STATE OF CALIFORNIA
The Resources Agency
Department of Water Resources

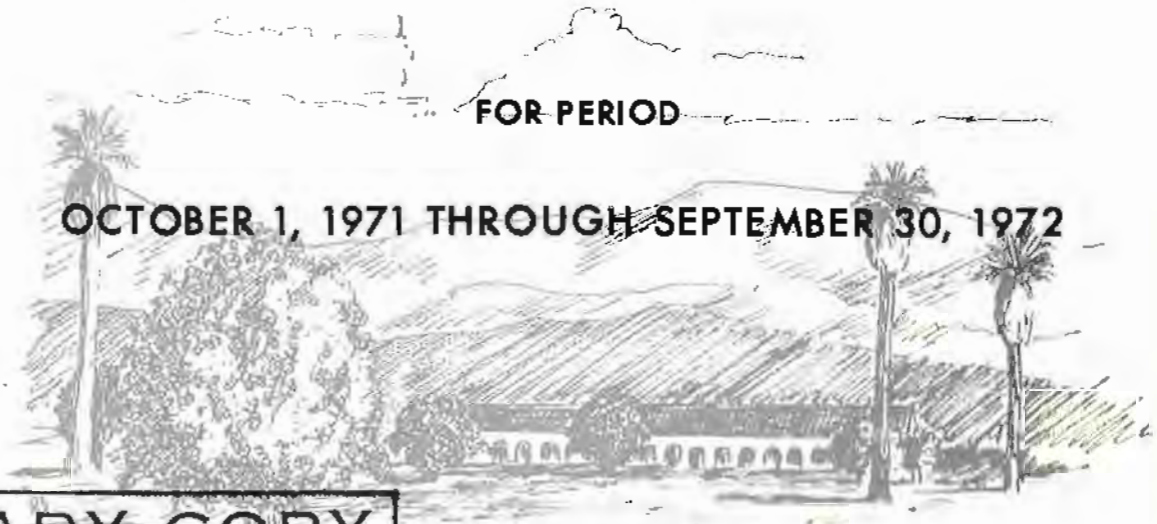
BULLETIN No. 181-72

WATERMASTER SERVICE

IN THE

UPPER LOS ANGELES RIVER AREA

LOS ANGELES COUNTY



FOR PERIOD

OCTOBER 1, 1971 THROUGH SEPTEMBER 30, 1972

MARCH 1973

NORMAN B. LIVERMORE, JR.
Secretary for Resources
The Resources Agency

RONALD REAGAN
Governor
State of California

WILLIAM R. GIANELLI
Director
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ABSTRACT

The 1971-72 water year was again a below-average rainfall year. Rainfall in the valley decreased by 7.47 inches when compared to the prior year and was about 8.35 inches below the LACFCD 90-year mean precipitation. As a result, spreading operations by the LACFCD decreased by 56% of the prior year's spreading. The ground water extractions exceeded the Restricted Pumping by 0.14% and imports increased by 6% over the prior year.

Nine parties overextracted a total of 2,008.99 acre-feet in the 1971-72 water year. Three of the nine parties are in violation of the Judgment either as a result of having a zero water right or having exceeded their allowable extraction by 10 percent of their Restricted Pumping.

During 1971-72, the Watermaster processed thirteen water right sale and assignment agreements. Several parties were warned about violations of the Judgment.

Item	Water Year 1970-71	Water Year 1971-72
Parties	28	28
Active pumpers	23	23
Active nonparties (within valley fill)	2	3
Restricted Pumping, in acre-feet	104,040	104,040
Watermaster expenses (fiscal year)	$ 21,647.37	$ 18,188.14
Watermaster expenses per acre-foot pumped	0.22	0.17
Valley rainfall, in inches	15.57	8.10
Spreading Operations, in acre-feet		
LACFCD	16,940	3,210
Los Angeles, City of	7,203	7,389
Extractions, in acre-feet	96,555.64	104,181.02
Imports, in acre-feet		
Colorado River water	33,607	27,138
Owens River water	433,352	460,396
State Project water	0	6,758
Delivered to hill and mountain areas, in acre-feet	40,984	45,406
Exports, in acre-feet		
Owens River water	220,039	228,864
Sewage	107,358	108,807

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

Ronald Reagan, Governor
Norman B. Livermore, Jr., Secretary for Resources
William R. Gianelli, Director, Department of Water Resources
John R. Teerink, Deputy Director

SOUTHERN DISTRICT

James J. Doody . . . . . District Engineer and Watermaster
Mitchell L. Gould . . . . . Chief, Operations Branch and Deputy Watermaster

Watermaster service in this area was conducted
and report prepared under the direction
of

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Pete Fielding . . . . . Engineering Aid II
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FOREWORD

The Department of Water Resources, as Watermaster for the Upper Los Angeles River Area, submits this annual report as a comprehensive review of water supply conditions in the Basin during the 1971-72 water year. The report was prepared for the Superior Court in the County of Los Angeles, and for the parties to the Upper Los Angeles River Area Judgment, whose provisions authorize its publication.

The Upper Los Angeles River Area is administered by the Department as a watermaster service area in accordance with Part 4, Division 2, of the California Water Code. The Basin has been operating for several years under a well-defined management plan that limits and monitors ground extractions.

This report contains information on ground water extractions, use of imported water, recharge operations, a financial report on watermaster service during the 1971-72 water year, and the tentative budget of the Watermaster for the 1973-74 water year.

James J. Doody
District Engineer
Southern District
and Watermaster
Reg. C. E. No. 6500

TABLE OF CONTENTS

Page

FIGURES (cont'd)

PLATES

TABLES

Page

TABLES (cont'd)

I. THE UPPER LOS ANGELES RIVER AREA

The Upper Los Angeles River Area (ULARA) encompasses all of the watershed of the Los Angeles River and its tributaries above a point in said river designated as Los Angeles County Flood Control District Gaging Station F-57C, northwesterly of the junction of the surface channels of the Los Angeles River and the Arroyo Seco as shown on Plate 1.

The entire area consists of approximately 329,000 acres, comprising 123,000 acres of valley fill area, referred to as the ground water basins, and 206,000 acres of hill and mountain areas. ULARA is bounded on the north by the Santa Susana Mountains and on the west by the Simi Hills. To the south, the Santa Monica Mountains separate it from the Los Angeles Basin and to the east the San Gabriel Mountains separate it from the San Gabriel Basin.

ULARA, as defined in the Judgment, has four distinct hydrologic ground water basins. The water supplies of these basins are separate and independent and are replenished by deep percolation from rainfall and from a portion of the water that is delivered for use within these basins and which returns to the ground water body. The four ground water basins in ULARA are the San Fernando Basin, the Sylmar Basin, the Verdugo Basin, and the Eagle Rock Basin. See Plate 1.

The San Fernando Basin is the largest of the four basins in ULARA. It consists of approximately 112,047 acres and comprises 90.8 percent of the total valley fill. It is bounded on the east and northeast by the San Rafael Hills and Verdugo Mountains; on the northwest and west by the Santa Susana Mountains and Simi Hills; and on the south by the Santa Monica Mountains.

The Sylmar Basin is located in the northerly part of ULARA. It consists of approximately 5,565 acres and comprises 4.5 percent of the total valley fill. It is bounded on the north and east by the San Gabriel Mountains; the topographic divide in the valley fill, lying between the Mission Hills and San Gabriel Mountains, divide it on the west; and to the south it is divided by the eroded limb of the Little Tujunga syncline.

The Verdugo Basin is located to the north and east of the Verdugo Mountains in ULARA. It consists of approximately 4,400 acres and comprises 3.8 percent of the total valley fill. It is bounded on the north by the San Gabriel Mountains; on the south and southwest by Verdugo Mountains; on the southeast by the San Rafael Mountains; and on the east by the ground water divide between the Monk Hill Subarea of the Raymond Basin and the Verdugo Basin.

The Eagle Rock Basin is the smallest of the four basins and is located in the extreme southeast corner of ULARA. It comprises approximately 807 acres and consists of 0.6 percent of the total valley fill.

History of Adjudication

ULARA was established by the JUDGMENT AFTER TRIAL BY COURT in Superior Court Case No. 650,079, entitled "The City of Los Angeles, A Municipal Corporation, Plaintiff, vs. City of San Fernando, et al., Defendants" signed March 14, 1968 by the Honorable Edmund M. Moor, Judge of the Superior Court. Prior to the Judgment, numerous pretrials were held, subsequent to the filing of the action by the City of Los Angeles in 1955 and before the trial commenced on March 1, 1966.

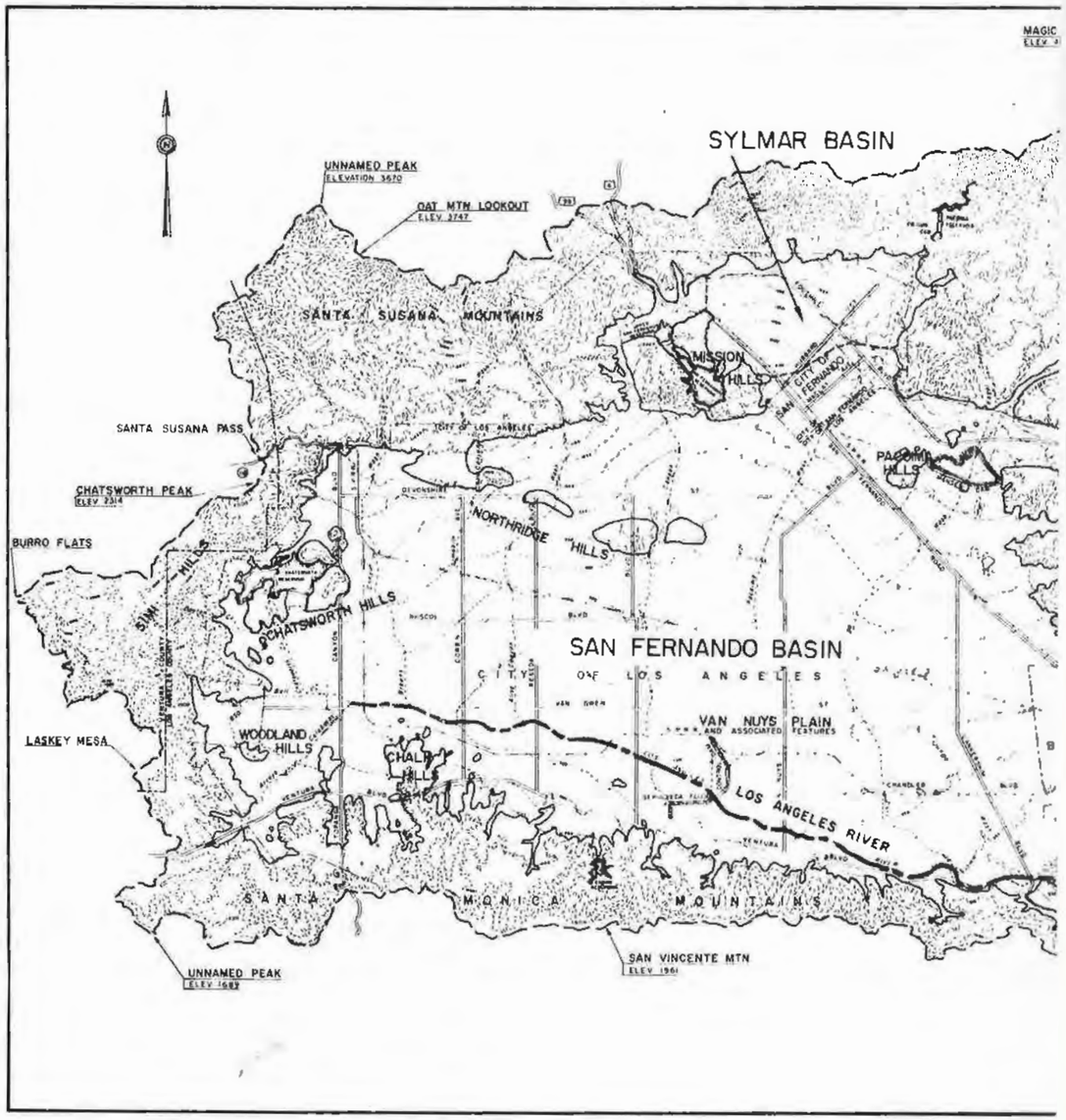
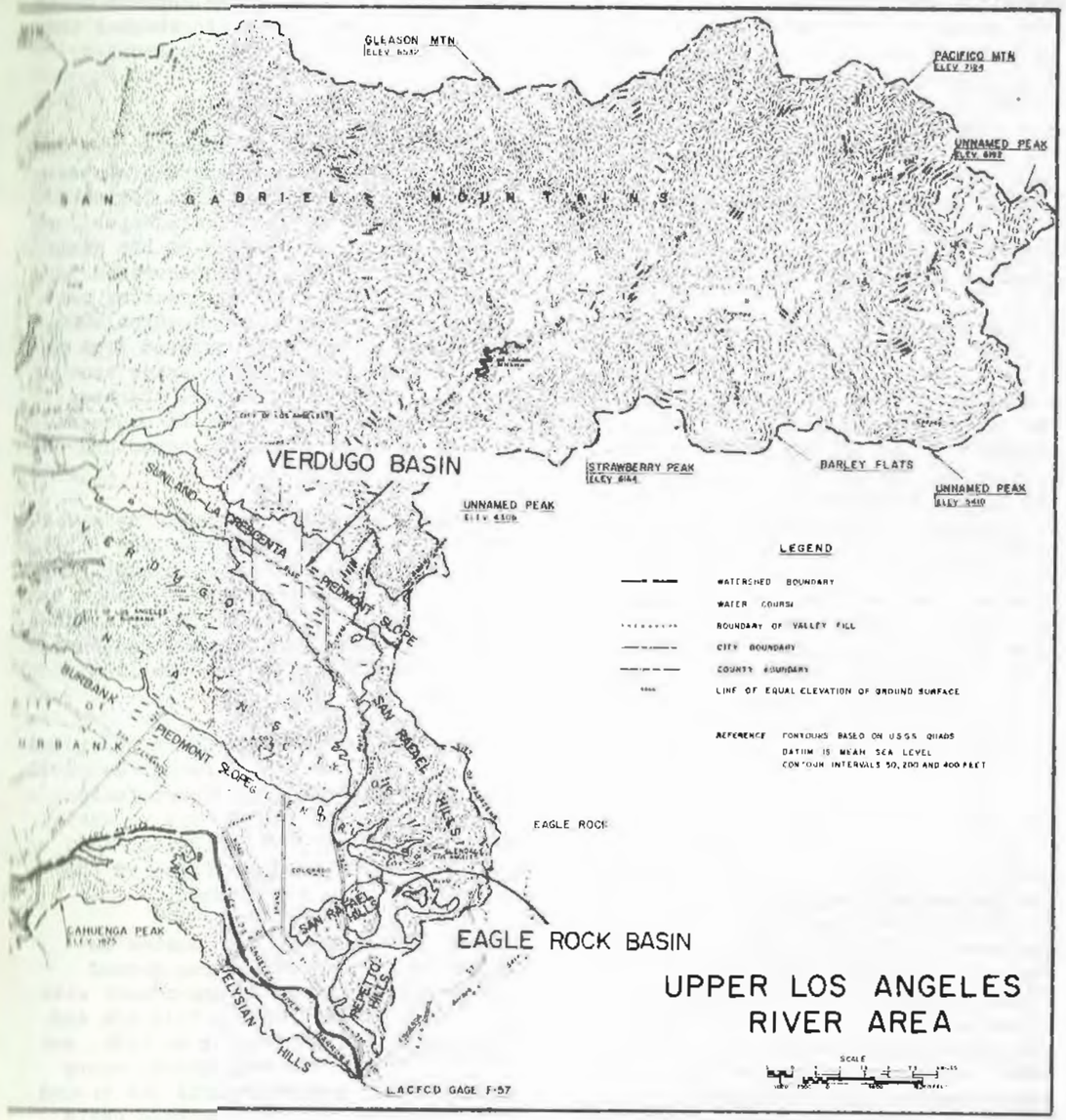


PLATE 1



UPPER LOS ANGELES RIVER AREA

On March 19, 1958, an Interim Order of Reference was entered by the Court directing the State Water Rights Board (now known as the Water Resources Control Board) to study the availability of all public and private records, documents, reports, and data relating to a proposed order of reference in the case. The Court subsequently entered an order on June 11, 1958, entitled "Order of Reference to State Water Rights Board to Investigate and Report Upon the Physical Facts (Section 2001, Water Code)".

A final Report of Referee was approved on July 27, 1962, and filed with the Court. The Report of Reference made a complete study of the geology, insofar as it affects the occurrence and movement of ground water, and the surface and ground water hydrology of the area. In addition, investigations were made of: the history of the horizontal and vertical location of the beds, banks and channels of the Los Angeles River and its tributaries; the areas, limits, and directions of flow of all ground water within the area; the quality of the ground water in the basins; all sources of water, whether it be diverted, extracted, or imported, etc. This was the basis for the Judgment.

The City of Los Angeles filed an appeal with the Court of Appeals which held a hearing on November 9, 1972, and issued its opinion on November 22, 1972. The opinion, prepared by Judge Compton and concurred by Judges Roth and Fleming, reversed, with direction, the original Judgment handed down by Judge Moor. In essence, the City of Los Angeles was given rights to all waters within ULARA including the use of the underground basins. The defendants, however, were given the right to capture "return water" which is purchased MWD water which percolates into the basin. A petition for re-hearing was filed on December 7, 1972, but denied by the Court of Appeals. Briefs have been filed by the defendants for the purpose of petitioning the State Supreme Court to hear the case. It is expected that by February 22, 1973, the Supreme Court will make a decision as to whether the defendants petition will be granted.

Watermaster Service

Watermaster Service is administered by the California Department of Water Resources in accordance with Division 2, Part 4, of the California Water Code. Under Section 4025 of the Water Code, the Department is authorized to divide the State into watermaster service areas. Pursuant to Section 4026, such service areas are created from time to time as rights to water are ascertained and determined. Particularly where ground water is concerned, such rights are usually ascertained or determined by court decree.

The first watermaster service area was formed in September 1929 and the latest (ULARA) was formed on April 19, 1968. Currently there are 19 such areas controlling surface water diversions in Northern California and four in Southern California controlling ground water use.

Under the Judgment, the Court appointed the Department of Water Resources as Watermaster to keep the Court fully advised in the premises, and to assist the Court in the administration and enforcement of the provisions of the Judgment.

A major task of the Watermaster in ULARA is that of monitoring ground water extractions. In accordance with the "General Information Policies and Procedures" dated January 4, 1971, and adopted by the Advisory Board, every ground water pumper reports its ground water extractions on a monthly basis on preprinted forms prepared and supplied by the Watermaster. This makes possible the updating of the water rights accounts (Watermaster Water Production Summary) by computing the amount pumped during the previous

month, the total amount pumped to date, and the amount that can be legally pumped during the remainder of the water year. A copy of the updated account is then mailed to the pumper each month.

The watermaster field staff performs water meter tests to verify ground water production reported by the parties, when requested by any party to the Judgment or at the discretion of the Watermaster.

Defective or inaccurate water measuring devices must be repaired within 30 days after receiving written notice of the results of the test from the Watermaster. A number of ground water production tests were performed during 1971-72.

The Watermaster keeps the Court apprised of hydrologic conditions within ULARA by means of this annual report and on special occasions by correspondence directed to the Court, both of which are reviewed by an advisory board before submittal. In preparing the annual report, the Watermaster collects and reports all information affecting and relating to the water supply and disposal within ULARA. Such information includes the following items:

1. Water Supply
   a. Precipitation
   b. Imported water

2. Water Use and Disposal
   a. Extractions
      (1) Used in valley fill area
      (2) Exported from each basin
   b. Water Outflow
      (1) Surface
      (2) Subsurface
      (3) Sewers

3. Water Levels

4. Transfers of Water Rights

5. Watermaster Administrative Budgets and Costs

6. Compliance and Violation by any Party in Terms of the Judgment.

7. Ownership and Locations of New Wells.

In addition to the above duties, the Watermaster also makes recommendations as it deems appropriate in connection with the proper utilization of the water supply in the underground storage capacities of ULARA.

Advisory Board

Section X, Paragraph 5 of the ULARA Judgment established an Advisory Board for the purpose of advising the Watermaster in the administration of its duties. The duly appointed members of the Board, as of September 30, 1972 are:

City of Los Angeles
Gerard A. Wyss (Vice Chairman)
Melvin L. Blevins (Secretary)
Duane Georgeson (Alternate)

City of Glendale
William H. Fell
Arnold W. Jagow (Alternate)

City of Burbank
Alan A. Capon
Martindale Kile, Jr. (Alternate)

City of San Fernando
Robert James (Chairman)
Stuart E. Bergman (Alternate)

Crescenta Valley County Water District
Robert E. Blomquist
Robert Argenio (Alternate)

The Advisory Board may be convened by the Watermaster at any time in order to seek its advice. In addition, the Advisory Board is also responsible for

reviewing with the Watermaster the proposed annual budget and annual report.

During the 1971-72 water year, the Advisory Board was convened on February 4, 1972. The meeting was called for the purpose of discussing the following items:

1. Annual Report for 1970-71

2. Budget for 1972-73.

3. Carryover of Restricted Pumping Right by City of San Fernando resulting from earthquake damage.

4. Report on the City of Los Angeles' pumping and spreading operations pursuant to the "Stipulation" by parties, following the February 9, 1971 earthquake.

5. Status report on Water System facilities regarding damage sustained during earthquake - Cities of San Fernando and Los Angeles and others.

6. Discussion of additional data and reporting in the Watermaster's annual report.

   (a) Water quality data
   (b) Separation of surface flow from Verdugo Subarea, and other places within the ULARA.

II. WATER SUPPLY CONDITIONS

The Upper Los Angeles River Area depends upon many sources of water to meet demands brought on by a fast growth in industry and a continuing population increase. At present, the water supply to ULARA consists of: precipitation on the watershed which includes portions of the San Gabriel, Santa Monica, Verdugo, and Santa Susana Mountains; ground water that is in storage within the four basins; imports from the Mono Basin-Owens River system; imports from the Colorado River; and water from Northern California made available through the facilities of the State Water Project.

Precipitation

The Upper Los Angeles River Area has the climate of an interior coastal valley and is hotter in the summer and wetter in the winter than the coastal areas which have a Mediterranean type climate.

Precipitation varies considerably throughout ULARA, depending on the topography and the elevation. Mean seasonal precipitation varies from about 14 inches at the western end of the San Fernando Valley to 35 inches in the San Gabriel Mountains. On the average, approximately 80 percent of the annual rainfall occurs in the four winter months of December through March.

Quantities of precipitation on the valley floor and on the hill and mountain areas are evaluated separately. The valley floor is made up of the four ground water basins, whereas the hill and mountain areas comprise the remaining areas in ULARA. Precipitation on the hill and mountain areas is evaluated to relate the runoff from the watersheds of Big Tujunga, Pacoima Creek, and Sycamore Canyon, with the runoff records which are included in this report and also to evaluate the ground water recharge. See Plate 2 for location of precipitation stations.

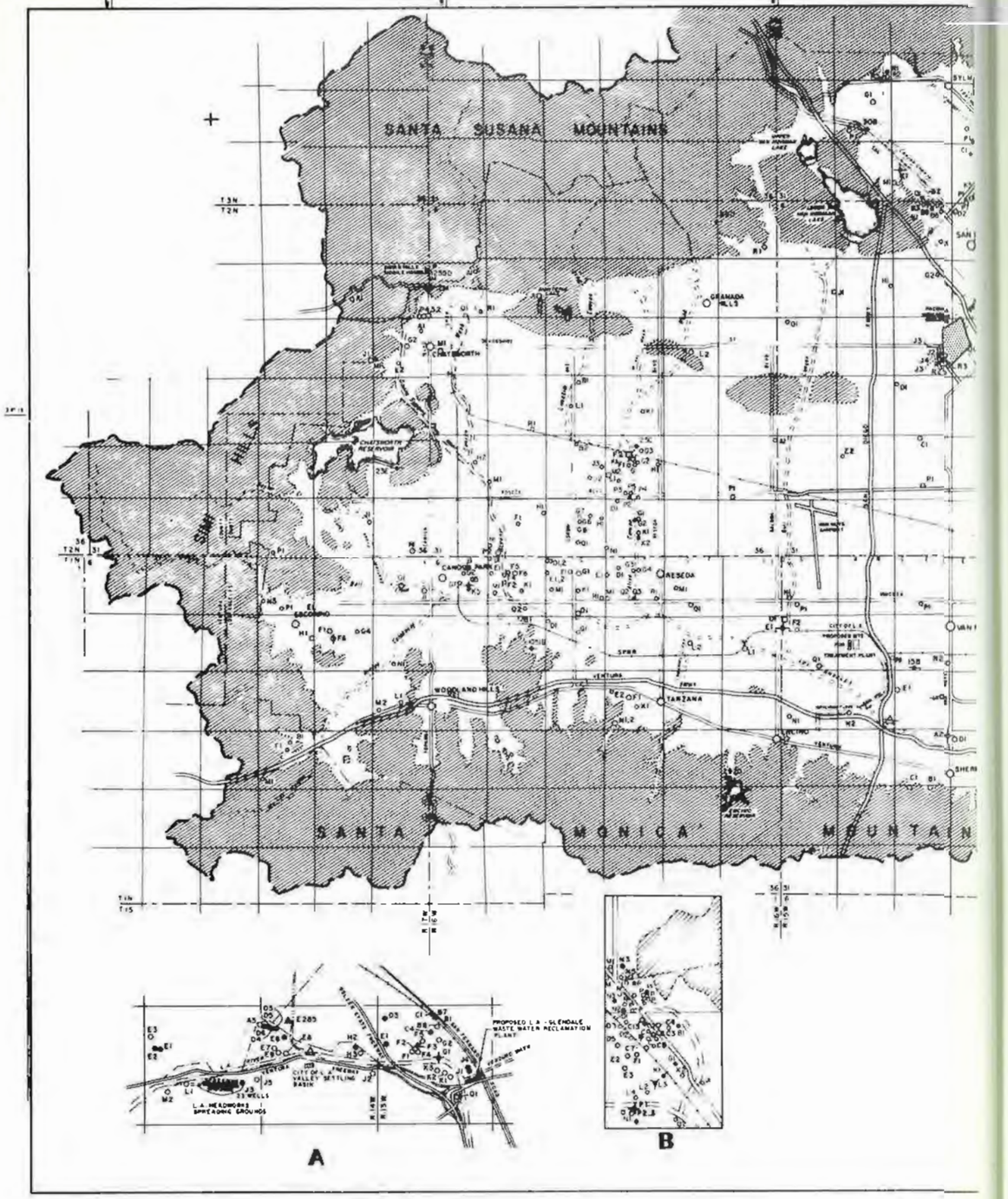
The 1971-72 water year experienced another below average rainfall. In the San Gabriel Mountains, some stations received as little as 41 percent of normal. On the average, about 8.10 inches of rain fell on the valley floor, whereas the mountain areas received approximately 10.64 inches of rainfall. The 29-year (1929-1957) average precipitation for the valley floor and mountain areas are 16.82 and 21.50 inches, respectively.

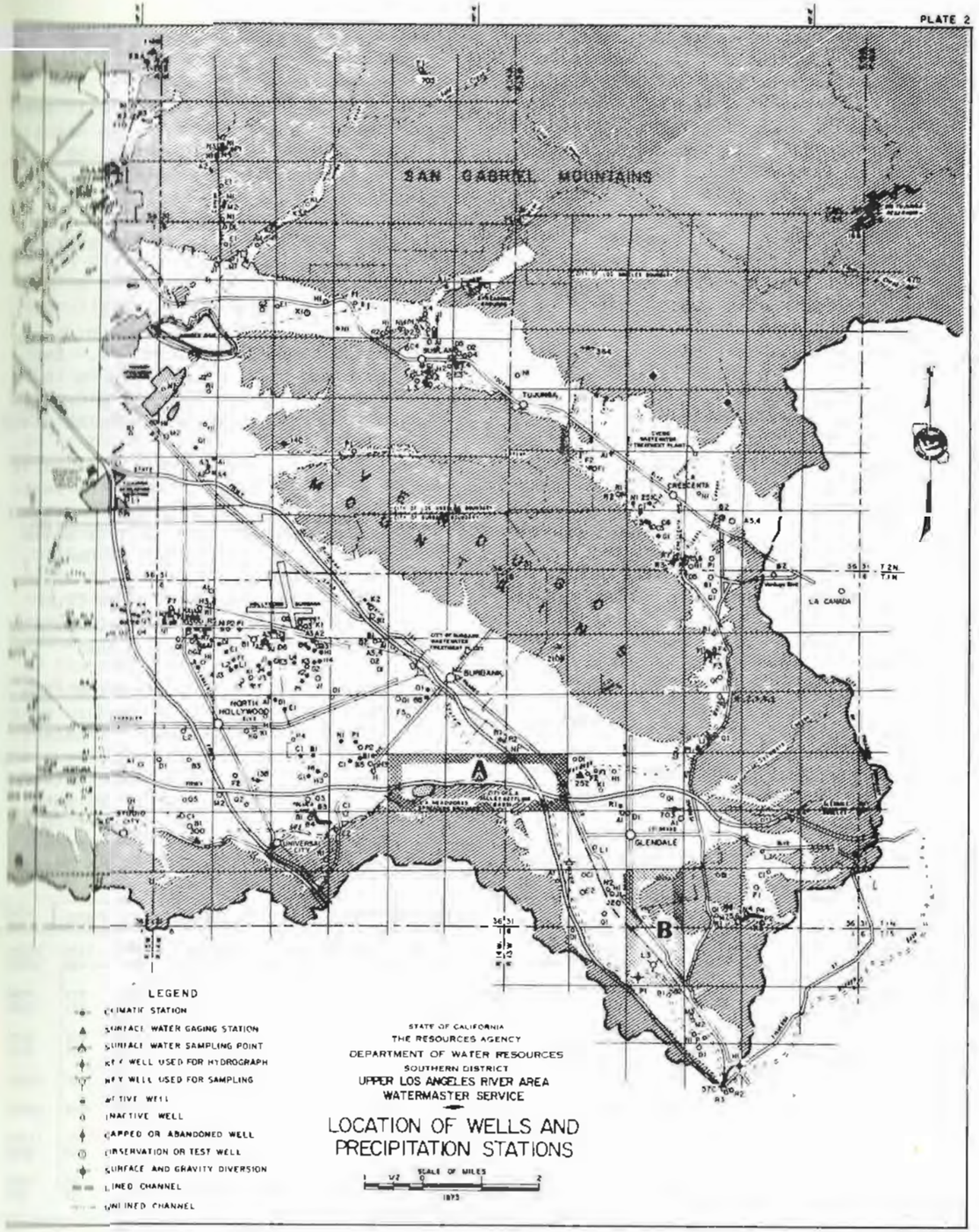
Table 1 presents a record of rainfall at 22 key precipitation stations which were used to develop the 29-year average rainfall and are described in the Report of Referee.

TABLE 1. PRECIPITATION [a]
In inches

LACFC District Number	Station Name	29-year mean	1970-71 precipitation	1971-72 Precipitation	1971-72 Percent of 29-year mean
11C	Upper Franklin Canyon Reservoir[b]	19.31	15.16	10.00	55
13B	North Hollywood[c]	18.79	15.15	8.27	56
14C	Roscoe-Merrill[c]	19.08	15.39	7.86	52
15B	Van Nuys[c]	19.67	14.97	7.15	47
17	Sepulveda Canyon	19.07	19.35	12.37	65
23E	Chatsworth Reservoir[c]	14.57	15.43	8.35	57
25C	Northridge-Andrews	14.92	14.58	7.40	51
29D	Granada Pump Plant	17.33	16.36	9.06	52
30B	Sylmar[c]	18.06	17.32	9.22	55
33A	Pacoima Dam	18.[illegible]	19.55	10.09	54
47D	Clear Creek City School	30.59	27.09	12.55	41
53D	Colby's Ranch	29.[illegible]	22.58	13.30	45
54C	Loomis Ranch-Alder Creek	20.4[illegible]	15.04	9.82	48
210B	Brand Park	18.71	16.94	10.11	54
251C	La Crescenta[c]	23.[illegible]	19.97	11.06	47
259D	Chatsworth Patrol	17.88	16.68	8.55	48
364	Haines Canyon-Lower	24.07	24.82	12.17	51
470	Tujunga-Mill Creek	17.94	12.99	7.87	44
703	Glendale-McIntyre[d]	17.[illegible]	13.75	8.27	47
705	Paradise Ranch-Alder Creek	18.93	18.30	9.53	50
1051B	Canoga Park[c]	14.39	17.80	8.65	60
1074	Little Gleason[e]	24.[illegible]	23.74	11.59	47

a/ Data furnished by Los Angeles County Flood Control District.
b/ Substituted for Franklin Canyon Station No. 12.
c/ Valley Station.
d/ Substituted by Glendale Station 295G.
e/ Substituted for Santa Clara Ridge Station No. 419.


SANTA SUSANA MOUNTAINS
SIMI HILLS
SANTA MONICA MOUNTAINS
GRANADA HILLS
CHATSWORTH RESERVOIR
CHATSWORTH
CANOGA PARK
CRESCENTA
ESCONDIDO
WOODLAND HILLS
TARZANA
VENTURA
SHERM
L.A. HEADWORKS SPREADING GROUNDS
33 WELLS
CITY OF L.A. VALLEY SETTLING BASIN
PROPOSED L.A. - GLENDALE WASTE WATER RECLAMATION PLANT
A
B


SAN GABRIEL MOUNTAINS
TUJUNGA
CRESCENTA
LA CANADA
BURBANK
SUNLAND
NORTH HOLLYWOOD
UNIVERSAL CITY
GLENDALE
A
B
LEGEND
CLIMATIC STATION
SURFACE WATER GAGING STATION
SURFACE WATER SAMPLING POINT
KEY WELL USED FOR HYDROGRAPH
KEY WELL USED FOR SAMPLING
ACTIVE WELL
INACTIVE WELL
CAPPED OR ABANDONED WELL
OBSERVATION OR TEST WELL
SURFACE AND GRAVITY DIVERSION
LINED CHANNEL
UNLINED CHANNEL
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
UPPER LOS ANGELES RIVER AREA
WATERMASTER SERVICE
LOCATION OF WELLS AND PRECIPITATION STATIONS
SCALE OF MILES
1973

Runoff and Outflow from ULARA

The drainage area of ULARA contains 329,137 acres of which 205,709 acres are hill and mountain areas. The drainage system in turn is made up of the Los Angeles River and its tributaries. The surface flow in the spring originates as : Storm runoff from the hill and mountain areas; storm runoff from the impervious areas of the valley floor; operational spills of imported water; industrial and sanitary waste discharge; and rising water.

Urbanization of the area has rapidly increased the flow discharge rates in much of ULARA and as such it is important to keep abreast of these changes to nature and its effect on the ground water basins.

A number of stream gaging stations are maintained throughout ULARA either by the LACFCD or the USGS. The Watermaster has selected six key gaging stations which in effect record major runoff from the hydrologic areas within ULARA.

Table 2 summarizes the monthly flows for each of the gaging stations and compares the 1971-72 water year with the 1970-71 water year. Both were very dry years as evidenced by the runoff quantities.

The records presented herein will keep the parties informed as to the magnitude of runoff from these various areas. The stations selected for this purpose are:

Station 57C; registers all surface outflow from ULARA.

Station 118B; registers all releases from Pacoima Dam which originate in Pacoima Canyon. Runoff below this point flows to the Lopez and Pacoima Spreading Grounds and on down to the Los Angeles River.

Station 168; registers all releases from Big Tujunga Dam which collects runoff from Tujunga Canyon northeasterly of the dam. Runoff below this point flows to Hansen Dam.

Station 252; registers flow from Verdugo Canyon plus flows from Dunsmore and Pickens Canyons.

Station E-285; registers flow from the westerly slopes of Verdugo Mountains and some flow east of Lankershim Boulevard. It also records any releases of reclaimed waste water discharged by the City of Burbank.

TABLE 2. MONTHLY RUNOFF AT SELECTED GAGING STATIONS[a/]

In acre-feet

Station	Water Year	Month												Total
		Oct.	Nov.	Dec.	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sept.	
57C-R (Los Angeles River)	1970-71	1090	35060	26420	3160	6110	7070	3290	2660	1860	4080	1380	1130	93310
	1971-72	3181	1414	30790	1414	1575	1139	1036	1009	1629	1412	1515	756	46870
E252-R (Verdugo Channel)	1970-71	276	2800	1980	450	171	462	274	232	243	302	259	237	7690
	1971-72	404	219	2320	263	206	164	172	236	145	133	185	121	4570
285-R (Burbank Storm Drain)	1970-71	406	2410	1730	769	748	648	569	464	379	277	365	432	9200
	1971-72	735	613	1690	621	495	638	427	392	508	443	533	378	7470
300-R (L. A. River at Tujunga Ave.)	1970-71	639	24340	20350	2500	5750	6580	2600	1520	1260	1020	1340	1190	69090
	1971-72	1560	1160	16440	1100	1190	1010	989	966	860	747	968	607	27600
168-R (Big Tujunga Dam)	1970-71	188	790	3574	1978	1302	1257	215	431	435	467	628	492	11760
	1971-72	307	121	170	1120	211	62	60	205	207	287	286	258	3290
118B-R (Pacoima Dam)	1970-71	32	27	1230	123	1200	932	429	309	529	61	61	60	4990
	1971-72	61	5	+[b/]	254	333	18	18	18	19	26	17	31	800

a/ Figures shown are rounded off; for details see Appendix C.
b/ Denotes insignificant flow.

Station 300; registers all flow west of Lankershim Boulevard plus outflow from Hansen Dam that is not spread. These records also include releases from Sepulveda Dam, which may include extractions from Reseda wells.

The location of these key gaging stations are shown on Plate 2. The mean daily discharge rates for these six gaging stations during 1971-72 are summarized in Appendix C.

At the request of the Advisory Board, the Watermaster has attempted to compute the surface flow of the Los Angeles River at gaging station F-57C as to the sources, i.e., storm runoff from precipitation, Owens River water, rising water, and industrial and reclaimed waste water discharges. The Watermaster utilized the procedures outlined in the Report of Referee for estimating the approximate flow rates and sources of water passing gaging station F-57C. A summary of the procedures used follows, and a tabulation of the computed flows is shown in Table 3.

The base low flows were separated from the surface runoff by the use of the hydrographs of Station F-57C. Base flows consist of rising water and industrial waste plus sewage. The separation of these two components is based on the following assumptions:

Rising water equals base low flow minus the sum of industrial waste and sewage.

Industrial wastes are estimated from City of Los Angeles waste permits, and the low flows in the Burbank-Western storm drain.

When the City of Los Angeles diverts water at the Headworks, all the rising water is diverted.

When there is no diversion at the Headworks, all the rising waters percolate upstream from Station F-57C.

The surface runoff obtained from the hydrographs of Station F-57C consists of net storm runoff and Owens River water. The separation of surface runoff into these two components is based on the following assumptions:

Net storm runoff equals surface runoff minus Owens River water.

If the Headworks is diverting, all releases of Owens River waters are diverted to the Headworks spreading grounds.

If the Headworks is not diverting, all releases of Owens River waters are considered to pass Station F-57C.

TABLE 3. SEPARATION OF SURFACE FLOW AT STATION F-57C
In acre-feet

Period	Base low flow		Surface runoff		Total measured outflow
	Rising water	Waste discharge	Owens River	Net storm	
1969-70	4,180 [a]	6,565	0	36,775 [a]	47,520
1970-71	2,556 [a]	8,856	12,978	68,920 [a]	93,310
1971-72	3,602 [a]	8,219	0	35,049 [a]	46,870
29-year average 1929-57	6,810	770	1,580	30,790	39,940

[a] Rising water and storm runoff from Verdugo to San Fernando Basin amounted to 2,881 and 4,805 acre-feet in 1970-71 and 2,050 and 2,513 acre-feet in 1971-72.

Ground Water Recharge

Local precipitation can have a marked influence on the ground water supply and water in storage. However, there is a wide variation in the annual amount of runoff as a result of changes in both precipitation and retentive characteristics of the watershed.

The accelerated urban development in ULARA has resulted in much of the rainfall being collected and routed into paved channels which discharge into the Los Angeles River and subsequently is carried out of the basin. Plate 2 depicts the lined channels within ULARA.

To somewhat overcome the rapid outflow due to urbanization, Pacoima Dam and Hansen Dam, originally built for flood protection, are currently being utilized to regulate storm flows for the purpose of recapturing the flow in spreading basins operated by the Los Angeles County Flood Control District (LACFCD) as well as the City of Los Angeles.

The LACFCD operates four spreading basins: Branford, Hansen, Lopez, and Pacoima Spreading Grounds. The City of Los Angeles, in turn, operates the Tujunga and Headworks Spreading Grounds. Plate 2 shows the location of these spreading basins. The spreading grounds operated by the LACFCD are utilized for spreading native water, whereas the spreading grounds operated by the City of Los Angeles are utilized to spread Owens River and native water, spillage from the Chatsworth Reservoir, ground water effluent, and the discharge from the Reseda wells. Table 4 summarizes the spreading operations for the 1971-72 water year.

TABLE 4. SPREADING OPERATIONS
In acre-feet

Month	Native water spread by Los Angeles County Flood Control District				Water spread by City of Los Angeles				
	Spreading Basins				Tujunga Spreading Grounds		Headworks Spreading Grounds		
	Branford	Hansen	Lopez	Pacoima	Native water	Owens River water	Owens River Releases	Reseda Wells	Ground water effluent in L. A. River[a/]
Oct. 1971	4	0	0	0	0	0	0	141	351
Nov.	3	0	0	16	0	0	0	184	399
Dec.	119	610	0	903	0	0	0	82	195
Jan. 1972	0	1,322	0	0	0	0	0	9	913
Feb.	3	0	0	194	0	0	0	56	611
Mar.	0	0	0	0	0	0	0	232	721
Apr.	4	0	0	0	0	0	0	223	527
May	2	0	0	0	0	0	0	193	674
June	1	0	0	0	0	0	0	41	108
July	2	0	0	0	0	0	0	0	184
Aug.	13	0	0	0	0	0	0	0	867
Sept.	10	0	0	0	0	0	0	0	678
Totals	165	1,932	0	1,113	0	0	0	1,161	6,228

a/ Includes industrial discharge, ground water effluent, and surface runoff diverted from Los Angeles River to Headworks Spreading Grounds.

Ground Water Table Elevations

During the 1971-72 water year, the Watermaster collected and processed data to determine prevailing ground water conditions in ULARA. The Watermaster obtained ground water level contour maps from the Los Angeles County Flood Control District and the City of Los Angeles in order to present the ground water table elevations for the spring and fall of 1972 and the change between the fall of 1971 and fall of 1972.

Ground water conditions during the spring and fall of 1972 are depicted by Plates 3 and 4, respectively. Data for lines of equal ground water elevation for Sylmar, Chatsworth, and Santa Monica Foothills were obtained from the City of Los Angeles, and data for the remaining area from the LACFCD.

The change in ground water surface elevation from fall of 1971 to fall of 1972 as presented in Plate 5 reflects the effects of variations in spreading, ground water extractions, and rainfall. The areas around Hansen and Tujunga spreading basins show a drop in ground water elevation because of a decrease in the amount of water spread in 1971-1972. On the other hand, the drop in water levels in the vicinity of La Crescenta is attributed to the increase in ground water extractions. The curtailment in ground water extractions has resulted in a rise of water levels in the vicinity of the Hollywood-Burbank airport, and the cities of Burbank and Glendale. A reduction in extractions by the City of Los Angeles at its Pollock Field, located halfway between the City of Glendale and Station F-57C, has resulted in a rise in water levels in that area.

In addition to the plates, Figures 1 and 2 depict the water levels at key wells located within ULARA. Plate 2 shows the location of key wells.

Waste Water Reclamation

The reclamation of waste water can provide a relatively economical source of water for irrigation, industrial, recreational, and ultimately, domestic use. Four waste water treatment plants are in operation in ULARA, and two are in the beginning stages of construction. See Plate 2 for locations. A tabulation of the operating waste water reclamation plants is shown in Table 5.

The Los Angeles-Glendale Waste Water Reclamation Plant project opened bids on December 6, 1972, with a scheduled start of construction date of March 1, 1973, and an on-line date of summer 1975, at which time it will provide 7.5 mgd of treated effluent to Griffith Park for irrigation and 2.5 mgd to the City of Glendale for cooling water for its steam plant.

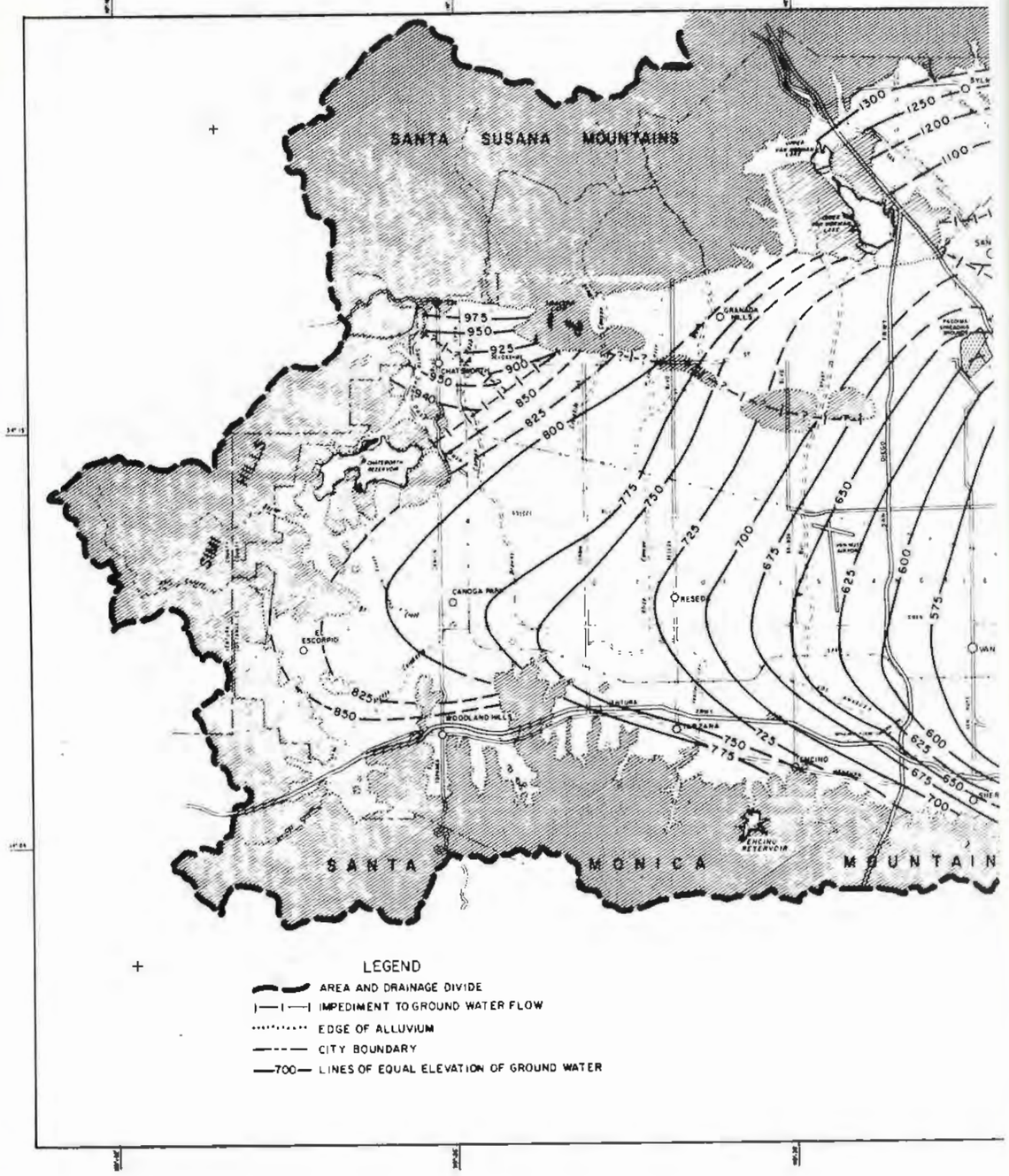
The Sepulveda Basin Water Reclamation Plant's design has been completed and a public hearing was scheduled for January 30, 1973. The portion to be constructed is the first of five modules of 40 mgd each and is scheduled to go on-line May 1975. At that time it will provide treated effluent for irrigation to the Sepulveda Basin Recreation Area.

TABLE 5. WASTE WATER RECLAMATION PLANTS

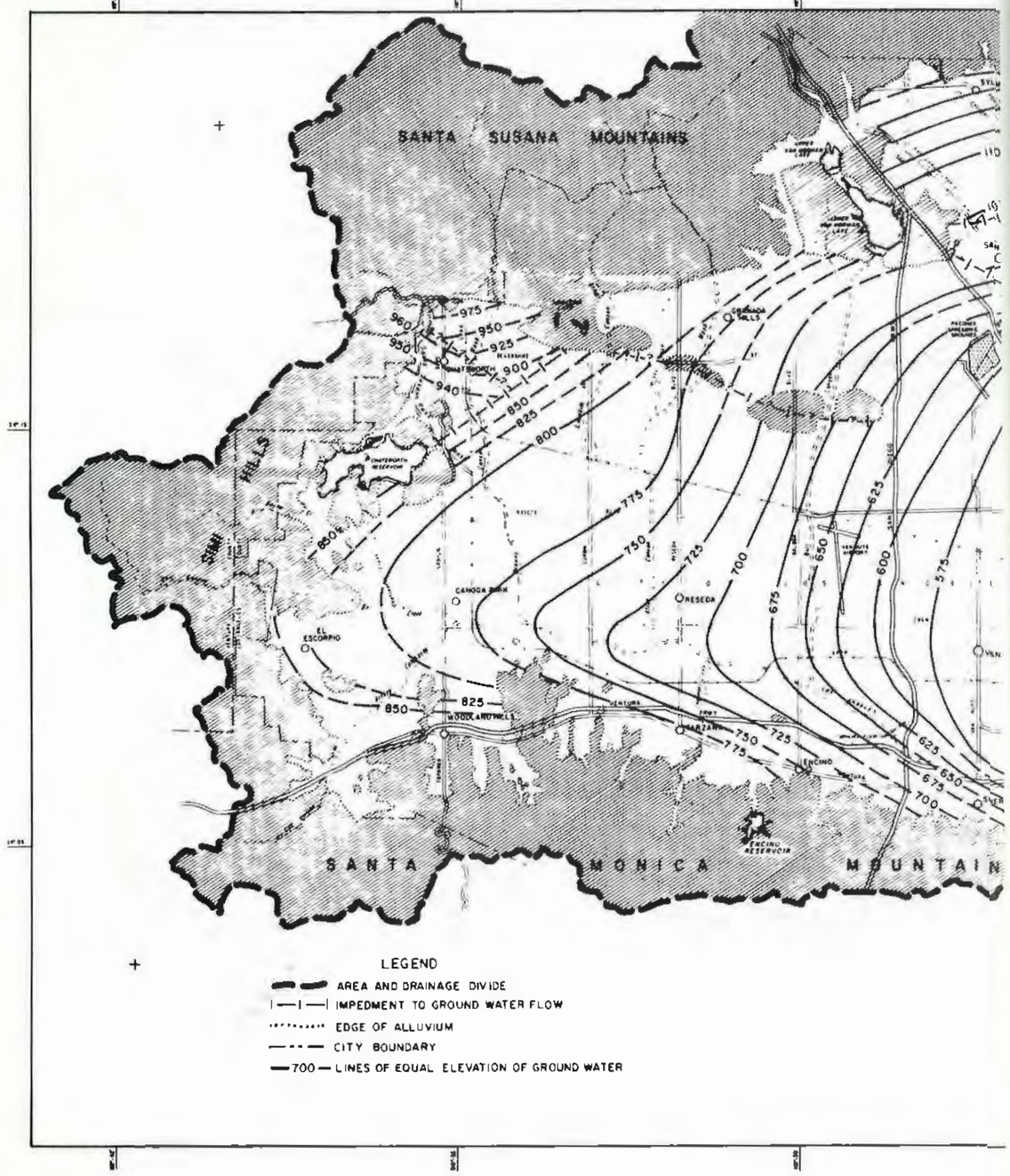
Plant	Quantity treated, in acre-feet
San Fernando Basin	
City of Burbank	5,566[a]
City of Los Angeles Valley Settling Basins	593[b]
Indian Hills Mobile Homes	15[c]
Las Virgenes Municipal Water District	448[c]
Verdugo Basin	
Crescenta Valley County Water District	96[c]

a/ Cooling towers used 2,473 acre-feet, balance to Los Angeles River.
b/ Applied 12 acre-feet to irrigation, balance to city sewer.
c/ Used for land irrigation.

PLATE 3


SANTA SUSANA MOUNTAINS
SIMI HILLS
SANTA MONICA MOUNTAINS
GRANADA HILLS
CHATSWORTH RESERVOIR
CANOGA PARK
RESEDA
ENCINO RESERVOIR
WOODLAND HILLS
ENCINO
VAN NUYS
975
950
925
900
850
825
800
775
750
725
700
675
650
625
600
575
1300
1250
1200
1100
LEGEND
AREA AND DRAINAGE DIVIDE
IMPEDIMENT TO GROUND WATER FLOW
EDGE OF ALLUVIUM
CITY BOUNDARY
700 LINES OF EQUAL ELEVATION OF GROUND WATER


SAN GABRIEL MOUNTAINS
HOLLYWOOD HILLS
SUNLAND
TUJUNGA
BRANFORD SPREADING GROUNDS
STATE TUJUNGA SPREADING GROUNDS
CRESCENTA
LA CANADA
Verdugo Blvd
NORTH HOLLYWOOD
STUDIO CITY
UNIVERSAL
LA RIVADORAS SPREADING GROUNDS
GLENDALE
COLORADO
1050
1000
950
1075
1100
1125
1150
1175
1200
1250
1300
1350
1400
1430
1600
1500
1100
900
850
800
700
650
550
525
500
475
450
425
400
375
350
325
300
275
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
UPPER LOS ANGELES RIVER AREA
WATERMASTER SERVICE
LINES OF EQUAL ELEVATION
OF GROUND WATER
SPRING 1972
SCALE OF MILES
1973


SANTA SUSANA MOUNTAINS
SANTA MONICA MOUNTAIN
SIMI HILLS
CHATSWORTH RESERVOIR
ENCINO RESERVOIR
CANOGA PARK
RESEDA
WOODLAND HILLS
ENCINO
VAN
975
950
925
900
940
850
825
800
775
750
725
700
675
650
625
600
575
LEGEND
AREA AND DRAINAGE DIVIDE
IMPEDMENT TO GROUND WATER FLOW
EDGE OF ALLUVIUM
CITY BOUNDARY
700 LINES OF EQUAL ELEVATION OF GROUND WATER

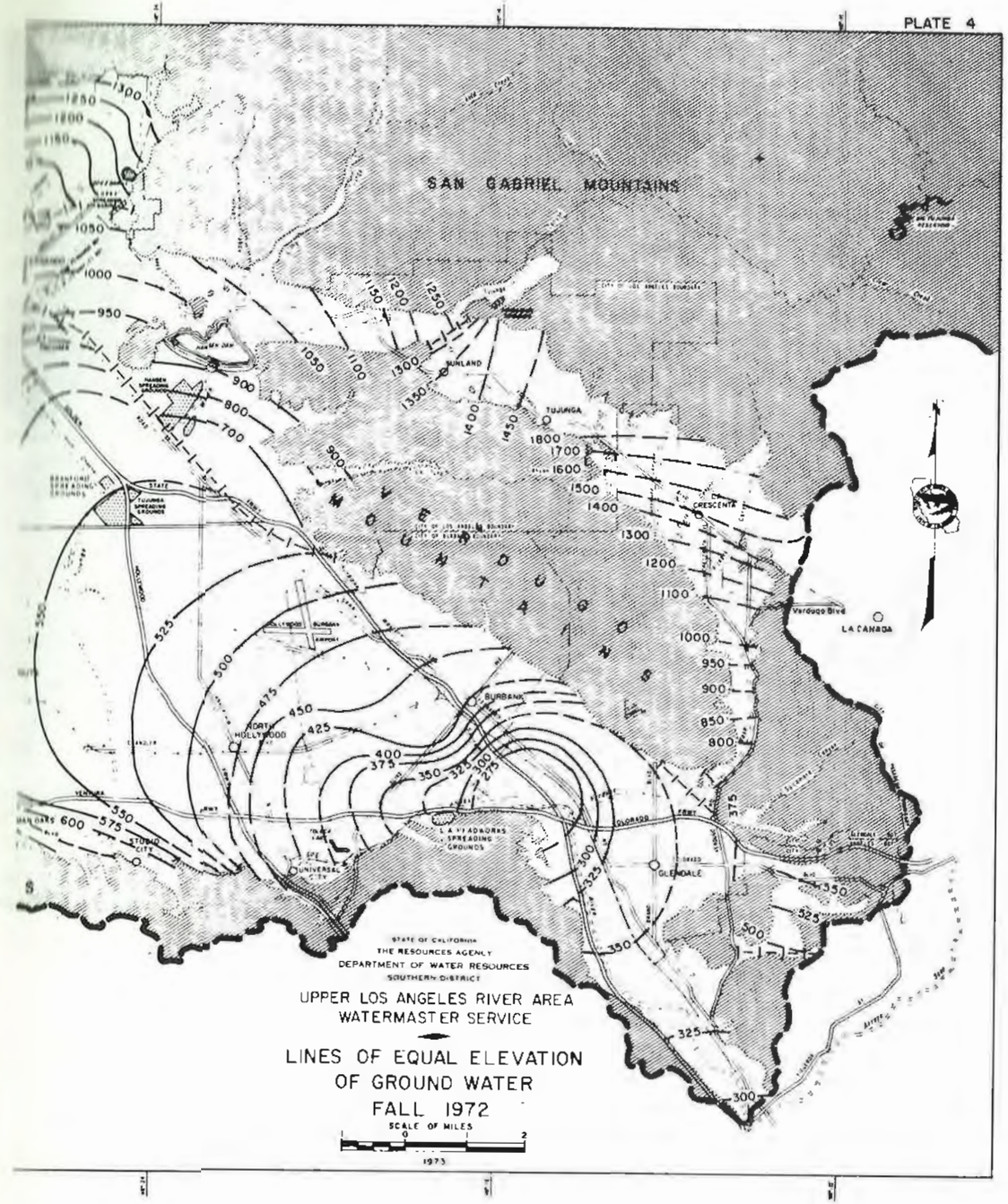
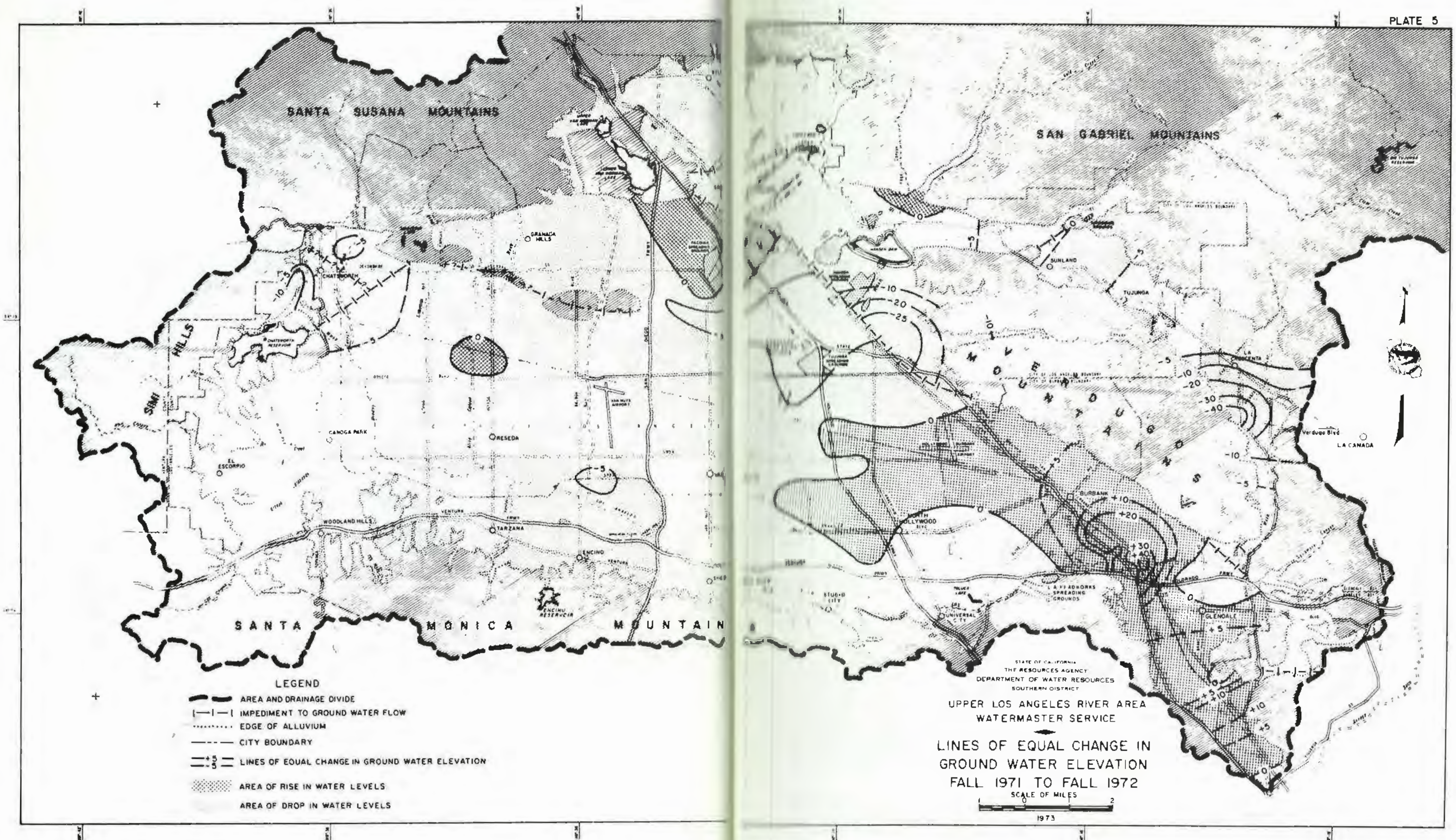

SAN GABRIEL MOUNTAINS
MOUNTAINS
TUJUNGA
SUNLAND
CRESCENTA
LA CANADA
Verdugo Blvd
BURBANK
NORTH HOLLYWOOD
UNIVERSAL CITY
STUDIO CITY
GLENDALE
GLENDALE FREEWAY
LA TUJUNGA SPREADING GROUNDS
1300
1250
1200
1150
1050
1000
950
900
850
800
700
1800
1700
1600
1500
1400
1100
525
500
475
450
425
400
375
350
325
300
275
600
575
550
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
UPPER LOS ANGELES RIVER AREA
WATERMASTER SERVICE
LINES OF EQUAL ELEVATION
OF GROUND WATER
FALL 1972
SCALE OF MILES
0
2
1973

PLATE 5


SANTA SUSANA MOUNTAINS
SAN GABRIEL MOUNTAINS
SIMI HILLS
SANTA MONICA MOUNTAINS
VERDUGO MOUNTAINS
CHATSWORTH
GRANADA HILLS
CANOGA PARK
RESEDA
EL ESCORPIO
WOODLAND HILLS
TARZANA
ENCINO
ENCINO RESERVOIR
VAN NUYS AIRPORT
SUNLAND
TUJUNGA
LA CRESCENTA
Verdugo Blvd
LA CANADA
BURBANK
NORTH HOLLYWOOD
STUDIO CITY
UNIVERSAL CITY
L A HEADWORKS SPREADING GROUNDS
GLENDALE
LEGEND
AREA AND DRAINAGE DIVIDE
IMPEDIMENT TO GROUND WATER FLOW
EDGE OF ALLUVIUM
CITY BOUNDARY
LINES OF EQUAL CHANGE IN GROUND WATER ELEVATION
AREA OF RISE IN WATER LEVELS
AREA OF DROP IN WATER LEVELS
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
UPPER LOS ANGELES RIVER AREA
WATERMASTER SERVICE
LINES OF EQUAL CHANGE IN
GROUND WATER ELEVATION
FALL 1971 TO FALL 1972
SCALE OF MILES
1 0 1 2
1973

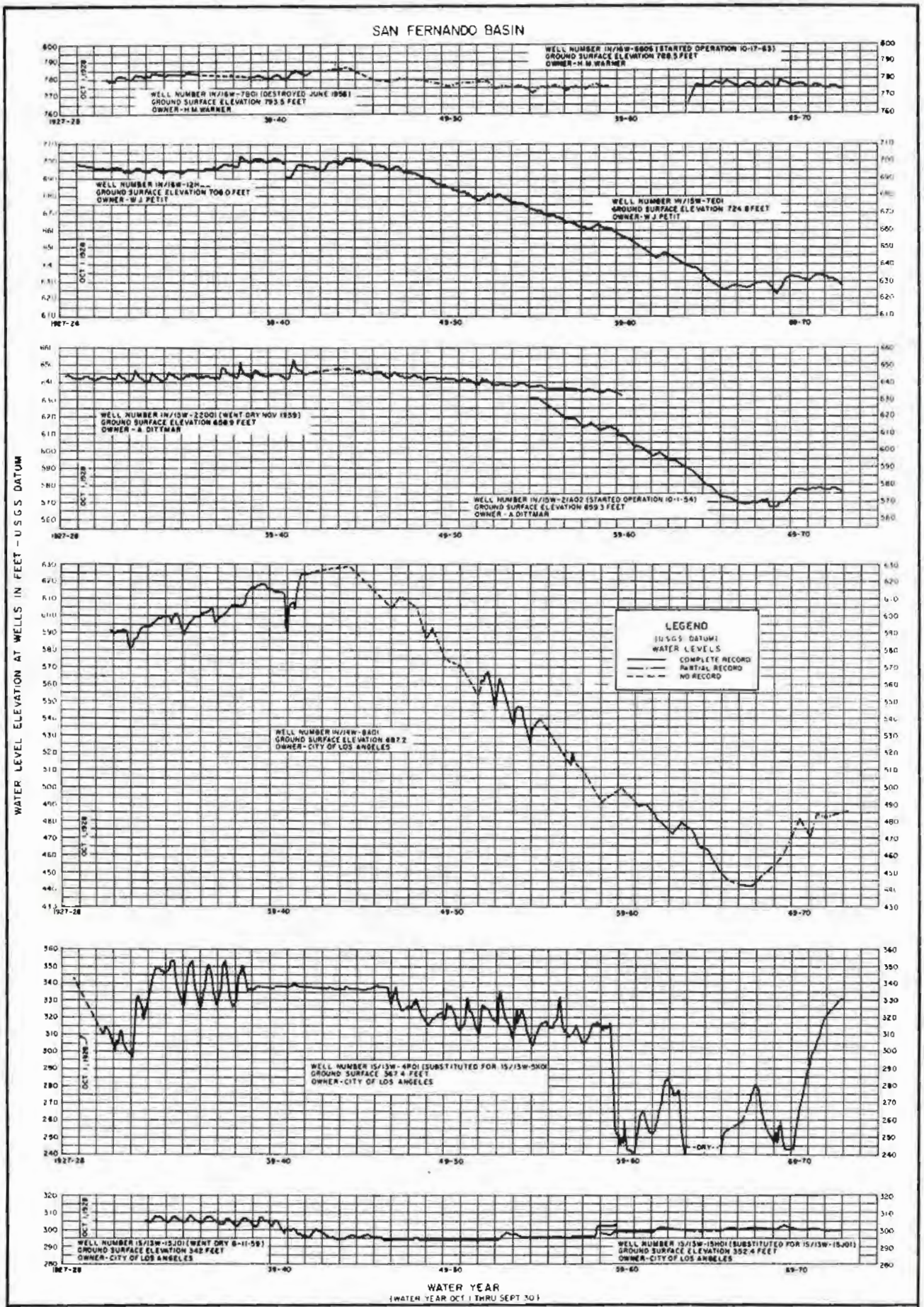


Figure 1—FLUCTUATION OF WATER LEVEL ELEVATION AT WELLS IN THE SAN FERNANDO BASIN

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1973

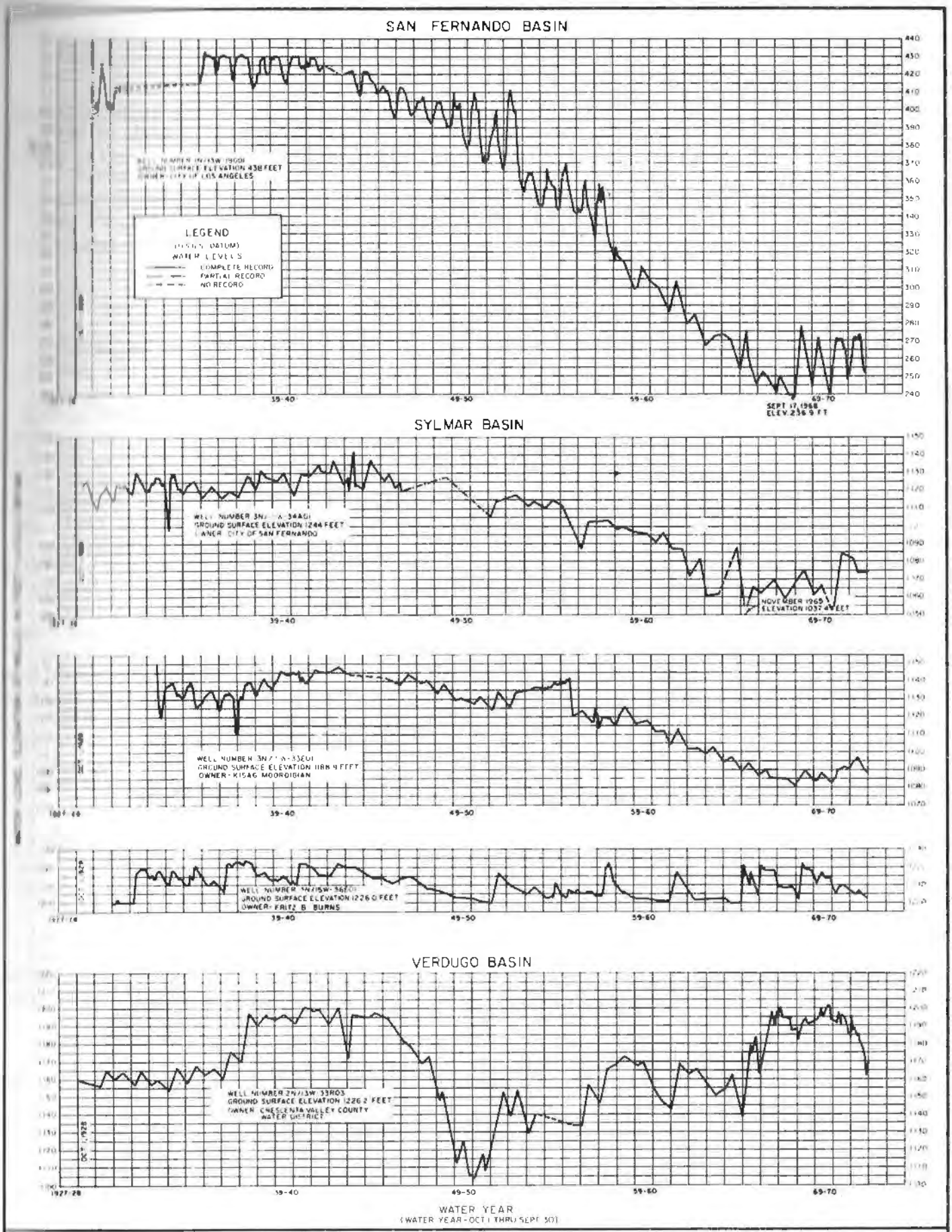


Figure 2 – FLUCTUATION OF WATER LEVEL ELEVATION AT WELLS IN THE SAN FERNANDO, SYLMAR AND VERDUGO BASINS

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1973

Water Quality

Water resources management must include water quality in the analysis of water supply factors. Water quality is in a constant state of flux as a result of changes made to the water supply environment by nature and by man. Monitoring the changes in water quality will always be important since it will be a measure of natural phenomena and of the effectiveness of management plans.

Imported Water

A. Owens River and Mono Basin Waters. The Los Angeles Aqueduct waters from Owens River and Mono Basin are of excellent quality, being of sodium-calcium bicarbonate in character. The TDS has averaged about 214 parts per million (ppm) for the past thirty years prior to 1970. The highest TDS content on record was 322 ppm, occurring on April 1, 1946, the minimum being on September 17, 1941 when it was 149 ppm. The past three years has shown a downward trend in TDS.

B. Colorado River Water. Colorado River waters are predominately sodium-calcium sulfate in character, changing to sodium sulfate after treatment to reduce total hardness. Samples taken at Burbank turnout between 1941 and 1972 indicate a TDS high of 875 ppm in August 1955 and a low of 625 ppm in April 1959. The average was approximately 742 ppm.

C. State Project Water. State Project water is of sodium-calcium bicarbonate-chloride-sulfate in character. Water from this source will generally contain less TDS and will be softer than local water and Colorado River water. From its first release in ULARA in May through September 1972, the TDS has averaged 309 ppm and hardness has averaged 157 ppm. Water quality should improve as storage in Castaic Reservoir is increased.

Surface Water

Surface runoff contains salts dissolved from rocks existing in each of the tributary areas. Surface waters are calcium bicarbonate in character. Low flows of 3 to 5 cfs at Station 57-C had a TDS content of 1,022 ppm and a total hardness of 422 ppm in 1972.

Ground Water

Ground water from the major water-bearing formations are of two general characters, each reflecting the composition of the surface runoff within the area. Ground water in the western portion of the area is calcium sulfate in character whereas water coming from the eastern portion of the area including Sylmar Basin and Verdugo Basin is calcium bicarbonate in character. Ground waters in the area are generally within the recommended limits set by U.S. Public Health Service drinking water standards. Possible exceptions are wells in the western end of the valley which have excess concentrations of sulfate and waters from the wells of the lower part of the Verdugo Basin which have abnormally high concentrations of nitrate. Ground waters in ULARA are classed as moderately hard to very hard.

Water quality studies indicate that except for short periods of time, the quality of imported waters from Owens River and Mono Basin and the State Water Project have been superior to native waters. The use of imported water should reflect a gradual improvement in ground water quality with time. Representative mineral analysis of imported, surface, and ground waters for 1971-72 are shown in Table 6. A comparison of the various water sources as to total dissolved solids, sulfate, and chloride content is shown graphical in Figure 3. Please note that records for State Project water are shown on a monthly basis since use commenced only in May of 1972.

TABLE 6. REPRESENTATIVE MINERAL ANALYSIS OF WATER

Well number or source	Date sampled	EC x 10^6 at 25°C	pH	Mineral constituents in Parts per million (ppm) / Equivalents per million (epm)											Total dissolved solids ppm	Total hardness as $CaCO_3$ ppm
				Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	NO_3	F	B		
IMPORTED WATERS																
Colorado River Water at Eagle Rock Reservoir	1971-72 (average)	1277	8.17	36 1.80	15 1.25	216 9.39	4.9 0.12	0 0	77 1.26	338 7.04	105 2.95	2.1 0.03	0.36 0.01	0.22 0.05	802	151
Owens River Water at Upper Van Norman Res. Inlet	4-18-72	338	8.51	25 1.25	5.4 0.45	37 1.60	3.7 0.09	0 0	67 1.09	24 0.50	15 0.42	0.7 0.01	0.63 0.03	0.53 0.14	202	84
State Project Water at Joseph Jensen Filtration Plant	9-72	505	8.25	33 1.65	14.5 1.19	49 2.13	3 0.08	0 0	122 2.00	69 1.44	53 1.49	0 0	0.3 0.02	0.14 0.04	290	142
SURFACE WATERS																
Los Angeles River at Sepulveda Blvd.	4-5-72	1340	8.67	122 6.10	40 3.33	116 5.04	5.9 0.15	0 0	119 1.95	352 7.33	109 3.07	12 0.19	——	——	876	470
Los Angeles River at Burbank-Western Wash	4-5-72	1240	7.95	54 2.70	18 1.50	183 7.95	13 0.33	0 0	115 1.88	259 5.39	109 3.07	13 0.20	——	——	800	208
Los Angeles River at Brazil Street	4-5-72	1380	9.55	112 5.60	35 2.91	141 6.13	7.0 0.17	0 0	82 1.34	395 8.22	128 3.60	18 0.29	——	——	1022	422
GROUND WATERS																
(SAN FERNANDO BASIN - WESTERN PORTION)																
2N/16W-27F02 (Reseda No. 8)	11-4-71	1200	7.40	148 7.40	34 2.83	68 2.95	1.3 0.03	0 0	162 2.65	315 6.56	46 1.29	22 0.35	0.34 0.01	0.32 0.08	756	510
(SAN FERNANDO BASIN - EASTERN PORTION)																
1N/14W-08B01 (North Hollywood No. 19)	4-6-72	602	7.80	70 3.50	17 1.41	28 1.21	3.0 0.07	0 0	110 1.80	93 1.93	15 0.65	12 0.19	0.85 0.02	——	379	240
(SAN FERNANDO BASIN - L. A. NARROWS)																
1S/13W-04L03 (Pollock No. 6)	10-26-71	1160	7.20	99 4.95	37 3.08	90 3.91	3.1 0.07	0 0	128 2.09	227 4.72	107 3.01	6.4 0.10	0.31 0.01	0.44 0.11	731	400
(SYLMAR BASIN)																
2N/15W-04B02 (Mission No. 1)	7-30-71	779	7.44	96 4.79	22 1.81	37 1.61	2.6 0.07	0 0	145 2.38	124 2.58	26 0.73	15 0.24	0.35 0.02	——	453	332
(VERDUGO BASIN)																
1N/13W-10F03 (Glorietta No. 3)	8-24-71	735	6.10	80 3.99	23 1.89	34 1.48	2.0 0.05	0 0	167 2.74	76 1.58	66 1.86	88 1.42	——	——	451	294

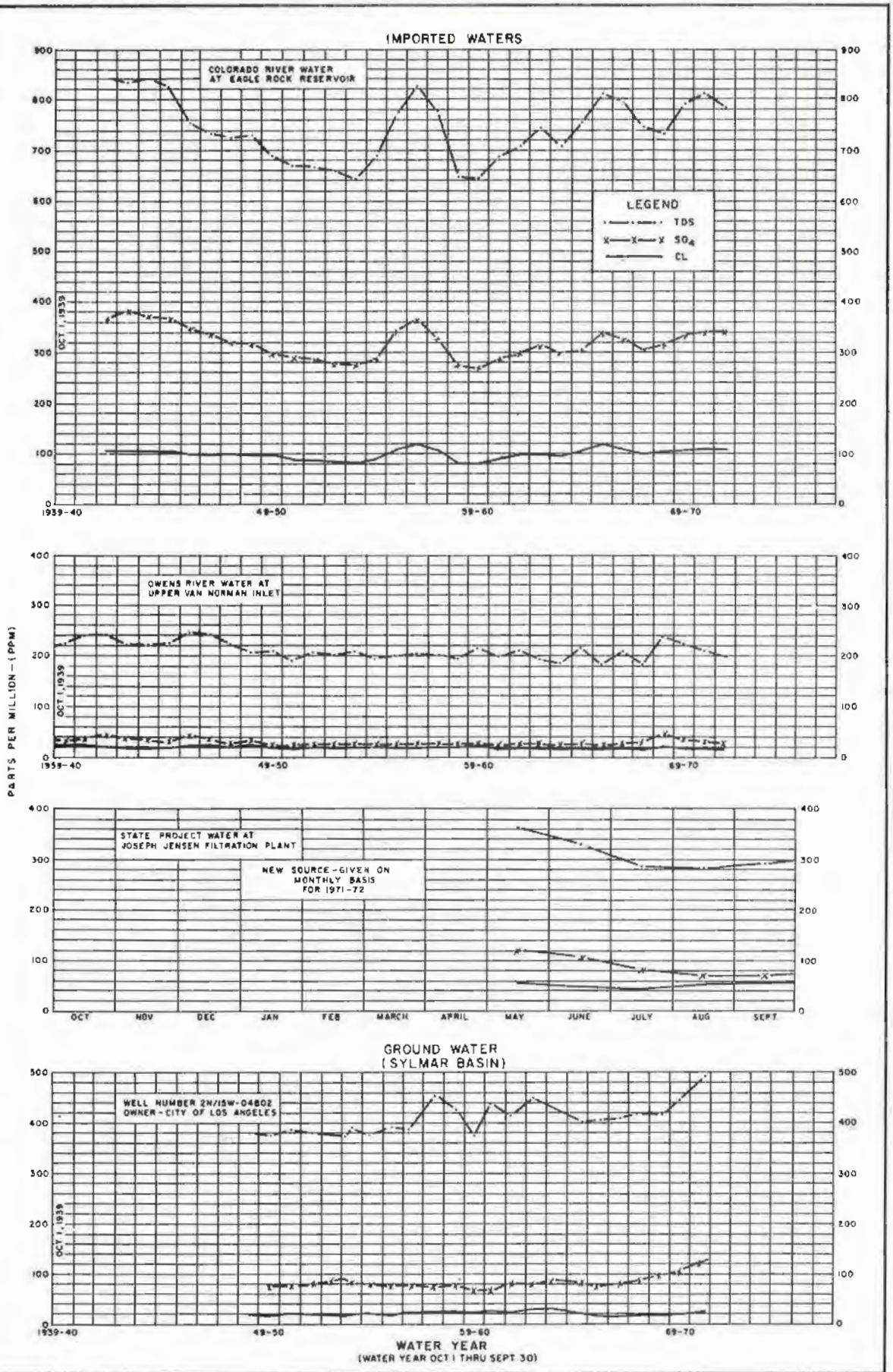


Figure 3 - TOTAL DISSOLVED SOLIDS, SULPHATE, AND CHLORIDE OF WATER SOURCES IN ULARA

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1973

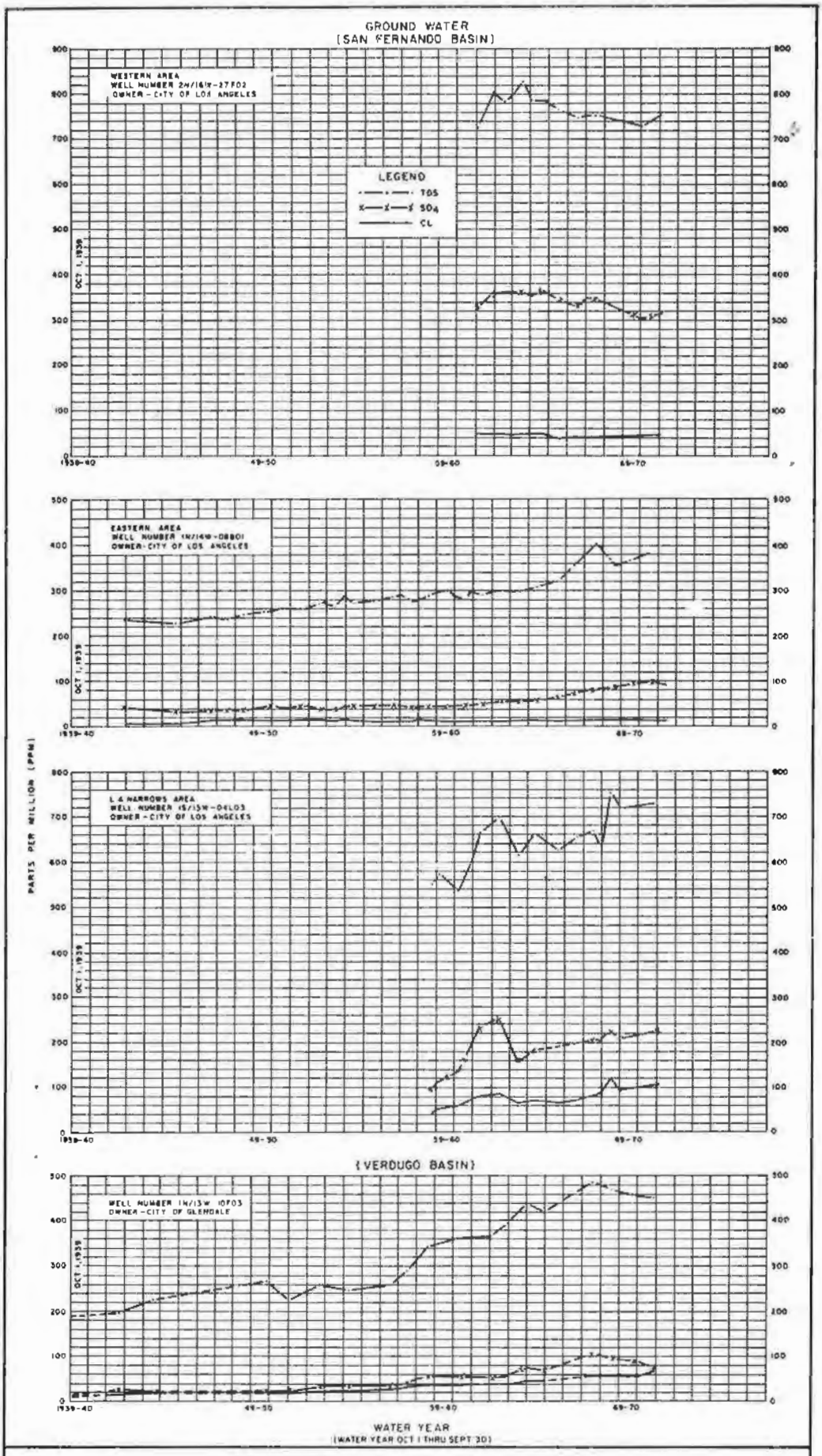


Figure 3 (Cont.) - TOTAL DISSOLVED SOLIDS, SULPHATE, AND CHLORIDE OF WATER SOURCES IN ULARA

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1973

Ground Water Contamination by Gasoline

During the 1971-72 water year, progress was made toward abating gasoline pollution near Forest Lawn Cemetery. The history of this major water quality problem was described in the 1968-69 and 1969-70 Watermaster reports.

The Western Oil and Gas Association (WOGA) has continued its efforts to abate the pollution. The California Regional Water Quality Control Board, Los Angeles Region, and the State Water Resources Control Board are exercising leading roles to insure effective and expeditious abatement. The Department of Water Resources has advised the Boards regarding the technical aspects of abatement. The City of Los Angeles Department of Water and Power (LADWP) and WOGA have maintained an effective monitoring program in the area of gasoline pollution.

As of November 1, 1971, WOGA has: (1) improved on monitoring of the areal extent and depth of free gasoline, and of the presence of taste and odor in ground water; (2) continued pumping of water from several sink wells to prevent the spread of free gasoline; (3) continued removal of gasoline from skimmer-pump wells; and (4) attempted to remove all traces of residual gasoline taste and odor in the ground water basin.

An additional monitoring well (W-66) was drilled during 1971-72 near the intersection of Cerritos and Glendale Avenues. The well is being used to determine whether evidence of gasoline exists now or occurred in the past few years. The following monitoring program is presently in effect: (1) LADWP collects six samples on the first and third Thursday of each month and tests for hydrocarbons by IR analysis; (2) WOGA measures all wells for surface water elevation and free gasoline every Monday and Thursday of each week; (3) gasoline odor is tested for by sniffing each Thursday and as warranted.

Traces of free floating gasoline (seldom more than a fraction of an inch) are still evident at Wells W-26, (abandoned August 7, 1972) W-50, and W-63 in the San Fernando Field; at Wells W-52 and W-53 in the Rosslyn Field; at Wells W-3, W-4, W-32 and W-47 in the Cox Field; and at Wells W-33, W-37 and W-39 in the Newman Field. Gasoline odors are still present in the Newman, Cox, and Rosslyn Fields; at Wells F-3, 4, and 6; and at W-42, 45, 46 and 54 along San Fernando Road (Figure 4).1/

Because of the decline in water levels in the gasoline-polluted area, pumping rates at the Cox, Rosslyn, and San Fernando fields have been reduced to the following levels, as of June 1, 1972:

Field	Well No.	Rate, in gpm
Cox	W-3	25
	W-4	16
	W-37	90
	W-52	9
	W-53	51
San Fernando	W-50	14
	W-63	40
	W-26	3

Well W-58 is pumped occasionally at about 97 gpm to keep it on a standby basis in the event that a drawdown in the water table might become necessary at this location. WOGA is maintaining slight drawdown cones at the Cox and San Fernando Fields, while attempting to minimize the withdrawal of ground water.

Gasoline recovery has decreased considerably since October 1970. Free gasoline removed from October 1971 through September 1972 was 160 gallons, excluding dissolved gasoline and losses by evaporation or aeration.

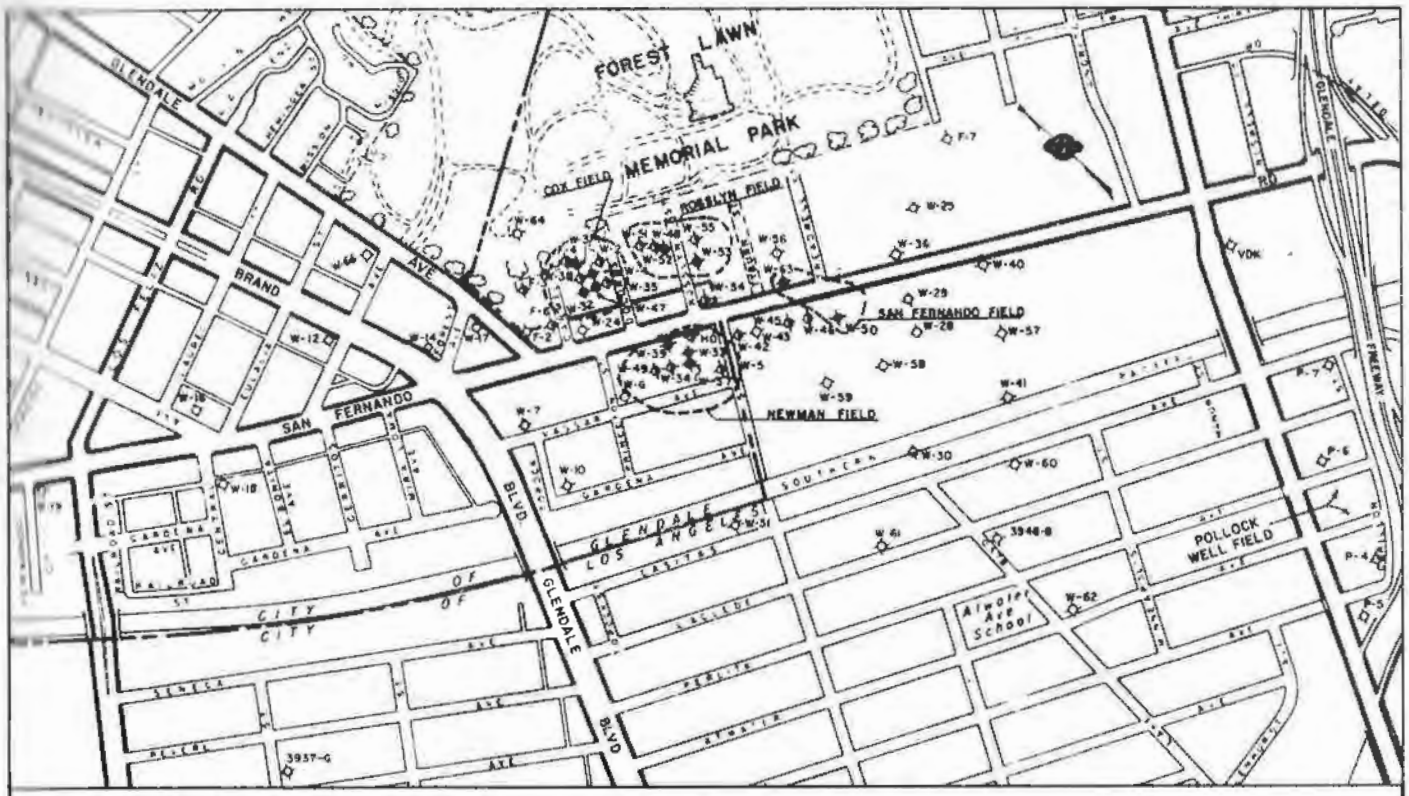


Figure 4- GASOLINE POLLUTION- FOREST LAWN, GLENDALE, LOS ANGELES

DEPARTMENT OF WATER RESOURCES, SOUTHERN DISTRICT, 1973

According to WOGA, the total removal of free and dissolved gasoline since the start of the cleanup program through June 1972 has been about 44,300 gallons. Trend in data indicate ultimate total gasoline removal may not exceed 45,000 gallons.

WOGA reports that almost all removable free gasoline has been removed, and pellicular gasoline retained by the sediments is being biodegraded by Pseudomonas and Arthrobacter bacteria.[1/] WOGA is monitoring bacterial densities as cleanup progresses. Efforts are also being made to accelerate the natural biodegradation of dissolved and pellicular gasoline by increasing the availability of oxygen to the bacteria.

1/ Western Oil and Gas Association, Los Angeles, California. "Progress Report to Los Angeles Regional Water Quality Control Board on Amelioration of Ground Water Contamination by Gasoline near San Fernando Road in Glendale and Los Angeles". Unpublished Report. July 1, 1972.

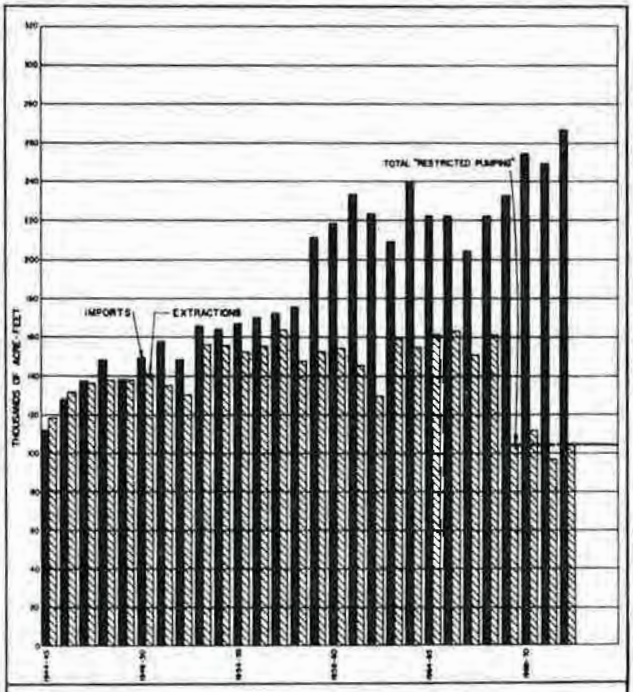


Figure 5 - GROUND WATER EXTRACTIONS AND USE OF IMPORTED WATER IN UPPER LOS ANGELES RIVER AREA

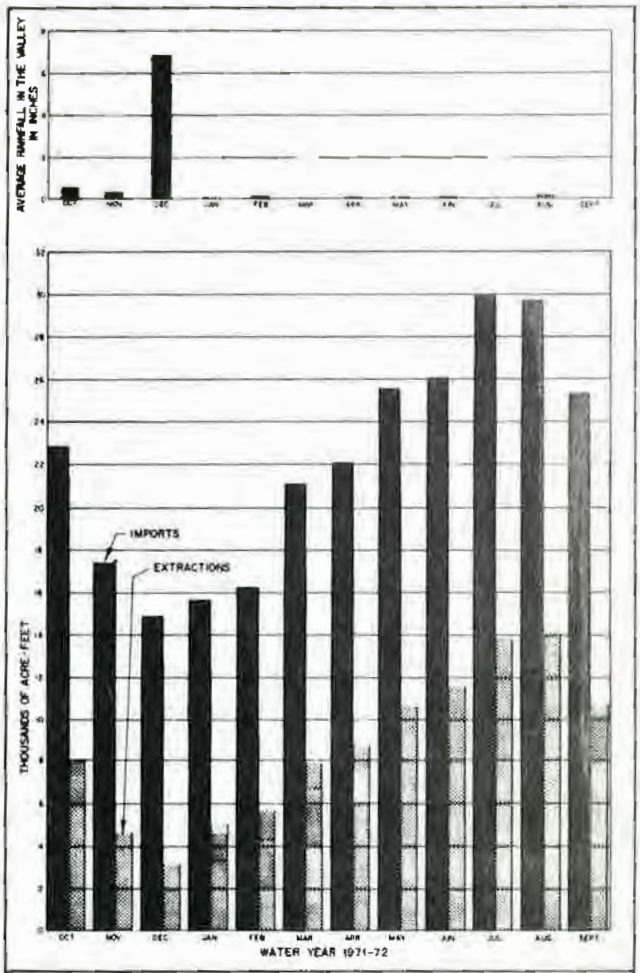


Figure 6 - MONTHLY WATER DEMAND AND AVERAGE RAINFALL IN UPPER LOS ANGELES RIVER AREA

III. WATER USE AND DISPOSAL

Water delivered for use in ULARA is either imported water, local ground water, local surface diversions, or a mixture, depending on the area and water system operation. During the 1971-72 water year, water purveyors in ULARA served approximately 369,600 acre-feet of water to their customers. Of this total approximately 104,180 acre-feet were extracted and the remaining 265,420 acre-feet were imported. The basin contains 582 wells of which 187 are active, and 406 are inactive. During 1971-72, 24 were drilled and 10 were destroyed.

The adjudication of ground water rights in ULARA restricted all ground water extractions effective October 1, 1968. On that date, ground water extractions were restricted to approximately 104,000 acre-feet per water year. This amounted to a reduction of approximately 50,000 acre-feet below the previous 6 years average.

Under the Judgment no determination was made regarding overdraft or surplus in the Eagle Rock Basin. Therefore, no restrictions on ground water extractions are imposed on the Eagle Rock Basin.

Except for Sparkletts Drinking Water Corporation and Deep Rock Artesian Water Company, there are no parties to the Judgment that extract water from Eagle Rock Basin. The safe yield of the basin, under 1964-65 conditions, was set at 70 acre-feet.

The restriction on ground water extractions together with the below average rainfall, has resulted in a record importation of water to ULARA.

Figure 5 graphically illustrates the annual ground water extractions and total water imported to ULARA beginning with 1944-45 water year. Note the change during years 1968-69 through 1971-72.

It can also be noted that for the 10 years before restricting pumping, imports exceeded extractions by 50,000 to 60,000 acre-feet per year and that for the four water years 1968-69-1971-72, the difference jumped to between 120,000 to 160,000 acre-feet. Due to restricted pumping in ULARA, any substantial increase in water demand in the future will show in an increase of imports only.

Figure 6 provides another graphical analysis of the monthly relationship between rainfall, ground water extractions, and imported supply. This graph is representative of the entire ULARA and not a specific ground water basin within ULARA. The precipitation values were obtained from those stations that are located on the valley floor. (See Table 1.)

Ground Water Extractions

By letter dated April 26, 1968, the Watermaster informed all parties that were known to be active, that ground water extractions within ULARA would be reduced and controlled by the Watermaster in accordance with the Judgment. The ULARA Judgment limits the amount of ground water each party can extract annually from each of the separate basins to an amount referred to as "Restricted Pumping".

Table 7 presents a balance sheet which summarizes each party's water account by listing its "Restricted Pumping" (see Appendix A for any changes); allowable carryover from 1970-71; any additional allowable pumping as

TABLE 7. RESTRICTED PUMPING AND QUANTITIES EXTRACTED AND ASSIGNED
In acre-feet

Party	(1) Restricted Pumping	(2) Allowable carryover from 1970-71	(3) Assignments in Restricted Pumping[a]	(4) Allowable extraction 1971-72 (1)±(2)±(3)=4	(5) Amount Extracted	(6) Balance (4)-(5)=(6)	(7) Allowable carryover into 1972-73
SAN FERNANDO BASIN							
Bartholomaus, William O.	15.00	0.00	- 15.00	0.00	0.00	0.00	0.00
Burbank, City of	13,649.00	12.05	+ 196.00[b]	13,857.05	13,856.81	0.24[c]	0.24
California Materials Company	0.00	0.00	+ 250.00[b]	250.00	276.97	- 26.97[c]	0.00
Conrock Company[a]	0.00	0.00	+1,300.00[b]	1,300.00	1,453.16	- 153.16[c]	0.00
Forest Lawn Memorial Park Assoc.	814.00	60.06	- 286.29	587.77	475.48	112.29	52.77
Glendale, City of	12,405.00	188.85	+ 150.00	12,743.85	12,303.51	440.34	440.34
Harper, Cecilia DeMille	0.00	4.50	+ 36.29[b]	40.79	29.22	11.57	3.63
Livingston-Graham, Inc.	0.00	0.00	+ 650.00[b]	650.00	520.27	129.73[c]	0.00
Lockheed Aircraft Corporation	239.00	0.00	- 239.00	0.00	0.00[d]	0.00	0.00[e]
Los Angeles, City of	63,257.00	226.60	-4,250.00	59,233.60	59,685.39[d]	- 451.79	- 881.29[e]
(Pursuant to "Stipulation for Emergency Spreading and Extraction")		- 978.92[f]	0.00	-978.92[f]	0.00	-978.92	- 978.92[f]
McCabe, Celeste Louise	1.00	0.10	0.00	1.10	0.00	1.10	0.10
Mena, John and Barbara	0.00	- 2.88	0.00	- 2.88	0.96	- 3.84	- 3.84
Monterie Lake Association	0.00	- 13.46	0.00	- 13.46	0.00	- 13.46	- 13.46
Riverwood Ranch Mutual Water Co.	0.00	3.20	+ 32.00[b]	35.20	14.72	20.48[c]	3.20
Sears, Roebuck and Company	0.00	0.00	+ 250.00[b]	250.00	304.08	- 54.08[c]	0.00
Southern Service Company, Ltd.	0.00	- 0.30	+ 80.00	79.70	76.41	3.29	3.29
Sportsmen's Lodge, Inc.	0.00	- 11.99	+ 36.00	24.01	25.76	- 1.75	- 1.75
Toluca Lake Property Owners' Association	23.00	0.82	0.00	23.82	19.02	4.80	2.30
U.S. Mortgage	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Valhalla Memorial Park	184.00	2.89	+ 20.00	206.89	205.30	1.59	1.59
Van de Kamp's Holland Dutch Bakers, Inc.	93.00	6.80	- 10.00[b]	89.80	3.64	86.16[c]	8.30
Walt Disney Productions	0.00	0.00	+1,800.00[b]	1,800.00	2,125.02	- 325.02[c]	0.00
Subtotals	90,680.00	-501.68	0.00	90,178.32	91,375.72	-1,197.40	-1,363.50
SYLMAR BASIN							
Brown, Charles T.	0.00	- 4.42	+ 20.00	15.58	13.44	2.14	2.00
Church of Jesus Christ of the Latter Day Saints	0.00	-804.52	+ 100.00	- 704.52	248.44	- 952.96	- 952.96
Fidelity Federal Savings and Loan Association	609.00	58.90	- 120.00	547.90	12.06	535.84	48.90
Los Angeles, City of	2,818.00	- 9.07	0.00	2,808.93	2,800.37	8.56	8.56
Moordigian, Kisag	46.00	0.60	- 40.00	6.60	0.00	6.60	0.60
San Fernando, City of	2,737.00	1526.06[h]	+ 40.00	4,303.06	3,065.43	1,237.63	1,237.63[h]
Subtotals	6,210.00	767.55	0.00	6,977.55	6,139.74	837.81	344.73
VERDUGO BASIN							
Crescenta Valley County Water District	3,294.00	227.45	0.00	3,521.45	3,516.01	5.44	5.44
Glendale, City of	3,856.00	385.60	0.00	4,241.60	3,149.55	1,092.05	385.60
Subtotals	7,150.00	613.05	0.00	7,763.05	6,665.56	1,097.49	391.04
ULARA TOTALS	104,040.00	878.92	0.00	104,918.92	104,181.02[d]	737.90	- 627.73

a/ Refer to Table 11 and Appendix A for information concerning assignments of "Restricted Pumping" or prior ownership.
b/ Reduction in City of Los Angeles extraction pursuant to separate Stipulated Judgment.
c/ Reverts to City of Los Angeles as a carryover.
d/ Excludes extractions from Reseda Wells which totaled 1,160.23 acre-feet.
e/ Includes year-end balance of parties to Stipulated Judgments.
f/ Amount to be returned to basin by spreading imported water or foregoing right to extract water or by combination of both.
g/ No credit for spreading imported water applied pursuant to "Stipulation for Emergency Spreading and Extraction".
h/ Allowable carryover by special Watermaster authorization. Amount to be extracted in following three years. See Chapter IV of this report for details.

the results of a water right assignment; amount of ground water extracted during the 1971-72 water year; and the amount that can be carried forward to the succeeding water year.

In order to provide flexibility in the control of ground water extractions, the Judgment contains various provisions which allow parties to carry over into the succeeding water year a portion of their unused water right and, in some cases, to overextract. This flexibility clause was provided to assist the parties in meeting unforseen emergencies in water demands. One provision allows parties to carry over from one water year to another any unused "Restricted Pumping" up to an amount not to exceed 10 percent of their "Restricted Pumping".

The flexibility clause also allows parties to overextract up to an amount equal to 10 percent of their "Restricted Pumping". However, any overextraction will be deducted from the Restricted Pumping" in the succeeding water year. Chapter IV contains additional information on this provision.

In addition to the flexibility clause, the City of San Fernando is allowed, by the Judgment, to exceed its assigned "Restricted Pumping" in Sylmar Basin. The additional allowance for the City of San Fernando is described in the Judgment as "Physical Solution-Sylmar Basin". This provision allows the City of San Fernando to extract up to 850 acre-feet of water per year in addition to the amount that it has received under its "Restricted Pumping". If the City of San Fernando takes, diverts, or extracts water in addition to its "Restricted Pumping", it must immediately notify the City of Los Angeles and the Watermaster in writing, and the City of Los Angeles must reduce its extractions in an amount equal to the amount that the City of San Fernando has exceeded its rights. Chapter IV describes the 1971-72 operation.

The Judgment, in Section IV, also allows various parties to divert and extract water from the San Fernando Basin in accordance with the terms and conditions of the stipulated Judgments between the City of Los Angeles and said parties (Case No. 650,079). The City of Los Angeles, in turn, shall deduct from its "Restricted Pumping" for each year, the aggregate amount of water extracted pursuant to the separate stipulated Judgments.

At the commencement of each water year, the City of Los Angeles advises the Watermaster of the estimated amount of water each party to the stipulated Judgments will pump during the water year (see Appendix A). The City then reduces its extractions in the San Fernando Basin in an amount equal to the estimates. For each subsequent year, the City of Los Angeles will reduce its extractions by the amount of water that said stipulated parties' extractions exceeded the estimates for the preceding year. Should the stipulated parties' extractions be less than the estimate for that year, the City of Los Angeles may increase its extractions by that amount in the next succeeding year.

The February 1971 earthquake resulted in such heavy damage to the City of San Fernando's water facilities and the City of Los Angeles' terminal storage complex at Van Norman Reservoir, that changes in allowable ground water extractions for these two parties were required. As a result, the City of Los Angeles was allowed to exceed its "Restricted Pumping" in the San Fernando Basin pursuant to the "Stipulation for Emergency Spreading and Extraction" (see Appendix A, 1970-71 report). Table 7 shows a separate accounting of this item. The City of San Fernando, in turn was allowed to extract the unused 1970-71 water right balance of 1,526.06 acre-feet in the ensuing three water years.

A further explanation of this authorization is discussed in Chapter IV.

The metered ground water production from each active well is listed by basin and by party in Appendix B, Table B-1. This tabulation presents the total ground water production as reported by each party. Plates 6 and 7 depict the service area wherein each party delivers its water supply.

Extractions by Nonparties

In order to keep the parties and the Court apprised of all the ground water extractions within ULARA, the Watermaster has attempted to seek and collect information on nonparty ground water extractions. A nonparty is an entity which was not named in the ULARA water right suit. These nonparties and parties which were dismissed by the court do not come under the jurisdiction of the Watermaster.

To the best of the Watermaster's knowledge, and information on hand, the Western Oil and Gas Association, The Metropolitan Water District of Southern California, and Glen A. Berry are the only nonparties extracting ground water within ULARA.

No report on ground water extractions is made as to the parties dismissed from the action: Glenhaven Memorial Park, Incorporated; Los Angeles County Waterworks District No. 21, etc., which are still active pumpers in the hill and mountain areas of ULARA.

Ground water extracted by The Metropolitan Water District of Southern California (MWD) and Western Oil and Gas Association is shown in Table 8. Extractions by G. A. Berry are estimated at 3 acre-feet/year (see Chapter IV).

Water Wells in ULARA

The Report of Referee described the wells in ULARA according to a number-location identification system devised by the Los Angeles County Flood Control District. However, the Watermaster has redesignated the wells in accordance with its recording system.

TABLE 8. EXTRACTIONS BY NONPARTIES
In acre-feet

Month	Western Oil and Gas Association					Total	Metropolitan Water District
	Cox	Newman	Spac-6	SF-4	San F		
October 1971	12.56	.60	.54	4.39	2.27	20.36	49.87
November	11.30	.79	.00	4.60	2.26	18.95	45.21
December	13.41	.89	2.62	5.76	2.27	24.95	47.95
January 1972	18.06	1.02	.34	3.49	2.47	25.38	51.65
February	18.39	1.54	.78	4.39	2.15	27.25	43.70
March	15.06	2.48	4.83	4.12	2.34	28.83	46.72
April	6.97	1.83	2.98	1.57	2.23	15.58	45.62
May	2.03	1.87	1.33	.76	2.25	8.24	43.02
June	2.65	2.17	1.67	.96	4.99	12.44	35.10
July	2.04	1.73	.97	1.01	8.22	13.97	26.99
August	12.19	1.93	1.36	1.90	8.19	25.57	25.21
September	19.98	2.51	2.96	2.22	7.95	35.62	23.20
Totals	134.64	19.36	20.38	35.17	47.59	257.14	484.24

A state well numbering system was adopted by the State several years ago which utilizes the United States Public Land Survey System. A graphical illustration and description of the coding system in ULARA is shown in Figure 7.

Each water well in ULARA was assigned a state well number in order to simplify the administration of the judgment and the monitoring of ground water extractions. A cross-index between State well numbers and County numbers was completed in March 1972, and made available to all interested parties.

Plate 2 on page 9 records all wells (party and nonparty) in ULARA in accordance with the above procedure. Wells drilled or destroyed in 1971-72 are listed in Appendix D.

As a matter of course, the Watermaster locates all new wells by survey and assigns a new state well number. The parties that submit detailed information as to the location of the well will preclude the Watermaster's requirement for a survey. Each party is required to notify the Watermaster whenever a new well is drilled or a well is destroyed.

State well numbers that identify each water well in ULARA are derived from a system based on the U.S. Public Land Survey. Each number consists of township and range designation, a section number, a letter representing the 40-acre tract in which the well is situated, a sequence number indicating the chronological order in which the well number was assigned, and a letter representing the base and meridian. The last letter is frequently omitted from well numbers in a single area because all wells there share a single base and meridian. Well numbers are assigned by the Watermaster.

The components of well No. 1N/14W-12C03S, for example, are identified in the following breakdown:

Township	Range	Section	Tract	Sequence number	Base and meridian
1N	14W	12	C	03	S

The derivation of the components is illustrated below:

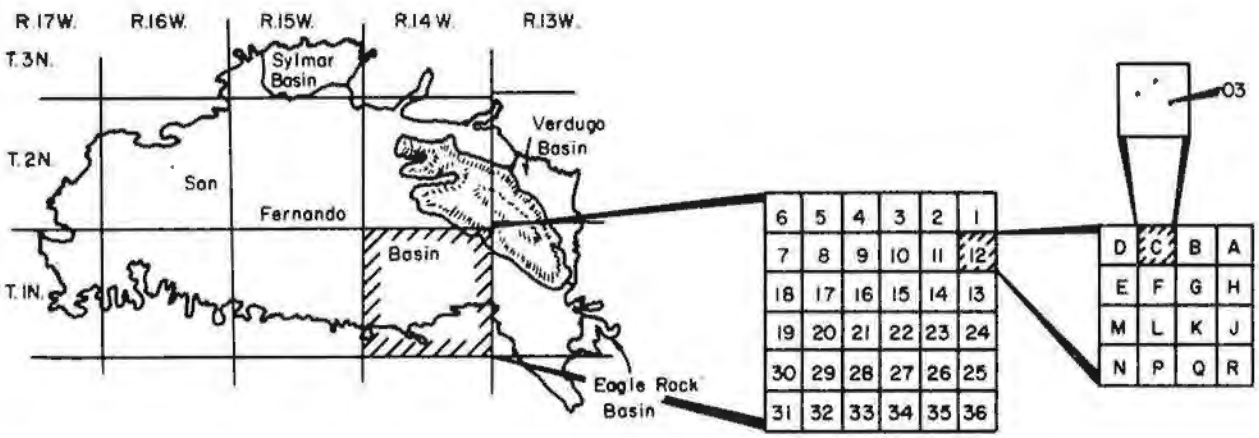
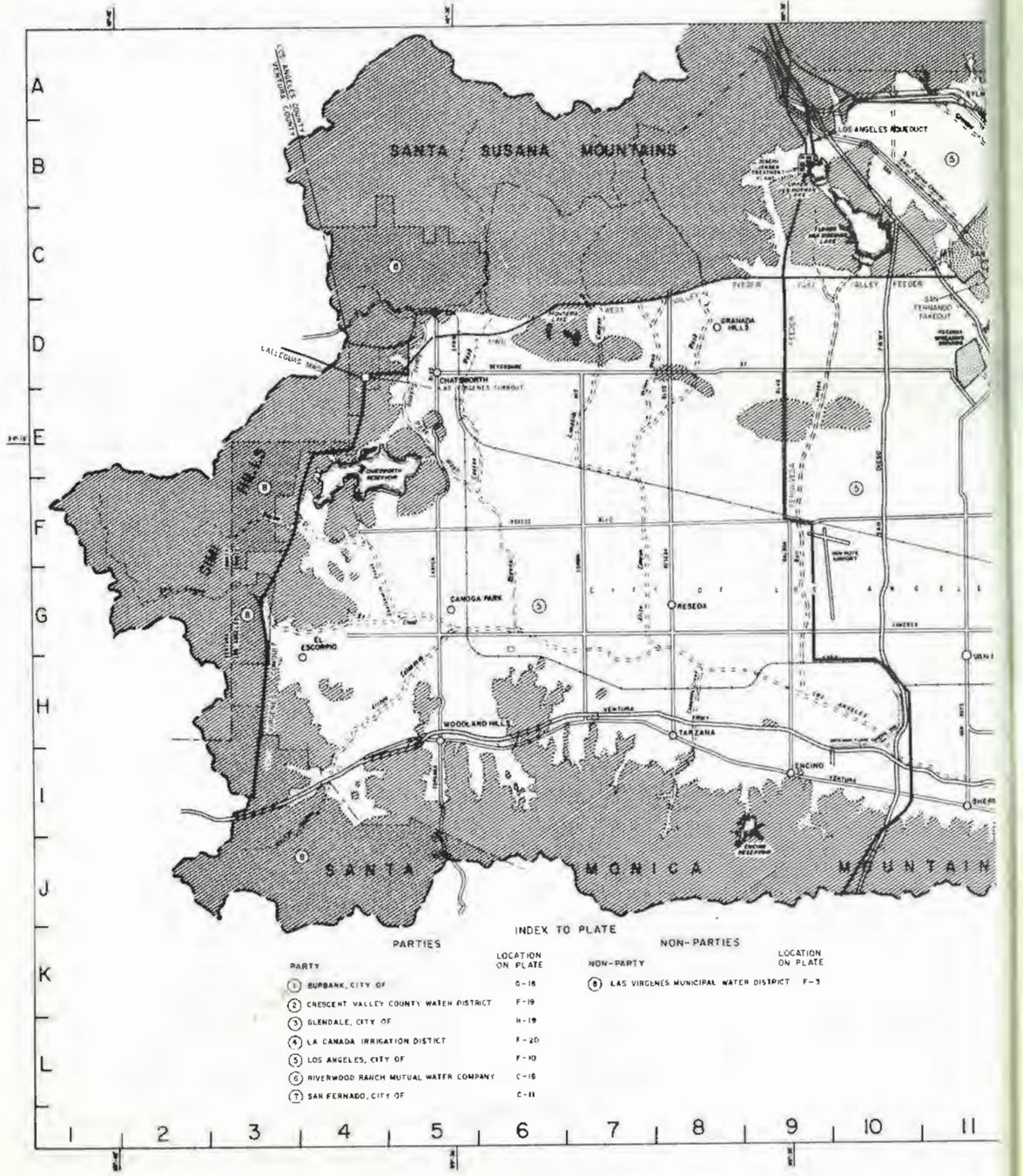


Figure 7 SYSTEM FOR WATER WELL IDENTIFICATION



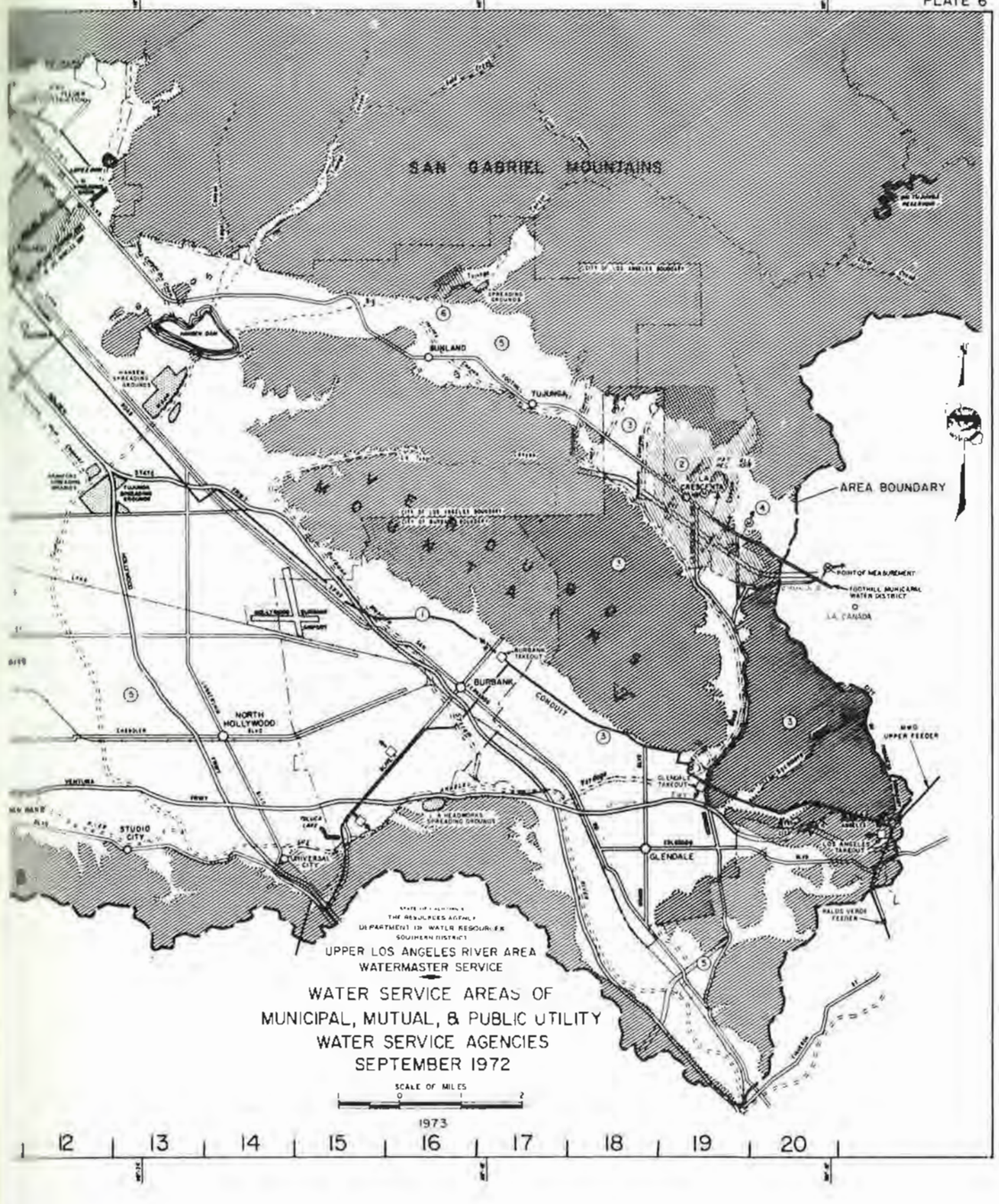
INDEX TO PLATE

PARTIES

PARTY	LOCATION ON PLATE
(1) BURBANK, CITY OF	G-16
(2) CRESCENT VALLEY COUNTY WATER DISTRICT	F-19
(3) GLENDALE, CITY OF	H-19
(4) LA CANADA IRRIGATION DISTICT	F-20
(5) LOS ANGELES, CITY OF	F-10
(6) RIVERWOOD RANCH MUTUAL WATER COMPANY	C-16
(7) SAN FERNADO, CITY OF	C-11

NON-PARTIES

NON-PARTY	LOCATION ON PLATE
(8) LAS VIRGENES MUNICIPAL WATER DISTRICT	F-3



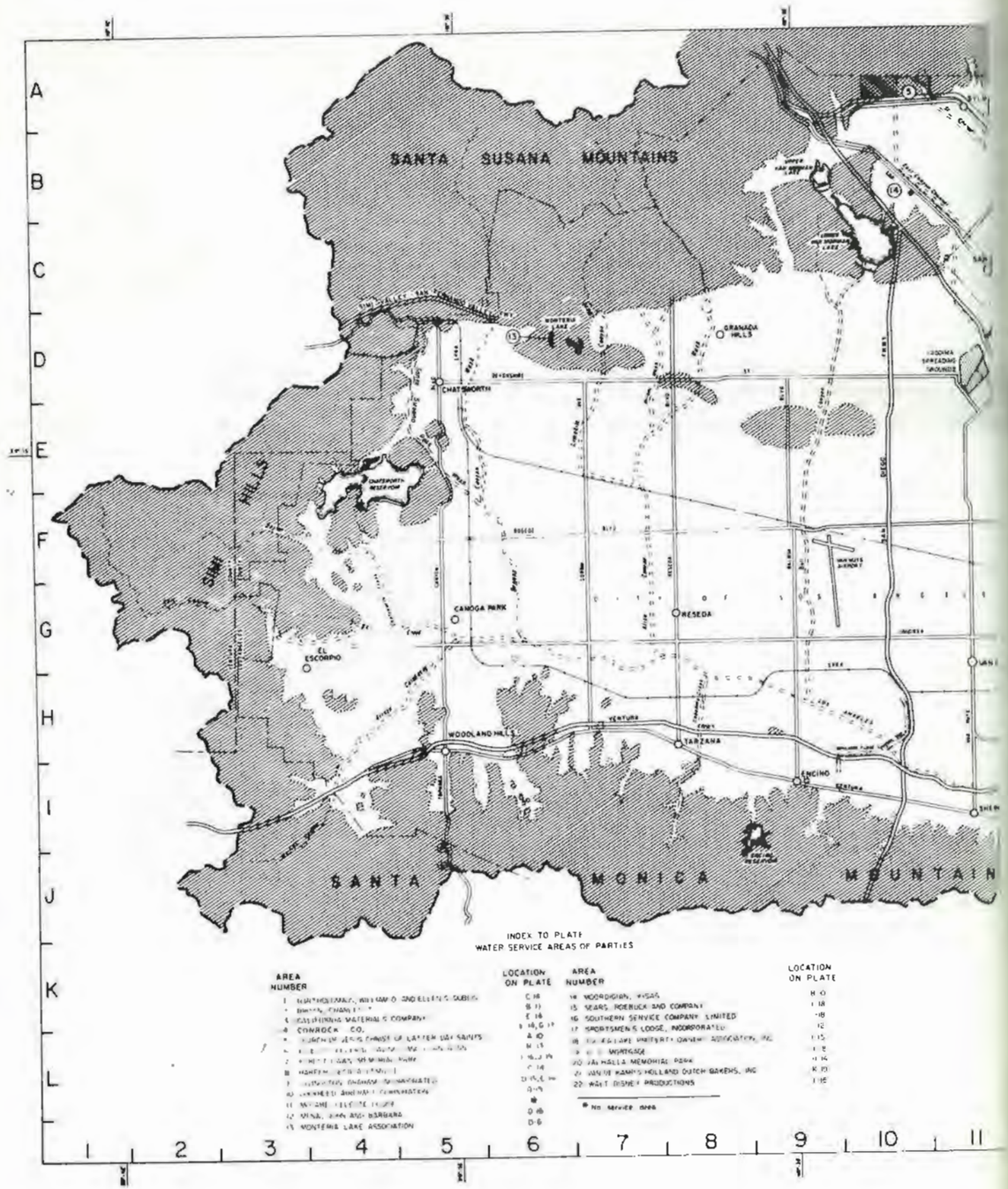
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT

UPPER LOS ANGELES RIVER AREA
WATERMASTER SERVICE

WATER SERVICE AREAS OF
MUNICIPAL, MUTUAL, & PUBLIC UTILITY
WATER SERVICE AGENCIES
SEPTEMBER 1972

SCALE OF MILES
0 1 2

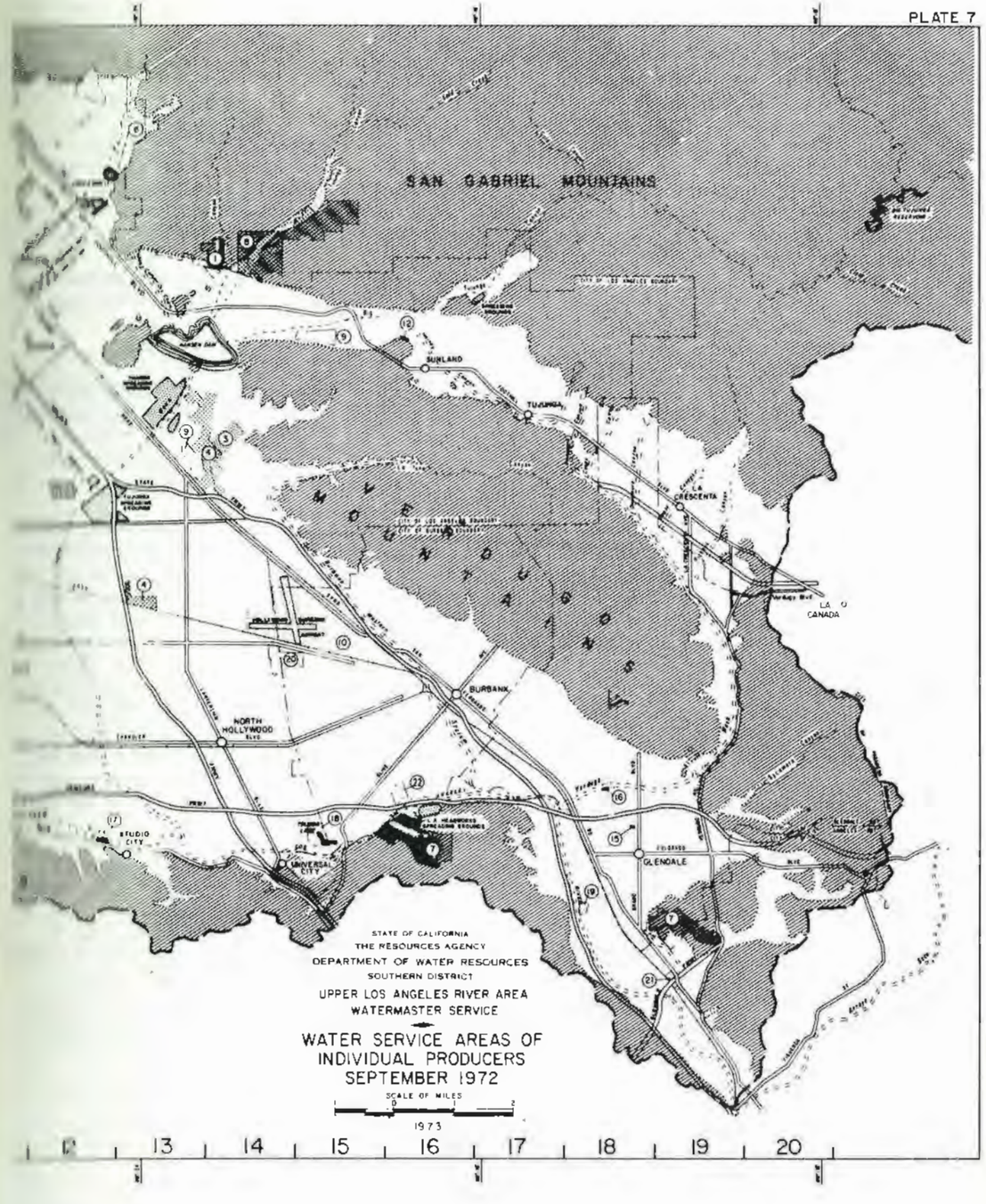
1973



INDEX TO PLATE
WATER SERVICE AREAS OF PARTIES

AREA NUMBER		LOCATION ON PLATE	AREA NUMBER		LOCATION ON PLATE
1	NORTHRIDGE, WILLIAM O. AND ELLEN S. SUBIN	C-10	14	MORRISON, HYSAN	H-10
2	BIMAT CHARLES	B-11	15	SEARS, ROEBUCK AND COMPANY	I-10
3	CLASSIFYING MATERIALS COMPANY	E-10	16	SOUTHERN SERVICE COMPANY, LIMITED	I-9
4	CONROCK CO.	B-10, G-11	17	SPORTSMEN'S LODGE, INCORPORATED	I-10
5	CHURCH OF JESUS CHRIST OF LATTER DAY SAINTS	A-10	18	STUDIO CITY PROPERTY OWNERS ASSOCIATION, INC	I-10
6	[illegible]	H-11	19	[illegible] MORTENSEN	I-11
7	[illegible]	I-10, J-11	20	VALHALLA MEMORIAL PARK	H-10
8	HANSEN, [illegible]	C-10	21	VAN DE KAMP'S HOLLAND DUTCH BAKERS, INC	K-10
9	[illegible]	D-9, E-10	22	WALT DISNEY PRODUCTIONS	I-10
10	[illegible]	G-11			
11	MAGNE [illegible]	*			
12	MESA, JOHN AND BARBARA	D-10			
13	MONTEMIA LAKE ASSOCIATION	D-9			

* No service area



STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SOUTHERN DISTRICT
UPPER LOS ANGELES RIVER AREA
WATERMASTER SERVICE

WATER SERVICE AREAS OF INDIVIDUAL PRODUCERS SEPTEMBER 1972

SCALE OF MILES
0 1 2

1973

Imports and Exports of Water

Residential, commercial, and industrial expansion within the ULARA requires the importation of additional water supplies to supplement that which is provided by the ground water basins. The City of Los Angeles and The Metropolitan Water District of Southern California (MWD) have kept abreast of this demand by continuing to expand their facilities for the importation of water.

The City of Los Angeles now has a second aqueduct capable of bringing in an additional supply of Owens River and Mono Basin water at the rate of more than 130 million gallons a day.

In addition to the City's aqueducts, the Colorado River aqueduct constructed by MWD, delivers water to the Cities of Burbank, Glendale, Los Angeles, and San Fernando. On November 9, 1971, by unanimous approval of a resolution by the Board of Directors of MWD, the City of San Fernando became a member agency of MWD. Thus, San Fernando can now obtain supplemental water on a permanent basis from MWD supplies and participate in all programs for future development and distribution of such water.

The Crescenta Valley County Water District and La Canada Irrigation District also import Colorado River water through the facilities of the Foothill Municipal Water District, which is a member agency of MWD.

Beginning in April 1972, State Project water from northern California is now delivered to MWD at Castaic Reservoir, thence through the MWD Foothill Feeder to the Joseph Jensen Water Filtration Plant in ULARA.

Exports from ULARA, exclusive of sewage, are limited to the City of Los Angeles, which exports water consisting of imported water and ground water. Table 9 summarizes the nontributary imports and exports from ULARA. Ground water imports and exports within and out of ULARA are listed in Table 10.

Facilities for importing nontributary water are depicted on Plate 6, page 35.

Physical Data by Basins

In order to comply with the Court's directive, the Watermaster has collected and summarized data on Table 10 which show the water supply and disposal in each of the basins.

The information for Table 10 was submitted by the parties. In instances where estimates were made, such as water delivered to hill and mountain areas, sewage exported, etc., estimates were made by the parties and based upon methods consistent with previous estimates computed by the State Water Resources Control Board (SWRCB) for the San Fernando Valley Reference. The Watermaster likewise made computations of subsurface outflows based on similar computations made by the SWRCB.

Some of the figures submitted for Table 10 are partially estimated due to the lack of information at the time of submittal. However, the actual figures based on measured values are subsequently submitted to the Watermaster for its permanent record file. The revised data is available at your request from the Watermaster.

TABLE 9. ULARA IMPORTS AND EXPORTS

Source and Agency	Quantity, in acre-feet			
	1970-71		1971-72	
IMPORTS				
Colorado River Water				
Burbank, City of	12,293		9,526	
Crescenta Valley County Water District	1,409		1,094	
Glendale, City of	10,075		8,270	
Los Angeles, City of	7,922		6,493	
La Canada Irrigation District	737		919	
Las Virgenes Municipal Water District (nonparty)	687		694	
San Fernando, City of	484		142	
		33,607		27,138
State Project Water				
Burbank, City of			2,746[a]	
Glendale, City of			2,684[a]	
Las Virgenes Municipal Water District (nonparty)			963[b]	
San Fernando, City of			365[a]	
				6,758
Owens River Water				
Los Angeles, City of		433,352[c]		460,396[d]
Total		466,959		494,292
EXPORTS				
Owens River Water				
Los Angeles, City of		-220,039[c]		-228,864
Net Import		246,920[c]		265,428

a/ Deliveries began July 3, 1972
b/ Deliveries began April 24, 1972
c/ Last year's figure was updated
d/ This value represents the summation of the gross amount of water delivered to and exported from ULARA. It does not include operational releases, reservoir evaporation, and water spread during the year.

TABLE 10. SUMMARY OF WATER SUPPLY AND DISPOSAL BY BASINS

In acre-feet

SAN FERNANDO BASIN

Water source and use	City of Burbank	City of Glendale	City of Los Angeles	City of San Fernando	All others	Total
Extractions						
Total quantity	13,857	12,304	59,685[a]	0	5,787[b]	91,633
Used in Valley Fill	13,194	6,426	10,496	0	5,530[b]	35,646
Imports						
Colorado River Water	9,526	8,270	3,539	142	694	22,171
Owens River Water	--	--	452,867	--	--	452,867
State Project Water	2,746	2,684		365	963	6,758
Ground water from Sylmar Basin	--	--	2,800	2,790	0	5,590
Exports						
Ground water:						
to Verdugo Basin	--	4,994	0	--	0	4,994
out of ULARA	--	--	51,988	--	0	51,988
Owens River Water:						
out of ULARA	--	--	228,864	--	--	228,864
to Eagle Rock Basin	--	--	1,312	--	0	1,312
Colorado River:						
to Verdugo Basin	--	2,811	0	--	0	2,811
State Project Water:						
to Verdugo Basin	--	912				912
Water delivered to hill and mountain areas						
Ground water	663	884	0	0	0	1,547
Owens River Water	--	--	34,410	--	--	34,410
Colorado River Water	456	559	1,995	0	694	3,704
State Project Water	131	182	0	0	963	1,276
Water outflow						
Surface						46,870[c]
Subsurface						297
Sewers	12,595[d]	16,446	74,080	1,365	0	104,486

SYLMAR BASIN

Water source and use	City of Los Angeles	City of San Fernando	All others	Total
Extractions				
Total quantity	2,800	3,065	759[e]	6,624
Used in Valley Fill	0	275	275[e]	550
Imports				
Owens River Water	6,473	--	--	6,473
Exports				
Ground water: to San Fernando Basin	2,800	2,790	0	5,590
Water delivered to hill and mountain areas				
Owens River Water	359	--	--	359
Water outflow				
Surface				5,000[f]
Subsurface: to San Fernando Basin				491
Sewers	740	135	0	875

TABLE 10. SUMMARY OF WATER SUPPLY AND DISPOSAL BY BASINS (Continued)
In acre-feet

VERDUGO BASIN

Water source and use	Crescenta Valley County Water District	City of Glendale	La Canada Irrigation District	City of Los Angeles	Total
Extractions					
Total quantity	3,516	3,150	0	0	6,666
Used in Valley Fill	3,408	2,795	0	0	6,203
Imports					
Colorado River Water	1,094	2,811	919	0	4,824
Owens River Water	--	--	--	1,056	1,056
State Project Water		912			912
Ground water from:					
San Fernando Basin	--	4,994	0	0	4,994
Exports	0	0	0	0	0
Water delivered to hill and mountain areas					
Colorado River Water	33	103	0	0	136
Owens River Water	--	--	--	339	339
State Project Water		318			318
Ground water from:					
Verdugo Basin	108	355	0	0	463
San Fernando Basin		565			565
Water outflow					
Surface					4,570[f/]
Subsurface:					
to Monk Hill Basin					300[h/]
to San Fernando Basin					66
Sewage	0	1,406	0	0	1,406

EAGLE ROCK BASIN

Water source and use	City of Los Angeles	Deep Rock Water Company	Sparkletts Drinking Water Corporation	Total
Extractions				
Total quantity	0	7	142	149
Used in Valley Fill	0	0	0	0
Imports				
Owens River	1,312	---	---	1,312
Colorado River	2,954	---	---	2,954
Ground water	0	0	0	0
Exports				
Ground water	0	7	142	149
Water delivered to hill and mountain areas				
Colorado River Water	1,692	---	---	1,692
Owens River Water	597	---	---	597
Water outflow				
Surface				---[j/]
Subsurface				50[k/]
Sewers	2,040	0	0	2,040

a/ Excludes production from Reseda wells.
b/ Excludes production by Western Oil and Gas Association (nonparty).
c/ Measured at Station F-57C where the 29-year mean (1929-57) base low flow is 7,580 acre-feet.
d/ Includes reclaimed waste water which infiltrates into the ground water basin after being discharged in L. A. River and while on route to gaging station F-57C.
e/ Excludes water from San Fernando Tunnel which is being built by MWD.
f/ Surface outflow is not measured. Calculated average surface outflow by Mr. Laverty - SF Exhibit 57.
g/ Information obtained from Station F-252R.
h/ Based on 29-year average (1929-57).
j/ Information not available.
k/ Estimated in Supplemental No. 2 to Report of Referee for dry years 1960-61. Currently, data not available for direct evaluation.

IV. ADMINISTRATION OF THE JUDGMENT

The Department of Water Resources as Watermaster in the Upper Los Angeles River Area, administers the Judgment and keeps the Court fully apprised of any violations or changes in administration.

Assignments of Restricted Pumping

In accordance with the provisions of the Judgment, the Watermaster records all changes of ownership, transfer, or assignment of Restricted Pumping rights. Table 11 lists all assignments, parties, and amounts involved. Appendix "A" records the documents used to assign Restricted Pumping rights by each of the parties as of September 30, 1972. During the 1971-72 water year, the City of Los Angeles submitted estimates on the amounts to be extracted by those parties having separate stipulated Judgments with the City of Los Angeles. The clause, which allows the parties with stipulated Judgments to extract ground water under the City of Los Angeles' Restricted Pumping right, is covered by Section V, Paragraph 2 of the Judgment. The City of San Fernando did not exercise its right to purchase water from the City of Los Angeles

TABLE 11. ASSIGNMENTS OF RESTRICTED PUMPING

Party	Assignment and amount, in acre-feet			Party
		San Fernando Basin		
Pursuant to Stipulated Judgments				
California Materials Company	Stipulated	250.00[a]	from	Los Angeles, City of
Consolidated Rock Products Co.	Stipulated	1,300.00[a]	from	Los Angeles, City of
Livingston-Graham, Incorporated	Stipulated	650.00[a]	from	Los Angeles, City of
Sears, Roebuck and Company	Stipulated	250.00[a]	from	Los Angeles, City of
Walt Disney Productions	Stipulated	1,800.00[a]	from	Los Angeles, City of
Pursuant to License				
Burbank, City of	Licensed	15.00	from	Bartholomaus, William O. and Dubois, Ellen S.
" " "	Licensed	181.00	from	Lockheed Aircraft Corporation
Glendale, City of	Licensed	150.00	from	Forest Lawn Memorial Park Association
Harper, Cecelia DeMille	Licensed	36.29	from	Forest Lawn Memorial Park Association
Riverwood Ranch Mutual Water Co.	Licensed	32.00	from	Lockheed Aircraft Corporation
Southern Service Company, Ltd.	Licensed	80.00	from	Forest Lawn Memorial Park Association
Sportsmen's Lodge, Incorporated	Licensed	20.00	from	Forest Lawn Memorial Park Association
" " "	Licensed	6.00	from	Lockheed Aircraft Corporation
" " "	Licensed	10.00	from	Van de Kamp's Holland Dutch Bakers, Inc.
Valhalla Memorial Park	Licensed	20.00	from	Lockheed Aircraft Corporation
		Sylmar Basin		
Pursuant to License				
Brown, Charles T.	Licensed	20.00	from	Fidelity Federal Savings and Loan Assoc.
Church of Jesus Christ of the Latter Day Saints	Licensed	100.00	from	Fidelity Federal Savings and Loan Assoc.
San Fernando, City of	Licensed	40.00	from	Moordigian, Kisag

a/ Estimate submitted by City of Los Angeles, see Appendix A.

pursuant to the "Physical Solution-Sylmar Basin", which is described in Section VII, Paragraph 2 of the Judgment.

In addition to the Cities of Los Angeles and San Fernando, a number of parties availed themselves of the opportunity to license water rights to meet their water demands.

In order that a water right license or sale agreement be in force during the water year, it will be the Watermaster's policy that it be signed before or during the water year in question. Failure to submit a license or sale document with the Watermaster by August 31 of the water year in question may be considered as evidence that such an agreement was never consummated during such water year.

Overextractions

In restricting ground water extractions in ULARA, it was foreseen that there would be unavoidable fluctuations in water usage occurring from year to year. Therefore, the flexibility clause was included in the Judgment which allowed each party to vary its extractions within reasonable limits so that it could pump more or less than its "Restricted Pumping", with equivalent debits or credits being applied to its extractions in the subsequent water year.

The provisions described in Section VIII of the Judgment, allows each party a flexibility of 10 percent of its Restricted Pumping right. In other words, a party may underpump or overpump by ten percent of its Restricted Pumping and in the succeeding water year increase or decrease (whichever is applicable) its pumping by the same amount. Table 12 summarizes all overextractions and violations of the Judgment.

Of the 9 parties that exceeded their allowable extraction for 1971-72, three were in violation of the Judgment.

TABLE 12. OVEREXTRACTIONS
In acre-feet

Party	(1) Restricted Pumping[a]	(2) Allowable carryover from 1970-71	(3) Allowable extraction 1971-72 (1)+(2)=(3)	(4) Amount extracted	Overextractions (5) Amount (3)-(4)=(5)	Overextractions (6) Allowable[b]	Overextractions (7) (5)÷(1)×100=(7)
San Fernando Basin							
California Materials Company	250.00	0.00	250.00	276.97	- 26.97	---[c]	
Conrock Company	1,300.00	0.00[d]	1,300.00	1,453.16	- 153.16	---[c]	
Los Angeles, City of	59,007.00	- 752.32	58,254.68	59,685.39	- 1,430.71[e]	6,325.70[f]	2.26[f]
Mena, John and Barbara	0.00	- 2.88	- 2.88	0.96	- 3.84	0.00	---[g]
Monteria Lake Association	0.00	- 13.46	- 13.46	0.00	- 13.46	0.00	---[g]
Sears, Roebuck and Company	250.00	0.00	250.00	304.08	- 54.08	---[c]	
Sportsmen's Lodge, Inc.	36.00	- 11.99	24.01	25.76	- 1.75	3.60	4.86
Walt Disney Productions	1,800.00	0.00	1,800.00	2,125.02	- 325.02	---[c]	
Subtotals	62,643.00	- 780.65	61,862.35	63,871.34	- 2,008.99		
Sylmar Basin							
Church of Jesus Christ of the Latter Day Saints	100.00	- 804.52	- 704.52	248.44	- 952.96	10.00	---[g]
Totals	62,743.00	- 1,585.17	61,157.83	64,119.78	- 2,961.95		

a/ Refer to Column (1)+(3), Table 7.
b/ Computed as 10 percent of Column (1) unless otherwise noted.
c/ Party entitled to extract ground water per stipulated Judgment with City of Los Angeles. The City will, in succeeding water year, decrease its extractions by the amount of the overextraction shown under Column (5).
d/ Includes 978.92 acre-feet overextracted in 1970-71 pursuant to "Stipulation for Emergency Spreading and Extraction".
e/ Not to be considered an overextraction per se, as the "Stipulation for Emergency Spreading and Extraction" permits the City of Los Angeles to overextract.
f/ For City of Los Angeles, the allowable overextraction is 10 percent of its "Restricted Pumping" shown in Column (1) of Table 7.
g/ Party in violation of the Judgment either as a result of having a zero water right or having exceeded its allowable extraction by 10 percent of its "Restricted Pumping" shown in Column (1).

The parties in violation are subject to possible court action. Recommendations are discussed under "Findings, Determinations and Recommendations by the Watermaster."

Table 12 also lists four parties that are subject to the Stipulated Judgment with the City of Los Angeles. These parties' extractions, in excess of the estimates submitted by the City of Los Angeles, will be adjusted against the City's Restricted Pumping right during the 1972-73 water year. As such, the parties in question are not considered to be in violation of the Judgment.

Findings, Determinations and Recommendations by the Watermaster

The Watermaster finds three parties in violation of the Judgment as a result of overextractions during the 1971-72 water year. The parties in violation are John and Barbara Mena, Monteria Lake Association, and Church of Jesus Christ of the Latter Day Saints. All three parties have zero water rights.

John and Barbara Mena extract approximately 1 acre-foot a year for domestic purposes; they have not been requested by the Watermaster to lease water rights to make up their overextractions; however, since their accumulated carryover deficit is now approximately 4 acre-feet, it would be desirable that they lease sufficient water rights during the 1972-73 water year to offset the deficit.

Monteria Lake Association has not extracted any water since the 1968-69 water year; however, the Association account continues to show an accumulated carryover deficit since they have not leased any water rights to offset the accumulated overextractions. They were advised by letter dated March 5, 1971 from the Watermaster that they eliminate their deficit; as of this date the Association has not taken any action. Therefore: THE WATERMASTER DOES HEREBY RECOMMEND THAT THE COURT TAKE ACTION AGAINST MONTERIA LAKE ASSOCIATION FOR NONCOMPLIANCE.

The third party that overextracted during 1971-72 has made some effort to eliminate its accumulated overextractions. By letter dated September 13, 1972, the Watermaster acknowledged a lease of 100 acre-feet by the Church of Jesus Christ of the Latter Day Saints. The lease of 100 acre-feet covered approximately one-tenth of their accumulated overextractions; therefore, they will require additional leasing of water rights in order to offset their past overextractions and future extractions. The Watermaster has notified this party of the need for additional water rights and recommends that no action be brought against the Church inasmuch as this party has leased water rights in an attempt to offset its overextractions.

During the 1970-71 water year, the City of Los Angeles extracted a total of 2,055.92 acre-feet of water in accordance with the provisions of the "Stipulation for Emergency Spreading and Extractions" which was entered into by parties of ULARA as a result of the February 9, 1971 earthquake. (See pages 54 and 55 in the 1970-71 Watermaster Report.)

A total of 1,077.00 acre-feet of Owens River was spread during the 1970-71 water year to return to the ground water basin a portion of the water previously extracted. This left 978.92 acre-feet remaining to be returned (see Table 7). Due to the below normal runoff year, imported Owens River water was not available for spreading during the 1971-72 water year. Thus, the amount of water remaining to be paid back remains the same (978.92 acre-feet). According to the City of Los Angeles, this

quantity will be repaid in the near future by the spreading of imported waters pursuant to the provisions of the afore-mentioned emergency stipulation. The Stipulation for Emergency Spreading and Extraction is shown in Appendix A of the 1970-71 Watermaster Report.

During the February 4, 1972 ULARA Advisory Board meeting, a motion was made and approved that the City of San Fernando be allowed to extract its unused water right in the subsequent 3 water years. The Watermaster concurred with the Advisory Board's recommendation in view of the emergency conditions that prevailed subsequent to the earthquake of 1971, which prevented the City of San Fernando from pumping its proportionate share of ground water from the Sylmar Basin.

The Watermaster subsequently approved, subject to the continuing jurisdiction of the Court, the City of San Fernando's allowable carryover for extraction in the three subsequent water years a total of 1,526.06 acre-feet of water which it was unable to utilize in 1970-71. During the 1971-72 water year, the City extracted 288.43 acre-feet of the allowable carryover, leaving 1,237.63 acre-feet of water right which it may extract during the 1972-73 and 1973-74 water years. A report describing the water system damages sustained by the City of San Fernando is presented in Appendix E.

As was mentioned in Chapter III, to the best of the Watermaster's knowledge and information on hand, Glen A. Berry, the Western Oil and Gas Association, and The Metropolitan Water District of Southern California are the only non-parties extracting ground water in ULARA. The Watermaster has approved the latter two operations which are necessary for the control of gasoline pollution at Forest Lawn and the construction of the San Fernando Tunnel of the Metropolitan Water District Foothill Feeder.

Glen A. Berry, on the other hand, has drilled a well at his residence in Chatsworth and is currently extracting ground water for his lawns, shrubs and trees. Mr. Berry was informed by letter dated June 20, 1972 of the ULARA Judgment which restricts ground water use in ULARA and places the use thereof under the Court's jurisdiction. The Watermaster has not tested the well capacity and at this time estimates the water use at approximately 3 acre-feet per year, based on water use of 2.8 acre-feet per acre per year used for lawns and shrubs.

V. ADMINISTRATIVE COSTS

The Upper Los Angeles River Area was established as a "Watermaster Service Area" in accordance with Part 4, Division 2, of the Water Code of the State of California. Pursuant to the provisions of Section 4201 thereof, the cost of watermaster service is payable one-half by the State and one-half by the parties. Thus, the parties are assisted by the State in their endeavor to distribute the waters of ULARA in the most economical way.

The Judgment, on the other hand, describes the procedures for apportioning the costs among the parties and how it should be collected. It requires that each year, the Watermaster prepare a tentative budget covering the forthcoming July 1 to June 30 fiscal year. Please keep in mind that watermaster service and the annual report are on a water year basis, i.e., October 1 through September 30.

The Judgment also provides that the parties' share of the budget be borne by each party in the proportion that its "Mutual Prescriptive Right" bears to the total "Mutual Prescriptive Right" of all parties in ULARA. However, no party having 50 acre-feet or less of "Mutual Prescriptive Right" shall be assessed any charges.

The Watermaster is required to include the tentative budget and its apportionment in the annual report, so that they may be reviewed and approved by the Advisory Board on or about February 1 of each year. The tentative budget is subsequently mailed to the parties as part of the annual report on or before March 1 of each year. If there are any objections to the budget, they must be presented in writing to the Court and to the Watermaster within 30 days(on or before March 31) after the mailing of the annual report. If no objections are received, the budget becomes final.

Invoices are mailed on or about April 1 and all payments must be received, whether objections are filed or not, within 60 days (on or before May 1) after mailing of the annual report.

APPROVED BUDGET FOR 1971-72

In accordance with the Judgment, the Watermaster submitted a budget for the fiscal year July 1, 1971 through June 30, 1972 as part of its 1969-70 annual report. The tentative budget and annual report were reviewed and approved by the Advisory Board on February 3, 1971.

The parties had 30 days after the mailing of the annual report to submit their objections to the tentative budget. No objections were received by March 31, 1971 and the budget became final. Table 13 presents the 1971-72 budget as approved by the Advisory Board and parties.

TABLE 13. APPROVED BUDGET FOR 1971-72

Salaries and wages	$18,307	
Operating expenses	8,352	
TOTAL BUDGET	$26,659	
One-half payable by State		$13,330
One-half payable by parties to Judgment		$13,329
Less estimated funds on hand July 1, 1971		- 1,500
Amount to be billed		$11,829

APPROVED:

UPPER LOS ANGELES RIVER AREA ADVISORY BOARD

By Robert E. James
Robert James
Chairman

Date Feb. 3, 1971

STATE OF CALIFORNIA
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Southern District

By J. J. Doody
James J. Doody
District Engineer
Southern District
and Watermaster

Date MAR 26 1971

Invoices for each party's proportionate share of the budget were mailed on or about April 1 and all payments were received prior to the deadline of May 1, 1971. Each party's proportionate share of the 1971-72 budget is shown on Table 14. A recapitulation for the Cities of Glendale and Los Angeles is made since they are billed in two separate basins.

During the fourth year of watermaster service the work load continued to decrease somewhat. As a result, the expenditures in 1971-72 were slightly lower when compared with the 1970-71 fiscal year.

Income and expenditures for watermaster service during the 1971-72 fiscal year are shown in Table 15. In accordance with the California Water Code, any credit or debit balance remaining at the end of the fiscal year is carried forward into the succeeding fiscal year. The parties' share of the carryover into the 1972-73 fiscal year totaled $5,973.66.

TABLE 14. APPORTIONMENT OF PARTIES' SHARE OF 1971-72 BUDGET

Party	Mutually Prescriptive Right, in acre-feet	Apportionment to be paid
San Fernando Basin		
Burbank, City of	17,760	$ 1,646.51
Forest Lawn Memorial Park Association	1,060	98.27
Glendale, City of	16,141	1,496.42
Lockheed Aircraft Corporation	310	28.74
Los Angeles, City of	82,310	7,630.88
Valhalla Memorial Park	240	22.25
Van de Kamp's Holland Dutch Bakers, Inc.	120	11.12
Verdugo Basin		
Crescenta Valley County Water District	1,988	184.30
Glendale, City of	2,327	215.73
Sylmar Basin		
Boise Cascade Building Company	527	48.85
Los Angeles, City of	2,440	226.21
San Fernando, City of	2,370	219.72
TOTALS	127,593	$ 11,829.00
Recapitulation for:		
Glendale, City of	18,468	$ 1,712.15
Los Angeles, City of	84,750	$ 7,857.09

TABLE 15. STATEMENT OF JULY 1, 1971 – JUNE 30, 1972 INCOME AND EXPENDITURES

Item	Parties		State		Parties and State	
Income						
From 1971-72 budget	$ 11,829.00		$13,330.00		$25,159.00	
Balance from 1970-71	3,238.73		0.00		3,238.73	
TOTAL INCOME		$15,067.73		$13,330.00		$28,397.73
Expenditures						
Salaries and wages	$ 6,895.24		$ 6,895.25		$13,790.49	
Operating expenses						
Miscellaneous indirect cost[a]	1,181.28		1,181.28		2,362.56	
Travel in State	32.50		32.50		65.00	
Printing annual report	91.65		91.65		183.30	
Electronic machine computing	489.94		489.94		979.88	
Other[b]	403.46		403.45		806.91	
TOTAL EXPENDITURES		$ 9,094.07		$9,094.07		$18,188.14
BALANCE		$ 5,973.66[c]		$4,235.93		$10,209.59

a/ Rent, utilities, auto rental, communications, retirement, employee's health plan, and workmen's compensation insurance.
b/ Equipment rental, mobile equipment operation, engineering contracts.
c/ Total credit to parties in 1972-73 fiscal year, subject to delayed charges.

APPROVED BUDGET FOR 1972-73

The tentative budget for the fiscal year July 1, 1972, through June 30, 1973, was submitted by the Watermaster for review and approval by the Advisory Board on February 4, 1972. The parties had 30 days after the mailing of the annual report for submitting their objections to the 1972-73 budget which was made a part thereof.

No objections were received by March 31, 1972, and the budget became final. Invoices for each party's proportionate share of the budget were mailed on April 1 and all payments were made before May 1, 1972. Table 16 presents the 1972-73 budget as approved by the Advisory Board on February 4, 1972. Each party's share of the 1972-73 budget is shown in Table 17.

TENTATIVE BUDGET FOR 1973-74

In accordance with the Judgment, the Watermaster hereby submits a budget for the fiscal year July 1, 1973, through June 30, 1974. The tentative budget submitted herewith was reviewed and approved by the Advisory Board on February 5, 1973. The parties will have 30 days after the mailing of the annual report for submitting their objections to this budget.

If no objections are received by March 31, 1973, the budget will become final. Invoices for each party's proportionate share of the budget will be mailed on or about April 1 and payments will be due on or before May 1, 1973. Table 18 presents the 1973-74 budget as approved by the Advisory Board. Each party's share of the 1973-74 budget is shown in Table 19.

TABLE 16. APPROVED BUDGET FOR THE FISCAL YEAR JULY 1, 1972 THROUGH JUNE 30, 1973

"LAHA Watermaster Service Area

Salaries and wages	$15,630
Operating expenses	8,500
TOTAL BUDGET	$24,130
One-half payable by State	$12,113
One-half payable by parties to Judgment	$12,113
Less estimated funds on hand July 1, 1972	- 1
Amount to be billed	$12,112

APPROVED:

UPPER LOS ANGELES RIVER AREA ADVISORY BOARD

By _____
Robert James
Chairman

Date Feb. 8, 1972

STATE OF CALIFORNIA
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Southern District

By _____
James J. Doody
District Engineer
Southern District
and Watermaster

Date JAN 31 1972

TABLE 17. APPORTIONMENT OF PARTIES' SHARE OF 1972-73 BUDGET

Party	Mutually Prescriptive Right, in acre-feet	Apportionment to be paid
San Fernando Basin		
Burbank, City of	17,760	$ 1,685.90
Forest Lawn Memorial Park Association	1,060	100.62
Glendale, City of	16,141	1,532.21
Lockheed Aircraft Corporation	310	29.43
Los Angeles, City of	82,310	7,813.43
Valhalla Memorial Park	240	22.78
Van de Kamp's Holland Dutch Bakers, Inc.	120	11.39
Verdugo Basin		
Crescenta Valley County Water District	1,988	188.71
Glendale, City of	2,327	220.90
Sylmar Basin		
Fidelity Federal Savings and Loan Association	527	50.03
Los Angeles, City of	2,440	231.62
San Fernando, City of	2,370	224.98
TOTALS	127,593	$ 12,112.00
Recapitulation for:		
Glendale, City of	18,468	$ 1,753.11
Los Angeles, City of	84,750	$ 8,045.05

Table 18. TENTATIVE BUDGET FOR THE FISCAL YEAR
JULY 1, 1973 THROUGH JUNE 30, 1974

ULARA Watermaster Service Area

Salaries and wages	$17,304	
Operating expenses	8,696	
TOTAL BUDGET		$26,000
One-half payable by State		$13,000
One-half payable by parties to Judgment		$13,000
Less estimated funds on hand July 1, 1973		5,000
Amount to be billed		$ 8,000

APPROVED:

UPPER LOS ANGELES RIVER
AREA ADVISORY BOARD

By Robert James
Robert James
Chairman

Date Feb. 5, 1973

STATE OF CALIFORNIA
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Southern District

By J J Doody
James J. Doody
District Engineer
Southern District
and Watermaster

Date JAN 19 1973

TABLE 19. APPORTIONMENT OF PARTIES' SHARE OF 1973-74 BUDGET

Party	Mutually Prescriptive Right, in acre-feet	Apportionment to be paid
San Fernando Basin		
Burbank, City of	17,760	$ 1,113.54
Forest Lawn Memorial Park Association	1,060	66.46
Glendale, City of	16,141	1,012.03
Lockheed Aircraft Corporation	310	19.44
Los Angeles, City of	82,310	5,160.79
Valhalla Memorial Park	240	15.05
Van de Kamp's Holland Dutch Bakers, Inc.	120	7.52
Verdugo Basin		
Crescenta Valley County Water District	1,988	124.64
Glendale, City of	2,327	145.90
Sylmar Basin		
Fidelity Federal Savings and Loan Association	527	33.04
Los Angeles, City of	2,440	152.99
San Fernando, City of	2,370	148.60
TOTALS	127,593	$ 8,000.00
Recapitulation for:		
Glendale, City of	18,468	$ 1,157.93
Los Angeles, City of	84,750	$ 5,313.78

APPENDIX A

RESTRICTED PUMPING OF
UPPER LOS ANGELES RIVER AREA PARTIES
SEPTEMBER 1972

AND

COPIES OF LEGAL DOCUMENTS

APPENDIX A
TABLE OF CONTENTS

RESTRICTED PUMPING OF UPPER LOS ANGELES RIVER AREA PARTIES SEPTEMBER 1972

Party [a]	Restricted Pumping, in acre-feet per year
SAN FERNANDO BASIN	
Bartholomaus, William O. and Ellen S. Dubois	15.00
Burbank, City of	13,649.00
California Materials Company	0.00 [b]
Consolidated Rock Products Company (now known as Conrock)	0.00 [b]
Forest Lawn Memorial Park Association Includes: American Security and Fidelity Company Forest Lawn Cemetery Association Forest Lawn Company	814.00
Glendale, City of	12,405.00
Harper, Cecilia DeMille Successor of Estate of Cecil B. DeMille	0.00
Livingston-Graham, Incorporated Successor of Livingston Rock and Gravel Company	0.00 [b]
Lockheed Aircraft Corporation	239.00
Los Angeles, City of	63,257.00
McCabe, Celeste Louise	1.00
Mena, John and Barbara Successor of Neva Bartlett Holmgrin	0.00
Monteria Lake Association	0.00
Riverwood Ranch Mutual Water Company	0.00
Sears, Roebuck & Company	0.00 [b]
Southern Service Company, Limited	0.00
Sportsmen's Lodge, Incorporated Formerly known as Sportsmen's Lodge Banquet Corporation	0.00
Toluca Lake Property Owners' Association	23.00
U. S. Mortgage Successor of Wright, Marion J. and Alice M.	00.00
Valhalla Memorial Park Includes: Valhalla Mausoleum Park Valhalla Properties	184.00
Van de Kamp's Holland Dutch Bakers, Incorporated	93.00
Walt Disney Productions	00.00 [b]
SUBTOTALS (SAN FERNANDO BASIN)	90,680.00

RESTRICTED PUMPING OF UPPER LOS ANGELES RIVER AREA PARTIES SEPTEMBER 1972

(Continued)

Party [a]	Restricted Pumping, in acre-feet per year	
SYLMAR BASIN		
Brown, Charles T. Successor of Stella M. Brown	0.00	
Church of Jesus Christ of the Latter Day Saints Successor of Henry G. Stetson	0.00	
Fidelity Federal Savings and Loan Association Successor of Boise Cascade Building Company Successor of The Wellesley Company Successor of Maxine Duckworth and John E. Mullin	609.00	
Los Angeles, City of	2,818.00	
Moordigian, Kisag	46.00	
San Fernando, City of	2,737.00	
SUBTOTALS (SYLMAR BASIN)		6,210.00
VERDUGO BASIN		
Crescenta Valley County Water District	3,294.00	
Glendale, City of	3,856.00	
SUBTOTALS (VERDUGO BASIN)		7,150.00
TOTAL (ULARA)		104,040.00

[a] Parties that are not listed on this table have zero "Restricted Pumping."

[b] Party is allowed to extract ground water pursuant to Stipulated Judgment with City of Los Angeles.

WATER USE LICENSE AGREEMENT

ELLEN S. DuBOIS and WILLIAM O. BARTHOLOMAUS (hereinafter referred to as "Licensors") hereby grant to CITY OF BURBANK, a municipal corporation, (hereinafter referred to as "Licensee") a license to extract fifteen (15) acre-feet of water of Licensors' Restricted Pumping allocated to Licensors under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court, Case Number 650,079, entitled "The City of Los Angeles, plaintiff, vs. City of San Fernando, et al., defendants", during the period commencing October 1, 1971, and continuing to and including September 30, 1972.

Said License is granted subject to the following conditions:

1) Licensee shall exercise said rights and extract the same on behalf of Licensors during the period above specified and put the same to beneficial use, and Licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of Licensors.

2) Licensee shall notify the watermaster that said pumping was done pursuant to this License and provide the watermaster with a copy of this License.

3) Licensee shall note, in any recording of water production for the period of this License, that said pumping was done pursuant to this License.

4) Licensors warrant that they have fifteen (15) acre-feet of Restricted Pumping and that they have not pumped and will not pump or permit or license any other person to pump any part of the fifteen (15) acre-feet granted by this License during the period of October 1, 1971, through September 30, 1972.

LICENSORS:

Ellen S. DuBois [signature]
Ellen S. DuBois
William O. Bartholomaus by Ellen S. DuBois attorney in fact [signature]
William O. Bartholomaus by
Ellen S. DuBois, Attorney in fact.

LICENSEE:

CITY OF BURBANK
a municipal corporation

By [signature]
City Manager

WATER LICENSE AGREEMENT

FOREST LAWN COMPANY (licensor) grants to CECILIA DE MILLE HARPER, (Licensee): a license to extract 55 [illegible] Restricted Pumping allocated to Licensor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court Case No. 650,079 entitled "The City of Los Angeles, Plaintiff vs. City of San Fernando, et al., Defendants", during the period commencing October 1, 1971, and continuing to and including September 30, 197~~2~~. 3 Sept 1972

Said License is granted, subject to the following conditions:

(1) Licensee shall exercise said right and extract the same on behalf of Forest Lawn Company during the period above specified and put the same to beneficial use and Licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of Licensor.

(2) Licensee shall notify the Watermaster that said pumping was done pursuant to this License and provide the Watermaster with a copy of the document.

(3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this License.

FOREST LAWN COMPANY warrants that it has 55 acre-feet of Restricted Pumping and that it has not pumped and will not pump or permit or license any other person to pump any part of said 55 acre-feet during period of October 1, 1971 through September 30, 197~~2~~. 3 Sept 1972

DATED: [illegible]

CECILIA DE MILLE HARPER

By: Cecilia de Mille Harper [signature]

Title: ____________

FOREST LAWN COMPANY

By: [signature]

Title: Vice President

WATERMASTER SERVICE
Department of Water and Power
Post Office Box 5[illegible]
Los Angeles, California [illegible]
Telephone Nos: 626-4[illegible]
[illegible]

UPPER LOS ANGELES RIVER AREA (ULARA)
EXTRACTION OF GROUNDWATER BY CITY OF LOS ANGELES
October 1, 1971

I. ESTIMATED GROUND WATER PRODUCTION BY PARTIES TO STIPULATED AGREEMENT
WATER YEAR 1971 - 72

STIPULATING PARTIES	Extracted prior year, in acre-feet 1970 - 1971	Estimated extractions* current water year, in A.F. 1971 - 1972
1. California Materials Company	275.44	250
2. Consolidated Rock Products Company	1306.10	1300
3. Livingston-Graham, Inc.	669.37	650
4. Sears Roebuck & Company	199.60	150
Walt Disney Productions	1974.67	1800
TOTAL	4575.40	4150

*Amounts greater or less than 10% of the amount extracted during the prior year shall be justified under remarks.

II. The completion and filing of this notice with the Watermaster fulfills the requirement of notification by the City of Los Angeles to the Watermaster pursuant to paragraph V of "Policies and Procedures"

III. The average cost per acre-foot for water purchased by City of Los Angeles from MWD during fiscal year ending June 30, 1971 is: $ 46.00*

IV. Remarks:
*(plus an additional $10.00 as required by the physical solution provision of the Judgment, section VII-2).

[illegible]
Asst. Chief Engr. of Water Works

By [signature]
(Designee)

[stamp: [illegible] NOV 16 1971]

Date November 15, 1971

Phone No. 481-6161

INFORMATION REQUIRED BY THIS FORM MUST BE FILED WITH THE WATERMASTER ON OR BEFORE NOVEMBER 15.

Ratway

WATER LICENSE AGREEMENT

FOREST LAWN COMPANY (Licensor) grants to CITY OF GLENDALE (Licensee): a license to extract 150 acre-feet of Licensor's Restricted Pumping allocated to Licensor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court Case No. 650,079 entitled "The City of Los Angeles, Plaintiff vs. City of San Fernando, et al., Defendants", during the period commencing as of the date hereof, and continuing to and including September 30, 1972.

Said License is granted, subject to the following conditions:

(1) Licensee shall exercise said right and extract the same on behalf of Forest Lawn Company during the period above specified and put the same to beneficial use and Licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of Licensor.

(2) Licensee shall notify the Watermaster that said pumping was done pursuant to this License and provide the Watermaster with a copy of the document.

(3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this License.

FOREST LAWN COMPANY warrants that it has 150 acre-feet of Restricted Pumping and that it has not pumped and will not pump or permit or license any other person to pump any part of said 150 acre-feet during period from date hereof through September 30, 1972.

DATED: Sept 28, 1971

FOREST LAWN COMPANY

By: James A. Averich [signature]

Title: Vice President

CITY OF GLENDALE

By: [signature]

Title: City Manager

APPROVED AS TO FORM
[signature]
CITY ATTORNEY
DATE Sept 25, 1972

WATER LICENSE AGREEMENT

FOREST LAWN COMPANY (Licensor) grants to SOUTHERN SERVICE COMPANY, LTD. (Licensee): a license to extract 80 acre-feet of Licensor's Restricted Pumping allocated to Licensor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court Case No. 650,079 entitled "The City of Los Angeles, Plaintiff vs. City of San Fernando, et al., Defendants", during the period commencing October 1st, 1971, and continuing to and including September 30, 1972.

Said license is granted, subject to the following conditions:

(1) Licensee shall exercise said right and extract the same on behalf of Forest Lawn Co pany during the period above specified and put the same to beneficial use and Licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of Licensor.

(2) Licensee shall notify the Watermaster that said pumping was done pursuant to this License and provide the Watermaster with a copy of the document.

(3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this License.

FOREST LAWN COMPANY warrants that it has 80 acre-feet of Restricted Pumping and that it has not pumped and will not pump or permit or license any other person to pump any part of said 80 acre-feet during period of October 1, 1971 through September 30, 1972.

DATED: July 12, 1972.

SOUTHERN SERVICE COMPANY, LTD.

By: _____

TITLE: PRESIDENT

FOREST LAWN COMPANY

By: _____

TITLE: President

WATER USE LICENSE AGREEMENT

Van de Kamp's hereby grants to Sportsmen's Lodge a license to extract 10 acre-feet of licensor's Restricted Pumping allocated to licensor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court Case No. 650,079 entitled "The City of Los Angeles, Plaintiff vs. City of San Fernando, et al., Defendants," during the period commencing October 1, 19 71 and continuing to and including, September 30, 19 72.

Said license is granted, subject to the following conditions:

(1) Licensee shall exercise said right and extract the same on behalf of Van de Kamp's during the period above specified and put the same to beneficial use and licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of licensor.

(2) Licensee shall notify the Watermaster that said pumping was done pursuant to this license and provide the Watermaster with a copy of the document.

(3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this license.

Van de Kamp's warrants that it has 10 acre-feet of Restricted Pumping and that it has not pumped and will not pump or permit or license any other person to pump any part of said 10 acre-feet during period of October 1, 19 71 through September 30, 19 72.

DATED: Sept. 30 1971

VAN DE KAMP'S

By: _____
Norris G. Lorraine

Title: Vice President, Finance

Dated 10-4-71

SPORTSMEN'S LODGE

By _____

Title: _____

WATER LICENSE AGREEMENT

FOREST LAWN COMPANY (Licensor) grants to SPORTSMEN'S LODGE, INC. (Licensee): a license to extract 20 acre-feet of Licensor's Restricted Pumping allocated to Licensor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court Case No. 650,079 entitled "The City of Los Angeles, Plaintiff vs. City of San Fernando, et al., Defendants", during the period commencing October 1st, 1971, and continuing to and including September 30, 1972.

Said license is granted, subject to the following conditions:

(1) Licensee shall exercise said right and extract the same on behalf of Forest Lawn Company during the period above specified and put the same to beneficial use and licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of Licensor.

(2) Licensee shall notify the Watermaster that said pumping was done pursuant to this License and provide the Watermaster with a copy of the document.

(3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this License.

FOREST LAWN COMPANY warrants that it has 20 acre-feet of Restricted Pumping and that it has not pumped and will not pump or permit or license any other person to pump any part of said 20 acre-feet during period of October 1, 1971 through September 30, 1972.

DATED: July 12, 1972.

SPORTSMEN'S LODGE, INC.

By: _____

TITLE: president

FOREST LAWN COMPANY

By: _____

TITLE: President

WATER USE LICENSE AGREEMENT

FIDELITY FEDERAL SAVINGS AND LOAN ASSOCIATION, a corporation, hereby grants to CHARLES T. BROWN COMPANY a license to extract twenty (20) acre feet of licensor's restricted pumping allocated to licensor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court, case number 650,079, entitled "The City of Los Angeles, Plaintiff, vs. City of San Fernando, et al., Defendants", during the period commencing October 1, 1971 and continuing to and including September 30, 1972; provided, however, that licensor shall have the right and option upon fifteen (15) days' written notice to licensee to terminate this license, by mailing said notice, postage prepaid to licensee at P. O. Box 311, San Fernando, California.

(1) Licensee shall exercise said right and extract the same on behalf of Charles T. Brown during the period above specified and put same to beneficial use and licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of rights of licensor.

(2) Licensee shall notify the Watermaster that said pumping done pursuant to this license and provide the Watermaster with a copy of the document.

(3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this license.

FIDELITY FEDERAL SAVINGS AND LOAN ASSOCIATION warrants that it has twenty (20) acre feet of restricted pumping and that it has not pumped and will not pump or permit or license any other person to pump any part of said twenty (20) acre feet during said period of October 1, 1971 through September 30, 1972, or until after fifteen (15) days' prior written notice terminating this license, said notice to be sent postage prepaid, addressed to licensee at P. O. Box 311, San Fernando, California.

DATED: December 23, 1971.

CHARLES T. BROWN COMPANY

By _____

FIDELITY FEDERAL SAVINGS AND LOAN ASSOCIATION, a corporation

By _____
Norris G. Lorraine, Vice President

By _____
Leonard I. Hunter, Asst. Secretary

WATER USE LICENSE AGREEMENT

THIS WATER USE LICENSE AGREEMENT, made and entered into this 7th day of June, 1972, by and between FIDELITY FEDERAL SAVINGS AND LOAN ASSOCIATION, a corporation, hereinafter referred to as "FIDELITY", and CORPORATION OF THE PRESIDENT OF THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS, a Utah corporation sole, hereinafter referred to as "CORPORATION".

RECITALS

(1) FIDELITY (or its predecessors in interest) has restricted pumping as to certain acre feet of water in the Sylmar basin under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court, case number 650,079, entitled "The City of Los Angeles, Plaintiff, vs. City of San Fernando, et al., Defendants."

(2) CORPORATION desires to procure from FIDELITY a revocable license to extract up to, but not to exceed, one hundred (100) acre feet of FIDELITY'S said restricted pumping rights, upon and subject to the terms and conditions hereinafter set forth.

NOW, THEREFORE, it is mutually agreed:

1. FIDELITY does hereby grant to CORPORATION, a license to extract up to, but not to exceed, one hundred (100) acre feet of FIDELITY'S restricted pumping allotted to FIDELITY (or its predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court, case number 650,079, entitled "The City of Los Angeles, Plaintiff, vs. City of San Fernando, et al., Defendants", in accordance with that certain Water Use License, a copy of which is attached hereto as Exhibit "A", hereinafter referred to as Exhibit "A", and made a part hereof as if set forth in full herein.

2. FIDELITY, as the Licensor, shall have the right and option, upon sixty (60) days' written notice, to terminate Exhibit "A" by mailing written notice to the Legal Department of CORPORATION at 336 South Third East, Salt Lake City, Utah, 84111

3. CORPORATION shall pay and discharge all costs and expenses in connection with the pumping and extraction of all water under Exhibit "A", and shall hold FIDELITY free and harmless from any and all said costs and expenses, inclusive of reasonable attorneys' fees, should FIDELITY incur the same as a result of the failure of CORPORATION in this regard, or should FIDELITY incur reasonable attorneys' fees as a result of the CORPORATION to perform, or carry out, the terms, covenants and conditions of this Agreement. CORPORATION shall cause to be installed and maintained upon the pump, or pumps, used to extract the water under the terms of this Agreement, a certified meter and shall register thereon all water extracted pursuant to Exhibit "A".

4. CORPORATION shall not acquire any right to extract water independently of the rights granted in Exhibit "A".

5. CORPORATION shall notify Watermaster that all pumping is done pursuant to Exhibit "A" and provide Watermaster with a fully executed copy of this Agreement and Exhibit "A".

6. CORPORATION shall note, in any recording of water production for the period set forth in Exhibit "A", that said pumping was done pursuant to Exhibit "A".

7. CORPORATION warrants that it has up to only one hundred (100) acre feet of restricted pumping under the terms of Exhibit "A" and that it has not pumped and will not pump, or permit or license any other person to pump, any part of said one hundred (100) acre feet during the license period of June 1, 1972 to May 31, 1973.

8. CORPORATION will pay to FIDELITY, monthly, by the 10th day of each following month, the sum of TWENTY-FIVE DOLLARS ($25.00) an acre foot for all water extracted by CORPORATION during the preceding calendar month, pursuant to Exhibit "A".

IN WITNESS WHEREOF, the parties place their hand and seal on the day, month and year first hereinabove written.

CORPORATION OF THE PRESIDENT OF THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS, a Utah corporation sole

By _____
Corporation Sole

FIDELITY FEDERAL SAVINGS AND LOAN ASSOCIATION

By _____
Leland L. Larsen, Senior Vice President

By _____
Leonard T. Baxter, Assistant Secretary

STATE OF UTAH)
: ss
County of Salt Lake)

On August 1st, 1972, before me, the undersigned, a Notary Public in and for said County and State, personally appeared HAROLD B. LEE, known to me to be the President of The Church of Jesus Christ of Latter-Day Saints, who acknowledged to me that he signed the foregoing instrument as the Corporation Sole of the Corporation of the President of The Church of Jesus Christ of Latter-Day Saints, and that the seal impressed on the within instrument is the seal of said corporation, and the said HAROLD B. LEE acknowledged to me that the said Corporation executed the same.

WITNESS my hand and official seal.

_____
NOTARY PUBLIC in and for said County and State

MY COMMISSION EXPIRES:
June 3, 1973

STATE OF CALIFORNIA)
: ss.
COUNTY OF LOS ANGELES)

On June 7th, 1972, before me, the undersigned, a Notary Public in and for said County and State, personally appeared Leland L. Larsen, known to me to be the Senior Vice President, and Leonard T. Baxter, known to me to be the Assistant Secretary of the corporation that executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the within instrument pursuant to its bylaws or a resolution of its board of directors.

WITNESS my hand and official seal.

NOTARY PUBLIC in and for said County and State

MY COMMISSION EXPIRES:

OFFICIAL SEAL
CAROL J. GRICE
NOTARY PUBLIC CALIFORNIA
LOS ANGELES COUNTY

EXHIBIT "A"

WATER USE LICENSE

FIDELITY FEDERAL SAVINGS AND LOAN ASSOCIATION, a corporation hereinafter called "Licensor", hereby grants to CORPORATION OF THE PRESIDENT OF THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS, a Utah corporation sole, hereinafter called "Licensee", a license to extract up to, but not to exceed, one hundred (100) acre feet of Licensor's restricted pumping allocated to Licensor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court, case number 650,079, entitled "The City of Los Angeles, Plaintiff, vs. City of San Fernando, et al., Defendants", during a period commencing June 1, 1972 and continuing to and including May 31, 1973, subject to Licensee performing each, every and all of the terms, covenants and conditions on his part to be performed under that certain written Water Use License Agreement dated the 7th day of June, 1972, by and between Licensor and Licensee.

Licensor shall have the right and option, upon sixty (60) days' written notice to Licensee, to terminate this License, by mailing said notice, postage prepaid, to Licensee at its Law Department, 336 South Third East, Salt Lake City, Utah 84111.

DATED this 7th day of June, 1972.

LICENSEE: CORPORATION OF THE PRESIDENT OF THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS, a Utah corporation sole

By _____
Corporation Sole

LICENSOR: FIDELITY FEDERAL SAVINGS AND LOAN ASSOCIATION

By _____
Leland L. Larsen, Senior Vice President

By _____
Leonard T. Baxter, Assistant Secretary

EXHIBIT "A"

STATE OF UTAH)
: ss
County of Salt Lake)

On August 14, 1972, before me, the undersigned, a Notary Public in and for said County and State, personally appeared HAROLD B. LEE known to me to be the President of The Church of Jesus Christ of Latter-Day Saints, who acknowledged to me that he signed the foregoing instrument as the Corporation Sole of the Corporation of the President of The Church of Jesus Christ of Latter-Day Saints, and that the seal impressed on the within instrument is the seal of said corporation, and the said HAROLD B. LEE acknowledged to me that the said corporation executed the same.

WITNESS my hand and official seal.

NOTARY PUBLIC in and for said County and State

MY COMMISSION EXPIRES:
June 8, 1973

STATE OF CALIFORNIA)
: ss
County of Los Angeles)

On June 7th, 1972, before me, the undersigned, a Notary Public in and for said County and State, personally appeared Leland L. Larsen, known to me to be the Senior Vice President, and Leonard T. Baxter, known to me to be the Assistant Secretary of the corporation that executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the within instrument pursuant to its bylaws or a resolution of its board of directors.

WITNESS my hand and official seal.

NOTARY PUBLIC in and for said County and State

MY COMMISSION EXPIRES:

OFFICIAL SEAL
CAROL J. GRICE
NOTARY PUBLIC - CALIFORNIA
LOS ANGELES COUNTY

SUGGESTED SAMPLES OF DOCUMENTS FOR TRANSFERRING WATER RIGHTS

YEARLY ASSIGNMENTS

WATER USE LICENSE AGREEMENT

JOHN DOE hereby grants to BILL SMITH: a license to extract _____ acre-feet of licensor's Restricted Pumping allocated to licensor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court Case No. 650,079 entitled "The City of Los Angeles, Plaintiff vs. City of San Fernando, et al., Defendants", during the period commencing October 1, 19__ and continuing to and including September 30, 19__.

Said License is granted, subject to the following conditions:

(1) Licensee shall exercise said right and extract the same on behalf of JOHN DOE during the period above specified and put the same to beneficial use and licensee shall not by the exercise hereunder of said right acquire any right to extract water independent of the rights of licensor.

(2) Licensee shall notify the Watermaster that said pumping was done pursuant to this license and provide the Watermaster with a copy of the document.

(3) Licensee shall note, in any recording of water production for the period of agreement, that said pumping was done pursuant to this license.

JOHN DOE warrants that he has _____ acre-feet of Restricted Pumping and that he has not pumped and will not pump or permit or license any other person to pump any part of said _____ acre-feet during period of October 1, 19__ through September 30, 19__.

DATED: _____

JOHN DOE

By _____

Title _____

(NOTARY)

BILL SMITH

By _____

Title _____

PERMANENT TRANSFERS

DEED OF WATER RIGHTS

For a valuable consideration, BILL SMITH hereby sells and transfers to the JOHN DOE COMPANY:

The Right to extract _____ acre-feet of grantor's Mutually Prescriptive Right (_____ acre-feet of Restricted Pumping) allocated to grantor (or predecessors in interest) under and pursuant to Judgment dated March 14, 1968, and entered in Los Angeles Superior Court Case No. 650,079 entitled "The City of Los Angeles, Plaintiff vs. City of San Fernando, et al., Defendants".

DATED: _____

JOHN DOE COMPANY

By _____

Title _____

(NOTARY)

BILL SMITH

By _____

Title _____

APPENDIX B

GROUND WATER EXTRACTIONS

TABLE B–1. GROUND WATER EXTRACTIONS

In acre-feet

STATE WELL NUMBER	OWNER'S DESIGNATION	PRODUCTION 1971 OCT	1971 NOV	1971 DEC	1972 JAN	1972 FEB	1972 MAR	1972 APR	1972 MAY	1972 JUNE	1972 JULY	1972 AUG	1972 SEPT	TOTAL
SAN FERNANDO BASIN														
BURBANK, CITY OF														
1N/14W-09P01S	6A	82.00	26.74	151.77	120.11	302.39	306.43	27.36	273.58	254.96	304.43	279.04	237.70	2366.51
1N/14W-10Q01S	7	102.92*	103.92*	45.19*	0*	0	0	69.45*	122.18*	102.04*	104.70*	103.98*	100.01*	854.39
1N/14W-09G03S	9	118.65	55.71	56.62	74.68	0	0	0	0	0	0	0	0	305.66
1N/14W-09H01S	10	20.48	100.60	98.62	129.20	70.59	97.09	104.63	20.06	75.13	103.06	108.18	153.48	1081.32
1N/14W-09H04S	11A	208.39	126.03	115.93	26.40	82.82	215.80	231.61	163.50	0	166.94	198.53	50.89	1586.84
1N/14W-09G02S	12	202.29	12.13	0	226.77	64.75	30.13	121.38	0	9.38	131.37	167.31	205.31	1170.82
1N/14W-09K02S	13A	259.48	116.23	42.41	0	0	57.49	147.28	134.29	236.06	215.60	126.94	240.40	1576.18
1N/14W-09A03S	14A	0	0	0	0	0	0	0	0	91.59	349.02	344.17	336.21	1120.99
1N/14W-14B08S	15	89.33	92.93	38.76	0	0	0	71.23	131.70	126.26	128.82	127.62	122.65	929.30
1N/14W-09B04S	17	199.22	105.40	10.13	192.07	190.32	153.99	195.44	189.00	155.68	59.09	4.10	36.16	1490.60
1N/14W-09L04S	18	204.66	105.69	20.29	0	0	0	125.60	231.62	158.29	91.36	221.77	214.92	1374.20
TOTALS		1487.42	845.38	579.92	769.23	710.87	860.93	1093.98	1265.93	1209.39	1654.39	1681.64	1697.73	13856.81
CALIFORNIA MATERIALS COMPANY														
1N/14W-30A01S	4926-	24.22	23.29	16.24	22.80	22.96	25.92	22.99	25.13	26.41	19.32	27.25	20.44	276.97
CONROCK CO.														
1N/14W-30A03S	2	82.85	78.31	62.67	61.38*	61.38*	61.78	67.96	71.06	81.22	70.46	70.17	69.49	838.73
1N/14W-30A04S	3	58.00	56.01	39.24	64.84	44.96*	22.98	52.10	57.07	64.84	52.54	49.35	52.50	614.43
TOTALS		140.85	134.32	101.91	126.22	106.34	84.76	120.06	128.13	146.06	123.00	119.52	121.99	1453.16
FOREST LAWN CEMETERY ASSN ET AL														
1N/13W-33N03S	4	32.25	24.86	9.48	7.13	26.41	36.83	41.86	45.70	40.96	32.04	41.38	31.91	370.81
1N/13W-33P01S	6	7.84	5.41	0	0	0	0	0	0	0	0	0	0	13.25
1N/13W-04B01S	7	12.19	9.44	6.94	7.37*	11.01*	13.41	0	0	1.17	12.29	9.58	8.02	91.42
TOTALS		52.28	39.71	16.42	14.50	37.42	50.24	41.86	45.70	42.13	44.33	50.96	39.93	475.48
GLENDALE, CITY OF														
1N/13W-19J01S	STPT1	32.65	27.41	4.31	2.02	4.28	2.59	1.13	2.74	2.22	7.15	7.53	6.05	100.08
1N/13W-19J04S	STPT2	56.09	52.99	107.96	112.09	103.01	107.84	91.82	98.25	89.14	129.31	117.14	86.10	1151.74
	GVENT	1126.59	579.10	630.04	630.96	628.82	634.34	622.68	858.06	1060.30	1628.97	1547.64	1104.19	11051.69
TOTALS		1215.33	659.50	742.31	745.07	736.11	744.77	715.63	959.05	1151.66	1765.43	1672.31	1196.34	12303.51
HARPER, CECILIA DE MILLE														
1N/14W-05A02S	CEREG	1.60*	.68*	.26*	.21*	.19*	.45*	.44*	.81*	.73*	1.04*	1.25*	.86	8.52
1N/14W-05L01S	WYCKE	3.76*	1.19*	1.62*	0	.07*	1.71*	2.74*	4.92*	4.26*	.43*	0*	0*	20.70
TOTALS		5.36	1.87	1.88	.21	.26	2.16	3.18	5.73	4.99	1.47	1.25	.86	29.22
LIVINGSTON-GRAHAM, INC.														
1N/14W-10N01S	SNLND	10.71	0	0	0	0	0	0	0	0	0	0	0	10.71
1N/14W-19Q01S	SNVAL	4.26	33.48	38.96	53.18	43.41	49.09	48.02	50.20	41.40	48.62	47.29	51.65	509.56
TOTALS		14.97	33.48	38.96	53.18	43.41	49.09	48.02	50.20	41.40	48.62	47.29	51.65	520.27
LOS ANGELES, CITY OF (RESEDA) **														
1N/16W-34K02S	R-5	20.48	25.85	11.04	1.45	7.92	27.34	25.76	24.56	5.33	0	0	0	149.73
1N/16W-27P02S	R-6	18.73	18.73	6.06	1.08	6.31	28.08	24.54	22.77	5.10	0	0	0	131.40
1N/16W-03Q03S	R-2	50.14	71.35	33.06	2.98	20.84	99.47	100.28	72.20	15.17	0	0	0	465.49
1N/16W-27F02S	R-8	34.41	43.02	20.16	2.09	14.03	55.35	50.73	51.33	11.39	0	0	0	282.51
1N/16W-34G02S	R-9	16.80	25.37	11.27	1.31	6.68	21.46	21.63	22.08	4.50	0	0	0	131.10
TOTALS		140.56	184.32	81.59	8.91	55.78	231.70	222.94	192.94	41.49	0	0	0	1160.23
LOS ANGELES, CITY OF														
1N/13W-19K03S	CS-51	0	.07	0	0	0	0	.34	0	0	0	0	0	.41
1N/14W-24H03S	CS-52	153.38	125.73	100.46	88.89	97.08	137.56	163.05	214.12	123.06	177.77	176.12	157.25	1714.47
1N/14W-13E02S	BRNHD	.05	0	0	0	0	0	0	0	0	0	0	0	.05
1N/14W-08J04S	E-1	0	0	.25	0	0	0	93.18	0	154.78	276.24	198.21	78.05	800.71
1N/14W-08J03S	E-3	0	0	.18	0	0	0	134.73	2.04	230.53	230.35	221.26	165.45	984.54
1N/14W-08L02S	E-4	0	0	.11	0	0	67.47	63.82	137.76	154.48	275.00	247.87	25.87	972.38
1N/14W-08J01S	E-5	0	0	.25	0	0	77.02	0	0	178.21	134.64	263.87	30.60	684.59
1N/14W-07J03S	E-6	0	0	.11	0	0	55.42	0	0	101.86	105.10	234.48	22.73	519.70
1N/14W-07J01S	E-10	0	0	.11	59.60	28.40	0	134.34	2.11	234.89	234.44	223.42	71.58	988.89
1N/14W-14A01S	FNWK1	.02	0	0	0	0	0	0	0	0	0	0	0	.02
1N/14W-13E04S	FTHL2	.07	0	0	0	0	0	0	0	0	0	0	0	.07
1N/14W-13E03S	FTHL3	.09	0	0	0	0	0	0	0	0	0	0	0	.09
1N/14W-24D04S	H-27	0	0	0	0	0	231.29	192.84	229.80	216.25	211.09	193.64	183.54	1458.45
1N/14W-13D05S	LNGMR	.07	0	0	0	0	0	0	0	0	0	0	0	.07
1N/14W-06N01S	NH-2	22.87	0	.18	0	0	0	3.21	0	0	0	0	0	26.26
1N/15W-02R01S	NH-4	0	0	.14	0	0	31.36	26.86	0	0	0	79.61	17.33	155.30
1N/14W-06P01S	NH-5	0	0	.07	0	0	0	0	20.96	44.47	0	99.59	0	165.09

TABLE B-1. GROUND WATER EXTRACTIONS (Continued)

In acre-feet

STATE WELL NUMBER	OWNERS DESIGNATION	PRODUCTION 1971 OCT	NOV	DEC	1972 JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	TOTAL
LOS ANGELES, CITY OF (CONTINUED)														
1N/15W-02Q01S	NH-7	0	0	.14	0	0	28.19	22.25	0	0	0	0	0	50.58
1N/14W-06R01S	NH-11	0	0	.16	0	0	0	0	94.86	0	0	0	0	95.02
1N/14W-06Q01S	NH-13	0	0	.16	0	0	0	0	51.63	0	0	0	0	51.79
1N/14W-06Q03S	NH-14	0	0	.25	0	0	0	0	0	176.84	0	0	0	177.09
1N/15W-01K01S	NH-15	0	0	.09	0	0	0	0	13.13	85.88	0	0	0	99.10
1N/14W-05N01S	NH-16	0	0	.23	0	0	0	0	33.61	225.80	0	87.88	0	347.52
1N/14W-05P02S	NH-17	0	0	.21	0	0	0	0	33.93	123.97	0	0	0	158.11
1N/14W-05P01S	NH-18	0	0	.28	0	0	0	99.06	0	0	0	0	0	99.34
1N/14W-08B01S	NH-19	0	0	.23	0	0	0	100.21	0	0	224.98	365.24	24.70	715.36
1N/14W-08A02S	NH-20	0	0	.32	0	0	111.59	18.41	0	0	169.83	71.40	0	371.55
1N/14W-08A01S	NH-21	0	0	.21	0	0	40.11	0	0	186.02	116.30	0	0	342.64
1N/15W-01Q02S	NH-22	24.01	0	.14	0	0	0	32.53	0	0	0	0	0	56.68
1N/15W-01Q03S	NH-23	0	0	.28	0	0	0	36.85	0	0	0	0	0	37.13
1N/14W-06L01S	NH-24	0	0	.14	0	0	0	29.59	0	0	0	0	0	29.73
2N/14W-12C01S	TGPLT	123.60	98.78	96.99	104.13	109.78	106.13	85.97	124.01	143.02	170.80	170.80	165.29	1499.30
1N/14W-22C01S	V-1	92.26	0	.69	66.67	0	27.11	190.17	209.09	200.76	200.32	191.00	173.78	1351.45
1N/14W-15N01S	V-2	125.99	0	.21	219.95	60.45	63.75	235.15	275.60	255.72	253.88	243.71	224.31	1958.72
1N/14W-15P01S	V-4	117.24	0	.11	120.16	79.73	0	0	0	133.45	237.33	230.72	217.42	1136.16
1N/14W-22B01S	V-11	125.69	0	.18	90.13	223.09	68.87	229.96	262.53	247.82	248.03	240.89	236.20	1973.39
1N/14W-21B01S	V-13	28.81	0	.02	22.89	36.96	17.77	37.99	63.77	57.71	52.78	48.03	44.83	411.56
1N/14W-21C01S	V-16	73.78	0	.07	45.75	0	133.75	51.72	169.17	153.76	145.20	134.96	116.80	1024.96
1N/14W-21H01S	V-22	59.64	0	.07	31.61	124.31	62.12	75.48	122.66	111.18	109.69	109.00	101.74	907.50
1N/14W-21G01S	V-24	103.81	0	0	61.20	89.85	200.44	182.90	219.86	210.54	213.02	209.14	201.95	1692.71
1N/14W-07A01S	W-1	122.18	0	.21	0	0	0	7.58	0	0	262.21	238.64	295.41	926.23
1N/14W-08D01S	W-2	146.56	0	.23	0	0	0	207.76	240.70	0	204.29	280.10	336.46	1416.10
1N/14W-08E01S	W-3	111.55	0	.16	0	0	0	166.14	203.01	0	253.33	284.44	272.52	1291.15
1N/14W-08F01S	W-4	105.72	0	.16	0	0	0	11.32	0	0	60.65	316.60	398.48	892.93
1N/14W-08L01S	W-5	113.06	0	.21	0	0	0	59.34	246.97	197.89	350.92	343.85	331.89	1644.13
1N/14W-08R01S	W-7	191.55	316.74	0	0	62.95	84.11	188.80	322.22	298.53	294.33	166.50	280.19	2225.92
1N/14W-17A01S	W-8	170.87	0	.21	0	70.41	94.33	205.51	347.66	323.81	294.15	246.40	235.26	1988.61
1N/14W-16D01S	W-9	60.65	0	.07	0	27.23	36.23	74.54	125.28	0	111.89	120.62	0	556.51
1N/14W-16E01S	W-10	64.67	0	.07	0	0	0	82.09	130.05	0	115.04	122.57	0	514.49
1N/14W-24E06S	H-25	198.23	68.07	0	204.43	227.96	245.18	203.40	242.08	225.44	154.50	196.97	181.93	2148.19
1N/14W-24D03S	H-26	216.48	74.49	0	220.27	254.48	260.10	216.14	257.23	241.97	236.23	208.79	190.54	2376.72
1S/13W-04L03S	P-6	.57	.46	0	0	0	0	0	0	0	0	0	0	1.03
1S/13W-04K01S	P-7	.34	0	0	0	0	0	0	0	0	0	0	0	.34
1N/15W-01P04S	NH-25	0	0	.28	0	0	0	149.66	0	0	0	0	0	149.94
1N/15W-01Q04S	NH-26	0	0	.11	0	0	0	37.17	0	0	0	0	0	37.28
1N/14W-06R05S	NH-27	0	0	.07	0	0	0	0	28.90	67.22	0	91.12	11.11	198.42
1N/14W-06R07S	NH-28	0	0	.30	0	0	0	0	88.18	0	0	0	0	88.48
1N/14W-06Q05S	NH-29	0	0	.25	0	0	0	0	81.63	126.77	104.43	0	0	313.08
1N/14W-06P02S	NH-31	0	0	.23	0	0	0	0	22.87	132.81	0	167.77	0	323.68
1N/14W-06N02S	NH-30	0	0	.11	0	0	0	3.47	0	0	0	0	0	3.58
1N/15W-02Q02S	NH-32	0	0	.18	0	0	128.49	52.46	0	202.16	128.26	323.46	12.60	847.61
1N/15W-02R02S	NH-33	0	0	.18	0	0	118.92	48.58	0	0	0	0	0	167.68
1N/15W-01K02S	NH-34	0	0	.21	0	0	0	0	19.33	154.96	132.19	0	0	306.69
1N/14W-24D05S	H-28	353.99	119.95	28.81	359.04	385.22	399.10	333.10	398.42	382.61	389.35	380.97	366.51	3897.27
1N/14W-08A03S	NH-35	0	0	.14	0	0	84.94	14.95	0	0	0	0	0	99.13
1N/15W-01K04S	NH-36	0	0	.25	0	0	58.82	0	27.55	77.50	279.16	177.20	0	620.48
1N/15W-01K05S	NH-37	0	0	.34	0	0	2.13	0	27.69	102.82	280.42	177.55	0	590.95
1N/14W-24D06S	H-29	396.01	132.35	482.44	456.27	419.65	433.43	359.16	425.96	401.63	404.84	385.10	357.32	4654.16
1N/14W-06K01S	NH-39	0	0	.32	0	0	0	52.98	0	0	0	0	0	53.30
1N/14W-06K02S	NH-40	0	0	.23	0	0	0	72.77	0	0	0	0	0	73.00
1N/14W-06K03S	NH-41	0	0	.30	0	0	0	43.04	0	0	0	0	0	43.34
1N/14W-06K04S	NH-42	459.09	449.75	0	0	330.07	466.21	34.23	460.33	446.44	459.76	456.45	440.04	4002.37
1N/13W-19 S	CS-CN	338.15	388.66	27.78	160.24	169.42	516.30	303.26	337.24	308.54	287.65	141.87	163.68	3142.79
1N/14W-23 S	DG3-4	11.59	158.06	67.15	211.89	109.62	201.79	102.04	151.40	15.04	0	2.75	0	1031.33
TOTALS		4112.64	1933.11	813.44	2523.32	2906.66	4590.03	5269.20	6465.34	7457.34	8590.39	8890.56	6133.36	59685.39
MENA, JOHN AND BARBARA														
2N/14W-11N01S	4973J	.08*	.08*	.08*	.08*	.08*	.08*	.08*	.08*	.08*	.08*	.08*	.08*	.96
RIVERWOOD RANCH MUTUAL WATER COMPANY														
2N/14W-11A01S	4982	.78	.08	.03	.26	.80	1.38	.92	1.38	1.53	2.33	2.98	2.25	14.72
SEARS ROEBUCK AND COMPANY														
1N/13W-20R01S	3945-	27.80	3.41	2.67	.98	6.84	25.78	29.83	41.64	41.95	38.39	42.07	42.72	304.08
SOUTHERN SERVICE COMPANY														
1N/13W-20F01S	METR1	2.15	2.49	1.94	2.20	1.91	2.13	2.11	1.79	2.17	1.93	2.56	1.72	25.10
1N/13W-20F01S	METR2	2.23	2.72	1.92	2.30	2.04	1.79	1.97	1.76	2.09	1.87	2.55	1.70	24.94
1N/13W-20F01S	METR3	2.51	3.20	2.25	2.33	1.99	2.22	2.16	1.86	2.21	1.98	2.12	1.54	26.37
TOTALS		6.89	8.41	6.11	6.83	5.94	6.14	6.24	5.41	6.47	5.78	7.23	4.96	76.41
SPORTSMENS LODGE, INCORPORATED														
1N/15W-25D01S	1	2.78	.70	.97	.66	1.52	1.69	1.50	3.43	5.66	4.31	1.82	.72	25.76

TABLE B–1. GROUND WATER EXTRACTIONS (Continued)
In acre-feet

STATE WELL NUMBER	OWNERS DESIG-NATION	PRODUCTION 1971 OCT	NOV	DEC	1972 JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	TOTAL
TOLUCA LAKE PROPERTY OWNERS ASSN														
1N/14W-28B01S	3845F	1.67	.25	.88	1.19	1.52	2.25	2.44	2.51	2.21	1.83	1.17	1.10	19.02
VALHALLA MEMORIAL PARK														
1N/14W-04N03S	4	9.54	.53	.39	0	0	0	12.14	32.96	25.44	34.82	43.29	30.60	189.71
1N/14W-09D06S	2	0	1.01	0	.01	0	7.68	0	3.81	.84	2.24	0	0	15.59
TOTALS		9.54	1.54	.39	.01	0	7.68	12.14	36.77	26.28	37.06	43.29	30.60	205.30
VAN DE KAMPS HOLLAND DUTCH BAKERS, INC														
1S/13W-04G01S	1	.02	.01	.01	.32	.55	.34	.85	.63	.52	.34	.03	.02	3.44
WALT DISNEY PRODUCTIONS														
1N/14W-23E01S	EAST	41.67	22.47	27.67	22.74	21.91	84.88	8.23	113.97	105.78	121.58	66.11	26.34	663.35
1N/14W-23E02S	WEST	127.10	117.11	145.33	134.09	136.76	109.98	142.74	81.79	50.31	50.25	209.11	157.10	1461.67
TOTALS		168.77	139.58	173.00	156.83	158.67	194.86	150.97	195.76	156.09	171.83	275.22	183.44	2125.02
WESTERN OIL AND GAS ASSOCIATION (NONPARTY)														
	COX	12.56	11.30	13.41	18.06	18.39	15.06	6.97	2.03	2.65	2.04	12.19	19.98	134.64
	NWMAN	.60	.79	.89	1.02	1.54	2.48	1.83	1.87	2.17	1.73	1.93	2.51	19.36
	SAN F	2.27*	2.26*	2.27*	2.47*	2.15*	2.34*	2.23*	2.25*	4.99*	8.22*	8.19*	7.95*	47.59
1S/13W-04C S	SPAC6	.54	0	2.62	.34	.78	4.83	2.98	1.33	1.67	.97	1.36	2.96	20.38
1S/13W-04C S	SF4	4.39	4.60	5.76	3.49	4.39	4.12	1.57	.76	.96	1.01	1.90	2.22	35.17
TOTALS		20.36	18.95	24.95	25.38	27.25	28.83	15.58	8.24	12.44	13.97	25.57	35.62	257.14
SUBTOTALS SAN FERNANDO BASIN		7432.32	4027.99	2601.76	4455.98	4822.98	6908.63	7758.41	9434.00	10374.10	12522.87	12890.24	9563.81	92793.09

SYLMAR BASIN

BROWN, CHARLES T														
3N/15W-34K03S	1	.66*	1.53*	.87*	.38*	.39*	.99*	.97*	.94*	1.96*	1.59*	2.07*	1.09*	13.44
CHURCH OF JESUS CHRIST OF L D SAINTS														
1N/15W-20R01S	1	22.78	23.45	13.21	0	12.62	22.85	31.60	24.81	30.49	26.04	19.11	21.48	248.44
FIDELITY FEDERAL SAVINGS & LOAN ASSN.														
1N/15W-25G01S	3	1.20*	.84*	.40*	.36*	.53*	.89*	.81*	.81*	1.47*	1.88*	1.84*	1.03*	12.06
LOS ANGELES, CITY OF														
1N/15W-04 S	MISSN	0	0	0	0	223.39	438.41	401.63	400.05	368.89	371.35	363.89	232.76	2800.37
METROPOLITAN WATER DISTRICT OF SO CAL (NONPARTY)														
1N/15W-36E S	TUNNL	49.87*	45.21*	47.95*	51.65*	43.70*	46.72*	45.62*	43.02*	35.10*	26.99*	25.21*	23.20*	484.24
SAN FERNANDO, CITY OF														
1N/15W-34P01S	1	0	0	.01	0	0	0	0	0	0	0	0	0	.01
1N/15W-34B01S	2	.80	1.26	.54	0	.04	9.49	.80	0	0	0	0	0	12.93
1N/15W-34C01S	3	134.52	191.66	205.48	197.76	190.01	228.28	168.93	189.85	188.16	138.12	116.66	199.84	2149.27
1N/15W-34A01S	4	36.60	46.05	24.18	30.34	38.86	64.42	51.20	63.68	54.22	31.49	16.96	47.49	505.49
1N/15W-27Q01S	7A	0	2.82	.04	.54	0	.01	42.62	93.58	94.26	54.45	33.52	75.89	397.73
TOTALS		171.92	241.79	230.25	228.64	228.91	302.20	263.55	347.11	336.64	224.06	167.14	323.22	3065.43
SUBTOTALS SYLMAR BASIN		246.43	312.82	292.68	281.03	509.54	812.06	744.18	816.74	774.55	651.91	579.26	602.78	6623.98

TABLE B-1. GROUND WATER EXTRACTIONS (Continued)

In acre-feet

STATE WELL NUMBER	OWNERS DESIG-NATION	PRODUCTION 1971 OCT	NOV	DEC	1972 JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	TOTAL
VERDUGO BASIN														
CRESCENTA VALLEY COUNTY WATER DIST														
2N/13W-33C03S	1	32.10	33.11	23.38	35.34	31.46	30.17	28.95	42.27	34.32	44.61	43.63	44.06	423.40
2N/13W-29F02S	2	0	0	0	0	0	.87	0	0	.98	5.95*	.73	2.14	10.67
2N/13W-29K01S	4	22.29	20.96	6.40	0	0	5.60	3.37	21.36	2.29	15.29*	15.84	17.85	131.25
2N/13W-33C06S	5	66.06	62.58	54.44	32.71	20.31	12.52	50.97	54.62	46.23	63.67	60.70	63.79	588.60
2N/13W-33K03S	6	6.84	9.98	.21	0	0	.01	.10	3.91	2.80	.03	0	.11	23.99
2N/13W-33C01S	7	47.31	42.33	38.38	27.84	28.23	25.88	38.10	45.03	37.94	47.70	45.35	45.78	469.87
1N/13W-03D05S	8	8.14	10.08	23.84	43.22	40.74	35.65	39.29	25.75	36.99	46.67	5.64	9.78	325.79
2N/13W-28N01S	9	0	0	0	0	2.55	3.70	0	0	2.18	0	0	.01	8.44
2N/13W-33H05S	10	29.63	36.22	24.49	45.50	42.82	40.59	44.92	48.41	19.59	64.95	92.80	94.84	584.76
2N/13W-33G01S	11	29.13	11.03	16.65	42.16	40.25	37.57	40.25	36.57	38.12	49.79	46.02	46.11	433.65
2N/13W-33H06S	12	.02	0	0	0	0	2.35	0	0	17.66	0	0	.07	20.10
2N/13W-33H01S	14	23.94	23.87	0	3.86	23.07	35.22	40.64	32.47	28.25	53.78	57.31	56.29	378.70
IV/FHS-TON	PICK	16.73	7.40	5.22	4.81	6.36	6.54	7.03	7.49	7.31	7.59	7.75	7.19	91.42
IV/FHS-TON	DUNS	2.92*	2.73*	1.79*	2.11*	2.10*	2.25*	2.22*	2.28*	1.59*	1.74*	1.82*	1.82*	25.37
TOTALS		285.11	260.29	194.80	237.55	237.89	238.92	295.84	320.16	276.25	401.77	377.59	389.84	3516.01
GLENDALE, CITY OF														
1N/13W-10F03S	GL3-4	146.11	170.95	175.36	175.21	161.22	172.36	166.12	170.61	158.57	168.41	166.63	158.55	1990.10
1N/13W-15L01S	VPCKP	108.43	111.76	66.12	52.25	91.66	100.30	98.20	108.16	104.20	111.02	100.77	106.58	1159.45
TOTALS		254.54	282.71	241.48	227.46	252.88	272.66	264.32	278.77	262.77	279.43	267.40	265.13	3149.55
SUBTOTALS VERDUGO BASIN		539.65	543.00	436.28	465.01	490.77	511.58	560.16	598.93	539.02	681.20	644.99	654.97	6665.56
GRAND TOTALS ULARA		8218.40	4883.81	3330.72	5202.02	5823.29	8232.27	9062.75	10,849.67	11,687.67	13,855.98	14,114.49	10,821.56	106,082.63***

* Estimated

** Extractions not chargeable against City of Los Angeles' Water Right Entitlement

*** Includes nonparty extractions and extractions from Reseda wells by City of Los Angeles

APPENDIX C

MEAN DAILY DISCHARGE
AT
KEY SURFACE RUNOFF
GAGING STATIONS

MEAN DAILY DISCHARGE OF LOS ANGELES RIVER ABOVE ARROYO SECO
In second-feet

Station 57C-R

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	16.5	8.7	13.0	38.0	14.3	14.2	13.5	14.9	20.0	49.0	15.6	12.8
2	17.4	11.1	18.0	31.0	14.3	13.5	13.5	22.0	20.0	41.0	10.4	11.6
3	19.3	24.0	169.0	38.0	15.0	12.8	19.4	19.4	20.0	42.0	12.8	9.8
4	16.5	20.0	78.6	25.0	13.0	10.4	16.5	17.5	16.0	38.0	8.2	10.4
5	19.3	16.5	45.0	23.0	157.0	9.8	16.5	18.4	19.4	34.0	7.2	14.2
6	19.3	11.1	28.0	25.0	43.0	15.6	14.9	14.9	41.0	37.0	6.2	18.4
7	23.0	9.2	22.0	36.0	30.0	14.9	15.6	14.2	49.0	33.0	6.7	15.6
8	18.4	15.0	20.0	20.0	26.0	14.9	13.5	19.6	32.0	20.0	9.8	11.0
9	17.4	16.5	22.0	16.5	22.0	14.2	16.5	12.8	17.5	25.0	10.4	10.4
10	19.3	23.0	34.0	16.5	24.0	9.8	17.5	14.2	17.5	21.0	12.2	7.7
11	28.0	27.0	24.0	20.0	34.0	42.0	12.2	19.4	17.5	23.0	12.8	9.2
12	31.0	265.0	19.3	20.0	42.0	21.0	14.2	19.4	17.5	23.0	289.0	18.4
13	30.0	28.0	194.0	20.0	26.0	19.4	14.2	31.0	26.0	27.0	100.0	15.6
14	22.0	15.0	36.0	23.0	30.0	14.2	11.6	14.9	23.0	26.0	28.0	11.0
15	30.0	15.6	16.5	18.4	24.0	14.2	12.2	24.0	28.0	22.0	22.0	10.4
16	39.0	13.7	15.6	18.4	23.0	14.2	12.2	16.5	28.0	17.5	14.2	11.0
17	75.0	7.4	61.0	34.0	23.0	18.4	21.0	12.8	28.0	18.4	13.5	6.7
18	27.0	12.4	39.0	28.0	23.0	22.0	39.0	18.4	30.0	18.4	13.5	7.7
19	32.0	8.7	34.0	23.0	22.0	26.0	33.0	14.2	27.0	22.0	11.6	12.8
20	25.0	7.8	46.0	24.0	22.0	27.0	26.0	26.0	31.0	25.0	10.4	13.5
21	39.0	7.8	42.0	33.0	22.0	24.0	16.5	21.0	33.0	17.5	11.6	14.2
22	46.0	15.0	1830.0	18.4	23.0	23.0	9.8	22.0	35.0	12.2	13.5	15.6
23	47.0	11.8	191.0	18.4	21.0	12.0	5.4	12.8	24.0	12.5	12.8	14.9
24	683.0	14.5	1830.0	17.4	25.0	24.0	9.8	9.8	24.0	15.6	15.6	12.2
25	154.0	17.4	1810.0	17.4	17.5	18.4	35.0	12.8	22.0	19.4	17.5	15.6
26	30.0	18.4	444.0	23.0	19.4	16.5	38.0	11.6	23.0	8.2	16.4	16.5
27	31.0	71.2	3710.0	36.0	14.2	22.0	12.8	9.2	30.0	14.2	16.4	13.5
28	16.5	19.3	1470.0	18.4	14.2	17.5	14.9	7.2	35.0	15.6	12.8	19.4
29	11.8	15.0	138.0	22.0	14.2	18.4	14.9	12.2	41.0	15.6	19.4	14.2
30	12.4	15.0	67.0	18.4		15.6	12.2	12.2	42.0	9.2	11.4	10.4
31	7.8		56.0	13.0		14.2		18.5		9.8	13.5	
Total	1603.9	713.1	15,583.0	713.1	794.3	574.1	522.3	508.8	821.4	712.1	763.6	380.9
Mean Daily Discharge	51.7	23.8	501.0	23.0	27.4	18.5	15.8	16.4	27.4	23.0	24.6	12.7
Max. Mean Daily Discharge	683.0	265.0	4830.0	38.0	157.0	42.0	32.0	31.0	49.0	49.0	289.0	18.4
Min. Mean Daily Discharge	7.8	7.4	13.0	13.0	13.0	9.8	5.4	7.2	16.0	8.2	6.2	6.7
Runoff in A.F.	3181.0	1414.0	30,790.0	1414.0	1575.0	1139.0	1036.0	1009.0	1629.0	1412.0	1514.0	756.0

Maximum Stage 6.40 feet at 0924 on December 27, 1971. Discharge 15,940 second feet. Total acre-feet 1971-72 (46,870)

MEAN DAILY DISCHARGE OF BIG TUJUNGA CREEK BELOW BIG TUJUNGA DAM
In second feet

Station 168-R

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	7.2	0.2	2.3	2.6	4.2	1.0	1.0	1.0	3.4	5.0	4.0	4.3
2	7.2	0.2	2.3	2.6	4.2	1.0	1.0	1.0	3.4	5.0	4.0	4.3
3	7.2	0.2	2.3	64.0	4.2	1.0	1.0	3.5	3.4	5.0	4.0	4.3
4	7.2	0.2	2.3	109.0	4.2	1.0	1.0	3.5	3.4	5.0	5.0	4.3
5	7.2	1.0	2.3	109.0	4.2	1.0	1.0	3.5	3.4	5.0	5.0	4.3
6	7.2	2.4	2.3	109.0	4.2	1.0	1.0	3.5	3.4	4.8	5.0	4.3
7	7.2	2.4	2.3	67.0	4.2	1.0	1.0	3.5	3.3	5.0	5.0	4.5
8	7.2	2.4	2.3	4.7	4.2	1.0	1.0	3.5	3.3	5.0	5.0	4.7
9	7.2	2.4	2.3	4.7	4.2	1.0	1.0	3.5	3.3	4.8	5.0	4.7
10	7.2	2.4	2.3	4.7	4.2	1.0	1.0	3.5	3.3	4.8	3.9	4.7
11	7.2	2.4	2.3	4.2	4.2	1.0	1.0	3.5	3.3	4.8	4.9	4.7
12	7.2	2.4	2.3	4.2	4.2	1.0	1.0	3.5	3.3	4.8	4.9	4.7
13	7.0	2.4	2.3	4.2	4.2	1.0	1.0	3.5	3.3	4.8	4.9	4.7
14	7.0	2.4	2.3	4.2	4.2	1.0	1.0	3.5	1.7	4.8	4.8	4.3
15	7.0	2.4	2.3	4.2	4.2	1.0	1.0	3.5	*	4.8	4.9	4.0
16	6.8	2.4	2.3	4.2	4.2	1.0	1.0	3.5	1.5	4.8	4.9	4.0
17	6.8	2.4	2.3	4.2	4.2	1.0	1.0	3.5	5.0	4.8	4.8	4.0
18	6.8	2.4	2.3	4.2	4.2	1.0	1.0	3.5	5.0	4.6	4.9	4.0
19	6.6	2.4	2.3	4.2	4.2	1.0	1.0	3.5	2.0	4.6	4.9	4.0
20	6.6	2.4	2.3	4.2	4.2	1.0	1.0	3.5	1.5	4.6	4.9	4.0
21	6.6	2.3	2.3	4.2	4.2	1.0	1.0	3.5	5.0	4.6	4.9	4.2
22	6.2	2.3	2.3	4.2	4.2	1.0	1.0	3.5	2.1	4.6	4.9	4.4
23	6.2	2.3	2.3	4.2	4.2	1.0	1.0	3.5	5.0	4.6	4.9	4.4
24	6.2	2.3	2.3	4.2	4.2	1.0	1.0	3.5	5.0	4.6	4.5	4.4
25	6.2	2.3	2.3	4.2	1.0	1.0	1.0	3.5	5.0	4.6	4.3	4.4
26	6.2	2.3	2.3	4.2	1.0	1.0	1.0	3.5	5.0	4.7	4.3	4.4
27	6.2	2.3	2.3	4.2	1.0	1.0	1.0	3.5	5.0	4.5	4.3	4.4
28	6.2	2.3	2.3	4.2	1.0	1.0	1.0	3.5	5.0	4.0	4.3	4.3
29	6.2	2.3	2.3	4.2	1.0	1.0	1.0	3.5	2.1	4.0	4.3	4.2
30	6.2	2.3	17.1	4.2		1.0	1.0	3.5	5.0	4.0	4.3	4.2
31	6.2		2.0	4.2		1.0		3.5		4.0	4.3	
Total	194.6	60.8	85.8	565.7	106.3	31.0	30.0	103.5	104.4	144.8	140.0	130.1
Mean Daily Discharge	4.98	2.02	2.77	18.25	3.80	1.00	1.00	3.34	3.48	4.67	4.45	4.34
Max. Mean Daily Discharge	7.2	2.4	17.1	109.0	4.2	1.0	1.0	3.5	5.0	5.0	5.0	4.7
Min. Mean Daily Discharge	0.2	0.2	2.0	2.6	1.0	1.0	1.0	1.0	*	4.0	3.9	4.0
Runoff in A.F.	307.0	121.0	170.0	1120.0	211.0	61.0	60.0	205.0	207.0	287.0	286.0	258.0

Maximum Stage 3.18 feet at 0932 on December 30, 1971. Discharge 705 second feet. Total acre-feet 1971-72 (3290).
* Denotes insignificant flow.

MEAN DAILY DISCHARGE OF VERDUGO CHANNEL AT ESTELLE STREET
In second-feet

Station 252-R

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	2.8	2.8	2.8	2.8	2.5	2.5	5.0	2.8	3.9	2.0	2.3	2.3
2	2.8	2.8	2.8	2.8	2.5	2.5	6.2	2.5	3.9	2.0	2.3	2.3
3	2.8	2.8	2.8	2.8	2.3	2.5	5.0	2.3	5.0	2.0	2.3	2.3
4	2.8	2.8	2.8	5.0	2.3	2.5	6.2	2.3	2.8	2.0	2.0	2.3
5	2.8	2.8	2.8	8.4	2.5	2.5	3.9	2.8	2.8	2.0	1.8	2.3
6	2.8	2.8	2.8	7.3	3.3	2.5	2.5	5.0	5.0	2.0	1.5	2.3
7	2.8	2.8	2.8	2.8	4.1	2.3	2.3	2.8	8.2	2.3	2.0	2.3
8	5.0	2.8	2.8	2.8	4.8	2.3	2.5	2.8	2.3	2.3	2.3	2.3
9	3.9	2.8	2.8	2.8	5.0	2.3	2.8	2.8	2.0	2.5	2.3	2.3
10	3.9	2.8	2.8	2.8	5.0	2.3	2.3	3.9	2.3	2.5	2.3	2.3
11	5.0	6.1	2.8	2.8	2.8	2.8	2.3	2.8	2.0	2.5	2.3	2.3
12	6.2	26.0	2.8	3.9	2.5	2.8	2.1	2.8	2.3	2.5	21.0	2.3
13	6.2	2.8	2.8	3.9	2.8	2.8	2.0	2.8	1.5	2.3	5.0	2.5
14	6.2	2.8	2.8	5.0	3.9	2.8	2.0	2.8	1.5	2.3	6.9	3.9
15	5.0	2.8	2.8	2.8	5.0	2.5	2.3	5.0	1.5	2.3	2.0	1.8
16	5.0	2.8	2.8	8.4	3.9	2.5	2.8	5.0	1.5	2.0	2.0	2.0
17	2.3	2.8	2.8	6.0	5.0	2.3	3.9	5.0	1.8	2.0	2.3	2.0
18	2.3	2.8	2.8	4.0	2.8	2.3	3.9	7.3	1.5	2.0	2.0	1.5
19	2.0	2.8	2.8	3.0	3.9	2.3	3.7	8.4	1.5	2.0	2.0	1.5
20	2.0	2.8	2.8	2.8	5.0	2.3	2.0	6.2	1.8	2.0	2.0	1.8
21	2.0	2.8	5.0	2.8	3.9	2.3	2.0	5.0	2.0	2.0	2.0	1.5
22	2.0	2.8	152.0	2.8	2.8	2.3	2.0	3.9	2.3	2.0	2.0	1.8
23	2.0	2.8	7.3	2.8	3.9	2.5	2.0	2.8	1.2	2.3	2.0	1.8
24	104.0	2.8	476.0	2.8	5.0	2.5	2.0	2.8	1.5	2.3	2.0	2.0
25	2.3	2.8	155.0	2.8	5.0	2.5	2.0	2.8	1.5	2.0	2.5	1.8
26	2.3	2.8	29.0	5.0	2.8	2.8	1.8	3.9	1.8	2.0	3.2	1.5
27	3.9	2.8	219.0	7.3	2.8	2.8	2.0	6.2	1.8	2.0	2.3	1.8
28	2.8	2.8	46.0	8.4	2.8	2.8	2.5	3.9	2.0	2.3	2.0	1.5
29	2.3	2.8	14.0	8.4	2.8	3.9	2.3	2.8	2.0	2.3	2.3	1.5
30	2.8	2.8	5.0	3.9		3.9	2.3	2.8	2.0	2.3	2.3	1.2
31	2.8		2.8	2.8		5.0		3.9		2.3	2.3	
Total	203.8	110.5	1167.1	132.7	103.7	82.9	86.8	118.9	73.2	67.3	93.5	61.0
Mean Daily Discharge	6.57	3.68	37.60	4.28	3.58	2.67	2.89	3.82	2.44	2.17	3.01	2.03
Max. Mean Daily Discharge	104.0	26.0	476.0	8.4	5.0	5.0	6.2	8.4	8.2	2.5	21.0	3.9
Min. Mean Daily Discharge	2.0	2.8	2.8	2.8	2.5	2.3	1.8	2.3	1.2	2.0	1.5	1.2
Runoff in A.F.	404.0	219.0	2320.0	263.0	206.0	164.0	172.0	236.0	145.0	133.0	185.0	121.0

Maximum Stage 1.79 feet at 1200 on December 24, 1971. Discharge 1960 second feet.

Total acre-feet 1971-72 (4,570)

MEAN DAILY DISCHARGE OF LOS ANGELES RIVER AT TUJUNGA AVENUE
In second feet

Station 300-R

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	12.2	10.6	12.0	20.0	13.4	13.9	15.4	14.2	16.3	14.9	13.0	13.3
2	14.2	10.6	34.0	20.0	12.7	15.2	15.2	14.9	15.7	12.2	13.7	10.9
3	14.2	12.7	28.0	19.1	12.7	15.7	15.2	14.4	15.4	11.8	10.2	10.6
4	14.7	13.0	24.0	12.5	17.3	16.4	17.5	14.9	15.7	12.2	9.1	12.2
5	14.9	13.7	12.2	12.7	147.0	18.9	16.7	14.7	17.2	11.3	9.7	12.5
6	15.7	13.9	12.5	18.3	18.5	17.2	15.4	17.7	22.0	11.1	8.0	13.0
7	16.7	14.4	12.7	17.7	14.7	16.9	14.2	17.3	37.0	9.7	11.3	11.6
8	16.4	12.5	11.1	14.7	12.7	16.7	15.4	14.7	13.4	12.5	10.9	11.1
9	16.9	12.7	12.2	13.7	16.4	17.2	15.2	16.2	12.2	11.8	10.9	10.6
10	16.4	12.7	13.9	13.7	14.7	27.0	14.2	16.4	10.4	11.4	10.4	9.8
11	15.9	33.0	12.7	20.0	32.0	33.0	15.7	14.4	12.7	11.8	10.6	11.2
12	15.2	199.0	13.7	16.4	18.4	18.3	14.2	19.4	12.0	12.0	131.0	11.5
13	12.2	12.0	126.0	16.4	18.5	18.0	12.5	16.2	13.8	18.8	24.0	11.3
14	12.2	9.1	10.4	15.9	14.4	15.9	11.8	17.2	10.0	16.4	13.5	9.3
15	15.9	9.1	10.6	16.7	13.9	15.4	15.4	16.7	12.5	13.4	12.0	10.0
16	23.0	10.2	9.1	16.4	18.0	15.9	27.0	16.2	12.2	13.7	12.2	9.3
17	20.0	13.7	34.0	25.0	14.2	15.9	22.0	14.4	13.4	13.2	11.6	8.9
18	12.0	14.9	10.2	19.1	15.4	17.2	23.0	14.4	13.0	13.4	12.0	8.7
19	12.7	12.2	10.6	21.0	14.2	15.4	22.0	14.4	11.8	13.1	11.1	9.3
20	12.7	13.2	10.0	21.0	14.4	15.2	13.7	22.0	13.2	11.4	11.1	9.1
21	13.2	14.4	10.0	21.0	14.4	14.9	14.7	13.9	13.2	9.3	11.8	9.5
22	13.2	14.4	1110.0	18.8	13.7	14.7	14.9	12.7	13.0	8.9	11.6	10.2
23	13.2	13.7	121.0	19.1	15.2	14.2	15.2	16.4	11.8	9.3	13.4	9.7
24	349.0	13.7	1180.0	17.5	16.4	14.4	20.0	15.2	13.7	10.6	16.4	9.7
25	35.0	13.7	1240.0	18.3	17.7	14.3	29.0	13.7	14.3	9.7	10.6	8.9
26	10.2	12.7	238.0	24.0	16.9	13.4	14.7	14.2	11.4	10.9	11.6	7.8
27	10.4	13.2	2800.0	22.0	18.3	13.2	14.9	15.7	13.7	10.4	10.4	8.9
28	8.8	12.7	1040.0	20.0	17.7	13.2	14.4	16.2	11.2	13.4	13.0	9.1
29	10.6	13.4	66.0	18.0	16.4	13.2	14.7	15.7	14.4	13.4	10.4	9.3
30	8.7	12.7	35.0	13.9		13.4	14.4	16.4	15.4	12.5	10.9	8.7
31	9.3		28.0	12.5		14.7		16.8		12.0	11.8	
Total	784.9	587.2	8287.9	555.4	600.2	509.0	498.6	486.9	434.0	376.5	488.2	306.0
Mean Daily Discharge	25.6	19.6	267.0	17.9	20.7	16.4	16.6	18.0	14.5	12.1	15.7	10.2
Max. Mean Daily Discharge	349.0	199.0	2800.0	25.0	147.0	33.0	29.0	22.0	37.0	18.8	131.0	13.3
Min. Mean Daily Discharge	8.7	9.1	9.1	12.5	12.7	13.2	11.8	12.7	10.0	8.9	8.0	7.8
Runoff in A.F.	1560.0	1160.0	16,440.0	1100.0	1190.0	1010.0	989.0	966.0	860.0	747.0	968.0	607.0

Maximum Stage 7.7 feet at 0812 on December 27, 1971. Discharge 10,970 second feet.

Total acre-feet 1971-72 (27,600)

MEAN DAILY DISCHARGE OF PACOIMA CREEK BELOW PACOIMA DAM
In second-feet

Station 118 B-R

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	1.0	0.7	+	+	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
2	1.0	0.7	+	+	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.2
3	1.0	0.1	+	+	1.6	0.3	0.3	0.3	0.3	0.3	0.3	0.2
4	1.0	0.1	+	+	2.0	0.3	0.3	0.3	0.3	0.3	0.3	0.2
5	1.0	0.1	+	+	2.7	0.3	0.3	0.3	0.3	0.9	0.3	0.9
6	1.0	0.1	+	+	2.7	0.3	0.3	0.3	0.3	0.3	0.3	1.0
7	1.0	0.1	+	+	1.4	0.3	0.3	0.3	0.3	0.3	0.3	1.5
8	1.0	0.1	+	+	1.2	0.3	0.3	0.3	0.3	0.3	0.3	2.0
9	1.0	0.1	+	+	1.8	0.3	0.3	0.3	0.3	0.3	0.3	2.0
10	1.0	0.1	+	1.6	2.5	0.3	0.3	0.3	0.3	1.1	0.3	2.0
11	1.0	0.1	+	3.4	27.0	0.3	0.3	0.3	0.3	0.8	0.3	1.1
12	1.0	0.1	+	3.4	39.0	0.3	0.3	0.3	0.3	0.6	0.3	0.9
13	1.0	0.1	+	3.5	54.0	0.3	0.3	0.3	0.3	0.3	0.3	0.4
14	1.0	0.1	+	3.6	20.0	0.3	0.3	0.3	0.3	0.8	0.3	0.3
15	1.0	0.1	+	3.6	3.5	0.3	0.3	0.3	0.3	1.2	0.3	0.3
16	1.0	+	+	3.6	3.1	0.3	0.3	0.3	0.3	0.3	0.2	0.3
17	1.0	+	+	3.6	0.5	0.3	0.3	0.3	0.3	0.3	0.2	0.3
18	1.0	+	+	8.6	0.5	0.3	0.3	0.3	0.3	0.3	0.2	0.3
19	1.0	+	+	13.0	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2
20	1.0	+	+	12.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
21	1.0	+	+	9.7	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
22	1.0	+	+	7.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
23	1.0	+	+	7.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
24	1.0	+	+	3.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
25	1.0	+	+	9.1	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
26	1.0	+	+	15.8	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
27	1.0	+	+	8.8	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
28	1.0	+	+	3.2	0.3	0.3	0.3	0.3	0.5	0.3	0.2	0.2
29	1.0	+	+	2.0	0.3	0.3	0.3	0.3	0.5	0.3	0.9	0.2
30	1.0	+	+	0.9		0.3	0.3	0.3	0.5	0.3	0.6	0.2
31	1.0		+	0.3		0.3		0.3		0.3	0.2	0.2
Total	31.0	2.7	+	128.1	167.8	9.3	9.0	9.3	9.6	12.9	8.8	15.7
Mean Daily Discharge	1.00	0.09	+	4.13	5.79	0.30	0.30	0.30	0.32	0.44	0.29	0.52
Max. Mean Daily Discharge	1.0	0.7	+	15.8	54.0	0.3	0.3	0.3	0.3	1.2	0.9	2.0
Min. Mean Daily Discharge	1.0	+	+	+	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2
Runoff in A.F.	61.0	5.4	+	254.0	333.0	18.0	18.0	18.0	19.0	26.[illegible]	[illegible]	[illegible]

Maximum Stage 0.87 feet at 0840 on February 13, 1972. Discharge 68.3 second feet. Total acre-feet 1971-72 (800)
+ Denotes Insignificant flow.

MEAN DAILY DISCHARGE OF BURBANK WESTERN STORM DRAIN AT RIVERSIDE DRIVE
In second-feet

Station E 285-R

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	7.9	10.6	10.6	9.1	7.9	9.1	6.7	4.5	11.7	7.1	7.1	8.6
2	10.6	10.6	17.4	9.1	6.7	6.7	10.6	4.5	11.7	5.6	7.1	5.6
3	10.6	9.1	5.0	9.1	6.7	6.7	10.6	4.5	11.7	7.1	7.1	5.6
4	11.9	7.9	5.0	9.1	6.7	6.7	7.9	5.0	11.7	5.6	11.7	7.1
5	7.9	7.9	5.0	9.1	7.9	6.7	7.9	5.0	11.7	7.1	8.6	7.1
6	7.9	9.1	5.6	9.1	7.9	9.1	7.9	5.0	10.2	8.6	7.1	7.1
7	9.1	7.9	5.0	9.1	7.9	9.1	7.9	5.0	13.2	5.6	7.1	7.1
8	9.1	6.7	5.0	9.1	6.7	9.1	9.1	4.5	8.6	5.6	8.6	7.1
9	9.1	6.7	5.6	9.1	9.1	9.1	9.1	5.6	8.6	5.6	11.7	7.1
10	9.1	6.7	5.6	10.6	9.1	9.1	7.9	7.1	7.1	8.6	11.7	8.6
11	9.1	7.9	6.7	10.6	9.1	11.9	7.9	5.6	7.1	8.6	10.2	5.6
12	10.6	20.0	10.6	10.6	9.1	13.1	6.7	5.0	11.7	8.6	41.0	5.6
13	10.6	5.6	6.9	10.6	9.1	10.6	7.9	4.5	10.2	8.6	7.1	5.6
14	10.6	5.6	5.6	11.9	9.1	13.1	10.6	4.5	7.1	8.6	7.1	5.6
15	9.1	10.6	10.6	11.9	10.6	10.6	9.1	4.5	8.6	7.1	7.1	5.6
16	10.6	11.9	11.9	10.6	10.6	10.6	7.9	5.0	7.1	7.1	7.1	4.5
17	5.6	11.9	13.1	11.9	10.6	11.9	7.9	5.0	5.6	7.1	5.6	3.9
18	6.7	11.9	11.9	10.6	7.9	14.6	7.1	5.6	5.6	7.1	5.6	3.6
19	5.6	10.6	5.6	11.9	7.9	15.7	7.1	7.1	7.1	8.6	5.6	5.6
20	6.7	13.1	5.6	11.9	7.9	14.6	7.1	10.7	7.1	8.6	5.6	5.0
21	9.1	13.1	7.9	10.6	9.1	11.9	4.5	8.6	7.1	8.6	5.0	5.0
22	15.7	13.1	90.0	9.1	9.1	15.7	4.5	10.1	8.6	8.6	5.6	2.2
23	15.7	10.6	10.6	9.1	9.1	12.1	3.9	8.6	7.1	8.6	5.6	1.7
24	96.0	10.6	291.0	9.1	7.9	10.6	4.5	10.2	7.1	8.6	6.2	2.8
25	7.9	10.6	93.0	7.9	9.1	9.1	10.6	10.2	5.6	7.1	6.8	4.5
26	7.9	10.6	17.3	10.6	7.9	13.1	4.5	8.6	7.1	7.1	7.4	5.6
27	7.9	10.6	131.0	10.6	7.9	11.9	4.5	7.1	7.1	7.1	8.0	10.2
28	9.1	11.9	28.0	10.6	9.1	7.9	4.5	5.0	8.6	7.1	8.6	13.2
29	11.9	13.1	9.1	10.6	11.9	7.9	4.5	5.6	7.1	7.1	8.6	11.9
30	11.9	13.1	9.1	10.6		6.7	4.5	5.6	7.1	7.1	8.6	10.2
31	11.9		9.1	9.1		5.6		10.2			8.6	
Total	370.4	309.0	854.4	312.9	249.6	321.6	215.4	197.5	255.9	223.5	208.8	190.7
Mean Daily Discharge	11.90	10.30	27.56	10.10	8.61	10.40	7.18	6.37	8.53	7.45	8.67	6.36
Max. Mean Daily Discharge	96.0	20.0	291.0	11.9	11.9	15.7	10.6	10.2	13.2	8.6	41.0	13.2
Min. Mean Daily Discharge	5.6	5.0	5.0	9.1	6.7	5.6	3.9	4.5	5.6	5.6	5.6	1.7
Runoff in A.F.	735.0	613.0	1690.0	621.0	495.0	638.0	427.0	392.0	508.0	[illegible]	533.0	378.0

Maximum Stage 1.90 feet at 1138 on October 24, 1971. Discharge 1690 second-feet. Total acre-feet 1971-72 (7470)

APPENDIX D

WELLS DRILLED
AND
DESTROYED

WELLS DRILLED 1971-72

Los Angeles County Flood Control District	1N/13W-15Q01
" " " " "	1N/13W-28A01
Western Oil and Gas Association	1N/13W-33M03
Los Angeles County Flood Control District	1N/14W-09J01
" " " " "	1N/15W-23P01
" " " " "	1N/15W-28B01
" " " " "	1N/15W-28C01
" " " " "	1N/16W-04G01
" " " " "	1N/16W-04Q01
" " " " "	1N/16W-05F06
" " " " "	1N/16W-08B01
" " " " "	1N/16W-15N02
" " " " "	2N/13W-34A03
" " " " "	2N/13W-34A04
Glen Berry	2N/16W-07R01
Los Angeles County Flood Control District	2N/16W-18M01
" " " " "	2N/16W-33G08
" " " " "	2N/17W-12R02
" " " " "	2N/17W-12R03
" " " " "	2N/17W-12R04
" " " " "	2N/17W-13G02
" " " " "	3N/15W-36D03
" " " " "	3N/15W-36D04
U. S. Army Corps of Engineers	3N/15W-36D05

WELLS DESTROYED 1971-72

State Water Rights Board	1S/13W-03A01
Western Oil & Gas	1S/13W-04C08
City of Los Angeles	1N/13W-05K01
Victor Caelson	1N/14W-13G01
City of Los Angeles	1S/15W-16H01
U. S. Army -- Corps of Engineers	2N/14W-18A01
Sierra Memorial Hospital	2N/14W-19M01
Los Angeles County Flood Control	2N/16W-27F04
Los Angeles Dept. of Water and Power	2N/16W-32P01
Aqua Sierra Sportman's Club	2N/17W-13D04

APPENDIX E

EARTHQUAKE DAMAGE TO WATER SUPPLY SYSTEM

CITY OF SAN FERNANDO

REPORT ON DAMAGE TO THE WATER WELLS, RESERVOIRS, AND WATER DISTRIBUTION SYSTEM OF THE CITY OF SAN FERNANDO CAUSED BY THE SAN FERNANDO EARTHQUAKE OF FEBRUARY 9, 1971.

General

At 6:01 a.m. on Tuesday, February 9, 1971, an earthquake with a magnitude of 6.6 on the Richter Scale rocked the northeasterly portion of the San Fernando Valley, particularly the area of San Fernando and Sylmar. This earthquake was particularly devastating to the 2.42 square-mile area of the City of San Fernando.

The severity of the damage to the water distribution system was immediately apparent due to the great number (approximately 1,500) major leaks throughout the City which were, however, more heavily concentrated in the area bounded by Hubbard Avenue on the northwest, Eighth Street on the northeast, Orange Grove Avenue on the southeast, and Glenoaks Boulevard on the southwest, than in other parts of the City. The City at the time was served by seven wells in or adjacent to the northwesterly section of the City and the distribution system consisted of five reservoirs serving three service levels, two of which were relatively small, one in the southwest section of the City and the other in the extreme northeast section.

Due to the severity of the earthquake, the extensive damage to the distribution system, and the inability to locate and control leaks, the reservoirs were emptied almost immediately. All other utilities of the City and for its wells were severed. There was no power or electrical energy for the pumps on the wells or for any purposes in the City.

The main natural gas line serving the City of San Fernando ruptured in numerous places, exploded, and caught fire. Water from leaking water mains and reservoirs ran into the broken gas lines, causing many gas lines as well as meters to be filled with water. Many of such lines and meters so filled with water were many miles removed from the scene of the breaks. There were 17,000 natural gas services in San Fernando and surrounding areas that were out of service. All of the gas meters were not completely repaired for some two weeks.

Telephone communications in the City were interrupted and severely strained but never completely ceased operation to the disaster headquarters in the City Hall. In the Sylmar area and the City of San Fernando and adjoining areas there were approximately 9,500 telephones out of service because of the earthquake. It required only 39 days to fully restore telephone service and re-build the Sylmar switching center.

The City was without electrical energy and power for some 20 hours, the service thereof being completely restored about 2:00 a.m. on February 10.

The City suffered extensive damage to its commercial district and residential districts. There were 75 commercial buildings that were destroyed or so severely damaged that they had to be demolished and the debris removed. There were 290 residential structures that were destroyed or so severely damaged that the same had to be demolished and the debris removed. Many of the destroyed and damaged commercial structures fell into the public streets and alleys under which leaks in water mains existed and could not be reached until the rubble was removed.

The sewer lines in the City of San Fernando and Sylmar, underlying the Sylmar Basin, which is the source of the water supply of San Fernando's wells, were broken or demolished. Without water, the sanitary facilities located in private, commercial, and public facilities could not be used.

Immediately following the earthquake no immediate assessment of the damage to the wells was possible due to the electrical power outage, although visible damage to pump bases and pump houses was apparent. There was no standby power to operate the wells or booster pumps.

Visual inspections of the City's five reservoirs revealed that Reservoir No. 1 (11,000 gallon capacity), located at Fourth and Hubbard Streets, was extensively damaged and that the roof had collapsed; that Reservoir No. 2 (2.6 million gallon capacity), located at Hubbard and Dronfield was extensively damaged; and that Reservoir No. 3 (113,000 gallon capacity), located at Foothill and Hubbard suffered no damage; that Reservoir No. 4 (1 million gallon capacity), located at Foothill and Hubbard was damaged and leaking; that Reservoir No. 5 (2.4 million gallon capacity), located at Dronfield and Hubbard, was likewise cracked and leaking.

By 9:30 a.m. on the day of the earthquake the entire water supply of the City was depleted, the wells were not operating, and the City was completely without water.

All of the wells, as well as the storage facilities, were located in the same general area, which was in or north of the area that experienced the greatest damage and ground movement. Supply facilities were in essence severed from the distribution system by the multitude of the breaks. The magnitude and diversified effects of the earthquake within the City overwhelmed the City's work force. There was no water of any kind from any source to meet the water needs of the City and its inhabitants. Under the California Emergency Services Act (Chapter 7, Div.1, Title 2 of the Government Code) request for aid was made to the Office of Emergency Services, Los Angeles Office, Region 1, and to the Cities of Burbank, Glendale, Pasadena, Long Beach, City of Los Angeles, County of Los Angeles, Metropolitan Water District of Southern California, and the Calleguas Municipal Water District.

To take care of the immediate drinking water needs of the inhabitants, private firms were contacted, water tanker trucks were rented, and drinking water was hauled in from as far away as Burbank. Schlitz Brewing Company donated for the use of the City and its inhabitants 18 tanker trucks or tanker trailers filled with water and, at no cost to the City, kept such tanker trucks and trailers filled with water. At one time the City had 33 tanker trucks and trailers located throughout the City to supply the inhabitants with drinking water.

To take care of the sanitation problems the City rented chemical toilets and located the same strategically throughout the City, at one time having as many as 252 chemical toilets.

Residents of Sylmar, in the City of Los Angeles, were without drinking water and without chemical toilets and the City of San Fernando released for use in Sylmar some seven tanker trucks and 100 chemical toilets.

Utilizing the crews from all of the various governmental agencies, preliminary efforts were directed toward shutting off of water services throughout the City. This was done so as to alleviate possible sources of pollution and also enable pressure tests to be made on pipe sections. Simultaneously, repairs were started wherever breaks were obvious.

Through the facilities of the Metropolitan Water District in conjunction with the Calleguas Municipal Water District (the owner of pipe line extending to Ventura County carrying MWD water), and the Department of Water and Power of Los Angeles, work started on February 11 to effect some temporary cross-connections between the systems of those agencies and the City of San Fernando water system.

On February 10, the City Council of the City of San Fernando adopted emergency resolutions requesting state and federal assistance under Public Law 91-606. The federal government, pursuant to such request from the City, delegated to the U.S. Army Corps of Engineers the task of immediate restoration of City water services, sewer services, and the repair of streets and other public facilities.

The U.S. Army Corps of Engineers retained Morrison & Knutson, the world's largest contractor, to do the emergency work and the Army Engineers and its contractor actually began such work on February 21.

The temporary cross-connections of water systems were first effected through fire hoses between the City of San Fernando's system and the City of Los Angeles and the Metropolitan Water District, and provided water from such other agencies which was utilized to restore water service in those areas of the City which received minor damage to the water system. This area in general is the area southwesterly of Glenoaks Boulevard.

Systematic pressurization of mains revealed leaks not previously detected and repair crews worked around the clock, 24 hours a day.

On the morning of February 13, the first house connections were ready to be turned on. The restoration to any number of individual services did not begin until about February 16.

Upon completion of the work by assisting agencies and City forces, about February 21, 1971, approximately 80% of the City's services had been restored. These services were being supplied by the equivalent of three pressure zones due to the nature of the temporary cross-connections.

The U.S. Army Corps of Engineers, commencing approximately February 21, 1971, and utilizing contractural services, began the task of rehabilitating the water distribution system in the severely damaged northwesterly section of the City and elsewhere, as needed. Shortly thereafter the services of the outside agencies from the adjoining or nearby communities were terminated. However, the City had to continue purchasing water from MWD and the Department of Water and Power until November 12, 1971 due to the contamination of wells.

Due to the severity of the damage to the water distribution system in the northwest section of the City, it was determined by the Army Engineers the quickest means of restoring services and providing fire protection was to install a temporary surface system of mains, hydrants, and garden hose bibs for domestic use. Work on the system proceeded on a 24-hour, seven days a week schedule, utilizing four, six, and eight-inch steel pipe with flexible couplings.

In establishing an above ground gridiron, three-inch risers with two and one-half inch heads were installed at approximately 250 foot intervals for fire protection.

House services were supplied by garden hose, utilizing 3/4 inch garden hose connection for temporary hookups. The supply for this above ground system was through booster pumps, taking water from Reservoir No. 5, a 2.4 million gallon reservoir, which at that time was only capable of providing 50% of its capacity because of its damage. Reservoir No. 5 obtained its source of water from a permanent six inch emergency connection with the City of Los Angeles water system which was operative on or about February 20.

As soon as the surface system was in use, the job of replacing or repairing damaged mains began. Essentially, all of the previously existing mains in the northwestern section of the City were replaced. The same trench which was used to remove the old pipe was used to install the new pipe. In some instances the installation was only a block or so behind the removal activity.

The entire project of replacing damaged pipe lines was completed by approximately April 15, 1971, at which time the surface system was de-activated and the City resumed the responsibility for its water distribution system.

The number of leaks in the system is estimated to be 1,500, of which 500 were repaired. The other leaks required replacement of pipe lines. In all, 28,200 feet of water pipe line had to be removed and replaced.

DAMAGE TO WATER WELLS, RESERVOIRS, AND WATER DISTRIBUTION SYSTEM

Specific Details of Damage, Repairs, and Replacement of Reservoirs:

RESERVOIR #1

Pre-earthquake Condition

Located near Hubbard and Fourth Streets in San Fernando, Reservoir #1 was a circular, concrete-lined, cut and fill type of 110,000 gallon capacity. The roof system was consisted of wood truss and sheathing supported by wood posts and composition roll roofing. This Reservoir was built prior to 1920. It served the smallest of the three pressure zones in the City water supply system.

Earthquake Damage

Trusses were shaken from supports, trusses failed, and roof collapsed into Reservoir. Construction joints opened or widened with some cracking of the lining. The Reservoir was taken out of service immediately and the debris was removed. Obvious or possible leaks were repaired and a temporary membrane cover installed and the Reservoir was put back in service.

Repairs

The original Reservoir, damaged by the earthquake, was beyond repair and was demolished. It was replaced by a steel ground storage Reservoir to American Water Works Association criteria. The new Reservoir, designated Reservoir #1A, has a tank capacity of 50,000 gallons. It is 24' in diameter with 16' sidewalls. The U.S. Army Corps of Engineers selected the steel tank on the basis of speed and erection as well as the least expensive. The tank cost was approximately $25,000. Replacement began on June 15, 1971 and was completed on July 15, 1971.

RESERVOIR #2

Pre-earthquake Condition

Reservoir #2 was located on the northwest corner of Hubbard and Dronfield Streets just outside the City boundary. The Reservoir was a 2.6 million gallon Reservoir, was an embankment-type, rectangular, concrete-lined with sloping sides and five wood truss gables 40' by 200' supported on post and walls. Corrugated metal roof covered the wood trusses.

Earthquake Damage

Reservoir #2 was damaged beyond repair. Side slopes were badly cracked, joints opened or widened, truss supports displaced and dropped, and several trusses failed. Reservoir #2 was taken out of service immediately.

Repairs

Since damage was so severe to the existing Reservoir, it was deemed necessary to replace the structure, utilizing the space formerly occupied by Reservoir #2 and utilizing the space to the best advantage. The new circular poured concrete Reservoir, having a capacity of three million gallons, designated as Reservoir #2A, was constructed by the U.S. Army Corps of Engineers at a cost of $191,000. Reconstruction began on May 1, 1971 and was completed on July 14, 1971.

RESERVOIR #3

Pre-earthquake Condition

This Reservoir was constructed prior to 1920 and was located northwest of Foothill Boulevard and Hubbard Street. It is a circular reinforced concrete ground level storage Reservoir with a capacity of 113,000 gallons. It is 50' in diameter and has 8' high walls with a top water surface elevation of 1,315'.

Earthquake Damage

Very little damage was done to Reservoir #3.

Repairs

No repair was needed as was revealed by thorough cleaning and inspection.

RESERVOIR #4

Pre-earthquake Condition

This Reservoir was constructed in 1963. It is located adjacent to Reservoir #3, northwest of Foothill Blvd. and Hubbard Street, and is connected by piping to Reservoir #3. It is a circular reinforced concrete storage Reservoir with a capacity of one million gallons. It is 75' in diameter and 30' high with a top water surface elevation of 1,315'. Piping for this Reservoir includes a 10" inlet/outlet pipe.

Earthquake Damage

Horizontal cracks caused weeping and were repaired by the Claude P. Williams Company under contract with the City of San Fernando.

Repairs

Repairs were made by patching and an application of Bitumastic coating on the interior walls and bottom. The 6" outlet pipe was broken under the tank and repaired. Cost to repair the cracking and etc. was $6,000. The U.S. Army Corps of Engineers fixed the 6" outlet pipe and repairs began on May 17, 1971 and were completed on May 21, 1971.

RESERVOIR #5

Pre-earthquake Condition

This Reservoir was constructed in 1964. It is located northwest of Hubbard and Dronfield Streets adjacent to Reservoir #2A. It is a circular reinforced concrete semi-burred storage Reservoir with a capacity of 2.4 million gallons. It is 160' in diameter, 17' high, with a top water surface elevation of 1,260'. Piping for this Reservoir includes a 6" inlet from Wells #4 and new Well #7A. A 6" emergency supply inlet is provided as a cross-connection between City of Los Angeles Department of Water and Power and an 18" inlet from the Calleguas Conduit, Metropolitan Water District water and an 18" outlet.

Earthquake Damage

Reservoir #5 sustained minor circumferential cracking which caused a great deal of weskening or leaking. This Reservoir was not taken out of service, as it was the major supply for the City. It was still in operation under a controlled water level condition.

Repairs

The drain was repaired and a 1/16" ethylene/propylene dienemonomer membrane liner is now being installed for the interior walls and floor and two coats of Bitumastic coating on exterior walls. The estimated repair cost is $35,000. Construction began on November 9, 1971 and is still not complete.

Specific Details on Water Wells:

WATER WELL #1

Pre-earthquake Condition

This Well was drilled in 1901. It is located northeast of Fourth and Hubbard Streets. The pump is a Gould Model 10JMC, 4-stage oil lubricated line shaft, deep well turbine pump with 8" diameter by 120' long column, set in a 15" diameter by 170' casing. The pump is driven by a 60 RPM, 30 horsepower, General Electric Motor #12F5612S operating on 220v, 3-phase, 60-cycle power. Mechanical components include the 8" pump discharge piping in the well house, complete with check valve, gate valve, propeller flow meter, and flow recorder. The discharge piping

to Reservoir #1 consisted of 62' of 8" pipe. The electrical service is furnished by Southern California Edison Company and runs underground to a meter box located on the well house wall. The motor and other electrical equipment has a 200 amp inline fuse for protection.

Earthquake Damage

This Well was tested by running the pump and discharging into the temporarily repaired Reservoir #1. No damage was apparent to Well #1 and the Well was put back in service as soon as Reservoir #1 was capable of storing water.

Repairs

When Reservoir #1 was being re-designed, it was apparent that minor modifications to Water Well #1 discharge piping were necessary. Compliance with electrical code required modifications to the electrical switch gear. Chlorinators were provided and the facility brought up to standards required by the State Board of Health. Work on Well #1 started February 22, 1971 and was completed on May 6, 1971. The cost was $15,000.

WATER WELL #2

Pre-earthquake Condition

Well #2 was drilled in 1910 and is located at the southeast corner of Borden and Sayre Streets. The well pump house was constructed of concrete blocks, wood roof, and composition roll roofing. Removable louvered frame walls were provided on two sides and a removable roof hatch. The Well was equipped with a permanently installed sandtrap, conventional electrical switch gear, flow meter, and no chlorinator. The pump was a Pacific Pump Company deep well turbine, oil lubricated with a 50 horsepower, 1,750 RPM, 60-cycle, 3-phase motor.

Earthquake Damage

Visual inspection of Well #2 after the earthquake indicated considerable disturbance at the surface. This damage, together with other indications such as displaced curbing and equipment supports as well as displaced soil at the building foundation line, indicated further examination would be required. The general ground level around the Well was raised over 5'. Post-earthquake damage survey of the inside dimensions of the casing by caging and of the straightness of the Well, disclosed no appreciable decrease in Well diameter; but there was a slight twist in the casing from the surface to 90' below the surface. The static water level was at 144'. Photographs of the Well were taken with a three-dimensional down hole camera both above and below the water surface showing that the casing was in fairly good condition considering its age. The joints were rough and the perforations were enlarged. At

90' depth the casing was slightly telescoped and there was a slight break at 204'. The slight twisting of the casing and the break at 204' were not considered serious enough by the Corps of Engineers to impair the efficiency of the Well. The pump pad and the concrete floor slab of the pump house had a few minor cracks.

Repairs

Repairs consisted of replacing the pump base and then sealing the pump at the base. Bacteriological tests, performed after the well had been put back into operation, showed contamination. A check at the sewage facilities within a 400' radius of the well revealed several septic tanks, seepage pits, and some broken sewer lines. The tanks and pits were cleaned out and back-filled and the sewer lines replaced. Also the upper 100' of the 15" casing was perforated and a 12-1/4" liner was inserted to a depth of 132' and cement grout was forced into the annular space between the casing and liner to form a seal against contamination entering the Well. The water quality was acceptable after these remedial measures and the Well was put in operation. The work on Well #2 started on May 3, 1971 and was completed on July 22, 1971. The cost was $25,000.

WATER WELL #3

Pre-earthquake Condition

Well #3 was drilled in 1926 to a depth of 309.5'. It was cased with an 18" inside diameter riveted steel casing with riveted joints to 309'. The casing was perforated with a Mills Knife between 165' and 300'. The pump was deep well turbine set directly on a concrete pump pad. The pump house was constructed with two permanent walls of concrete block and two removable sides of wood. The walls were set on a concrete foundation and the floor was a concrete slab. The roof was made of four wood triangular sections that could be removed. The closest sewage disposal facility was about 100' from the Well.

Earthquake Damage

The post-earthquake damage survey showed the Well to be in excellent condition. There was some structural damage to the floor and pad of the pump house. The concrete slabs were badly broken and the support blocks under the discharge lines were shifted out of alignment. Survey showed that the entire area rose about 4.5' in elevation. Bacteriological tests made after the Well was placed in operation showed contamination. It was later discovered that there were broken sewer lines and leaking septic tanks in the area of the Well.

Repairs .

Broken sewer lines were repaired and septic tanks cleaned out and back-filled and the top 100' of the 18" casing was perforated, and a 15" steel liner was set inside the 18" casing and sealed. The grounds surrounding the perforations were charged with 100 lbs. of dry, highly

concentrated, chlorine compound in approximately 1,000 gallons of water. Then 11 cubic yards of neat grout cement were pumped into the formation under 100 lbs. per square inch pressure and allowed to set for 24 hours before the pump was put back into the Well. Remedial work consisted of constructing a new base for the pump and the pump was sealed. The Well was then put back into operation. The new pump is a Lean and Buller Model 12RH, 5-stage, oil lubricated line shaft deep well turbine pump with 10" diameter by 200' long column set in an 18" diameter ± 309' casing. The pump is driven by a new 1,770 RPM, 125 horsepower, U.S. Electric Motor operating on 460v, 3-phase, 60-cycle power. Mechanical components in the Well house include the 10" pump discharge piping complete with propeller flow meter, air vacuum release valve, check valve, gate valve, and a chlorinator unit. The 10" discharge piping extends 20' outside the Well house to the 10" main on Borden Avenue which extends 800' to the juncture with Well #2 discharge piping, then 1,400' further to the juncture with the supply mains from Reservoirs #2 and #5. Electrical service is furnished by the Los Angeles Department of Water and Power and runs underground to a meter box located on the Well house wall. The pump motor is protected by 350 amp fuse switch. Work on this well began April 26, 1971 and was completed on June 25, 1971.

WATER WELL #4

Pre-earthquake Condition

Well #4 was drilled in 1926 with cable tool to 483'. It was cased with an 18" inside diameter, riveted steel casing with riveted joints to 481'. The casing was perforated from 198' to 238' and from 293' to 297' and from 363' to 389'. The pump was a Peerless Model 10MA, 6-stage, water lubricated line shaft, deep well turbine pump with 6" diameter by 230' long column set in a 14" diameter by 481' casing. The pump was driven by a 50 horsepower, 1,750 RPM General Electric Motor #FBJ615470 operating on 460v, 3-phase, 60-cycle electrical power. Mechanical components inside the well house included an 8" pump discharge piping complete with check valve, gate valve, air vacuum release valve, propeller flow meter, flow recorder, and chlorinator unit. Outside of the Well house was a 6" pipeline delivering flow to a juncture point 30' away from which it was continued to Reservoir #5 and a 6" pipe 80' long and to Reservoir #2 in a 10" pipe 200' long. Electrical service is furnished by the Los Angeles Department of Water and Power and runs underground to a meter box located on the Well house wall. The pump motor is protected by a 225 amp fuse switch.

Earthquake Damage

Post-earthquake damage survey showed that the concrete slabs in the pump house had cracks. The blocks under the discharge lines were shifted out of alignment, and the casing had a severe break at 298' from the surface. Bacteriological tests made after the Well was placed in operation showed contamination which was presumably caused from water seeping out of Reservoir #5 and into Well #4.

Repairs

The pump was removed and cleaned and re-installed. The initial bacteriological tests after the earthquake showed contamination of the Well. Remedial measures consisted of constructing a new base for the pump and sealing the pump. After treatment with chlorine, the water quality was satisfactory and the Well was put back into operation. Work on Well #4 began on April 23, 1971 and was completed on July 23, 1971. Total cost was $18,000. Production from this Well after the earthquake was equal to pre-earthquake production. The break at 298' was unrepairable.

WATER WELL #5

Pre-earthquake Condition

Well #5 is located southeast of Eighth and Hubbard Streets. It was drilled in 1950 to a depth of 612'. It was cased with a 14" inside diameter 8-guage steel stovepipe casing with telescoping joints to a depth of 500'. The well was gravel packed and had a 30" conductor pipe to a 50' depth. The pump is a Johnson Model 10BC, 8-stage oil lubricated line shaft, deep well turbine pump. The pump is driven by a 1,760 RPM, 50 horsepower U.S. Corporation Motor #874839 operating on 460v, 3-phase, 60-cycle power. The well house was constructed below grade. The pump discharge piping in the well house did not include a guage or check valve. The check and gate valves are buried outside the well house. Flow from this well was previously measured by a Cress Meter located at Reservoir #2. Electrical service is furnished by Southern California Edison Company and runs underground to a meter box located on the well house wall. The motor is protected by a 200 amp instantaneous fuse.

Earthquake Damage

The post-earthquake damage of the well showed that the pump had shifted in the well. A short pumping test resulted in severe vibration to the pump. As no other examination was made of the well, it is not known if the vibration was caused due to the pump damage or shifting of the pump head. This well has not been returned to service.

Repairs

No repairs have been made to this well because O.E.P. was able to provide pumping capacity equal to pre-earthquake from Wells 1, 2, 3, 4, and 7A. The equipment has been removed and the well capped.

WATER WELL #6

Pre-earthquake Condition

Well #6 was drilled in 1955 to a depth of 300'. It was cased with an 18" double 8-guage steel stovepipe casing with telescoping joints to 300'. The distance of the highest perforation was 52'. The pump is

an electrically driven deep well turbine type. The pump house was constructed of corrugated metal with an earth floor. The nearest sewer line to this well is approximately 225'. Well #6 is located south of the zone of surface rupturing, 145' south of Well #1. The pump is Winthroath Model #12-352, 4-stage, oil lubricated line shaft deep well turbine pump with an 8" diameter by 170' long column set in an 18" diameter by 301' casing. The pump is driven by a 1,760 RPM, 40 horsepower General Electric Motor #UMJ627014 operating on 460v, 3-phase, 60-cycle power. The mechanical components inside the well house included the 8" pump discharge piping, complete with check valve, gate valve, propeller flow meter, and flow recorder. Outside the well house, the piping reduced to 6" and the flow was discharged into old Reservoir #1. Electrical service was furnished by Southern California Edison and runs underground to a meter box located on the well house wall. The motor is protected by a 175 amp instantaneous fuse.

Earthquake Damage

Surveys made after the earthquake showed very little vertical displacement had occurred at this site. No detailed post-earthquake survey was made of the well.

Repairs

No repairs have been made to this Well because O.E.P. was able to provide pumping capacity equal to pre-earthquake from Wells 1, 2, 3, 4, and 7A. The equipment has been removed and the Well capped.

WATER WELL #7

Pre-earthquake Condition

This Well was drilled in 1960 to a depth of 376'. It was cased with 18" inside diameter double 8-guage steel stovepipe casing with telescoping joints to 376'. The highest perforation was 88' below top of casing. The pump was an electrical driven, submersible type. The Well discharge line was housed in a 3' deep concrete pit with a concrete floor and diamond plate steel cover. A sewer line is within approximately 150' of the Well and it is possible the casing may have been crooked; thus explaining the use of the submersible pump. This Well is the only one of the seven located in the zone of surface rupturing.

Earthquake Damage

The damage survey showed that the electrical cable had split open near the top of the Well creating a short circuit. A check was made of the Well cross-section by caging. The Well diameters measured in this operation are as follows:

Diameter	Distance
17-5/8"	0 - 150 ft.
17-1/4"	150 - 180 ft.
17"	180 - 230 ft.
15-3/8"	230 - 280 ft.
14"	280 - 304 ft.
7-3/4"	304 - 309 ft.

The cage would not penetrate below the 309' depth. The Well was then checked for straightness and found to have many bends and twists. When survey photographs were taken, a bend at 174' was found. The casing shape was distorted from 226 to 334'. There was a slight break at 229', and a bulge in the casing was found from 302 to 309'. Photographs showed how the casing was distorted in shape and twisted by the severe earth movements. The break at the 229' depth can be clearly seen. Static water level was at 89' depth at the time of photograph. As the Well was inoperable, a check could not be made of the water quality. It was apparent, however, that there were many swirl lines and storm drains broken in the vicinity of the Well. Because of distortion and twisting of the casing, the Well was determined to be beyond repair; and, therefore, it was destroyed in accordance with approved methods.

Repairs

Evaluation of the above data indicated that the Well was not worth restoring. Therefore, the Well was ordered abandoned in accordance with provisions of the Department of Water Resources Bulletin No. 74. The Well is now abandoned, the equipment dismantled, and the Well properly filled with concrete. The work on this Well began on April 13, 1971 and was completed on April 16, 1971. Total cost was $5,000.

WATER WELL #7A

Well #7A was drilled by the U.S. Army Corps of Engineers after the earthquake to repair the supply lost when Well #7 was abandoned. Well 7A is located at the northwest corner of Astoria and Dronfield Streets. The pump and motor previously installed in Well #3 were re-installed at the new Well #7A. The pump is a Gould Model #14JHO 6-stage, oil lubricated line shaft deep well turbine pump with 12" diameter by 300' long column set in an 18" diameter by 377' long casing. The pump is driven by 1,170 RPM 100 horsepower U.S. Pump Company Motor #102115, operating on 489v, 3-phase, 60-cycle power. This well will safely produce 950 gallons per minute. The mechanical components in the Well house include a 10" pump discharge piping complete with check valve, gate valve, flow meter, air vacuum release valve, and chlorinator unit. The discharge piping is extended to its junction with the supply mains to Reservoirs #2 and #5 with 2,700' of 12" pipe. Electrical service is furnished by Los Angeles Department of Water and Power and runs underground to a meter box located on the Well house wall. The motor is protected by a 350 amp fuse. Well #7A construction was begun on June 1, 1971 and completed on July 1, 1971. The cost was $85,000. Decontamination of the Well was not completed until November 12, 1971.

EMERGENCY CONNECTIONS

Five cross-connections were provided to supply the domestic water requirements of the City of San Fernando on an emergency basis and permit time to repair the damaged supply facilities. A 6" connection

was made at Wolfskill and O'Melveny to supply the low zone area. The source of this water was Metropolitan Water District, Calleguas Conduit. A 6" connection was provided at Wolfskill and O'Melveny to supply middle zone water. The source of this water was Metropolitan Water District. A 6" connection was made at O'Melveny and Fox Streets to supply water to the middle zone and supply of this water was Los Angeles Department of Water and Power. A 6" connection was made at Glenoaks and Arroyo Street to supply water to the middle zone and the source of this water was Los Angeles Department of Water and Power. The City of San Fernando, with the cooperation of Los Angeles Department of Water and Power, had prior to the earthquake, provided an emergency 6" permanent cross-connection with provision to fill Reservoir #2. This connection was utilized immediately after the earthquake to fill Reservoir #5 and through suction from Reservoir #5, the booster pumps were utilized to boost water up to Reservoir #4 and supply water to the upper and middle zones.

PERMANENT MWD CONNECTION INCLUDING PIPELINE AND PUMPING STATION

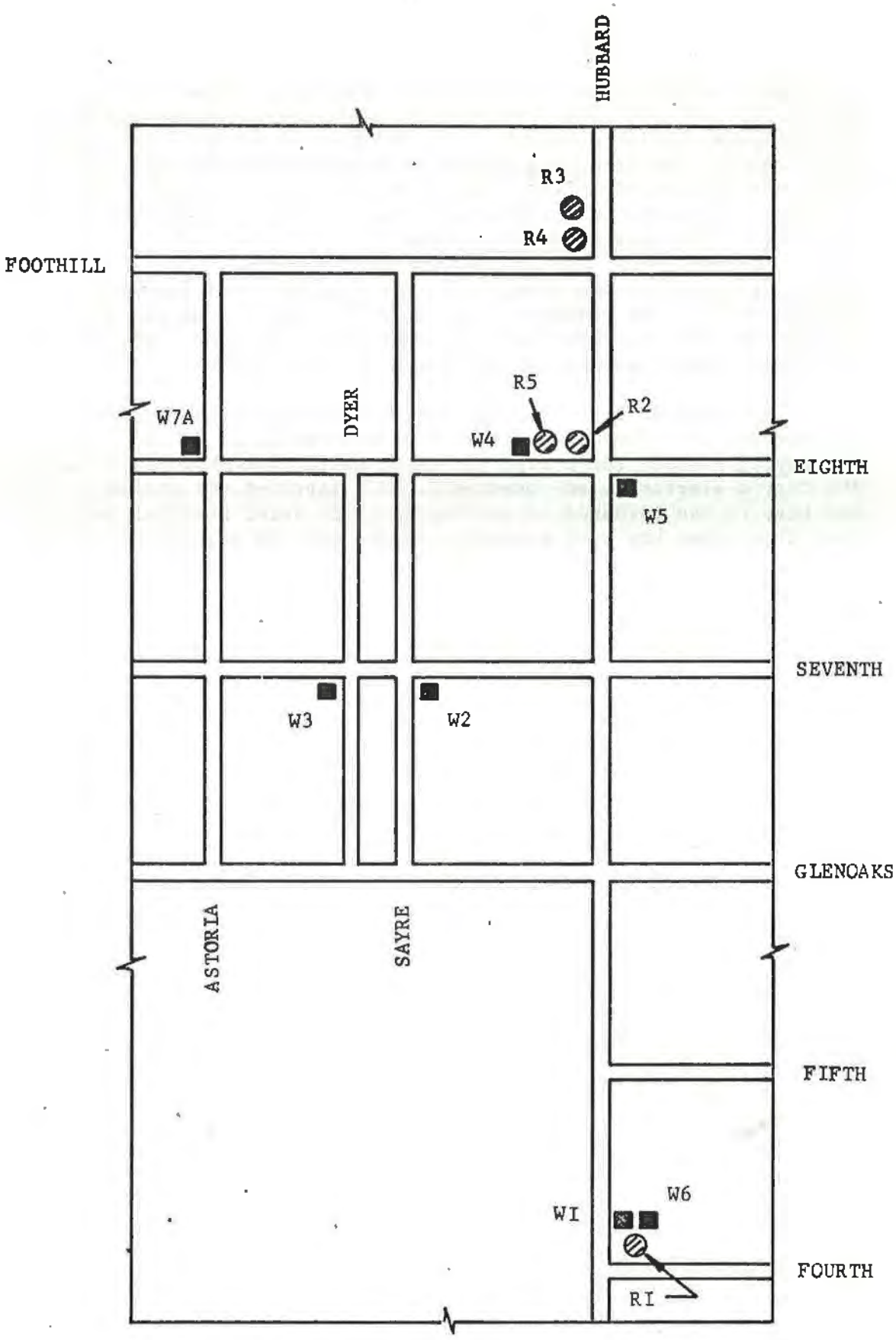
After the earthquake it was uncertain as to when, if ever, the City would have the ability to pump uncontaminated water in sufficient quantity to supply the City needs or an amount equal to that which we were able to pump prior to the earthquake. Therefore, the U.S. Army Corps of Engineers and the Office of Emergency Preparedness decided to construct a facility to replace the present well supply in the event that one or more water wells including Well #7A had to be abandoned. A permanent connection was constructed by the Metropolitan Water District at O'Melveny and Fox Streets. This connection was on the Calleguas Conduit and has the capacity of supplying ten cubic feet per second of water.

The U.S. Army Corps of Engineers constructed a pipeline from this permanent connection northwesterly to Wolfskill Street and northeasterly in Wolfskill to a booster pumping station located at the intersection of First Street and Jessie Street. Then, continuing northeasterly to Glenoaks Boulevard. Then the pipeline turns northwesterly to Griswold Street and at Griswold it turns northeasterly and continues to Seventh Street. Then the pipeline turns northwesterly and continues at Seventh Street to Orange Grove Avenue. At that point the pipeline turns northeasterly and continues in Orange Grove Avenue to Phillippi Street. The pipeline then turns northwesterly and continues on Phillippi Street to Hubbard Avenue. Then the pipeline turns northeasterly and continues in Hubbard Avenue to Dronfield Street at which point there is a permanent discharge connection to Reservoirs #2 and #5. The booster pumping station, which was constructed subsequent to the earthquake by the U.S. Army Corps of Engineers, is located at the northeast corner of Jessie and First Streets. Two identical pumping units were initially installed with provisions for two additional identical pumps to be installed in the future. The fourth pump would be used strictly on a stand-by basis. Each pump is a Johnston Model No. 12ES, 4-stage oil lubricated vertical cam turbine pump. Each motor is driven by 1,800 RPM, 150 horsepower Westinghouse Motor operating on 460v, 3-phase, 60-cycle power. The piping inside the pump station includes an 18" suction and discharge manifold, a 10" gate valve on the suction and discharge side of each pump, a 10" pump control valve,

a 6" surge relief valve on the suction manifold, and a 6" surge anticipator valve on the discharge manifold. The suction piping from the Calleguas Conduit consists of 1,000 feet of 18" pipe and 2,900 feet of 20" pipe. The discharge piping to Reservoirs #2 and #5 consists of 13,900 feet of 18" pipe. Electrical service is furnished by Southern California Edison Company from pad mounted transformer located adjacent to the booster pumping station.

Construction of the MWD connection, the pipeline, and the booster pumping station was began on July 12, 1971. The system was operational by July 29, 1971 and complete construction of the pump house and all incidental appurtenances was completed in April 1972.

It should be noted that although the MWD connection was operational on July 29, 1971 the City was not a member agency of MWD and the City was paying a heavy surcharge for using water from MWD. Subsequently, the City's electorate on November 2, 1971 approved the annexation of the City of San Fernando to the Metropolitan Water District and since that time water has been available to the City at regular MWD rates.



SAN FERNANDO WATER SOURCES

AND STORAGE