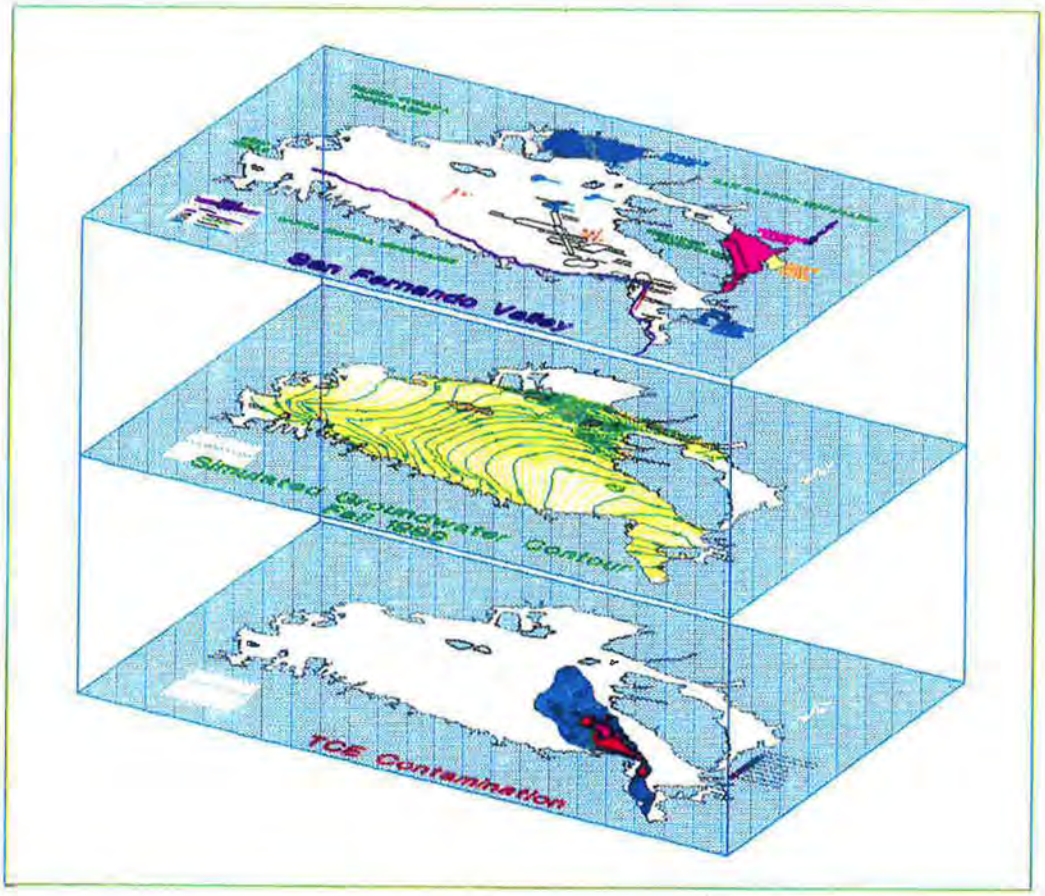
UPPER LOS ANGELES RIVER AREA WATERMASTER

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

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

1996-2001 WATER YEARS



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P.O.Box 51111, Room 1311
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1996-2001 WATER YEARS

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JULY 1997

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I. EXECUTIVE SUMMARY

This report is prepared for compliance with Section 2.9.4., amended July 1993, of the Upper Los Angeles River Area (ULARA) Watermaster's Policies and Procedures. This section established the Watermaster's responsibility for water quality management in the ULARA groundwater basins. This includes plans submitted by the five major water rights holders which might incorporate changes in recharge, such as spreading, changes in pumping, or changes in pumping patterns, especially in relation to the present and future plans for groundwater clean-up.

The pumping and spreading plans for the 1996-2001 Water Years feature the January 3, 1996 activation of the Phase I Burbank Operable Unit (OU). Phase II of the Burbank OU is planned to begin production in January 1998. Both of these activities restore Burbank's groundwater pumping capabilities. Glendale's North and South OUs have been delayed almost another year because of negotiations between Glendale, the U.S. Environmental Protection Agency (USEPA), and the respondents. Glendale has limited pumping capacity in the Verdugo Basin. San Fernando can pump all its groundwater rights from the Sylmar Basin, and Crescenta Valley Water District is pumping all its assigned water rights from the Verdugo Basin, and, on an interim basis, is increasing its groundwater pumping until Glendale has the ability to pump its full prescriptive right. This increase is subject to an annual review and approval by the Watermaster and Administrative Committee. At the encouragement of the Watermaster, Los Angeles will pump greater than its historic 1979-96 average annual pumping for 1996-97.

Currently, there are four groundwater clean-up plants in operation: the City of Los Angeles' North Hollywood OU, the City of Burbank's Granular Activated Carbon Treatment Plant, the Burbank OU, and Crescenta Valley Water District's Glenwood Nitrate Removal Plant. Two other treatment facilities are in the design or the construction stage: the Glendale North and South OUs are in the final design stage and the Pollock Wells Treatment Plant is presently under construction. The City of Los Angeles' Headworks Well Field Remediation Project is currently in its conceptual planning stage.

The groundwater model this year simulated the effect on groundwater elevations of projected pumping in the San Fernando Basin for the next five years. The most significant feature is the pumping cone of depression formed in Layer I (Upper Zone) as a result of the Burbank OU pumping.

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 thrust of the revisions to the ULARA Watermaster's Policies and Procedures is detailed in Section 2.9.4. In Section 2.9.4., any party who produces groundwater is required to submit to the ULARA Watermaster annually (on or before May 1 of the current water year), a Groundwater Pumping and Spreading Plan. This plan should include projected groundwater pumping and spreading amounts, recent water quality data on each well, and facility modification plans. In order to obtain the information needed to project future groundwater contamination levels, a monitoring program should also be included in the plan.

The ULARA Watermaster recommended a change in the report publication date from September of each year to July. This enables the Watermaster to incorporate the previous years actual data into the model simulations and the projected pumping values for the next five years. All the parties are required to submit their own pumping and spreading reports by April 1.

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, that the Administrative Committee is to review and approve by July of the current water year.

This is the July 1997 Groundwater Pumping and Spreading Plan for ULARA, prepared following the revision of the Policies and Procedures (July 1993). This report provides guidance to the Administrative Committee for use in protecting the water quality within ULARA, improving basin management, and providing overall protection for each party's water rights.

III. PLANS FOR THE 1996-2001 WATER YEARS

A. Projected Groundwater Pumping for 1996-97 Water Year

The total 1996-97 ULARA pumping is projected at 112,841 AF, approximately 21,000 AF above the 17-year average. However, estimated pumping for 1997-98 is 130,565 AF, a 39,000 AF increase above the historical average. (Appendices A-E).

In 1996-97, the City of Burbank plans to pump 10,300 AF, an increase of 8,100 AF as compared to its past four years pumping, and overall, nearly a 900% increase from its historical 17-year average. This increase is due to the start up of Phase I of the Burbank OU. As of October 1, 1996, Burbank had storage credit of 61,415 AF. Burbank's annual return water credit is approximately 4,800 AF and its right to physical solution water is 4,200 AF/Y. Pumping in excess of Burbank's annual pumping right can come from its banked storage, or negotiations with the City of Los Angeles for purchasing a portion of Los Angeles' stored water.

The Crescenta Valley Water District (CVWD) plans to pump 3,694 AF, which is an increase of about 1,206 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. CVWD plans to pump 3,294 AF in 1997-98, or more, depending on Glendale's operation. Pumping beyond the 3,294 AF will still require the Watermaster's approval.

The City of Glendale will not resume significant pumping from the San Fernando Basin (SFB) until the Glendale N/S OUs come on-line. Its annual SFB extraction rights are approximately 5,400 AF. Glendale plans to extract 2,700 AF from the Verdugo Basin, an increase of about 500 AF greater than its historical average, and 1,200 AF more than the average over the past four years. Glendale anticipates pumping the same for 1996-97. Glendale had storage credit of 54,797 AF as of October 1, 1996.

The City of Los Angeles plans to pump about 92,420 AF this year, approximately 11,400 AF above its 1979-96 annual average and about 34,500 AF more than the past four year average (1993-96).. A total of 3,294 AF of groundwater will be pumped from the Sylmar Basin, about a 300 AF increase as compared to the 1979-96 average and 1,100 AF more than the last four years (1993-96). The amount of Los Angeles' pumping is dependent upon the availability of imported

water supplies, particularly, from the two Los Angeles Aqueducts. In 1997-98, Los Angeles plans to pump 107,578 AF from the SFB, an increase of 38% compared to its average pumping, and 3,492 AF from the Sylmar Basin, which is 500 AF above normal pumping. As of October 1, 1996, Los Angeles had storage credit of 302,670 AF in the SFB and 3,986 AF in the Sylmar Basin.

The City of San Fernando plans to pump 3,230 AF from the Sylmar Basin, 240 AF below its normal pumping for the past four years and 360 AF below the past 17-year average. San Fernando had storage credit of 2,313 AF as of October 1, 1996.

Estimated capactities of ULARA well fields are provided in Table 3-1. Actual and projected amounts of pumping and spreading by the major parties during 1996-97 are given in Tables 3-1A, 3-1B, and 5-1.

B. Constraints on Pumping as of 1996-97

SAN FERNANDO BASIN

Burbank - In January 1996, Burbank's pumping capability was restored when the Lockheed - Burbank Operable Unit (BOU) was activated under Phase I of the Consent Decree with the USEPA. The Lockheed-BOU is pumping at about 8,000 gpm. The Burbank Liquid Phase GAC pumps at a rate of 1,800 gpm to supplement the Lockheed-BOU water. In the SFB, Burbank accumulates storage credits from the water delivered to the hill, mountain, and valley floor areas and receives storage credits for the return water rights it is unable to pump. In addition, Burbank has the right to purchase from Los Angeles up to 4,200 AF/Y as physical solution water.

Glendale - Essentially, all of Glendale's pumping has been curtailed due to groundwater contamination by TCE and PCE. At present, Glendale is unable to pump its water rights to return waters (recharge from delivered water), physical solution waters, or stored water credits from the SFB. However, Glendale continues to accumulate 20% return water credit for water delivered to the hill, mountain, and valley floor areas of the SFB. The unpumped water rights are added to storage credits. In addition, Glendale has the right to purchase from Los Angeles up to 5,500 AF/Y of physical solution water.

Los Angeles - Several of the well fields within the SFB can not be fully utilized because of groundwater contamination, primarily from synthetic organic contaminants, such as TCE

and PCE. The well fields most impacted include the Crystal Springs Well Field, which has been completely taken out-of-service, and the Pollock and Headworks well fields which are temporarily out-of-service. The number of wells has been reduced to the following: Crystal Springs wells from 4 to 0, Erwin wells from 6 to 4, the Headworks wells from 6 to 0, the North Hollywood wells from 35 to 30, Pollock wells from 4 to 0, the Verdugo from 7 to 6, and Whitnall Wells from 7 to 6. The loss of production from these 23 wells, amounting to approximately 14,000 AF/YR, can be made up by pumping Los Angeles' newest well field, the Tujunga Well Field (14,500 AF/YR) which is located upgradient of the most significant contaminant plumes.

SYLMAR BASIN

San Fernando - All of San Fernando's groundwater rights are pumped from the Sylmar Basin, where there are no limitations related to contamination. The City of San Fernando is in the process of rehabilitating wells to maximize their efficiency.

Los Angeles - The number of wells at the Mission Well Field has been reduced from six to three, because of the age and condition of these wells. In November 1996 the wells were shut down to replace the collector line and the discharge line. The wells will begin pumping again in May 1996.

VERDUGO BASIN

Crescenta Valley - All of Crescenta Valley's groundwater rights are in the Verdugo Basin, where contamination from synthetic organic contaminants is minimal. High nitrate levels are reduced by sending a portion of the pumped groundwater through a nitrate removal plant and blending to acceptability with MWD water. Crescenta Valley was given permission by the Watermaster and Administrative Committee to pump in excess of its prescriptive right, on an annual basis until the City of Glendale is able to pump its complete prescriptive right. CVWD will seek approval from the Watermaster and the Administrative Committee for continued pumping in excess of its prescriptive right.

City of Glendale -The City of Glendale currently does not have the capability to pump its entire adjudicated right from the Verdugo Basin. Glendale is in the process of studying and evaluating various alternatives to increase its pumping capacity.

TABLE 3-1: ESTIMATED CAPACITIES OF ULARA WELL FIELDS

Party/Well Field	Number of Wells	Estimated Capacity (cfs)
	SAN FERNANDO BASIN	
City of Los Angeles		
Aeration	7	3
Erwin	4	10
Headworks	6	25
North Hollywood	30	129
Pollock	2	4
Rinaldi-Toluca	15	112
Tujunga	12	112
Verdugo	6	12
Whitnall	6	15
City of Burbank	7	5*
City of Glendale	3	15*
Lockheed	7	17
TOTAL:	105	459
	SYLMAR BASIN	
City of Los Angeles	3	9
City of San Fernando	4	9
TOTAL:	7	18
	VERDUGO BASIN	
CVWD	11	18
City of Glendale	5	15
TOTAL:	16	33

Notes:
(*) - Only two wells capable of pumping.

TABLE 3-1A: 1996-97 ACTUAL AND PROJECTED GROUNDWATER EXTRACTIONS
(acre-feet)

Party/Well Field	Total	1996 Oct.	Nov	Dec	1997 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							SAN FERNANDO BASIN						
City of Los Angeles													
AERATION	1716	143	140	132	113	173	115	150	150	150	150	150	150
ERWIN	1062	432	418	212	0	0	0	0	0	0	0	0	0
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	27930	3270	3124	2751	1216	108	61	2850	2950	2850	2950	2950	2850
POLLOCK	0	0	0	0	0	0	0	0	0	0	0	0	0
RINALDI-TOLUCA	42478	3375	3458	1777	882	1	0	5405	5590	5405	5590	5590	5405
TUJUNGA	12596	2615	3460	2933	761	15	2812	0	0	0	0	0	0
VERDUGO	1285	418	566	300	0	0	1	0	0	0	0	0	0
WHITNALL	2060	629	631	59	0	1	0	0	0	0	0	740	0
TOTAL:	89127	10882	11797	8164	2972	298	2989	8405	8690	8405	8690	9430	8405
City of Burbank	1300	199	216	181	111	2	39	92	92	92	92	92	92
City of Glendale	500	45	16	5	5	16	54	59	60	60	60	60	60
Lockheed	9000	144	373	651	588	824	913	919	917	917	918	918	918
TOTAL:	99927	11270	12402	9001	3676	1140	3995	9475	9759	9474	9760	10500	9475
							SYLMAR BASIN						
City of Los Angeles	3293	363	311	0	0	0	0	0	291	582	582	582	582
City of San Fernando	3227	314	0	164	209	210	281	299	350	350	350	350	350
TOTAL:	6520	677	311	164	209	210	281	299	641	932	932	932	932
							VERDUGO BASIN						
Crescenta Valley Water District	3694	385	276	264	233	266	330.6	323	323	323	323	323	323
City of Glendale	2700	228	287	257	169	226	282	208	208	208	209	209	209
TOTAL:	6394	613	563	521	402	492	613	531	531	531	532	532	532
ULARA TOTAL:	112841	12560	13276	9686	4287	1842	4889	10305	10931	10937	11224	11964	10939

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

Party/Wellfield	Historical Average Pumping	Projected Groundwater Pumping					
		SAN FERNANDO BASIN					
City of Los Angeles	1979-96(A)	1993-96(B)	1996-97	1997-98	1998-99	1999-2000	2000-01
AERATION	481	1203	1716	1965	1990	1985	1999
ERWIN	5649	2008	1062	1283	1300	1296	1306
HEADWORKS	2311	0	0	0	0	0	0
No HOLLYWOOD	33709	11523	27930	32296	32717	32626	32867
POLLOCK	936	0	0	2400	2400	2400	2400
RINALDI-TOLUCA	17706	22294	42478	49874	50523	50384	50755
TUJUNGA	3421	14538	12596	15219	15417	15375	15488
VERDUGO	5840	2301	1285	2053	2111	2097	2131
WHITNALL	8032	1934	2060	2489	2521	2514	2533
TOTAL City of Los Angeles	78085	55801	89127	107579	108979	108677	109479
City of Burbank	1064	2158	1300	1300	1300	1300	1300
LOCKHEED BOU	0	0	9000	9000	9000	9000	9000
City of Glendale	1635	71	500	500	500	7700	7700
TOTAL San Fernando Basin	80784	58030	99927	118379	119779	126677	127479
		SYLMAR BASIN					
City of Los Angeles	2957	2125	3293	3492	3492	3492	3492
City of San Fernando	2869	2987	2700	2700	2700	2700	2700
TOTAL Sylmar Basin	5826	5112	5993	6192	6192	6192	6192
		VERDUGO BASIN					
Crescenta Valley Water District	2488	3401	3694	3294	3294	3294	3294
City of Glendale	2215	1540	2700	2700	3300	3300	3356
TOTAL Verdugo Basin	4703	4941	6394	5994	6594	6594	6650
TOTAL ULARA	91313	68083	112314	130565	132565	139463	140321

(A) All wellfields divided by 17 yrs. even if not active.
(B) Average values for most recently in active service of the past four years. Well field start up: Tujunga 92/93; R-T 87/88. Wellfield shut down: Crystal Springs 87/88; Headworks 87/88; Pollock 90/91.

IV. GROUNDWATER PUMPING FACILITIES

A. Well Fields

There are 12 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 1, and their estimated capacities are given on Table 3-1. The City of Burbank's Well No. 10/Lockheed WP-180 will be connected to the Burbank OU-Lockheed treatment plant. Lockheed Martin will provide new pumping equipment and the connection for Phase II of the Burbank Consent Decree beginning during the water year 1997-98. The well is to produce 1,500 gpm with an anticipated drawdown of 20 feet. Ad additional 50 feet of dradown is included for long term water level variation.

B. Active Groundwater Pumping and Treatment Facilities

Burbank OU- Lockheed

The remediation of groundwater contamination in the SFB has been significantly enhanced by the start-up of the Burbank OU on January 3, 1996. The Burbank OU-Lockheed, consisting of airstripping towers followed by liquid and gaseous phase GAC polishers, began pumping and delivering water to the municipal system at an average rate of about 6,000 gallons per minute (gpm), with a maximum rate of over 8,000 gpm. During the Fall of 1996 the facility was shut down due to problems with the wet phase GAC. There was never any health hazard. The facility continues to pump heavily with the re-establishment of a pumping cone. Burbank is using all the water pumped with a 60-40 blend to reduce nitrates.

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

This facility is designed to treat by airstripping up to 2,000 gpm of groundwater. The treated water is delivered to Los Angeles' water distribution system. During 1995-96, the plant was closed several months for repair work at the North Hollywood sump and the eastbound collector line. Repair work was completed on two wells. In April 1997 the plant operated at a capacity of 1,500 gpm.

GAC Treatment Plant - City of Burbank

This facility is operated by the City of Burbank. Two wells (Nos. 7 and 15) have been reactivated to deliver water to a GAC plant for removal of VOCs. The treated water is delivered to the Burbank distribution system and supplements the Lockheed-BOU water. The plant will be operated in the parallel configuration.

Glenwood Nitrate Removal Plant - CVWD

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

C. Projected Groundwater Pumping and Treatment Facilities

Glendale OU

Under the Record of Decision for the South and North Glendale OUs, many new facilities will be constructed consisting of: shallow extraction wells, a combined 5,000 gpm water treatment plant, piping to convey the untreated water from the wells to the treatment plant, a conveyance system from the treatment plant to Glendale's potable distribution system, a facility to blend the treated groundwater with water from the Metropolitan Water District to reduce nitrate levels, and a disinfection facility. The proposed site of the treatment facility was selected for an animation studio to be constructed by DreamWorks Inc. The treatment plant site will be relocated on city property at the Glendale Recycling Center approximately 500 feet from the previously proposed location. DreamWorks is on schedule to complete its construction by December 1997. The USEPA has ordered the PRPs to hire a contractor by September 1997.

Pollock Wells Treatment Plant

Construction of the Pollock Wells Treatment Plant, planned to treat 3,000 gpm of groundwater, began March 1997. This project is being funded by the City of Los Angeles. The Pollock Project's main focus is to reduce rising groundwater flowing past gaging station F- 57C-R and to enhance the overall groundwater clean-up program in the Los Angeles River Narrows area of the SFB. The groundwater will be processed through liquid-phase GAC vessels intended for VOC removal, followed by blending of the chlorinated groundwater to reduce nitrate levels. The processed water will then be delivered to LADWP's distribution system. The projected pumping pattern, through two existing wells, PO-4 and PO-7, will operate for a period of six months each year beginning approximately in May 1998.

Headworks Well Field Remediation Project

The Headworks Well Field objective is to rehabilitate the well field by pumping and treating the groundwater for VOCs from six wells with a combined flow of approximately 13,000 gpm. An alternative study is being evaluated using Advanced Oxidation Process (AOP) technology at a site in the San Gabriel Basin under construction by Applied Process Technology (APT). This process uses ozone and hydrogen peroxide under a revised system to optimize treatment for control of

bromate formation in the source water. In addition, hydraulic criteria are being established to evaluate the system. The planning stage will continue through 1997.

D. Groundwater Remediation Projects

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

E. Dewatering Operations

Metropolitan Transit Authority (MTA)

As part of the planned transportation system in Los Angeles County, the MTA is constructing the Universal City Subway Station. This activity requires temporary groundwater dewatering. In 1995 the MTA was granted approval to remove about 1,200 AF over a two-year period under an existing National Pollutant Discharge Elimination System permit. During these two years about 430 AF have been discharged to storm drains which flow into the Los Angeles River. The MTA has requested a time extension of its 1,200 AF from January 1997 to January 1999. The dewatering activities are subject to review by the Watermaster and Administrative Committee, until the project is completed. The water will be charged against the Basin Account.

Permanent Dewatering Operations

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

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS

A. Existing Spreading Operations

There are six spreading facilities located in the SFB. The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima Spreading Grounds. The City of Los Angeles operates the Headworks Spreading Grounds. The LACDPW in cooperation with the City of Los Angeles operates the Tujunga Spreading Grounds. The spreading facilities are used primarily for spreading native and imported water. There are no plans for modifications of existing spreading grounds, or for the construction of new facilities in the 1996-97 Water Year. Estimated capacities are shown in Table 5-1.

B. Future Spreading Operations

The East Valley Water Recycling Project (EVWRP) will take tertiary-treated water from the Tillman Water Reclamation Plant for spreading at the Hansen Spreading Grounds. The RWQCB, the California Department of Health Services, and the ULARA Watermaster have approved a Phase IA Demonstration Project which allows for the spreading of 10,000 acre-feet per year (AF/YR) during a three-year demonstration period. Monitoring wells are currently being installed in the EVWRP study area to identify the nature of groundwater quality associated with the spreading of recycled water. The monitoring will provide an evaluation of the impact of the vadose zone on the concentrations of Total Organic Compound 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. Construction of the pipeline in the Hansen Spreading Grounds was completed in the Fall of 1996. The Phase I pipeline construction began in August 1996.

C. Actual and Projected Spreading

Table 5-1 shows the actual plus projected spread volumes for the 1996-97 Water Year. Estimated capacity of each basin is detailed on Table 5-2. As shown in table 5-1, the 1996-97 water year will experience below average recharge activities. Overall, approximately 23,724 AF will be spread as compared to the historical average of 34,873 AF, and as compared to the past four year average of 44,368 AF. Rainfall precipitation on the valley fill is estimated at 14.3 inches for 1996-97 as compared to the long-term average of 17.44 inches/year and the previous four year average of 23.05 inches/year.

TABLE 5-1A: 1996-97 SPREADING OPERATIONS

(acre-feet)

Spreading in ULARA Spreading Grounds in 1996-97							
	Operated by:						
	LACDPW				LADWP	LACDPW and LADWP	
Month	Branford	Hansen	Lopez	Pacoima	Headworks	Tujunga	Total
Oct-96	26	0	1	0	0	238	265
Nov-96	71	291	1	335	0	70	768
Dec-96	85	1,650	10	1,600	0	611	3,956
Jan-97	89	3,180	4	3,050	0	2,750	9,073
Feb-97	35	2,430	393	782	0	666	4,306
Mar-97	10	629	158	0	0	863	1,660
Apr-97	6	560	75	0	0	280	921
May-97	6	325	75	0	0	325	731
Jun-97	6	300	0	0	0	300	606
Jul-97	6	270	0	0	0	270	546
Aug-97	6	240	0	0	0	240	486
Sep-97	6	200	0	0	0	200	406
TOTAL	352	10,075	717	5,767	0	6,813	23,724
1969-96 Average	508	14,827	583	6,914*	2,653	9,388*	34,873
1992-1996 Average	447	20,862	824	9,997	29	12,209*	44,367

Table 5-1B: HISTORICAL PRECIPITATION

(inches per year)

1969-96 Average	1992-96 AV	1992-93	1993-94	1994-95	1995-96	1996-97**
17.44	23.05	36.62	10.19	33.36	12.03	14.3

* - 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	8	1,000
Hansen	Shallow basin	110	36,000
Lopez	Shallow basin	13	5,000
Pacoima	Med. depth basin	111	29,000
	Operated by LADWP		
Headworks	Shallow basin	28	22,000
	Operated by LACDPW and LADWP		
Tujunga	Shallow basin	130	58,000
	TOTAL:	400	151,000

VI. BASIN MANAGEMENT ACTIVITIES AND INVESTIGATIONS

A. Groundwater Investigation Programs

Pacoima Area Groundwater Investigation

The Pacoima Groundwater Investigation Group (PGIG) met on December 10, 1996, January 30, and April 24, 1997 to discuss the Pacoima Area groundwater contamination. The PGIG is comprised of the regulatory lead agency - State Department of Toxics Substance Control (DTSC), the Regional Water Quality Control Board, the ULARA Watermaster, Los Angeles Bureau of Sanitation - Industrial Waste Division, and the Los Angeles Department of Water and Power (LADWP).

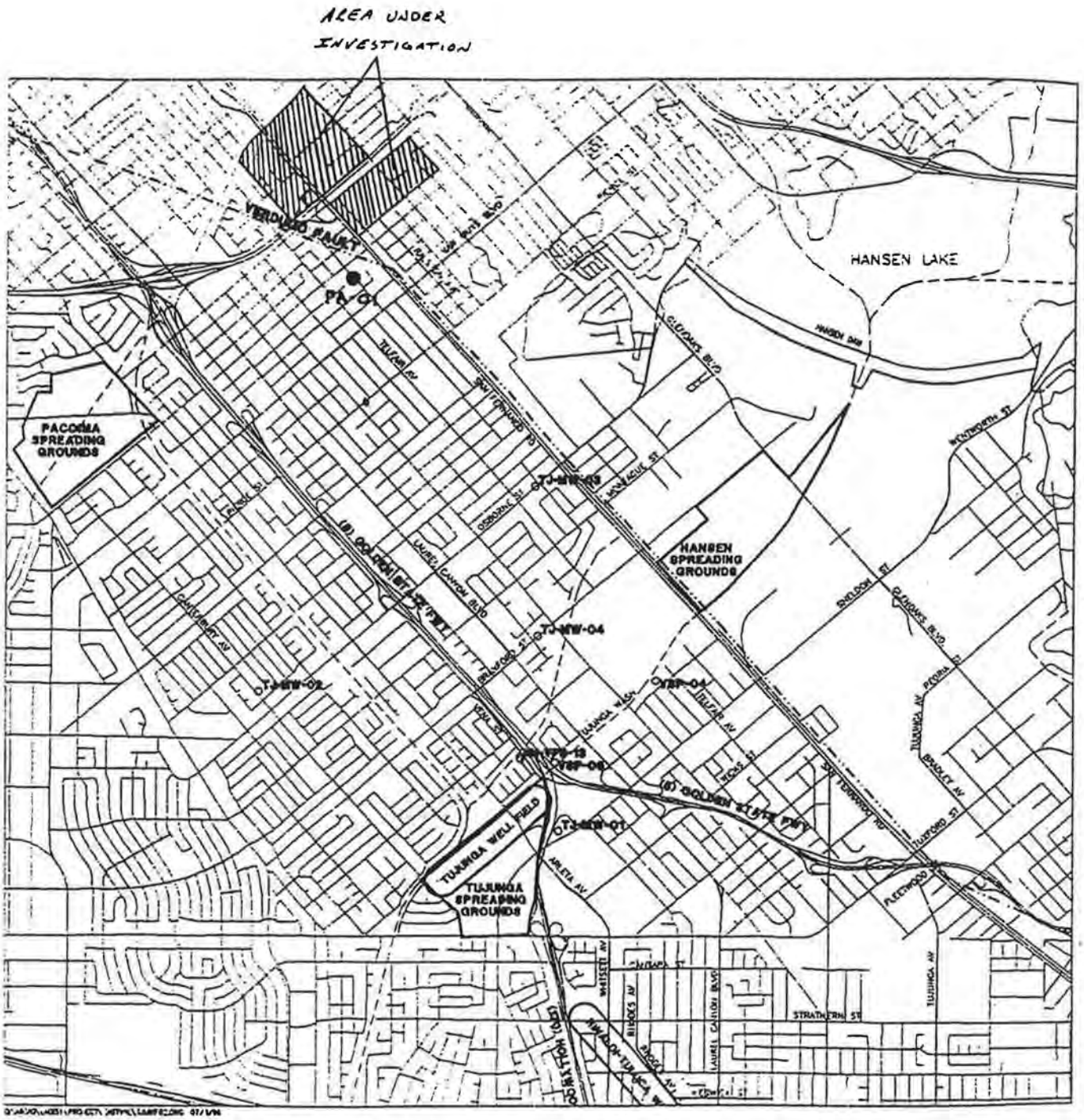
The PGIG's objective is to address the nature and extent of groundwater contamination near the intersection of San Fernando Road and the Simi Valley Freeway (Hwy 118), the Pacoima Area. This area is located approximately 2.5 miles north and upgradient of the LADWP's Tujunga Well Field. Groundwater samples 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 Los Angeles Regional Water Quality Control Board personnel.

There are four primary synthetic organic contaminants 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 a monitoring well, PA-01, approximately one half mile downgradient. PA-01 was sampled on April 18, 1997 and three VOCs were detected: PCE (~27 ug/L), TCE (~6 ug/L) and 1,1, DCE (~11 ug/L). LADWP intends to install one additional well approximately one-half mile downgradient of PA-01.

DTSC is in the process of issuing a unilateral order to the property lessee, Holchem, and is negotiating a consent order with the property owner, Mr. Herman Benjamin. DTSC is also developing additional work plans for the Price Pfister site and will continue its evaluation of any other potential source sites.

Pacoima Area Investigation Map

Table 6-1



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 1997 "Pumping and Spreading Plans" as submitted by each party pursuant to the provisions established in the July 1993 Policies and Procedures. The groundwater flow model used for this study is a comprehensive three-dimensional computer model that was developed for the U.S. Environmental Protection Agency to incorporate data, characterizations, and findings during the Remedial Investigation Study of the San Fernando Valley (December 1992).

The model code, "Modular Three-Dimensional Finite-Difference Groundwater Flow Model," commonly called MODFLOW, was developed by the U.S. Geological Survey (McDonald-Harbaugh) and was used to develop the groundwater model for the SFB. This model consists of four layers to reflect the varying geologic and hydrogeologic characteristics of the SFB as a function of depth. In the deepest portion of the SFB, the model is subdivided into four layers with each layer characterizing a specific aquifer zone. The model is broken up into cells, in a rectangular fashion, that range in size from 1,000 by 1,000 feet near the southeastern SFB to 3,000 by 3,000 feet in the northwestern SFB (Table 7-1) or where less relevant data are available. The model is actively updated.

B. Model Input

The five-year study period begins with the water year of 1996-97 and ends in 2000-01. Projected pumping values for each well field were taken from the "Pumping and Spreading Plans" submitted by each party and entered in the model's input (Table 7-2). The percentage of pumping assigned to a specific layer is calculated based on a percentage of a well's perforation in a particular layer and its aquifer characteristics, and then imported into the well file. Normal or average rainfall and recharge conditions were projected for the entire five-year study period. Initial head values (groundwater elevation) were derived from the previous simulations run for the 1996-97 Water Year.

C. Simulated Groundwater Contours

After running the model for three stress periods, each 12 months in length, the model output was imported into a graphics package that developed the simulated groundwater elevation contours for the water table (Layer 1) as shown in Plates 1 to 5, and for Layer 2 in Plate 6. In addition,

initial groundwater elevations were compared to elevations at the end of the five-year study. The results are demonstrated on Plates 7 and 8, the "Change in Groundwater Elevation from 1996-97 to 2000-01 (Layer 1 and 2)". Finally, superimposed on the 2000-01 groundwater elevation contour were the relevant contaminant plumes for TCE, PCE, and NO_3 (Plates 9 to 11).

D. Evaluation of Model Results

The most dramatic characteristic demonstrated by the model simulations for the upper zone (layer 1) is the effect of the Burbank OU pumping cone. The stagnation point or radius of influence is estimated to extend to a distance of approximately 4,000 feet downgradient of the wellfield or near a point southwest of the intersection of Victory Boulevard and Chandler Avenue. Some portion of the 1,000-5,000 ug/L "hot spot" TCE and PCE contaminant plumes are captured by the influence of Phase I of the Burbank OU. The uncaptured portions of the plumes appear to migrate in the direction of the Glendale North and South OUs, and a portion could be intercepted by the Headworks Wells if they were reactivated. The present five year pumping projections do not include pumping from the Headworks Wells. However, the effect of pumping the Burbank OU wells will tend to slow the movement of the contaminant plume. The activation of the Pollock Wells Treatment Plant (1998) and the Glendale North and South OU wells (1999) have a less pronounced affect. The combined pumping of the Burbank OU is up to 10,000 AF/YR, primarily from Layer 1. Layer 2 (Plate 5) illustrates a much less pronounced capture zone beneath the Burbank OU. The combined extraction from the Glendale North and South OU wells will be up to 7,200 AF/YR. Approximately 25% of the pumping will be derived from Layer 2. Most of the Pollock Wells pumping (2,400 AF/YR) is derived from Layer 2.

Plate 5 (Layer 1) shows three other minor cones of depression near Los Angeles' North Hollywood Aeration wells and the west branch of the North Hollywood Wellfield. Plate 6 (Layer 2) depicts a radius of influence near the Rinaldi-Toluca and North Hollywood Wellfields. The 475 foot contour generally frames an area of relative stagnation to an area south of Burbank Boulevard.

The groundwater elevations from 1997-2001 (Plates 7 and 8) for Layer 1 and Layer 2 show a 50 foot decline in the water table near the Rinaldi-Toluca Wellfield. Nearly half (50,000 AF/YR) of Los Angeles' pumping occurs from this wellfield. Plate 7 illustrates that as much as an 80 foot drawdown may develop by the year 2001 near the heart of the Burbank OU wells. A 40 foot drop in the water table spans the Tujunga and North Hollywood Wellfields. The water table rises about 40 feet beneath the Hansen Spreading Grounds, due in part to the addition of 10,000 AF/YR of spreading for the East Valley Water Recycling Project.

E. Groundwater Contaminant Plume Evaluation

Contaminant plumes for TCE, PCE and NO3 were superimposed on the Fall 2001 simulated groundwater contours (Plates 9-11). These plates show that the Burbank OU is effective in capturing a significant portion of the 1,000-5,000 ug/L TCE and PCE plumes in the Burbank area. Extractions from the Rinaldi-Toluca, North Hollywood, and Burbank OU wellfields tend to flatten the natural groundwater gradient and slow the horizontal movement of the plumes to an area south, near Burbank Boulevard. The Glendale North and South OU Wells should intercept a portion of the most significant plumes in the Glendale area. The Pollock Wells should reduce rising groundwater in the Los Angeles River Narrows Area and capture a portion of the upgradient plumes. The deflection of the contour lines toward the Glendale North and South OU wells begins to show the development of a containment zone in their early stages of operation.

F. Groundwater Flow Direction

The "Horizontal Groundwater Flow Direction" for Layers 1 and 2 are depicted in Plates 12 and 13. A graphics software package interpolated the horizontal direction of groundwater and superimposed flow path arrows on the 2001 groundwater contour for Layers 1 and 2. For layer 1 (Plate12) near the Rinaldi-Toluca Wellfield, groundwater moves in a south to south-easterly direction. From the west-side of the North Hollywood Wellfield, groundwater flows in an easterly to north-easterly direction and from the east-side, flow is generally moving southerly. From both the west and east views of the Erwin, Whitnall and Verdugo Wellfields, groundwater flows in an easterly to north-easterly direction. The Burbank OU develops a condition where flow moves from all directions, in a radial fashion, towards the wellfield.

Plate 13 (Layer 2) illustrates conditions similar to Layer 1 except, near the Burbank OU, the radius of influence is much less dramatic. Some influence from pumping near the Glendale North and South OU and the Pollock Wells can be observed.

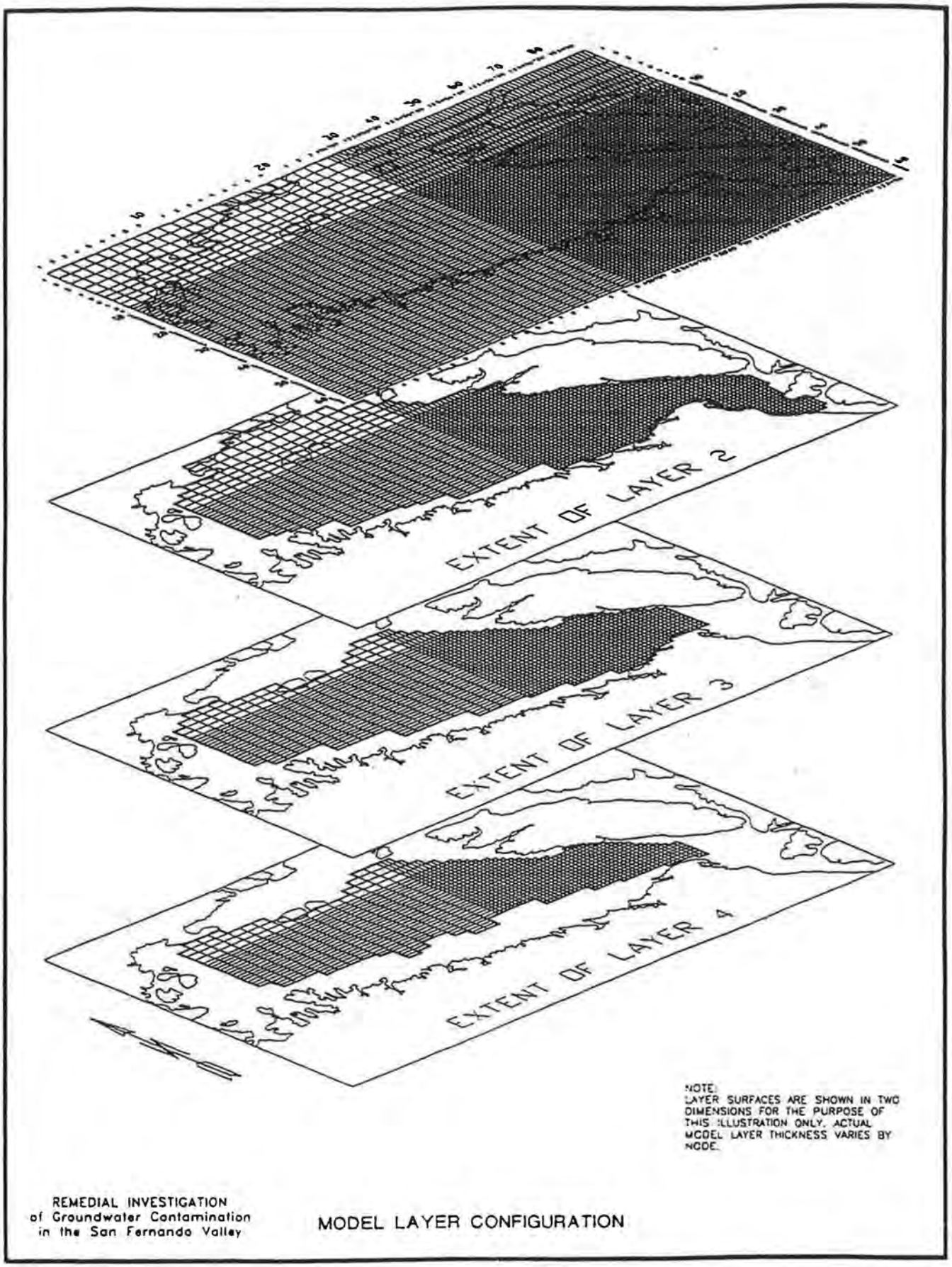

EXTENT OF LAYER 2
EXTENT OF LAYER 3
EXTENT OF LAYER 4
NOTE:
LAYER SURFACES ARE SHOWN IN TWO DIMENSIONS FOR THE PURPOSE OF THIS ILLUSTRATION ONLY. ACTUAL MODEL LAYER THICKNESS VARIES BY NODE.
REMEDIAL INVESTIGATION
of Groundwater Contamination
in the San Fernando Valley
MODEL LAYER CONFIGURATION

Table 7-1

MODEL INPUT
SCENARIO FORM

PROJECT: *TERRMASTER*
PROJECT NO.: *WR97001*
DATE: 3/21/97

Table 7-2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
		BASIN RECHARGE (AF/Y)																
		INFALL (IN/Y)		PERCOLATION			SPREADING GROUNDS							SUB-SURFACE INFLOW				
	WATER YEAR	VALLEY	HILL & MTN	HILL & MTN	VALLEY FILL	RETURN WATER	BRANFORD	HANSEN	HW	LOPEZ	PACOIMA	TUJUNGA	SUB-TOTAL	PACOIMA	SYLMAR	VERDUGO	SUB-TOTAL	TOTAL RECHARGE
1	1996-97	14.30	17.70	3248	9,914	51,028	352	10075	0	717	5,767	6813	23,724	350	400	70	820	88,735
2	1997-98	18.57	23.06	3939	12,874	61,525	352	13252	0	1037	4,520	4000	23,161	350	400	70	820	102,319
3	1998-99	18.57	23.06	3939	12,874	61,525	352	23252	0	1037	4,520	4000	33,161	350	400	70	820	112,319
4	1999-00	18.57	23.06	3939	12,874	61,525	352	23252	0	1037	4,520	4000	33,161	350	400	70	820	112,319
5	2000-01	18.57	23.06	3939	12,874	61,525	352	23252	0	1037	4,520	4000	33,161	350	400	70	820	112,319

	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
		BASIN EXTRACTION (AF/Y)																		
		LADWP										BURBANK			GLENDALE			OTHERS		
	WATER YEAR	AE	EW	HW	NR	PO	SY	TU	VD	WHI	TOTAL LADWP	BURBANK PSD	LOCKHEED	VMP	CITY OF GLENDALE	OU-NORTH	OU-SOUTH	TOTAL NON LADWP	TOTAL NON-GLENDALE	TOTAL EXTRACTION
1	1996-97	-1720	-1061	0	-27932	0	-42478	-12594	-1283	-2059	-89,127	-1000	-9000	-339	-100	0	0	-1,326	-222	-101,114
2	1997-98	-2076	-1280	0	-32512	-2400	-50072	-15201	-1549	-2485	-107,575	-1000	-9000	-339	-100	0	0	-1,326	-222	-119,562
3	1998-99	-2103	-1297	0	-32951	-2400	-50739	-15399	-1569	-2517	-108,975	-1000	-9000	-339	-100	0	0	-1,326	-222	-120,962
4	1999-00	-2097	-1293	0	-32857	-2400	-50596	-15356	-1565	-2510	-108,675	-1000	-9000	-339	-100	-4320	-2880	-1,326	-222	-127,862
5	2000-01	-2113	-1303	0	-33107	-2400	-50596	-15469	-1576	-2529	-109,093	-1000	-9000	-339	-100	-4320	-2880	-1,326	-222	-128,280

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 clean-up program which has, in effect, restored Burbank's groundwater pumping capability, and within three years, will restore Glendale's San Fernando Basin pumping capability. The Watermaster approves of Los Angeles' projected average annual pumping for the next four years of approximately 108,000 AF/YR. This is approximately 30,000 AF/YR more than their pumping over the period 1979-96 and roughly 52,000 AF/YR more than the last four years (1993-96). As of October 1, 1996, Los Angeles' accumulated stored water credit was 302,670 AF. This increased pumping will reduce its stored water account by approximately 50,000AF, in part, because of the addition of 10,000 AF/YR recharged from the East Valley Water Recycling Project.

The Watermaster is particularly encouraged that Burbank's groundwater pumping capability has been fully restored through the activation of the Burbank OU. Over the past ten years, Burbank's reduction in groundwater pumping has contributed to an increase in its stored water credit from 29,386 AF (October 1, 1986) to 61,415 AF (October 1, 1996). The projected Burbank OU extractions of 10,000 AF/YR for the next five years, is approximately 5,400 AF more than its annual return flow credit. Meaning that over the next five years, Burbank would have to use 27,000 AF from its stored water bank or purchase up to 4,200 AF/YR as physical solution water from Los Angeles. This would result in approximately a 6,000 AF reduction in stored water credit.

Glendale's reduction in groundwater pumping due to groundwater contamination has contributed to an increase in their stored water credit from 19,841 AF (October 1, 1987) to 60,221 AF (October 1, 1996). Reinstitution of Glendale's pumping ability through the North and South OUs, will provide 7,200 AF/YR. of groundwater supply. This is in excess of their average annual return flow credit of 5,400 AF. Glendale can make up the difference from banked storage or purchasing up to 5,500 AF/YR as physical solution water from Los Angeles. In addition, the loss of Los Angeles' Headworks, Crystal Springs and Pollock Wells has contributed to an increasing trend to the basin's water levels in the Los Angeles River Narrows area, resulting in a build-up in groundwater storage and an increase in rising groundwater outflow from the San Fernando Basin. This is why it is important to restore as much groundwater pumping capability as possible in this area.

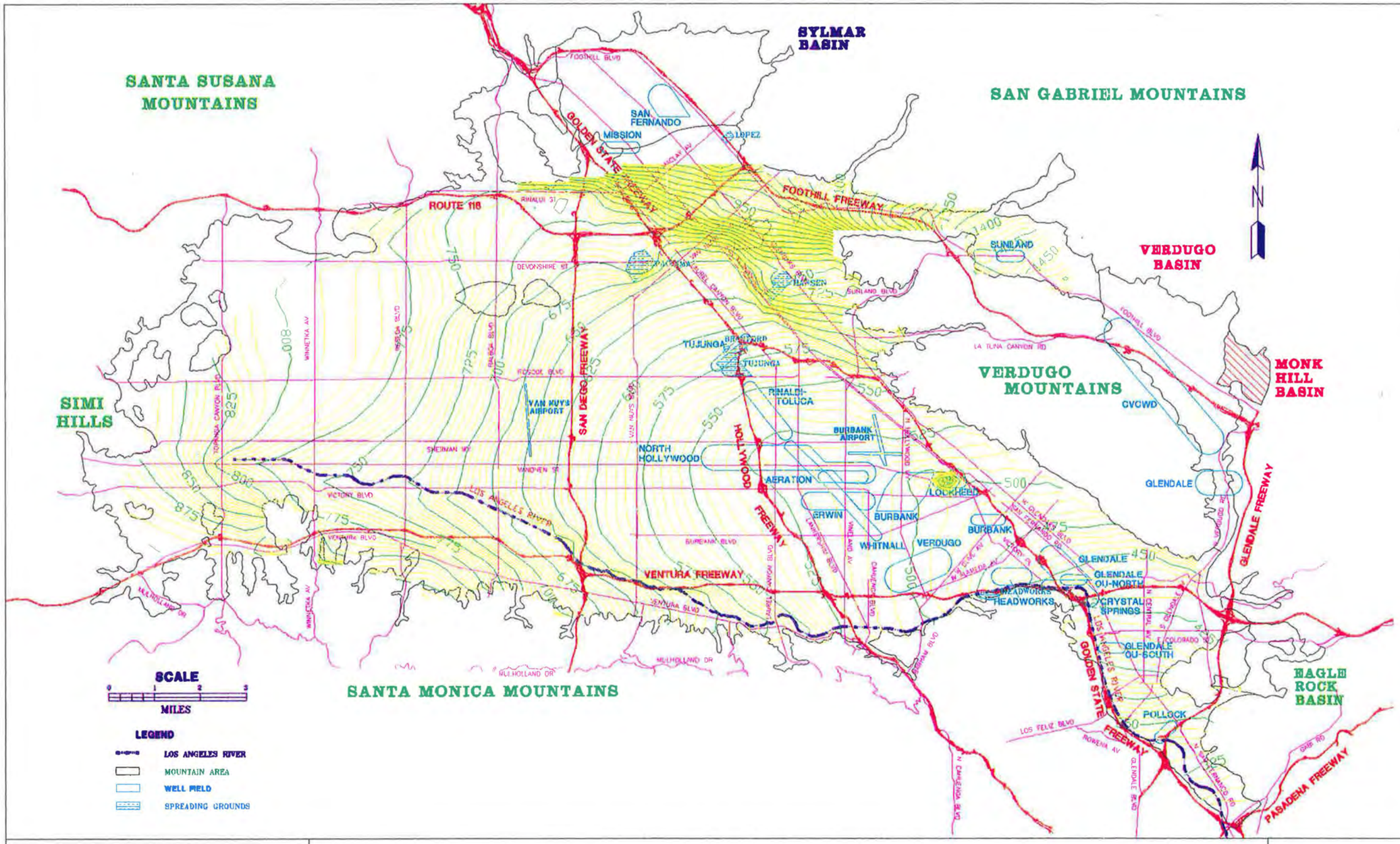
The model simulations demonstrate that a significant portion of the "hot spot" TCE and PCE contamination in the Burbank area will be captured by the Burbank OU wells. However, the remaining uncaptured portion will migrate towards the Los Angeles River Narrows area. Reactivation of the Headworks Wells,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

The change in groundwater elevation contours illustrates that over the next five years, a 50 foot drawdown in water levels can be anticipated near the Rinaldi-Toluca Wellfield, and as much as, an 80 foot drawdown near the Burbank OU wells, with an average of about 40 feet. The Tujunga and North Hollywood Wellfields could also experience a 40 foot drawdown of water levels. There is little decline in water levels near the Headworks and Pollock Wells and in the vicinity of the Glendale North and South OU wells. The model demonstrates that the capture zone for the Burbank OU wells extends to approximately 4,000 feet downgradient and that the combined pumping of the Burbank OU, Rinaldi-Toluca, and North Hollywood Wells, tends to flatten the horizontal gradient and slows the movement of the contaminant plumes outside of the Burbank OU capture zone.

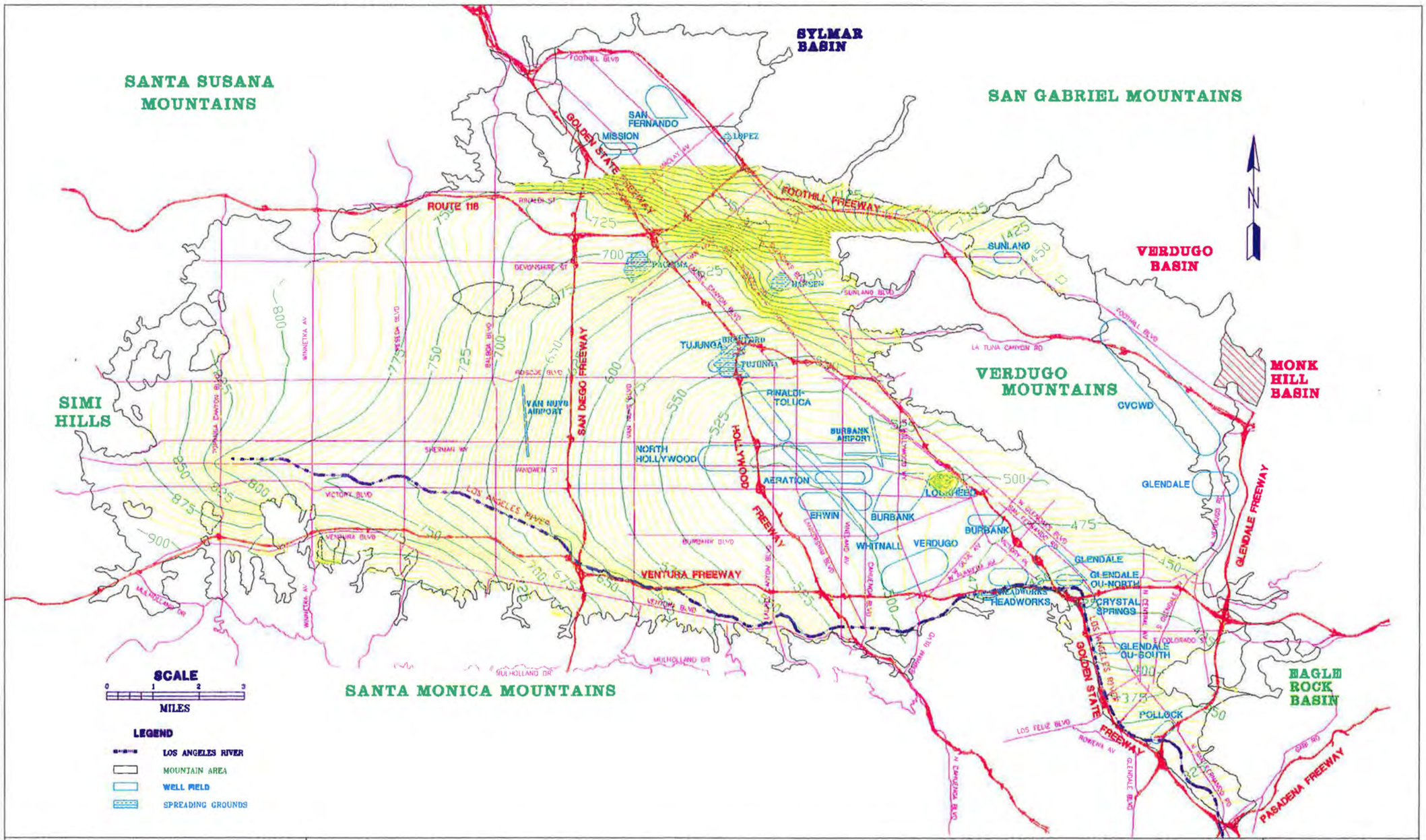
The Pacoima Area groundwater investigation is of particular concern to the Watermaster because the contamination is upgradient of all the wellfields in the San Fernando Basin and is only 2.5 miles upgradient of Los Angeles' Tujunga Wellfield. The Watermaster will continue to take an active role, along with the lead regulatory agency, Cal EPA - Department of Toxics Substance Control, the Regional Water Quality Control Board and the Los Angeles Department of Water and Power. The Watermaster will support aggressive actions to define the nature and extent of contamination, and, if necessary, support additional activities to control and contain contaminant migration.

The Watermaster also supports Crescenta Valley Water District's increased pumping in the Verdugo Basin until Glendale has the ability to utilize its full prescriptive right. The Watermaster will continue to provide support to Glendale's pursuit to utilize all of its prescriptive rights in the Verdugo Basin.

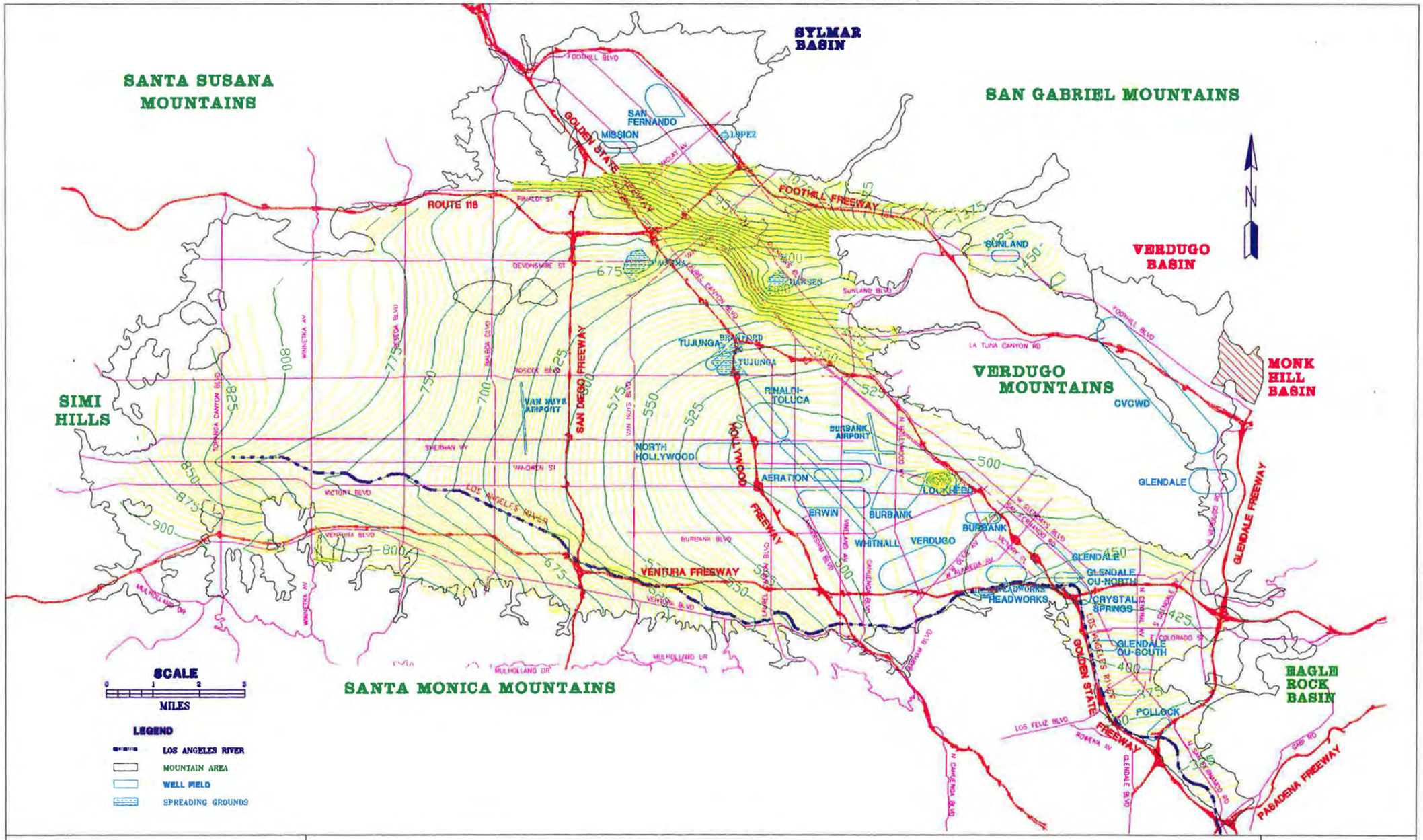
PLATES



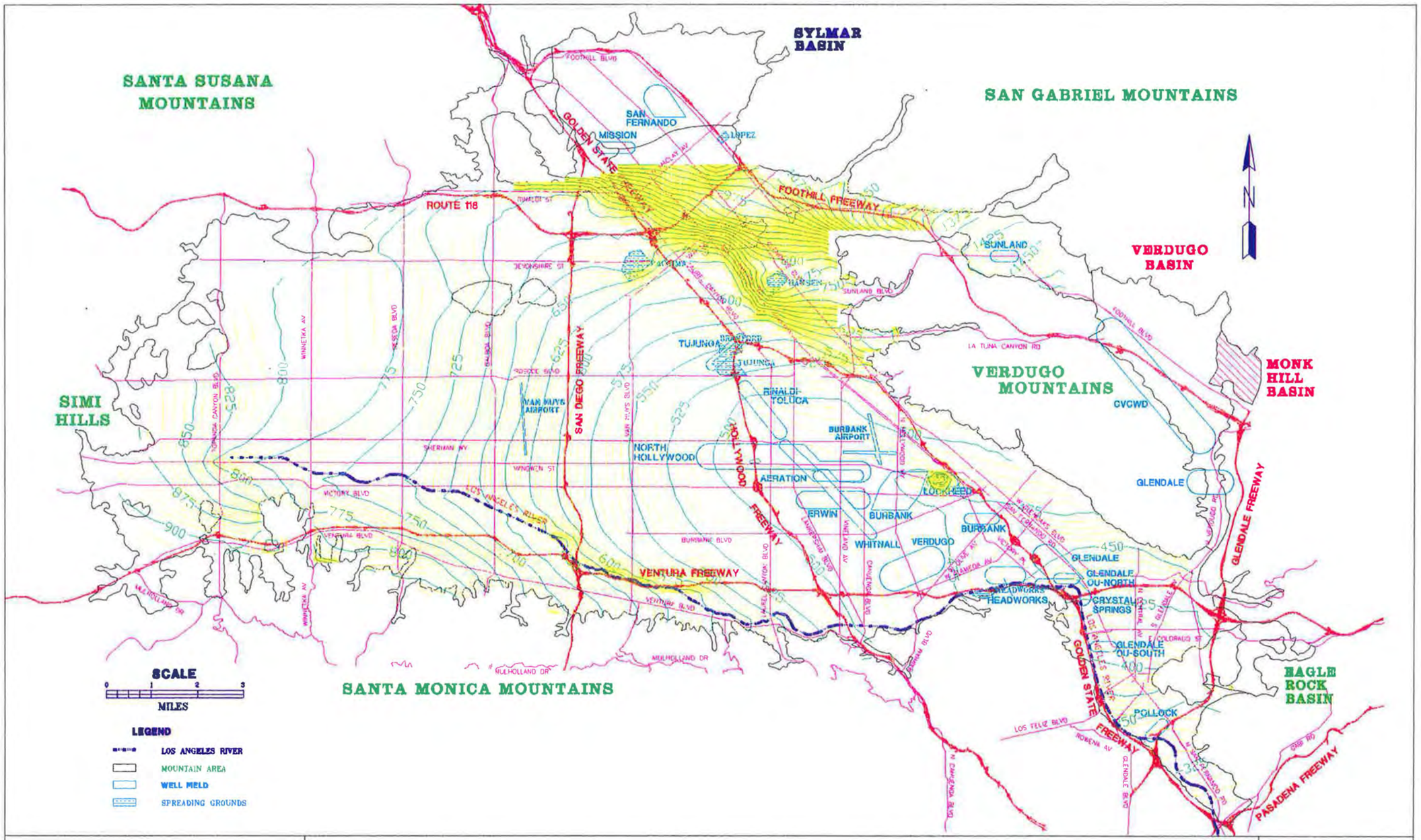
PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour - Model Layer 1** **FALL 1997**	PLATE 1



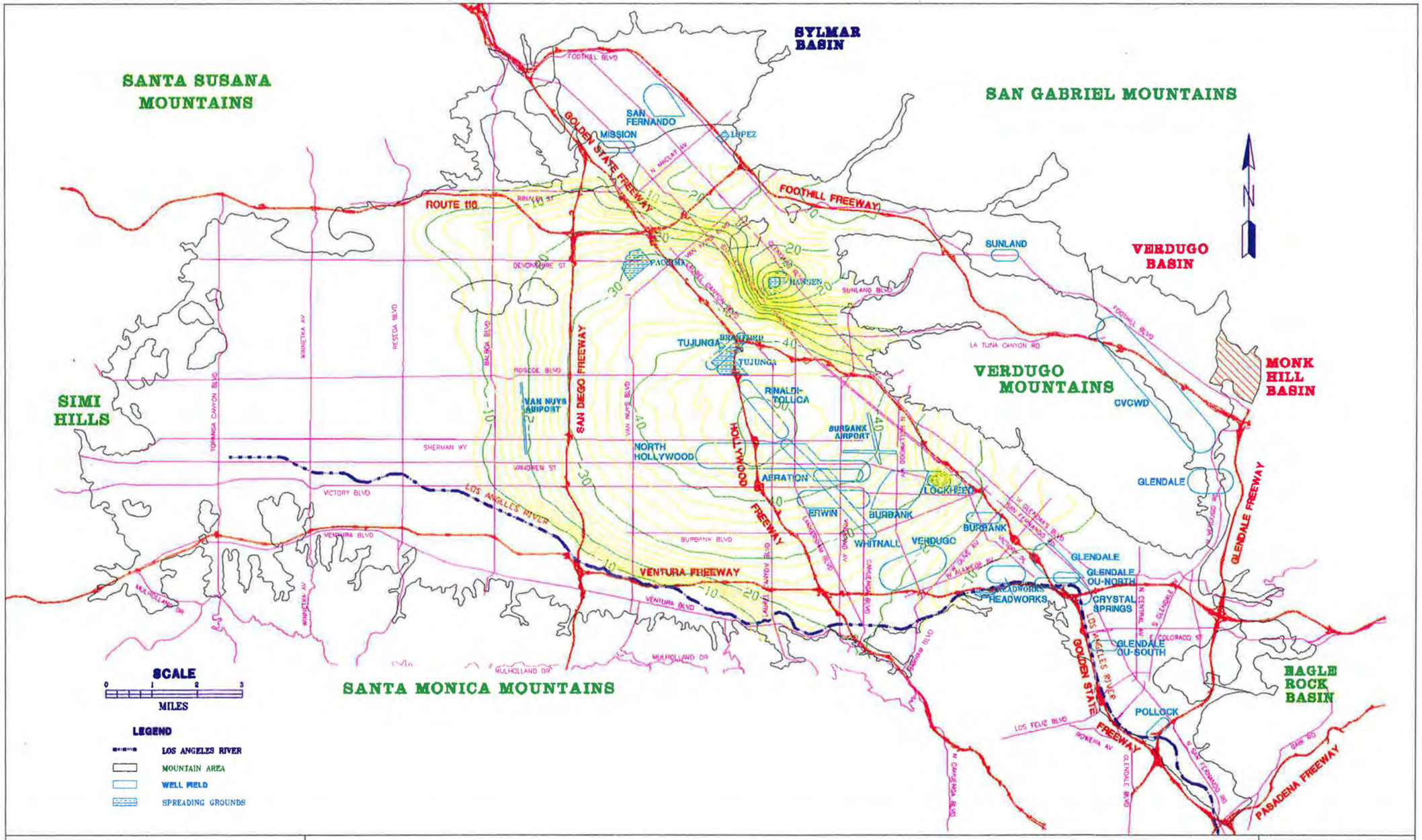
PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour - Model Layer 1** **FALL 1998**	PLATE **2**



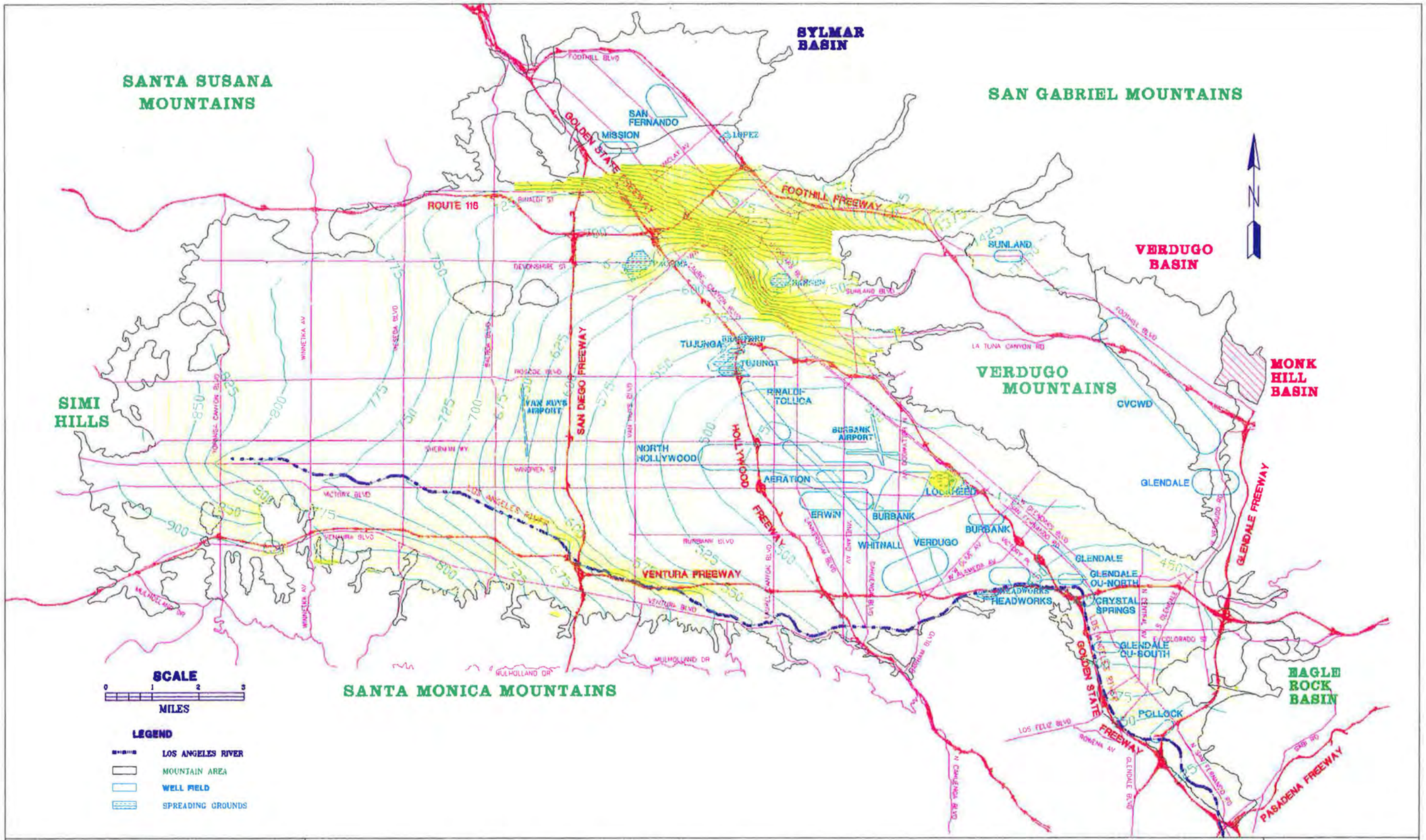
PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour - Model Layer 1** **FALL 1999**	PLATE **3**



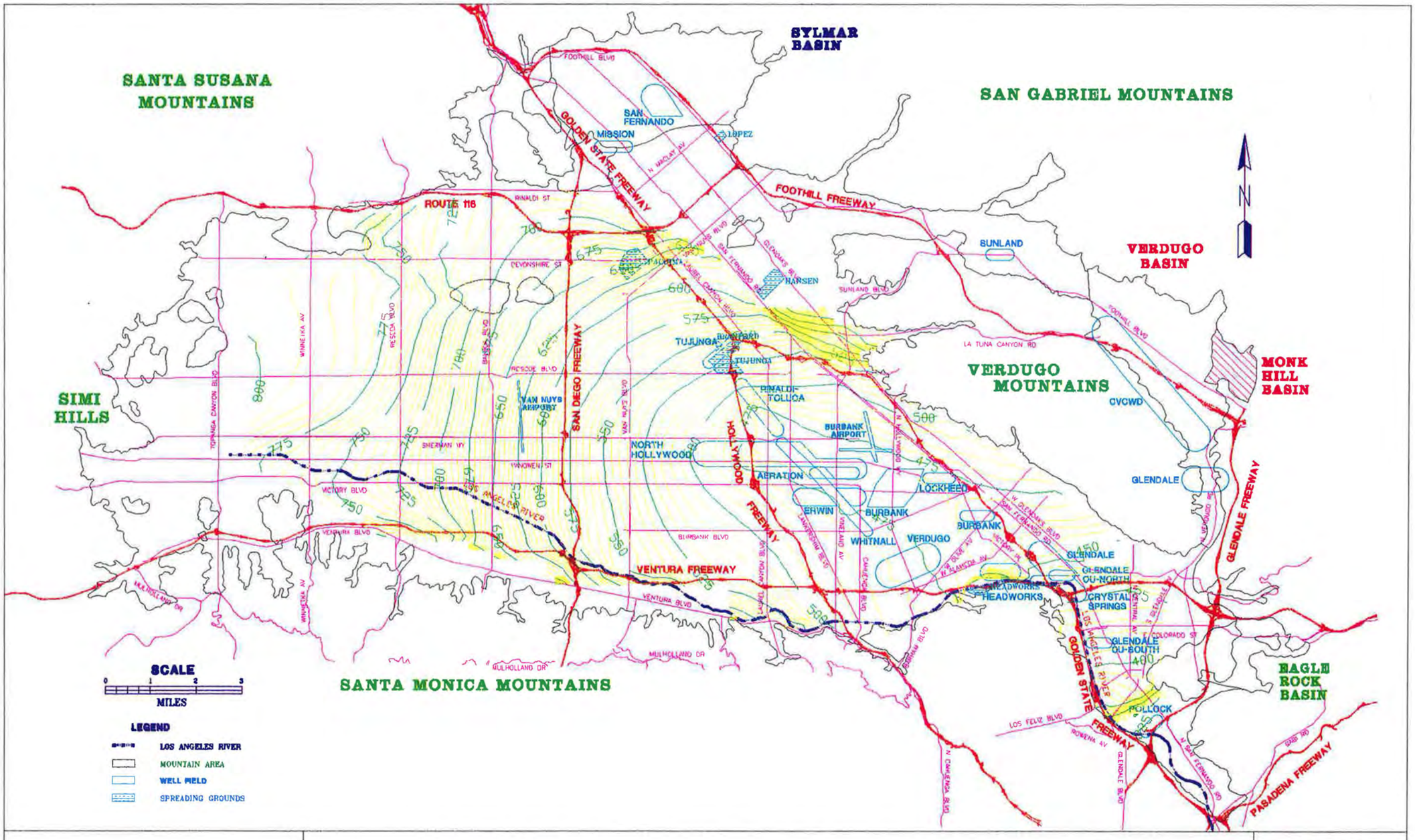
PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour - Model Layer 1** **FALL 2000**	PLATE **4**



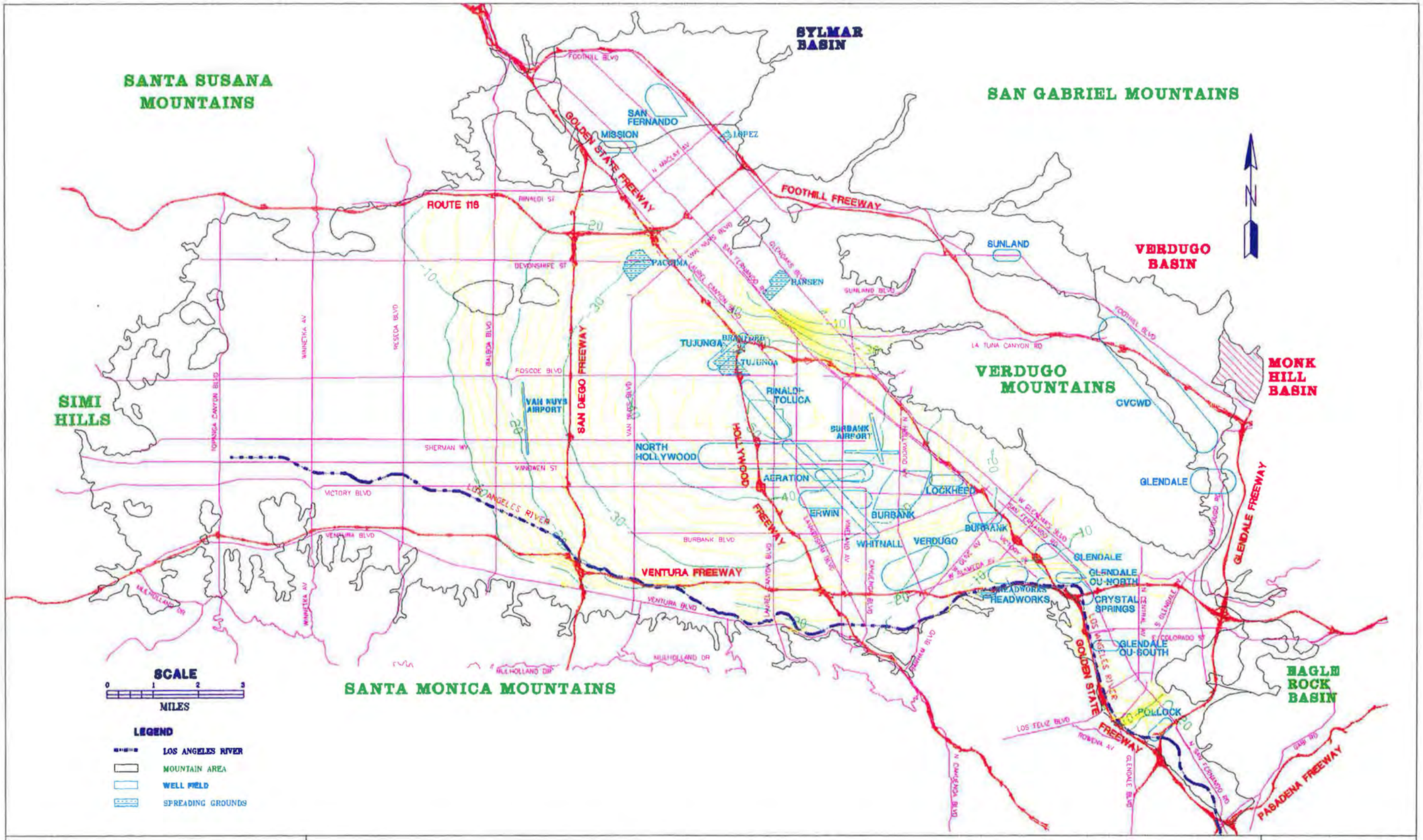
PROJECT: WATERMASTER PROJECT NO: WM97001	**Change in Groundwater Elevation - Model Layer 1** **Fall 1997 - Fall 2001**	PLATE **7**



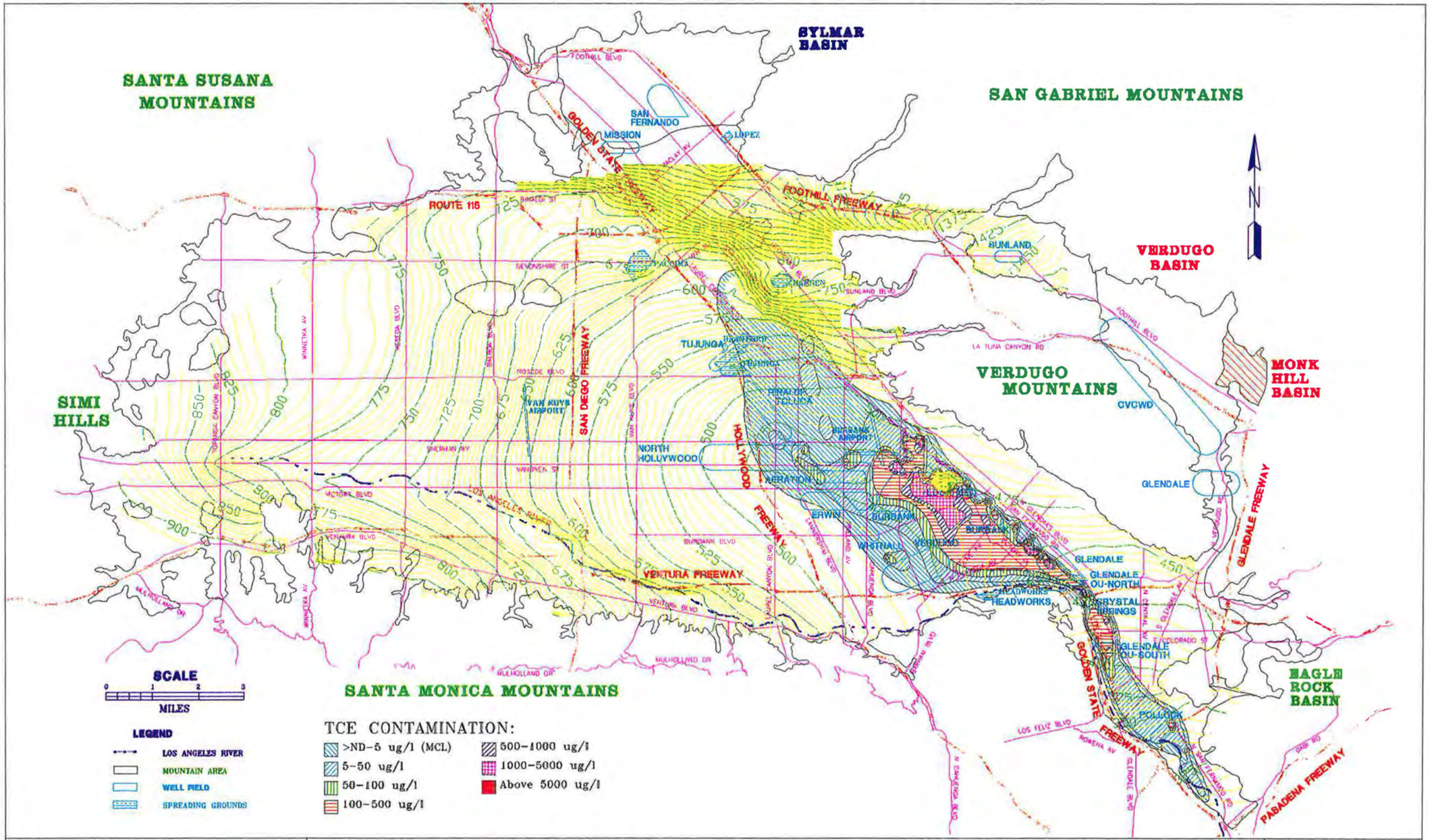
PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour - Model Layer 1** **FALL 2001**	PLATE **5**



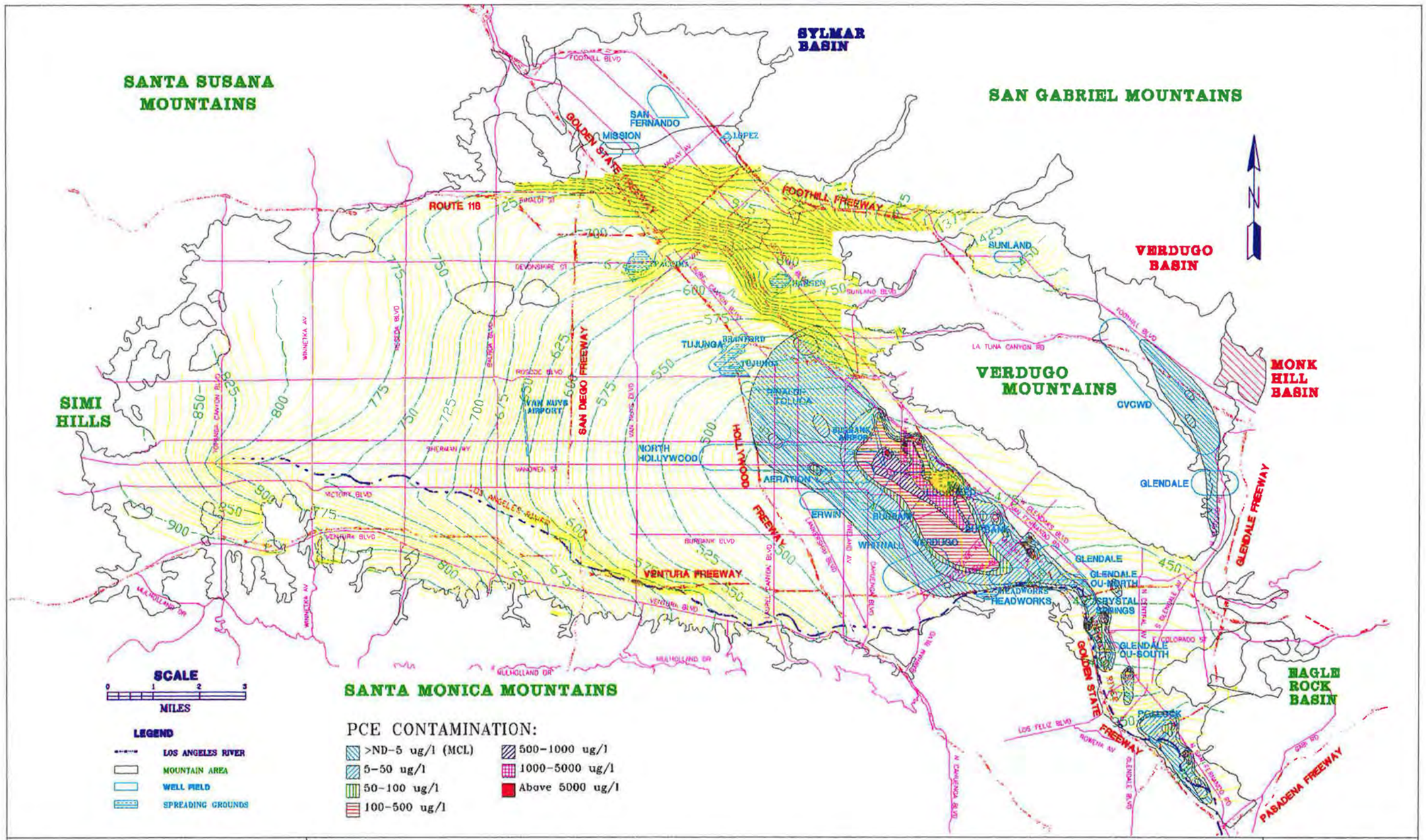
PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour - Model Layer 2** **FALL 2001**	PLATE **6**



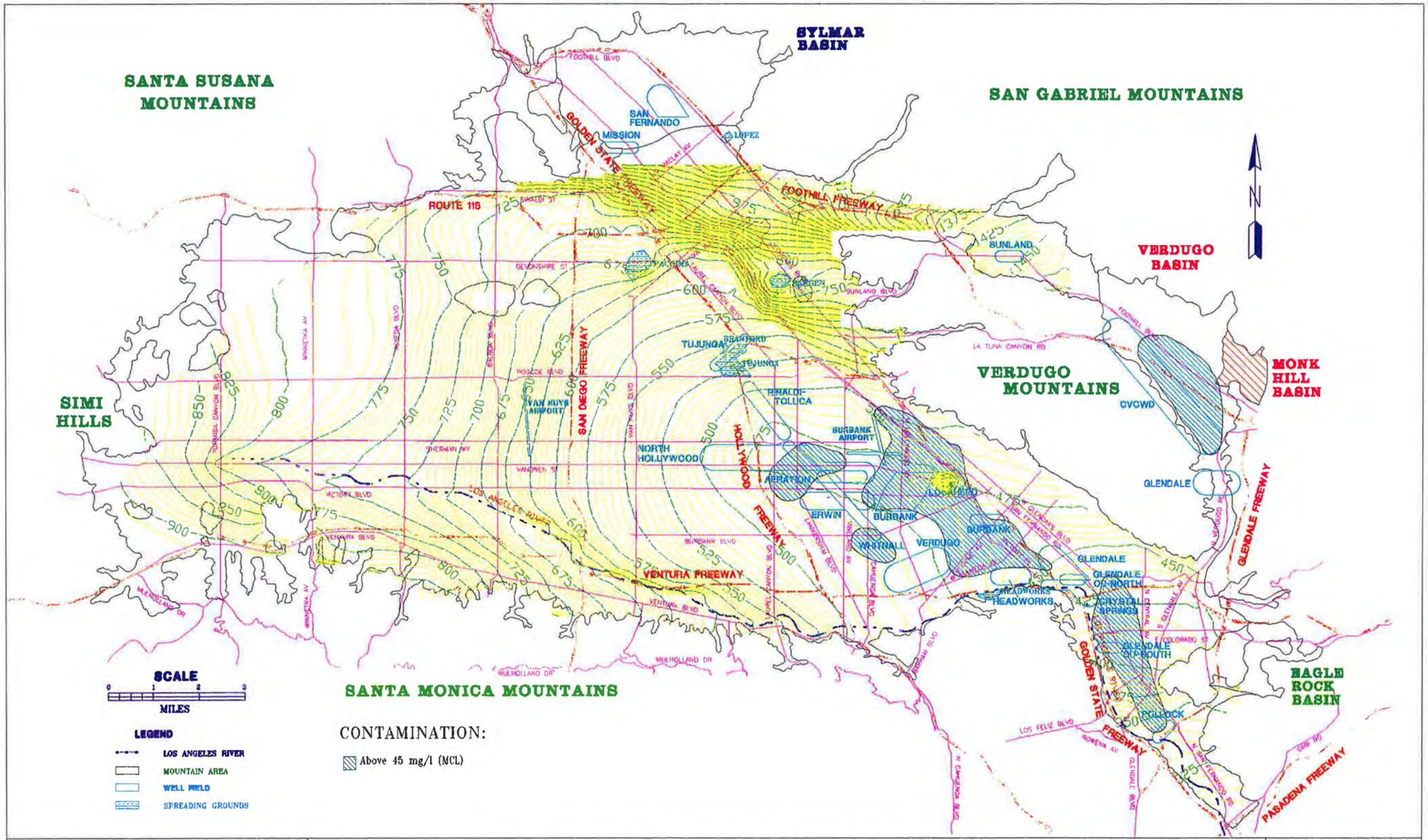
PROJECT: WATERMASTER PROJECT NO: WM97001	**Change In Groundwater Elevation - Model Layer 2 Fall 1997 - Fall 2001**	PLATE **8**



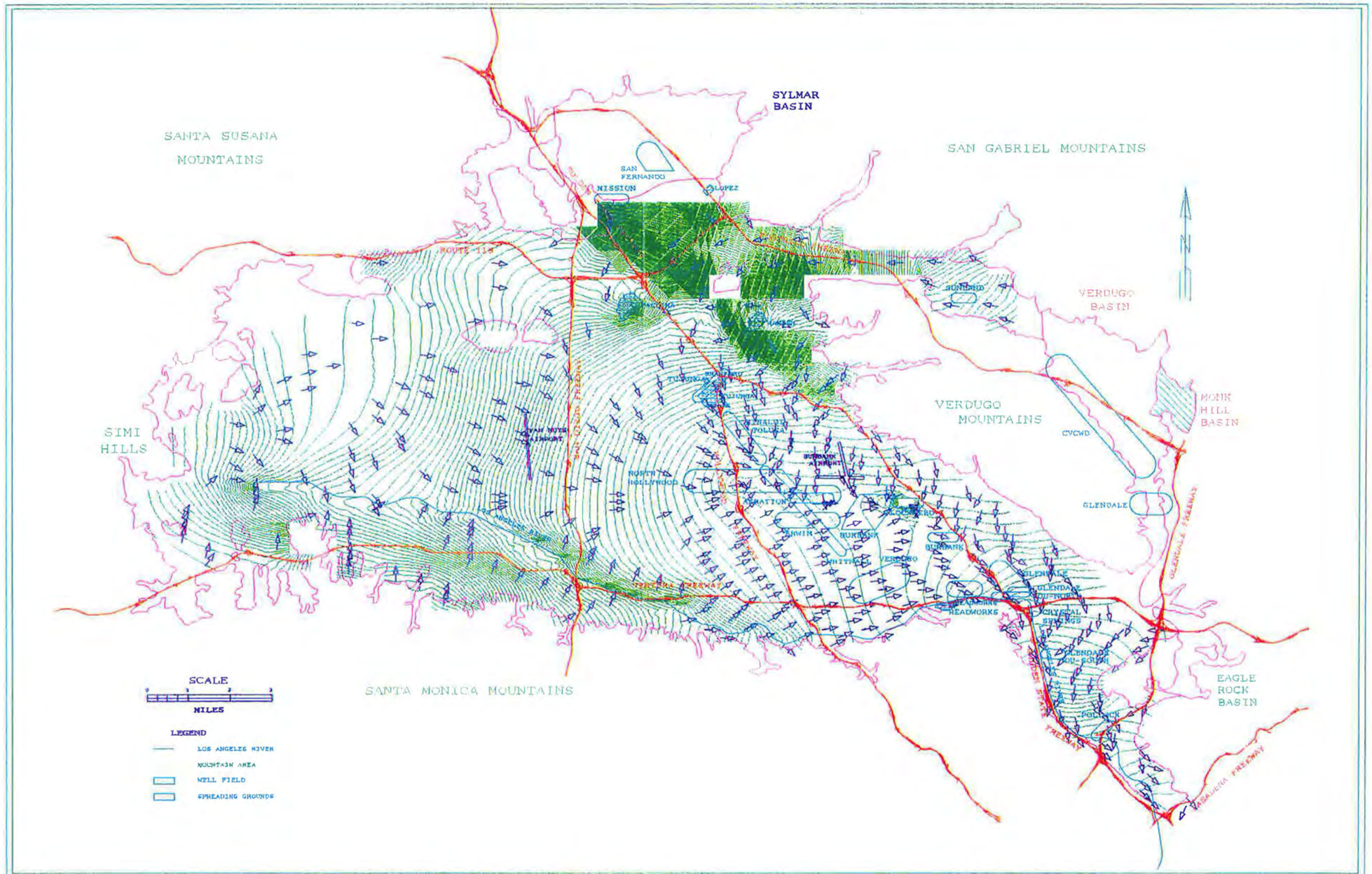
PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour and TCE Contamination Model Layer 1 - Fall 2001**	PLATE **9**



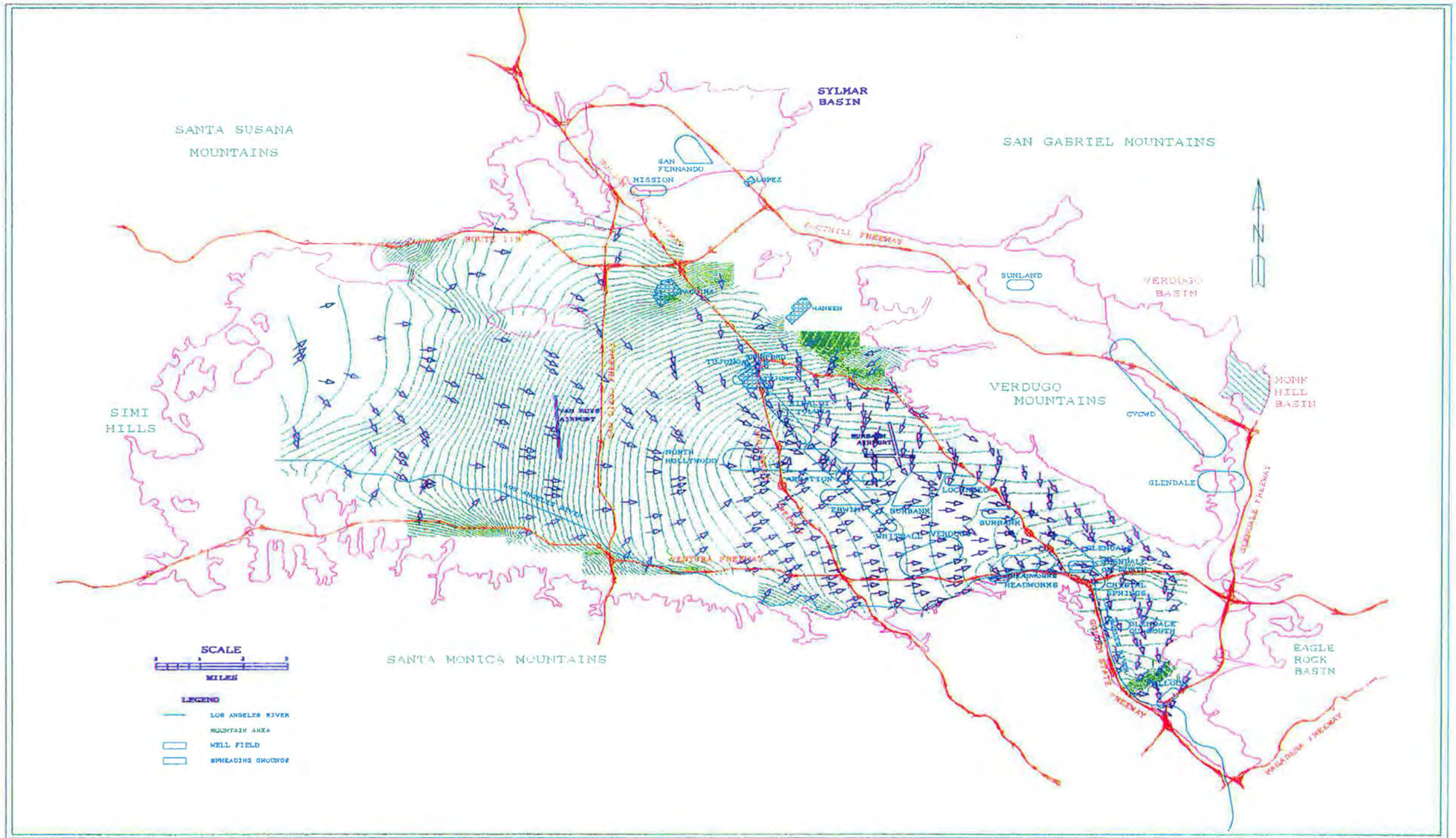
PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour and PCE Contamination Model Layer 1 - Fall 2001**	PLATE **10**



PROJECT: WATERMASTER PROJECT NO: WM97001	**Simulated Groundwater Contour and NO3 Contamination Model Layer 1 - Fall 2001**	PLATE **11**



Project Name: ULARA WATERMASTER *Project No: WM97001*	***Horizontal Groundwater Flow Direction - Layer 1*** ***FALL 2001***	PLATE: **12**



Project Name: ULARA WATERMASTER *Project No: WM97001*	***Horizontal Groundwater Flow Direction - Layer 2*** ***FALL 2001***	PLATE: **13**

APPENDIX A

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

1996-2001 Water Years

April 24, 1997

Mr. Melvin L. Blevins
ULARA Watermaster
111 North Hope Street, Room 1463
Los Angeles, CA 90012

Annual Pumping and Spreading Plan

We are hereby transmitting the Los Angeles' Pumping and Spreading Plans for the 1996-2001 Water Years. This plan satisfies the requirements set forth in the Upper Los Angeles River Area (ULARA) Watermaster Policies and Procedures Section 2.9.4.

We are hopeful that this information will assist you in developing this year's ULARA Pumping and Spreading Plan report.

Sincerely,

ROBERT Y. YOSHIMURA
Director
Water Supply Division

PTK:jc

Enclosure

c: Bruce Kuebler
Robert Y. Yoshimura
Robert L. Simmons
Gerald A. Gewe
Ernest F. Wong
Richard A. Nagel
Patricia T. Kiechler

ULARA Watermaster

PTK-PS1 - LAPSLETR.DOC

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR THE 1996-2001 WATER YEARs

APRIL 1997

Prepared by:
Groundwater Group
Water Resources Section
WATER SUPPLY DIVISION
Los Angeles Department of Water and Power

TABLE OF CONTENTS

Introduction

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

In Section 2.9.4 of the ULARA Policies and Procedures as amended in July 1993, it is stated that:

> *"...each party or non-party who produces groundwater will submit to the ULARA Watermaster annually (on or before May 1 of the current water year), a Ground Water Pumping and Spreading Plan. This will include information on projected pumping and spreading rates and volumes, and recent water quality information on each well. In order to obtain the information needed to project future contamination levels, a monitoring program should be included."*

This report constitutes Los Angeles' 1997 Groundwater Pumping and Spreading Plan for the Water Years 1996 - 2001.

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*	58,000
TOTAL:			151,000

*Recalculation of area produced smaller wetted area number.

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 estimated capacities are shown in Table 1-2. The listed capacities are approximate and may vary depending on the water levels and maintenance schedule of the available pumping equipment.

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 2.9.4 of the ULARA Policies and Procedures as amended in July 1993, it is stated that:

> *"...each party or non-party who produces groundwater will submit to the ULARA Watermaster annually (on or before May 1 of the current water year), a Ground Water Pumping and Spreading Plan. This will include information on projected pumping and spreading rates and volumes, and recent water quality information on each well. In order to obtain the information needed to project future contamination levels, a monitoring program should be included."*

This report constitutes Los Angeles' 1997 Groundwater Pumping and Spreading Plan for the Water Years 1996 - 2001.

Table 1-2

Estimated Capacities of LADWP Well Fields in ULARA		
Well field	Number of wells	Estimated Initial Capacity [cfs]
San Fernando Basin		
Aeration	7	3
Crystal Springs (A)	---	---
Erwin	4	10
Headworks	6	25
North Hollywood	30	129
Pollock	2	4
Rinaldi-Toluca	15	112
Tujunga	12	112
Verdugo	6	12
Whitnall	6	15
Sylmar Basin		
Mission	3	9
TOTAL:	91	431

(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. The locations of these facilities are shown in Figure 1-1.

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

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

Section 2: Annual Pumping And Spreading Projections

a. Pumping Projections for the 1996-97 Water Year: The supply to the City of Los Angeles has three components. The most preferred source of water is Los Angeles Aqueduct supply imported from the Owens Valley/Mono Basin area, secondly, groundwater supply from the Central, San Fernando, and Sylmar Basins, and finally, purchased water from the Metropolitan Water District of Southern California (MWD). The MWD sources of supply are the State Water Project and the Colorado River Aqueduct. Use of groundwater fluctuates depending on the availability of imported water which varies due to climatic and operational constraints.

Table 2-1 shows the amount of groundwater extractions that is expected during the 1996-97 Water Year from the San Fernando and Sylmar Basins. Appendix B provides groundwater extraction projections from 1997 to 2001. 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 96-97
(Acre-Feet)

	TOTAL	Oct-96	Nov-96	Dec-96	Jan-97	Feb-97	Mar-97	Apr-97	May-97	Jun-97	Jul-97	Aug-97	Sep-97
San Fernando Basin													
AERATION	1,716	143	140	132	113	173	115	150	150	150	150	150	150
ERWIN	1,062	432	418	212	0	0	0	0	0	0	0	0	0
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	27,930	3270	3124	2751	1216	108	61	2850	2950	2850	2950	2950	2850
POLLOCK	0	0	0	0	0	0	0	0	0	0	0	0	0
RINALDI-TOLUCA	42,478	3375	3458	1777	882	1	0	5405	5590	5405	5590	5590	5405
TUJUNGA	12,596	2615	3460	2933	761	15	2812	0	0	0	0	0	0
VERDUGO	1,285	418	566	300	0	0	1	0	0	0	0	0	0
WHITNALL	2,060	629	631	59	0	1	0	0	0	0	0	740	0
TOTAL:	89,128	10,882	11,797	8,164	2,972	298	2,990	8,405	8,690	8,405	8,690	9,430	8,405
Sylmar Basin													
MISSION	3,293	363	311	0	0	0	0	0	291	582	582	582	582
ULARA TOTAL:	92,421	11,245	12,108	8,164	2,972	298	2,990	8,405	8,981	8,987	9,272	10,012	8,987

b. Spreading Projections for the 1996-97 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 1996-97. The East Valley Water Recycling Project in Phase IA will add recycled water to the Hansen Spreading Grounds beginning approximately December 1998 with an amount anticipated at 10,000 AFY. Phase IB will carry recycled water to the Pacoima Spreading Grounds.

Table 2-2

Projected Spreading in ULARA Spreading Grounds in 1996-97							
Operated by:							
	LACDPW				LADWP	LACDPW and LADWP	Monthly Total
Month	Branford	Hansen	Lopez	Pacoima	Headworks (A)	Tujunga	
Oct-96	26	0	1	0	0	238	265
Nov-96	71	291	1	335	0	70	768
Dec-96	85	1650	10	1600	0	611	3956
Jan-97	89	3180	4	3050	0	2750	9073
Feb-97	35	2430	393	782	0	666	4306
Mar-97	10	629	158	0	0	863	1660
Apr-97	6	560	75	0	0	280	921
May-97	6	325	75	0	0	325	731
Jun-97	6	300	0	0	0	300	606
Jul-97	6	270	0	0	0	270	546
Aug-97	6	240	0	0	0	240	486
Sep-97	6	200	0	0	0	200	406
TOTAL:	352	10075	717	5767	0	6813	23724

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

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

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

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

Section 4: Groundwater Treatment Facilities Operations Summary

Hollywood Operable Unit (NHOU): The NHOU was out of service during April 1996 due to mechanical problems at the facility. Aeration Well No. 8 had a damaged motor that required replacement. 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)	(in ug/L)	(in ug/L)
4/96	162	318	288	161	—	316	311	884	59/2.3	0.7/ND
5/96	178	320	309	—	—	318	314	980	54/3.5	ND/ND
6/96	176	282	306	79	243	319	—	1594	96/4.7	1.6/ND
7/96	0	52	304	259	314	313	—	1027	46/5.2	1.1/ND
8/96	174	314	302	195	300	314	—	1195	127/5.4	2.6/ND
9/96	172	314	299	192	299	312	—	1308	127/5.4	2.0/ND
10/96	170	311	293	183	296	306	—	1202	76/18	1.0/ND
11/96	—	313	290	172	295	305	283	1335	76/19	2.0/ND
12/96	163	—	284	156	291	302	319	1061	77/21	1.6/ND
1/97	167	—	—	158	293	304	321	1312	77/21	1.4/ND
2/97	—	309	—	160	290	307	319	1214	86/24	1.7/ND
3/97	167	306	244	159	284	300	330	1237	160/24	2.9/ND

Pursuant to the East Valley Water Recycling Project, the Department is presently installing eleven miles of pipeline to convey recycled water from the Tillman Reclamation Plant to the Hansen Spreading Grounds. Concurrently, twelve monitoring wells will be installed by the summer of 1997 which will help to monitor the groundwater quality and groundwater levels. The Department is installing additional monitoring wells near the Tujunga and Headworks wellfields and near the Pacoima Area. These wells are intended to provide depth-specific groundwater quality and elevation data.

APPENDIX A:
1996-97 Water Quality Sampling Results

ULARA WELLS

Number	Cluster	Well	Date	PCE (ug/L)	TCE (ug/L)	NO^3 (mg/L)
1	11	AERATION #2	9/25/96	2.90	185.00	55.82
2	11	AERATION #3	10/22/96	7.50	74.80	46.96
3	10	AERATION #4	9/25/96	3.10	42.00	40.31
4	9	AERATION #5	3/15/96	37.00	34.00	
5	9	AERATION #6	10/22/96	6.20	39.40	46.52
6	8	AERATION #7	10/22/06	5.50	74.00	31.01
7	8	AERATION #8	10/22/96	48.70	95.70	51.83
8	6	ERWIN #1	---			
9	7	ERWIN #2	5/4/95	4.30	13.20	
10	6	ERWIN #3	7/30/96	1.40	24.00	14.66
11	7	ERWIN #4				
12	7	ERWIN #6	1/29/97	ND	ND	29.24
13	7	ERWIN #10	7/2/96	ND	ND	
14	20	MISSION #5	8/9/96	ND	2.20	23.04
15	21	MISSION #6	6/26/96			8.42
16	21	MISSION #7	---			
17	12	NORTH HOLLYWOOD #2	---			
18	14	NORTH HOLLYWOOD #4	---			
19	15	NORTH HOLLYWOOD #7	7/2/96	ND	ND	10.63
20	10	NORTH HOLLYWOOD #11	11/19/96	5.80	19.90	23.92
21	14	NORTH HOLLYWOOD #15	---			
22	9	NORTH HOLLYWOOD #16	5/23/96	12.60	2.70	16.30
23	9	NORTH HOLLYWOOD #17	1/14/97	3.80	0.09	
24	8	NORTH HOLLYWOOD #18	1/14/97	1.20	ND	13.73
25	8	NORTH HOLLYWOOD #20	9/24/96	4.00	7.20	15.50
26	7	NORTH HOLLYWOOD #21	---			
27	12	NORTH HOLLYWOOD #22	5/23/96	ND	ND	21.93
28	12	NORTH HOLLYWOOD #23	11/19/96	ND	ND	25.69
29	14	NORTH HOLLYWOOD #25	9/24/96	ND	0.90	
30	12	NORTH HOLLYWOOD #26	11/19/96	ND	ND	27.91
31	9	NORTH HOLLYWOOD #27	---			
32	10	NORTH HOLLYWOOD #28	1/14/97	ND	2.42	2.17
33	12	NORTH HOLLYWOOD #30	---			
34	15	NORTH HOLLYWOOD #32	7/2/96	ND	ND	4.16
35	14	NORTH HOLLYWOOD #33	9/26/95	ND	ND	
36	13	NORTH HOLLYWOOD #34	12/5/96	ND	2.10	26.58
37	8	NORTH HOLLYWOOD #35	12/31/96	2.20	0.60	
38	14	NORTH HOLLYWOOD #36	9/19/96	ND	2.00	18.16
39	13	NORTH HOLLYWOOD #37	10/8/96	0.60	2.40	
40	10	NORTH HOLLYWOOD #38	---			
41	10	NORTH HOLLYWOOD #39	---			
42	11	NORTH HOLLYWOOD #40	7/28/95	ND	4.60	
43	11	NORTH HOLLYWOOD #41	1/31/97	1.90	141.50	
44	11	NORTH HOLLYWOOD #42	1/31/97	1.40	61.10	
45	13	NORTH HOLLYWOOD #43A	1/2/97	ND	0.70	19.67
46	13	NORTH HOLLYWOOD #44	1/2/97	ND	ND	8.86
47	13	NORTH HOLLYWOOD #45	1/2/97	ND	ND	13.87

NOTE: ND = non-detect
--- not tested (refer to p.8)

ULARA WELLS

Number	Cluster	Well	Date	PCE (ug/L)	TCE (ug/L)	NO^3 (mg/L)
48	3	POLLOCK #4	---			
49	3	POLLOCK #6	---			
50	3	POLLOCK #7	---			
51	15	RINALDI-TOLUCA #1	1/28/97	ND	ND	
52	16	RINALDI-TOLUCA #2	1/28/97	ND	0.50	
53	17	RINALDI-TOLUCA #3	8/10/95	ND	1.00	
54	17	RINALDI-TOLUCA #4	8/10/95	ND	1.70	
55	17	RINALDI-TOLUCA #5	12/19/96	ND	2.10	16.83
56	17	RINALDI-TOLUCA #6	8/10/95	ND	1.10	
57	17	RINALDI-TOLUCA #7	10/8/96	ND	ND	13.17
58	18	RINALDI-TOLUCA #8	8/10/95	ND	ND	
59	18	RINALDI-TOLUCA #9	10/16/96	ND	ND	12.40
60	16	RINALDI-TOLUCA #10	1/28/97	ND	ND	
61	16	RINALDI-TOLUCA #11	1/28/97	ND	ND	
62	16	RINALDI-TOLUCA #12	11/8/96	ND	ND	
63	16	RINALDI-TOLUCA #13	11/8/96	0.80	ND	
64	15	RINALDI-TOLUCA #14	1/28/97	ND	ND	
65	15	RINALDI-TOLUCA #15	1/28/97	ND	ND	
66	18	TUJUNGA #1	8/15/96	ND	ND	17.72
67	18	TUJUNGA #2	2/7/97	ND	0.80	15.50
68	18	TUJUNGA #3	2/7/97	ND	2.90	19.49
69	19	TUJUNGA #4	2/7/97	0.50	6.40	27.91
70	19	TUJUNGA #5	2/7/97	0.60	8.50	
71	19	TUJUNGA #6	1/22/97	ND	4.60	40.31
72	19	TUJUNGA #7	1/22/97	ND	7.90	39.87
73	19	TUJUNGA #8	1/22/97	ND	4.10	24.81
74	20	TUJUNGA #9	2/7/97	0.80	8.10	1.77
75	20	TUJUNGA #10	2/7/97	1.50	15.40	
76	20	TUJUNGA #11	2/7/97	1.80	15.70	11.90
77	20	TUJUNGA #12	1/22/97	1.10	13.80	
78	4	VERDUGO #1	1/31/97	ND	2.20	
79	4	VERDUGO #2	1/31/97	0.70	7.80	34.11
80	4	VERDUGO #4	1/31/97	8.20	25.70	25.69
81	4	VERDUGO #11	11/8/96	ND	3.30	
82	5	VERDUGO #13	---			
83	5	VERDUGO #24	9/19/96	ND	ND	5.32
84	6	WHITNALL #4	1/29/97	ND	1.20	
85	6	WHITNALL #5	1/29/97	0.70	3.80	
86	6	WHITNALL #6A	6/28/95	1.20	ND	
87	5	WHITNALL #7	11/27/96	ND	ND	
88	5	WHITNALL #8	10/22/96	4.60	10.20	
89	5	WHITNALL #9	---			
ularatbl.xls						

NOTE: ND = non-detect
--- not tested (refer to p.8)

APPENDIX B:
Groundwater Extraction Projections 1997-2001

GROUNDWATER EXTRACTION PROJECTIONS
WATER YEARS 1997-98 THROUGH 2000-2001

	Total Groundwater Extractions From Water Ctrl 5-yr Projection	Sylmar Basin Extractions	Central Basin Extractions	San Fernando Basin Extractions
Oct-97	13,550	582	1,670	11,298
Nov-97	13,100	0	1,670	11,430
Dec-97	9,850	0	0	9,850
Jan-98	9,850	0	0	9,850
Feb-98	8,350	0	0	8,350
Mar-98	8,950	0	1,670	7,280
Apr-98	9,400	0	1,670	7,730
May-98	9,700	582	1,670	7,448
Jun-98	10,450	582	1,670	8,198
Jul-98	10,300	582	1,670	8,048
Aug-98	12,500	582	1,670	10,248
Sep-98	10,100	582	1,670	7,848
Totals	126,100	3,492	15,030	107,578
Oct-98	13,100	582	1,670	10,848
Nov-98	13,100	0	1,670	11,430
Dec-98	8,700	0	0	8,700
Jan-99	6,200	0	0	6,200
Feb-99	5,400	0	0	5,400
Mar-99	11,200	0	1,670	9,530
Apr-99	13,000	0	1,670	11,330
May-99	9,800	582	1,670	7,548
Jun-99	11,700	582	1,670	9,448
Jul-99	11,200	582	1,670	8,948
Aug-99	13,300	582	1,670	11,048
Sep-99	10,800	582	1,670	8,548
Totals	127,500	3,492	15,030	108,978

Note: Projections are based upon estimated demand and Los Angeles Aqueduct flow projections, and are very rough estimates.

	Total Groundwtr Extractions From Water Ctrl 5-yr Projection	Sylmar Basin Extractions	Central Basin Extractions	San Fernando Basin Extractions
Oct-99	13,700	582	1,670	11,448
Nov-99	13,100	0	1,670	11,430
Dec-99	8,400	0	0	8,400
Jan-00	6,200	0	0	6,200
Feb-00	5,400	0	0	5,400
Mar-00	9,000	0	1,670	7,330
Apr-00	11,000	0	1,670	9,330
May-00	10,500	582	1,670	8,248
Jun-00	12,400	582	1,670	10,148
Jul-00	12,000	582	1,670	9,748
Aug-00	14,000	582	1,670	11,748
Sep-00	11,500	582	1,670	9,248
Totals	127,200	3,492	15,030	108,678
Oct-00	9,000	582	1,670	6,748
Nov-00	9,000	0	1,670	7,330
Dec-00	6,200	0	0	6,200
Jan-01	6,200	0	0	6,200
Feb-01	10,500	0	0	10,500
Mar-01	11,500	0	1,670	9,830
Apr-01	11,800	0	1,670	10,130
May-01	10,900	582	1,670	8,648
Jun-01	13,200	582	1,670	10,948
Jul-01	12,600	582	1,670	10,348
Aug-01	14,700	582	1,670	12,448
Sep-01	12,400	582	1,670	10,148
Totals	128,000	3,492	15,030	109,478

Note: Projections are based upon estimated demand and Los Angeles Aqueduct flow projections, and are very rough estimates.

GROUNDWATER PUMPING

AND

SPREADING PLAN

WATER YEAR
OCTOBER 1, 1996 TO SEPTEMBER 30, 2001

Prepared by

PUBLIC SERVICE DEPARTMENT
WATER DIVISION
CITY OF BURBANK

MARCH 1997

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APPENDIX

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

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

III. WATER SUPPLY

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

A. MWD

The amount of treated water purchased from the MWD is expected to be reduced over the next four years as the result of bringing several water resource projects on line. Burbank may be purchasing 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. EPA CONSENT DECREE

The EPA Consent Decree project became operational January 3, 1996. The source of water will be from wells operated by Lockheed Martin. The City of Burbank will account for the production beneficially used by Burbank. Projected use of EPA Consent Decree water produced by Lockheed Martin is shown in Table 3.3.

C. GAC TREATMENT PLANT

The City placed a granular activated carbon (GAC) Treatment Plant in service in November 1992. Historic and proposed production from this plant is shown in Table 3.2. The GAC Treatment Plant will be taken out of service

periodically for carbon change-out of the contactors. Mechanical maintenance will be performed during the change-out period. The GAC Treatment Plant uses the groundwater production of Well No. 7 and Well No. 15.

D. RECLAIMED WATER

The City has used reclaimed water for its power plant cooling for more than 20 years. An expansion of the reclaimed water system has been completed. One major service (McCambridge Park) will be added during the 1996-97 water year. Historic and proposed use of reclaimed water is shown in Table 3.5.

E. PRODUCTION WELLS

The City has seven wells that are mechanically and electrically operable. Five (5) wells are on "Inactive" status with the DHS. We do not plan to operate the inactive wells unless an emergency develops in the 1996-97 water year.

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

IV. JUDGEMENT CONSIDERATIONS

A. PHYSICAL SOLUTION

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

Physical Solution Producers

Valhalla	300 Acre-feet
Lockheed	25 Acre-feet

Table 3.3 lists the past and projected extractions by Lockheed. Table 3.4 lists the past and projected extractions by Valhalla.

B. STORED WATER CREDIT

The City has a stored water credit of 63,215 acre-feet as of October 1, 1996.

C. ALLOWANCE FOR PUMPING

The extraction right for the 1996-97 water year is 4,624 acre-feet. This amount is exclusive of additional extractions allowed due to the City's stored water credits, physical solution right or pumping for groundwater clean-up.

Estimated allowable future pumping, based on 20,000 acre-feet of delivered water, will be 4,000 acre-feet per year.

D. SPREADING OPERATIONS

The City has purchased water for basin replenishment since 1989. The water has been typically spread at the Pacoima Spreading Grounds by L.A. County Public Works Department with the assistance of the L.A.D.W.P. The L.A.D.W.P. water pipelines to the Pacoima Spreading Ground were damaged during the 1994 Northridge earthquake. Replenishment water, beginning in water year 1994-95, will be taken "in lieu" through the L.A. Treatment Plant. The historic and projected spreading water is shown in Table 4.1.

V. CAPITAL IMPROVEMENTS

A. WELLS

BURBANK

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

MAINTENANCE ACTIVITY

Well No. 18. All electrical connections and transformers will be removed. The well may be used for level monitoring.

IV. JUDGEMENT CONSIDERATIONS

A. PHYSICAL SOLUTION

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

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C. ALLOWANCE FOR PUMPING

The extraction right for the 1996-97 water year is 4,624 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.

Well Nos. 14 and 17. Both of these wells will be abandoned in accordance with County standards. All above-ground equipment will be removed and the casings filled and sealed.

Well No. 10. Lockheed Martin will provide new pumping equipment and connection to the treatment plant for Phase II of the Burbank Consent Decree during water year 1997/98. The well is to produce 1,500 GPM with an anticipated drawdown of 20 feet. An additional 50 feet of drawdown is included for long term water level variation. After redevelopment and testing, in 1997, the well will be placed into active production status on February 1, 1998.

LOCKHEED-MARTIN

Lockheed will operate seven (7) wells for the production capability of the EPA Consent Decree Project until January 1998. See Figure 5.1. The well field will produce from 3,000 GPM to 8,000 GPM during water year 1996/97. An additional well (Burbank No. 10/Lockheed WP-180) will become operable on February 1, 1998. Production capacity of the Lockheed Martin facilities will become a nominal 9,000 GPM. Lockheed Martin will perform normal operating well maintenance.

Well No. 10. In 1994, Hyro-Search, Inc. performed modifications to Well No. 10. This work consisted of removing the existing motor, pump and column, a video survey to establish the initial condition of the well, wire

brushing, bailing, eight hours of well development, placing 18 cubic yards of pea gravel up to a depth of 360 feet, placing a bentonite seal to a depth of 356 feet, placing a cement seal to a depth of 354 feet. The well was acidified with a combination of granular acid, acid enhancer and bacteria controller and then disinfected with chlorine bleach. A video survey was performed at the completion of this work. See Figure 5.2.

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.

Lockheed Martin treatment facilities were out of operation from September 19, 1996 to November 18, 1996 due to problems with the wet phase GAC system.

Burbank plans to use the production and treatment facilities of the EPA Project at flow rates from 3,000 GPM to 8,000 GPM during the 1996/97 Water Year. Monthly use will meet or exceed the monthly minimum requirement shown in Appendix C.

GAC TREATMENT PLANT

Burbank plans to use the production and GAC Treatment Plant at the following flow rates during the 1996/97 Water Year:

October - December	1,800 GPM
January	1,000 GPM
February - April	0 GPM
May - September	1,800 GPM

The plant will be operated in the parallel configuration.

TABLE 2.1
FIVE-YEAR PROJECTED WATER DEMAND

WATER YEAR	ACRE-FEET
88-89	23,863
89-90	23,053
90-91	20,269
91-92	20,930
92-93	21,839
93-94	24,175
94-95	22,541
95-96	23,124
96-97*	23,000
97-98*	25,000
98-99*	23,000
99-00*	23,000
00-01*	23,000

* Projected

NOTES:

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

(2) Values above include Valhalla extractions.

TABLE 3.1
FIVE-YEAR PROJECTED USE OF MWD TREATED WATER

WATER YEAR	ACRE-FEET
88-89	22,936
89-90	22,397
90-91	17,773
91-92	18,830
92-93	18,005
93-94	18,074
94-95	17,173
95-96	12,040
96-97*	11,000
97-98*	11,000
98-99*	11,000
99-00*	11,000
00-01*	11,000

* Projected

NOTES:

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

TABLE 3.2
FIVE-YEAR PROJECTED USE OF GAC TREATED WATER

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

* Projected

NOTES:

(1) The GAC Treatment Plant has a 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 1250 GPM
Well No. 15 750 GPM

(3) Treatment Plant production will be reduced beginning in water year 1996-97 in order to meet monthly minimums required by the EPA Consent Decree project.

TABLE 3.3
FIVE-YEAR PROJECTED EXTRACTIONS OF GROUNDWATER BY LOCKHEED

WATER YEAR	ACRE-FEET
93-94	803 (4)
94-95	462 (6)
95-96	5,737 (6)
96-97*	9,000
97-98*	9,000
98-99*	9,000
99-00*	9,000
00-01*	9,000

* Projected

NOTES:

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

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

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

(4) The "Policies and Procedures" allow a 50 acre-foot reduction for well development and testing.

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

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

1993-94	378 Acre-feet
1994-95	462 Acre-feet
1995-96	34 Acre-feet, December through October
1996-97	320 Acre-feet, Year to date, February 1997

The Watermaster will not charge Burbank for these amounts.

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

TABLE 3.4
FIVE-YEAR PROJECTED EXTRACTIONS OF GROUNDWATER BY VALHALLA

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

* Projected

NOTES:

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

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

TABLE 3.5
FIVE-YEAR PROJECTED USE OF RECLAIMED WATER

WATER YEAR	ACRE-FEET
88-89	927
89-90	656
90-91	1,234
91-92	2,100
92-93	2,629
93-94	3,706
94-95	2,480
95-96	1,880
96-97*	3,500
97-98*	3,500
98-99*	3,500
99-00*	4,000
00-01*	4,000

* Projected

NOTES:

(1) The source of reclaimed water is the Burbank Wastewater Treatment 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. The PS-1 Booster at the wastewater treatment plant was placed into service.

(4) McCambridge Park will be provided reclaimed water service in water year 1996-97.

(5) The Burbank Nature Center and Starlight Park will be provided reclaimed water service in water year 1997-98.

APPENDIX A

WATER QUALITY DATA

BURBANK WELLS

- WELL NO. 7
- WELL NO. 15

WATER QUALITY DATA FOR WATER YEAR 1994-95 HAS BEEN INCLUDED WITH THIS REPORT.

LOCKHEED WELLS

- NO. 1
- NO. 2
- NO. 3
- NO. 4
- NO. 5
- NO. 6
- NO. 7

NOTE: WATER QUALITY TEST DATA FOR LOCKHEED WELLS WILL BE PROVIDED ON SPECIFIC REQUEST, AND IS NOT INCLUDED WITH THIS REPORT

CITY OF BURBANK
PUBLIC SERVICE DEPARTMENT
WATER DIVISION

GAC TREATMENT PLANT DATA
WATER YEAR 1995-96

MONTH	VOC - COMBINED INFLUENT µg / l				PRODUCTION (INTO SYSTEM) A.F.
	TCE	PCE	c-1,2-DCE	1,2-DCA	
October, 1995	ND	ND	ND	ND	270.68
November	ND	ND	ND	ND	192.49
December	ND	ND	ND	ND	199.75
January, 1996	97.3	13.50	4.57	ND	166.50
February	41.3	3.20	3.00	ND	106.42
March	95.6	6.60	6.08	ND	118.84
April	82.9	7.50	5.70	ND	101.44
May	118.0	16.20	5.50	ND	254.60
June	111.0	18.00	4.74	ND	189.20
July	102.0	16.80	4.68	ND	268.20
August	ND	ND	ND	ND	178.77
September	96.7	18.30	3.53	ND	241.28
				TOTAL:	2,288.17

CARBON CHANGE-OUT DATES:

12/8/95	6/21/96
2/4/96	9/2/96
5/2/96	

PRODUCTION WELLS:

NO. 7	NO. 15

NOTES:

- Combined Influent VOC results of "ND" for October, November, December, and July are not believable. This must result from some anomaly in sampling or analysis. It does not result from sampling immediately after well startup; the wells had been running at least 5 days. Results reported above have been checked against the original laboratory reports.

- Series operation February 4, 1996 through April 26, 1996. Well No. 15 shut off.

GACDATA.XLS (WY 95-96)
1/30/97

APPENDIX B

WATER TREATMENT FACILITIES

LAKE STREET GAC TREATMENT PLANT

320 LAKE STREET
BURBANK, CA 91503

OPERATOR:

CITY OF BURBANK
PUBLIC SERVICE DEPARTMENT, WATER DIVISION

ALBERT LOPEZ, WATER PRODUCTION/OPERATIONS SUPERINTENDENT

QUANTITY TREATED (10/1/95 THROUGH 9/30/96):

2,286 Acre-Feet

WATER QUALITY:

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

DISPOSAL:

Burbank Water System
Potable Water

EPA CONSENT DECREE PROJECT

2030 N. Hollywood Way
Burbank, CA 91505

OPERATOR:

CITY OF BURBANK
PUBLIC SERVICE DEPARTMENT, WATER DIVISION

ALBERT LOPEZ, WATER PRODUCTION/OPERATIONS SUPERINTENDENT

QUANTITY TREATED (10/1/95 THROUGH 9/30/96):

5,767 ACRE-FEET FOR DOMESTIC USE.

WATER QUALITY:

N/A

DISPOSAL:

(1) TEST WATER - WASTE

(2) BURBANK WATER SYSTEM
Potable water after blending

APPENDIX C

MISCELLANEOUS

TABLE 3-1
EXTRACTION WELL FLOW RATE SETPOINTS
(For Odd Months if Flow is Maintained Continuously at a Given Production Requirement)
All Values are Gallons Per Minute (gpm).

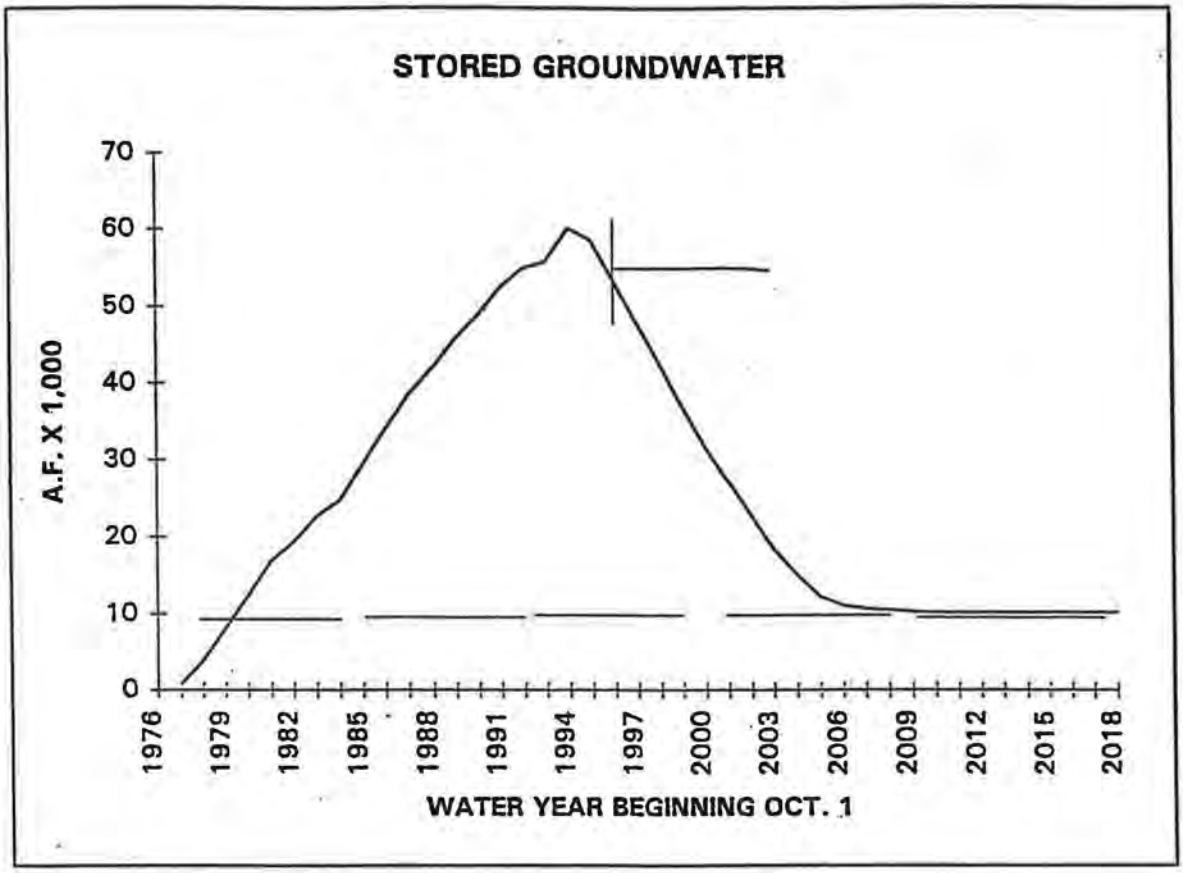
Production Requirement	VO-1	VO-2	VO-3	VO-4	VO-5	VO-6	VO-7
650-1600	–	–	–	–	850-1600	[1]	[2]
1700-2300	–	–	–	–	[1]	1700-2300	[2]
2400	(1)	1200	(2)	1200	–	–	–
2500	(1)	1200	(2)	1300	–	–	–
2600	(1)	1300	(2)	1300	–	–	–
2700	(1)	1300	(2)	1400	–	–	–
2800	(1)	1400	(2)	1400	–	–	–
2900	(1)	1400	(2)	1500	–	–	–
3000	(1)	1500	(2)	1500	–	–	–
3100	(1)	1500	(2)	1600	–	–	–
3200	(2)	1500	(3)	(1)	[1]	1700	[2]
3300	(2)	1500	(3)	(1)	[1]	1800	[2]
3400	(2)	1500	(3)	(1)	[1]	1900	[2]
3500	(2)	1500	(3)	(1)	[1]	2000	[2]
3600	(2)	1500	(3)	(1)	[1]	2100	[2]
3700	1000	(1)	1000	(2)	1700	[1]	[2]
3800	1000	(1)	1000	(2)	1800	[1]	[2]
3900	1100	(1)	1000	(2)	1800	[1]	[2]
4000	1100	(1)	1100	(2)	1800	[1]	[2]
4100	(1)	1200	(2)	1200	[1]	1700	[2]
4200	(1)	1200	(2)	1200	[1]	1800	[2]
4300	(1)	1200	(2)	1200	[1]	1900	[2]
4400	(1)	1200	(2)	1300	[1]	1900	[2]
4500	(1)	1300	(2)	1300	[1]	1900	[2]
4600	(1)	1300	(2)	1400	[1]	1900	[2]
4700	(1)	1300	(2)	1500	[1]	1900	[2]
4800	(1)	1400	(2)	1500	[1]	1900	[2]
4900	(1)	1500	(2)	1500	[1]	1900	[2]
5000	(1)	1500	(2)	1500	[1]	2000	[2]
5100	(1)	1500	(2)	1600	[1]	2000	[2]
5200	(1)	1500	(2)	1600	[1]	2100	[2]
5300	1000	1200	(1)	1400	[1]	1700	[2]
5400	1000	(1)	1000	(2)	1700	[1]	1700
5500	1100	1200	(1)	1400	[1]	1800	[2]
5600	1000	(1)	1000	(2)	1900	[1]	1700
5700	1200	1200	(1)	1400	[1]	1900	[2]
5800	1200	(1)	1100	(2)	1800	[1]	1700
5900	1200	1300	(1)	1500	[1]	1900	[2]
6000	1200	(1)	1100	(2)	1900	[1]	1800
6100	1200	1400	(1)	1500	[1]	2000	[2]
6200	1200	(1)	1100	(2)	1900	2000	[1]
6300	(1)	1300	(2)	1300	1800	1900	[1]
6400	(1)	1300	(2)	1300	1800	2000	[1]
6500	(1)	1400	(2)	1300	1800	2000	[1]
6600	(1)	1400	(2)	1400	1800	2000	[1]
6700	(1)	1400	(2)	1400	1900	2000	[1]
6800	(1)	1500	(2)	1400	1900	2000	[1]
6900	(1)	1500	(2)	1500	1900	2000	[1]
7000	1100	1200	(2)	1300	1700	1700	[1]

( ) Indicates priority of alternate well operation for 200-hp pumps.
[ ] Indicates priority of alternate well operation for 250-hp pumps.

TABLE 3-2
EXTRACTION WELL FLOW RATE SETPOINTS
(For Even Months if Flow is Maintained Continuously at a Given Production Requirement)
All values are Gallons Per Minute (gpm).

Production Requirement	VO-1	VO-2	VO-3	VO-4	VO-5	VO-6	VO-7
650-1600	–	–	–	–	[1]	850-1600	[2]
1700-2300	–	–	–	–	1700-2300	[1]	[2]
2400	(1)	1200	(2)	1200	–	–	–
2500	(1)	1200	(2)	1300	–	–	–
2600	(1)	1300	(2)	1300	–	–	–
2700	(1)	1300	(2)	1400	–	–	–
2800	1400	(1)	(2)	1400	–	–	–
2900	1400	(1)	(2)	1500	–	–	–
3000	1500	(1)	(2)	1500	–	–	–
3100	1500	(1)	(2)	1600	–	–	–
3200	1500	(1)	(3)	(2)	1700	[1]	[2]
3300	1500	(1)	(3)	(2)	1800	[1]	[2]
3400	1500	(1)	(3)	(2)	1900	[1]	[2]
3500	1500	(1)	(3)	(2)	2000	[1]	[2]
3600	1500	(1)	(3)	(2)	2100	[1]	[2]
3700	(1)	1000	(2)	1000	[1]	1700	[2]
3800	(1)	1000	(2)	1000	[1]	1800	[2]
3900	(1)	1100	(2)	1000	[1]	1800	[2]
4000	(1)	1100	(2)	1000	[1]	1800	[2]
4100	(1)	1200	(2)	1200	[1]	1700	[2]
4200	(1)	1200	(2)	1200	[1]	1800	[2]
4300	(1)	1200	(2)	1200	[1]	1900	[2]
4400	(1)	1200	(2)	1300	[1]	1900	[2]
4500	(1)	1300	(2)	1300	[1]	1900	[2]
4600	(1)	1300	(2)	1400	[1]	1900	[2]
4700	(1)	1300	(2)	1500	[1]	1900	[2]
4800	1000	(1)	(3)	(2)	1900	[1]	1900
4900	1100	(1)	(3)	(2)	1900	[1]	1900
5000	1200	(1)	(3)	(2)	1900	[1]	1900
5100	1200	(1)	(3)	(2)	2000	[1]	1900
5200	1200	(1)	(3)	(2)	2000	[1]	2000
5300	1200	(1)	1000	(2)	1600	[1]	1700
5400	1000	(1)	1000	(2)	1700	[1]	1700
5500	1100	1200	(1)	1400	[1]	1800	[2]
5600	1000	(1)	1000	(2)	1900	[1]	1700
5700	1200	1200	(1)	1400	[1]	1900	[2]
5800	1200	(1)	1100	(2)	1800	[1]	1700
5900	1200	1300	(1)	1500	[1]	1900	[2]
6000	1200	(1)	1100	(2)	1900	[1]	1800
6100	1200	1400	(1)	1500	[1]	2000	[2]
6200	1200	(1)	1100	(2)	1900	2000	[1]
6300	1100	(1)	1100	(2)	1800	1900	[1]
6400	(1)	1300	(2)	1300	1800	2000	[1]
6500	(1)	1400	(2)	1300	1800	2000	[1]
6600	(1)	1400	(2)	1400	1800	2000	[1]
6700	(1)	1400	(2)	1400	1900	2000	[1]
6800	(1)	1500	(2)	1400	1900	2000	[1]
6900	(1)	1500	(2)	1500	1900	2000	[1]
7000	1100	1200	(2)	1300	1700	1700	[1]

( ) Indicates priority of alternate well operation for 200-hp pumps.
[ ] Indicates priority of alternate well operation for 250-hp pumps.



NOTES:

- Q 10,000 AF RECOMMENDED AS BASIN BALANCE. THIS EQUATES TO ABOUT ONE YEAR OF DOMESTIC SYSTEM PRODUCTION IF REPLENISHMENT NOT AVAILABLE FROM MWD
- Q DRAW DOWN STORED WATER BY FULL RETURN FLOW CREDIT OF PRIOR YEARS (~4,600 AF) PLUS PRODUCTION BALANCE (~4,400AF)
- Q MINIMUM SPREAD WATER SHALL BE THE ESTIMATED GAC PRODUCTION. EXPENSE QUALIFIED UNDER G.R.P. WITH M.W.D.
- Q GROUNDWATER PRODUCTION EQUALS GAC (~1,000 AF), EPA (~9,000AF) AND VALHALLA (~300 AF)
- Q ADDITIONAL SPREADING WATER WILL BE NEEDED BEGINNING 2004 TO MAINTAIN BASIN BALANCE.

revised 2/20/97 @1320

GRDWTR1.XLS

CITY OF BURBANK
PUBLIC SERVICES DEPARTMENT
WATER DIVISION

BURBANK'S STORED GROUNDWATER
1976/77 - 2017/18

WATER YEAR	DELIVERED WATER AF	RETURN FLOW CREDIT AF	SPREAD WATER AF	PUMPED GROUNDWATER AF	STORED WATER CREDIT AF
1976-77	22,743	4,549			
1977-78	22,513	4,503		3,767	(1) 782
1978-79	24,234	4,847		1,358	(2) 3,947
1979-80	24,184	4,837		677	8,117
1980-81	25,202	5,040		595	12,359
1981-82	22,120	4,424		523	16,876
1982-83	22,118	4,424		2,002	19,298
1983-84	24,927	4,985		1,063	22,659
1984-85	23,641	4,728		2,863	24,781
1985-86	23,180	4,636		123	29,386
1986-87	23,649	4,730		0	34,022
1987-88	23,172	4,742		253	38,499
1988-89	23,863	4,773		1,213	42,028
1989-90	23,053	4,611	378	1,401	45,778
1990-91	20,246	4,049	504	2,032	48,861
1991-92	20,930	4,186	503	938	52,475
1992-93	21,839	4,368	500	* 2,184	54,977
1993-94	24,566	4,913	0	* 3,539	55,806
1994-95	22,540	4,508	2,000	2,589	60,130
1995-96	23,124	4,624	2,000	7,996	58,642
1996-97	23,000	4,600	0	10,000	53,266
1997-98	23,000	4,600	0	10,000	47,866
1998-99	23,000	4,600	0	10,000	42,466
1999-2000	23,000	4,600	0	10,000	37,066
2000-01	23,000	4,600	0	10,000	31,666
2001-02	23,000	4,600	2,000	11,000	27,266
2002-03	23,000	4,600	2,000	11,000	22,866
2003-04	23,000	4,600	2,000	11,000	18,466
2004-05	23,000	4,600	3,000	11,000	15,066
2005-06	23,000	4,600	3,500	11,000	12,166
2006-07	23,000	4,600	5,300	11,000	11,066
2007-08	23,000	4,600	6,000	11,000	10,666
2008-09	23,000	4,600	6,200	11,000	10,466
2009-10	23,000	4,600	6,200	11,000	10,266
2010-11	23,000	4,600	6,300	11,000	10,166
2011-12	23,000	4,600	6,400	11,000	10,166
2012-13	23,000	4,600	6,400	11,000	10,166
2013-14	23,000	4,600	6,400	11,000	10,166
2014-15	23,000	4,600	6,400	11,000	10,166
2015-16	23,000	4,600	6,400	11,000	10,166
2016-17	23,000	4,600	6,400	11,000	10,166
2017-18	23,000	4,600	6,400	11,000	10,166

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

2/20/97 @ 1340

TABLE 4.1
FIVE-YEAR PROJECTED BURBANK SPREADING OPERATIONS

WATER YEAR	ACRE-FEET
88-89	0
89-90	378 (1)
90-91	504 (1)
91-92	503 (1)
92-93	500 (2)
93-94	0 (3)
94-95	2,200 (4)
95-96	2,000 (4)
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

* Projected

NOTES:

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

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

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

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

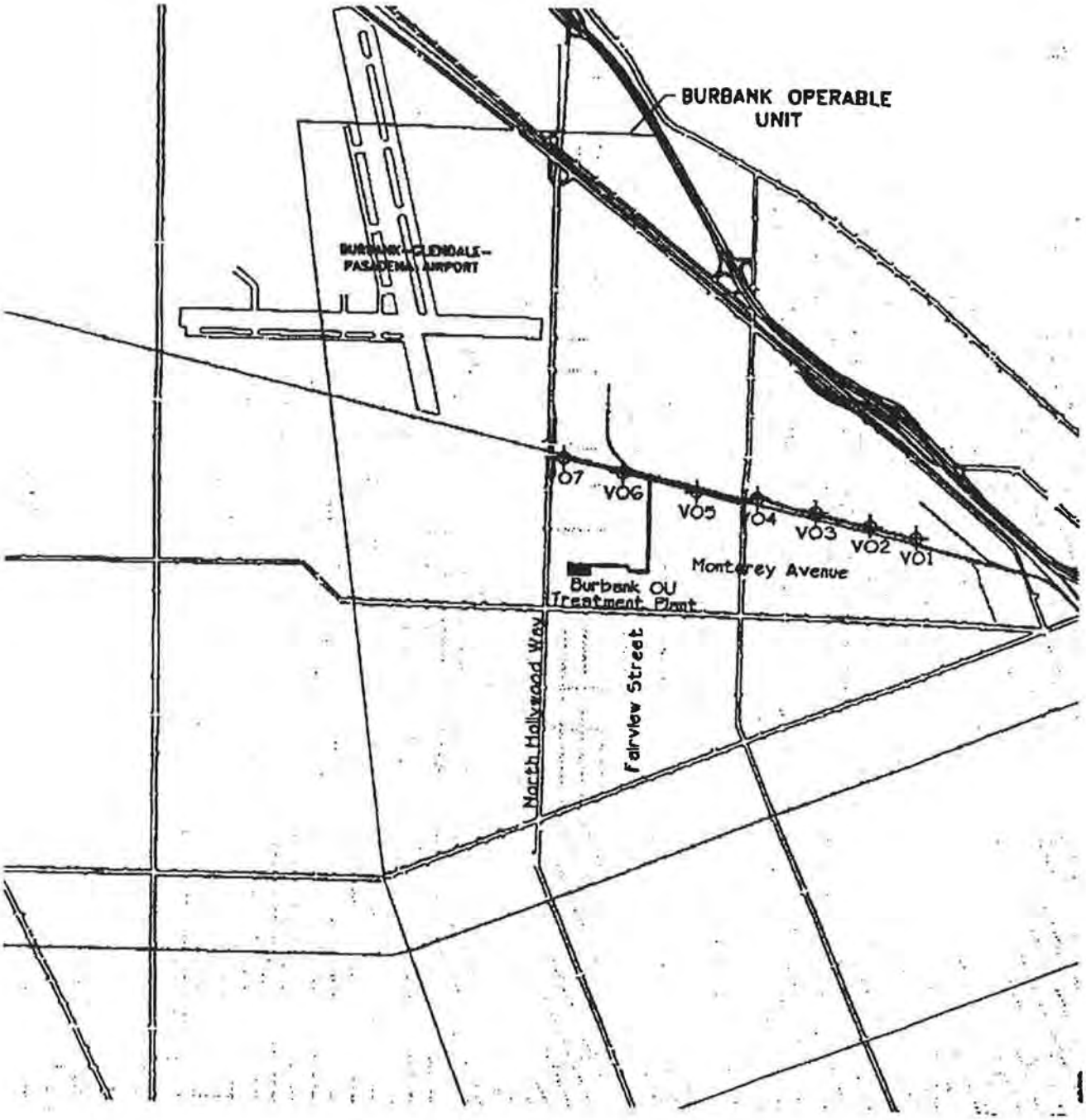


FIGURE 3.1
EPA CONSENT DECREE EXTRACTION WELLS

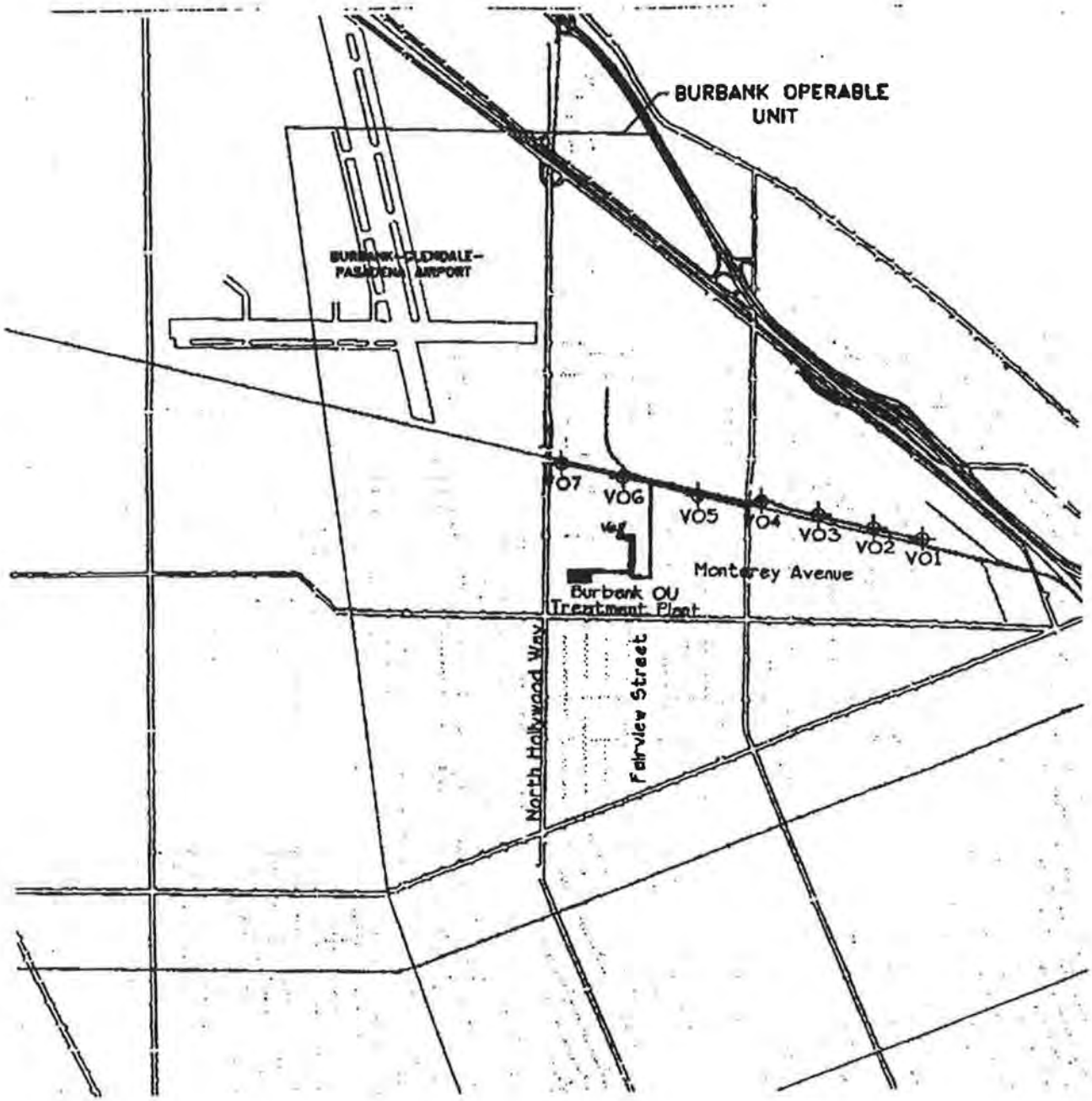
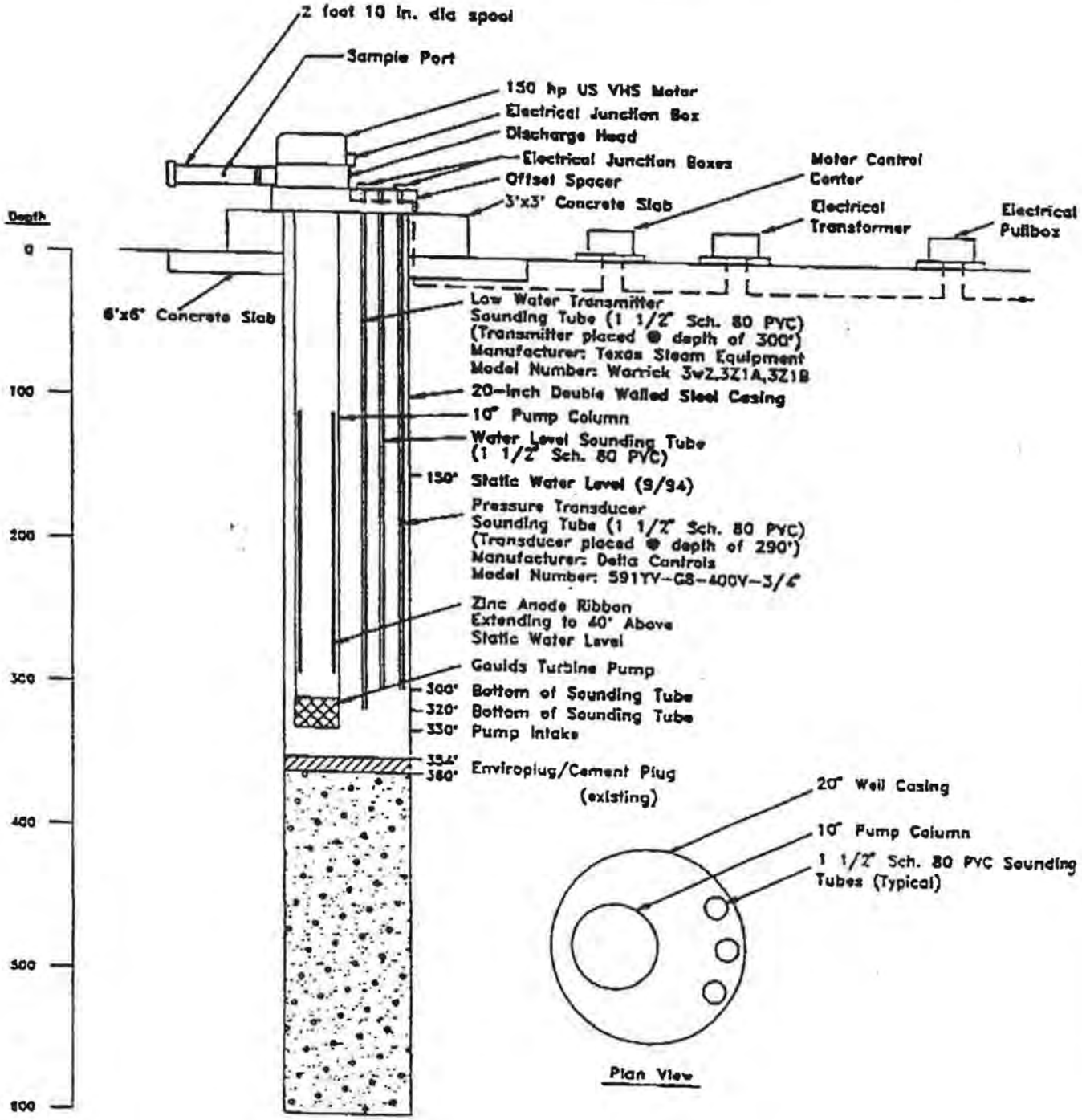


FIGURE 5.1
EPA PHASE II EXTRACTION WELLS



Drawing Not to Scale

FIGURE 5.2
WELL NO. 10 DETAIL

CITY OF GLENDALE
WATER RESOURCE PLAN

City of Glendale

Public Service Department - Water Section

February, 1997

G:/users/water/Al/logo/Ray.dwg

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INTRODUCTION

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

Fundamentally, it is imprudent for a city of 192,000 people to be almost totally dependent on water supplies (88 percent of demands) originating hundreds of miles away that Glendale has little control over. The purpose of this document is to discuss the City's Water Resource Plan designed to develop more local water resources. The implementation of this plan will cost about $50 million. Of this amount, $25 million has been spent to date.

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

EXISTING WATER SOURCES

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

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

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

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

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

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

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

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

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

TABLE 1
METROPOLITAN CONNECTIONS AND CAPACITY

Service Connection Number	Capacity (cfs)
G-1	48
G-2	10
G-3	12

Recycled Water - The City has been delivering recycled water from the Los Angeles/Glendale Water Reclamation Plant (LAGWRP) since the late 1970's. The first deliveries of recycled water were to the Glendale Power Plant for use in the cooling towers and to Caltrans for irrigation of a portion of Route 134 Freeway. In 1992, the City began delivering recycled water for irrigation purposes to Forest Lawn Memorial Park. The total deliveries to these existing users is about 800 AFY in 1996, recycled water wage totals 927 AF. To the extent recycled water is used, there is a corresponding reduction in the amount of water purchased from Metropolitan. The capacity of LAGWRP is 20 MGD with indefinite plans for expansion to 50 MGD, and Glendale is entitled to 50 percent of any effluent produced at the plant.

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

TABLE 2
LOCAL WATER USE (AFY)

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

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

(1) Return flow credit only.

PAST WATER USE TRENDS

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

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

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

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

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

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

The historic and projected water use from the various sources is plotted on Figure 2 and shows the significant reduction in production from the San Fernando Basin and corresponding increase in imported water supplies from Metropolitan. The annual water use in Glendale for fiscal year 1995-96 was 31,348 AFY. In 1989-90, the use was about 32,600 AFY. The recent drought and many water conservation measures have resulted in reduced water use in Glendale. The 29,448 AFY is equivalent to an average daily use of 26 million gallons per day (MGD).

PROJECTED WATER DEMANDS

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

Projected Water Use - The projected water demand using MWD-MAIN calibrated for Glendale shows a year 2000 demand of 32,003 AFY and a year 2010 demand of 33,215 AFY. These figures were based on incorporating projected population, housing, and employment data into the MWD-MAIN water demand forecasting model for Glendale along with a weather variable. The year 2010 demand reflects a modest increase over current use. These projections incorporate the 1981 and 1992 California plumbing codes changes requiring ultra-low flush toilets beginning in 1992, along with a continuation of current drought oriented public education and information programs. As additional conservation measures are implemented, there could be still more reductions in projected use.

Future Water Sources - The basic objective of the plan is to develop more local supplies and the facilities required to increase the use of local resources thereby reducing the need for imported water. The cost of these new facilities is estimated to be $50 million. Currently, about 90 percent of the potable water used in the City comes from Metropolitan. With the proposed supplies and facilities, the goal is to reduce dependence on Metropolitan to 60 percent of demand. This will be accomplished by building new facilities for expanding production from the San Fernando and Verdugo Basins, and increased recycled water use.

PROPOSED WATER FACILITIES

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

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

Under the Record of Decision (ROD) for the South Glendale and North Glendale Operable Units, many new facilities will be constructed consisting of: shallow extraction wells, a combined 5,000 gpm water treatment plant, piping to convey the untreated water from the wells to the treatment plant, a conveyance system from the treatment plant to Glendale 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 facilities being proposed is shown on Figure 4. Also, shown on the figure is an assumed new connection to the Metropolitan water system to blend with the treated groundwater to reduce the nitrate levels in the groundwater to acceptable limits.

The major agreements between Glendale, the Responsible Parties (PRP's), and the EPA have been signed. The PRPs have retained CDM Consulting Engineers to design the required facilities. Construction should be completed in the 1998-99 time frame.

In addition, the City proposes to construct wells to provide water from the lower San Fernando Aquifer. It is anticipated that these wells would be constructed in the 1998-99 time frame. The City's basic water right of 5,400 AFY will meet about 18 percent of projected near-term water demands based on an annual use in the City of 30,000 AFY.

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

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

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

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

TABLE 3
RECYCLED WATER USE (AFY)

PROJECTS	1995	2000	2005	2010
Brand Park	0	160	170	170
Forest Lawn Pipeline	293	350	350	350
Power Plant Pipeline	371	450	450	450
Verdugo-Scholl Pipeline	216	832	935	1054
Other Potential Projects	0	0	0	0
TOTAL	880	1792	1905	2024

Metropolitan Water District - The City currently has three treated water connections to the Metropolitan water system in the City. The cities of Los Angles, Burbank and Glendale have looked at a 150 cfs, equally divided, untreated water connection on the San Fernando Tunnel to percolate water into the San Fernando Basin. With this additional water delivered 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.

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

Water Year	San Fernando Basin	Verdugo Basin	Recycled Water	MWD Water	Total
1989-90	2,041	1,635	333	28,848	32,857
1990-91	2,932	1,132	432	25,354	29,850
1991-92	1,577	732	551	23,003	25,863
1992-93	447	904	770	25,905	28,026
1993-94	554	1,226	625	27,043	29,448
1994-95	441	1,667	574	26,215	28,897
1995-96	503	2,059	880	27,906	31,348
1996-97	500	2,700	1,664	26,910	31,774
1997-98	500	2,700	1,709	26,965	31,874
1998-99	~~5,506~~ 500	~~3,300~~ 2700	1,748	~~21,991~~ 26,991	~~31,939~~ 26,939
1999-00	7,700	~~3,356~~ 3300	1,792	19,211	32,003

SUMMARY OF WATER SUPPLIES

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

RELATED INFORMATION ON WATER USE

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

Figure B-1

GLENDALE WATER SUPPLY AND DEMAND (AF/YR)

(Use MWD Direct Deliveries for Blending)

Date: 25-Feb-97

	Fiscal Year	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	2000	2005	2010
(1)	Water Demands (a)	31,953	32,857	29,850	25,863	28,026	29,448	28,897	31,674	31,774	31,874	31,939	32,003	32,626	33,215
	Water Supplies:														
(2)	San Fernando Basin														
(3)	Water Rights	5,591	5,771	5,170	4,373	4,805	5,090	4,979	5,535	5,555	5,575	5,588	5,601	5,725	5,843
(3A)	Physical Solution Pmts (LADWP)														
	Water Production														
(4)	City Production	1,411	1,564	2,445	1,080	78	140	65	100	100	100	100	100	100	100
(5)	EPA Treat. Plant (b)												7,200	7,200	7,200
(6)	Physical Solution	467	477	487	497	369	414	376	400	400	400	400	400	400	400
(7)	Total:	1,878	2,041	2,932	1,577	447	554	441	500	500	500	500	7,700	7,700	7,700
	Verdugo Basin														
(8)	Wells 3, 4, & 6	2,287	1,635	1,132	732	904	1,226	1,667	1,700	1,700	1,700	1,700	1,700	1,700	1,700
(9)	VPWTP								1,000	1,000	1,000	1,000	1,000	1,000	1,000
(10)	Other Production												600	656	656
(11)	Total:	2,287	1,635	1,132	732	904	1,226	1,667	2,700	2,700	2,700	2,700	3,300	3,356	3,356
	Reclaimed Water														
	Brand Park Project									150	155	155	160	170	170
	Forest Lawn Project					348	299	280	350	350	350	350	350	350	350
	Power Plant Project	233	333	432	551	422	326	260	450	450	450	450	450	450	450
	Verdugo-Scholl Project							34	674	714	754	793	832	935	1,054
	Other Potential Projects														
(12)	Total:	233	333	432	551	770	625	574	1,474	1,664	1,709	1,748	1,792	1,905	2,024
	Metropolitan Water														
(13)	Direct Deliveries (G1,G2, & G3)	27,555	28,848	25,354	23,003	25,905	27,043	26,215	27,000	26,910	26,965	26,991	19,211	19,665	20,135
(15)	Replenishment Deliveries (G4)														
(16)	Total	27,555	28,848	25,354	23,003	25,905	27,043	26,215	27,000	26,910	26,965	26,991	19,211	19,665	20,135
(17)	Total Water Supplies	31,953	32,857	29,850	25,863	28,026	29,448	28,897	31,674	31,774	31,874	31,939	32,003	32,626	33,215

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

5) 5,000 gpm @90%

6) Forest Lawn, et. al.

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

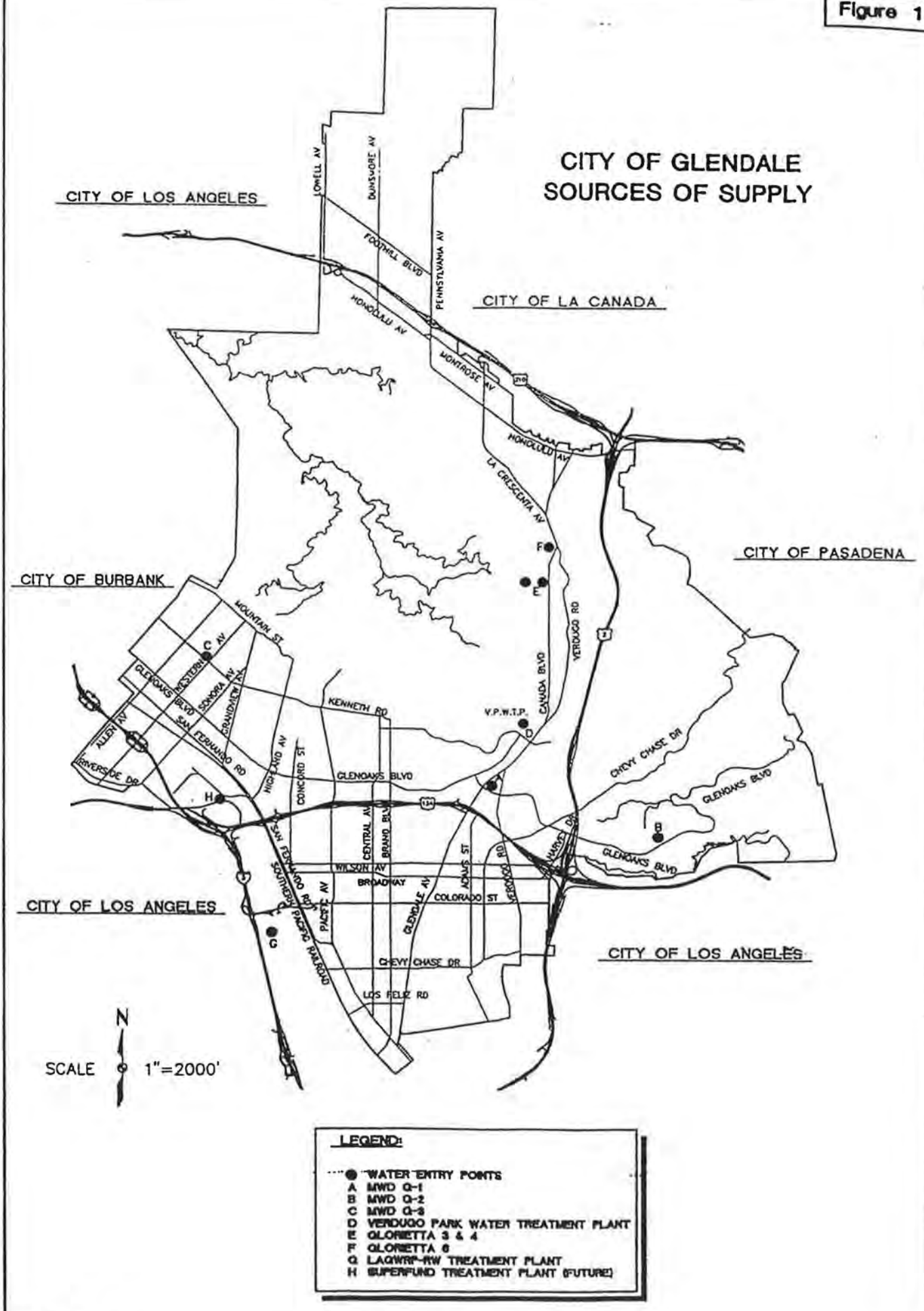
3A) (7) - (3) - (15)

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

(a) Projected demands from MWD

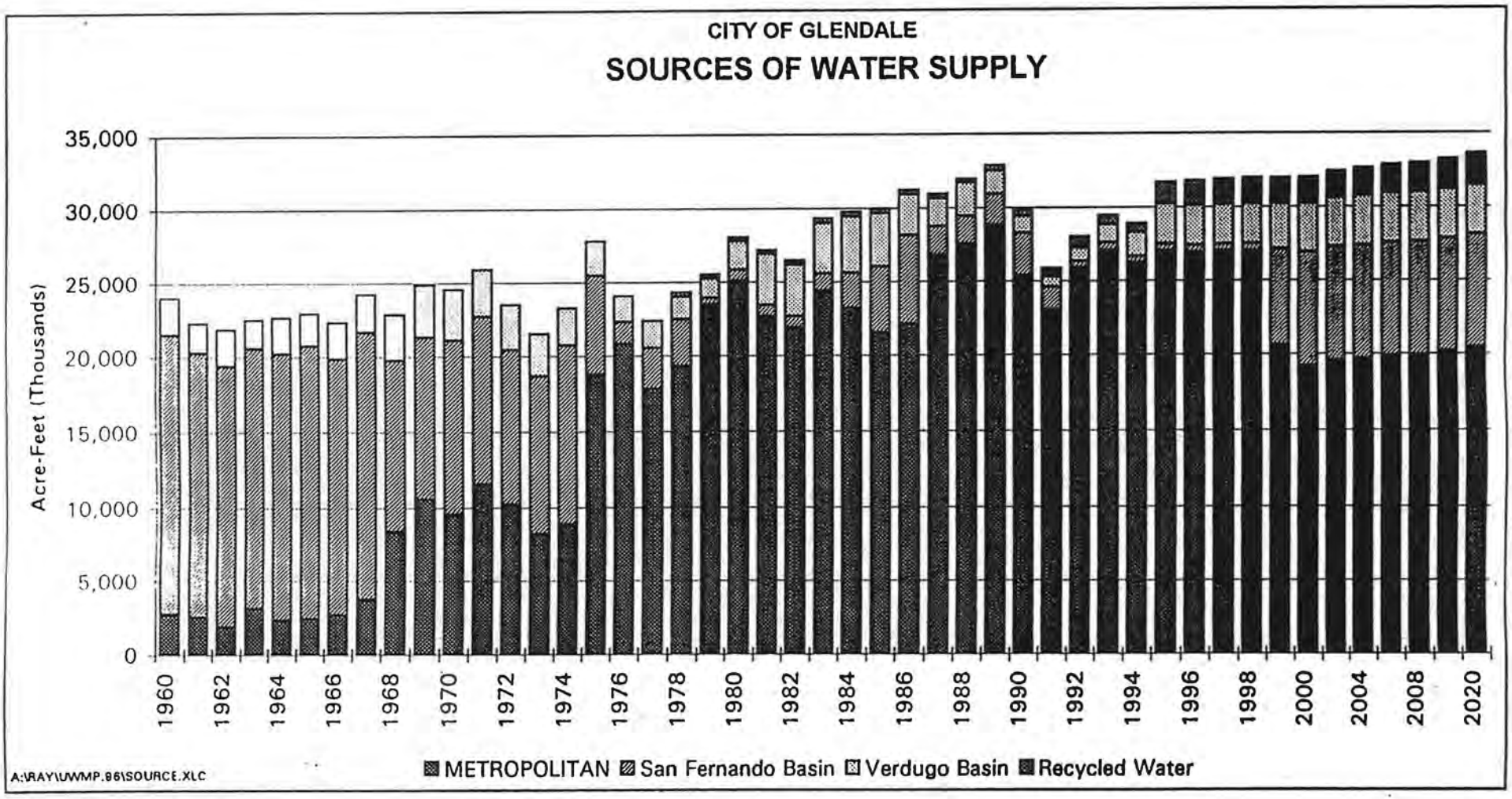
(b) Assume operational date October, 1998

Figure 1



Prepared: RAY MOTARO
Drawn: PHONG NGO
Date: February 19, 1987

FIGURE 2


CITY OF GLENDALE
SOURCES OF WATER SUPPLY
Acre-Feet (Thousands)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2004
2008
2020
METROPOLITAN
San Fernando Basin
Verdugo Basin
Recycled Water
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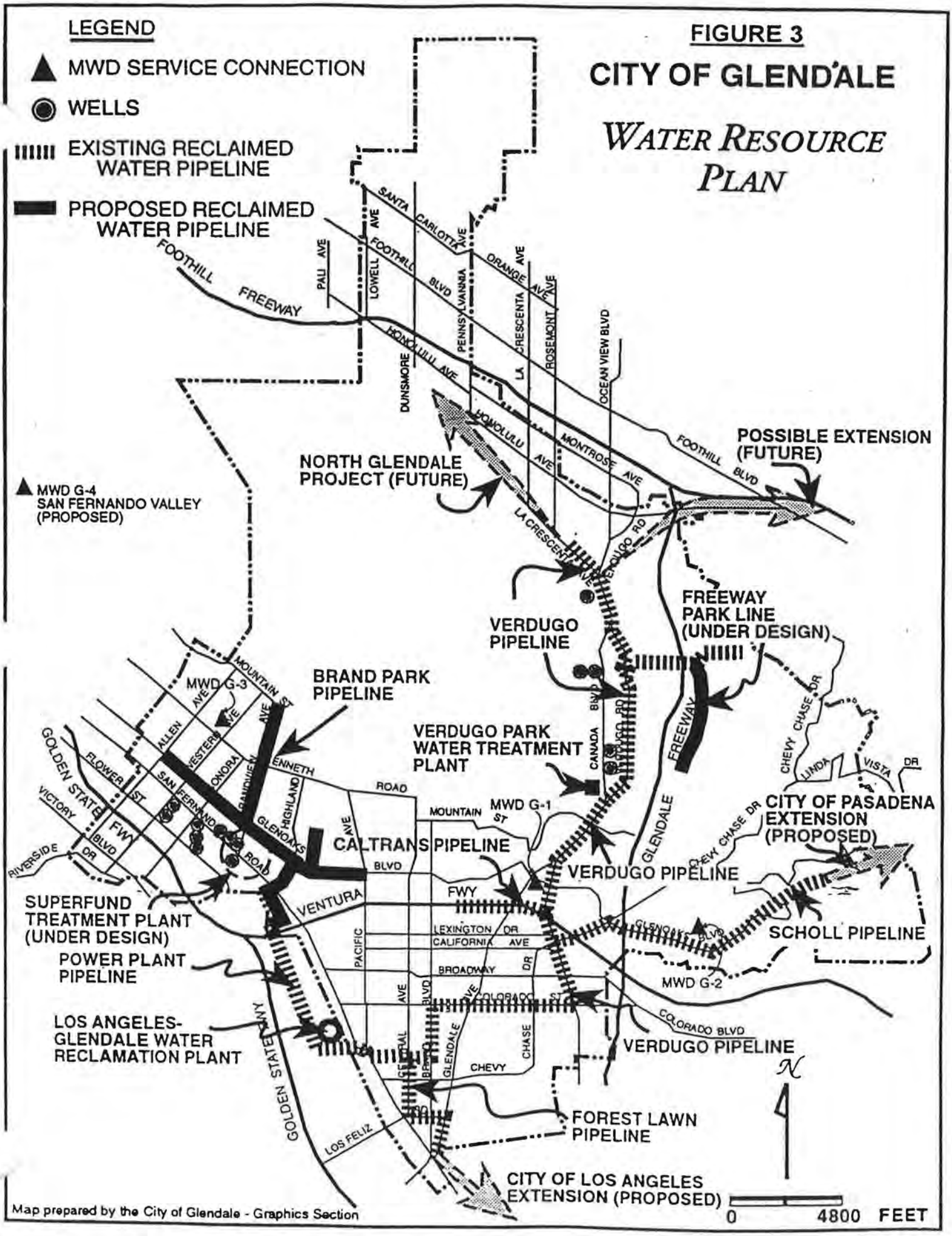
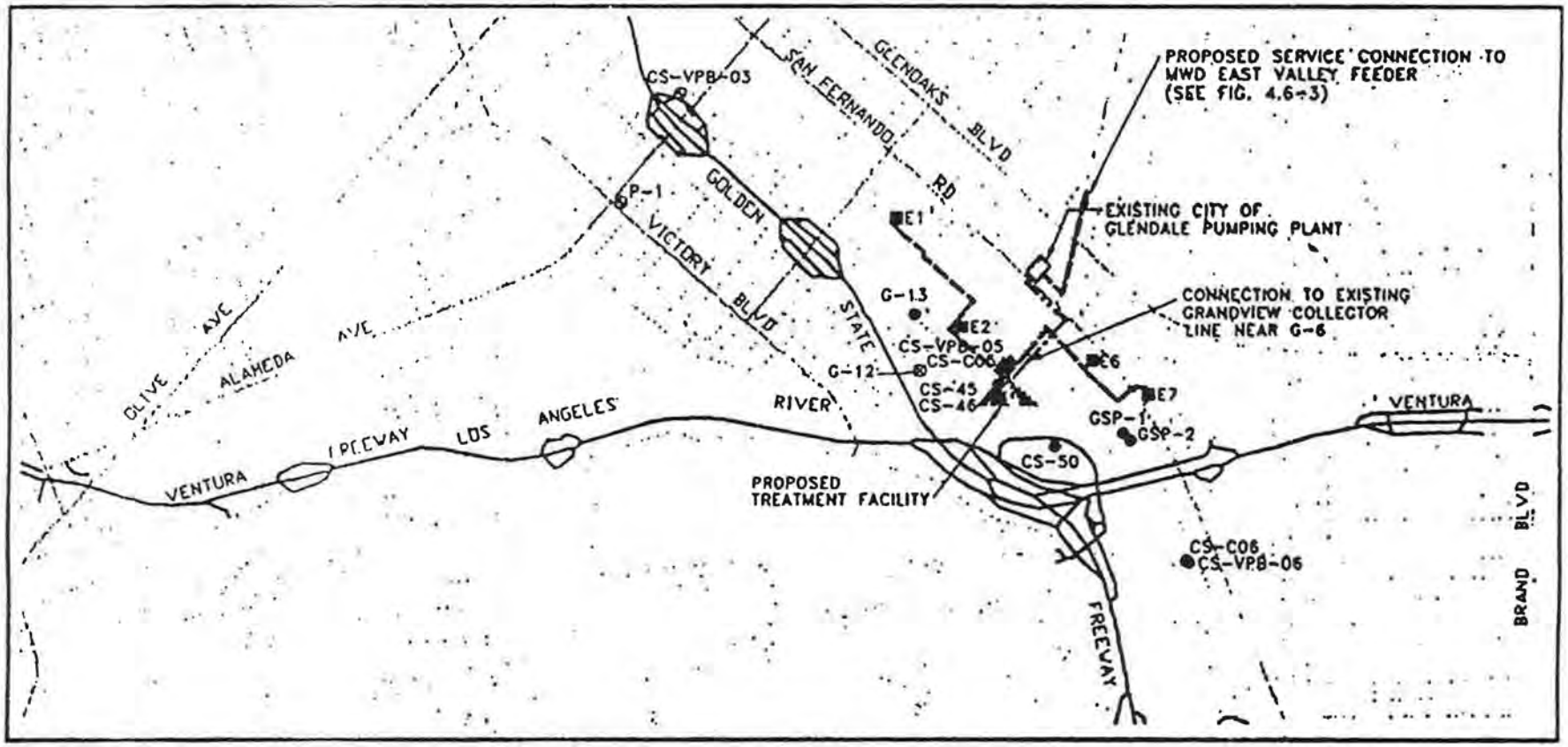

LEGEND
MWD SERVICE CONNECTION
WELLS
EXISTING RECLAIMED WATER PIPELINE
PROPOSED RECLAIMED WATER PIPELINE
FIGURE 3
CITY OF GLENDALE
WATER RESOURCE PLAN
MWD G-4 SAN FERNANDO VALLEY (PROPOSED)
NORTH GLENDALE PROJECT (FUTURE)
POSSIBLE EXTENSION (FUTURE)
FREEWAY PARK LINE (UNDER DESIGN)
VERDUGO PIPELINE
BRAND PARK PIPELINE
VERDUGO PARK WATER TREATMENT PLANT
CALTRANS PIPELINE
CITY OF PASADENA EXTENSION (PROPOSED)
SUPERFUND TREATMENT PLANT (UNDER DESIGN)
POWER PLANT PIPELINE
SCHOLL PIPELINE
LOS ANGELES-GLENDALE WATER RECLAMATION PLANT
FOREST LAWN PIPELINE
CITY OF LOS ANGELES EXTENSION (PROPOSED)
FOOTHILL FREEWAY
SANTA CARLOTTA AVE
FOOTHILL BLVD
ORANGE AVE
OCEAN VIEW BLVD
HONOLULU AVE
MONTROSE AVE
LA CRESCENTA AVE
VERDUGO RD
MOUNTAIN ST
MWD G-3
ALLEN AVE
WESTERN AVE
ONORA AVE
GLENOAKS BLVD
ENNETH ROAD
HIGHLAND AVE
MWD G-1
CANADA BLVD
FREEWAY
CHEVY CHASE DR
LINDA VISTA DR
GOLDEN STATE FWY
VICTORY BLVD
RIVERSIDE DR
SAN FERNANDO ROAD
VENTURA BLVD
FWY
LEXINGTON DR
CALIFORNIA AVE
BROADWAY
COLORADO ST
COLORADO BLVD
PACIFIC AVE
GLENDALE BLVD
CHEVY CHASE
LOS FELIZ
GLENOAKS BLVD
MWD G-2
N
0
4800 FEET
Map prepared by the City of Glendale - Graphics Section



LEGEND

- MONITORING WELL
- ABANDONED WELL
- REHABILITATED WELL
- EXTRACTION SITE
- 12" PIPELINE
- 16" PIPELINE
- 30" PIPELINE (existing)

ALTERNATIVE 2

- 3,000 gpm Extraction (Scenario 4)
- Dual-Stage AS with Vapor-Phase GAC
- Blending
- Use as Potable Supply

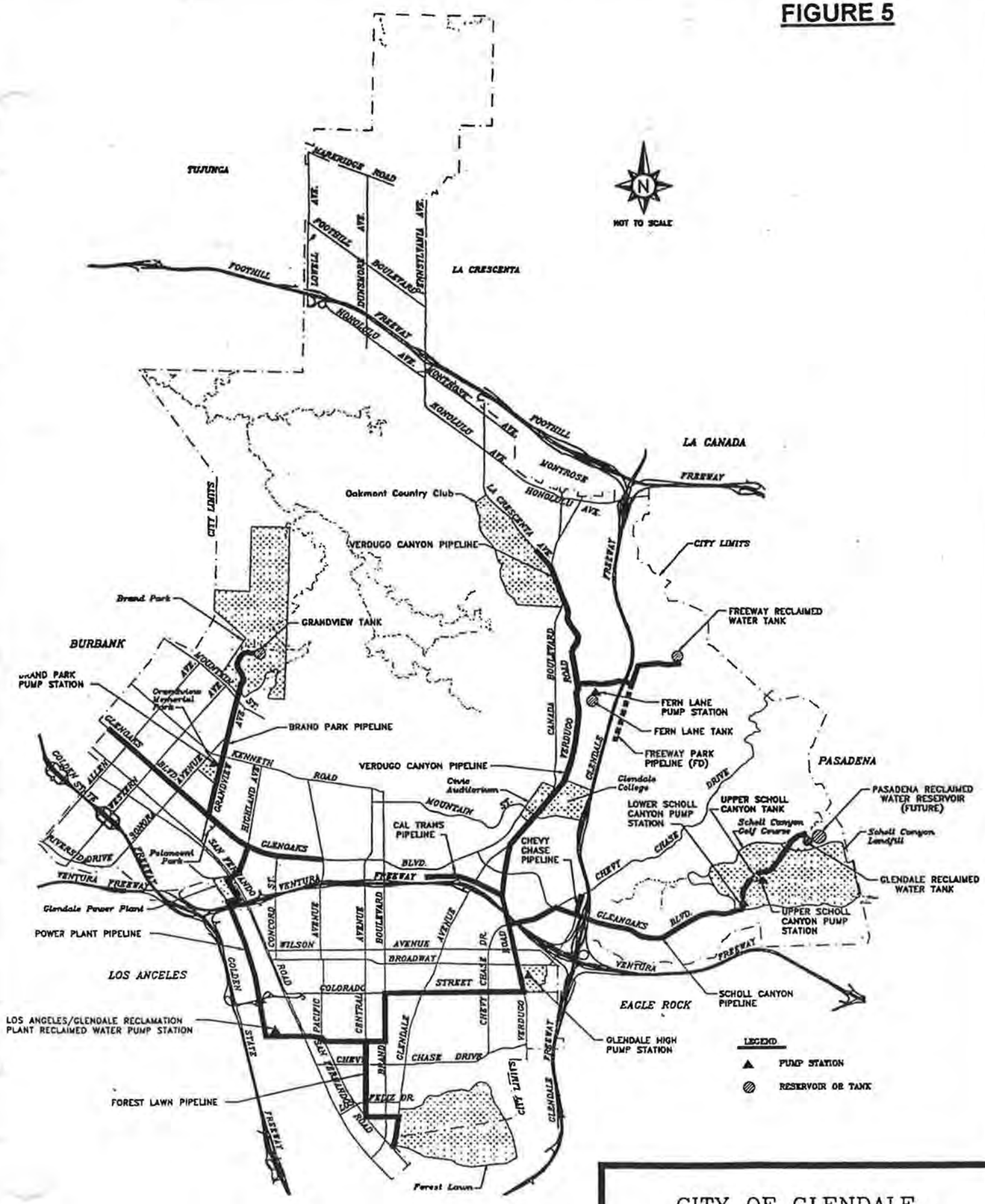
0 2000 4000
FEET

FIGURE 4

NORTH PLUME OPERABLE UNIT
FEASIBILITY STUDY

LOCATION OF EXTRACTION, TREATMENT, DISPOSAL AND MONITORING FACILITIES-ALTERNATIVE 2

FIGURE 5



CITY OF GLENDALE
RECYCLED WATER PROGRAM
MAJOR FACILITIES

CITY OF GLENDALE
RECYCLED WATER USER STATUS - SN 1990008

FIGURE 6

LOC. NO.	RECYCLED WATER USER PROJECT	Actual/Anticipated Delivery Date	User	Quantity A.F./year
	FOREST LAWN PROJECT			
1	Forest Lawn Memorial Park	1992	YES	300-600
2	1600 South Brand Median	1995	YES	2
	POWER PLANT PROJECT			
7	Caltrans - 943 West Dofan Street	1978	YES	40-60
8	Glendale Grayson Power Plant	1978	YES	300-400
	VERDUGO SCHOLL PROJECT			
	PARKS and RECREATION - City of Glendale			
4	Adult Recreation Center	1995	YES	10
3	Armory	1996	YES	
5	Central Library	1995	YES	4
24	Civic Auditorium	1996	YES	15
31	North Verdugo Road Median/La Cresenta Ave.	1996	YES	10
17	Glenoaks Park	1995	YES	4
28	Glorietta Pump Station	1997	NO	
	Mayor's Park (Proposed)	Unknown	NO	6
29	Montecito Park	1995	YES	1
14	Monterey Road Median - WJH	1996	NO	1
13	701 North Glendale Avenue - Median @ Monterey Road	1995	YES	12
	Park Site C (Proposed)	Unknown	NO	54
	Park Site A (Proposed)	Unknown	NO	69
2	741 S Brand Median	1995	YES	3
23	Parque Vaquero	1997	NO	
20	Scholl Canyon Ballfield	1997	NO	17
18	Scholl Canyon Park	1996	YES	12
27	Sports Complex (Proposed)	1997	NO	99
25	Verdugo Rd/Canada (South) Overpass	1995	YES	0.5
30	Verdugo Rd/Canada (North Median)	1996	YES	1.5
	CALTRANS (5 Meters):			
7A	1970 E Glenoaks Boulevard (E/S)	1995	YES	
7A-1	1970 E Glenoaks Boulevard (W/S I2)	1995	YES	
7B	406 N Verdugo Road @ Chevy Chase	1995	YES	100
7C	709 Howard Street @ Monterey Road	1995	YES	
7D	2000 E Chevy Chase Drive @ Harvey	1995	YES	
	GLENDALE UNIFIED SCHOOL DISTRICT:			
6	Glendale High School	1995	YES	15
15	Wilson Junior High School	1995	YES	7
	OTHERS:			
16	Glendale Adventist Memorial Hospital	1997	NO	8
26	Glendale Community College	1996	YES(Partially)	25
32	Oakmont Country Club	1996	YES	200
21	Scholl Canyon Golf Course	1996	YES	100
22	Scholl Canyon Landfill (LACSD)	1997	YES	100
19	Scholl Canyon Landfill (PW)	1996	NO	
18	Upper Scholl Pump Station	1996	YES	
33	*PUBLIC WORKS - City of Glendale*	1978	YES	
	BRAND PARK PROJECT			
12	Brand Park	1997	NO	60
9	Glenoaks Median (6 Meters)	1996	YES	4
11	Grandview Memorial Park	1997	NO	50
10	Pelanconi Park	1996	YES	8
	TOTAL CURRENT USER SITES	32		1,650-2,070

GROUNDWATER PUMPING

PLAN

WATER YEARS
OCTOBER 1, 1996 TO SEPTEMBER 30, 2001

Prepared by
CRESCENTA VALLEY
WATER DISTRICT

MARCH 1997

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TABLES

I. INTRODUCTION

The ground water rights of the Crescenta Valley Water District (CVCWD) 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, 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 2.4, Draft 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 a voluntary water conservation and an emergency water shortage ordinance on file and the District's Board of Directors can enact its provisions at any time deemed necessary. Moderate "hard conservation" in the form of retrofit "low-flow" showerhead giveaways and an ultra-low flush toilet program has been or is currently being provided.

The 1995-96 base year saw a very large increase in water consumption locally. A warm spring and summer coupled with below average rainfall may have contributed to the District's record production but as of the time of this report, the water demands appear to be trending back down somewhat for 1996-1997.

Projected water demands for the next five years is expected to increase only slightly (0.5%) from the 1995-96 base year. The increase is expected mainly from residential growth. However, it is seen from Table 2.1 that water use increased dramatically in 1993-94 and has continued at a much higher rate, probably due to consumer's habits returning to less-water conserving, pre-drought days.

The projected water demand may vary significantly due to weather conditions, economic conditions and/or social conditions in the CVWD service area. A variance of ±10% can be expected.

III. WATER SUPPLY

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

A. PRODUCTION WELLS

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

B. GLENWOOD NITRATE REMOVAL PLANT

The Glenwood ion exchange nitrate removal plant began operation in January 1990. The plant remained in operation until August 1992 when repairs were necessary. In May 1993 the plant was put back in operation. 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. The tunnel water has not been used since July 1996 due to frequent coliform-positive sampling. The District is currently working with the Califiornia Department of Health Services on a water quality remediation plan for the tunnel. It is estimated that the Pickens Gravity Tunnel water supply will be back in service by January 1998. Historic and projected production from Pickens Tunnel is shown in Table 3.3.

D. MWD

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

IV. JUDGEMENT CONSIDERATIONS

The allowable pumping for CVWD's share of the Verdugo Basin is 3,294 acre-feet annually. Estimated future pumping is expected to realize this adjudicated quantity assuming continued full operation of the Nitrate Removal Plant and relatively stable levels of Verdugo Basin Groundwater. In the past two water years (94/95 and 95/96), 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 1996-97. Future consideration for excess pumping will take into account the City of Glendale's ability to pump their prescriptive right along with overall hydrogeologic conditions within the Verdugo Basin. There is no projection of excess pumping beyond 1996-97.

TABLE 2.1
HISTORIC AND PROJECTED WATER DEMAND

(Acre-Feet)

91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000 2001
4232	4249	4806	4686	5346	5050	5075	5100	5125	5150
ACTUAL					PROJECTED				

TABLE 3.1
HISTORIC AND PROJECTED COMBINED WELL
AND TUNNEL GROUNDWATER PRODUCTION

(Acre-Feet)

91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000 2001
2630	2555	3631	3707	3702	3694	3294	3294	3294	3294
ACTUAL					PROJECTED				

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

(Acre-Feet)

90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000 2001
960	847	337	1550	1626	1419	1500	1500	1500	1500	1500
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)

91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000 2001
49	60	67	65	42	0	60	60	60	60
ACTUAL					PROJECTED				

TABLE 3.4
HISTORIC AND PROJECTED USE OF MWD TREATED WATER

(Acre-Feet)

90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000 2001
1353	1602	1694	1175	979	1644	1356	1781	1806	1831	1856
ACTUAL						PROJECTED				

NOTES:

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

CITY OF SAN FERNANDO GROUNDWATER PUMPING AND SPREADING PLAN

OCTOBER 1, 1996 TO SEPTEMBER 30, 2001

1996-97 Water Year

Prepared by:

PUBLIC WORKS DEPARTMENT

ENGINEERING DIVISION

117 Macneil Street

San Fernando, California 91340

APRIL 1997

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TABLE OF CONTENTS

I. INTRODUCTION

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

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

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

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

II. WATER DEMAND

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

Water demand during the last five years has been affected by drought conditions in California. The City of San Fernando imposed voluntary conservation since 1977.

Projected water demands for the next five years is expected to increase only slightly from the 1992-93 base year. The increase is not from residential growth, but is a rebound from the drought conditions and re-establishment of commercial-industrial demand.

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

III. WATER SUPPLY

The water supply for the City of San Fernando is composed of purchased water from the Metropolitan Water District of Southern California (MWD), and locally produced and treated groundwater. 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 is expected to remain the same over the next five years. Historic and projected use of MWD water is 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: 2000 GPM

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

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

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

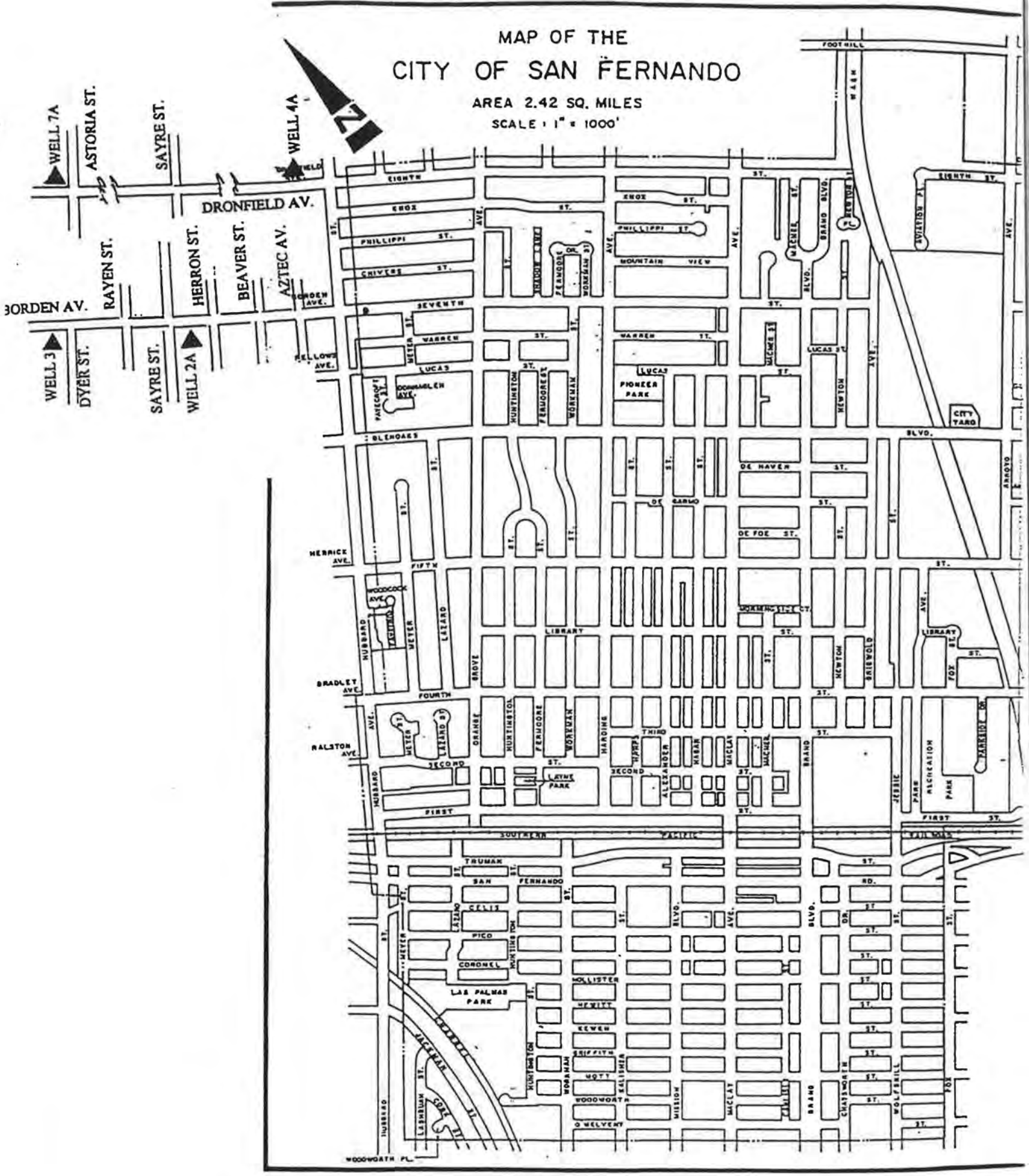
C. Quantity (Acre-Feet) of Water Pumped From Each Well (1995-96)

1.	Well 2A -	1619.25
2.	Well 3 -	942.96
3.	Well 4A -	242.97
4.	Well 7A -	179.74
	Total	2985.12

D. Wells Groundwater Level Data

1.	Well 2A -	1066.50'	Taken 10/96
2.	Well 3 -	1066.10'	Taken 10/96
3.	Well 4A -	1066.11'	Taken 10/96
4.	Well 7A -	1064.29'	Taken 10/96

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, 1996 the City of San Fernando has a stored water credit of 119.9 acre-feet accumulated during the 95-96 water year.

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

(Acre-Feet)

DEMAND	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-2000	2000-01
WELLS	2826.00	2145.00	3398.00	3411.47	2985.12	2700	2700	2700	2700	2700
MWD	568.00	1285.00	93.00	9.53	614.50	900	900	900	900	900
TOTAL	3394.00	3430.00	3491.00	3421.00	3599.62	3600	3600	3600	3600	3600
	ACTUAL					PROJECTED				

APPENDIX A

WATER QUALITY DATA

1996

CITY OF SAN FERNANDO

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

REPORT TO BE SUBMITTED
AS SOON AS AVAILABLE

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APPENDIX B

POLICIES AND PROCEDURES

(By ULARA)