

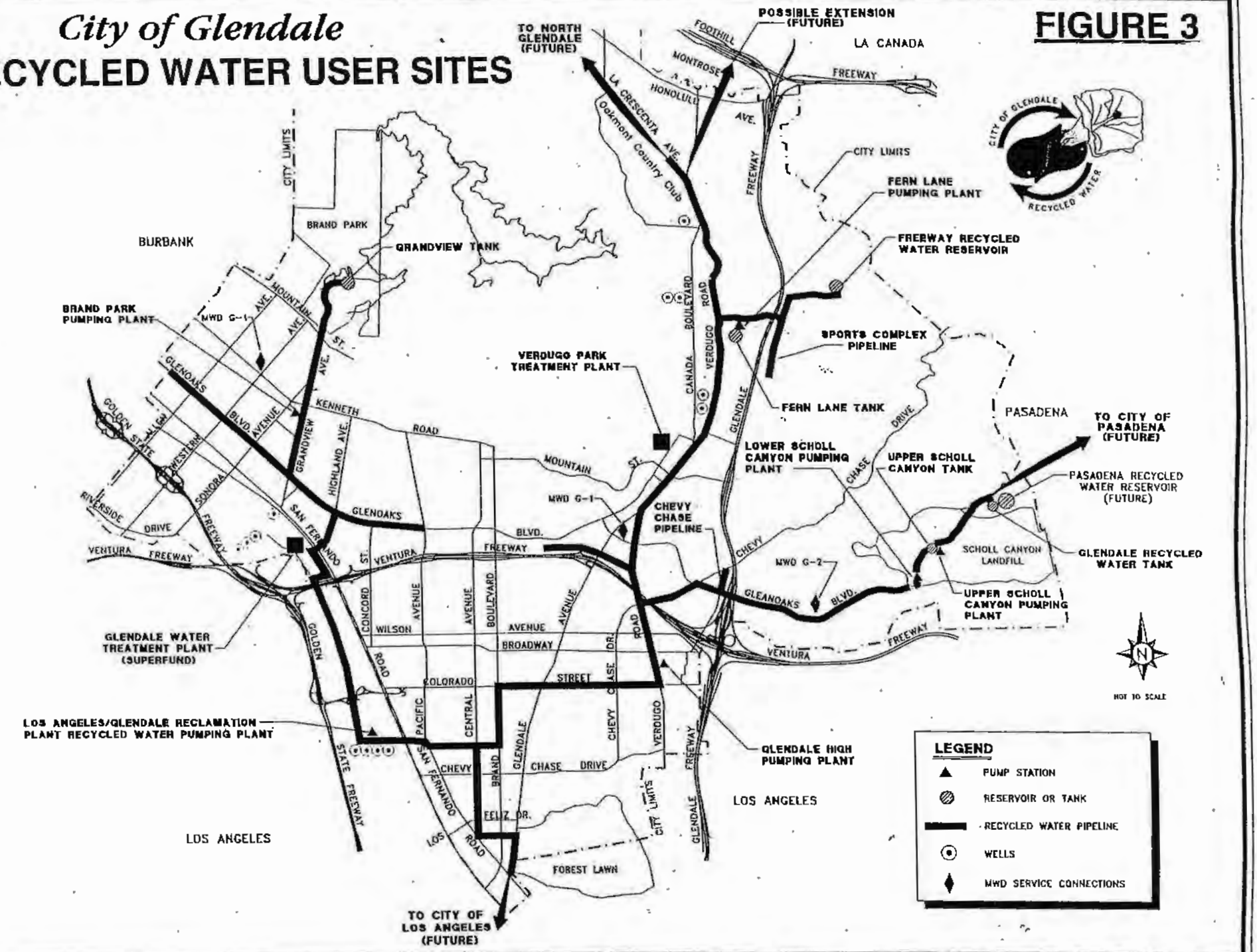
LEGEND

- FEDERAL AQUEDUCT
- STATE AQUEDUCT
- LOCAL AQUEDUCT

City of Glendale

RECYCLED WATER USER SITES

FIGURE 3

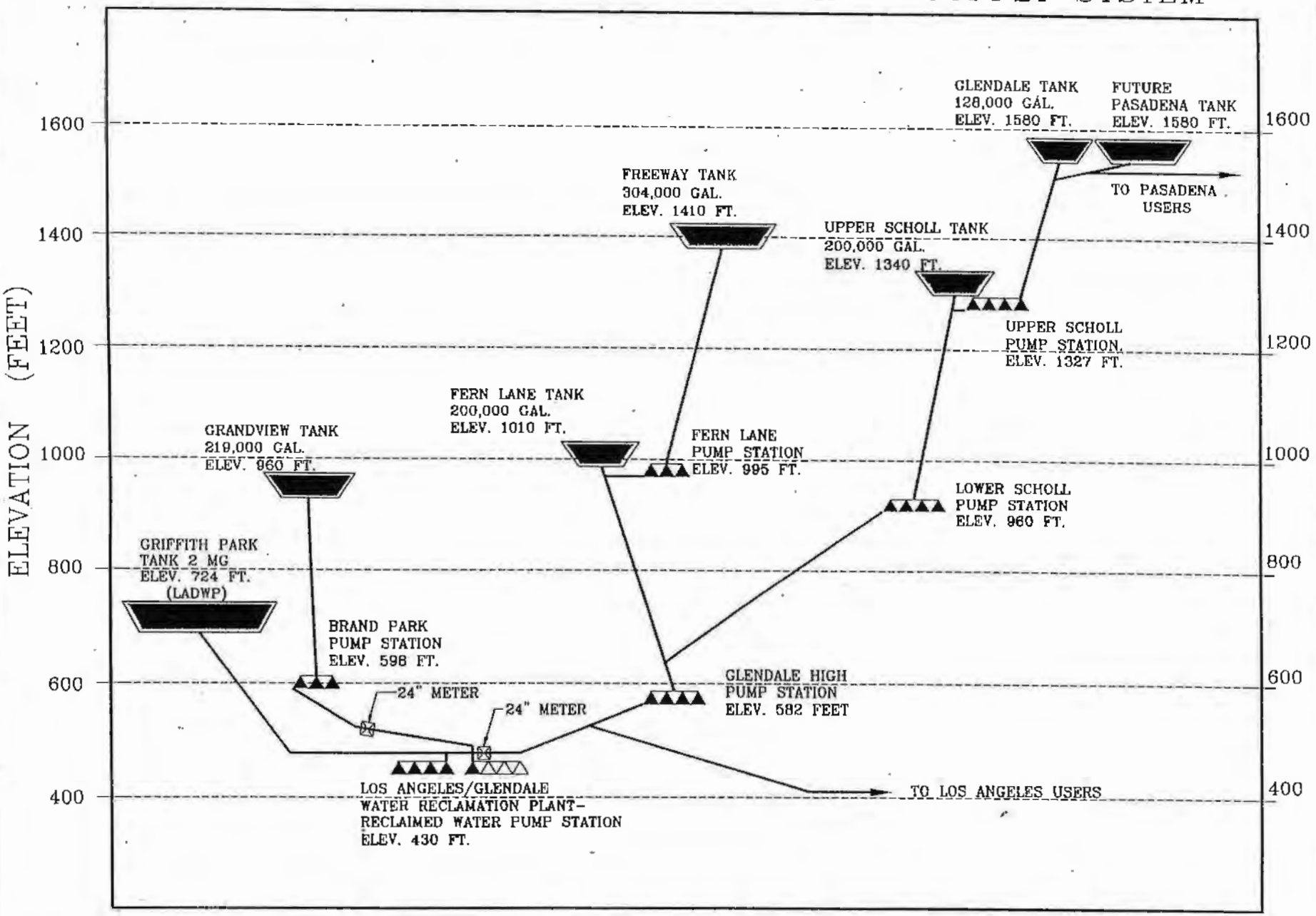


GROUNDWATER PUMPING & SPREADING PLAN

C:\AL\ACAD\RECSUPSY.DWG

FIGURE 4

CITY OF GLENDALE
SCHEMATIC DIAGRAM OF RECYCLED WATER SUPPLY SYSTEM



GROUNDWATER PUMPING & SPREADING PLAN

FIGURE 5

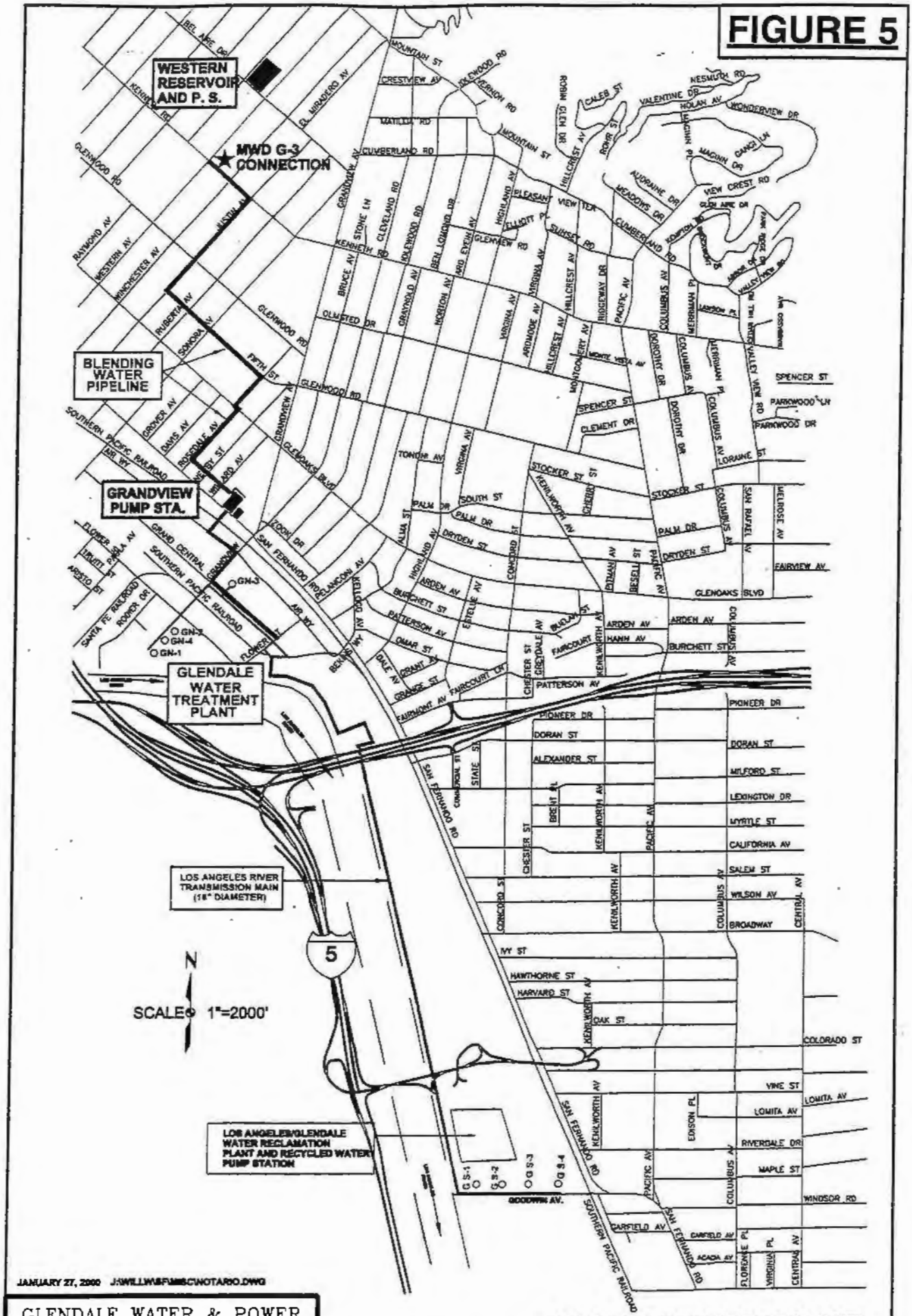
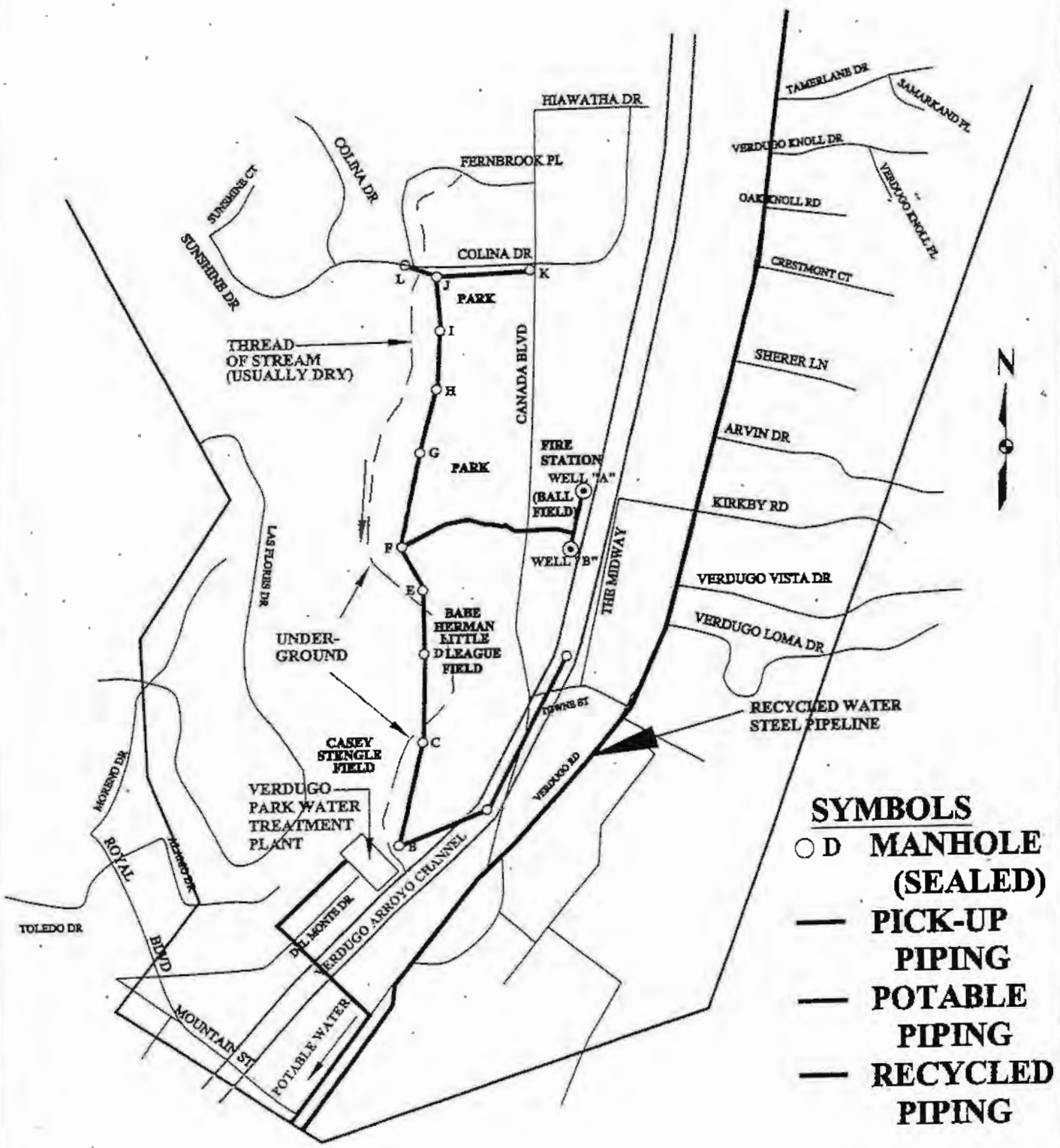

WESTERN RESERVOIR AND P. S.
MWD G-3 CONNECTION
BLENDING WATER PIPELINE
GRANDVIEW PUMP STA.
GLENDALE WATER TREATMENT PLANT
LOS ANGELES RIVER TRANSMISSION MAIN (16" DIAMETER)
LOS ANGELES/GLENDALE WATER RECLAMATION PLANT AND RECYCLED WATER PUMP STATION
GN-1
GN-2
GN-3
GN-4
GS-1
GS-2
GS-3
GS-4
SCALE 1"=2000'
N
5
JANUARY 27, 2000 J:\WELLWS\FIGS\CWOTAR50.DWG
GLENDALE WATER & POWER
CITY OF GLENDALE
CALIFORNIA
GLENDALE WATER TREATMENT PLANT AND DELIVERY FACILITIES

FIGURE 6

VERDUGO PARK W.T.P.
PICK-UP AND WELL SYSTEM



CITY OF GLENDALE
RECYCLED WATER USERS - SN 1990008
As of MARCH 2001

FIGURE 7

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	200-400	Irrigation
2	1600 South Brand Median	1995	YES	2	Irrigation
43	323 W Garfield Avenue	2000	YES	2	Irrigation
	POWER PLANT PROJECT				
7	Caltrans - 943 West Doran Street	1978	YES	40-60	Irrigation
8	Glendale Grayson Power Plant	1978	YES	400-600	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	1996	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	4	Irrigation
23	Parque Vaquero	1998	YES	2	Irrigation
20	Scholl Canyon Ballfield	1997	YES	17	Irrigation
18	Scholl Canyon Park	1996	YES	12	Irrigation
27	Sports Complex (Completed)	1998	YES	99	Irrigation
25	Verdugo Rd/Canada (South) Overpass	1995	YES	0.5	Irrigation
30	Verdugo Rd/Canada (North Madian)	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 I2)	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)	20	Irrigation
32	Oakmont Country Club	1996	YES	150-200	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	Completed	NO		Flushing Toilets
42	Police Building - Isabel Street	Under Construction	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	2001	YES(Partially)	50	Irrigation
10	Pelanconi Park	1996	YES	8	Irrigation
	TOTAL CURRENT METERS	42		**1,599-2,069**	

GLENDALE WATER SUPPLY AND DEMAND (AF/YR)

(Use MWD Direct Deliveries for Blending)

FIGURE 8

	Fiscal Year	1989-90	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2005	2010	2015	2020
(1)	**Water Demands (a)**	25,857	25,176	28,056	29,382	28,881	31,346	32,270	29,678	31,229	33,556	32,113	32,223	32,333	32,443	32,554	33,824	35,091	36,821
	Water Supplies:																		
(2)	*San Fernando Basin*																		
(3)	Water Rights	5,771	4,373	4,805	5,090	4,979	5,535	5,555	5,575	5,588	5,601	5,626	5,651	5,676	5,701	5,725	5,843	5,843	5,843
(3A)	Physical Solution Pmts (LADWP)																		
	Water Production																		
(4)	City Production	1,564	1,080	78	140	65	35	25	24	32	25	25	25	25	25	25	25	25	25
(5)	Glendale Water Treat. Plant (b)											2,400	3,600	3,600	3,600	3,600	7,200	7,200	7,200
(6)	Physical Solution	477	497	369	414	376	461	442	243	377	491	400	400	400	400	400	400	400	400
(7)	**Total:**	2,041	1,577	447	554	441	496	467	267	409	516	2,825	4,025	4,025	4,025	4,025	7,625	7,625	7,625
	Verdugo Basin																		
(8)	Wells 3,4, & 6	1,635	732	904	1,226	1,667	2,059	2,116	1,981	2,080	1,960	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
(9)	VPWTP						0	453	715	640	491	500	500	500	500	500	500	500	500
(10)	Other Production										0	0	0	0	0	0	0	0	0
(11)	**Total:**	1,635	732	904	1,226	1,667	2,059	2,569	2,696	2,720	2,451	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700
	Recycled Water																		
	Brand Park Project							32	63	73	106	110	110	110	110	110	110	110	110
	Forest Lawn Project			348	299	280	292	344	239	191	200	350	350	350	350	350	350	350	350
	Power Plant Project	333	551	422	326	260	377	264	306	698	453	400	400	400	400	400	400	400	400
	Verdugo-Scholl Project					34	217	472	479	496	979	980	990	1000	1010	1020	1,040	1,060	1,080
	Other Potential Project																		
(12)	**Total:**	333	551	770	625	574	886	1,112	1,087	1,458	1,738	1,840	1,850	1,860	1,870	1,880	1,900	1,920	1,940
	Metropolitan Water																		
(13)	Direct Deliveries (G1, G2, & G3)	21,848	22,316	25,935	26,977	26,199	27,905	28,122	25,628	26,642	28,851	24,748	23,648	23,748	23,848	23,949	21,599	22,846	24,556
(15)	Replenishment Deliveries (G4)																		
(16)	**Total:**	21,848	22,316	25,935	26,977	26,199	27,905	28,122	25,628	26,642	28,851	24,748	23,648	23,748	23,848	23,949	21,599	22,846	24,556
(17)	**Total Water Supplies**	25,857	25,176	28,056	29,382	28,881	31,346	32,270	29,678	31,229	33,556	32,113	32,223	32,333	32,443	32,554	33,824	35,091	36,821

3) [(1) - 4,000 AF] * 20% return
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) Started operation Dec. 2000, not used by the system

APPENDIX D

CITY OF SAN FERNANDO

PUMPING AND SPREADING PLAN

2000-2005 Water Years

CITY OF SAN FERNANDO

GROUNDWATER PUMPING AND SPREADING PLAN

OCTOBER 1, 2000 TO SEPTEMBER 30, 2005

2000-2001 Water Year

Prepared by:

Public Works Department

Engineering Division

117 Macneil Street

San Fernando, California 91340

APRIL 2001

TABLE OF CONTENTS

Section		Page No.
I.	INTRODUCTION	1
II.	WATER DEMAND	1
III.	WATER SUPPLY	
	A. MWD	2
	B. PRODUCTION WELLS	2
	C. WATER PUMPED FROM EACH WELL (1999-2000)	2
	D. WELLS GROUNDWATER LEVEL DATA (11/2000)	2
	E. MAP SHOWING WELL LOCATIONS	3
IV.	JUDGMENT CONSIDERATIONS	
	A. NATIVE AND IMPORTED RETURN WATER	4
	B. STORED WATER CREDIT	4
V.	TABLE	
	A. FIVE-YEAR HISTORIC AND PROJECTED WATER DEMAND (PUMPED AND IMPORTED)	5
VI.	APPENDIX	
	A. WATER QUALITY DATA	6
	B. POLICIES AND PROCEDURES	7

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 1997-98 through 2001 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: 1100 GPM

3. ***Well 4A***
   Location: 12900 Dronfield Avenue, Sylmar
   Capacity: 400 GPM

4. ***Well 7A***
   Location: 13180 Dronfield Avenue, Sylmar
   Capacity: 800 GPM

C. Quantity (Acre-Feet) of Water Pumped From Each Well (1999-2000)

1.	Well 2A	1,686.59
2.	Well 3	1095.74
3.	Well 4A	295.72
4.	Well 7A	688.14
	Total	3,766.19

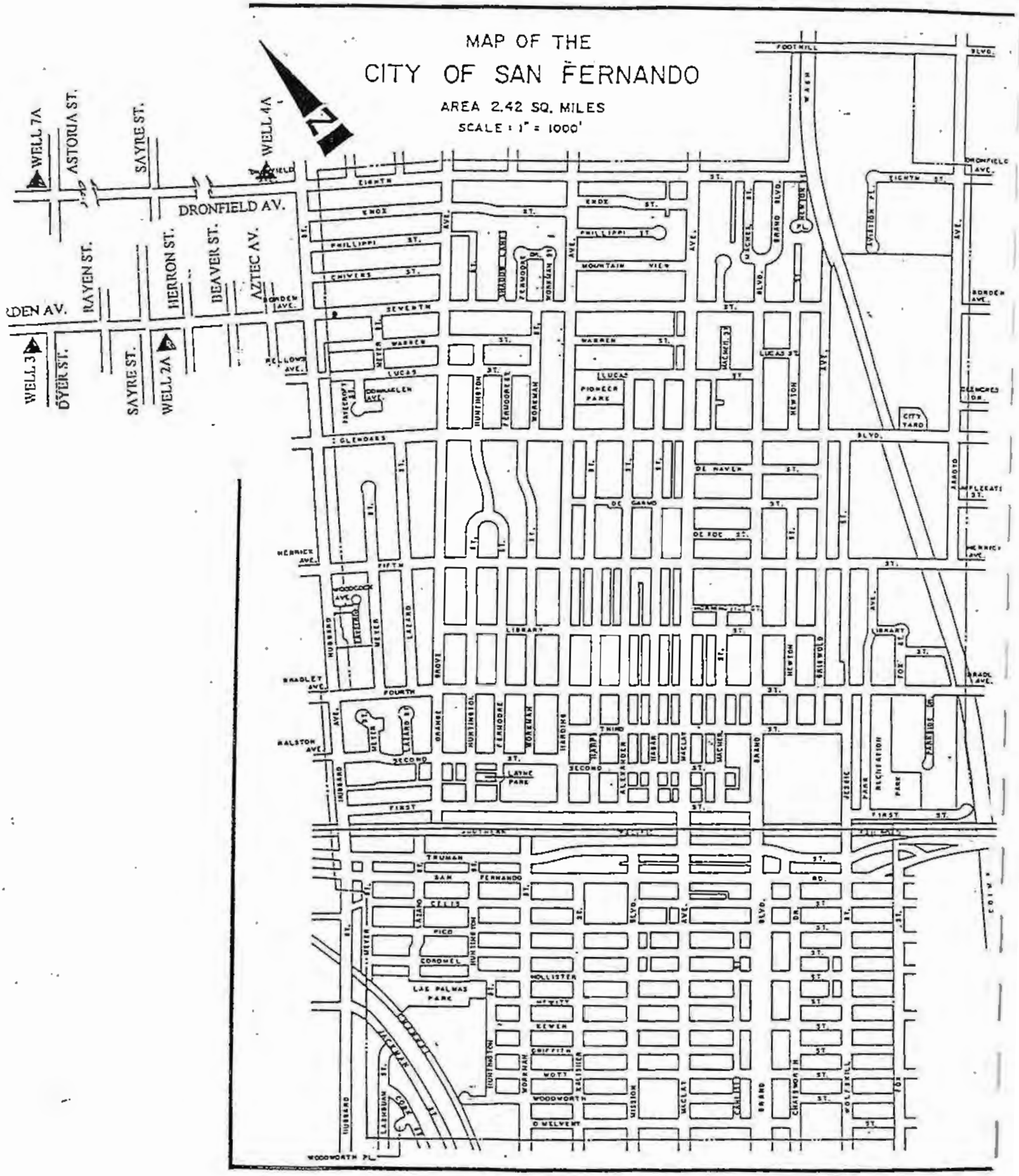
D. Wells Groundwater Level Data

1.	Well 2A	1053.5'	Taken 11/00
2.	Well 3	1057.2'	Taken 11/00
3.	Well 4A	1051.0'	Taken 11/00
4.	Well 7A	1055.3'	Taken 11/00

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, 2000 the City of San Fernando has a stored water credit of 1453.42 acre-feet accumulated during previous years through the 99-00 water year.

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

(Acre – Feet)

FY	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
DEMAND										
WELLS	2,985.12	3,258.59	3,307.91	3,528.29	3,766.19	3,800	2,800	3,900	3,900	4,000
MWD	614.50	315.59	0	0	0	0	1000	0	0	0
TOTAL	3,599.62	3,574.18	3,307.91	3,528.29	3,766.19	3,800	3,800	3,900	3,900	4,000
ACTUAL						PROJECTED				

APPENDIX A

WATER QUALITY DATA

SEE ATTACHED WATER QUALITY REPORT, 1999

CITY OF SAN FERNANDO

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

APPENDIX B

POLICIES AND PROCEDURES

(By ULARA)

WATERMASTER SERVICE

UPPER LOS ANGELES RIVER AREA

POLICIES AND PROCEDURES

February 1999

APPENDIX E

CRESCENTA VALLEY WATER DISTRICT

PUMPING AND SPREADING PLAN

2000-2005 Water Years

GROUNDWATER PUMPING

PLAN

WATER YEARS

OCTOBER 1, 2000 TO SEPTEMBER 30, 2005

Prepared by
CRESCENTA VALLEY
WATER DISTRICT

APRIL 2001

TABLE OF CONTENTS

Page

I. INTRODUCTION----------1

II. WATER DEMAND----------1

III. WATER SUPPLY----------2

A. PRODUCTION WELLS----------2

B. GLENWOOD NITRATE REMOVAL PLANT----------2

C. PICKENS GRAVITY TUNNEL PRODUCTION----------3

D. MWD----------3

IV. JUDGEMENT CONSIDERATIONS----------3

TABLES

2.1 FIVE-YEAR HISTORIC AND PROJECTED WATER DEMAND--------5

3.1 HISTORIC AND PROJECTED WELL PRODUCTION----------6

3.2 HISTORIC AND PROJECTED GLENWOOD NITRATE REMOVAL PLANT PRODUCTION----------7

3.3 HISTORIC AND PROJECTED PICKENS TUNNEL WATER PRODUCTION----------8

3.4 HISTORIC AND PROJECTED USE OF MWD TREATED WATER------9

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 is currently being provided.

The 1999-00 base year again saw a sizable increase in production compared to the prior year due to the relatively dry winter and spring. In any case, the water consumption patterns are quite high and 1999-2000 was a record year due to a third consecutive dry year and unusually warm fall-winter-spring.

Projected water demand is expected to decrease a bit in 2000-2001 but then increase slightly thereafter. The increase is expected mainly from residential growth. However, it is seen from Table 2.1 that water use has increased dramatically from 1994-95 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 ten active 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 typically contain 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.

The District's active wells range in age from 50 to 75 years and are beyond their useful life. During 1999-00 construction was started on the first well in the District's well replacement program with the goal of replacing existing groundwater production capacity with new, modern wells over the next 10 years. The first well, although of low capacity, will be

completed in summer of 2001 while the second well may be completed in early 2002. Additional wells, as needed, should be constructed at a rate of approximately every 1 to 1 ½ years thereafter.

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 although not utilized quite as heavily as in prior years since overall groundwater production was down due to basin level decline resulting in more imported water, thereby reducing the need for treatment. This trend should continue in the near term. 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 remain fairly consistent over the next five years to make up the difference between groundwater adjudication and Customer demand. 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 if normal or above-average rainfall resumes. For the past six 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 will continue for 2000-2001. 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 on an annual basis by the Watermaster. There is no projection of excess pumping beyond 2004-2005 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)

95-96	96-97	97-98	98-99	99-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
5346	5483	4991	5394	5884	5600	5600	5650	5700	5730
ACTUAL					PROJECTED				

TABLE 3.1
HISTORIC AND PROJECTED COMBINED WELL AND TUNNEL GROUNDWATER PRODUCTION

(Acre-Feet)

95-96	96-97	97-98	98-99	99-2000	2000 2001	2001 2002	2002-2003	2003-2004	2004-2005
3702	3672	3747	3797	3698	3400	3600	3600	3650	3650
ACTUAL					PROJECTED				

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

(Acre-Feet)

95-96	96-97	97-98	98-99	99-2000	2000-2001	2001 2002	2002-2003	2003-2004	2004-2005
1419	1562	1391	1281	1137	1200	1300	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)

95-96	96-97	97-98	98-99	99-2000	2000 2001	2001 2002	2002-2003	2003-2004	2004-2005
42	6	62	65	54	57	60	60	60	60
ACTUAL					PROJECTED				

TABLE 3.4
HISTORIC AND PROJECTED USE OF MWD TREATED WATER

(Acre-Feet)

95-96	96-97	97-98	98-99	99-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
1644	1811	1244	1597	2186	2200	2000	2050	2050	2080
ACTUAL					PROJECTED				

NOTES:

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