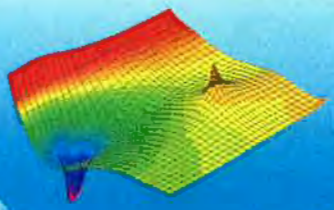
Upper Los Angeles River Area Watermaster

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

Case No. 650079 - County of Los Angeles

GROUND WATER PUMPING AND SPREADING PLAN

2003-2008 Water Years



July 2004

Upper Los Angeles River Area Watermaster

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UPPER LOS ANGELES RIVER AREA WATERMASTER

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

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

2003-2008 WATER YEARS

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JULY 2004

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I. EXECUTIVE SUMMARY

As Watermaster for the Upper Los Angeles River Area (ULARA), I am pleased to submit the 2004 ULARA Pumping and Spreading Plan. This report is prepared in compliance with Section 5.4 of the ULARA Watermaster's Policies and Procedures that established the Watermaster's responsibility for water quality management in the ULARA groundwater basins. The Pumping and Spreading Plan includes the individual plans submitted by the five major pumping parties, which incorporates changes in recharge, spreading, and pumping, or pumping patterns, especially in relation to the present and future plans for groundwater cleanup.

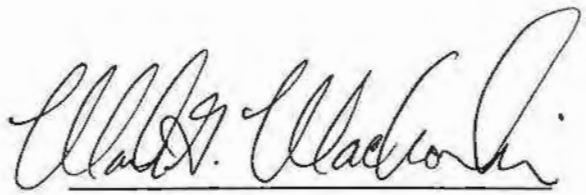
In the Sylmar Basin, the City of San Fernando can pump all its groundwater rights, and the City of Los Angeles plans to pump its full right in this Water Year. Glendale plans to pump its full adjudicated amount in the San Fernando Basin (SFB), but it has limited pumping capacity in the Verdugo Basin. Crescenta Valley Water District (CVWD) may be unable to pump all its assigned water rights from the Verdugo Basin due to a declining water table, and is conducting a study to determine the cause and possible corrective measures. Both Burbank and Los Angeles are planning to pump their adjudicated amount in the SFB.

Currently, there are five groundwater cleanup plants in operation: the City of Los Angeles' North Hollywood Operable Unit (OU) and the Pollock Wells Treatment Plant, the Burbank OU, CVWD's Glenwood Nitrate Removal Plant, and the Glendale OU. The City of Burbank's Granular Activated Carbon (GAC) Treatment Plant has been temporarily removed from service due to elevated levels of hexavalent chromium.

The Watermaster will continue to address the declining water table in the SFB. Projected spreading continues at much lower rates than the 35-year average, contributing to a lower water table. The Watermaster is working with the County and City of Los Angeles to find ways to maximize spreading in the Hansen and Tujunga Spreading Grounds and to explore spreading in new areas. A methane gas mitigation plan for the Tujunga Spreading Grounds has begun, and further testing is currently underway.

The groundwater model this year simulates the effect on groundwater elevations of projected pumping in the SFB for the next five years. The most significant features continue to be the pumping cones of depression formed in Layer I (Upper Zone) as a result of pumping at Los Angeles' Tujunga and Rinaldi-Toluca wells and the Burbank OU (Plate 3).

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



MARK G. MACKOWSKI
ULARA Watermaster

II. INTRODUCTION

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

Section 5.4 of the Policies and Procedures assigns the responsibility for this annual Pumping and Spreading Plan to any municipal party who produces groundwater. Each municipal pumper is required to submit to the ULARA Watermaster annually (on or before May 1 of the current Water Year) a Groundwater Pumping and Spreading Plan. This plan should include five-year projected groundwater pumping and spreading amounts, recent water quality data on each well, and facility modification plans.

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 San Fernando Judgment (January 26, 1979) and groundwater management, and make the needed recommendations. The Watermaster's evaluation and recommendations are to be included in a Groundwater Pumping and Spreading Plan for ULARA, and the Administrative Committee is to review and approve the plan by July of the current Water Year.

This is the July 2004 Groundwater Pumping and Spreading Plan for ULARA, prepared according to the Policies and Procedures. This report provides guidance to the Administrative Committee for use in protecting the water quality within ULARA, improving basin management, and providing protection of each party's water right.

III. PLANS FOR THE 2003-2008 WATER YEARS

A. Projected Groundwater Pumping for 2003-04 Water Year

The total 2003-04 ULARA pumping is projected at 113,181 acre-feet (AF) (Table 3-1B), 1,331 AF above the 24-year average (1979-2003). The estimated pumping for 2004-05 is 117,225 AF, a 5,375 AF increase from the historical average (Appendices A-E).

In 2003-04, the City of Burbank plans to pump 10,300 AF (Table 3-1A) from all its groundwater sources, 623 AF less than its five-year average, and a 1,552 AF increase from its historical 24-year average. This increase is due to pumping at the Burbank OU. As of October 1, 2003, Burbank had a storage credit of 27,429 AF. Burbank's annual return water credit of 20 percent is approximately 5,000 AF, and its right to purchase Physical Solution water from Los Angeles is 4,200 acre-feet per year (AF/yr). The plant capacity is 9,000 gpm (14,000 AF/yr). Pumping in excess of Burbank's annual return water credit can come from its banked storage or Physical Solution purchases from Los Angeles. Burbank may also purchase and import water from the Metropolitan Water District (MWD) and store it in the SFB for later extraction, or purchase stored water credit from other water rights holders in the SFB.

CVWD plans to pump 2,550 AF, which is a decrease of 268 AF compared to its average pumping since 1979, and a reduction of 854 AF from its five-year average. In past years when there was more groundwater available in the Verdugo Basin CVWD pumped a portion of Glendale's allocation of the Verdugo Basin safe yield, which Glendale was unable to pump. This additional pumping was approved by the Watermaster and the Administrative Committee. The current pumping plan does not include additional pumping beyond the CVWD's adjudicated right of 3,294 AF/yr.

The City of Glendale resumed significant pumping from the SFB when the Glendale North and South OUs began operating in September 2000. In the SFB, Glendale accumulates 20 percent return credit for water delivered to its entire service area within the SFB. In addition, Glendale has the right to purchase from Los Angeles up to 5,500 AF/yr. of Physical Solution water. Glendale had storage credit of 68,408 AF in the SFB as of October 1, 2003. Glendale plans to pump 7,625 AF in the 2003-04 Water Year, 2,578 AF more than the past five-year average. Glendale plans to extract 2,500 AF from the Verdugo Basin in 2003-04, an increase of 105 AF over its 24-year historical average, and 235 AF more than the average of the past five years.

The City of Los Angeles plans to pump 83,483 AF this year from the SFB, 3,515 AF below its 1979-2003 annual average and 2,293 AF less than the past five-year average. A total of 3,323 AF of groundwater will be pumped from the Sylmar Basin, 340 AF more than the 1979-2003 average and 410 AF more than the average of the last five years (1998-2003). As of October 1, 2003, Los Angeles had a storage credit of 270,113 AF in the SFB and 6,081 AF in the Sylmar Basin.

In 2003-04 the City of San Fernando plans to pump 3,400 AF from the Sylmar Basin, 231 AF less than its average pumping for the past five years and 358 AF more than the past 24 year average. San Fernando has storage credit of 426 AF as of October 1, 2003.

Estimated capacities of ULARA well fields are provided in Table 3-1. Actual and projected amounts of pumping and spreading by the major parties during 2003-04 are shown in Tables 3-1A, 3-1B, and 5-1A.

B. Constraints on Pumping as of 2003-04

SAN FERNANDO BASIN

City of Burbank - In January 1996, a portion of Burbank's pumping capability was restored when the Lockheed-Burbank Operable Unit (Burbank OU) was activated under Phase I of the Consent Decree with the United States Environmental Protection Agency (USEPA). The City assumed the 18-year operation of the facility on March 12, 2001 under provisions of the Second Consent Decree. Although the USEPA turned over operating control of the facility to the City of Burbank, negotiations continued with Lockheed Martin (Lockheed) over several issues including the pumping capacity of the eight supply wells.

In June 2000, the Burbank OU went off-line due to breakthrough of 1,2,3-Trichloropropane (1,2,3-TCP) in the liquid phase carbon contactors. An investigation revealed inefficient design of the contactor piping and other design flaws. Repair of the distribution headers and underdrains in the liquid-phase carbon contactors has been completed and replacement of corroded screens in the vapor-phase contactors is expected to begin by September 2004.

In January 2002, USEPA approved a mode of operation using the existing wells and blending the output with MWD water to keep total chromium levels at 5 parts per billion (ppb) or less, the goal established by the Burbank City Council for the City's delivered water. Part of the pumping plan includes the voluntary shut down of the Lake Street/GAC wells, which could not be blended down to 5 ppb. The Lake Street/GAC wells continue to be temporarily off-line.

The Burbank OU will pump approximately 10,000 AF of groundwater during the 2003-04 Water Year, a reduction from its design capacity of 14,000 AF/yr. The cause of the reduced pumping is the subject of a proposed study by Burbank. The study would examine well design and construction, piping, controls, and other appurtenant structures. In addition, with the consent of USEPA, it may also evaluate whether deflating the well packers will increase production while still containing the Volatile Organic Compound (VOC) plume.

City of Glendale – The Glendale OU began operating in September 2000. Subsequently, hexavalent chromium contamination has been detected in the groundwater. However, the Glendale OU was not designed to treat for chromium, so Glendale blends the treated water with imported supplies from MWD to keep hexavalent chromium levels below 6 ppb, a goal set by the Glendale City Council.

Glendale has received more than $1 million from federal appropriations and the American Water Works Association Research Foundation (AWWARF) to investigate technology capable of large-scale treatment of hexavalent chromium. The project entered Phase II in April 2003 to provide vendors the opportunity to demonstrate the capabilities of their systems to treat hexavalent chromium from the technologies selected in Phase I. During Phase III the pilot study will take place. This study will also benefit other pumpers in the SFB including the cities of Burbank and Los Angeles, as well as water purveyors from other parts of the country.

City of Los Angeles - All of the well fields within the SFB have been impacted because of groundwater contamination, primarily from VOCs such as TCE and PCE. The Pollock Well Field was partially restored when the Pollock Wells Treatment Plant was placed into service March 17, 1999. The Tujunga and Rinald-Toluca Well Fields have also experienced levels of TCE, PCE, and nitrates above the Maximum Contaminant Level (MCL) at the wellheads and are being evaluated. Low levels of perchlorates have been detected in both the Rinaldi-Toluca and Tujunga Well Fields.

LADWP is considering adding up to eight new 8-cubic feet per second (cfs) wells in the North Hollywood Well Field-West Branch to restore capacity resulting from contamination and obsolescence of some existing wells.

In 2003 the City of Los Angeles began a five-year project to convert the disinfection of all water in the system from chlorine to chloramines. The conversion is necessary to meet the more stringent MCLs for total trihalomethanes (THMs) and Haloacetic Acids (HAA) that have been recently established under the Disinfection Byproduct (DPB) Rule.

SYLMAR BASIN

City of San Fernando - All of San Fernando's groundwater is pumped from the Sylmar Basin, where there are no limitations related to contamination. However, nitrate levels have been rising for several years in San Fernando's wells. Old septic systems, and possibly past agricultural practices, are the likely cause(s) of the high nitrate levels.

City of Los Angeles - The number of active wells at the Mission Well Field has been reduced from six to two because of the age and condition of the wells. The Mission Wells will be pumping the City's full entitlement during 2003-04.

VERDUGO BASIN

Crescenta Valley Water District - All of CVWD's groundwater rights are in the Verdugo Basin. Contamination from VOCs is minimal, however, nitrate contamination is widespread. High nitrate levels are reduced in the supply by treating a portion of the groundwater by ion exchange at the Glenwood Nitrate Removal Plant, and blending untreated groundwater with treated groundwater and/or MWD supplies to meet drinking water standards.

In past years CVWD has been given permission on an annual basis by the Watermaster and Administrative Committee to pump in excess of its right until the City of Glendale is able to pump its entire right. Due to the low water table CVWD has not been able to pump its full entitlement, and has implemented a water conservation program. CVWD's Board of Directors may implement more restrictive measures if it is not successful in reducing demand, or if the water supply becomes less reliable. In the past, groundwater composed up to 75 percent of CVWD's water supply in contrast to 50 percent today.

CVWD has received two grants to study declining groundwater levels in the Verdugo Basin.

CVWD has completed construction of a 12-inch 5-cfs line to expand its imported water supply capabilities with the City of Glendale. The project includes the line and an interconnection with the City of Glendale. CVWD also worked on a pump station upgrade by the Foothill Municipal Water District (FMWD) to increase flow from 7.1 cfs to 8.85 cfs.

CVWD has begun a ten-year program to construct new wells to replace old wells. Two new wells have been constructed in the past two years, though the well capacity is less than anticipated. CVWD is awaiting the results of the basin evaluation before installing additional wells.

City of Glendale - The City of Glendale currently does not have the capability of pumping its entire adjudicated right from the Verdugo Basin. Glendale is in the process of studying and evaluating various alternatives to increase its pumping capacity. Limitations in pumping are caused by the lack of wells, rather than contamination problems, as well as the limited availability of groundwater in the basin which is highly variable and based significantly on rainfall.

Verdugo Study Area Superfund Site - In October 2003 the USEPA issued a letter stating that the Verdugo Study Area Superfund Site within the Verdugo Basin does not warrant further assessment for VOC contamination, and that "No action is necessary at the Site to ensure adequate protection of human health and the environment."

TABLE 3-1: ESTIMATED CAPACITIES OF ULARA WELL FIELDS

Party/Well Field	Number Standby Wells	Number Active Wells	Estimated Capacity (All Wells) (cfs)
	SAN FERNANDO BASIN		
City of Los Angeles			
Aeration	---	7	4
Erwin	0	2	5
North Hollywood	1	16	80
Pollock	1	2	6
Rinaldi-Toluca	---	15	110
Tujunga	---	12	105
Verdugo	2	2	8
Whitnall	0	4	20
City of Burbank	3	10	24
City of Glendale		8	11
TOTAL:	7	78	373
	SYLMAR BASIN		
City of Los Angeles	---	2	6
City of San Fernando	---	4	9
TOTAL:		6	18
	VERDUGO BASIN		
CVWD		12	5.75
City of Glendale		5	15
TOTAL:		17	20.75

TABLE 3-1A: 2003-04 ACTUAL AND PROJECTED GROUNDWATER EXTRACTIONS

(acre-feet)

Party/Well Field	Total	2003			2004								
		Oct.	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
						SAN FERNANDO BASIN							
City of Los Angeles													
AERATION	2348	144	208	215	212	201	99	208	215	208	215	215	208
ERWIN	2637	270	286	295	295	276	53	0	0	286	295	295	286
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	23372	2739	2253	2300	2768	2039	381	0	0	2678	2768	2768	2678
POLLOCK	1975	193	163	52	117	173	185	179	185	179	185	185	179
RINALDI-TOLUCA	25443	2993	2243	2202	2863	2372	910	0	0	2916	3014	3014	2916
TUJUNGA	19536	2156	1978	1929	1214	2152	1635	0	0	2083	2153	2153	2083
VERDUGO	4770	529	512	529	529	495	94	0	0	512	529	529	512
WHITNALL	3402	452	290	277	277	259	151	0	0	417	431	431	417
TOTAL:	83483	9476	7933	7799	8275	7967	3508	387	400	9279	9590	9590	9279
City of Burbank	300	27	23	10	0	25	14	34	34	34	34	34	34
Burbank OU	10000	602	756	731	769	787	728	938	938	938	938	938	938
City of Glendale	7625	803	681	695	747	650	699	558	558	558	558	558	558
TOTAL:	101408	1433	1459	1435	1516	1461	1441	1530	1530	1530	1530	1530	1530
						SYLMAR BASIN							
City of Los Angeles	3829	394	369	381	155	0	352	357	369	357	369	369	357
City of San Fernando	3400	357	19	26	272	248	354	354	354	354	354	354	354
TOTAL:	7229	751	388	407	427	248	706	711	723	711	723	723	711
						VERDUGO BASIN							
Crescenta Valley Water Dist.	2550	219	212	214	173	153	158	155	267	250	250	250	250
City of Glendale	2500	204	199	178	180	157	177	234	234	234	234	234	234
TOTAL:	5050	423	411	392	353	309	335	389	501	484	484	484	484
ULARA TOTAL:	113688	12082	10191	10032	10571	9986	5990	3017	3154	12004	12327	12327	12004

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

Party/Wellfield	Historic Average Pumping		Projected Groundwater Pumping				
SAN FERNANDO BASIN							
City of Los Angeles	1979-2003 (A)	1998-2003 (B)	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
AERATION (14 yrs)	769	1331	2348	2390	2390	2390	2390
ERWIN	4354	1096	2637	994	994	994	994
HEADWORKS (1979-87)	4905	0	0	0	0	0	0
No HOLLYWOOD	29900	18564	23372	25276	25276	25276	25276
POLLOCK(16 yrs.)	996	2008	1975	2400	2400	2400	2400
RINALDI-TOLUCA (16yrs.)	21237	27382	25443	25900	25900	25900	25900
TUJUNGA (11 yrs)	13501	29468	19536	22179	27179	22179	22179
VERDUGO	4999	3654	4770	5261	5261	5261	5261
WHITNALL	6337	2273	3402	2600	2600	2600	2600
TOTAL City of Los Angeles	**86998**	**85776**	**83483**	**87000**	**92000**	**87000**	**87000**
City of Burbank (C)	1956	1027	300	300	300	300	300
BURBANK OU (9yrs)	6792	9896	10000	10900	10900	10900	10900
City of Glendale (C)	4866	5047	7625	7625	7625	7625	7625
TOTAL San Fernando Basin	**100612**	**101746**	**101408**	**105825**	**110825**	**105825**	**105825**
SYLMAR BASIN							
City of Los Angeles	2983	2913	3323	3300	3300	3300	3300
City of San Fernando	3042	3631	3400	3500	3500	3500	3500
TOTAL Sylmar Basin	**6025**	**6544**	**6723**	**6800**	**6800**	**6800**	**6800**
VERDUGO BASIN							
Crescenta Valley Water Dist.	2818	3404	2550	2300	2100	2250	2400
City of Glendale	2395	2265	2500	2300	2300	2300	2300
TOTAL Verdugo Basin	**5213**	**5669**	**5050**	**4600**	**4400**	**4550**	**4700**
TOTAL ULARA	111850	113959	113181	117225	122025	117175	117325

A. 24 year average regardless of the life of well field. Paranthesis indicates life of well field if less than 24 years..

B. 5 year average.

C. Includes Forest Lawn, City wells, and GOU pumping for Glendale; Valhalla and GAC pumping for Burbank.

IV. GROUNDWATER PUMPING AND TREATMENT FACILITIES

A. Well Fields

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

B. Active Groundwater Pumping and Treatment Facilities

Glendale OU

The Glendale OU has been producing and treating groundwater for VOCs since September 2000. On April 23, 2001, the City of Glendale assumed operation of the Glendale Water Treatment Plant. Prior to that time the Glendale Respondents Group had operated the plant through a contract with Camp Dresser & McKee.

The Glendale OU is comprised of a treatment plant, eight groundwater extraction wells, a pumping plant, disinfection facility, and associated piping (Appendix C, Figure 4). The treatment facility is designed to treat groundwater contaminated by trichloroethylene (TCE) and perchloroethylene (PCE) at a rate of 5,000 gpm using aeration and granulated activated carbon (GAC). The treated water is blended with imported supplies to control nitrate levels. Currently, the wells are being pumped to limit hexavalent chromium to six ppb or less in the treated, blended effluent.

Burbank OU

The remediation of groundwater contamination in the SFB has been significantly enhanced by the startup of the Burbank OU on January 3, 1996. The Burbank OU, consisting of air-stripping towers followed by liquid and gaseous phase GAC, has the capacity to produce 9,000 gpm (14,000 AF annually). Under the terms of the Second Consent Decree, Burbank assumed operation of the Burbank OU on March 12, 2001 as the long-term primary operator for the next 18 years. Although the USEPA has turned over operation of the facility to the City of Burbank, there have been continuing negotiations with Lockheed over several issues including the pumping capacity of the eight wells. These issues are being resolved and the design and maintenance problems are being corrected.

GAC Treatment Plant - City of Burbank

This facility has been operated by the City of Burbank since November 1992. Two wells can deliver water at 2,000 gpm to the GAC plant for removal of VOCs, but not chromium which has been found in the groundwater. When the plant is in use the treated water supplements production from the Burbank OU and can be delivered to the Burbank distribution system. However, current plans are to keep the plant shut down, except for emergencies until new chromium regulations are issued in 2004-05.

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

This facility is designed to treat up to 2,000 gpm of VOC-contaminated groundwater by air-stripping and deliver the treated water to Los Angeles' water distribution system. In October 2003 the facility was shut down to change out the GAC and to replace a battery for a humidity sensor. The facility operates below design capacity due to a declining water table. The USEPA is reviewing the LADWP proposal for the NHOU to increase production by drilling additional wells. The decision is complicated by the presence of hexavalent chromium upgradient of the proposed wells.

The USEPA five-year review of the NHOU published September 2003 found that the interim remedy of the NHOU "currently protects human health and the environment because the concentration of TCE and PCE in treated groundwater is less than the Record of Decision (ROD) selected cleanup goals and no other Contaminants of Concern (COC) currently exceed health-based standards."

Pollock Wells Treatment Plant - City of Los Angeles

Pollock Wells Treatment Plant, treating 3,000 gpm of groundwater, began operating in March 1999. This project is funded, owned, and operated by the City of Los Angeles. The Pollock Wells Treatment Plant reduces rising groundwater flowing out of ULARA and enhances the overall groundwater cleanup program in the Los Angeles River Narrows area of the SFB. The groundwater is processed through liquid-phase GAC vessels for VOC removal, followed by chlorination and blending of the treated groundwater to reduce nitrate levels. The treated water is then delivered to LADWP's distribution system.

Glenwood Nitrate Removal Plant - CVWD

Groundwater pumped from CVWD's wells is high in nitrates. A portion of the pumped groundwater is treated by ion-exchange and blended with untreated water and/or imported MWD water to reduce nitrate levels below the MCL. In the past year the plant was operated below

design capacity because overall groundwater production was down due to basin level decline, resulting in more imported water, thereby reducing the need for treatment.

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

Water Year	Burbank GAC	Lockheed Aqua Detox	Burbank OU	Glendale North/South OU	CVWD Glenwood Nitrate Removal Plant	North Hollywood OU	Pollock Wells Treatment Plant	Annual Total AF
1985-86		1						1
1986-87		1						1
1987-88		1						1
1988-89		924						924
1989-90		1,108				1,148		2,256
1990-91		747				1,438		2,185
1991-92		917			847	786		2,550
1992-93	1,205	692			337	1,279		3,513
1993-94	2,395	425	378		1,550	726		5,474
1994-95	2,590		462		1,626	1,626		6,304
1995-96	2,295		5,737		1,419	1,182		10,633
1996-97	1,620		9,280		1,562	1,448		13,910
1997-98	1,384		2,580		1,391	2,166		7,521
1998-99	1,555		9,184		1,281	1,515	1,513	15,048
1999-00	1,096		11,451	979	1,137	1,213	1,851	17,727
2000-01	995		9,133	6,345	989	1,092	1,256	19,810
2001-02	0		10,540	6567	515	998	1,643	20,263
2002-03	0		9,170	7,508	216	1,838	1,720	20,452
Total AF	**15,135**	**4,815**	**67,915**	**21,399**	**12,870**	**18,455**	**7,983**	**148,572**

TABLE 4.2 PROJECTED GROUNDWATER TREATMENT

	Burbank GAC	Burbank OU	Glendale North/South OUs	CVWD Glenwood Nitrate Removal Plant	North Hollywood OU	Los Angeles' Pollock Wells Treatment Plant	Annual Total AF
2003-04	0	10,000	7,200	216	2,348	1,975	21,739
2004-05	0	10,900	7,200	225	2,390	2,400	23,115
2005-06	0	10,900	7,200	225	2,390	2,400	23,115
2006-07	0	10,900	7,200	225	2,390	2,400	23,115
2007-08	0	10,900	7,200	225	2,390	2,400	23,115
Total AF	**0**	**53,600**	**36,000**	**1,116**	**11,908**	**11,575**	**114,199**

C. Projected Groundwater Pumping Facilities

North Hollywood Well Field Restoration Project

LADWP is evaluating the possibility of adding new North Hollywood Wells in the west branch to restore capacity lost due to contamination and age.

D. Other Groundwater Remediation Projects

Many privately owned properties in the eastern SFB have been found to have groundwater contamination, and some are under Cleanup and Abatement Orders from the Regional Water Quality Control Board (RWQCB). Each site typically has monitoring wells and some have extraction wells and treatment facilities. The RWQCB is also in the process of evaluating and closing a significant number of cases in the underground tank program.

The USEPA began including hexavalent chromium in the quarterly sampling from its monitoring wells to characterize the plume as a step in containment and cleanup of this contaminant. A Total Dissolved Chromium plume map is shown on Plate 10.

E. Dewatering Operations

Northeast Interceptor Sewer (NEIS) Project

The NEIS Project, a portion of which is located northerly of the intersection of the Los Angeles River and the Arroyo Seco, requires dewatering during construction. This project began in 2003 and is under the direction of the Los Angeles Department of Public Works Bureau of Engineering.

Eagle Rock Interceptor Sewer (ERIS) Project

The ERIS Project, located in the Eagle Rock Basin along York Boulevard and Eagle Rock Boulevard, will require dewatering during construction. This project is under the direction of the Los Angeles Department of Public Works Bureau of Engineering. Construction started early in 2004, and will last approximately two years.

Temporary Construction Dewatering

Temporary construction excavations, such as building foundations and pipelines, sometimes require dewatering in areas that have a high groundwater table. Water that is discharged is

required to be accounted for by the Watermaster, and may be deducted from the water right holder.

Permanent Dewatering Operations

Some facilities along the southern and western boundaries of the SFB have deep foundations in areas of high groundwater that require permanent dewatering. The amount of groundwater pumped is required to be reported to the Watermaster on a monthly basis. These activities are subject to approval by the affected Administrative Committee party, and the dewaterer is required to pay for the replacement cost of the extracted groundwater. The pumped groundwater is subtracted from the affected party's water right.

F. Unauthorized Pumping in the County

Unauthorized Pumping

There are a significant number of individuals, primarily within the unincorporated hill and mountain area, who are pumping groundwater without reporting the production to the Watermaster. This groundwater has been adjudicated and is the property of the City of Los Angeles. Although the volume produced by each pumper is probably small, the cumulative effect may be significant. Working in cooperation with the County Department of Health Services and County Planning, the Watermaster and the LADWP have developed a process to identify and monitor water usage through a water license agreement. The Watermaster Office has also identified pumping by lessees on U.S. Forest Service (USFS) land within ULARA. The USFS will be conducting an evaluation of water sources for each residence in the area below the Big Tujunga Dam beginning in 2004.

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS

A. Existing Spreading Operations

There are five active spreading facilities located in the San Fernando Basin (SFB) (Plate 1). The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima Spreading Grounds. The LACDPW, in cooperation with the City of Los Angeles, operates the Tujunga Spreading Grounds. The spreading facilities are used for spreading native and imported water. Plans are being developed to deepen and modernize the Hansen Spreading Grounds. An analysis is being made by the LACDPW, LADWP, and the Watermaster to identify ways to maximize spreading. Estimated capacities are shown in Table 5-2.

B. Other Spreading Operations

Headworks Spreading Grounds

The Headworks Spreading Grounds, inactive since 1982, are now being considered for a joint project among LADWP, Bureau of Sanitation, and City Department of Recreation and Parks as a multi-use site. As proposed, this 41-acre site would provide space for 28 acres of wetlands and trails, and a buried reservoir would replace the function of the Silver Lake and Ivanhoe Reservoirs. The three project partners will continue the feasibility studies.

Boulevard Pit Spreading Facility

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

C. Actual and Projected Spreading

Table 5-1A shows the actual and projected spread volumes for the 2003-04 Water Year. The 2003-04 Water Year will experience below-average recharge. Overall, approximately 8,306 AF of native runoff will be spread compared to the 35-year historical average of 27,515 AF of native runoff, and compared to the past five-year average of 13,139 AF. Precipitation on the valley fill

is estimated at 11 inches for 2003-04 compared to the long-term average of 18.12 inches per year and the previous five-year average of 13.91 inches per year.

TABLE 5-1A: 2003-04 SPREADING OPERATIONS

(acre-feet)

TABLE 5-1A SPREADING OPERATIONS

Actual and Projected Spreading in ULARA Spreading Grounds 2003-04 (in acre-feet)							
Operated by:							
	LACDPW				LADWP	LACDPW and LADWP	
Month	Branford	Hansen	Lopez	Pacoima	Headworks	Tujunga*	Total
Oct-03	29	24	0	0		0	53
Nov-03	21	144	0	402		0	567
Dec-03	76	546	4	151		10	787
Jan-04	36	284	0	20		0	340
Feb-04	158	1540	0	802		254	2754
Mar-04	33	3380	140	252		0	3805
Apr-04							
May-04							
Jun-04							
Jul-04							
Aug-04							
Sep-04							
TOTAL	353	5,918	144	1,627	0	264	8,306
1968-2003 Average	521	14,010	540	6,589	2,125	8,341 *	32,126
1998-2003 Average	594	7,779	360	2,346	0	2,060	13,139

*Includes 3,730 AF native and 4,611 AF imported water.

TABLE 5-1B HISTORICAL PRECIPITATION ON THE VALLEY FILL

(inches per year)

1968-03	1998-03	1998-99	1999-00	2000-01	2001-02*	2002-03	2003-04**
18.12	13.91	9.81	14.84	19.52	5.95	19.41	11.0

* Historic Low

** Estimated

TABLE 5-2: ESTIMATED CAPACITIES OF ULARA SPREADING GROUNDS

Spreading Ground	Type	Total Wetted Area (acres)	Capacity (acre-feet/year)
	Operated by the LACDPW		
Branford	Deep basin	7	1,000
Hansen	Shallow basin	105	36,000
Lopez	Shallow basin	12	5,000
Pacoima	Med. depth basin	107	29,000
	Operated by LACDPW and LADWP		
Tujunga	Shallow basin	83	43,000
	TOTAL:	314	114,000

D. Hansen and Tujunga Spreading Grounds Task Force

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

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

measures to improve the utilization of both spreading grounds, particularly during years of above-normal runoff.

- Hansen Spreading Grounds Mitigation Plan

Above-average recharge at the Hansen Spreading Grounds affects the Bradley-East Landfill, located approximately 3,000 feet downgradient. The RWQCB and the Watermaster Office prohibit groundwater inundation of the unlined landfill. The groundwater table is allowed to rise to a designated level, and then spreading is temporarily suspended until the groundwater table recedes to a safe level. This occurs only in years when above-average runoff is available. To assure the safety of the landfill, a groundwater alert level, with a 10-foot buffer zone, was established in the late 1980s. The Hansen Spreading Grounds Mitigation Plan established an improved location to record the groundwater levels – 1,000 feet further downgradient from its previous location and adjacent to the existing Bradley-East Landfill. The Watermaster Office estimated that this change should improve the volume of groundwater recharge by at least 25 percent or approximately 7,000 AF/yr. Unfortunately, recharge at this spreading ground has been limited due to below-average rainfall.

- Tujunga Spreading Grounds Mitigation Plan

The Tujunga Spreading Grounds are located adjacent to the Sheldon-Arleta Landfill. Methane gas is produced by the landfill, which is a source of environmental concern.

During the spreading of surface water, water moves through the underlying soil column and displaces the air from voids within the soil matrix. The resulting lateral migration of air mass has the potential to displace methane gas out of the adjacent landfill. In recent years the methane has occasionally migrated and caused elevated levels at a nearby high school, and in at least one instance, forced an evacuation of the school grounds. In order to avoid these episodes, a methane gas monitoring system was constructed. When methane gas is detected at specific concentrations, the spreading activities are suspended, resulting in local storm water runoff being lost to the ocean.

The Tujunga Spreading Grounds Mitigation Plan consists of continuous operation of the perimeter methane gas flare system, situated around the landfill, prior to and during spreading of surface water. This improves containment of the methane gas within the landfill, and halts its migration out of the landfill. The plan requires close coordination between the Los Angeles

Bureau of Sanitation, the operators of the existing perimeter flare system, and the LACDPW. The goal is to contain methane gas within the landfill and improve the spreading capacity. A test was conducted in May 2003 by the consultant, GeoSyntec. The results were encouraging at a spreading rate of 100 cfs. The lack of available stormwater makes it unlikely that additional testing will be conducted during the 2003-04 Water Year.

E. Big Tujunga Dam/Endangered Species

Big Tujunga Dam was constructed by LACDPW in the 1930s on an easement on USFS property. In the 1970s a seismic analysis of the dam was performed, and it was found to be susceptible to damage in the event of a large earthquake. Since then, the dam has been operated at a reduced storage capacity for safety reasons. LACDPW has proposed a seismic retrofit of the dam to increase the storage capacity.

In February 2004, the United States Fish and Wildlife Service (USFWS) published in the Federal Register a rule designating the area along Big Tujunga Creek from Big Tujunga Dam to Hansen Dam a "critical habitat" for the Santa Ana Sucker (SAS), an endangered species of fish. USFWS is requiring that flow releases from the dam consider the impact on the SAS, and is concerned that large releases could jeopardize the SAS.

This native runoff belongs to the City of Los Angeles under its pueblo right, and is used to recharge the San Fernando Basin at the Hansen and Tujunga Spreading Grounds. Relatively large releases are required for the water to reach the spreading grounds. Unfortunately, the period of maximum flow during the spring occurs during the spawning season of the SAS. In addition, the USFWS is also requiring that small releases occur throughout the dry summer months to periodically refresh the pools along the creek. Depending on the final operational requirements, Los Angeles' pueblo right could be impactd by a reduction in the recharge of the SFB.

LACDPW, USFS, USFWS, LADWP, and the Watermaster are attempting to reach a compromise that provides adequate flood control, maximizes water conservation, and is protective of the SAS.

VI. BASIN MANAGEMENT ACTIVITIES AND INVESTIGATIONS

A. Groundwater Investigation Programs

Pacoima Area Groundwater Investigation

A significant groundwater VOC contaminant plume exists in the Pacoima area near the intersection of San Fernando Road and the Simi Valley Freeway (118 Freeway). This area is located approximately 2.5 miles north and upgradient of the LADWP's Tujunga Well Field. There are four primary VOCs present in the groundwater beneath the Pacoima area: PCE, TCE, 1,1-TCA and 1,1 DCE. Concentrations of TCE were found to be as high as 24,000 ppb in this area, which is the highest level found in the San Fernando Valley.

To help characterize the extent of contaminant migration, LADWP installed two monitoring wells: PA-01, approximately 0.5 mile downgradient, and PA-02, approximately 1.25 miles downgradient of the plume.

The Brenntag/Holchem site is under the jurisdiction of the Department of Toxic Substances Control (DTSC). Brenntag is operating a soil vapor extraction system and has installed monitoring wells both on and off site. During its third quarter 2003-04 sampling event, Bremtag will sample from the two LADWP wells.

The Price-Pfister site is located nearby, and is under the jurisdiction of the RWQCB. Price-Pfister has installed several monitoring wells on site and has also performed soil vapor extraction. Due to the close proximity of these sites, DTSC and RWQCB are coordinating their oversight efforts.

Chromium Investigations

The RWQCB, funded in part with a grant from the United States Environmental Protection Agency (USEPA), reviewed 4,040 sites for potential hexavalent chromium contamination and published its findings in December 2002. After this review, 255 suspected hexavalent chromium sites were identified and inspected. As a result of these inspections, the RWQCB recommended closure for 150 sites and further assessment for 105 sites. In addition, the RWQCB has issued Cleanup and Abatement orders to B.F. Goodrich (formerly Menasco Aerospace Division), PRC-

Desoto (formerly Courtauld), Drilube, Honeywell (formerly Allied Signal), Lockheed (2), and Excello Plating, and may issue several more. The Cleanup and Abatement Orders require a responsible party to assess, clean up, and abate the effects of contamination discharged to soil and groundwater.

The Chrome 6 Task Force has been meeting on an as-needed basis to keep the various parties informed regarding hexavalent chromium issues, including regulations, health studies, and treatment technologies. A new Public Health Goal (PHG) should be established by the Office of Environmental Health Hazard Assessment (OEHHA) in late 2004 or early 2005. A MCL will subsequently be issued by the California Department of Health Services (DHS).

VII. ULARA WATERMASTER MODELING ACTIVITIES

A. Introduction

The purpose of the groundwater modeling study presented herein is to evaluate the effects of groundwater pumping in the SFB, as projected over a five-year period. The projected pumping values were extracted from the "Year 2003-08 Pumping and Spreading Plans" submitted by each party pursuant to the provisions established in the revised February 1998 Policies and Procedures. The groundwater flow model used for this study is a comprehensive three-dimensional computer model that was developed originally for the USEPA to incorporate data, characterizations, and findings during the Remedial Investigation Study of the San Fernando Valley (December 1992). The model is a tool to estimate the future response to pumping and spreading in the San Fernando Basin for the next five years. Up-to-date groundwater elevations for specific locations can be obtained by contacting the Watermaster Office at (213) 367-0921.

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

B. Model Input

The input data for this model is illustrated in Table 7-1. Table 7-1A is the Basin Recharge, which consists of precipitation, delivered water, hill and mountain runoff, spreading, and sub-surface inflow. Table 7-1B is the Basin Extraction of major producers - the City of Los Angeles, City of Burbank, City of Glendale, the City of San Fernando, Crescenta Valley Water District, and other iudividual producers. Both tables represent a projected value for the five-year study, from Fall 2003 to Fall 2008, except for the first half of Water Year 2003-04 where the actual values are known.

In Table 7-1A, the percolation and spreading values were derived from the average or normal rainfall and recharge conditions over the five-year study period except for the first half of Water Year 2003-04 where actual values are known. The LACDPW estimated the spreading values for

the second half of the water year. Anticipated spreading at Pacoima Spreading Grounds by the City of Burbank will help to improve the recovery of the water table in the area above the Tujunga Well Field. The values of the sub-surface inflow from the adjacent basins are assumed to be constant throughout the five-year study.

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

The model's initial head values (groundwater elevations) were derived from the actual data from Water Year 2002-2003, during which the SFB experienced a continuous decline in groundwater elevation as a result of above-average extractions combined with low artificial recharge. The total spreading recharge for the same year was only 64 percent of the long-term average.

At the close of every Water Year, the Watermaster staff updates the model input files with the actual Basin Recharge and Extraction data. This activity has been performed each year since 1980.

C: Simulated Groundwater Elevations and Flow Directions

After running the model for five stress periods (Water Years 2003-2008), each lasting 365 days, the MODFLOW generated numerical data: the head (groundwater elevations), the drawdown (change in groundwater elevations), and the cell-by-cell flow (vector or flow direction data). These numerical data were used to develop the following figures or Plates:

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

- Additionally, the change in groundwater elevation contours were generated from the drawdown data from the Fall 2003 to Fall 2008 stress period and is shown on Plate 3 for Layer 1 and Plate 4 for Layer 2.

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

- Finally, Plates 7-10 depict the most recent TCE, PCE, NO_3, and Total Dissolved Chromium contaminant plumes that are superimposed onto the Layer 1 horizontal groundwater flow direction.

D. Evaluation of Model Results

Plate 1: Simulated Groundwater Contour Model Layer 1 – Fall 2008

- The most noticeable feature is the cone of depression (pumping cone) that has developed around the Burbank OU. These extractions are derived primarily from Layer 1, although Layer 2 does provide some recharge to Layer 1. The Burbank OU projected pumping for the period from 2003 though 2008 is about 10,900 AF/yr. The radius of influence extends as far as 7,500 feet in the downgradient (southeasterly) direction. An upgradient radius of influence is usually larger than the downgradient radius of influence.

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

Plate 2: Simulated Groundwater Contour Model Layer 2 – Fall 2008

- The most significant features are the cones of depression near the Rinaldi-Toluca (R-T), Tujunga (TJ), North Hollywood-West (NHW), and Burbank OU. Over 75 percent of the R-T, TJ, and NHW pumping is derived from Layers 2-4.

Plate 3: Change in Groundwater Elevation Model Layer 1 – Fall 2003 to Fall 2008

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

- The primary reason for the decline in water levels is that basin extractions are projected to exceed recharge for the five-year study period by about 48,000 AF.

- The water table within the cone of depression at the Rinaldi-Toluca Well Field is lowered by about 10 feet due to pumping and the groundwater level is lowered approximately 18 feet at the lowest point in the pumping cone near the Burbank OU.

- The water table near the Glendale North OU wells will decline between one to two feet. A minor decline was observed near the Glendale South OU Wells. Full-scale operation of the OU plant started at the beginning of the 2000-01 Water Year. The North OU Wells will pump 5,184 AF/yr and the South OU Wells 2,016 AF/yr.

- The area upgradient of the Tujunga and Rinaldi-Toluca Well Fields will experience about two feet of recovery in the water table due to the projected recharge by the City of Burbank at the Pacoima Spreading Grounds. The area near the North Hollywood, Erwin, Whitnall, and Verdugo Well Fields will experience a 14 to 20 foot depression in the water table.

Plate 4: Change in Groundwater Elevation Model Layer 2 – Fall 2003 to Fall 2008

- The area near the Rinaldi-Toluca and North Hollywood – West well fields will experience a 6 to 12 foot decline in the water table. The area near the North Hollywood East Branch, Erwin, Whitnall and Verdugo Well Fields will experience an 11 to 16 foot depression in the water table. The area upgradient of the Tujunga Well Field will experience about two feet of recovery in the water table.

Plate 5: Simulated Groundwater Flow Direction Model Layer 1 – Fall 2008

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

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

- A groundwater divide apparently develops just north of the Verdugo Wells and south of the Whitnall, Erwin, and Burbank OU Wells. This is primarily due to the 'pumping trough' formed by the Burbank OU and North Hollywood Well Field extractions.

Plate 6: Simulated Groundwater Flow Direction Model Layer 2 – Fall 2008

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

Plates 7 – 10: Simulated Groundwater Flow Direction and TCE, PCE and NO_3, and Chromium Contamination Model Layer 1 – Fall 2008

- Plates 7-10 depict the most recent TCE, PCE, NO_3 and Cr contaminant plumes that are superimposed onto the interpolated horizontal direction of groundwater movement for Layer 1, Fall 2008. The Burbank OU appears to contain the >5,000 µg/L TCE and PCE plumes and a portion of the 1,000-5,000 µg/L TCE and PCE plumes. The uncaptured portion of these plumes will migrate southeasterly in the direction of the Los Angeles River Narrows area and toward the Glendale OU.

- The Burbank OU pumping (10,900 AF/yr) tends to flatten the horizontal gradient in a southeasterly direction and slows the natural movement of groundwater southeasterly of the Burbank OU area plume.

- The Glendale North and South OU Wells pumping tend to capture a portion of the plumes uncaptured by Burbank OU Wells.

- The Pollock Wells (2,400 AF/yr) have a less pronounced effect on Layer 1 because 75 percent of the Pollock pumping originates from Layer 2.

- Plate 9 (NO_3 contamination) indicates that Layer 1 extractions by the Burbank and Glendale OU facilities may be impacted by NO_3. The nitrate levels are currently below 40 mg/L.

- Plate 10 (Total Dissolved Chromium) indicates that Layer 1 extractions by North Hollywood OU, Burbank OU, and Glendale OU facilities may be impacted by chromium contamination.

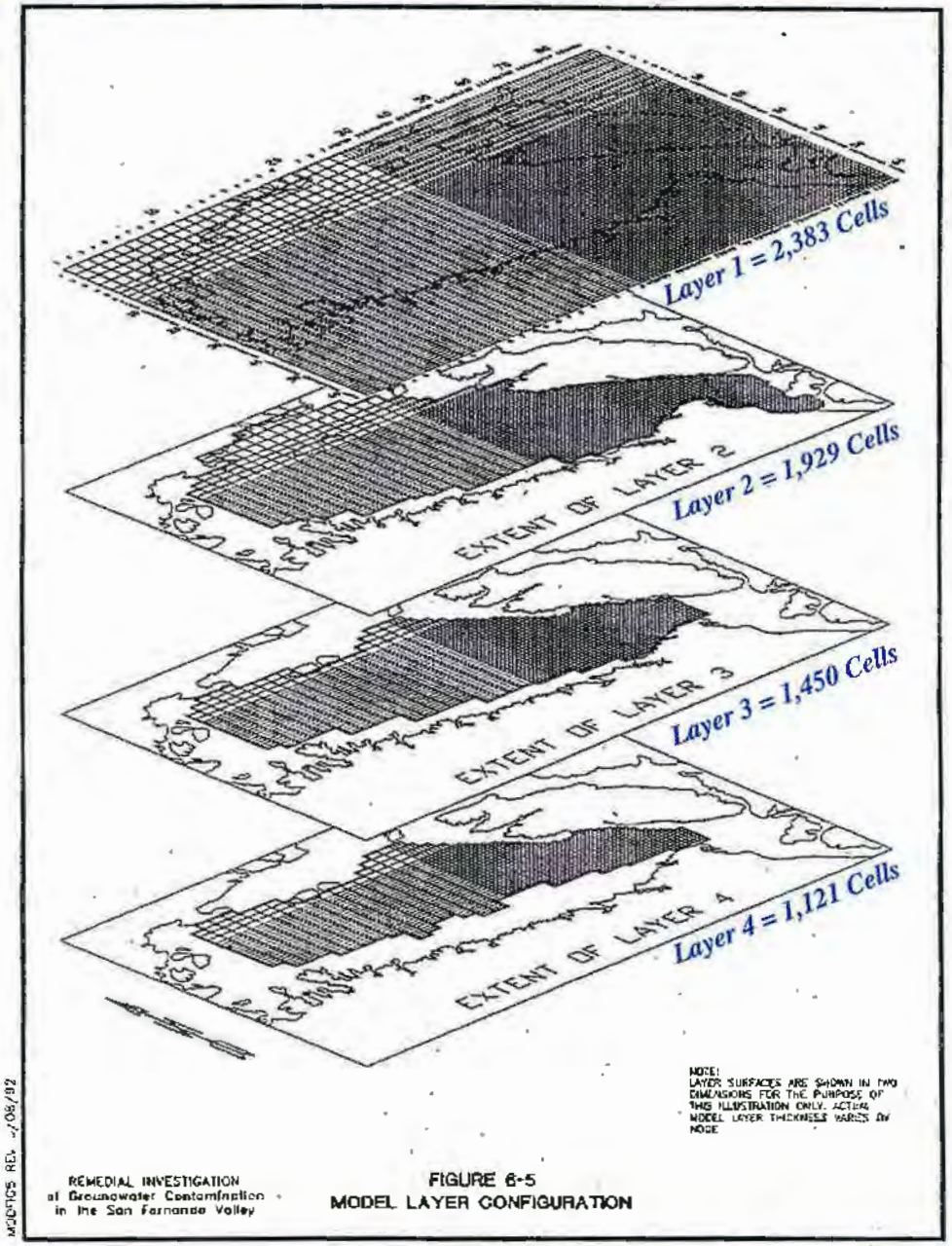
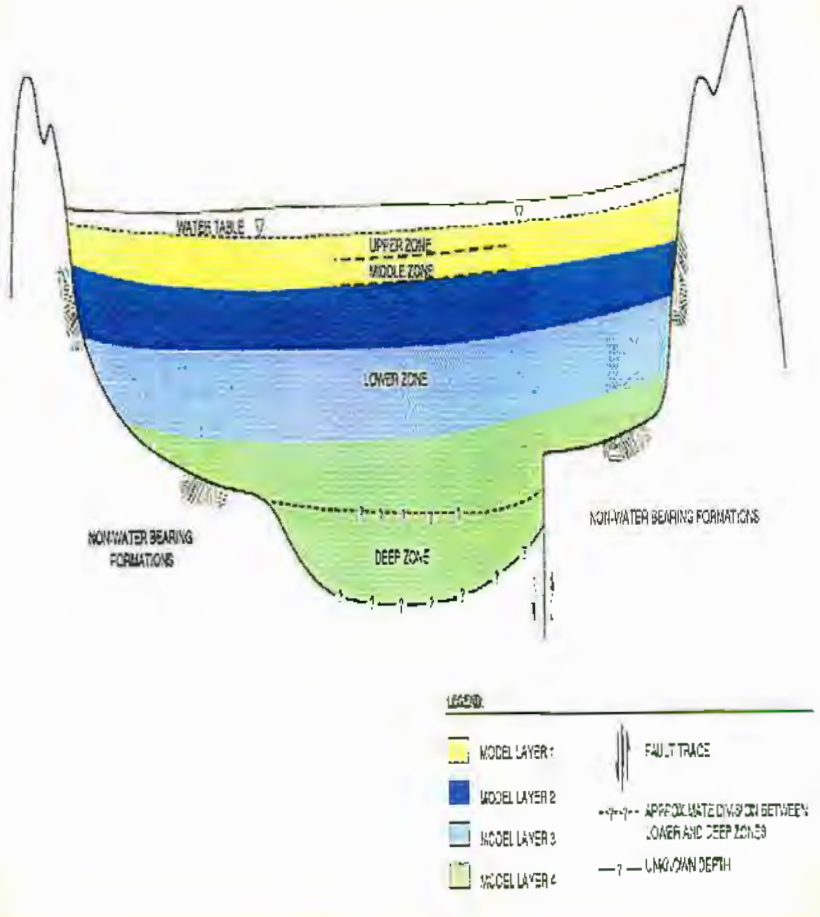


Figure 7.1
Model Layers and Cell Configurations



Source: Remedial Investigation Report of Groundwater Contamination in the San Fernando Valley, December 1992

TABLE 7-1
MODEL INPUT
Pumping and Spreading Scenario
Water Years 2003 - 2008

Table 7-1A

	BASIN RECHARGE (AF/Y)																	
	RAINFALL (IN/Y)		PERCOLATION (A)			H&M (B)	SPREADING GROUNDS (B)							SUB-SURFACE INFLOW (B)				
WATER YEAR	VALLEY	HILL & MTN	VALLEY FILL	RETURN WATER	SUB TOTAL	HILL & MTN	BRANFORD	HANSEN	HW	LOPEZ	PACOIMA	TUJUNGA	SUB - TOTAL	PACOIMA	SYLMAR	VERDUGO	SUB - TOTAL	TOTAL RECHARGE
2003-04	10.32	13.42	7,169	56,370	**63,539**	**2,292**	353	5,918	-	144	2,827	264	**9,506**	350	400	70	**820**	**76,157**
2004-05	18.57	23.06	12,874	55,085	**67,959**	**3,939**	438	12,973	-	579	7,327	6,696	**28,013**	350	400	70	**820**	**100,731**
2005-06	18.57	23.06	12,874	55,085	**67,959**	**3,939**	438	12,973	-	579	8,527	6,696	**29,213**	350	400	70	**820**	**101,931**
2006-07	18.57	23.06	12,874	55,085	**67,959**	**3,939**	438	12,973	-	579	9,977	6,696	**30,663**	350	400	70	**820**	**103,381**
2007-08	18.57	23.06	12,874	55,085	**67,959**	**3,939**	438	12,973	-	579	11,177	6,696	**31,863**	350	400	70	**820**	**104,581**

Table 7-1B

	BASIN EXTRACTION (AF/Y)																	
	LADWP (C)										BURBANK (C)			GLENDALE (C)			OTHERS (C)		
WATER YEAR	AE	EW	HW	NH	PO	RT	TJ	VD	WH	TOTAL LADWP	BURBANK PSD	LOCKHEED	NON-BURBANK (VMP)	CITY OF GLENDALE	OU-NORTH	OU-SOUTH	TOTAL NON-LADWP	TOTAL NON-GLENDALE (F. LAWN)	TOTAL EXTRACTION
2003-04	-2,348	-2,637	0	-23,372	-1,975	-25,443	-19,536	-4,770	-3,402	**-83,483**		-10,000	-300	-25	-5,184	-2,016	-1,918	-400	**-103,326**
2004-05	-2,390	-994	0	-25,276	-2,400	-25,900	-22,179	-5,261	-2,600	**-87,000**	0	-10,900	-300	-25	-5,184	-2,016	-1,918	-400	**-107,743**
2005-06	-2,390	-994	0	-25,276	-2,400	-25,900	-22,179	-5,261	-2,600	**-87,000**	0	-10,900	-300	-25	-5,184	-2,016	-1,918	-400	**-107,743**
2006-07	-2,390	-994	0	-25,276	-2,400	-25,900	-22,179	-5,261	-2,600	**-87,000**	0	-10,900	-300	-25	-5,184	-2,016	-1,918	-400	**-107,743**
2007-08	-2,390	-994	0	-25,276	-2,400	-25,900	-22,179	-5,261	-2,600	**-87,000**	0	-10,900	-300	-25	-5,184	-2,016	-1,918	-400	**-107,743**

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

PROJECT: *WATERMASTER*
PROJECT NO.: *PS02-07*
DATE: 5/24/2004

VIII. WATERMASTER'S EVALUATION AND RECOMMENDATIONS

The Watermaster is encouraged by the five year projected pumping and spreading plan because of the progress of the groundwater cleanup program which has restored Burbank's and Glendale's groundwater pumping capability in the San Fernando Basin. Unfortunately, during the past several years hexavalent chromium contamination has become an issue that may threaten the ability of the parties to put the water to beneficial use in the short-term. The Watermaster is concerned that chromium contamination near the Glendale OU, Burbank OU, and the North Hollywood OU could eventually overwhelm the cities' abilities to blend the treated groundwater to acceptable levels. If that happens, the cities may be forced to reduce the treatment rate or shut down the facilities, which could be violations of the Consent Decrees established for VOC cleanup.

In order to avoid this potential conflict, the Watermaster recommends an assertive approach by the USEPA to add chromium to the list of contaminants that must be cleaned up by the Responsible Parties, and by the RWQCB to issue and enforce Cleanup and Abatement Orders.

The Watermaster is also concerned about a general decline in San Fernando Basin groundwater levels during the past several years. Probable causes include continued heavy pumping and reduced recharge of the groundwater aquifer. Basin extractions are projected to exceed recharge by 48,000 AF over the next five years, further exacerbating this problem. We address this issue in more detail in the May 2004 Watermaster Report. The Watermaster will monitor the situation closely and will seek the advice and guidance of the Parties to the Judgment in reversing this decline.

City of Los Angeles

The Watermaster approves of Los Angeles' projected average annual pumping from the SFB of approximately 87,296 AF/yr for Water Years 2003-04 to 2007-08. This is approximately 299 AF/yr less than the 1979-2003 average and 1,520 AF/yr more than the average over the last five years (1998-2003). As of October 1, 2003 Los Angeles' accumulated stored water credit was 270,113 AF in the SFB.

The loss in the 1980s of Los Angeles' Headworks, Crystal Springs, and Pollock Well Fields due to VOC contamination caused increased rising groundwater levels in the Los Angeles River Narrows area. The Watermaster is pleased by the partial restoration of pumping in this area by

the Pollock Wells Treatment Plant, and encourages Los Angeles to operate this facility at least 2,000 AF/yr to minimize the loss of water from ULARA due to excess rising groundwater.

In the Sylmar Basin, Los Angeles plans to pump an average of 3,300 AF/yr for Water Years 2003-04 through 2007-08. This represents an increase of 332 AF/yr. over the long-term average (1979-2003), and is also higher than the average of 2,913 AF/yr during the past five years (1998-2003). As of October 1, 2003 Los Angeles' stored water credits were 6,081 AF in the Sylmar Basin.

City of Burbank

The Watermaster is pleased that Burbank's pumping capability has been restored through the construction of the Burbank OU. However, Burbank's stored water credit is showing the impact of this pumping, dropping from 50,771 AF on October 1, 1999 to 27,429 AF on October 1, 2003. At current pumping rates Burbank's stored water will be depleted in few years, eventually requiring arrangements to purchase or replace extractions that are in excess of Burbank's return flow credits and physical solution purchase rights. The Watermaster is encouraged by the proposed plan by Burbank to import approximately 6,000 AF/yr. through MWD's San Fernando Tunnel and spread it at Pacoima Spreading Grounds.

City of Glendale

Since its start-up on September 26, 2000, the Glendale OU has pumped and treated approximately 25,365 AF from the SFB as of May 1, 2004. Glendale has taken a lead role in investigating treatment technology for hexavalent chromium with funds provided by AWWARF and the federal government. The results will have widespread application. Glendale's stored water credits are 68,408 AF as of October 1, 2003. It is estimated that the facility can be operated for approximately 35 years before exhausting Glendale's stored water credits.

In the Verdugo Basin, Glendale expects to pump an average of 2,340 AF/yr. for the next five years. The long-term average (1979-2003) is 2,395 AF/yr, and the five-year average (1998-2003) is 2,265 AF/yr.

City of San Fernando

San Fernando expects to pump an average of 3,480 AF/yr over the next five years from the Sylmar Basin. The long-term average (1979-2003) is 3,042 AF/yr, and the five year average

(1998-2003) is 3,631 AF/yr. As of October 1, 2003 San Fernando's stored water credit was 426 AF in the Sylmar Basin.

Crescenta Valley Water District (CVWD)

The Watermaster has supported CVWD's increased pumping in the Verdugo Basin until Glendale has the ability to pump its full right, but the lower water table may limit pumping by both parties. CVWD expects to pump an average of 2,294 AF/yr during the next five years. The long-term average (1979-2003) is 2,818 AF/yr, and the five-year average (1998-2003) is 3,404 AF/yr.

Model Simulation

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

The change in groundwater elevation contours illustrates that over the next five years, there is an overall basinwide decline in groundwater levels, with the exception of the areas in the immediate vicinity of the Hansen and Pacoima Spreading Grounds. Specifically, the water table declines about 10 feet near the Tujunga and Rinaldi-Toluca Well Fields; up to 18 feet near the Burbank OU; one to two feet near the Glendale OU; and 14 to 20 feet near the North Hollywood, Whitnall, Erwin, Verdugo, and Headworks Well Fields.

Proposed recharge by the City of Burbank at the Pacoima Spreading Grounds will help basin water levels recover upgradient of the Tujunga and Rinaldi-Toluca Well Fields.

Pacoima Area Contamination

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

Tujunga Spreading Grounds

The Watermaster continues to take an active role in addressing the landfill gas migration problem at the Tujunga Spreading Grounds. The goal is to restore the full operation of the spreading

grounds by preventing off-site methane gas migration during heavy spreading. Los Angeles has retained a consultant to help resolve this problem.

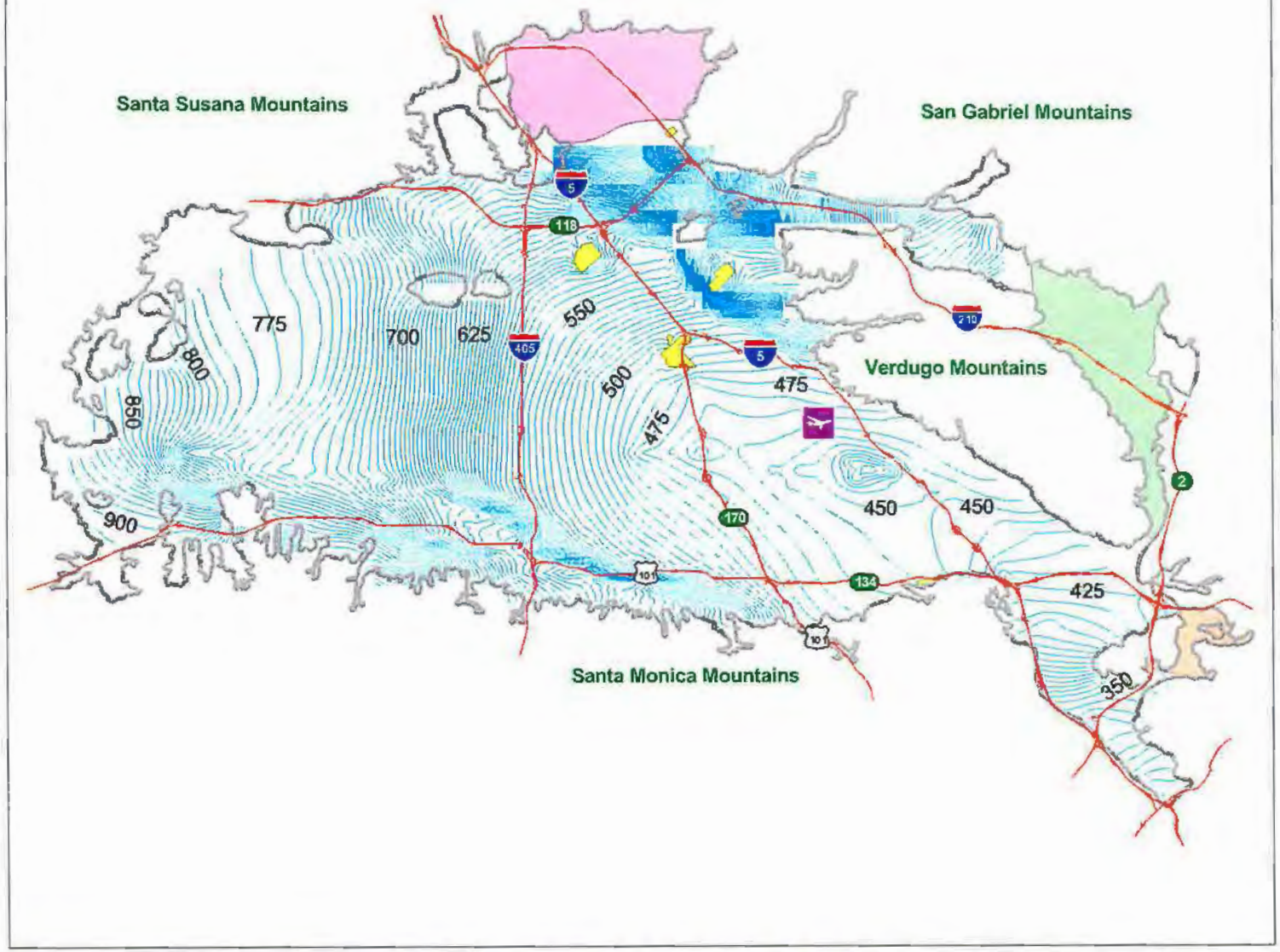
Boulevard Pit

The Boulevard Pit is owned by Vulcan Materials and is currently being mined for sand and gravel. The Watermaster has partnered with the LADWP and the LACDPW to investigate the potential for obtaining this property and converting it into a spreading and/or storage facility for native runoff. This facility could provide a significant new opportunity to enhance basin recharge for the City and provide additional flood control for the County, especially during above-normal rainfall events.

PLATES

PLATE 1

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year



LEGEND

- Groundwater Contour
- Spreading Grounds
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

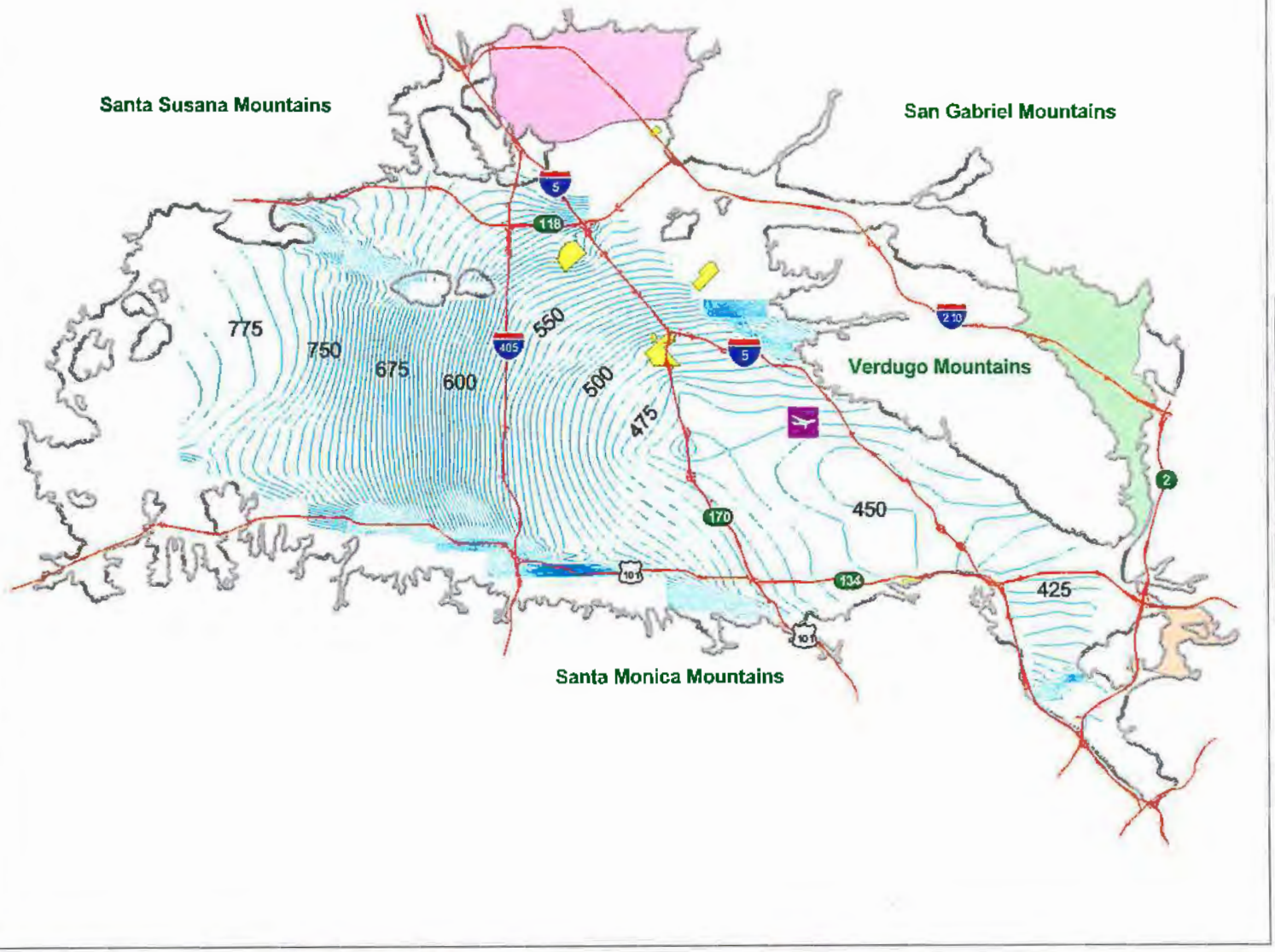
N

2 0 2 Miles

Simulated Groundwater Contours - Model Layer 1
FALL 2008

PLATE 2

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year



LEGEND

- Groundwater Contour
- Spreading Grounds
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

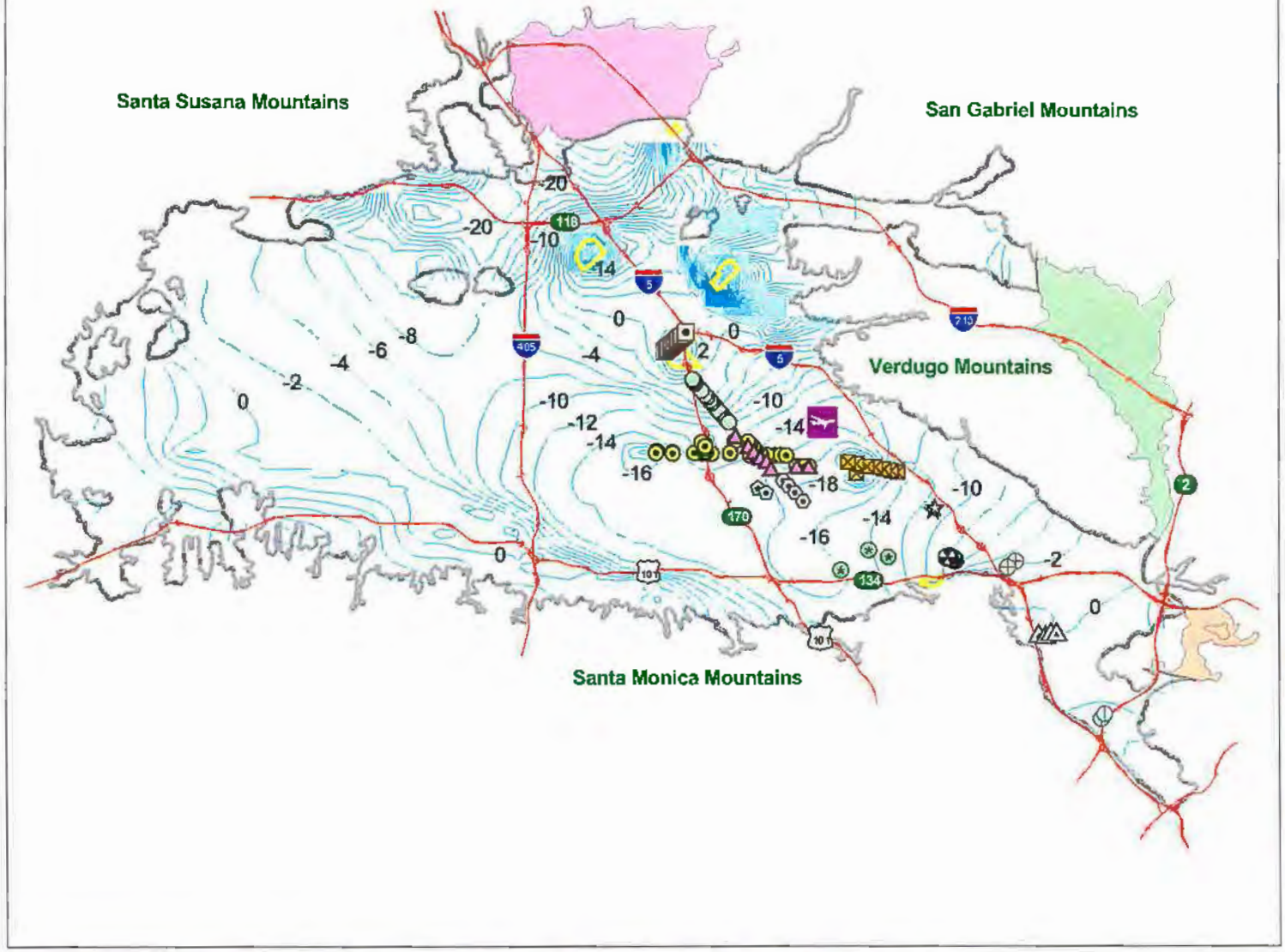
N

2 0 2 Miles

Simulated Groundwater Contours - Model Layer 2
FALL 2008

PLATE 3

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year



LEGEND

Well Fields

- Burbank OU
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headwork
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

- Freeway
- Spreading Grounds
- Change in GW Elev.
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

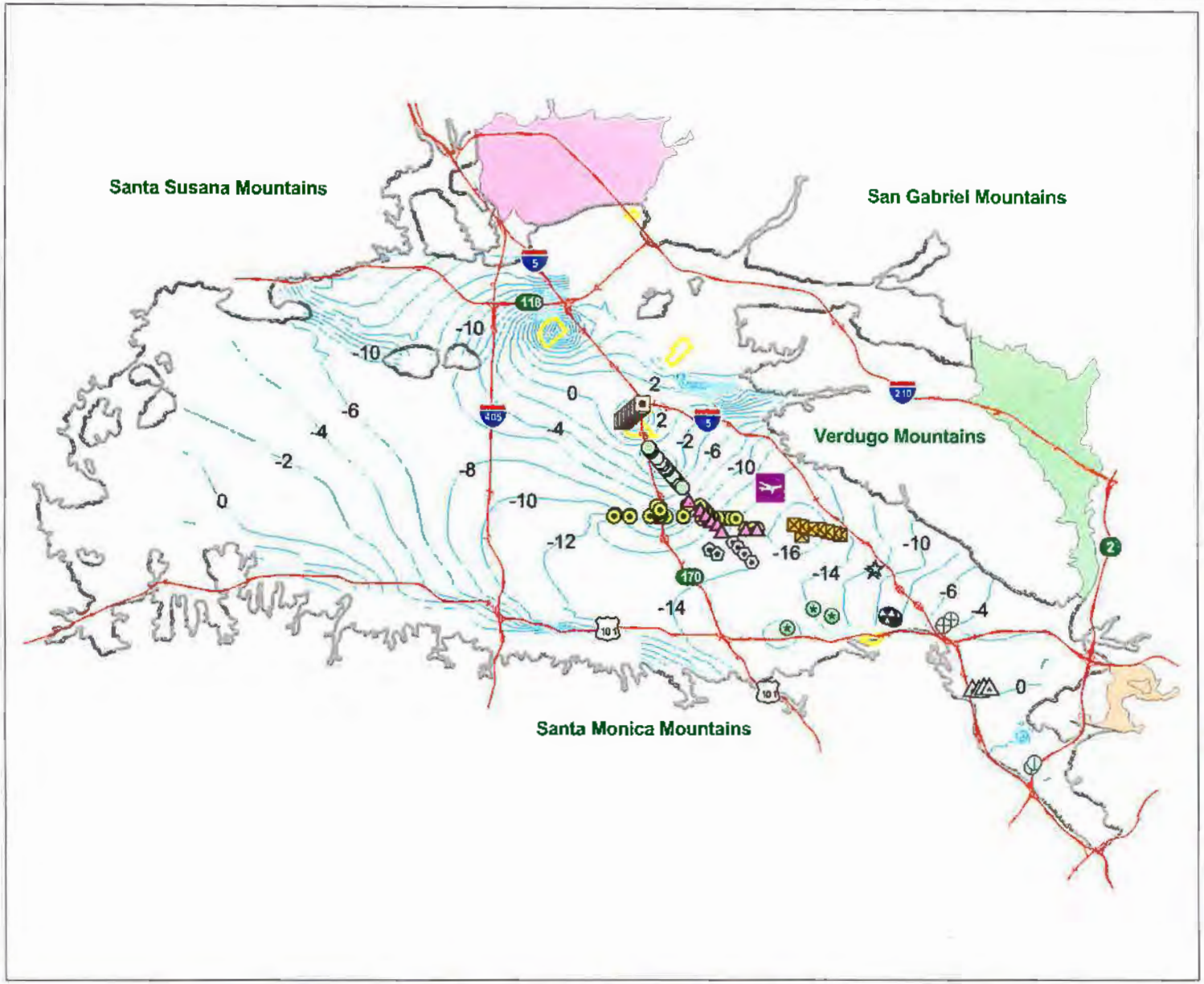
N

2 0 2 Miles

Change in Groundwater Elevation - Model Layer 1
Fall 2003 - Fall 2008

PLATE 4

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year



LEGEND

Well Fields

- Burbank OU
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headwork
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

- Freeway
- Spreading Grounds
- Change in GW Elev.
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

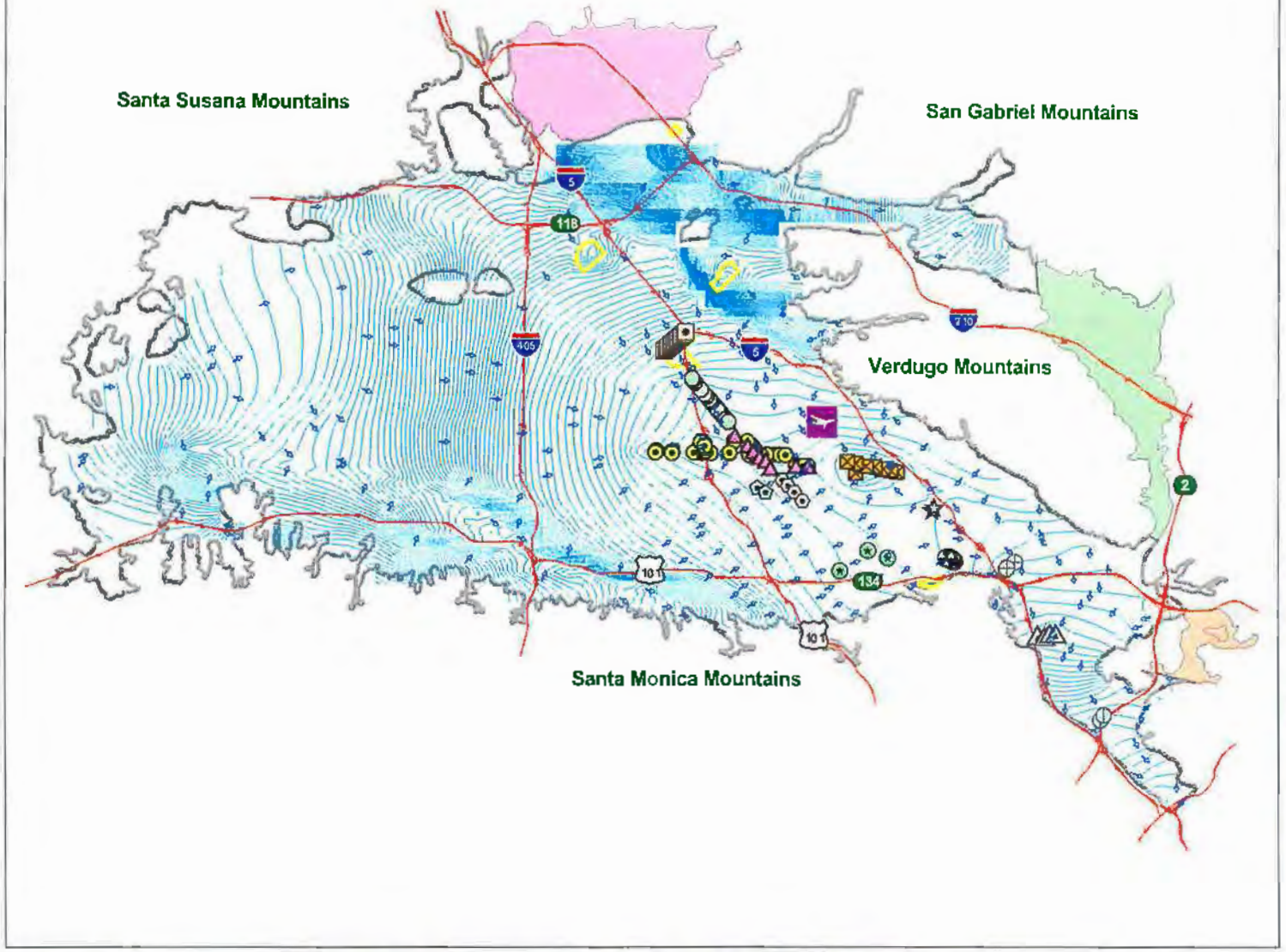
N

2 0 2 Miles

Change in Groundwater Elevation - Model Layer 2
Fall 2003 - Fall 2008

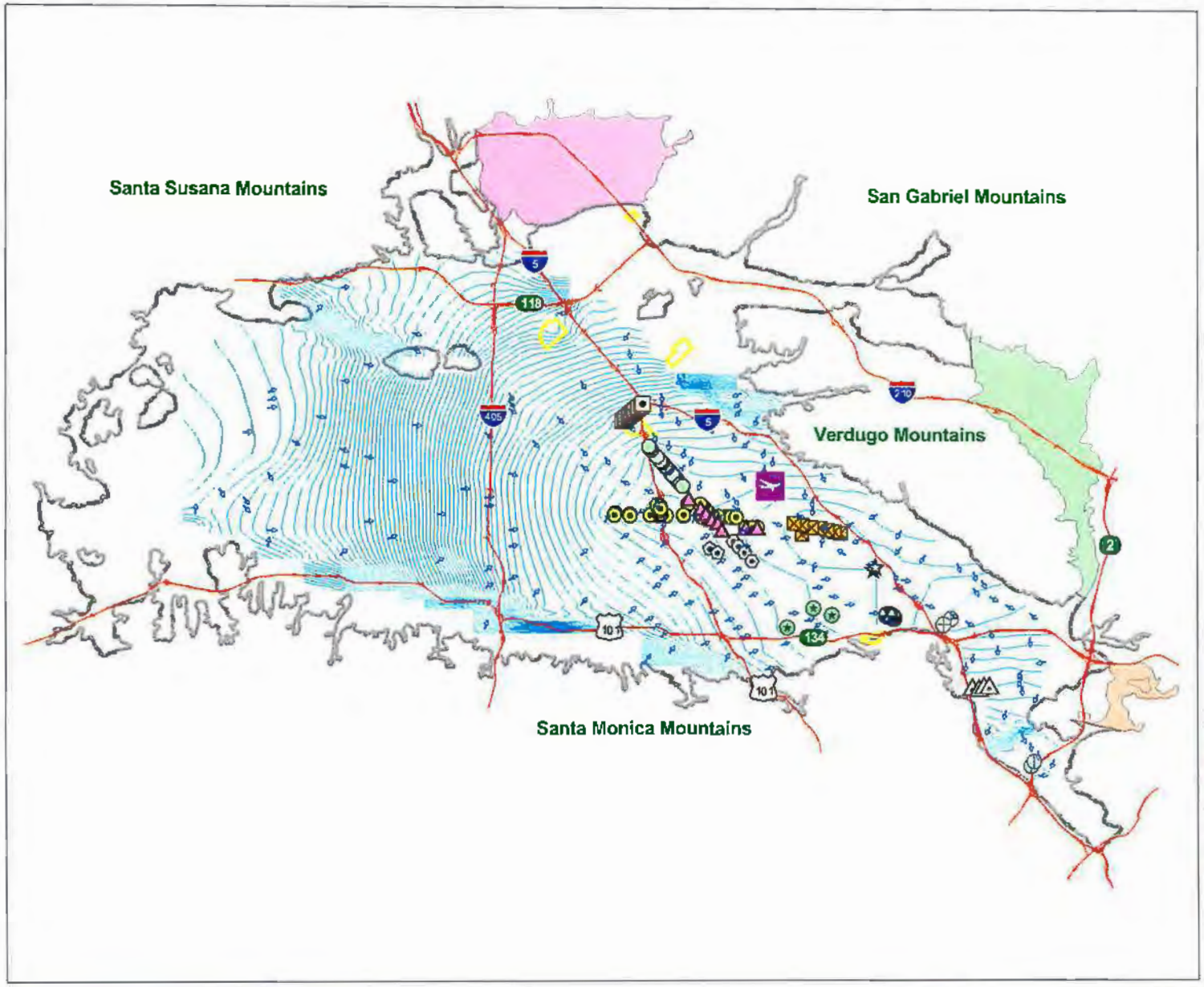
PLATE 5

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year



Simulated Groundwater Flow Direction - Model Layer 1
FALL 2008

PLATE 6



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year

LEGEND

Well Fields

- Burbank OU
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headwork
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

- Freeway
- Spreading Grounds
- Groundwater Contour
- Groundwater Flow Direction
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

N

2 0 2 Miles

Simulated Groundwater Flow Direction - Model Layer 2
FALL 2008

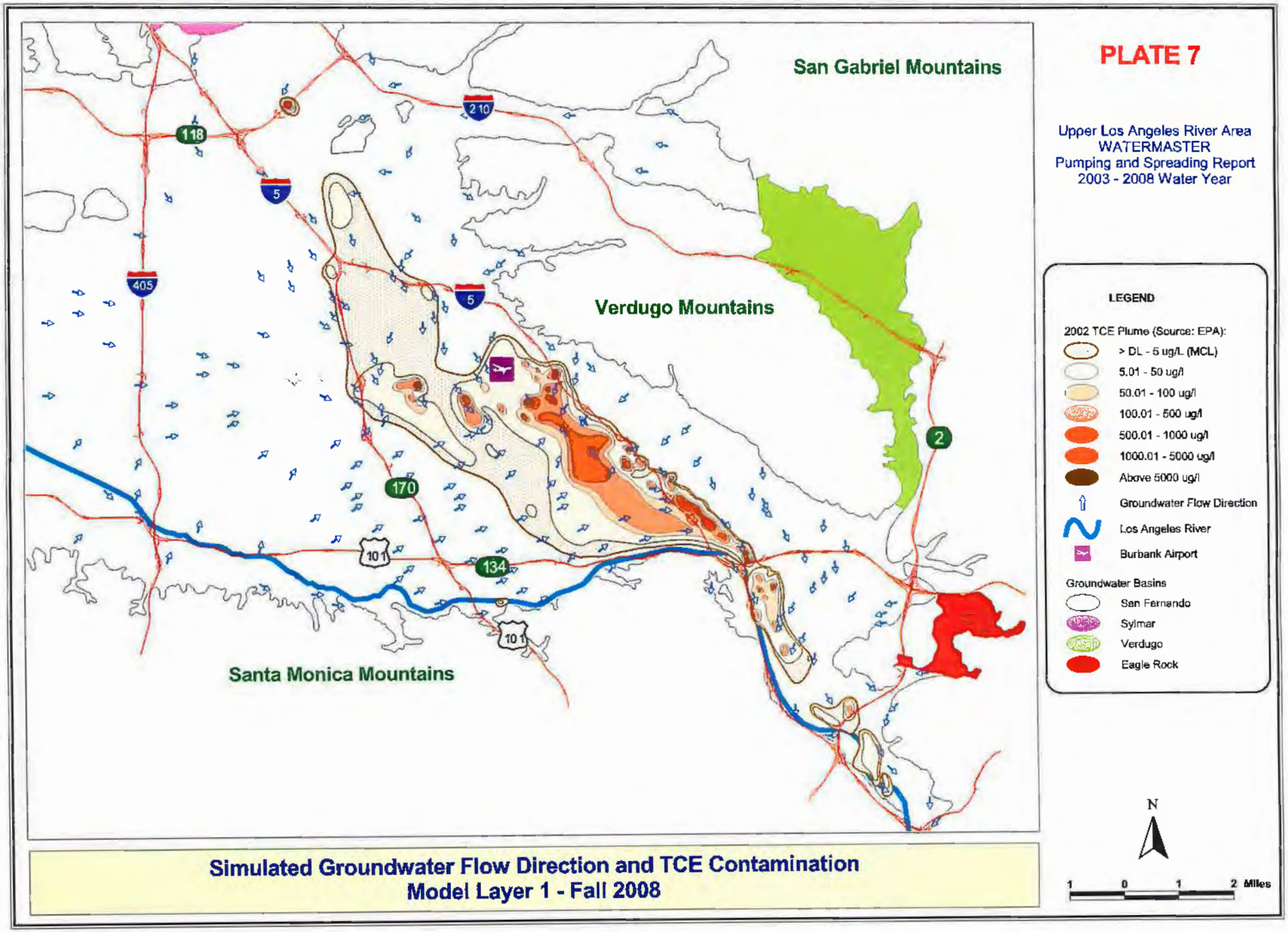


PLATE 7
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
LEGEND
2002 TCE Plume (Source: EPA):
> DL - 5 ug/L (MCL)
5.01 - 50 ug/l
50.01 - 100 ug/l
100.01 - 500 ug/l
500.01 - 1000 ug/l
1000.01 - 5000 ug/l
Above 5000 ug/l
Groundwater Flow Direction
Los Angeles River
Burbank Airport
Groundwater Basins
San Fernando
Sylmar
Verdugo
Eagle Rock
N
1 0 1 2 Miles
Simulated Groundwater Flow Direction and TCE Contamination
Model Layer 1 - Fall 2008

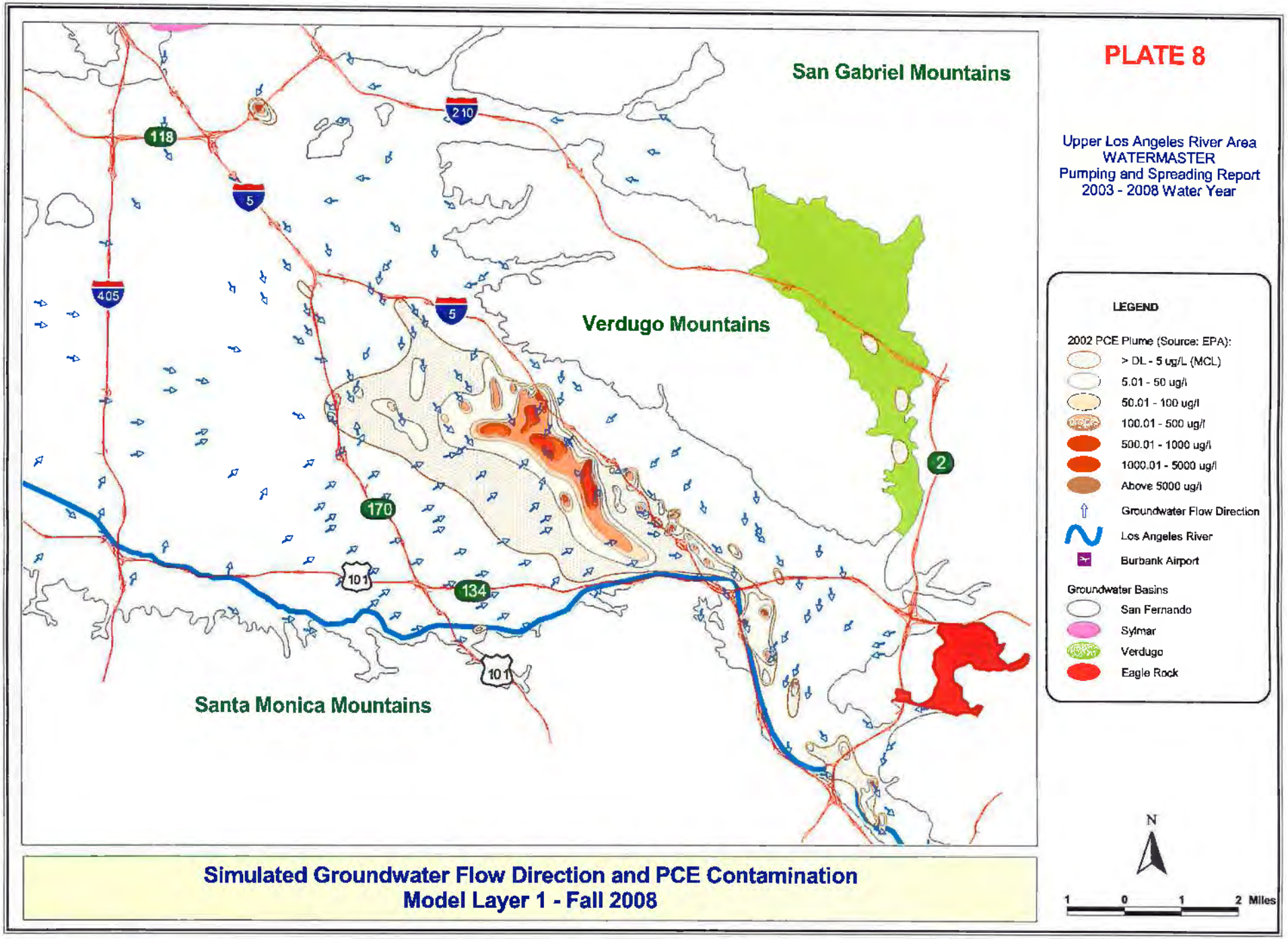


PLATE 8
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
118
210
5
405
170
101
134
2
LEGEND
2002 PCE Plume (Source: EPA):
> DL - 5 ug/L (MCL)
5.01 - 50 ug/l
50.01 - 100 ug/l
100.01 - 500 ug/l
500.01 - 1000 ug/l
1000.01 - 5000 ug/l
Above 5000 ug/l
Groundwater Flow Direction
Los Angeles River
Burbank Airport
Groundwater Basins
San Fernando
Sylmar
Verdugo
Eagle Rock
N
1 0 1 2 Miles
Simulated Groundwater Flow Direction and PCE Contamination
Model Layer 1 - Fall 2008

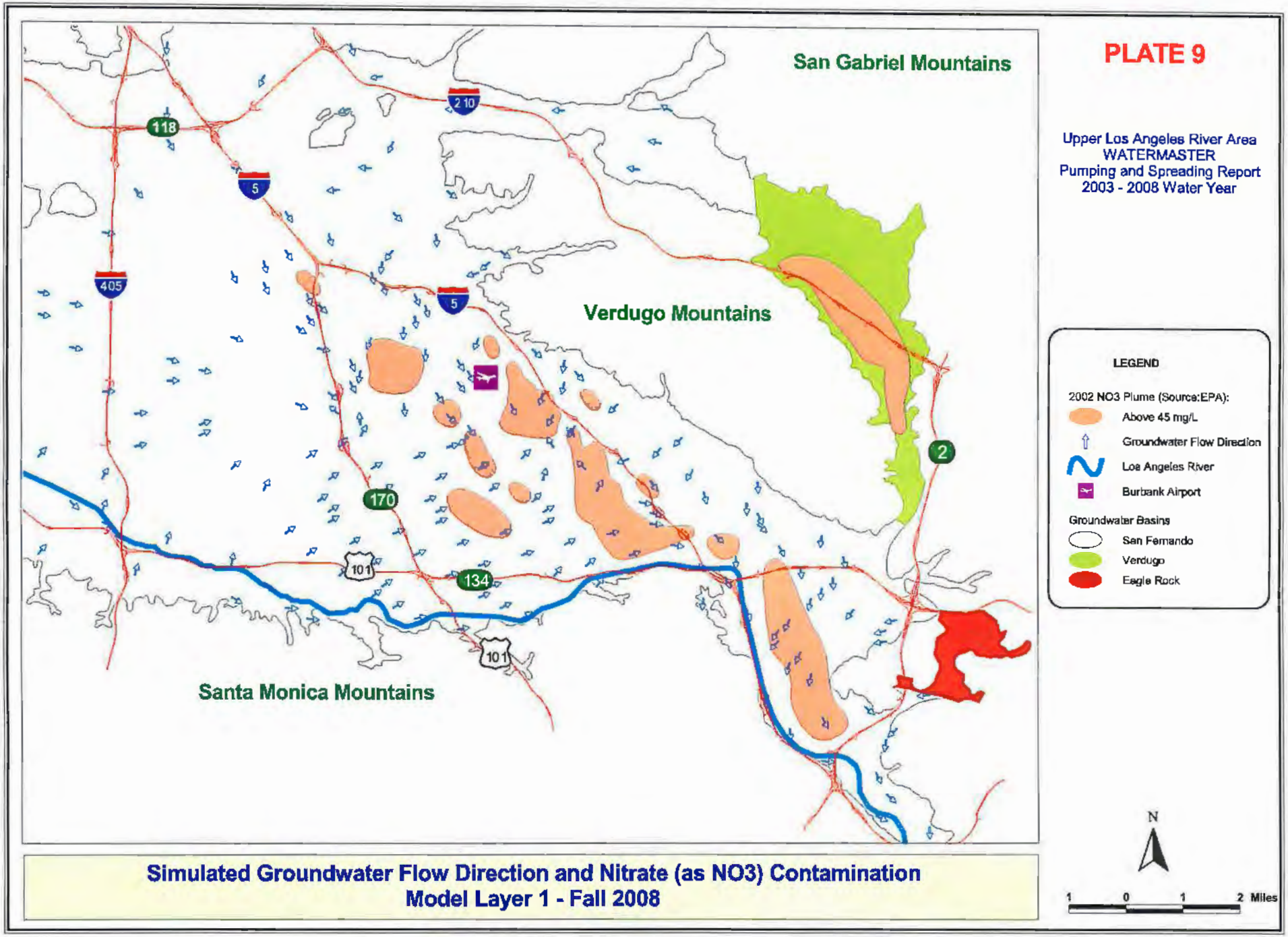


PLATE 9
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
118
210
5
405
170
101
134
2
LEGEND
2002 NO3 Plume (Source:EPA):
Above 45 mg/L
Groundwater Flow Direction
Los Angeles River
Burbank Airport
Groundwater Basins
San Fernando
Verdugo
Eagle Rock
N
1 0 1 2 Miles
Simulated Groundwater Flow Direction and Nitrate (as NO3) Contamination
Model Layer 1 - Fall 2008

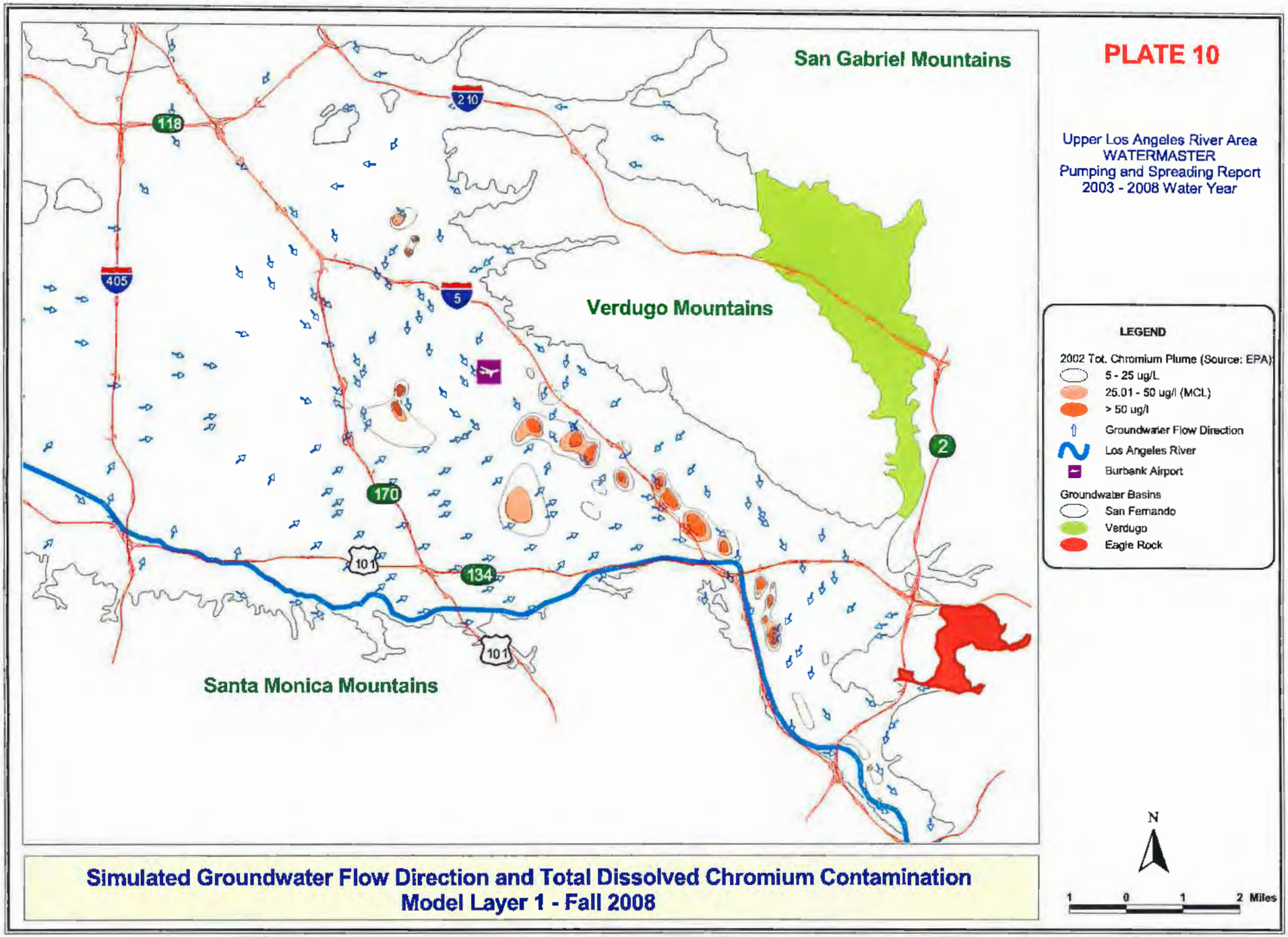


PLATE 10
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2003 - 2008 Water Year
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
118
210
405
5
170
101
134
2
LEGEND
2002 Tot. Chromium Plume (Source: EPA)
5 - 25 ug/L
25.01 - 50 ug/l (MCL)
> 50 ug/l
Groundwater Flow Direction
Los Angeles River
Burbank Airport
Groundwater Basins
San Fernando
Verdugo
Eagle Rock
N
1 0 1 2 Miles
Simulated Groundwater Flow Direction and Total Dissolved Chromium Contamination
Model Layer 1 - Fall 2008

APPENDIX A

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

2003-2008 Water Years

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR THE 2003-2008 WATER YEARS

APRIL 2004

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

TABLE OF CONTENTS

Introduction

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

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

> *"...all parties or non-parties who pump groundwater are required to submit annual reports by May 1 to the Watermaster that include the following:*
>
> - *A 5-year projection of annual groundwater pumping rates and volumes.*
> - *A 5-year projection of annual spreading rates and volumes.*
> - *The most recent water quality data for each well."*

This report constitutes Los Angeles' 2004 Groundwater Pumping and Spreading Plan for the Water Years 2003 - 2008.

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	11,000
Operated by LACDPW and LADWP			
Tujunga	Shallow basins	83	43,000
TOTAL:			125,000

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

Table 1-2

Rated Capacities of LADWP Well Fields in ULARA				
Well Field	Number of Wells			Rated Capacity (cfs)
San Fernando Basin	Active	Stand-by	Total	cfs
Aeration	7	---	7	4
Crystal Springs (A)	---	---	---	---
Erwin	2	0	2	5
Headworks			---	---
North Hollywood	16	1	17	80
Pollock	2	0	2	6
Rinaldi-Toluca	15	---	15	110
Tujunga	12	---	12	105
Verdugo	2	---	2	8
Whitnall	4	---	4	20
Sylmar Basin				
Mission	2	---	2	6
TOTAL	62	1	63	344

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

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

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

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

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

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

Section 2: Annual Pumping And Spreading Projections

a. Pumping Projections for the 2003-2008 Water Year: The City of Los Angeles has the following three sources of water supply: 1. Los Angeles Aqueduct supply imported from the Owens Valley/Mono Basin area, 2. Local groundwater supply from the Central, San Fernando, and Sylmar Basins, 3. Purchased water from the Metropolitan Water District of Southern California (MWD). The MWD sources of supply are the State Water Project and the Colorado River Aqueduct. Use of San Fernando Basin groundwater can fluctuate annually depending on the availability of imported water which varies due to climatic and operational constraints.

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

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

Table 2-1 shows the amount of groundwater extractions that are expected during the 2003-04 Water Year from the San Fernando and Sylmar Basins. Appendix B provides groundwater extraction projections from 2003 to 2008. 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
ACTUAL AND PROJECTED PUMPING FOR WY 03-04

San Fernando Basin		Actual Extraction (Acre-Feet)						Projected Extraction (Acre-Feet)					
	TOTAL	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04	May-04	Jun-04	Jul-04	Aug-04	Sep-04
AERATION	2,348	144	208	215	212	201	99	208	215	208	215	215	208
ERWIN	2,637	270	286	295	295	276	53	0	0	286	295	295	286
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH HOLLYWOOD	23,372	2,739	2,253	2,300	2,768	2,039	381	0	0	2,678	2,768	2,768	2,678
POLLOCK	1,975	193	163	52	117	173	185	179	185	179	185	185	179
RINALDI-TOLUCA	25,443	2,993	2,243	2,202	2,863	2,372	910	0	0	2,916	3,014	3,014	2,916
TUJUNGA	19,536	2,156	1,978	1,929	1,214	2,152	1,635	0	0	2,083	2,153	2,153	2,083
VERDUGO	4,770	529	512	529	529	495	94	0	0	512	529	529	512
WHITNALL	3,402	452	290	277	277	259	151	0	0	417	431	431	417
SAN FERNANDO BASIN TOTAL:	83,483	9,476	7,933	7,799	8,275	7,967	3,508	387	400	9,279	9,590	9,590	9,279
Sylmar Basin													
MISSION	3,829	394	369	381	155	0	352	357	369	357	369	369	357
ULARA TOTAL:	87,312	9,870	8,302	8,180	8,430	7,967	3,860	744	769	9,636	9,959	9,959	9,636

b. Spreading Projections for the 2003-04 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 2003-04.

Table 2-2

Actual and Projected Spreading in ULARA Spreading Grounds in 2003-04 (in acre-feet)							
Operated by:							
	LACDPW				LADWP	LACDPW and LADWP	Monthly Total
Month	Branford	Hansen	Lopez	Pacoima	Headworks (A)	Tujunga	
Oct-03	29	24	0	0		0	53
Nov-03	21	144	0	402		0	567
Dec-03	76	546	4	151		10	787
Jan-04	36	284	0	20		0	340
Feb-04	158	1540	+	802		254	2754
Mar-04	33	3380	140	252		0	3805
Projected							
Apr-04							0
May-04							0
Jun-04							0
Jul-04							0
Aug-04							0
Sep-04							0
Total	353	5918	144	1627	0	264	8306

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

Section 3: Water Quality Monitoring Program Description

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

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

Each well, whether on active or standby status, is monitored every three years for a full range of inorganic and organic compounds. Phase II and V Initial monitoring involves analysis for newly regulated organic compounds at all wells. Each well must be sampled for four consecutive quarters within a three-year period. Quarterly organics compounds analysis monitoring are performed four times a year for each well where organic compounds have been detected. A complete list of the parameters that must be tested for is contained in Title 22 of the California Code of Regulations. Appendix A provides a recent report for TCE, PCE, and nitrates in Los Angeles' San Fernando and Sylmar Basins wells.

Section 4: Groundwater Treatment Facilities Operations Summary

North Hollywood Operable Unit (NHOU): In September and October 2003 the Aeration Facility was shut down to change out the GAC and to replace a battery for the humidity sensor. In late March 2004 the facility was turned off for repair work related to the River Supply Conduit. There have been continuing low level detections of total chromium and hexavalent chromium at Well No. 2.

	Aeration Well No.							Average Flow to Facility	Influent to Facility TCE/PCE	Effluent from Facility TCE/PCE
Mon/Yr	2	3	4	5	6	7	8	(gpm)	(ug/L)	(ug/L)
4/03	131	264	259	39	265	291	282	1234	76.3/12.2	ND/0.8
5/03	130	264	258	41	265	275	98	1198	65.1/8.78	0.5/ND
6/03	129	264	258	42	265	275	282	1174	70.9/10.5	.09/ND
7/03	129	259	258	42	265	243	282	1255	79.9/12	<0.7/ND
8/03	128	259	251	36	233	301	265	1106	97.5/12.1	<0.5/ND
9/03	130	259	251	31	233	218	265	1148	NS	NS
10/03	129	131	101	39	231	282	235	1021	89/12	ND/ND
11/03	135	269	269	45	269	314	269	910	81/12	ND/ND
12/03	90	180	180	45	180	224	135	910	87/9.9	ND/ND
1/04	135	269	269	45	269	315	269	912	79/15	ND/ND
2/04	135	269	269	45	269	314	269	910	73.1/12.3	ND/ND
3/04	135	269	269	45	269	63	269	617	81.3/15.4	ND/ND

Section 5: Plans For Facilities Modifications

This section describes any plans for modifications to existing facilities, or plans to construct new facilities in the 2003-2004 Water Year, as of the printing of this report (April 2004).

a. Spreading Grounds:. LADWP plans to restore the full groundwater recharge capacity of the Tujunga Spreading Grounds by developing and implementing a mitigation action plan to control the methane gas migration from Sheldon-Arleta Landfill to the local neighborhood as a result of recharge. LADWP is investigating the possibility of developing a multi-objective project to restore the recharge activity of the Headworks Spreading Grounds while incorporating other compatible uses including passive recreation.

b. Extraction Wells: LADWP is planning to add up to eight new North Hollywood Wells in the west branch to restore diminished capacity resulting from contamination and obsolescence of some existing wells.

c. Groundwater Treatment Facilities:

North Hollywood Operable Unit. A feasibility study to improve the sustained production capacity of the HOU well system to 2,000 gpm, to enhance the NHOUcapture zone, and to improve the reliability of the NHOU to remain in operation is being reviewed by the USEPA. This plan includes the development of two or three new wells northwesterly of the NHOU. The discovery of hexavalent chromium above 5,000 ppb upgradient of the proposed well locations has created a need for a more extensive review of the consequences of implementing the plan. The USEPA, the City of Los Angeles, and the RWQCB are investigating the source of the hexavalent chromium contamination.

East Valley Water Recycling Project. The LADWP is focusing this project on direct non-potable (irrigation, industrial, commercial) use of the recycled water supply. Tertiary treated recycled water from the Donald C. Tillman Water Reclamation Plant will be used, but only for non-potable projects. The Hansen Area Water Recycling Project Phase I, scheduled to be on line by early 2006, will use some of the recycled water for cooling towers at the Valley Generating Station. The Hansen Area Water Recycling Project Phase II is being planned to deliver recycled

water to the Angeles National Golf Course formerly (Canyon Trails Golf Club) and the Hansen Dam Recreation Area. Other areas that will benefit from recycled water include irrigation projects in the West Valley and the Sepulveda Basin.

APPENDIX A:
2003-2004 Water Quality Sampling Results

	Owner Name	Well Name	Well	Date	PCE 5 ppb	TCE 5 ppb	NO3 45 ppm
1	NHE-1	3800E	NH AERATION WELL-001	6/17/98	3.66	240.00	
2	NHE-2	3810U	NH AERATION WELL-002	2/25/04	8.30	186.00	47.40
3	NHE-3	3810V	NH AERATION WELL-003	2/25/04	6.10	34.00	40.50
4	NHE-4	3810W	NH AERATION WELL-004	2/25/04	35.00	55.00	48.70
5	NHE-5	3820H	NH AERATION WELL-005	2/25/04	46.00	40.00	47.00
6	NHE-6	3821J	NH AERATION WELL-006	2/25/04	13.00	23.00	26.90
7	NHE-7	3830P	NH AERATION WELL-007	2/25/04	14.00	242.00	45.20
8	NHE-8	3831K	NH AERATION WELL-008	2/25/04	16.00	46.00	47.40
9	EW-1	3831H	ERWIN-001	10/22/97	0.72	-99.00	
10	EW-2	3821G	ERWIN-002	5/4/95	4.30	13.20	
11	EW-3	3831G	ERWIN-003	7/30/96	1.40	24.00	14.66
12	EW-4	3821F	ERWIN-004	4/7/97	0.60	8.10	4.43
13	EW-6	3821H	ERWIN-006	2/4/04	0.90	2.80	23.90
14	EW-10	3811F	ERWIN-010	2/4/04	-99.00	-99.00	7.09
15	M-5	4840J	MISSION-005	6/20/03	-99.00	5.15	27.60
16	M-6	4840K	MISSION-006	2/25/04	-99.00	4.34	25.40
17	M-7	4840S	MISSION-007	2/25/04	-99.00	-99.00	9.83
18	NH-02	3800	NORTH HOLLYWOOD-002	9/28/99	5.06	38.60	32.40
19	NH-04	3780A	NORTH HOLLYWOOD-004	1/6/04	-99.00	-99.00	8.86
20	NH-07	3770	NORTH HOLLYWOOD-007	2/3/04	-99.00	-99.00	12.40
21	NH-11	3810	NORTH HOLLYWOOD-011	2/10/04	8.60	4.70	19.90
22	NH-15	3790B	NORTH HOLLYWOOD-015				
23	NH-16	3820D	NORTH HOLLYWOOD-016	5/23/96	12.80	2.70	16.30
24	NH-17	3820C	NORTH HOLLYWOOD-017	12/9/97	6.16	1.65	11.92
25	NH-18	3820B	NORTH HOLLYWOOD-018	11/10/99	8.18	83.70	36.90
26	NH-20	3830C	NORTH HOLLYWOOD-020	7/21/99	3.00	9.58	39.50
27	NH-21	3830B	NORTH HOLLYWOOD-021	3/23/01			10.94
28	NH-22	3790C	NORTH HOLLYWOOD-022	1/9/04	-99.00	-99.00	23.50
29	NH-23	3790D	NORTH HOLLYWOOD-023	12/6/00	-99.00	-99.00	28.85
30	NH-25	3790F	NORTH HOLLYWOOD-025	1/29/04	-99.00	-99.00	14.20
31	NH-26	3790E	NORTH HOLLYWOOD-026	1/23/04	-99.00	-99.00	33.20
32	NH-27	3820F	NORTH HOLLYWOOD-027	4/23/02	-99.00	-99.00	10.40
33	NH-28	3810K	NORTH HOLLYWOOD-028	2/10/04	8.33	6.14	17.30
34	NH-30	3800D	NORTH HOLLYWOOD-030	6/18/03	1.12	8.08	25.00
35	NH-32	3770C	NORTH HOLLYWOOD-032	6/2/03	-99.00	-99.00	5.14
36	NH-33	3780C	NORTH HOLLYWOOD-033	2/3/04	-99.00	-99.00	4.12
37	NH-34	3790G	NORTH HOLLYWOOD-034	2/3/04	1.40	4.40	23.50
38	NH-35	3830N	NORTH HOLLYWOOD-035	11/15/01	2.81	1.22	10.40
39	NH-36	3790H	NORTH HOLLYWOOD-036	2/3/04	0.80	1.60	17.30
40	NH-37	3790J	NORTH HOLLYWOOD-037	9/25/02	5.88	7.76	31.40
41	NH-38	3810M	NORTH HOLLYWOOD-038				
42	NH-39	3810N	NORTH HOLLYWOOD-039				
43	NH-40	3810P	NORTH HOLLYWOOD-040	2/10/04	3.86	2.97	6.56
44	NH-41	3810Q	NORTH HOLLYWOOD-041	5/8/01	5.63	47.20	14.13
45	NH-42	3810R	NORTH HOLLYWOOD-042	5/12/99	5.73	88.50	24.50
46	NH-43A	3790K	NORTH HOLLYWOOD-043A	2/25/04	2.12	3.97	35.50
47	NH-44	3790L	NORTH HOLLYWOOD-044	1/23/04	-99.00	-99.00	13.00
48	NH-45	3790M	NORTH HOLLYWOOD-045	1/23/04	1.60	2.30	15.60
49	P-4	3959E	POLLOCK-004	2/27/04	3.27	4.99	34.20
50	P-6	3958H	POLLOCK-006	2/25/04	9.29	12.90	41.90

NOTE: -99 = non-detect

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

= above MCL

	Owner Name	Well Name	Well	Date	PCE 5 ppb	TCE 5 ppb	NO3 45 ppm
51	P-7	3958J	POLLOCK-007	6/2/03	-99.00	-99.00	13.50
52	RT-1	4909E	RINALDI-TOLUCA-001	2/6/04	2.60	8.60	9.90
53	RT-2	4898A	RINALDI-TOLUCA-002	2/6/04	2.70	17.00	19.00
54	RT-3	4898B	RINALDI-TOLUCA-003	1/15/04	3.10	7.40	23.90
55	RT-4	4898C	RINALDI-TOLUCA-004	2/13/04	1.02	2.09	23.90
56	RT-5	4898D	RINALDI-TOLUCA-005	2/11/04	-99.00	-99.00	20.80
57	RT-6	4898E	RINALDI-TOLUCA-006	1/15/04	-99.00	-99.00	15.50
58	RT-7	4898F	RINALDI-TOLUCA-007	1/15/04	-99.00	-99.00	17.70
59	RT-8	4898G	RINALDI-TOLUCA-008	8/22/03	-99.00	-99.00	16.20
60	RT-9	4898H	RINALDI-TOLUCA-009	1/15/04	-99.00	-99.00	16.80
61	RT-10	4909G	RINALDI-TOLUCA-010	2/6/04	1.00	7.90	24.40
62	RT-11	4909K	RINALDI-TOLUCA-011	2/6/04	1.00	3.90	
63	RT-12	4909H	RINALDI-TOLUCA-012	2/6/04	-99.00	-99.00	8.82
64	RT-13	4909J	RINALDI-TOLUCA-013	1/22/04	-99.00	1.20	12.00
65	RT-14	4909L	RINALDI-TOLUCA-014	2/6/04	3.10	12.00	18.60
66	RT-15	4909M	RINALDI-TOLUCA-015	2/6/04	3.00	8.40	17.40
67	TJ-01	4887C	TUJUNGA-001	6/11/03	-99.00	-99.00	23.50
68	TJ-02	4887D	TUJUNGA-002	1/27/04	-99.00	-99.00	26.10
69	TJ-03	4887E	TUJUNGA-003	2/26/04	-99.00	-99.00	23.90
70	TJ-04	4887F	TUJUNGA-004	2/26/04	0.50	2.87	25.40
71	TJ-05	4887G	TUJUNGA-005	2/26/04	2.68	-99.00	28.70
72	TJ-06	4887H	TUJUNGA-006	2/26/04	11.60	19.70	42.80
73	TJ-07	4887J	TUJUNGA-007	2/26/04	1.71	12.00	43.90
74	TJ-08	4887K	TUJUNGA-008	2/26/04	0.75	8.23	44.30
75	TJ-09	4886B	TUJUNGA-009	2/26/04	1.48	9.87	44.70
76	TJ-10	4886C	TUJUNGA-010	2/26/04	0.57	5.62	46.10
77	TJ-11	4886D	TUJUNGA-011	2/26/04	0.86	11.50	37.60
78	TJ-12	4886E	TUJUNGA-012	2/26/04	0.92	5.51	14.60
79	V-1	3863H	VERDUGO-001	8/7/03	0.76	6.46	32.90
80	V-2	3863P	VERDUGO-002	2/26/03	0.78	18.30	38.70
80	V-2	3853F	VERDUGO-002	3/21/03	-99.00	3.60	36.10
81	V-4	3863J	VERDUGO-004	1/13/98	6.47	17.90	1.92
82	V-11	3863L	VERDUGO-011	2/4/04	-99.00	2.20	12.60
83	V-13	3853G	VERDUGO-013				
84	V-24	3844R	VERDUGO-024	2/4/04	-99.00	-99.00	6.78
85	WH-4	3821D	WHITNALL-004	5/18/00	4.22	15.10	
86	WH-5	3821E	WHITNALL-005	2/10/04	4.35	12.10	26.60
87	WH-6A	3831J	WHITNALL-006A	2/10/04	0.82	2.68	7.31
88	WH-7	3832K	WHITNALL-007	2/10/04	2.48	8.57	16.60
89	WH-8	3832L	WHITNALL-008	10/22/96	4.60	10.20	
90	WH-9	3832M	WHITNALL-009				

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

APPENDIX B:
Groundwater Extraction Projections 2003-2008

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

SAN FERNANDO BASIN (SFB) WELL FIELDS	WATER YEAR				
	2003-04	2004-05	2005-06	2006-07	2007-08
AERATION	2,348	2,390	2,390	2,390	2,390
ERWIN	2,637	994	994	994	994
HEADWORKS	0	0	0	0	0
NO HOLLYWOOD	23,372	25,276	25,276	25,276	25,276
POLLOCK	1,975	2,400	2,400	2,400	2,400
RINALDI-TOLUCA	25,443	25,900	25,900	25,900	25,900
TUJUNGA	19,536	22,179	22,179	22,179	22,179
VERDUGO	4,770	5,261	5,261	5,261	5,261
WHITNALL	3,402	2,600	2,600	2,600	2,600
TOTAL SFB ACRE-FEET	83,483	87,000	87,000	87,000	87,000

Sylmar Basin	3,323	3,300	3,300	3,300	3,300

APPENDIX B

CITY OF BURBANK

PUMPING AND SPREADING PLAN

2003-2008 Water Years

GROUNDWATER PUMPING AND SPREADING PLAN

FIVE WATER YEARS
OCTOBER 1, 2003 TO SEPTEMBER 30, 2008

Prepared by

BURBANK WATER AND POWER
WATER DIVISION

May 2004

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APPENDICES

I. INTRODUCTION

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

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

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

II. WATER DEMAND

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

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

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

III. WATER SUPPLY

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

A. MWD

The amount of treated water purchased from the MWD has been reduced as the result of bringing several water resource projects on-line. Burbank may purchase additional quantities of untreated water for basin replenishment. See Section IV. Historic and projected use of MWD water is shown in Table 3.1.

B. GAC TREATMENT PLANT

The City placed a granular activated carbon (GAC) Treatment Plant in service in November 1992. Historic and proposed production from this plant is shown in Table 3.2. The GAC Treatment Plant will normally be operated during the summer season from May to October. However, current plans are to keep the plant shut down, except for emergencies. New chromium regulations due in 2004-05 will lead to decisions on the future use of the water. When the plant is operated, shutdowns for carbon change-out can be expected every two months. Mechanical maintenance will be performed when the plant is out of service during the winter season. The GAC Treatment Plant uses the groundwater produced from Well No. 7 and Well No. 15 (Figure 3.1). The plant capacity is 2,000 gpm. Lockheed Martin has arranged to utilize the capacity of the GAC Treatment Plant to augment the production of the Burbank Operable Unit (BOU) to reach the required annual average of 9,000 gpm. Lockheed Martin will pay a share of the operation and maintenance cost of the GAC in proportion with the volume of water which is credited toward the 9,000 gpm.

C. EPA CONSENT DECREE

The EPA Consent Decree Project became operational January 3, 1996. The source of water is wells VO-1 through VO-8 (Figure 3.1). The Second Consent Decree was entered on June 22, 1998. The plant was out of service from December 15, 1997 to December 13, 1998. The plant capacity is 9,000 gpm. Projected use of EPA Consent Decree water produced by the BOU is shown in Table 3.3.

D. RECLAIMED WATER

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

E. PRODUCTION WELLS

The City has five wells that are mechanically and electrically operable, plus the eight wells of the BOU. Two wells are on "Active" status and three are on "Inactive" status with the Department of Health Services (DHS). Three others have had equipment pulled. We do not plan to operate the inactive wells unless an emergency develops in the 2003-2004 water year.

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

*No transformer; cannot be operated.

IV. JUDGEMENT CONSIDERATIONS

A. PHYSICAL SOLUTION

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

Physical Solution Producers	
Valhalla	300 acre-feet
Lockheed Martin	25 acre-feet

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

B. STORED WATER CREDIT

The City has a stored water credit of 27,429 acre-feet as of October 1, 2003.

C. ALLOWANCE FOR PUMPING

The import return water extraction right (20 percent of water delivered the prior year) for the 2003-2004 water year is 4,622 acre-feet. This amount is exclusive of additional extractions allowed due to the City's stored water credits, physical solution right or pumping for groundwater clean-up.

Estimated allowable future pumping, based on 23,000 acre-feet of delivered water, will be 4,600 acre-feet per year.

D. SPREADING OPERATIONS

The City has purchased water for basin replenishment since 1989. The water has been typically spread at the Pacoima Spreading Grounds by L.A. County Public Works Department with the assistance of the Los Angeles Department of Water and Power (LADWP). The LADWP water pipelines to the Pacoima Spreading Ground were damaged during the 1994 Northridge earthquake. Replenishment water, beginning in water year 1994-95, has been taken "in lieu" through MWD service connection LA-35 at the L.A. Treatment Plant. The historic and projected spreading water is shown in Table 4.2.

Burbank is currently preparing to construct an MWD connection at the end of the Foothill Feeder Tunnel. (See Figure 4.1.) The connection will be capable of delivering 50 cubic feet per second (cfs). This will allow spreading of 6,000 to 8,000 acre-feet per year of purchased water at the Pacoima Spreading Grounds starting in January 2005.

V. CAPITAL IMPROVEMENTS

A. WELLS

Burbank: Burbank is in the process of retaining the services of a consultant to conduct an efficiency study of the BOU wells and well water transmission system. Proposed capital improvements may result from the study.

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

Maintenance Activity- Wells 14A, 17 and 18: These wells are planned to be destroyed in accordance with County standards. Well 14A was destroyed in July 2003. Wells 17 and 18 will be destroyed during Fiscal Year 2004-05.

B. GROUNDWATER TREATMENT FACILITIES

EPA Project: The EPA Consent Decree Project became fully operational on January 3, 1996. Production and treatment of 3,000 gpm to 8,000 gpm was performed through mid-September 1996.

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

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

In late June 2000, the treatment plant went off-line due to a breakthrough of 1,2,3- trichloropropane (TCP) in the plant effluent. The plant did not return to service until DHS had approved an operation and sampling plan and the carbon was changed out in the wet phase contactors. Well VO-6 was removed from service at that time because it had high concentrations of 1,2,3-TCP. The overall production of the BOU was also reduced at this time due to general mechanical problems in the BOU, including the vapor phase GAC screens, the wearing of well pumps/motors and the failure of well level sensors. While these problems were being analyzed, Lockheed Martin invoked a "*force majeure*" provision of the Second Consent Decree in October 2001. EPA has ruled against the *force majeure* claim. The results of the well field study will guide the next step in optimizing the BOU facilities to reliably produce 9,000 gpm.

The distribution headers and underdrains in the liquid phase carbon contactors were being replaced during the summer of 2003. The work was completed in December of 2003. Design of replacement screens for the vapor phase carbon contactors is in progress. Construction is projected for summer of 2004.

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

GAC Treatment Plant: Burbank does not plan to use the production and treatment facilities of the GAC Treatment Plant during the 2003-2004 water year. The plant will remain on an active status, but will not be operated except for emergencies.

TABLE 2.1
FIVE-YEAR PROJECTED WATER DEMAND

Water Year	Acre – Feet
93-94	25,369
94-95	23,003
95-96	23,188
96-97	24,845
97-98	22,447
98-99	22,672
99-00	26,313
00-01	25,619
01-02	24,937
02-03	23,129
03-04*	23,700
04-05*	24,300
05-06*	25,227
06-07*	25,856
07-08*	26,087

* Projected

NOTES:

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

(2) The last five year average water demand was 24,534 acre-feet.

TABLE 3.1
FIVE-YEAR PROJECTED USE OF MWD TREATED WATER

Water Year	Acre-Feet
93-94	18,074
94-95	17,173
95-96	12,937
96-97	10,525
97-98	16,972
98-99	10,536
99-00	10,471
00-01	12,447
01-02	12,086
02-03	13,158
03-04*	12,900
04-05*	11,800
05-06*	12,027
06-07*	12,256
07-08*	12,487

*Projected

NOTES:

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

TABLE 3.2
FIVE-YEAR PROJECTED USE OF THE LAKE STREET GAC TREATMENT PLANT

Water Year	Acre-Feet
93-94	2,395
94-95	2,590
95-96	2,295
96-97	1,620
97-98	1,348
98-99	1,542
99-00	1,086
00-01	987
01-02	0
02-03	0
03-04*	0
04-05*	0
05-06*	0
06-07*	0
07-08*	0

*Projected

NOTES:

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

(2) Wells No. 7 and No. 15 supply water for the GAC Treatment Plant. Proposed production rates (if the plant is used) are as follows:

Well No. 7	1,050 gpm
Well No. 15	850 gpm

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

(4) The GAC Treatment Plant has been shut down since March 2001 because of chromium 6 concerns.

TABLE 3.3
FIVE-YEAR PROJECTED USE OF VALLEY/ BOU TREATED GROUNDWATER

Water Year	Acre-Feet
93-94	803 (3) (5)
94-95	462 (5)
95-96	5,737 (5)
96-97	9,280
97-98	2,102
98-99	9,042
99-00	11,345
00-01	9,046
01-02	10,402
02-03	9,100
03-04*	10,000
04-05*	10,900
05-06*	10,900
06-07*	10,900
07-08*	10,900

*Projected

NOTES:

(1) Burbank includes BOU extractions in its pumping rights.
(2) Lockheed Martin has physical solution right of 25 AF/year.
(3) Lockheed Martin stopped its operation of the Aqua Detox Treatment System in June 1994. (BOU378 + AD450 - 25) = 803
(4) Re-injected water has been excluded from the above values.
(5) During the water years 1993-94, 1994-95 and 1995-96, Lockheed-Martin produced water for testing of the EPA Consent Decree Project. The Watermaster did not charge Burbank for these amounts included in Table 3.3. Beginning January of water year 1995-96, all extractions shown in Table 3.3 are charged to Burbank. GAC flushing and treatment bypass were accounted for separately and charged to a 'basin account' (following table), but beginning June 2003, most such losses are charged to Burbank as "non-municipal use."

Water Year	AF	Water Year	AF	Water Year	AF	Water Year	AF
1993-94	378	1996-97	320	1999-2000	107	2002-03	70
1994-95	462	1997-98	478	2000-01	88		
1995-96	34	1998-99	142	2001-02	138		

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

TABLE 3.4
FIVE-YEAR PROJECTED USE OF RECLAIMED WATER

Water Year	Acre-Feet
93-94	3,706
94-95	2,480
95-96	1,880
96-97	3,120
97-98	1,744
98-99	1,210
99-00	2,979
00-01	2,732
01-02	2,087
02-03	488
03-04*	500
04-05*	1,300
05-06*	2,000
06-07*	2,000
07-08*	2,000

*Projected

NOTES:

1) The source of reclaimed water is the Burbank Water Reclamation Plant.
2) The Upper and Lower Landfill areas were provided reclaimed water service in water year 1994-95.
3) The DeBell Golf Course and Par-3 Course were provided reclaimed water service in water year 1995-96. McCambridge Park landscaping was added to the reclaimed water system in 1996-97.
4) The Burbank Nature Center was provided reclaimed water service in water year 1998-99.
5) The BWP Power Plant reduced its reclaimed water use beginning water year 1996-97 due to decreased local power generation. Beginning water year 2000-01, power production and reclaimed water use were increased again.
6) Beginning May 2002, the Power Plant began to use reclaimed water as its source for demineralized water production using the Puretec treatment system.
7) Water use dropped in 2002-03 and 2003-04 as the Magnolia power plants were decommissioned and demolished and Olive 1 and 2 were offline for major modifications.
8) The Magnolia Power Project will begin using reclaimed water in the second half of WY 2004-05

TABLE 4.1
FIVE-YEAR PROJECTED EXTRACTIONS OF GROUNDWATER BY VALHALLA

Water Year	Acre- Feet
93-94	391
94-95	298
95-96	339
96-97	300
97-98	281
98-99	342
99-00	432
00-01	407
01-02	362
02-03	383
03-04*	300
04-05*	300
05-06*	300
06-07*	300
07-08*	300

*Projected

NOTES:

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

(2) Valhalla has physical solution right of 300 AF/year.

TABLE 4.2
FIVE-YEAR PROJECTED BURBANK SPREADING OPERATIONS

WATER YEAR	ACRE-FEET
93-94	0 (1)
94-95	5,380 (2)
95-96	2,000 (2)
96-97	1,500 (2)
97-98	0
98-99	2,000 (2)
99-00	0
00-01	0
01-02	0
02-03	300 (2) (3)
03-04*	1,200
04-05*	2,400 (4)
05-06*	3,850
06-07*	5,050
07-08*	6,000

*Projected

NOTES:

1) The Maclay pipeline was damaged in the 1994 Northridge earthquake. Deliveries to the Pacoima Spreading Grounds are precluded until repaired by the LADWP.
2) The City exercised its physical solution right in water years 1994-95, 1995-96, 1996-97, 1998-99, and 2002-03 for basin replenishment.
3) Beginning in FY 2002-03, Burbank began to ramp into its long-term basin replenishment obligation.
4) A new connection to MWD is planned to allow the necessary spreading at Pacoima Spreading Grounds after January 2005. (Figure 4.1)

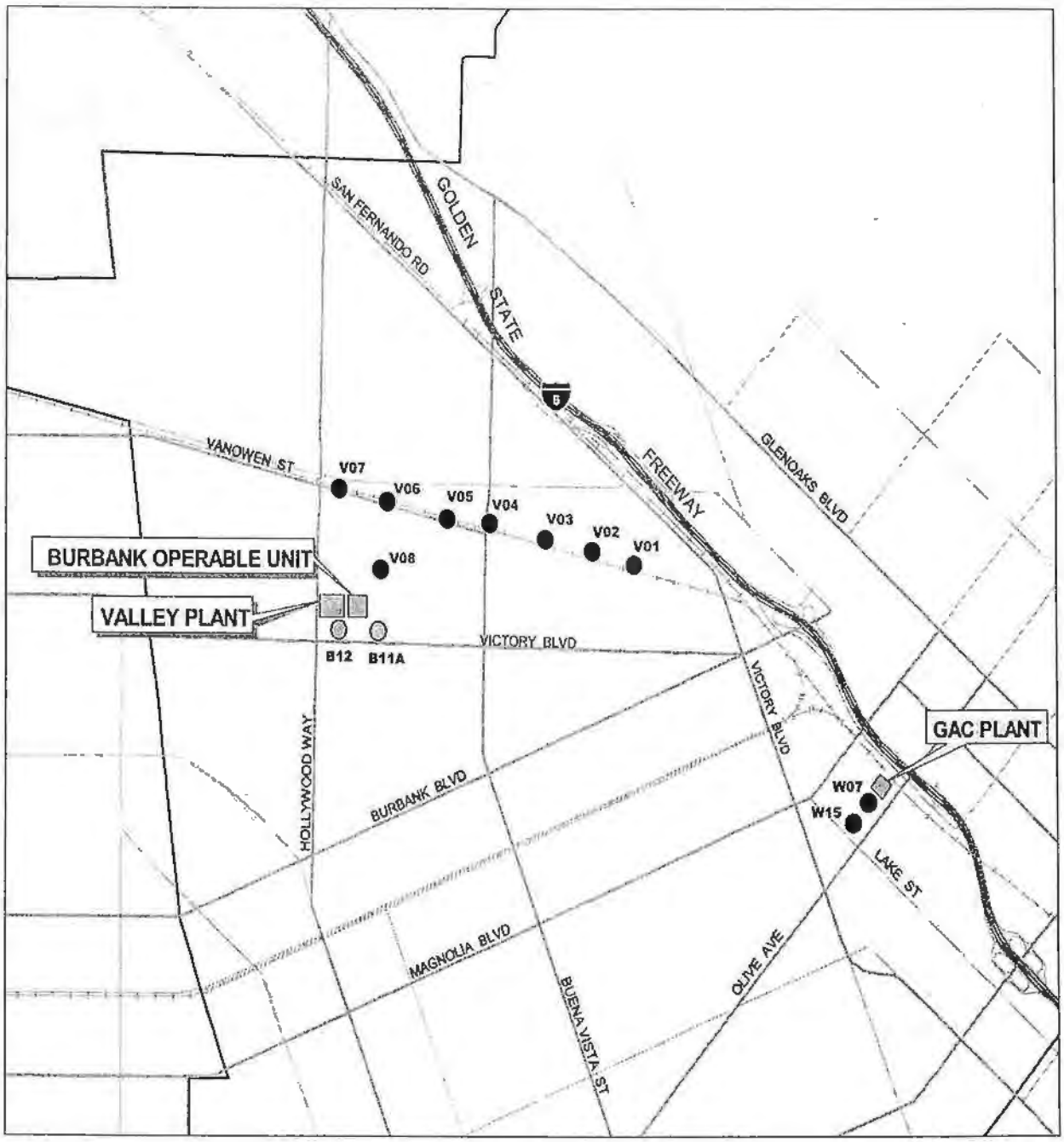


FIGURE 3.1
WELLS AND GROUNDWATER TREATMENT PLANTS

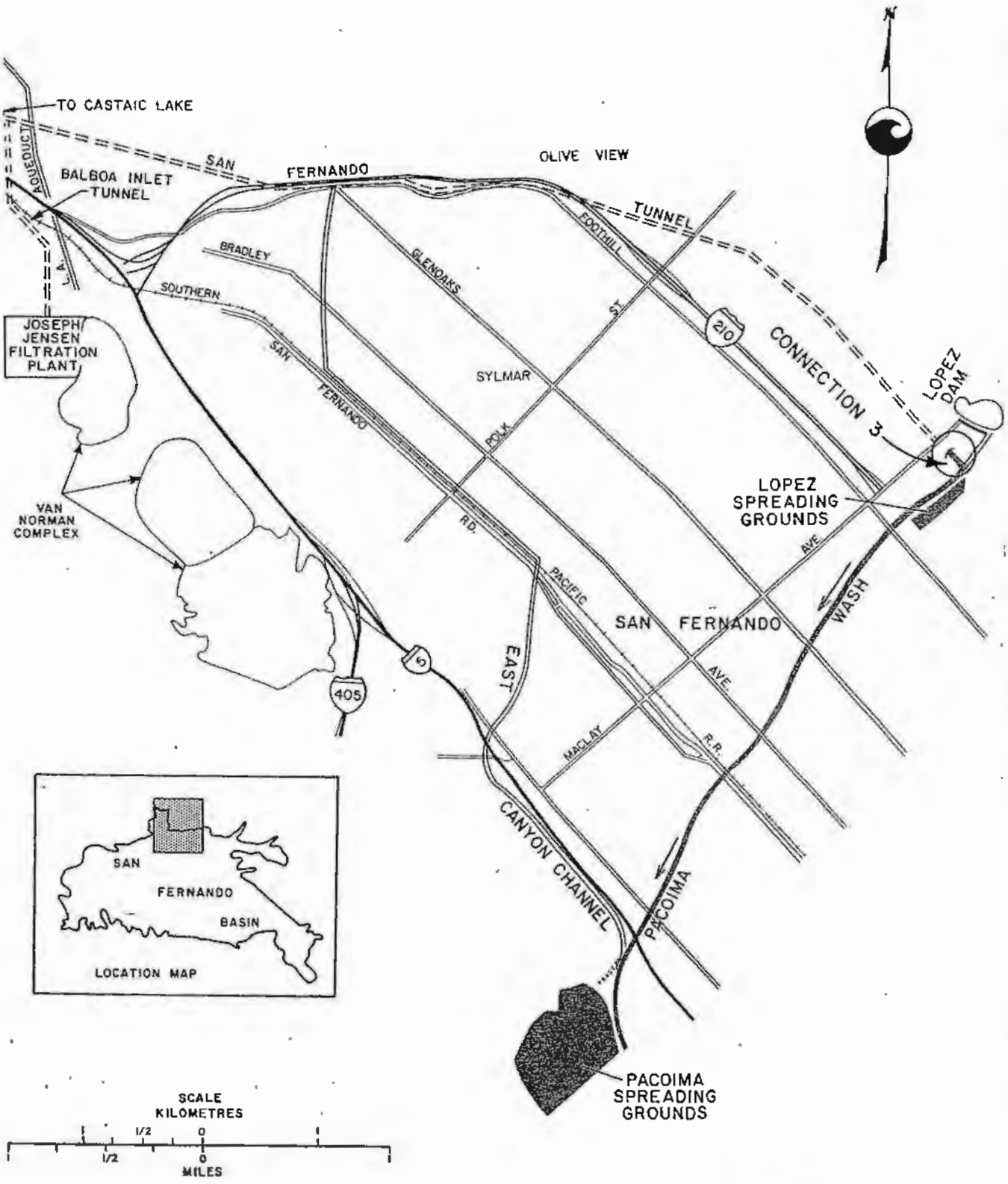


FIGURE 4.1
LOCATION OF PROPOSED MWD UNTREATED WATER CONNECTION

APPENDIX A

WATER QUALITY DATA

The 2003 Annual Water Quality Report is not yet available. Water Quality monitoring and testing of supply sources is not included with this report.

APPENDIX B

WATER TREATMENT FACILITIES

LAKE STREET GAC TREATMENT PLANT

320 North Lake Street
Burbank CA 91502

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division

Albert Lopez, Water Production/ Operations Superintendent

QUANTITY TREATED (10/1/02 through 10/1/03):

None—plant remained on standby

WATER QUALITY:

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

DISPOSITION:

Burbank Water System
Potable Water

EPA CONSENT DECREE PROJECT – BURBANK OPERABLE UNIT

2030 North Hollywood Way
Burbank CA 91505

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division

Albert Lopez, Water Production/ Operations Superintendent

QUANTITY TREATED (10/1/02 through 10/1/03):

9,080 Acre-Feet for domestic use

WATER QUALITY:

Contaminants: VOCs, Nitrate, Chromium, 1,2,3-TCP

DISPOSITION:

(1) Test Water- Waste

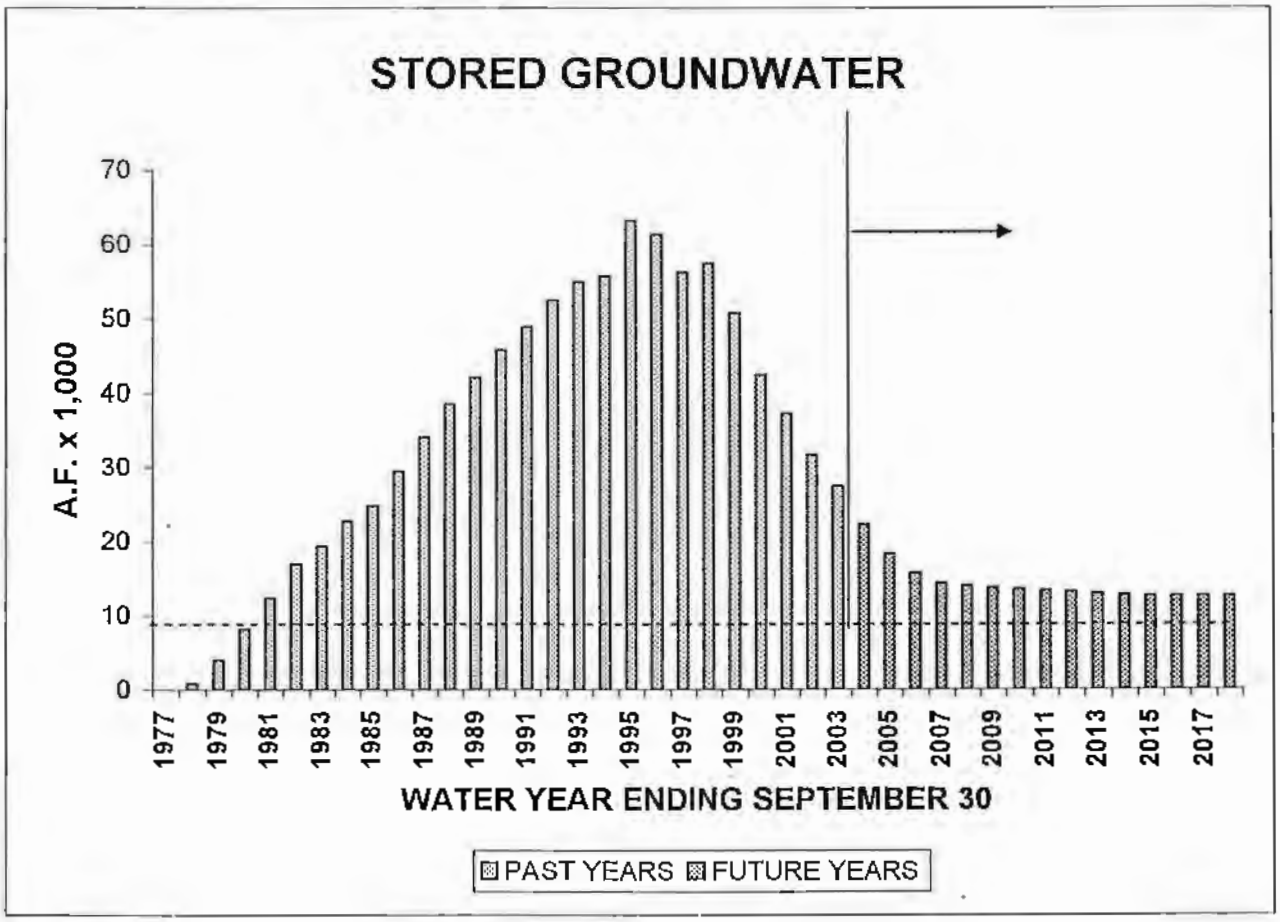
(2) Operation Water (backwash, etc.) - Waste

(3) Burbank Water System-
Potable water after blending

APPENDIX C

STORED GROUNDWATER

BURBANK WATER AND POWER
WATER DIVISION
FY 2003/04



NOTES:

- 10,000 AF RECOMMENDED AS BASIN BALANCE. THIS EQUATES TO ABOUT ONE YEAR OF DOMESTIC SYSTEM PRODUCTION IF REPLENISHMENT NOT AVAILABLE FROM MWD.
- DRAW DOWN STORED WATER BY PRODUCTION EXCEEDING THE RETURN FLOW CREDIT (~4,600 AF) PLUS SPREAD WATER OR PHYSICAL SOLUTION CREDITS.
- GROUNDWATER PRODUCTION EQUALS EPA (10,700 AF) AND VALHALLA (300 AF).
- RAMP UP SPREADING WATER PURCHASES BEGINNING WATER YEAR 2002-03 TO MAINTAIN BASIN BALANCE.

CITY OF BURBANK WATER AND POWER
WATER DIVISION

BURBANK'S STORED GROUNDWATER

70% EPA - With Ramp

WATER YEAR	DELIVERED WATER AF	RETURN FLOW CREDIT AF	SPREAD WATER AF	PUMPED GROUNDWATER AF	STORED WATER CREDIT AF
1976-77	22,743	4,549			
1977-78	22,513	4,503		3,767	(1) 782
1978-79	24,234	4,847		1,358	(2) 3,947
1979-80	24,184	4,837		677	8,117
1980-81	25,202	5,040		595	12,359
1981-82	22,120	4,424		523	16,876
1982-83	22,118	4,424		2,002	19,298
1983-84	24,927	4,985		1,063	22,659
1984-85	23,641	4,728		2,863	24,781
1985-86	23,180	4,636		123	29,386
1986-87	23,649	4,730		0	34,022
1987-88	23,712	4,742		253	38,498
1988-89	23,863	4,773		1,213	42,027
1989-90	23,053	4,611	378	1,401	45,777
1990-91	20,270	4,054	504	2,032	48,860
1991-92	20,930	4,186	503	938	52,479
1992-93	21,839	4,368	500	(3) 2,184	54,981
1993-94	24,566	4,913	0	(3) 3,539	55,810
1994-95	22,541	4,508	5,380	2,888	63,215
1995-96	23,124	4,625	2,000	8,308	61,415
1996-97	24,888	4,977	1,500	11,243	56,297
1997-98	22,447	4,489	0	3,731	57,543
1998-99	22,671	4,534	2,000	13,262	50,770
1999-2000	26,312	5,262	0	12,862	42,442
2000-01	25,619	5,124	0	10,440	37,264
2001-02	24,937	4,987	0	10,764	31,624
2002-03	23,108	4,622	300	9,483	27,428
2003-04	23,000	4,600	1,200	11,000	22,250
2004-05	23,000	4,600	2,400	11,000	18,250
2005-06	23,000	4,600	3,850	11,000	15,700
2006-07	23,000	4,600	5,050	11,000	14,350
2007-08	23,000	4,600	6,000	11,000	13,950
2008-09	23,000	4,600	6,200	11,000	13,750
2009-10	23,000	4,600	6,200	11,000	13,550
2010-11	23,000	4,600	6,200	11,000	13,350
2011-12	23,000	4,600	6,200	11,000	13,150
2012-13	23,000	4,600	6,200	11,000	12,950
2013-14	23,000	4,600	6,200	11,000	12,750
2014-15	23,000	4,600	6,200	11,000	12,550
2015-16	23,000	4,600	6,400	11,000	12,550
2016-17	23,000	4,600	6,400	11,000	12,550
2017-18	23,000	4,600	6,400	11,000	12,550

NOTES:
(1) STORED WATER AS OF OCTOBER 1, 1978
(2) STORED WATER AS OF OCTOBER 1, 1979
(3) EXCLUDES 150 A.F. OF PUMPING FOR TESTING.
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 CITY, VALHALLA, LOCKHEED, & DISNEY.
SHADED AREAS OF TABLE ARE PROJECTED VALUES .

APPENDIX C

CITY OF GLENDALE

PUMPING AND SPREADING PLAN

2003-2008 Water Years

CITY OF GLENDALE

GROUNDWATER PUMPING AND SPREADING PLAN

WATER YEARS 2003-08

Prepared By

GLENDALE WATER & POWER

MAY 2004

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INTRODUCTION

This report discusses historic water supplies to Glendale, future water demands, and new sources of local water available to meet demands and reduce dependency 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, others interested in Glendale's water resource future and, more recently, to demonstrate adequate water supplies for the future development in the City.

EXISTING WATER SOURCES AND SUPPLIES

The City has four sources of water available to meet its long-term water demands, the San Fernando Basin, the Verdugo Basin, Metropolitan Water District of Southern California (MWD), and recycled water from the Los Angeles – Glendale Water Reclamation Plant. Location of these sources is shown in Figure 1.

SAN FERNANDO BASIN

Water Rights and Supplies - The City's right to San Fernando Basin groundwater supplies is defined in The City of Los Angeles, Plaintiff, vs. The City of San Fernando, ET. al., Defendants, (Judgment). The Final Judgment of 1979 concluded litigation over San Fernando Basin water rights that began in 1955. Location of the San Fernando Basin is shown in Figure 2. The California Supreme Court found that under "Pueblo" Water Rights, Los Angeles owns all San Fernando surface and groundwater supplies, and that the cities of Burbank and Glendale are entitled to only an annual Return Flow credit. There is also a Physical Solution Water Right that allows for additional but limited extractions for payment. Various categories of San Fernando Basin water supplies are:

Return Flow Credits - Glendale has a right to extract 20 percent of all water, including recycled water, it delivered in the San Fernando Basin. This does not apply to waters delivered to the Verdugo Basin. This return flow credit is about 5,500 acre-feet per year (AFY).

Accumulated Groundwater Rights – Glendale has the right to store groundwater credits and extract an equivalent amount. Because Glendale was not been able to fully utilize its right to Return Flow Credits from 1979 to 2000 due to the presence of volatile organics in the groundwater, the stored water credits accumulated to a peak of almost 80,000 AF in 2000.

Physical Solution Water Rights - Glendale has a secondary right to produce additional water called Physical Solution Water. Glendale has a 5,500 AFY physical solution allowance. This would be charged to the City of Los Angeles' extraction rights in exchange for payment roughly equivalent to MWD's water costs less the energy cost for extraction.

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.

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.

Water Quality - San Fernando Basin production was greatly reduced between 1980 and 2000 because of the volatile organic compounds in the groundwater. The U. S. Environmental Protection Agency (EPA) established Operable Units in North Hollywood, Burbank, and Glendale to extract and treat the contaminated groundwater.

The Glendale Operable Unit consists of eight extraction wells, a 5,000 gpm water treatment plan and pipelines between the facilities. The Grandview Pumping Plant, a chloramination station, and a blend line from the MWD G-3 connection were needed to put the treated water into the distribution system. A general layout of these facilities is shown on Figure 4. This source will provide over 7,200 AFY to the City and will meet about 22 percent of projected near-term water demands.

There is additional groundwater production of 400 AFY by Forest Lawn Memorial Park for irrigation purposes, and 25 AFY for use of the cooling towers at the Glendale Power Plant for a total of 7,625 AFY from the San Fernando Basin.

Summary – Glendale has extraction rights to about 5,500 AFY plus an additional 5,500 AFY of physical solution allowance. Because of the Glendale Water Treatment Plant, the City can use 7,200 AFY from the Operable Unit wells, plus 400 AFY produced by Forest Lawn Memorial Park used for irrigation purposes, and 25 AFY for use of the cooling towers at the Glendale Power Plant. The annual production from the San Fernando Basin totals 7,625 AFY. This represents about 20 percent of the year 2025 water demands as shown in Table 6.

VERDUGO BASIN

Water Rights and Supplies – The Judgment gave Glendale the right to extract 3,856 AFY from the Verdugo Basin, shown on Figure 2. Glendale has a long history of pumping water from this basin. It was the primary source of water during the formation of the City in the early 1900s. The production of water varies year to year depending on rainfall. The City operates three extraction wells constructed prior to 1950. To increase production from this basin, Glendale constructed the Verdugo Park Water Treatment Plant (VPWTP). It consists of two new shallow wells and the underground water infiltration pick-up system, and a diatomaceous earth filtration plant. The plant has a capacity of 1,150 gpm. This water is delivered to the potable water supply system.

Even with the VPWTP, the City has not been able to fully utilize their Verdugo Basin extraction rights. The reduced yield from this basin is attributed to low rainfall and the replacement of septic tanks with wastewater lines in the La Cresenta area. It is anticipated that the City can produce about 2,300 AFY from this basin.

Water Quality – Historically, the only water quantity parameter of concern in the Verdugo Basin is the high nitrates from past septic tanks in the La Crescenta area. Since the areas have been sewered, the nitrate levels have decreased in recent years and are below the MCL of 10 ppm. Even so, the groundwater is blended with MWD supplies and monitored weekly.

Summary – If the City were able to fully utilize its rights to these supplies, about ten percent of demands could be met from this supply. Realistically, based on historical pumping records, only 2,300 AFY will be available from this source on a reliable basis, and will provide about 6 percent of the City's water needs. Location of the VPWTP and wells are shown on Figure 3.

METROPOLITAN WATER DISTRICT

The Metropolitan Water District of Southern California (MWD) provides supplemental water from Northern California via the State Water Project and the Colorado River via the Colorado River Aqueduct. The location of these aqueducts is shown on Figure 5. Within its service area, it has 26 member agencies that provide water to 16 million people. Glendale is one of the member agencies.

Glendale has three service connections to MWD. Service connection number and capacity are summarized in Table 1. The City is proposing to increase the G-3 capacity to 20 cfs to meet the new blending demands from the GWTP.

TABLE 1
METROPOLITAN CONNECTIONS AND CAPACITY

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

RECYCLED WATER

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

Power Plant Project - Recycled water deliveries were first made to the Glendale Power Plant for use in the cooling towers and to Caltrans for irrigation along the 134 Freeway near the 5 Freeway in the late 1970's. A pipeline was constructed from the LAGWRP to the Glendale Power Plant.

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

Los Angeles proposes to extend the system from its south Glendale terminus into Elysian Park and into the downtown Los Angeles area.

Verdugo – Scholl Project was designed to deliver recycled water to Oakmont Country Club, Scholl Canyon Golf Course, and Scholl Canyon Landfill. Another major user is Cal Trans for irrigation along the 134 and 2 Freeways. Additional users include Glendale Community College, Glendale High School, and the Central Library.

The portion of the project up to Scholl Canyon was a joint effort with the City of Pasadena. Pasadena provided funds for Glendale to the size the facilities to accommodate future deliveries to Pasadena for their projects.

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

Delivery System - Recycled water delivery system is now comprised of 20 miles of mains, 5 storage tanks, pumping plants and 43 customers currently using about 1,400 AFY. Specific features of the recycled water program are shown in more detail on Figure 6 including location of various recycled water projects. Schematic diagram of the recycled water system is shown on Figure 7. Recycled water use has increased from 550 AF in 1991-92 to 1,400 AF in 2002-2003. Expected deliveries from the various projects are shown on Table 2. The objective is to increase the use of recycled water to meet 10 percent of demands. This will require a significant increase in users and expansion of the system. The list of recycled water users is shown in detail on Figure 8.

TABLE 2

RECYCLED WATER USE (AFY)

PROJECTS	2000	2005	2010	2020
Brand Park	111	170	170	170
Forest Lawn Pipeline	242	350	350	350
Power Plant Pipeline	472	450	450	450
Verdugo-Scholl Pipeline	839	1,020	1,040	1,080
TOTAL	**1,664**	**1,990**	**2,010**	**2,050**

High-Rise Office Building - The City requires dual plumbing system in new high-rise office buildings so when recycled water becomes available, it can be used for sanitary flushing purposes in the buildings without retrofitting. A list of office buildings that have been dual plumbed is provided on Table 3.

Glendale Community College has recently completed on-site plumbing changes to utilize recycled water on two of their dual plumbed buildings. They started delivery of recycled water for toilet flushing in April 2004.

The City started a chlorination program for the recycled water storage facilities a few years ago in anticipation of the higher quality expected for dual plumbing purposes. Substantial improvement in odor and bio-growth in the system was noted.

TABLE 3

Office Buildings Dual Plumbed to Use Recycled Water for Sanitary Programs

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

Summary of Supplies

A general summary of the City's rights to local water resources compared to the amount currently being used is shown on Table 4.

TABLE 4

LOCAL WATER USE (AFY)

Potential Source	Right	Current Use	Future Use
San Fernando Basin[1]	About 5,400	8,500 AFY	7,625
Verdugo Basin	3,856	1,600 AFY	2,300
Recycled Water	10,000	1,400 AFY	2,050

PAST WATER USE, CURRENT AND TRENDS

Historically, the City used ground water to meet a varying portion of its water demand. In the 1940's and 1950's essentially all of the City's water needs were obtained from the San Fernando and the Verdugo Basins with limited supplies from Metropolitan. In the 1960's, production from the San Fernando Basin reached a peak of about 18,000 acre-feet per year (AFY). The Grandview wells in the San Fernando Basin had a peak capacity of about 24,000 gpm.

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.

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

---

[1] Return flow credit only.

that volatile organic compounds (VOCs), in particular, trichloroethylene (TCE) and perchloroethylene (PCE) were present in the San Fernando Basin. Both chemicals were used extensively in the past by the aerospace, metal plating, and dry cleaning industries. As the VOC plume spread across the basin, Glendale and other water agencies in the San Fernando Basin began shutting down wells as the VOC concentrations approached the State Department of Health Service maximum contaminant levels (MCL). As a result, the City production from the basin declined to about 400 ac-ft per year. This use was limited to the Glendale Power Plant for cooling tower make-up water and irrigation at Forest Lawn Memorial Park.

In the 1980's, the U. S. Environmental Protection Agency designated the San Fernando Basin as a Superfund site. After a decade of studies, and facility design and construction, a water treatment plant, eight extraction wells and collection lines to the treatment plant, a delivery line to the Grandview Pumping Station, a blend line from the MWD G-3 connection to reduce nitrate levels, and a chloramination facility, were completed in the summer of 2000 to begin the use of San Fernando Basin water supplies. This plant is called the Glendale Water Treatment Plant (GWTP). A general layout of the plant facilities is shown on Figure 4. Since January 2002, the GWTP has exceeded the 7,256 AFY production requirement of the consent decree.

The City also completed construction of the Goodwin Treatment facility in December 2002. This GAC facility can remove VOCs from one of the higher chromium wells before delivering the effluent to the Recycled Water system. This was constructed as a contingency to meet upcoming regulations on hexavalent chromium.

Ten of the old Grandview Wells in the San Fernando Basin were decommissioned in December 2002.

Figure 9 shows the historic and projected water use from the various sources. The annual water use in Glendale for fiscal year 2001-02 was 33,769 AFY. In 1991-92, the use was about 25,782 AFY because of mandatory conservation. Water use in FY

1997-98 was below normal because of the very heavy rain (El Nino) during the first half of 1998. However, with the below normal rainfall in FY 1998-99, water use was up significantly as shown on Table 5. In the fiscal year 2002-03, the use was 33,346 AFY and is equivalent to an average daily use of 30 million gallons per day (MGD).

TABLE 5

TOTAL ANNUAL WATER DEMAND

Fiscal Year	Demand	Comments
1991-92	25,780 AF	
1997-98	29,680 AF	Heavy Rainfall (El Nino)
1998-99	31,230 AF	Below Normal Rainfall
1999-00	33,435 AF	
2000-01	33,475 AF	
2001-02	33,770 AF	
2002-03	33,345 AF	
2005	*32,554 AF*	*Projected*
2010	*33,824 AF*	
2020	*36,821 AF*	
2025	*38,600 AF*	

PROJECTED WATER DEMANDS AND SOURCES

Projection Methodology - MWD uses the U.S. Army Corps of Engineers IWR-MAIN (Municipal and Industrial Needs) water demand forecasting system modified for 51 of the larger cities in MWD's service area including Glendale. The model (MWD-MAIN) is used to project water demands incorporating a wide range of economic, demographic, and climatic factors. Specific data includes projected population, housing mix, household occupancy, housing values, weather conditions, and conservation

measures. The forecasts generate expected demands during a year of normal weather conditions. This modeling is considered the state-of-the-art approach in projecting demands and is being used by an increasing number of major cities in the country for water demand forecasting.

Projected Water Use - The projected water demand using MWD-MAIN calibrated for Glendale shows the overall water demand for year 2005 of 32,554 AFY, for year 2020 a demand of 36,821 AFY and 38,600 for the year 2025. These figures were based on incorporating projected population, housing, and employment data into the MWD-MAIN water demand forecasting model for Glendale along with a weather variable. The year 2020 demand reflects a modest increase over current use even though Glendale is essentially "built-out". These projections incorporate the 1981 and 1992 California plumbing codes changes requiring ultra-low flush toilets beginning in 1992, along with a continuation of current drought oriented public education and information programs. As additional conservation measures are carried out, there could be still more reductions in projected use.

Future **Water Sources** - The basic objective of the City's Water Resource Plan has been to develop more local supplies. Currently, about 66% of the water used in the City comes from MWD. This compares to 90% just a few years ago before building new facilities and the use of the San Fernando Basin water supplies. Because there is no increase in future groundwater supplies, the projected growth in the City's water demand will be met by MWD and Recycled Water. The change in source of water to be used in the City between now and year 2025 is presented on Figure 10.

TABLE 6
HISTORIC AND PROJECTED WATER USE IN GLENDALE (AF)

Fiscal Year	San Fernando Basin	Verdugo Basin	Recycled Water	MWD Water	Total
Historic					
1980-81	761	3,488	300	22,647	27,196
1985-86	6,089	2,733	300	22,080	31,202
1990-91	2,440	1,132	396	24,925	28,893
1991-92	1,476	732	551	23,023	25,782
1992-93	426	909	770	25,905	28,010
1993-94	550	1,225	620	27,044	29,439
1994-95	441	1,662	914	26,213	29,230
1995-96	496	2,059	886	27,905	31,346
1996-97	467	2,569	1,112	28,150	32,298
1997-98	267	2,696	1,087	25,626	29,678
1998-99	409	2,720	1,458	26,642	31,229
1999-00	515	2,451	1,738	28,731	33,435
2000-01	673	2,105	1,664	29,033	33,475
2001-02	4,018	2,120	1,500	26,131	33,769
2002-03	8,495	1,551	1,376	21,924	33,346
Projected					
2005	7,625	2,300	1,990	20,639	32,554
2010	7,625	2,300	2,010	21,889	33,824
2015	7,625	2,300	2,030	23,136	35,091
2020	7,625	2,300	2,050	24,846	36,821
2025	7,625	2,300	2,050	26,625	38,600

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MAY 3, 2004

FIGURES

FIGURE 1

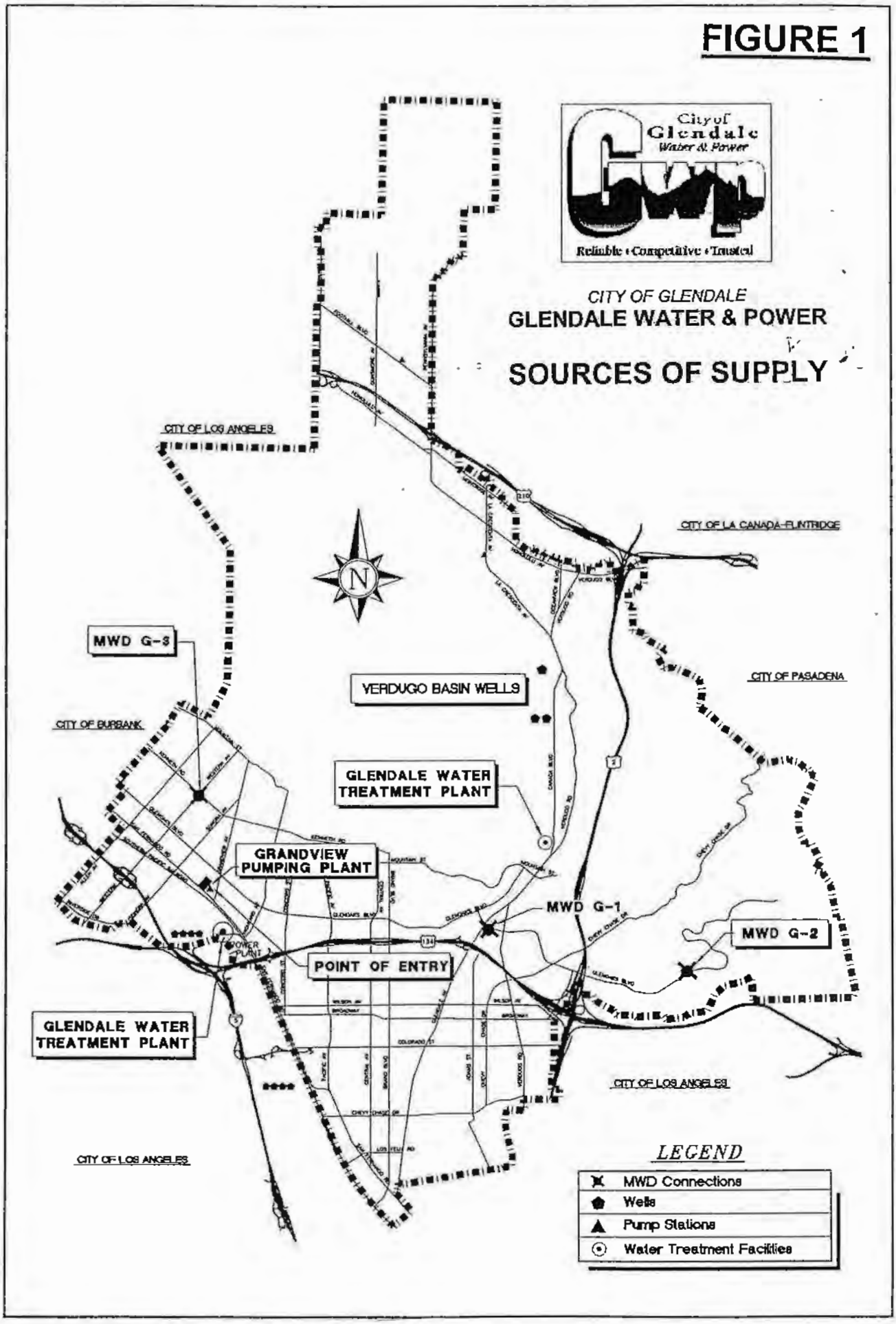
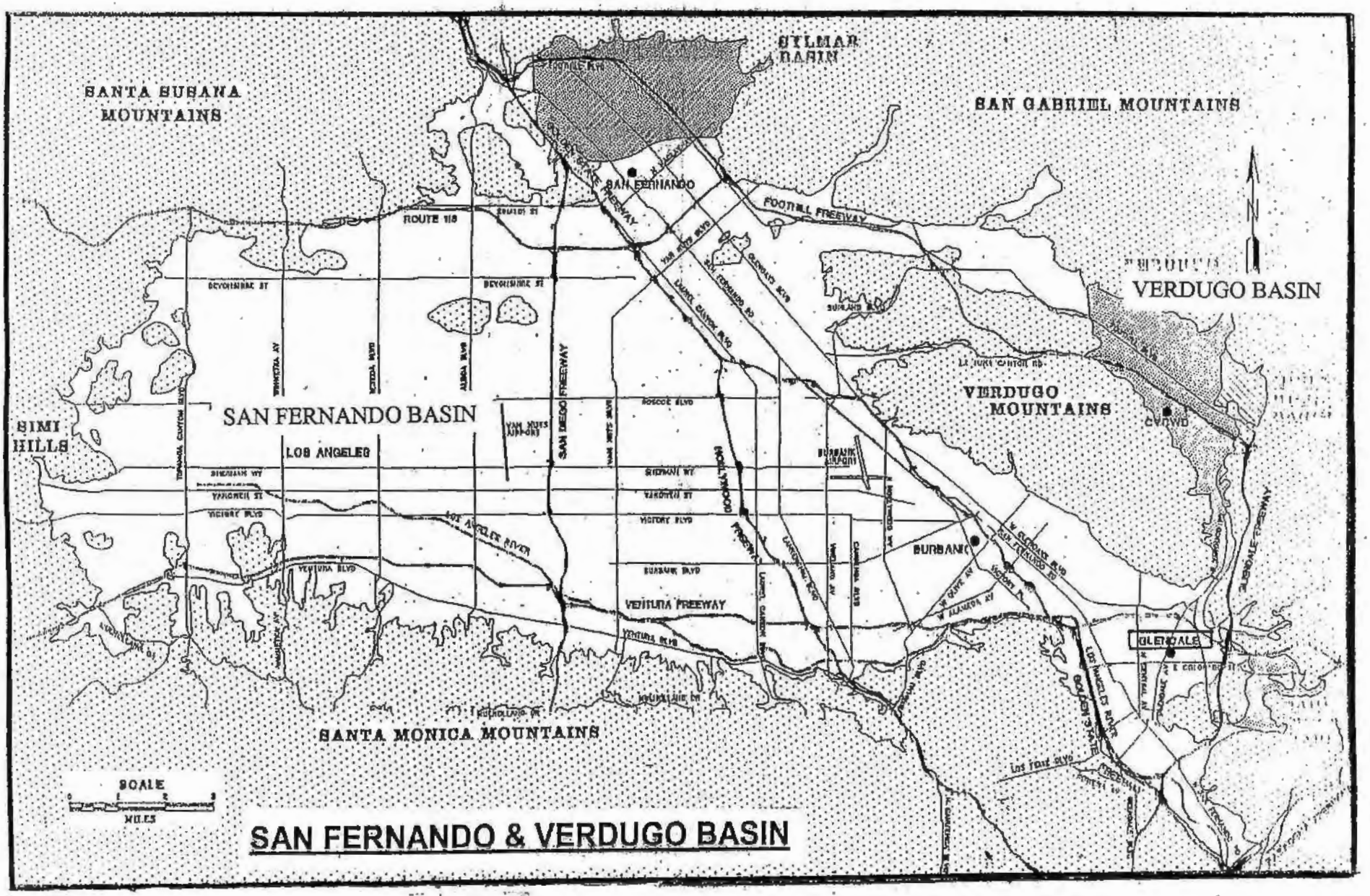

City of Glendale
Water & Power
Reliable • Competitive • Trusted
CITY OF GLENDALE
GLENDALE WATER & POWER
SOURCES OF SUPPLY
CITY OF LOS ANGELES
CITY OF LA CANADA-FLINTRIDGE
CITY OF PASADENA
CITY OF BURBANK
CITY OF LOS ANGELES
CITY OF LOS ANGELES
MWD G-3
VERDUGO BASIN WELLS
GLENDALE WATER TREATMENT PLANT
GRANDVIEW PUMPING PLANT
MWD G-1
MWD G-2
POINT OF ENTRY
GLENDALE WATER TREATMENT PLANT
POWER PLANT
N
LEGEND
MWD Connections
Wells
Pump Stations
Water Treatment Facilities

FIGURE 2

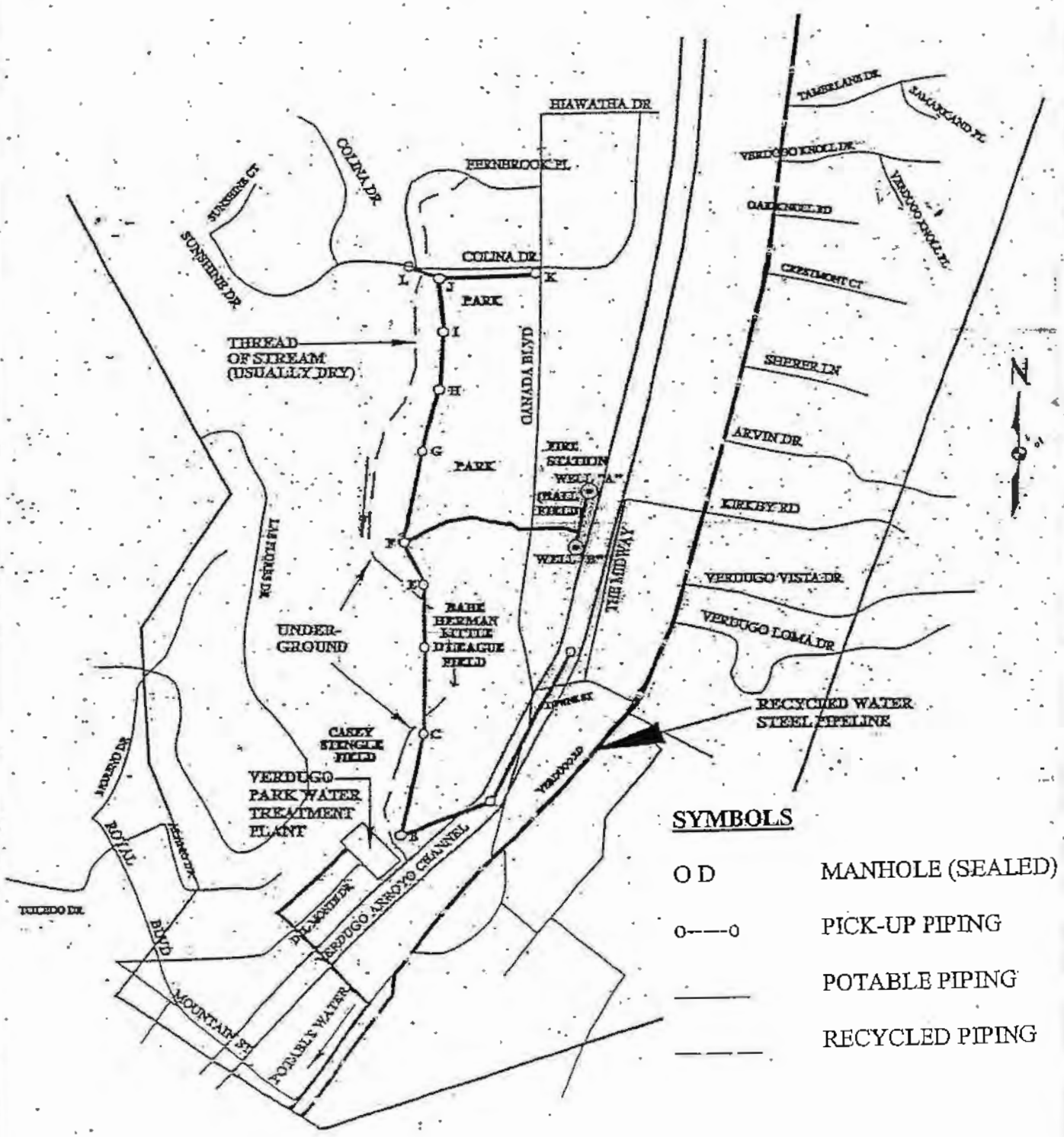


SAN FERNANDO & VERDUGO BASIN

CITY OF GLENDALE

VERDUGO PARK WATER TREATMENT PLANT PICK-UP AND WELL SYSTEM

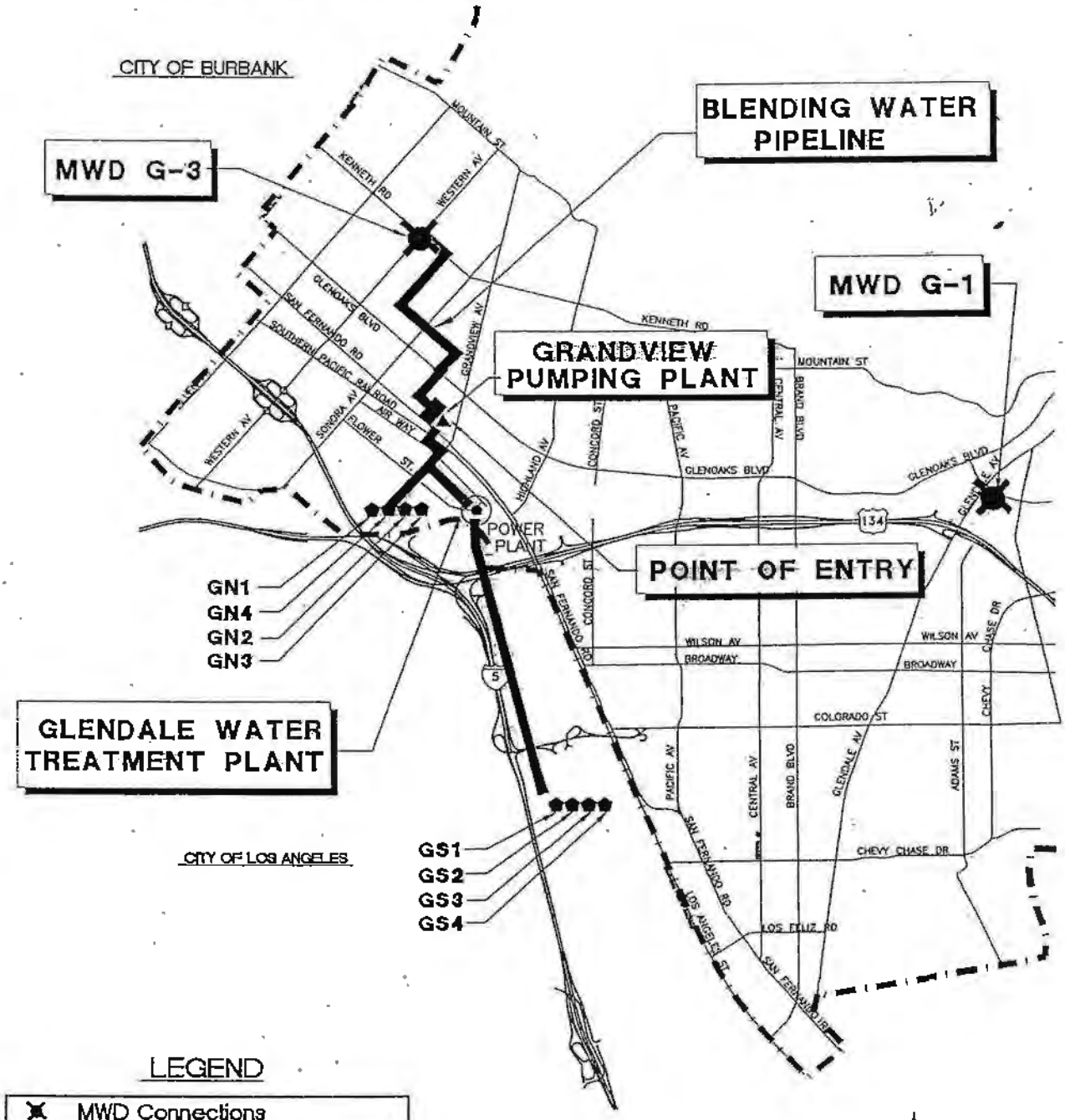
FIGURE 3



CITY OF GLENDALE

GLENDALE WATER TREATMENT PLANT & WELL LOCATIONS

FIGURE 4



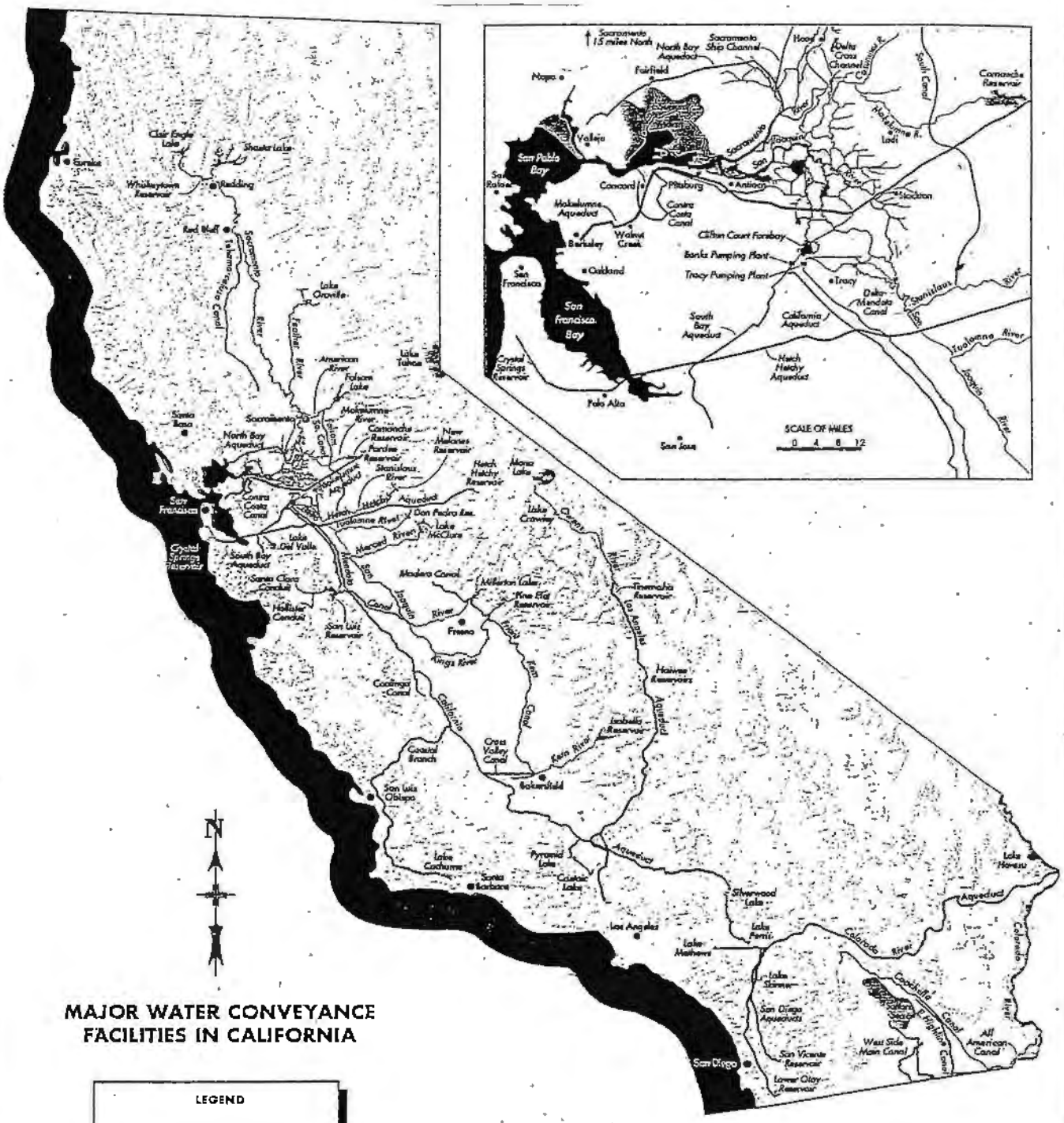
LEGEND

✕	MWD Connections
⬟	Wells
▲	Pump Stations
⊙	Water Treatment Facilities

CITY OF GLENDALE

STATE WATER PROJECT and COLORADO RIVER AQUEDUCT

FIGURE 5



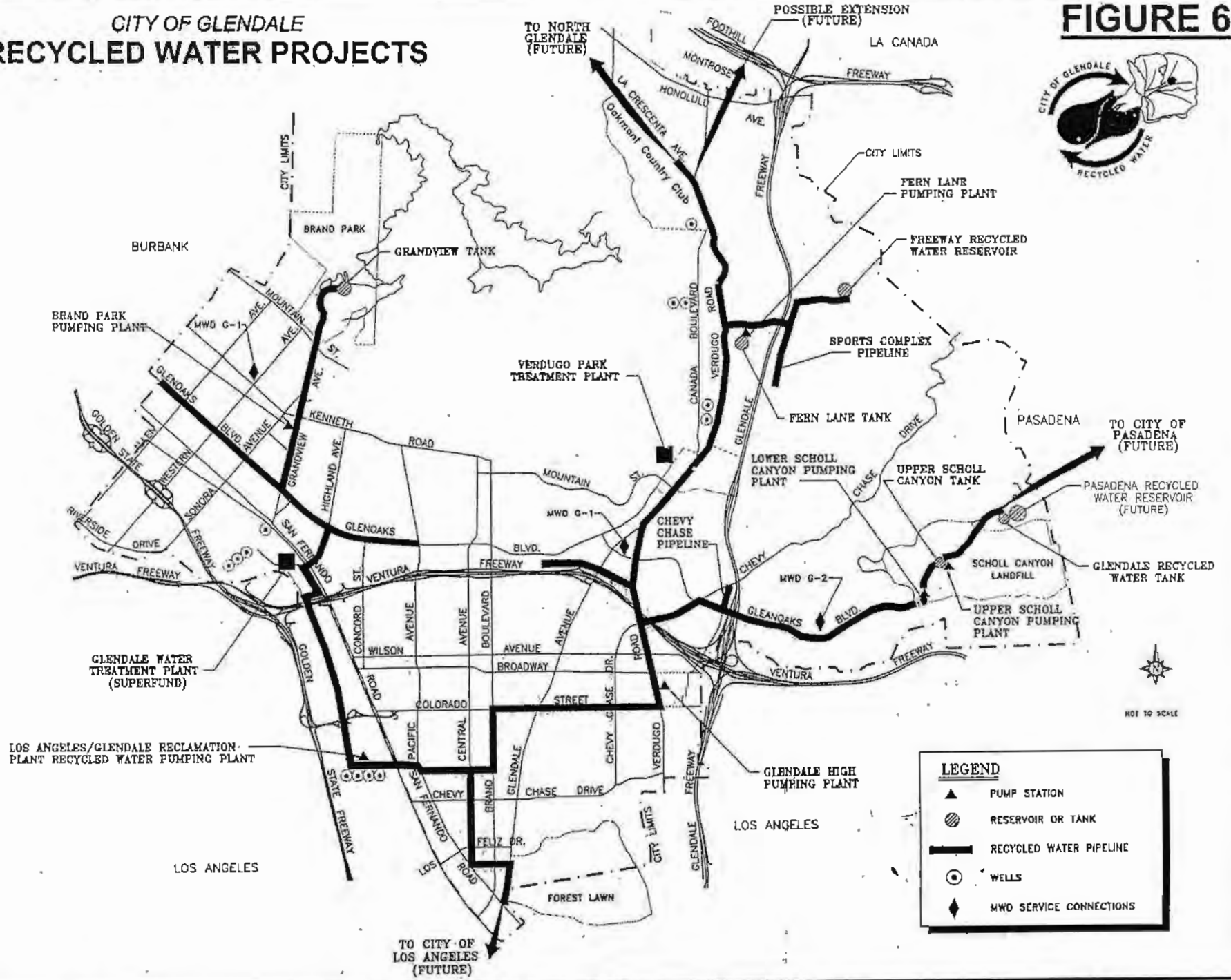
MAJOR WATER CONVEYANCE FACILITIES IN CALIFORNIA

LEGEND

- FEDERAL AQUEDUCT
- STATE AQUEDUCT
- LOCAL AQUEDUCT

FIGURE 6

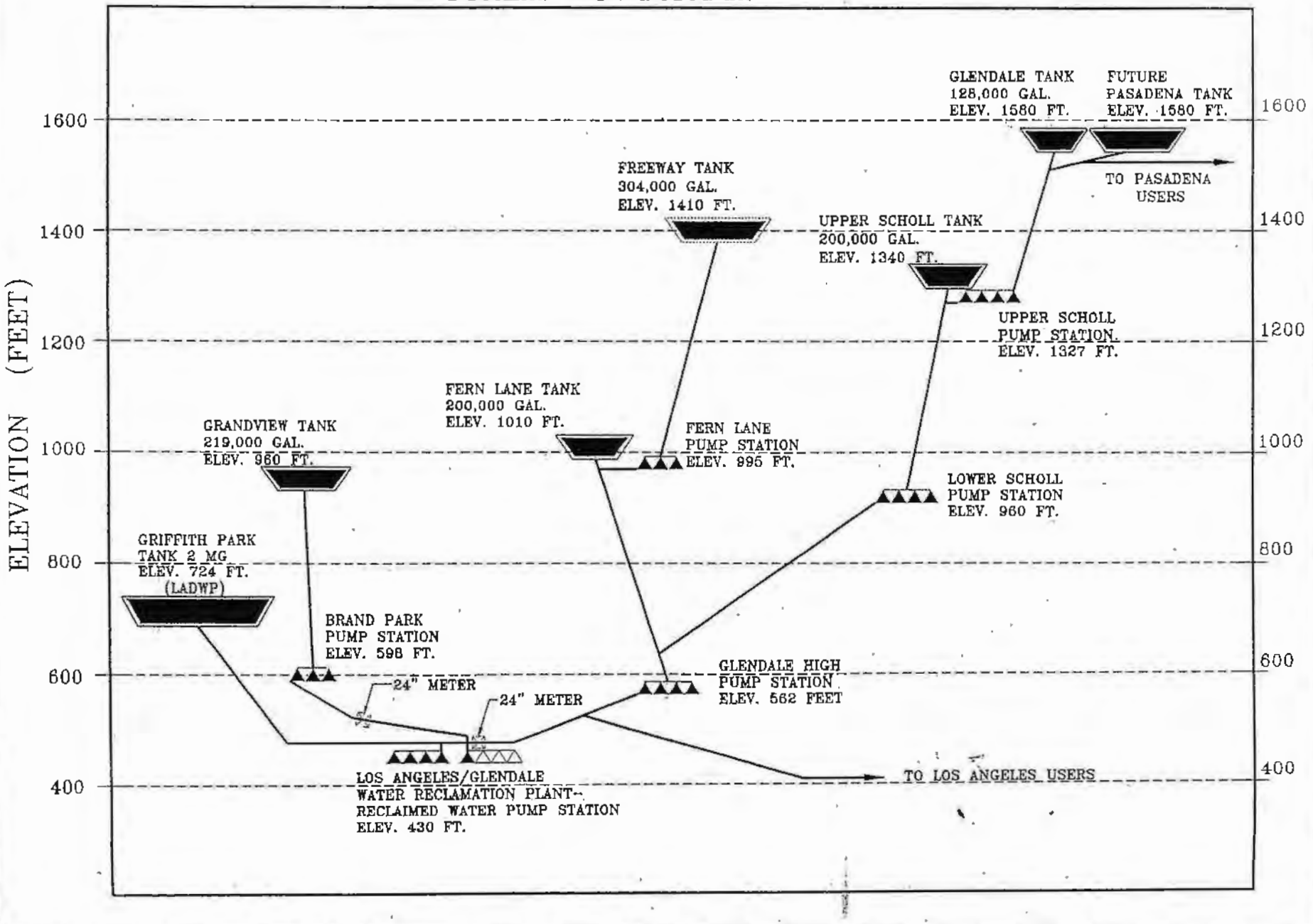
CITY OF GLENDALE
RECYCLED WATER PROJECTS



CITY OF GLENDALE

RECYCLED WATER DELIVERY SYSTEM SCHEMATIC DIAGRAM

FIGURE 7



CITY OF GLENDALE
RECYCLED WATER USERS - SN 1990008

FIGURE 8

As of DECEMBER 2003

LOC. NO.	RECYCLED WATER USER PROJECT	Actual/Anticipated Delivery Date	User	Quantity A.F./year	Type of Use
	FOREST LAWN PROJECT				
1	Forest Lawn Memorial Park	1992	YES	200-400	*Irrigation*
2	1600 South Brand Median	1995	YES	2	*Irrigation*
43	323 W Garfield Avenue	2000	YES	2	*Irrigation*
	POWER PLANT PROJECT				
7	Caltrans - 943 West Doran Street	1978	YES	40-60	*Irrigation*
8	Glendale Grayson Power Plant	1978	YES	400-600	*Cooling Towers*
	VERDUGO SCHOLL PROJECT				
	PARKS and RECREATION - City of Glendale				
4	Adult Recreation Center	1995	YES	10	*Irrigation*
3	Armory	1996	YES	4	*Irrigation*
35	Carr Park	Planning Stage	NO		*Irrigation*
5	Central Library	1995	YES	4	*Irrigation*
34	City of Glendale - Fern Lane	1997	YES	2.5	*Irrigation*
24	Civic Auditorium	1996	YES	15	*Irrigation*
37	Colorado Boulevard - Parkway Irrigation	1997	YES	3	*Irrigation*
31	North Verdugo Road Median/La Cresenta Avenue	1996	YES	10	*Irrigation*
17	Glenoaks Park	1995	YES	4	*Irrigation*
28	Glorietta Pump Station	1997	NO		*Irrigation*
	Mayor's Park (Proposed)	Unknown	NO	6	
29	Montecito Park	1995	YES	1	*Irrigation*
14	Monterey Road Median - WJH	1996	NO	1	*Irrigation*
13	701 North Glendale Avenue - Median @ Monterey Road	1995	YES	12	*Irrigation*
	Park Site C (Proposed)	Unknown	NO	54	
	Park Site A (Proposed)	Unknown	NO	69	
2	741 S Brand Median	1995	YES	4	*Irrigation*
23	Parque Vaquero	1998	YES	2	*Irrigation*
20	Scholl Canyon Ballfield	1997	YES	17	*Irrigation*
18	Scholl Canyon Park	1996	YES	12	*Irrigation*
27	Sports Complex (Completed)	1998	YES	99	*Irrigation*
25	Verdugo Rd/Canada (South) Overpass	1995	YES	0.5	*Irrigation*
30	Verdugo Rd/Canada (North Median)	1996	YES	1.5	*Irrigation*
43	Fern Lane Medians-Irrigation	2003	YES		*Irrigation*
	CALTRANS (5 Motors):				
7A	1970 E Glenoaks Boulevard (E/S)	1995	YES	10	*Irrigation*
7A-1	1970 E Glenoaks Boulevard (W/S I2)	1995	YES	12	*Irrigation*
7B	406 N Verdugo Road @ Chevy Chase	1995	YES	40	*Irrigation*
7C	709 Howard Street @ Monterey Road	1995	YES	12	*Irrigation*
7D	2000 E Chevy Chase Drive @ Harvey	1995	YES	8	*Irrigation*
	GLENDALE UNIFIED SCHOOL DISTRICT:				
6	Glendale High School	1995	YES	15	*Irrigation*
36	Glenoaks Elementary School	1998	YES	1	*Irrigation*
15	Wilson Junior High School	1995	YES	7	*Irrigation*
	OTHERS:				
16	Glendale Adventist Memorial Hospital	1997	YES(Partially)	20	*Irrigation*
32	Oakmont Country Club	1996	YES	150-200	*Irrigation*
21	Scholl Canyon Golf Course	1998	YES	100	*Irrigation*
22	Scholl Canyon Landfill (LACSD)	1997	YES	100	*Dust Control/Soil Compaction*
19	Scholl Canyon Landfill (PW)	1996	YES		*Irrigation/Soil Compaction*
18	Upper Scholl Pump Station	1996	YES		*Irrigation*
	Dual Plumbing:				
26	Glendale Community College	1996	YES(Partially)	25	*Irrigation/Flushing Toilets*
38	Glendale Plaza - 655 N Central Avenue	Completed	NO		*Flushing Toilets*
39	Building - 400 N Brand	Completed	NO		*Flushing Toilets*
41	Building - 450 N Brand	Completed	NO		*Flushing Toilets*
42	Police Building - Isabel Street	Const. On-going	NO		*Flushing Toilets*
40	Building - 611 N Brand	Planning Stage	NO		*Flushing Toilets*
33	*PUBLIC WORKS - City of Glendale*	1978	YES	1.5	*Street Cleaning*
	BRAND PARK PROJECT				
12	Brand Park	1997	YES	60	*Irrigation*
9	Glenoaks Median (9 Meters)	1996	YES	4	*Irrigation*
11	Grand View Memorial Park	2001	YES(Partially)	50	*Irrigation*
10	Pelanconi Park	1996	YES	8	*Irrigation*
	TOTAL ***CURRENT METERS***	43		**1,599-2,069**	

HISTORICAL - PROJECTED WATER SUPPLY AND DEMAND (AF/YR)

(Use MWD Direct Deliveries for Blending)

FIGURE 9

	Fiscal Year	1989-90	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2005	2010	2015	2020	2025
(1)	**Water Demands (a)**	32,551	25,782	28,010	29,439	29,230	31,346	32,298	29,678	31,229	33,435	33,475	33,897	33,318	32,443	32,554	33,824	35,091	36,821	38,600
(2)	San Fernando Basin-Water Rights	5,771	4,373	4,805	5,090	4,979	5,535	5,555	5,575	5,588	5,601	5,626	5,651	5,676	5,701	5,725	5,843	5,843	5,843	5,843
	Water Supplies:																			
	San Fernando Basin																			
(3)	Grandview Wells	1336	950																	
(4)	Power Plant	227	130	78	140	65	35	25	24	32	24	381	337	918	25	25	25	25	25	25
(5)	Glendale Water Treat. Plant (b)												3,228	7,238	7,200	7,200	7,200	7,200	7,200	7,200
(6)	Forest Lawn/Physical Solution	170	396	348	410	376	461	442	243	377	491	292	453	339	400	400	400	400	400	400
(7)	**Total:**	1,733	1,476	426	550	441	496	467	267	409	515	673	4,018	8,495	7,625	7,625	7,625	7,625	7,625	7,625
	Verdugo Basin																			
(8)	Wells 3,4, & 6	1,635	732	909	1,225	1,662	2,059	2,116	1,981	2,080	1,960	1,635	1,663	880	2,000	1,800	1,800	1,800	1,800	1,800
(9)	VPWTP						0	453	715	640	491	470	457	671	500	500	500	500	500	500
(10)	Other Production										0	0	0	0	0	0	0	0	0	0
(11)	**Total:**	1,635	732	909	1,225	1,662	2,059	2,569	2,696	2,720	2,451	2,105	2,120	1,551	2,500	2,300	2,300	2,300	2,300	2,300
	Recycled Water																			
	Brand Park Project							32	63	73	106	111	95	104	150	170	170	170	170	170
	Forest Lawn Project			348	295	290	292	344	239	191	200	242	252	187	350	350	350	350	350	350
	Power Plant Project	333	551	422	325	284	377	264	306	698	453	472	318	232	425	450	450	450	450	450
	Verdugo-Scholl Project					340	217	472	479	496	979	838.5	835	853	910	1020	1,040	1,060	1,080	1,080
(12)	**Total:**	333	551	770	620	914	886	1,112	1,087	1,458	1,738	1,664	1,500	1,376	1,835	1,990	2,010	2,030	2,050	2,050
	Metropolitan Water																			
(13)	Direct Deliveries (G1, G2, & G3)	28,850	23,023	25,905	27,044	26,213	27,905	28,150	25,628	26,642	28,731	29,033	26,131	21,924	20,483	20,639	21,889	23,136	24,846	26,625
(14)	**Total:**	28,850	23,023	25,905	27,044	26,213	27,905	28,150	25,628	26,642	28,731	29,033	26,131	21,924	20,483	20,639	21,889	23,136	24,846	26,625
(15)	**Total Water Supplies**	32,551	25,782	28,010	29,439	29,230	31,346	32,298	29,678	31,229	33,435	33,475	33,769	33,346	32,443	32,554	33,824	35,091	36,821	38,600

2) [(1) - 4,000 AF] * 20% return flow

5) 5,000 gpm @ 90%

6) Forest Lawn, et.al.

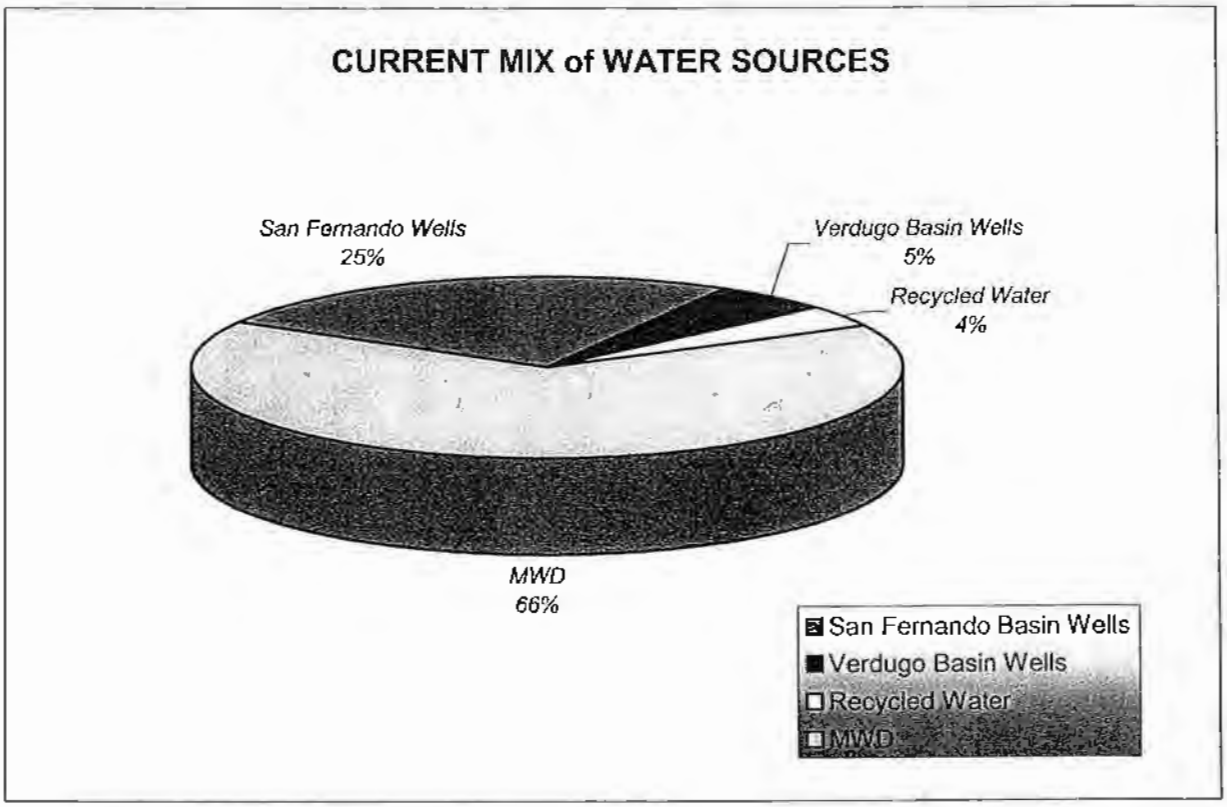
13) (1) - (7) - (11) - (12)

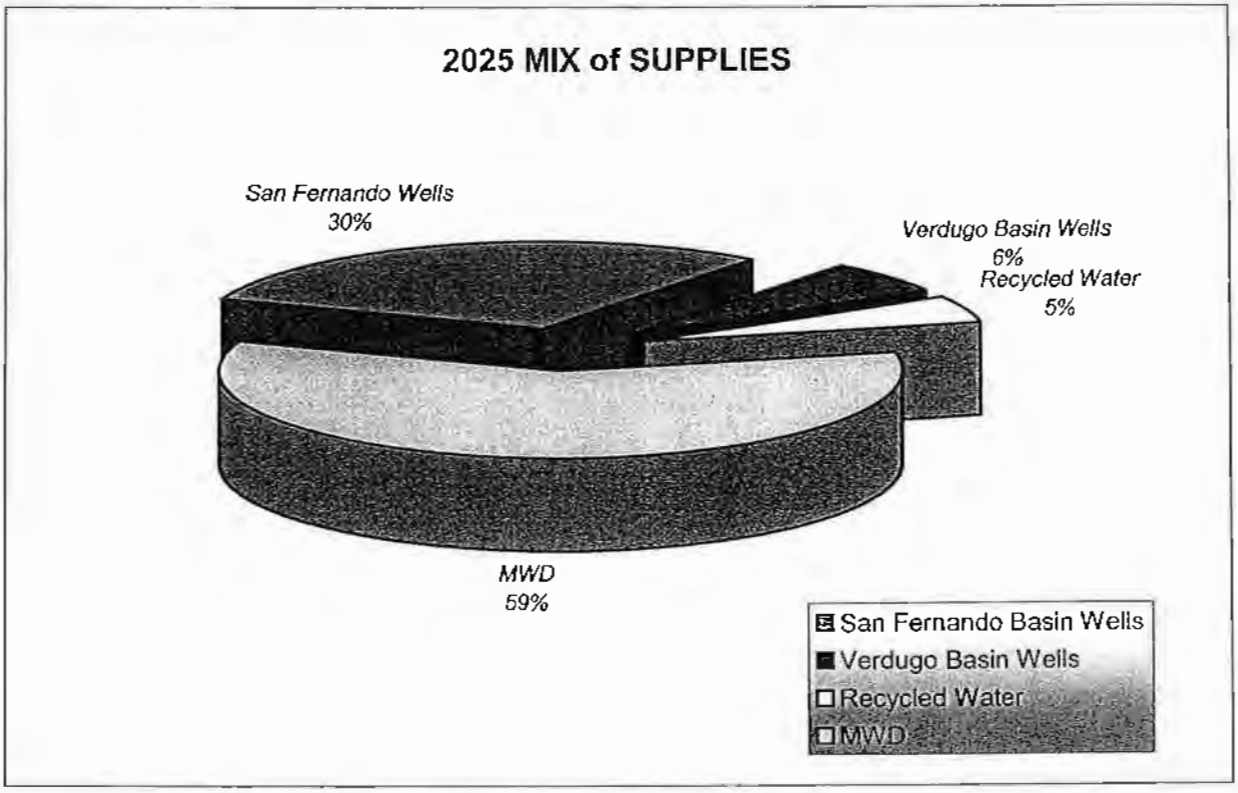
(a) Projected demands from MWD

(b) Started operation Dec. 2000, not used by the system
Started delivering water to the system July 2001. 24-hr operation, 1/6/02

FIGURE 10

CURRENT PROJECTED SOURCES OF WATER





APPENDIX D

CITY OF SAN FERNANDO

PUMPING AND SPREADING PLAN

2003-2008 Water Years

CITY OF SAN FERNANDO

GROUNDWATER PUMPING AND SPREADING PLAN

OCTOBER 1, 2003 TO SEPTEMBER 30, 2008

2003-2004 Water Year

Prepared by:

Public Works Department

Engineering Division

117 Macneil Street

San Fernando, California 91340

APRIL 2004

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 (6,210 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 are shown on Table 2.1.

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

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

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

III. WATER SUPPLY

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

A. MWD: The amount of treated water purchased from the MWD has been changed beginning in 1997-98 through 2001 as reflected in the Historic and projected use of MWD water as shown in Table 2.1.

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

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

2. ***Well 3***
   Location: 13003 Borden Avenue, Sylmar
   Capacity: 1100 GPM

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

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

C. Quantity (Acre-Feet) of Water Pumped From Each Well (2002-2003)

1.	Well 2A	1,755.60
2.	Well 3	844.79
3.	Well 4A	90.77
4.	Well 7A	666.34
	Total	3357.50

D. Wells Groundwater Level Data

1.	Well 2A	1057.5	Taken 06/03
2.	Well 3	1069.2	Taken 06/03
3.	Well 4A	1072.1	Taken 06/03
4.	Well 7A	1056.3	Taken 06/03

E. Well Locations
See next page

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, 2003 the City of San Fernando has a stored water credit of 426.5 acre-feet accumulated during previous years through the 01-02 water year.

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

(Acre – Feet)

FY	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
DEMAND										
WELLS	3,528.29	3,766.19	3,686.60	3,765.72	3357.50	3,400	3,500	3,500	3,500	3,500
MWD	0	0	0		382	500	500	500	500	500
TOTAL	3,528.29	3,766.19	3,686.60	3765.72	3739.50	3,900	4,000	4,000	4,000	4,000
ACTUAL						PROJECTED				

APPENDIX A

WATER QUALITY DATA

SEE ATTACHED WATER QUALITY REPORT, 2002

CITY OF SAN FERNANDO

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

(In Progress)

APPENDIX B

POLICIES AND PROCEDURES

(By ULARA)

WATERMASTER SERVICE

UPPER LOS ANGELES RIVER AREA

POLICIES AND PROCEDURES

February 1998

APPENDIX E

CRESCENTA VALLEY WATER DISTRICT

PUMPING AND SPREADING PLAN

2003-2008 Water Years

GROUNDWATER PUMPING

PLAN

WATER YEARS

OCTOBER 1, 2003 TO SEPTEMBER 30, 2008

Prepared by
CRESCENTA VALLEY
WATER DISTRICT

APRIL 2004

I. INTRODUCTION

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

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

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

II. WATER DEMAND

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

Water demand during the last five years has been affected by the fact that we have had less than normal amounts of rainfall in the Crescenta Valley since 1997-98. The 2002-03 water year concluded five consecutive years of below average rainfall in the Crescenta Valley and 2003-04, with only 13.7 inches of rainfall at the time of this writing, will surely be well below the 41-year average of 24 inches. The CVWD has implemented a voluntary water conservation program and the District's Board of Directors will implement a water conservation alert for summer of 2004, which will ask for customer demand reduction during 2 levels of potential water shortages. Furthermore, a tiered rate system is expected to be in place by January 1, 2005. Conservation incentives in the form of rebates for turf replacement, ultra-low flush toilets, and high efficiency clothes washers are currently being provided along with continuous water conservation information.

The 2002-03 base year had slightly less production compared to the prior year (peak year) and it now appears that demand has stabilized in the 5600-5900 AF/yr. range, hopefully due to conservation. However, the ongoing drought has serious implications for the Verdugo Basin groundwater supply and will force CVWD to look at additional ways to augment its supply. The District has already implemented a pump station expansion from its MWD wholesaler, the Foothill Municipal Water District (FMWD), and recently constructed an emergency wholesale water supply interconnection with the City of Glendale, but this may still not be enough supply to meet all future peak demands.

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

III. WATER SUPPLY

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

A. PRODUCTION WELLS

The CVWD has eleven active wells that are currently in operation. Historic and projected production from these wells is shown in Table 3.1. The CVWD wells produce water which typically contain nitrate concentrations above the 45mg/L maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) and State of California Department of Health Services (DHS). As a result, an ion exchange process, the Glenwood Nitrate Removal Plant, is used to treat a portion of the produced water. Untreated water and water treated at the Glenwood Plant is blended to produce water with less than the nitrate MCL. The blended water is distributed by the CVWD system. In the 2002-03 base year and beyond, very little water will be treated for nitrate removal since the straight blending accommodates nitrate reduction in the distribution system during low groundwater production.

The District's active wells range in age from 2 to 75 years and are mostly beyond their useful life. The District's well replacement program set a goal of replacing existing groundwater production capacity with new, modern wells over the next 10 years. However, the new active well is of very low capacity, while a second well did not produce enough to be put into production. As the capacity of these wells appears to be far less than anticipated and a grant-funded Verdugo Basin monitoring well study also indicated low-capacity well sites, the District will probably suspend the well replacement program until the current grant-funded groundwater recharge and conjunctive use study is completed.

B. GLENWOOD NITRATE REMOVAL PLANT

The Glenwood ion exchange nitrate removal plant began operation in January 1990. The plant has been out of operation for extended periods in 1992-93 and in 1997 when repairs were necessary. In the past year, the plant was only in marginal operation because overall groundwater production was down due to basin level decline, resulting in more imported water, thereby reducing the need for treatment. This trend should continue in the near term, as already mentioned. The historic and projected production from the Glenwood Plant is shown in Table 3.2.

C. PICKENS GRAVITY TUNNEL PRODUCTION

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

D. MWD

The amount of treated water purchased from the MWD via FMWD is expected to remain high over the next five years to make up the difference between decreased groundwater production capacity and customer demand. Historic and projected use of MWD water is shown in Table 3.4.

IV. JUDGEMENT CONSIDERATIONS

The allowable pumping for CVWD's share of the Verdugo Basin is 3,294 acre-feet annually. Basin production has been declining and 2001-02 was the first in over ten years to be less than the full adjudication. Estimated future pumping is expected to stay below this adjudicated quantity on an annual basis. A return to normal rainfall conditions is assumed to replenish the groundwater levels and production capacity in the Verdugo Basin but this will probably take a wet cycle of several years.

However, this assumption is speculative and optimistic and a more conservative approach is taken in the estimates provided here. In prior years, the Watermaster, with approval from the ULARA Administrative Committee, has allowed CVWD to over-pump their rights in the Basin. This will probably not be an issue again in the near future. In any case, future consideration for excess pumping in the Verdugo Basin is now addressed in the February 1998 "Policies and Procedures", Section 2.3.4. Either party, Glendale or CVWD, may pump in excess of their adjudication as long as total production does not exceed 7150 AF/year, as reviewed on an annual basis by the Watermaster.

TABLE 2.1
HISTORIC AND PROJECTED WATER DEMAND

(Acre-Feet)

98-99	99-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
5394	5884	5614	5823	5711	5800	5850	5900	5900	5900
ACTUAL					PROJECTED				

TABLE 3.1
HISTORIC AND PROJECTED COMBINED WELL AND TUNNEL GROUNDWATER PRODUCTION

(Acre-Feet)

98-99	99-2000	2000 2001	2001 2002	2002-2003	2003-2004	2004 2005	2005-2006	2006-2007	2007-2008
3797	3698	3412	3266	2842	2470	2250	2100	2250	2400
ACTUAL					PROJECTED				

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

(Acre-Feet)

98-99	99-2000	2000-2001	2001 2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007 2008
1281	1137	989	515	500	216	225	225	225	225
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)

98-99	99-2000	2000 2001	2001 2002	2002-2003	2003-2004	2004-2005	2005 2006	2006 2007	2007-2008
65	54	61	59	57	56	55	52	52	52
ACTUAL					PROJECTED				

TABLE 3.4
HISTORIC AND PROJECTED USE OF MWD TREATED WATER

(Acre-Feet)

98-99	99-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
1597	2186	2202	2556	2869	3330	3600	3800	3650	3500
ACTUAL					PROJECTED				

NOTES:

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