ANNUAL REPORT

Upper Los Angeles River Area Watermaster

Re: City of Los Angeles vs. City of San Fernando, et al.

Superior Court Case No. 650079 – County of Los Angeles

WATERMASTER SERVICE

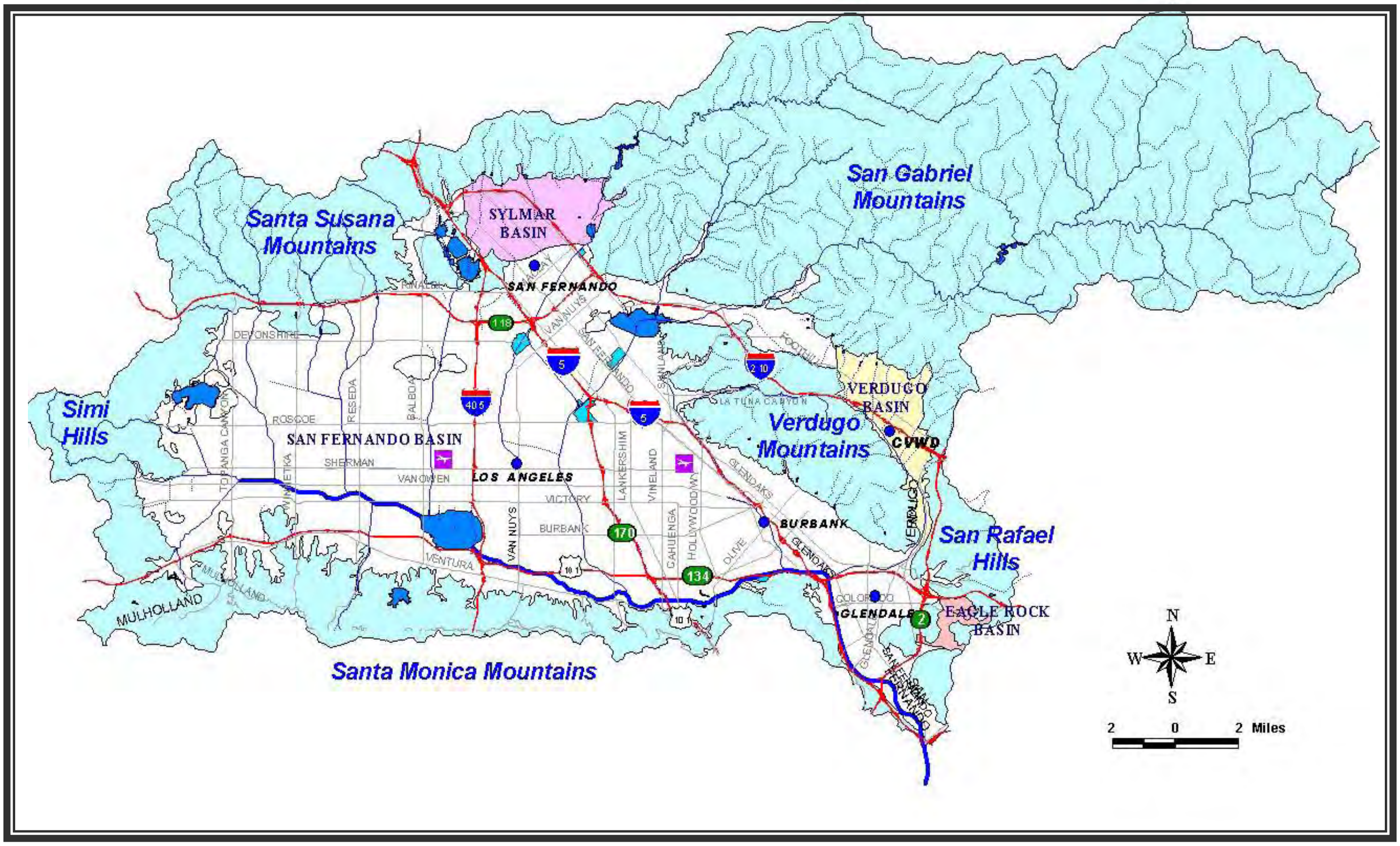
IN THE

UPPER LOS ANGELES RIVER AREA

LOS ANGELES COUNTY, CALIFORNIA

2011-12 WATER YEAR

OCTOBER 1, 2011 – SEPTEMBER 30, 2012



MAY 2013

ANNUAL REPORT
UPPER LOS ANGELES RIVER AREA WATERMASTER

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

WATERMASTER SERVICE
IN THE
UPPER LOS ANGELES RIVER AREA (ULARA)
LOS ANGELES COUNTY, CALIFORNIA

2011-12 WATER YEAR
OCTOBER 1, 2011 - SEPTEMBER 30, 2012

ULARA WATERMASTER
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Copies of this report may be viewed and downloaded from the ULARA Watermaster website located at http://ularawatermaster.com/

MAY 2013

FOREWORD

As Watermaster, I am pleased to present the Annual Watermaster Report for the Upper Los Angeles River Area (ULARA) for the 2011-12 Water Year (i.e., from October 1, 2011 through September 30, 2012). This report has been prepared in general accordance with the provisions of the Judgment, dated January 26, 1979, in regard to the Court-defined water rights case of the Superior Court for the County of Los Angeles (i.e., City of Los Angeles vs. City of San Fernando, et al, Case No. 650079). Four distinct groundwater basins and their adjoining hill and mountain watershed areas comprise ULARA; from largest to smallest in surface area, these four groundwater basins are known as the San Fernando, the Sylmar, the Verdugo and the Eagle Rock basins.

Described in this Annual Watermaster Report are the water rights of each Party to the Judgment in each of the four ULARA groundwater basins and the volume of groundwater in storage to the credit of each Party as of October 1, 2012. This report also provides background information on the history of the San Fernando case and information regarding the four ULARA groundwater basins such as: their respective locations and basin boundaries; local geologic conditions; local water supply; groundwater extractions; trends in groundwater levels; estimates of the change in groundwater in storage; imported water use; recharge operations; water quality; and other pertinent information for the 2011-12 Water Year.

Based on available information, key challenges in ULARA over the long-term will continue to be: the accumulation of stored water credits in the San Fernando Basin; new and/or ongoing contamination of groundwater in the San Fernando, Verdugo and Sylmar basins; and the need to increase recharge into the local groundwater basins by different methods, at different locations and depths, and by using different sources of water. This need for increased recharge is particularly important for the San Fernando Basin.

In late-2007, the cities of Glendale, Burbank, and Los Angeles entered into a 10-year agreement to help reverse the long-term decline in stored groundwater and the concurrent accumulation of a large quantity of unsupported stored water credits in the San Fernando Basin. The agreement contains several important provisions, including: restrictions on pumping of stored water credits; the joint efforts of the City of Los Angeles and the County of Los Angeles

Department of Public Works to rehabilitate existing facilities and/or construct new facilities to help increase recharge of stormwater runoff; and working to reduce future losses from the basin due to rising groundwater and underflow out of ULARA.

Groundwater contamination from volatile organic compounds (VOCs) and hexavalent chromium continues to be a serious problem for water-supply in the eastern portion of the San Fernando Basin. The cities of Burbank, Glendale and Los Angeles continue to enlist the assistance of key regulatory agencies including the United States Environmental Protection Agency (USEPA), the California Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board – Los Angeles (LARWQCB) to help further characterize and expedite the cleanup of the contaminated soils and aquifers within San Fernando Basin. Pumping of excessive concentrations of chromium by certain wells and limitations of existing treatment facilities to treat those excessive concentrations have also become more recent problems. In addition, various gasoline components continue to impact and/or threaten municipal-supply water wells owned by the Crescenta Valley Water District in the Verdugo Basin. In the Sylmar Basin, nitrate concentrations have been increasing in recent years in wells operated by the City of San Fernando; Los Angeles has at least one well that has been impacted by TCE in this basin. A number of the municipal-supply water wells owned by these purveyors have had to be removed from active service due to excessive concentrations of various contaminants, mainly in the San Fernando Basin, but also in the Sylmar and Verdugo basins.

An ongoing activity of the Watermaster continues to be the review and the approval/denial of the possible plans for infiltration of stormwater collected at all new development and/or redevelopment projects within the San Fernando Basin portion that lies within the City of Los Angeles. These stormwater collection plans, as prepared by the engineer for the developer, have been part of the Standard Urban Stormwater Mitigation Plan (SUSMP) program of the LARWQCB. Recently, this SUSMP program has been re-named as the Low Impact Development (LID) program by LARWQCB.

To provide ongoing groundwater management within the four ULARA groundwater basins, the Watermaster and the Administrative Committee continued to meet on a quarterly basis during 2011-12. The Watermaster continued to provide updates of key ULARA issues at occasional status conferences with Judge Susan Bryant-Deason, Judge of the Los Angeles County

Superior Court. Further, and as outlined in Section 5.4 of the ULARA Policies and Procedures, the ULARA Groundwater Pumping and Spreading Plan report for 2011/12 to 2015/16 Water Years was prepared by the Watermaster and the Watermaster Support staff at the Los Angeles Department of Water and Power (LADWP), and was filed with the Court in July 2012.

For this current Annual Watermaster Report, I want to acknowledge and personally thank the Watermaster Support Staff at LADWP for their continued efforts in creating many of the data tables, figures and maps, and for conducting computer model simulations that continue to be vital to the preparation and submittal of this report to the Court on a timely basis. Among those at LADWP whose efforts continue to be particularly notable are: Mr. Greg Reed; Ms. Fatema Akhter; Mr. Hadi Jonny; Ms. Araceli Carrillo; and Ms. Billie Washington. I also appreciate the efforts of Mr. Mel Blevins (former Watermaster) in his capacity as Special Consultant to this Watermaster.

Respectfully submitted

Richard C. Slade
ULARA Watermaster

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1. INTRODUCTION

1.1 Background

The Upper Los Angeles River Area (ULARA) encompasses the entire hill and mountain watershed and the topographically-lower and intervening valley floor areas of the Los Angeles River and its tributaries above (north of) a point in the river designated by the Los Angeles County Department of Public Works (LACDPW) as Gaging Station F-57C-R; this gage lies near the junction of the Los Angeles River and the Arroyo Seco (see Plate 1, "ULARA Location Map"). This ULARA watershed encompasses an approximate total of 328,500 acres of hill and mountain areas and intervening valley fill areas. Of this total watershed area, there are approximately 122,800 acres of valley fill that form the four groundwater basins, whereas the remaining 205,700 acres are comprised by the tributary hills and mountains in the watershed. ULARA is bounded on the north and northwest by the Santa Susana Mountains; on the north and northeast by the San Gabriel Mountains; on the east by the San Rafael Hills; on the south by the Santa Monica Mountains; and on the west by the Simi Hills.

Four distinct groundwater basins were defined within the valley fill areas by the ULARA Judgment of 1979; these include, from largest to smallest, the San Fernando, Sylmar, Verdugo and Eagle Rock basins (refer to Plate 1). The groundwater reservoir comprising each of these basins is separated from the others and is considered to be replenished (recharged) by the following sources: deep percolation from direct rainfall; infiltration of surface water runoff; and infiltration of excess irrigation of a portion of the water that is delivered for use within these basins. Artificial recharge also occurs in the San Fernando Basin via the ongoing use of existing spreading basins whenever excess rainfall and runoff are available.

The basic characteristics of the four ULARA groundwater basins are briefly described in the paragraphs below. Noteworthy is that Bulletin 118 Update 2003, prepared by the California Department of Water Resources (DWR, October 2003) defined a groundwater basin as: "an alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and having a definable bottom." This Watermaster, as a result of a large number of prior groundwater projects, has used the following as a more detailed definition of a typical groundwater basin: a three dimensional region that has reasonably-definable surface and subsurface boundaries and that contains layers and lenses of potentially water-bearing sediments which are capable of yielding groundwater in useable quantities and of acceptable quality for beneficial use. In short, a groundwater basin could be considered to typically represent an area underlain by permeable sediments capable of storing and yielding a substantial supply of groundwater to water-supply wells. For the four ULARA groundwater basins, the potentially water-bearing sediments are comprised by various young and old alluvial fan-type deposits. In the San Fernando and Sylmar basins, the potentially water-bearing sediments also include various strata within the Saugus Formation that is known to underlie the geologically younger and older alluvial-type deposits beneath the bottoms of these groundwater basins.

Exposed at ground surface in all of the topographically-elevated hill and mountain watershed areas of ULARA, and also known to directly underlie all potentially water-bearing sediments beneath the four ULARA groundwater basins, are geologically older sedimentary rocks (i.e., sedimentary bedrock) and even older crystalline, metamorphic and igneous rocks (i.e., crystalline basement rock). These geologically older rocks are either well-lithified, cemented and/or crystalline in nature, and as such, they are considered to display only secondary porosity; their permeability is low to very low. Because of their lithified and/or cemented and/or crystalline character, these rocks do not contain water in the interstices between the individual sand or gravel grains (as occurs in the potentially water-bearing deposits), but rather the groundwater is contained solely within fractures, joints, and/or along bedding planes in the rocks. Hence, the groundwater storage capacity of these rocks is low and their long-term sustained yield is unpredictable; as a result, only limited quantities of water can be yielded to wells. For these reasons, these rocks are classified as nonwater-bearing for municipal-supply purposes in ULARA, and none of these older sedimentary or crystalline rocks are considered to be part of the four groundwater basins within ULARA.

THE SAN FERNANDO BASIN (SFB), the largest in surface area of the four basins, directly underlies the San Fernando Valley, and has a surface area of approximately 112,000 acres and a maximum thickness of potentially water-bearing sediments of ±1200 ft. The surface area of SFB represents 91.2 percent of the total surface of all four groundwater basins (i.e., the total of all valley fill areas) within ULARA. The lateral or ground surface boundaries of this basin are formed by nonwater-bearing bedrock and/or crystalline basement rock in the adjoining hills/mountains, as follows: on the east and northeast by the San Rafael Hills, the Verdugo Mountains, and the San Gabriel Mountains; on the north by the San Gabriel Mountains and the eroded south limb of the Little Tujunga syncline which separates it from the Sylmar Basin on the north; on the northwest and west by the Santa Susana Mountains and Simi Hills; and on the south by the Santa Monica Mountains. Plate 1A, “San Fernando Groundwater Basin Map,” illustrates the approximate ground surface boundaries of the SFB (as originally interpreted by prior Watermasters and as subsequently converted to GIS format by LADWP personnel); also shown on Plate 1A are the general locations of key wellfields owned by the cities of Burbank, Glendale and Los Angeles in this basin.

THE SYLMAR BASIN (SB), lies just northeast of SFB, and its surface area of approximately 5,600 acres makes it the second largest groundwater basin in ULARA. SB may have a maximum thickness of potentially useable water-bearing sediments of at least 1000 ft. Sylmar Basin is bounded by the nonwater-bearing bedrock and/or basement rock in the adjoining hills/mountains, as follows: on the north and east by the San Gabriel Mountains; on the west by a topographic divide in the valley fill between the Mission Hills and the San Gabriel Mountains; on the southwest by the Mission Hills; on the east by the older portion of the Saugus Formation along the east bank of Pacoima Wash; and on the south by the eroded south limb of the Little Tujunga syncline, which separates it from the SFB to the south. Plate 1B, “Sylmar Groundwater Basin Map,” illustrates: the approximate ground surface boundaries of Sylmar Basin (as originally interpreted by prior Watermasters and as subsequently converted to GIS format by LADWP personnel). Also shown on this plate are the approximate locations of water-supply wells owned by the cities of Los Angeles and San Fernando in SB.

THE VERDUGO BASIN (VB), which lies north and east of the Verdugo Mountains, has an approximate surface area of 4,400 acres and a maximum thickness of potentially water-bearing sediments of perhaps 250 to 300 ft; the surface area of this basin comprises 3.6 percent of the total valley fill area in ULARA. VB is bounded on the north by nonwater-bearing basement rock in San Gabriel Mountains; by a groundwater divide on the northwest which separates VB from the SFB; by a groundwater divide separating it from the Monk Hill Subarea of the Raymond Groundwater Basin to the east; on the southeast by sedimentary bedrock in the San Rafael Hills; and on the south and southwest by the crystalline basement rock within the Verdugo Mountains. Plate 1C, “Verdugo Groundwater Basin Map,” shows the boundaries of Verdugo Basin (as originally interpreted by prior Watermasters and as subsequently converted to GIS format by LADWP personnel); also illustrated are the approximate locations of the water-supply wells owned by the City of Glendale and the Crescenta Valley Water District.

THE EAGLE ROCK BASIN (EB), lies in the extreme southeast corner of ULARA. The 800-acre surface area of this basin makes it the smallest basin in ULARA (it comprises only 0.6 percent of the total valley fill in ULARA). Within EB, the maximum thickness of potentially water-bearing sediments may be on the order of only ±200 ft. The approximate ground surface boundaries of this small basin (as originally interpreted by prior Watermasters and as subsequently converted to GIS format by LADWP personnel) are shown on Plate 1D, “Eagle Rock Groundwater Basin Map”; note that there are no existing municipal-supply water wells in this basin.

1.2 History of Adjudication

Water rights in ULARA were finally established by the JUDGMENT AFTER TRIAL BY COURT in Los Angeles County Superior Court Case No. 650079. Results of this case (known as The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et al., Defendants), were originally determined and signed on March 14, 1968 by the Honorable Edmund M. Moor, Judge of the Superior Court. Numerous pre-trial conferences were held subsequent to the filing of the action by the City of Los Angeles in 1955 and also before the trial commenced on March 1, 1966.

On March 19, 1958, an Interim Order of Reference was entered by the Court directing the State Water Rights Board (now known as the State Water Resources Control Board, SWRCB) to determine the availability of all public and private records, documents, reports, and data relating to a proposed Order of Reference in the case. On June 11, 1958, the Court subsequently entered an "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 Referee provided the results of a detailed study of the surface and subsurface geology, the occurrence and movement of groundwater, aquifer characteristics, and the surface hydrology. In addition, investigations for that report were made regarding the history of: channels of the Los Angeles River and its tributaries; the general directions of groundwater flow within each of the four ULARA groundwater basins; the groundwater quality and the historic extractions of groundwater in each of the four groundwater basins; and all sources of water, whether they be diverted, extracted, imported, etc within those four basins. The Report of Referee served as the principal basis for the geological, hydrogeological and hydrological facts for the original Trial Court Judgment in 1968, for the Decision of the Supreme Court in 1975 (14 Cal 3d 199, 123 Cal Rept 1), and for the Trial Court Final Judgment on remand dated January 26, 1979.

The Trial Court issued its opinion on March 15, 1968. The City of Los Angeles filed an appeal from the Judgment of the Trial Court with the Court of Appeal, whereafter the City of Los Angeles participated in a hearing on November 9, 1972 conducted by the Court of Appeal. The opinion prepared by Judge Compton, was issued on November 22, 1972, and was concurred with by Judges Roth and Fleming. It provided a reversal, with direction, of the original Judgment handed down by Judge Moor on March 14, 1968. In essence, this reversed opinion gave rights to the City of Los Angeles for all water in ULARA, including the use of the groundwater in the local groundwater basins, along with some limited entitlements to other waters. The defendants, however, were given the right to capture "import return water", which was considered to be that portion of the treated surface water purchased and imported to the area by the City of Los Angeles from the Metropolitan Water District of Southern California (MWD) that could percolate back into the local groundwater basin.

A petition for rehearing was filed on December 7, 1972, but this petition was denied by the Court of Appeal. On January 2, 1973, the defendants filed a petition for hearing with the State Supreme Court. The State Supreme Court, on March 2, 1973, advised the parties it would hear the case, and the appeals hearing began on January 14, 1975.

On May 12, 1975, the California Supreme Court filed its opinion on the then-current 20 year-long San Fernando Groundwater Basin litigation. This opinion, which became final on August 1, 1975, upheld the Pueblo Water Rights of the City of Los Angeles to all groundwater in the SFB derived from precipitation (infiltration of direct rainfall plus surface water runoff) within ULARA. The Pueblo Water Rights of Los Angeles were not allowed to extend to and/or include the groundwater in the Sylmar, Verdugo or Eagle Rock basins. However, all surface and groundwater underflows from these adjoining groundwater basins were considered to be a part of the Pueblo Water Rights of the City of Los Angeles.

The California Superior Court opinion also provided the City of Los Angeles with rights to all groundwater in the SFB that was derived from water imported by the City from outside ULARA that was eventually spread or delivered within the SFB. The Cities of Glendale and Burbank were also given rights to all SFB groundwater derived from water that each imports from outside ULARA and delivered within ULARA. Because the City of San Fernando was not a member of MWD until the end of 1971, and because that city had never imported any water from outside ULARA prior to 1971, the City of San Fernando was given no return flow rights based on a March 22, 1984 stipulation between the cities of Los Angeles and San Fernando.

The California Supreme Court reversed the principal judgment of the March 15, 1968 Trial Court opinion and remanded the case back to the Superior Court for further proceedings consistent with the Supreme Court's opinion. On remand, the case was assigned to the Honorable Harry L. Hupp, Judge of the Superior Court of Los Angeles County. The Final Judgment (Judgment), signed by Judge Hupp, was entered on January 26, 1979; copies of this Judgment are available from the ULARA Watermaster website. Importantly, the water rights set forth in the Judgment are generally consistent with the opinion of the Supreme Court as described above, with the exception of a provision regarding the calculation of Import Return Credit. That is, contrary to the Supreme Court opinion, the cities of Burbank, Glendale and Los Angeles in 1978 agreed to use all delivered water, instead of only imported water, in the calculation of their Import Return Credit. This agreement among these cities has had a significant but adverse impact on groundwater in storage in the San Fernando Basin, as discussed later in this report.

In addition, the January 26, 1979 Final Judgment includes provisions and stipulations regarding water rights, storage of water, stored water credits, and arrangements for physical solution water for certain parties as recommended by the Supreme Court.

A separate stipulation was filed in Superior Court on January 26, 1979 appointing Mr. Melvin L. Blevins of LADWP as the original ULARA Watermaster under the Judgment. On September 1, 2003, Mr. Mark G. Mackowski, also of LADWP, was appointed as the second ULARA Watermaster by the Superior Court, succeeding Mr. Blevins after his 24 years of service. On January 1, 2009, Mr. Richard C. Slade of Richard C. Slade and Associates LLC, Consulting Groundwater Geologists, was appointed as the first completely independent ULARA Watermaster, thereby succeeding Mr. Mackowski after his 5 years of service.

On August 26, 1983, the original ULARA Watermaster (Mr. Blevins) reported to the Court, pursuant to Section 10.2 of the Judgment, that the Sylmar Basin was in a condition of overdraft. In response to that Watermaster's letter and a Minute Order of the Court, the cities of Los Angeles and San Fernando responded by letter to the Court, agreeing with the Watermaster that overdraft existed in the Sylmar Basin at that time. On March 22, 1984, Judge Hupp signed a stipulation ordering, effective October 1, 1984, that the cities of Los Angeles and San Fernando would be limited in their pumping from the Sylmar Basin in order to bring their total groundwater extractions within the safe yield of this basin, including any rights exercised by private parties.

Pursuant to Judgment Section 8.2.10, the original Watermaster (Mr. Blevins) increased the safe yield of the Sylmar Basin on a temporary basis in 1996, from 6,210 acre-feet per year (AFY) to 6,510 AFY. On October 1, 2005 this temporary increase expired, and the then-current Watermaster (Mr. Mackowski) conducted his re-evaluation of the safe yield of the Sylmar Basin. Based on that re-evaluation, a recommendation, along with certain conditions, was made by that Watermaster in 2006 to increase the total safe yield of this basin to 6,810 AFY (3,405 AFY each for the cities of Los Angeles and San Fernando). The Court approved the new Stipulation after its hearing on December 13, 2006.

A new and updated re-assessment of the safe yield of Sylmar Basin was conducted by the current Watermaster in 2012 and this recent re-assessment resulted in the following conclusions: SB is not in a current state of overdraft; the new safe yield of this basin is temporarily and conditionally increased to 7140 AFY (3,570 AF each for the cities of Los Angeles and San Fernando); and these pumping amounts may continue for the five Water Years of 2011-12 through 2015-16, unless in-progress data evaluation by the Watermaster reveals that Sylmar Basin is being adversely affected by the increased pumping by these Parties. This recent reassessment of the safe yield of Sylmar Basin by the current Watermaster is to be filed in the near future with the Court.

In September 2007, the cities of Burbank, Glendale, and Los Angeles entered into a 10-year Stipulated Agreement to address the long-term decline in stored groundwater in the San Fernando Basin (see Section 2.9 of this report and Appendix G). This 10-year interim agreement restricted the pumping of Stored Water Credits, helped account for basin losses, and provided for the support of Los Angeles for enhancing the recharge of native water within this basin. It also provided for a re-evaluation of the safe yield of the San Fernando Basin, but that project was never completed.

Table 1-1, "Judges of Record," lists the judges (and their respective date of appointment) who have succeeded the original Superior Court Judge (Judge Hupp, who signed the Final Judgment in this case as Judge of Record for the San Fernando Judgment dated January 26, 1979).

TABLE 1-1: JUDGES OF RECORD

Judge	Date Appointed
Vernon G. Foster	April 30, 1985
Miriam Vogel	January 16, 1990
Sally Disco	May 25, 1990
Jerold A. Krieger	April 16, 1991
Gary Klausner	December 9, 1991
Ricardo A. Torres	January 1, 1993
Susan Bryant-Deason	January 1, 1999

1.3 Extraction Rights

The extraction rights under the January 26, 1979 Final Judgment for the four ULARA groundwater basins and the separate August 26, 1983 (and subsequent) Sylmar Basin Stipulations are as follows:

1.3A San Fernando Groundwater Basin

Native Water

The City of Los Angeles has an exclusive right to extract and utilize all of the native safe yield water in the San Fernando Basin; refer to Plate 1A for the boundaries of this basin. This native safe yield, which was originally determined to be an average of 43,660 AFY, represents the Pueblo Water Right of the City of Los Angeles under the Final Judgment dated January 26, 1979.

Import Return Water

The cities of, Burbank, Glendale, and Los Angeles each have a right to extract the following amounts of groundwater from the SFB.

Burbank:	20.0 percent of all delivered water, including recycled water, to the valley fill lands of the SFB and all of its tributary hill and mountain areas.
Glendale:	20.0 percent of all delivered water, including recycled water, to the valley fill lands of the SFB and all of its tributary hill and mountain areas.
Los Angeles:	20.8 percent of all delivered water, including recycled water, to the valley fill lands of the SFB and all of its tributary hill and mountain areas.

Physical Solution Water

Several private entities have been granted limited entitlement to extract groundwater from the SFB but each such entitlement is chargeable by the Watermaster to the rights of the respective Party; that specific entity must then pay that Party for the resulting costs of the pumped water. Table 1-2 "Physical Solution Parties," lists the various private pumping entities and their maximum physical solution pumping volumes per year.

TABLE 1-2: PHYSICAL SOLUTION PARTIES

Chargeable Party	Pumping Party	Allowable Pumping (acre-feet)
City of Burbank	Valhalla	300
	Lockheed-Martin	25
City of Glendale	Forest Lawn	400
	Angelica Healthcare[2]	75
City of Los Angeles	City of Glendale	5,500
	City of Burbank	4,200
	Middle Ranch	50
	Hathaway	60
	Van de Kamp[1]	120
	Toluca Lake	100
	Sportsmen's Lodge	25
	Water Licenses	83

1. Van de Kamp has never pumped its physical solution right.
2. Angelica Healthcare no longer pumps its physical solution rights.

<u>Stored Water</u>

Each of the cities of Burbank, Glendale, and Los Angeles has a right to store groundwater and the right to extract equivalent amounts of groundwater from the SFB.

1.3B Sylmar Groundwater Basin

<u>Native Water</u>

The March 22, 1984 Stipulation assigned the cities of Los Angeles and San Fernando equal rights to the then-current total safe yield value of 6210 AFY for the Sylmar Basin (see basin boundaries on Plate 1B). On July 16, 1996, the original Watermaster (Mr. Blevins) re-evaluated this safe yield value and established a temporary increase (for a 10-year period) in the safe yield of this basin from 6,210 AFY to 6,510 AFY. This temporary 10-year period ended on October 1, 2005, and triggered a re-evaluation of the safe yield of this basin by the then-current Watermaster (Mr. Mackowski). This re-assessment work was once again performed to be consistent with Section 8.2.10 of the Judgment. That re-assessment by the Watermaster (Mr. Mackowski) and by the special Consultant to the Watermaster (Mr. Blevins) resulted in a new Stipulation which was approved by the Court on December 13, 2006. This updated safe yield assessment permitted a temporary increase in the safe yield of the Sylmar Basin to 6,810 AFY, beginning October 1, 2006. That Stipulation also noted that the safe yield of the Sylmar Basin "shall be re-evaluated within 5 years after adoption of the Stipulation."

A recent 2012-dated safe yield re-assessment of Sylmar Basin by the current Watermaster, indicates: there is currently no overdraft in Sylmar Basin; the current safe yield, subject to various conditions, is 7140 AFY; this value is to be equally divided between the cities of Los Angeles and San Fernando; and another safe yield update of this basin may be performed in 5 years (in or immediately following the 2016-17 Water Year). A new Stipulation is soon to be filed with the Court for this updated safe yield re-assessment of the Sylmar Basin.

The only potentially active, but private, party with overlying rights within the Sylmar Basin is Santiago Estates, a successor to Meurer Engineering, M.H.C. Inc. Any future pumping by Santiago Estates would be deducted from the total safe yield of this basin and the cities of Los Angeles and San Fernando would then be permitted to equally divide the remainder of the safe yield value of this basin. However, for many years, no deductions have been needed because Santiago Estates has not pumped any groundwater from Sylmar Basin since the 1998-99 Water Year.

Stored Water

Each of the cities of Los Angeles and San Fernando has a right to store groundwater by in-lieu practices and also a right to extract equivalent amounts of groundwater from the Sylmar Basin.

1.3C Verdugo Groundwater Basin

Native Water

The City of Glendale and the Crescenta Valley Water District (CVWD) have appropriative and prescriptive rights to extract 3,856 and 3,294 AFY of groundwater, respectively, from Verdugo Basin; refer to Plate 1C for the boundaries of this basin.

Import Return Water

The City of Los Angeles may have a right to recapture its delivered (imported) water in this basin upon application to the Watermaster and on subsequent order after a hearing by the Court pursuant to Section 5.2.3.2 of the Judgment.

Stored Water

There are no storage rights for any party in the Verdugo Basin based on the Judgment.

1.3D Eagle Rock Groundwater Basin

Native Water

The Eagle Rock Basin has only a limited native safe yield. Plate 1D provides the approximate boundaries of this small groundwater basin.

Imported Return Water

The City of Los Angeles delivers imported water to lands overlying this groundwater basin, and return flow from this delivered water is considered to constitute the majority of the safe yield of this groundwater basin. Los Angeles has the right to extract, or to allow to be extracted, the entire safe yield of this basin.

Physical Solution Water

DS Waters (successor to Sparkletts and Deep Rock water companies) has a physical solution right to extract groundwater from Eagle Rock Basin pursuant to a stipulation with the City of Los Angeles, and as provided for in Section 9.2.1 of the Judgment.

Stored Water

There are no storage rights for any party in the Eagle Rock Basin, based on the Judgment, dated January 26, 1979.

1.4 Watermaster Service and Administrative Committee

In preparing this Annual Watermaster Report, the Watermaster support staff at LADWP continued to collect and record a large amount of information relating to the water supply, water use and disposal, groundwater levels, water quality, and the ownership and location of all new water-supply wells within ULARA. Groundwater pumpers are required to report their extractions on a monthly basis to the Watermaster. This allows the Watermaster staff at LADWP and the Assistant Watermaster to update all required water production accounts on a monthly basis, from which the allowable pumping by each Party for the remainder of the year can be determined by the Watermaster.

Section 8.3 of the Judgment established an Administrative Committee for the purpose of advising the Watermaster in the administration of his duties. As of April 17, 2013, the duly appointed members of the Committee are:

CITY OF BURBANK
Bill Mace (Committee Chair)
Matt Elsner (Alternate)

CITY OF GLENDALE
Ramon Abueg
Raja Takidin (Alternate)

CITY OF SAN FERNANDO
Ron Ruiz
Tony Salazar (Alternate)

CITY OF LOS ANGELES
Gregory Reed (Committee Vice-Chair)
Milad Taghavi (Alternate)

CRESCENTA VALLEY WATER DISTRICT
Dennis Erdman
David Gould (Alternate)

The Watermaster may convene the Administrative Committee at any time in order to seek its advice although, typically, meetings are held each year on an approximate quarterly basis. The Watermaster met with the Administrative Committee on October 19, 2011, and also on January 16, April 18, and July 25, 2012 of the 2011-12 Water Year. Each year the Administrative Committee is also responsible for reviewing and approving a Draft of the proposed Annual Report prepared by the Watermaster. The Administrative Committee approved this current 2011-12 Watermaster Report on May 9, 2013.

1.5 Significant Events through April 2013

Groundwater System Improvement Study (GSIS)

In February 2009, LADWP began a six-year, approximately $23 million study and development of a comprehensive containment strategy for all groundwater contamination in the San Fernando Basin, to evaluate groundwater quality near its major wellfields and to provide recommendations for treatment options that will help enable Los Angeles to recover the full use of its groundwater supply from this basin. A drilling contractor and a geological consultant were retained by LADWP in March 2012 to begin drilling and logging a network of 20 to 30 groundwater monitoring wells in the eastern portion of SFB . These monitoring wells will be nested monitoring wells and are being designed to provide vital water level and water quality data and further information on subsurface conditions for the study.

Burbank Operable Unit (BOU)

The BOU, operated by Burbank under a contract with APT, Inc., and funded by Lockheed-Martin, removes volatile organic compounds (VOCs) from the local groundwater. The City of Burbank, in cooperation with the United States Environmental Protection Agency (USEPA) and Lockheed-Martin, continued with design improvements and operational changes to make the facility more mechanically reliable at its design capacity of 9,000 gallons per minute (gpm). During the 2011-12 Water Year, a total of 9,993 AF of groundwater were pumped and treated at the BOU; this volume is about 401 AF less than the volume treated in the prior Water Year. As a requirement of the Consent Decree, Burbank also reduces the concentrations of nitrate in its pumped groundwater through its blending facility using imported supplies from MWD before delivery to customers in the City of Burbank.

Montgomery Watson Harza (MWH) was retained by Burbank to perform a Well Field Performance Attainment Study that evaluated the BOU wellfield and related facilities in an effort to increase groundwater extractions to 9,000 gpm. As a part of this work, a 60-day “stress test” was requested by the EPA, and completed in summer, 2010. A total combined discharge rate of 9,000 gpm was pumped from six BOU wells for a period of

60 days. EPA used observations from this pumping test to update values for hydraulic conductivity, transmissivity and storativity in the aquifer systems beneath the BOU for use in the EPA basin-wide groundwater model.

Glendale Operable Unit (GOU)

The GOU was designed to remove VOCs in the local groundwater and it has the capacity to treat up to a total of ±5,000 gpm from its two existing wellfields: the Glendale North Wellfield; and the Glendale South Wellfield. Pumped groundwater is treated and then blended with imported MWD supplies to reduce the concentrations of nitrate and hexavalent chromium. The GOU treated 7,830 AF of pumped groundwater during the 2011-12 Water Year.

As reported by Glendale, one of the biggest challenges in operating the GOU is maintaining the capacities of the 8 total wells in (4 wells in each of two local wellfields). While the wells are intended to operate full-time (i.e., 24 hours a day, 365 days a year), they are in their 12th year of operation. As a result of declining production, a few of these wells have recently been subjected to re-development operations to help restore their original capacity. Also, issues with power and communications reliability in the GOU wellfield have resulted in additional interruptions to well production.

In an effort to control hexavalent chromium levels in the local groundwater, the GOU operates under a modified pumping plan approved by the USEPA that varies from the original Consent Decree. The modified pumping plan allows reduced pumping from certain GOU wells containing high concentrations of chromium, and increased pumping from other GOU wells displaying lower chromium concentrations. The previous Consent Decree expired in November 2012. Once a new Interim Remedy is issued by the EPA, then a new Consent Decree can be negotiated. In April 2012, the Final version of the Remedial Investigation Work Plan for the Glendale Chromium Operable Unit (GCOU) was issued. Remedial investigation work will include the construction of ground water monitoring wells that will allow EPA to obtain additional data to continue to evaluate the nature and extent of hexavalent chromium in groundwater in the GCOU.

On February 28, 2013, Glendale released the Final version of the “Hexavalent Chromium Removal Research Project” Report to the California Department of Public Health (CDPH). That report details Glendale’s research efforts to identify viable treatment technologies for the removal of hexavalent chromium in its local groundwater.

Glendale also continues to serve on the American Water Research Foundation (AWRF) technical advisory committee on chromium.

The wellhead treatment system at Well GS-3 (one of the wells in the South Wellfield), known as the WBA Chromium Removal Demonstration facility, has been effective at removing chromium from the local groundwater to concentrations below 5 micrograms per liter (µg/L, where 1 µg/L is equivalent to 1 part per billion).

North Hollywood Operable Unit (NHOU)

Since the 1980 discovery of VOCs in the groundwater in the San Fernando Basin, LADWP has worked with state and federal agencies to help contain and remediate the high-concentration plumes of VOCs in the North Hollywood area. With 90 percent funding provided by the USEPA and 10 percent funding provided by the CDPH, the NHOU was designed and implemented to contain and remove the VOC contamination at a total groundwater pumping rate of 2,000 gpm. This system consisted of seven extraction wells and an air-stripping tower with vapor-phase granular activated carbon for control of air emissions. An eighth extraction well has been dry and, hence, it has never been operated as part of the remedy. Unfortunately this NHOU remedy has failed to fully contain the plumes, resulting in contaminants escaping the containment areas and forcing the closure of other nearby LADWP water-supply wells.

Newly emerging constituents have been detected in the NHOU extraction wells, including hexavalent chromium and 1,4-dioxane; the remedy was not designed to remove these contaminants. Concentrations of hexavalent chromium in excess of 400 µg/L have forced the closure of extraction well NHE-2 and, since 2009, the groundwater pumped by this extraction well has been diverted to the sanitary sewer. Concentrations of this contaminant have also recently spiked in NHE-3 and now exceed the MCL of this constituent of 50 micrograms per liter (µg/L), set by the California regulatory agencies for total chromium. NHE-3 has been shut off as a result of the elevated hexavalent chromium concentration pending additional direction from USEPA and the RWQCB. The remedy has also become increasingly unreliable due to equipment failures and deteriorating infrastructure, resulting in numerous plant shutdowns. The plant was shut down for 80 days and 171 days in 2011 and 2012, respectively.

These problems have clearly shown the urgent need for a new remedy that is able to address the emerging contaminants, adequately contain the known plumes, and prevent contaminants from escaping to other areas outside the containment zones. USEPA's 15-year Consent Decree expired on December 31, 2004 and LADWP is working with this agency on the new remedy. The Record of Decision (ROD) for the NHOU Second Interim Remedy (NHOU-2IR) was issued in September 2009. It is expected that this new remedy will include the deepening of several extraction wells, construction of more extraction wells, and a new treatment facility designed to remove VOCs, chromium, 1,4 dioxane and other contaminants of concern. However, this remedy will focus on containing and removing only the highest concentrations of contaminant mass which exceed 10 times their respective MCL. More needs to be done to remove contaminant masses that are lower in concentration, yet still exceeding their respective state and federal MCLs.

To address the increasing levels of hexavalent chromium, LARWQCB issued a Cleanup and Abatement Order (CAO) to the responsible party, Honeywell Inc. Under this CAO, Honeywell took over operating NHE-2 to contain the plume by treating the water and discharging the effluent to the local sewer system while evaluating remedial alternatives. During the 2011-12 Water Year, 171 AF of groundwater were discharged to the sanitary sewer. Hexavalent chromium levels are decreasing at NHE-2, but the levels are increasing at the down gradient extraction well NHE-3 and now exceed the MCL of this constituent of 50 µg/L.

Although NHE-2 is being operated under the CAO by Honeywell, LADWP continues to operate and maintain the facility under the direction of USEPA pursuant to a Cooperative Agreement between the two parties. Current operations include use of five of the seven extraction wells. A total of 1,248 AF of groundwater were treated through the NHOU during the 2011-12 Water Year.

Pollock Wells Treatment Plant

LADWP's Pollock Wells Treatment Plant treats groundwater pumped from two wells with four liquid-phase granular activated carbon (GAC) vessels that have a total design flow of 3,000 gpm. The Pollock Wells Treatment Plant was designed to absorb the VOCs trichloroethylene (TCE) and tetracloroethylene (PCE). The original purpose of this facility was to prevent the loss of groundwater through the Los Angeles River Narrows as a result of rising groundwater outflow. An evaluation of basin discharge through the Los Angeles River Narrows area demonstrated in 1990 that, on average, approximately

2,000 AFY of groundwater were rising into the unlined portion of the river and leaving the SFB. Much of this groundwater is lost from the SFB when a sufficient volume is not extracted by the Pollock wells. During the recent water year, the Pollock wellfield successfully extracted a total of 2,957 AF of groundwater and processed for treatment at this facility.

Temporary Tujunga Wellfield Treatment Study Project

The Temporary Tujunga Wellfield Treatment Study Project has restored the use of two of the 12 production wells in this wellfield and 12,000 AFY of pumping capacity that have been unavailable due to water quality constraints.

The project utilizes liquid-phase GAC vessels on Well Nos. 6 and 7 to process extracted groundwater and remove certain VOCs like TCE, PCE, carbon tetrachloride, and 1,1 dichloroethene (DCE). The treated water has been discharged into the distribution system since May 2010. Nearly 4,680 AF of groundwater were pumped and treated for VOC removal during the recent water year, however, the treatment systems were out of service for several months due to lack of a GAC contract; these systems were restarted on October 20, 2012.

Verdugo Park Water Treatment Plant

The City of Glendale Verdugo Park Water Treatment Plant (VPWTP) treats groundwater pumped from the Verdugo Basin for turbidity and bacteria, but has been operating significantly below its expected rate of 700 gpm; methods to increase the treatment rate are still being investigated. The City of Glendale is not able to attain the treatment capacity for its VPWTP due to the lack of production capacity from its two Verdugo wells that were constructed in 1992. A total of 316 AF were treated at the VPWTP in the 2011-12 Water Year.

Glenwood Nitrate Removal Plant

The Glenwood Nitrate Removal Plant uses ion exchange to remove nitrate from groundwater pumped by CVWD-owned water wells. CVWD increased its utilization of this plant to increase the amount of groundwater produced. The facility treated 447 AF of groundwater during the 2011-12 Water Year, a decrease of 145 AF from the volume treated in the 2010-11 Water Year. In addition, the treatment plant has occasionally been taken out of service to replace the ion exchange resin. Use of the newer resin typically permits longer batch runs, and a lower overall salt content of the wastewater, which ultimately results in a lower volume of wastewater to be discharged to the Los Angeles sewer system.

Plans to Increase Glendale's Pumping Capacity from Verdugo Basin

Glendale has never pumped its full water right of 3,856 AFY from the Verdugo Basin. In the past few years, Glendale has been actively trying to identify possible new water well sites to increase its groundwater production capacity from this basin. Currently, a majority of Glendale's groundwater extractions are from its eight GOU wells in SFB. In 2007, Glendale drilled two pilot boreholes in the Verdugo Basin and conducted isolated aquifer zone testing in each borehole. Due to the poor results of the zone tests (i.e., low flow rates), one of the boreholes was permanently destroyed in March 2008.

Glendale also drilled a third pilot hole in the Montrose area in February 2009. In October 2007, Glendale initiated the rehabilitation of its Foothill Well and this work was completed in 2010. Currently, the Foothill well is online, and produces groundwater at a rate of approximately 130 gpm. Drilling and construction of the City's Rockhaven well, located at the Rockhaven Sanitarium site, was completed in April 2011; However, the nitrate concentration in the wellblend from this new well exceeds the Primary MCL of 45 mg/L for this constituent. Glendale and CVWD are currently exploring options for a cooperative effort to address the elevated nitrate concentrations in this well. The Watermaster appreciates Glendale's effort in drilling and testing exploratory boreholes and in rehabilitating existing wells to increase its pumping from the Verdugo Basin; the Watermaster also appreciates the proposed cooperation between the two Parties in trying to negotiate a successful joint resolution to the nitrate in the Rockhaven well.

City of San Fernando Nitrate Removal

Elevated nitrate concentrations are a problem in some wells operated by the City of San Fernando in Sylmar Basin. Specifically, at least two of its four wells have had to be shut-down over time due to elevated nitrate concentrations. San Fernando issued an RFP and selected a consultant to design a nitrate removal system and a new transmission line. Engineering and construction of the treatment plant are near completion, and are awaiting final permitting before placing the facility online.

Mission Wellfield Rehabilitation

LADWP is continuing to pursue capital improvements at its Mission Wellfield and restore the capacity needed to fully utilize its entitlement to groundwater in the Sylmar Basin. These improvements will address the decline in pumping capacity caused by mechanical deterioration and water quality problems that have restricted use of this wellfield. Phase 1 of the project included the replacement of a water storage tank and related control systems. LADWP is now planning Phase 2, which will provide for the construction of three new water-supply wells, the destruction of two deteriorated/older water wells, and the construction of additionally-required infrastructure.

Mission Wellfield Groundwater Remediation

LADWP is pursuing the construction of offsite groundwater monitoring wells to investigate contamination affecting the area surrounding its Mission Wellfield in Sylmar Basin. Currently, the primary contaminant of concern is the VOC known as trichloroethylene (TCE). Based on the extent of contamination present in the groundwater, LADWP may expedite the development of facilities to remediate, cleanup, and remove the contamination and prevent further loss of Sylmar Basin groundwater. Information gained from the new monitoring wells will be provided to environmental regulators to support their investigation of potentially responsible parties who may be held responsible for the cleanup costs.

Pacoima B-6, MWD Foothill Feeder Replenishment Project

The MWD Foothill Feeder connection enables the City of Burbank to import surplus water from the State Water Project into the San Fernando Basin for artificial recharge at the Pacoima Spreading Grounds. This relatively new source of water offers Burbank flexibility to purchase MWD water for spreading as opposed to purchasing physical solution water. The first delivery of MWD water occurred on April 26, 2010 through the new Pacoima B-6 MWD connection; at that time, 33.6 AF of water were delivered for groundwater recharge into the Pacoima Spreading Grounds. During this 2011-12 Water

Year, a total volume of 1,371 AF of MWD water was spread by Burbank in the Pacoima Spreading Grounds.

LADWP Water Recycling Programs in the San Fernando Valley

LADWP's Recycled Water Master Planning (RWMP) documents are a series of draft reports that identify opportunities to use recycled water for groundwater replenishment (GWR) and non-potable reuse. The RWMP documents are comprised of the following reports.

- Groundwater Replenishment Master Planning Report
- Groundwater Replenishment Treatment Pilot Study
- Non-Potable Reuse Master Planning Report
- Terminal Island Water Reclamation Plant Barrier Supplement, and Non-Potable Reuse Concepts Report
- Long-Term Concepts Report

LADWP's most recent Urban Water Management Plan (i.e., the 2010 UWMP) established a goal of increasing recycled water use to 59,000 AFY by 2035. Of this 59,000 AFY, LADWP expects to deliver as much as 29,000 AF of recycled water annually for non-potable reuse within the City of Los Angeles. Of this total volume, 5,212 AFY of recycled water originating from both the Donald C. Tillman (DCT) and Los Angeles-Glendale (LAG) water reclamation plants will be delivered to customers in the SFB. This provides 3,788.3 AFY of recycled water for irrigation and 1,424.2 AFY for industrial cooling.

Construction of pipelines to supply Valley Presbyterian Hospital and Van Nuys High School with recycled water was completed in February 2010. In late-2010, LADWP began supplying recycled water to the Van Nuys High School to meet an expected annual demand of 30 AF for onsite irrigation use. LADWP staff continues to work with Valley Presbyterian Hospital personnel on their onsite conversion to recycled water for irrigation use.

Distribution facilities are also being designed to deliver approximately 200 AFY and 500 AFY of recycled water to Woodley Park and to the Hansen Dam Golf Course, respectively. Irrigation with recycled water at Woodley Park began in 2012, whereas the facilities at the Hansen Dam Golf Course will be constructed and in service by the middle of 2013.

LADWP has added the following customers to its recycled water customer portfolio for the period October 1, 2011 to Sept 30, 2012. These customers will utilize recycled water obtained from the two reclamation plants in SFB.

Customer	Beginning Date	Use Type	Expected Annual Use	Source
LA Media Center	10/31/2012	Irrigation	10 AF	LAG
Woodley Park Phase I	9/19/2012	Irrigation	150 AF	DCT
LA Community College N.E. Campus	6/26/2012	Irrigation	2 AF	LAG
Gibson Ranch	5/8/2012	Dust Control	2 AF	DCT

Los Angeles has entered into agreements with the City of Burbank to provide groundwater storage credits in exchange for recycled water delivery from Burbank. These agreements include expanding Burbank's recycled water distribution system to the city boundary where Los Angeles will receive the recycled water for distribution to potential recycled water customers. Per the agreements, Burbank would deliver up to 1,500 AFY of recycled water to Los Angeles, once all proposed infrastructure improvements are completed.

In November, 2012, LADWP finalized an agreement to establish additional connections to the City of Glendale's water reclamation pipeline originating from the LAG. This will facilitate conversion of several customer sites in the LAG area including Atwater Park, Chevy Chase Park, and Los Feliz Golf Course, all of which are maintained by Los Angeles Department of Recreation and Parks.

LADWP has facilitated successful approval and use of recycled water via water truck for permanent dust control at the Gibson Ranch in Sunland. This water comes from one of a dozen fill stations on LADWP's recycled water system. There are potentially dozens of customers who are interested in this application and LADWP expects to add many more customers, as well as expand its fill station network.

Headworks Reservoir Project

The former Headworks Spreading Grounds is the site of a multi-objective project to improve water quality, provide the community with an opportunity for passive recreation, and restore a portion of the wetlands along the Los Angeles River. The primary objective of this project is to comply with the Long Term 2 Enhanced Surface Water Treatment Rule and the Stage 2 Disinfectants and Disinfection Byproducts Rule; these regulations were recently promulgated by the USEPA.

LADWP's Silver Lake and Ivanhoe Reservoirs located within the Central Basin will be removed from service, thereby removing two sources of open reservoir storage from the water distribution system and their vulnerability to surface-runoff contamination. The regulatory storage provided by these two reservoirs will be replaced by buried (underground) reservoirs located at the former Headworks Spreading Grounds site, providing a storage capacity of 110 million gallons. The underground facility, which will be divided into two reservoirs (an, east and a west one), is currently under construction. The east reservoir is scheduled to begin operation as early as November 2014.

The Headworks Reservoir Project, which is located between the 134 Freeway on the north and the Los Angeles River on the south, and just west of the Victory Blvd exit from the 134 Freeway, includes a hydroelectric power plant that will generate approximately four megawatts of green power. LADWP is also working jointly with the United States Army Corps of Engineers to develop wetlands on a portion of the site.

Projects to Enhance Recharge Capacity in the San Fernando Groundwater Basin

LADWP along with the Los Angeles County Flood Control District (LACFCD) and the City of Los Angeles Department of Public Works Bureau of Sanitation (BOS) and Bureau of Engineering (BOE) continue to cooperate on several projects that will enhance recharge of native water at existing spreading grounds along the eastern side of the SFB. These projects have included: the Big Tujunga Dam Seismic Retrofit Project; the Hansen Spreading Grounds Enhancement Project; the Tujunga Spreading Grounds Enhancement Project; the Pacoima Spreading Grounds Enhancement Project; the Sheldon-Arleta–Cesar Chavez Recreational Complex Project; and other distributed recharge efforts to implement non-traditional flood control measures that provide the added benefit of stormwater capture and groundwater recharge. The Watermaster appreciates the large amounts of time, effort, and money provided by the LACFCD, by

BOS, and by BOE to enhance the recharge capacity of these spreading basins and to improve their ability to allow additional water to percolate into the SF Basin.

Each of these projects is summarized below:

- *Big Tujunga Dam Seismic Retrofit Project*

  The project was conducted to seismically retrofit the existing dam and to increase its spillway capacity. In addition to preventing flood damage and impacts to public safety associated with a possible dam failure, the project provides for the conjunctive management of stormwater runoff at the dam that is expected to increase average stormwater capture by 4,500 AFY to 6,000 AFY.

  LADWP and the LACFCD entered into a cooperative agreement in September 2007, with LADWP providing $9 million in funding toward construction of the $105 million project. The project was completed in July 2011.

- *Big Tujunga Dam Sediment Removal Project*

  The Big Tujunga Dam Sediment Removal Project will remove the accumulated sediment behind the dam which resulted from the 2009 Station Fire in the Angeles National Forest. This project, led by the Los Angeles County Flood Control District (LACFCD), will enhance the reservoir capacity for flood control and stormwater capture. LADWP will provide $10 million for design and construction of this $33 million project.

- *Hansen Spreading Grounds Enhancement Project*

  The Hansen Spreading Grounds is a 156-acre parcel located adjacent to the Tujunga Wash Channel and just downstream from Hansen Dam. Phase 1 basin re-construction to enlarge and deepen the spreading basins was completed in November 2009. Phase 2, which will retrofit and automate the existing intake structure on Tujunga Wash, is scheduled to be completed by the winter of 2013. LADWP and LACFCD share equally in the $8.2 million cost for constructing this project, and it is expected that the project will increase average stormwater capture by 2,100 AFY.

- *Tujunga Spreading Grounds Enhancement Project*

  Owned by LADWP and operated by LACFCD, the Tujunga Spreading Grounds is a 188-acre parcel located along the Tujunga Wash Channel at its confluence with the Pacoima Wash Channel. Plans are underway to enhance the facility by relocating and automating the current intake structure on Tujunga Wash, installing a second automated intake to receive flows from the Pacoima Wash, and reconfiguring the existing spreading basins. Other enhancements include constructing and/or improving recreational walking trails, native habitat, and educational facilities on property not needed for the primary function of stormwater capture. These improvements will greatly increase stormwater capture and subsequent groundwater recharge while improving flood protection, water quality, and open space attributes.

  Design of this project is scheduled to be completed by the winter of 2013, whereas construction is to occur from 2014 through 2016. It is expected that this project will increase annual stormwater capture by 8,000 AFY. LADWP will provide $20 million to the LACFCD to construct the project.

- *Pacoima Spreading Grounds Enhancement Project*

  The 169-acre Pacoima Spreading Grounds, owned and operated by LACFCD, is located on both sides of the old Pacoima Wash Channel downstream of the Pacoima Dam and Reservoir. LADWP and LACFCD are currently working cooperatively to improve stormwater capture by upgrading and automating the intake facility and revitalizing the recharge basins.

  This project is expected to increase average annual stormwater capture by 2,000 AFY. Final designs are scheduled to be completed by the spring of 2013, and are to be followed by construction in 2014 through 2016. LADWP will provide up to $15 million for design and construction of this $30 million project.

- *Pacoima Dam Sediment Removal Project*

  The Pacoima Dam Sediment Removal Project will remove the accumulated sediment behind the dam which resulted from the Marek, Sayre, and Station fires. This project, led by LACFCD, will enhance the reservoir capacity for flood control and stormwater capture. LADWP will provide $10 million for design and construction of this $80 million project.

- *Sheldon-Arleta Project – Cesar Chavez Recreational Complex Project*

  The Sheldon-Arleta Project is located at the Sheldon-Arleta Landfill adjacent to the Tujunga Spreading Grounds. During stormwater spreading operations within the Tujunga Spreading Grounds, the potential exists for the recharged water to displace the methane gas being produced within the nearby landfill. In recent years, methane gas has migrated offsite and elevated concentrations of this gas have been detected at a nearby school. To avoid such occurrences, limitations were previously placed on the amount of stormwater that can be spread at the Tujunga Spreading Grounds. These limitations have reduced the capacity of the spreading grounds.

  To mitigate the displacement of methane gas, LADWP, and the City Bureau of Sanitation and Bureau of Engineering collaborated on a project to replace the existing methane gas collection system at the Sheldon-Arleta Landfill. LADWP's contribution to the Sheldon-Arleta Gas Management System Project is $6.25 million. This new gas collection system will enhance the containment of the methane gas within the landfill and restore the historic spreading flow capacity of 250 cubic feet per second, as well as bring some of the spreading basins located closest to the landfill back into operation. Construction was completed in 2009 and an evaluation to determine the maximum recharge capacity of the improved facility is being planned. It is expected that the project will increase average annual stormwater capture by 4,000 AFY.

- *Rory M. Shaw (formerly Strathern) Wetlands Park Project*

  Rory M. Shaw (formerly Strathern) Wetlands Park Project is a LACFCD-led project which consists of constructing stormwater capture and treatment facilities within the bounds of a 46-acre site formerly used as a gravel pit. This project has the potential to provide groundwater recharge, flood protection, water quality enhancements, habitat restoration, and recreational opportunities. LADWP provided $600,000 for the design of the project which is currently at 60% of being completed.

- *LADWP's Distributed Recharge Efforts*

  Across the San Fernando Valley, urban stormwater runoff from impervious surfaces enters the storm drain system and eventually flows into the ocean. LADWP is exploring partnerships, projects, and programs that promote infiltration of rainfall runoff close to its point of origin.

  Several partnerships that LADWP continues to develop are with the City of Los Angeles Department of Public Works, the LACFCD, the MWD, TreePeople, the Council for Watershed Health, the Hollywood/Los Angeles Beautification Team (HBT), The River Project, and Generation Water. Some of the projects and programs being developed include facility retrofits, neighborhood retrofits, and local recharge projects such as along medians, rain gardens, power line easements, and parkways.

Integrated Resources Plan (IRP)

The Water IRP of the City of Los Angeles is a strategic plan to integrate its wastewater, storm water, potable water, and reclaimed water programs for the next 20 years. Adopted by the Los Angeles City Council in 2006, the Water IRP was developed through a stakeholder-driven process and uses a broader "watershed" approach to promote more efficient use of all water within Los Angeles.

Strategies adopted as a result of the Water IRP process include a facilities plan that identified immediate upgrades, capital improvements triggered by targeted changes in demographics, and a set of 25 policies covering the four areas of recycled water, conservation, dry-weather runoff, and wet-weather runoff. The Water IRP also directed LADWP to study the feasibility of using recycled water for groundwater replenishment, to increase recycled water use in certain parts of the City, and to continue water conservation efforts. LADWP is the lead agency in the further development of these water strategies.

The Water IRP stipulates that progress must be reported annually to the City Council and that its findings must be updated every five years. An interdepartmental City team collaborated with stakeholders to review the Water IRP stipulates that progress must be reported annually to City Council and that its findings must be updated every five years. An interdepartmental City team collaborated with stakeholders to review agency in the further development of these programs that have been developed as a result of the plan's policies. This 5-year review was completed in 2012 and the report was presented to the LADWP Board of Commissioners and the Board of Public Works in October 2012.

The Water IRP has made great strides towards integrated water planning and management, and the benefits include reduced dependence on imported water supplies, putting more recycled water to beneficial uses, recharging more stormwater runoff, and increased conservation of local drinking water.

The following are the major reported accomplishments related to the recycled water strategies of the Water IRP.

- *Recycled Water Master Planning (RWMP) Documents:*
  Completed in March 2012, these documents outline strategies to meet the City's goal of achieving 59,000 AFY of recycled water delivered by 2035 along with identifying future opportunities to maximize recycled water use beyond the 59,000 AFY goal.

- *Groundwater Replenishment (GWR) Master Planning Report:*

  As part of the RWMP documents, the GWR Master Planning report defines a project to replenish the SFB with purified recycled water, originating from the Donald C. Tillman Water Reclamation Plant. This project would spread 15,000 AFY of advanced treated water by 2022 and up to 30,000 AFY by 2035.

- *GWR Treatment Pilot Study*
  In the summer of 2011, the City completed a 16 the s pilot study which evaluated the proposed treatment processes for the GWR project using effluent from the Donald C. Tillman Water Reclamation Plant. Processes evaluated included micro-filtration, reverse osmosis, and advanced oxidation processes, including ultraviolet radiation/hydrogen peroxide and ozone/hydrogen peroxide. Results demonstrated exceptional water quality can be produced by the AWP processes and that this water would be safe for basin replenishment via the GWR.

- *Non-Potable Reuse Master Planning Report:*
  The Non-Potable Reuse Master Planning Report outlines potential opportunities to expand the City's non-potable reuse (NPR) systems to

provide recycled water to more LADWP customers for irrigation and industrial applications. The existing recycled water distribution system delivers approximately 8,000 AFY. The expanded infrastructure will enable delivery of an additional 11,350 AFY of NPR, with total NPR deliveries of 19,350 AFY by 2015, or as funding becomes available.

- *Recycled Water Advisory Group (RWAG) and Stakeholder Engagement:* Formed in December 2009, the RWAG consists of approximately 60 stakeholders representing diverse interests and demographics throughout the City of Los Angeles, and this group provided input during the development of the Recycled Water Master Planning Documents. The RWAG continues to provide input as the RWMP strategies, including GWR, are implemented. In addition, stakeholder engagement efforts have included recycled water forums for the general public, elected official briefings, and presentations to Neighborhood Councils and community groups.

In addition to recycled water and water conservation, the Water IRP identifies policies for runoff management. Several projects have been identified, planned, designed and/ or constructed as a result of the Water IRP's dry weather and wet weather runoff goals. Much of this effort is being pursued within the scope of the distributed recharge projects in the SFB.

Standard Urban Stormwater Mitigation Plan (SUSMP)

Resulting from the municipal stormwater National Pollution Discharge Elimination System Permit (NPDES Permit No. CAS004001) issued by the LARWQCB on December 13, 2001, the County of Los Angeles and 84 cities that are subject to the region-wide permit developed and adopted Standard Urban Stormwater Mitigation Plan (SUSMP) policies or ordinances within their respective jurisdictions to address stormwater. Under SUSMP, all new privately-owned development and redevelopment projects within the City of Los Angeles may be required to implement certain Best Management Practices and/or stormwater mitigation measures to contain or treat the first ¾- inch of rainfall runoff from every storm, and to implement on-site stormwater infiltration. The City of Los Angeles-Watershed Protection Division refers projects to the Watermaster that are undergoing a SUSMP evaluation within the City-portion of the San Fernando Basin. The Watermaster reviews the SUSMP mitigation measures and provides his approval or denial of the infiltration portion of each SUSMP. The Watermaster encourages infiltration of collected stormwater whenever feasible, but is concerned about encouraging recharge in areas having known soil contamination and/or plumes of groundwater contamination, and/or any areas having ongoing groundwater remediation. Recently, the LARWQCB renamed the SUSMP program as the Low Impact Development (LID) program.

Dewaterers

Depths to groundwater in a few portions of the SFB (particularly along Ventura Blvd on the south side of the basin) are close to ground surface. As a result, permanent dewatering is common for certain types of building foundations or structures with deep underground parking, and active dewatering helps to artificially lower and maintain groundwater levels at depths that are several feet below the building foundations and/or the bottoms of the subterranean parking structure. Wherever such dewatering is needed, the building owner (i.e., the “dewaterer”) is required to meter the extracted groundwater (i.e., the rates and volumes of discharge), report those extractions to the Watermaster, and enter into an agreement with the affected Party for payment for this extraction. The Watermaster requires and regularly receives groundwater production reports from several dewaterers in the SFB (see Table 2-5).

The Watermaster has participated in a few meetings with the City’s Department of Building and Safety to explore ways in which the Watermaster can be notified when any new dewatering project might begin in ULARA in the future. The goal of those meetings has been to develop a mechanism at the plan check counter at the Department of Building and Safety by which the owners or agents of new temporary or permanent dewatering operation is/are required to notify the Watermaster before dewatering begins.

Water Licenses

Portions of ULARA located in unincorporated portions of Los Angeles County are without water service. Working in cooperation with the County Department of Public Health and the County Planning Department, prior Watermasters and LADWP have tried to develop a process oriented to identify and monitor water usage through a water license agreement (see Table 2-5). Those agreements allow the use of groundwater on overlying property until a water service becomes available to the property owner. The agreements also establish maximum annual groundwater usage, and require the monthly reporting of groundwater production to the Watermaster and annual payment to the City of Los Angeles (the owner of the water rights in these unincorporated areas).

1.6 Summary of Water Operations in ULARA

Highlights of all elements of water operations within ULARA for the 2010-11 and 2011-12 Water Years are summarized in Table 1-3. Details of the 2011-12 operations and hydrologic conditions are provided in Section 2. Locations of the groundwater basins, water service areas of the parties and individual producers, and other pertinent hydrologic facilities that measure precipitation, runoff, and water levels are shown on Plates 1 through 8.

Average Rainfall

Average precipitation determined for all listed raingages (stations) on all valley floor areas during the 2011-12 Water Year in ULARA was 10.81 inches; this value represents 66 percent of the calculated 100-year mean (16.48 inches) for the original safe yield calculations for all of these stations, as determined. Average precipitation for all listed stations in the hill and mountain areas within ULARA in the 2011-12 Water Year was 12.01 inches; this value is 55 percent of the calculated 100-year mean (21.76 inches) for all of these stations. The weighted average of 11.55 inches of precipitation for all stations throughout ULARA was 59 percent of the 100-year mean (19.64 inches).

Spreading Operations

A total of 14,948 AF of water was spread in ULARA in Water Year 2011-12. The average annual spreading of native water during the period 1968 through 2012 was 32,848 AF.

Groundwater Extractions

Total groundwater extractions in 2011-12 in all four groundwater basins were 79,314 AF. Specific extractions were: 69,768 AF in San Fernando Basin; 4,295 AF in Sylmar Basin; 5,082 AF in Verdugo Basin; and 169 AF in Eagle Rock Basin. This current total represents an increase of 6,011 AF compared to the total extractions from these 4 groundwater basins in Water Year 2010-11, but is less than the long-term (1968-2012) average of 99,705 AFY. Of the total production for the 2011-12 Water Year, 1,209 AF of groundwater were pumped for non-consumptive use. The Groundwater Extractions Report provided in Appendix A summarizes the groundwater extractions for the 2011-12 Water Year by all pumpers.

Imports

Gross imports (including pass-through water) for 2011-12 totaled 487,808 AF; this represents an increase of 21,795 AF from the 2010-11 total. Net imports used within ULARA in 2011-12 amounted to 277,532 AF (an increase of 3,927 AF from the volume in the 2010-11 Water Year).

Exports

A total of 258,220 AF of water was exported from ULARA. Of these total exports, 44,035 AF were from groundwater extractions, whereas the remaining 214,185 AF were from imported supplies (pass-through water).

Treated Wastewater

A total of 85,313 AF of wastewater was treated in ULARA in the 2011-12 Water Year. The majority of this treated water volume, 56,023 AF, was discharged to the Los Angeles River. A portion of this treated water was exported from ULARA and delivered to the Hyperion Treatment Plant located in Playa Del Rey. The remaining 17 percent of the annual total (approximately 15,055 AF) was used as recycled water, as discussed below.

Recycled Water

Total recycled water used in 2011-12 in ULARA was 15,055 AF. This represents an increase of 2,032 AF from the value in the 2010-11 Water Year. The recycled water is used for landscape irrigation, golf course irrigation, in-plant use, power plant use (i.e. cooling), and other industrial uses.

Groundwater in Storage

Groundwater in storage in the SFB increased by 10,338 AF during Water Year 2011-12. This modest increase (when compared to the relatively large increase in the 2010-11 Water Year) is attributed to below-average rainfall and the resultant decrease in stormwater spreading when compared to spreading that occurred in the previous 2010-11 Water Year. Compared to the groundwater in storage in 2010-11, the estimated increases in groundwater in storage for the Sylmar and Verdugo basins were 1941 AF and 1998 AF, respectively, for Water Year 2011-12. For Eagle Rock Basin, a decrease in storage of 81 AF is estimated for Water Year 2011-12.

Construction/Destruction of Water Wells

No water wells were constructed or destroyed in any of the four groundwater basins in ULARA in Water Year 2011-12.

TABLE 1-3: SUMMARY OF OPERATIONS IN ULARA

Item	Water Year 2010-11	Water Year 2011-12
Active Pumpers (parties and nonparties)	36	36
Inactive Pumpers (parties)[1]	7	7
Annual Weighted Average Rainfall, in inches		
Valley Floor	24.44	10.83
Mountain Area	25.71	12.01
Total ULARA	25.21	11.56
Spreading Operations, in acre-feet	90,507	14,948
Extractions, in acre-feet	73,303	79,314
Gross Imports, in acre-feet		
Los Angeles Aqueduct Water	334,294	213,043
MWD Water	131,719	274,765
Total	**466,013**	**487,808**
Exports, in acre-feet		
Los Angeles Aqueduct Water	156,219	93,638
MWD Water	56,742	120,547
Groundwater	37,423	44,035
Total	**250,384**	**258,220**
Net Groundwater Used in ULARA, in acre-feet	35,880	35,279
Net Imports Used in ULARA, in acre-feet	253,052	273,623
Recycled Water Used, in acre-feet	13,023	15,055
Total Water Used in ULARA, in acre-feet [2]	301,955	323,957
Treated Wastewater, in acre-feet [3]	84,545	83,513

1. The seven inactive pumpers are Van de Kamp, Disney, Angelica, Santiago Estates, Greeff, Sears, and Waste Management.
2. Extractions used in ULARA plus Net Imports and Recycled Water.
3. Most treated wastewater is discharged to the Los Angeles River, whereas a portion is delivered to the Hyperion Plant or to other locations utilizing recycled water.

1.7 Allowable Pumping for the Forthcoming 2012-13 Water Year

Table 1-4 provides a summary of the groundwater extraction rights in each of the three major groundwater basins in ULARA for the forthcoming 2012-13 Water Year and the Stored Water Credit (as of October 1, 2012), for the cities of Los Angeles, Burbank, Glendale and San Fernando, and for the CVWD. The determination of these values is provided in more detail in Section 2.

TABLE 1-4: ALLOWABLE GROUNDWATER EXTRACTION RIGHTS
2012-13 WATER YEAR - ULARA
(Acre-feet)

	Native Safe Yield Credit [1]	Import Return Credit [2]	Total Native + Import	Available Stored Water Credit [3, 4] (as of Oct. 1, 2012)	Allowable Pumping 2012-13 Water Year[5]
San Fernando Basin					
City of Burbank	---	4,117	4,117	4,442	8,559
City of Glendale	---	4,898	4,898	16,688	21,586
City of Los Angeles	43,660	40,981	84,641	184,666	269,307
Total	43,660	49,996	93,656	205,796	299,452
Sylmar Basin					
City of Los Angeles	3,570	---	3,570	9,014	12,584
City of San Fernando	3,570	---	3,570	404	3,974
Total	7,140	---	7,140	9,418	16,558
Verdugo Basin					
CVWD	3,294	---	3,294	---	3,294
City of Glendale	3,856	---	3,856	---	3,856
Total	7,150	---	7,150	---	7,150

1) Native Safe Yield extraction right per page 11 of the Judgment.
2) Import Return extraction right per page 17 of the Judgment.
3) There is no Stored Water Credit assigned in Verdugo Basin.
4) See Table 2-11A for calculation of SFB Totals and Stored Water Credits in reserve; See Table 2-11B for Sylmar Basin credit calculation.
5) Allowable pumping in Sylmar Basin must not exceed the native safe yield by more than 1,200 AF in any given year. Pumping in excess of the Safe Yield must be reported to Watermaster as soon as is reasonable practicable

2. WATER SUPPLY, OPERATIONS, AND HYDROLOGIC CONDITIONS

2. WATER SUPPLY, OPERATIONS, AND HYDROLOGIC CONDITIONS

2.1 Precipitation

Precipitation varies considerably throughout ULARA depending on such local factors as topography and elevation. Mean annual precipitation ranges from about 14 inches at the western end of the San Fernando Valley to 33 inches near the highest elevations of the watershed in the San Gabriel Mountains in the easterly portion of ULARA. Approximately 80 percent of the annual rainfall in ULARA occurs from December through March.

During the 2011-12 Water Year, the weighted average rainfall from all rainfall stations on the valley floor areas was 10.81 inches (66 percent of the 100-year mean value that was calculated for the original safe yield determination), whereas the weighted average annual rainfall from all rainfall stations in the hill and mountain areas was 12.01 inches (55 percent of the 100-year mean). The weighted average from all rainfall stations on the valley floor and in the hill and mountain areas in the 2011-12 Water Year was 11.55 inches (59 percent of that 100-year mean). Table 2-1 provides rainfall data for several raingages on the valley floor areas and in the hill and mountain areas; Plate 5 illustrates the locations of these raingages (stations). Figure 2.1 shows the monthly rainfall totals on the valley floor and in the hill and mountain areas in ULARA for 2011-12 for the raingages mentioned above.

Because annual rainfall totals have a very important impact on groundwater levels and, hence, on the availability of and recharge to the groundwater in the four ULARA groundwater basins, the Watermaster acquired additional rainfall data available from the local City of Burbank Valley Pump Plant raingage (Gage No. 041194); the database for this gage extends from 1940 to the present. These rainfall data were accessed through the website of the Western Regional Climate Center (WRCC). The resulting data for this gage are shown as a bar graph of rainfall for each Water Year (i.e., October 1 through September 30) of available gage data on Figure 2.1A, “Yearly Rainfall Totals, Burbank Valley Pump Plant Gage”. As shown thereon, the long-term average annual rainfall for the period of record for this gage is 16.10 inches.

To help identify possible trends in annual rainfall for each water year at this raingage, the Watermaster further created the graph shown on Figures 2.1B, “Accumulated Rainfall Departure Curve”. This graph illustrates the accumulated departure of annual rainfall for each water year from the long-term average annual rainfall at this gage. On this graph, the accumulated rainfall departure values have been plotted for each rainfall year relative to the long-term average annual rainfall for this Burbank raingage. The zero line on the accumulated departure curve represents the long-term average rainfall points; data points above this zero line represent years of excess precipitation whereas points below that line represent years of deficient precipitation, relative to the long-term average. The basic purpose of the accumulated departure curve is to illustrate temporal trends in the rainfall data over time.

To prepare this accumulated departure curve of annual rainfall, the total rainfall in inches for each water year, beginning with the initial year of record, is divided by the long-term average annual rainfall and the result (i.e., the quotient) is converted into a percent value. The percentage of departure from the long-term average is then calculated for each successive water year and this value is algebraically added to the result for the prior water year, and so on, through the final year of available data.

Interpretation of the curve presented on Figure 2.1B is as follows:

- Whenever the accumulated departure curve descends over time to the right, the total rainfall in each water year during that period was generally at or below the long-term average annual rainfall. Hence, such a period displayed generally deficient rainfall; in essence, a dry period or drought had been occurring. Examples of such dry periods on Figure 2.1B are: 1944-45 through 1976-77 and 1983-84 through 1991-92.
- In contrast, whenever the accumulated departure curve ascends over time to the right, the total rainfall in each water year during that period was generally at or above the long-term average annual rainfall. Thus, such a period displayed generally excess rainfall. In essence, a wet period had been occurring. Examples of such wet periods on Figure 2.1B are 1977-78 through 1984-85, and 1992-93 through 1998-99.

TABLE 2-1: 2011-12 PRECIPITATION

(inches)

Gage No.	LACDPW Rain Gage Stations	2011-12 Precipitation	100-Year Mean (1881-1981)	Percent of 100-Year Mean
	Valley Floor Stations			
13C	North Hollywood-Lakeside	10.39	16.63	62%
1107D	La Tuna Debris Station	9.68	14.98	65%
465C	Sepulveda Dam	11.26	15.30	74%
21B	Woodland Hills	10.30	14.60	71%
735H	Bell Canyon Debris Basin	9.45	15.19	62%
25C	Northridge-LADWP	9.81	15.16	65%
251C	La Crescenta	14.17	23.31	61%
293B	Los Angeles Reservoir	11.46	17.32	66%
	Weighted Average[1]	**10.81**	**16.48**	**66%**
	Hill & Mountain Stations			
11D	Upper Franklin Canyon Reservoir	12.75	18.50	69%
17	Sepulveda Canyon at Mulholland	12.32	16.84	73%
33A	Pacoima Dam	10.16	19.64	52%
47D	Clear Creek - City School	16.91	33.01	51%
53D	Colby's Ranch	12.94	29.04	45%
54C	Loomis Ranch-Alder Creek	8.43	18.62	45%
210C	Brand Parks	9.53	19.97	48%
AL301	Brown's Canyon	13.15	17.52	75%
1074	Tujunga-Mill Creek	13.39	21.79	61%
	Weighted Average[1]	**12.01**	**21.76**	**55%**
	Weighted Average Valley Floor and Hill & Mountain Areas[1]	**11.55**	**19.64**	**59%**

1. Weighted Averages calculated using methodology provided in the Report of Referee-July 1962. Hill & Mountain Station Weighted Average estimated due to incomplete data sets that exist in the 100-year period for which the average is calculated.

FIGURE 2.1: 2011-12 MONTHLY WEIGHTED AVERAGE RAINFALL

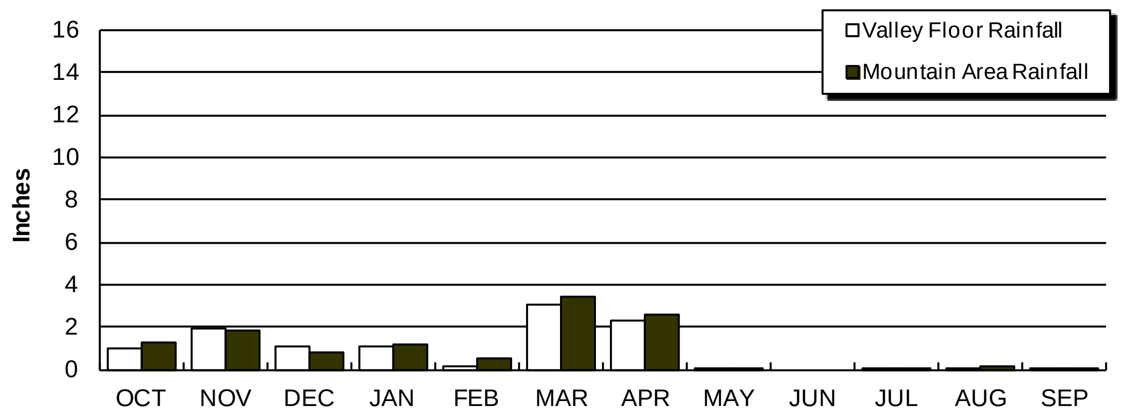
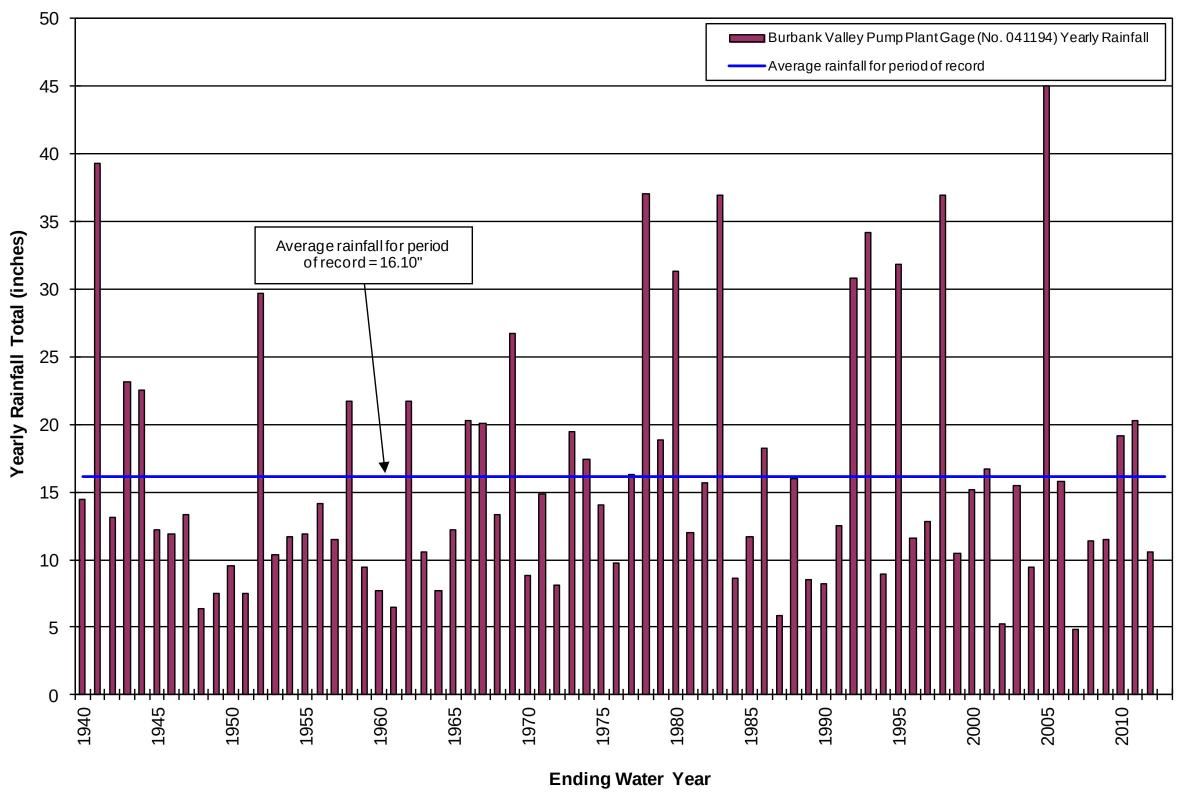
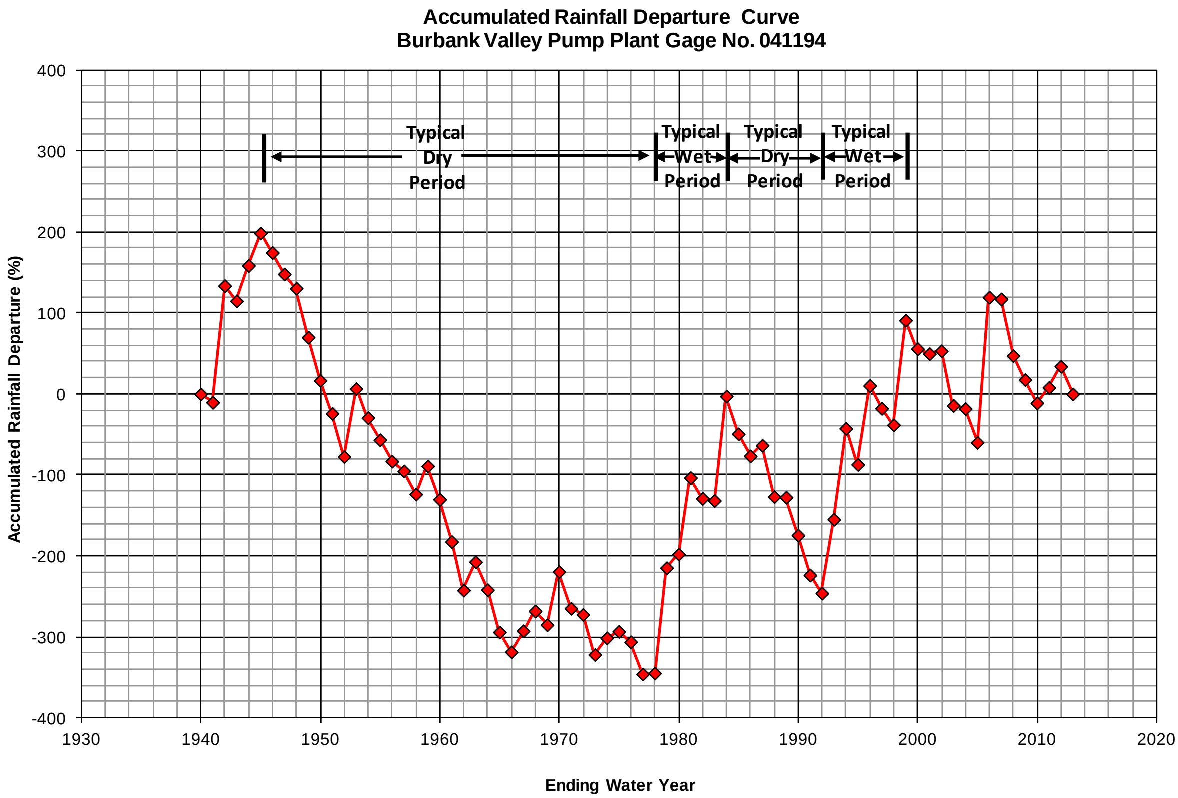


FIGURE 2.1A: YEARLY RAINFALL TOTALS, BURBANK VALLEY PUMP PLANT GAGE



1. Yearly Rainfall Data compiled from Western Regional Climate Center (WRCC)
2. Major divisions are equal to 5 years; minor divisions are equal to 1 year

FIGURE 2.1B: ACCUMULATED RAINFALL DEPARTURE CURVE, BURBANK VALLEY PUMP PLANT GAGE



2.2 Runoff and Outflow from ULARA

The entire watershed of ULARA (including the surface areas of its four groundwater basins) contains 328,500 acres. Of this total, 205,700 acres lie within the tributary hill and mountain areas, whereas the remaining 122,800 acres represent the combined surface areas of the four groundwater basins within ULARA. The drainage system in ULARA is made up of the Los Angeles River and its tributaries. Surface flow in ULARA originates as: runoff from the hills and mountains; runoff from the impervious areas of the valley floor; industrial and sanitary waste discharges; domestic irrigation runoff; and rising groundwater.

A number of stream gaging stations are maintained throughout ULARA, either by the Los Angeles County Department of Public Works (LACDPW) or the United States Geological Survey (USGS). For the Annual Watermaster Report, six key gaging stations have been utilized over the years to illustrate surface water runoff from the main tributary areas of the ULARA watershed. From upstream to downstream, these six gaging stations (see locations on Plate 5) are as follows:

1. Station F-118C-R, which monitors all releases from Pacoima Dam. Runoff below this point flows to the Los Angeles River through lined channels, or it can be diverted to the Lopez and Pacoima spreading grounds for artificial recharge purposes. Note that new downstream Station F-118C-R replaced Station F-118B-R beginning in June 2012.

2. Station F-168B-R, which records all releases from Big Tujunga Dam. This dam collects runoff from the watershed which lies in the hill and mountain areas to the northeast. Runoff below this point flows to Hansen Dam and then to the Los Angeles River. These releases can be diverted for artificial recharge purposes to the Hansen or Tujunga spreading grounds. Note that Station F-168B-R replaced Station F-168-R beginning in June 2012; no data are available for the period Oct 2011 through May 2012.

3. Station F-300-R, which monitors all flow in the main channel of the Los Angeles River west of Lankershim Boulevard, and which includes the outflows from Pacoima and Hansen dams which are not otherwise diverted to the spreading grounds. These records also include flow through the

Sepulveda Dam and releases of reclaimed wastewater discharged by the City of Los Angeles.

4. Station E-285-R, which monitors flow from the westerly slopes of the Verdugo Mountains and tributary areas of the watershed located east of Lankershim Boulevard. This station also records releases of reclaimed wastewater discharged by the City of Burbank.

5. Station F-252-R, which monitors flow from Verdugo Canyon which includes flows from Dunsmore and Pickens canyons.

6. Station F-57C-R, which lies in the main channel of the Los Angeles River and records all surface outflows from ULARA (see location also on Plates 1A and 5).

Table 2-2 summarizes the monthly runoff for these six stations for Water Years 2010-11 and 2011-12. The daily mean discharge volumes for the Water Year 2011-12 for these six stations are summarized in Appendix B.

TABLE 2-2: MONTHLY RUNOFF AT SELECTED GAGING STATIONS

(Acre-feet)

Station	Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
F-118C-R	2010-11	1	5	3,790	3,970	1,200	6,490	3,860	1,360	654	735	332	1,240	**23,637**
Pacoima Dam	2011-12	0	3	0	259	334	0	811	631	404	0	0	0	**2,442**
F-168B-R	2010-11	279	345	6,550	7,240	4,900	9,950	6,790	4,390	2,470	3,550	1,670	874	**49,008**
Big Tujunga Dam	2011-12	ND	ND	ND	ND	ND	ND	ND	ND	630	611	678	623	**2,542**
F-300-R	2010-11	7,520	6,980	42,390	8,450	17,640	57,180	16,110	4,510	3,250	3,050	3,030	3,580	**173,690**
L.A. River Tujunga Ave.	2011-12	3,150	12,010	7,230	8,490	4,490	13,750	10,930	2,310	2,740	3,270	3,240	3,100	**74,710**
E-285-R	2010-11	1,720	1,840	5,110	2,120	3,700	5,410	2,320	2,230	1,820	585	568	576	**27,999**
Burbank Storm Drain	2011-12	900	1,240	994	1,050	796	1,600	1,010	651	621	697	502	891	**10,952**
F-252-R	2010-11	448	620	9,930	639	3,570	2,860	383	451	512	461	287	256	**20,417**
Verdugo Wash	2011-12	703	757	400	365	178	1,040	830	184	75	52	76	76	**4,736**
F-57C-R	2010-11	9,260	8,940	44,230	8,270	25,270	42,770	7,750	6,880	6,050	5,570	5,420	5,650	**176,060**
L.A. River Arroyo Seco	2011-12	8,450	11,170	8,780	13,910	5,540	15,910	17,010	5,270	5,410	5,380	6,060	5,960	**108,850**

ND = No Data

2.3 Components of Surface Flow

The surface flow of the Los Angeles River at Gaging Station F-57C-R consists of:

1. Storm water runoff;
2. Treated wastewater from the Tillman, Burbank, and Los Angeles-Glendale water reclamation plants (WRPs);
3. Industrial discharges and domestic irrigation runoff; and,
4. Rising groundwater.

Storm flows are typically the largest component of the total surface flow recorded at Gage F-57C-R, and these storm flows occur principally in the winter months (Table 2-3 and Appendix B).

A significant factor affecting surface water runoff in the Los Angeles River has been the releases of treated wastewater over time by the 3 local WRPs mentioned above. Specifically, releases from the Los Angeles-Glendale WRP, the Burbank WRP, and the Tillman WRP appear to have begun in 1976-77, 1967, and 1985, respectively.

Industrial discharges and irrigation runoff upstream of Gage F-57C-R are relatively small but cumulatively contribute a moderate amount of surface flow to the Los Angeles River. Field inspection during 1998-99 confirmed year-round unmetered flows of domestic irrigation runoff from residential areas, golf courses and industrial sites.

Rising groundwater is a constant source of loss from the Verdugo and San Fernando groundwater basins. Rising groundwater occurs above the Verdugo Wash Narrows, and in the unlined reach of the Los Angeles River immediately upgradient from Gage F-57C-R. Outflow at Gage F-57C-R includes rising groundwater leaving the Verdugo Basin past Gage F-252-R (Table 2-3). In Water Year 2011-12, rising groundwater was estimated to be 2,068 AF at Gage F-252-R and 3,121 AF at the downstream Gage F-57C-R.

Releases of treated wastewater also have an influence on rising groundwater. These large year-round releases tend to keep the alluvium beneath the Los Angeles River saturated, even in dry years. Nevertheless, there is some opportunity for continuing percolation in the unlined reaches of the river, both upstream and downstream of the lined section near the confluence of the Verdugo Wash and the Los Angeles River. Water percolating in the unlined reach is thought to percolate through the shallow alluvial zones and to re-appear as rising groundwater along the river at a location downstream from Los Feliz Boulevard. Also, there are up to 3,000

AF of recharge per year from delivered water within the Los Angeles Narrows-Pollock Wellfield area that contributes to the rising groundwater condition.

In the Report of Referee (1962, Volume II, Appendix O), procedures were developed for calculating the volume of rising groundwater for the original base period of 1928-1958. Some of the important factors of that study that have been discontinued include: releases of Owens River water; operation of the Chatsworth Reservoir; and operation of the Headworks Spreading Grounds. As shown on Figure O-2 of the Report of Referee (1962), excess rising groundwater was considered to have declined to essentially zero by the late-1950s. The January 1993 report by Brown and Caldwell, "Potential Infiltration of Chlorides from the Los Angeles River Narrows into the Groundwater Aquifer" assessed groundwater levels along the course of the Los Angeles River; the then-current Watermaster provided the data for that 1993 evaluation. As of the end of the drought period in 1977, groundwater levels in the Los Angeles River Narrows were very low; hence, there was very little potential for creating excess rising groundwater at that time. However, increased rainfall and runoff occurred during the 1978-83 period, which, combined with reduced pumping by the Los Angeles-owned Crystal Springs, Grandview, and Pollock wellfields, induced large rises in groundwater levels in the Los Angeles River Narrows. Such elevated groundwater levels that follow periods of heavy rainfall tend to increase the amounts of rising groundwater.

Finally, the methodology used to calculate rising groundwater (Table 2-3) needs to be improved. Over the years, many of the gaging stations in the Los Angeles River and its tributaries have been lost or abandoned. Actual data from these gaging stations have been replaced by estimates, and the LADWP-operated groundwater flow model has been used to check the results. Although the current methodology provides an approximation, it is considered to be less accurate than using actual gage data. To improve the calculation of rising groundwater, the abandoned, lost or inaccurate gaging stations need to be identified, and then these stations should be either rehabilitated or replaced entirely. The first step to be taken by the Watermaster will be a field visit to these types of facilities.

TABLE 2-3: ESTIMATED SEPARATION OF SURFACE FLOW AT STATIONS F-57C-R & F-252-R

(Acre-feet)

	F-57C-R				F-252-R		
Water Year	Rising Groundwater[1]	Waste Discharge	Storm Runoff	Total Outflow [2]	Rising Groundwater[3,4]	Storm Runoff [4]	Total Outflow
2011-12	3,121	69,176	36,603	108,900	2,068	2,662	4,730
2010-11	6,588	88,541	135,815	230,945	2,397	18,023	20,420
2009-10	5,814	74,736	75,150	155,700	2,394	11,936	14,330
2008-09	2,698	73,983	66,882	142,563	2,097	7,808	9,905
2007-08	3,905	76,287	96,548	176,740	1,212	8,700	9,912
2006-07	1,720	72,544	21,236	95,500	1,272	6,668	7,943
2005-06	5,441	74,256	77,063	156,760	1,414	12,717	14,131
2004-05	6,309	70,828	423,293	500,430	5,198	31,874	37,072
2003-04	3,330	90,377	42,153	135,860	2,468	2,851	5,319
2002-03	3,869	75,159	106,862	185,890	3,167	5,183	8,350
2001-02	2,126	74,737	43,937	120,800	1,819	5,721	7,540
2000-01	3,000	91,795	94,065	188,860	1,500	6,370	7,870
1999-00	1,980	78,009	62,202	142,190	824	4,243	8,470
1998-99	2,000	72,790	39,110	113,900	1,000	2,534	7,250
1997-98	4,000	97,681	245,079	346,730	4,000	12,140	16,140
1996-97	3,000	75,827	76,485	155,312	3,000	13,860	16,860
1995-96	3,841	86,127	61,188	151,156	2,577	10,946	13,523
1994-95	4,900	66,209	367,458	438,567	4,809	28,881	33,696
1993-94	2,952	60,594	73,149	136,695	1,387	6,156	7,543
1992-93	4,900	77,000	478,123	560,023	3,335	20,185	23,520
1991-92	3,000	120,789	197,040	320,829	1,412	13,209	14,621
1990-91	3,203	75,647	117,779	196,629	1,157	6,865	8,022
1989-90	3,000	76,789	55,811	167,639	1,182	2,938	4,120
1988-89	3,000	80,020	56,535	136,843	1,995	4,453	6,448
1987-88	3,000	81,920	74,074	156,204	3,548	10,493	14,041
1986-87	3,000	64,125	19,060	83,295	2,100	1,690	3,790
1985-86	3,880	48,370	102,840	155,090	2,470	6,270	8,740
1984-85	3,260	21,600	46,300	71,160	2,710	3,970	6,680
1983-84	3,000	17,780	49,090	69,870	4,000	n/a	n/a
1982-83	3,460	17,610	384,620	405,690	5,330	21,384	26,714
1981-82	1,280	18,180	80,000	99,460	3,710	5,367	9,077
1980-81	4,710	19,580	51,940	76,230	5,780	2,917	8,697
1979-80	5,500	16,500	n/a	n/a	5,150	7,752	12,902
1978-79	2,840	16,450	119,810	139,100	2,470	n/a	n/a
1977-78	1,331	7,449	357,883	366,663	1,168	23,571	24,739
1976-77	839	7,128	58,046	66,013	1,683	2,635	4,318
1975-76	261	6,741	32,723	39,725	2,170	2,380	4,550
1974-75	427	7,318	56,396	64,141	1,333	4,255	5,588
1973-74	2,694	6,366	79,587	88,878	1,772	5,613	7,385
1972-73	4,596	8,776	100,587	113,959	1,706	7,702	9,408
1971-72	---	---	---	---	2,050	2,513	4,563
Average	3,294	56,645	119,552	181,050	2,508	9,114	11,767

1. Includes the influence of treated waste water discharged to the Los Angeles River from the Los Angeles-Glendale Water Reclamation Plant (as of Water Year 1976-77) and the Donald C. Tillman Water Reclamation Plant (as of September 1985).
2. Gage F-57, the major measurement point of discharge to the Los Angeles River, is estimated due to erroneous readings.
3. Includes the influence of declining capacity at Verdugo Park Treatment Plant.
4. Includes influence of dry weather runoff and perennial stream flow.

2.4 Groundwater Recharge

Precipitation has a direct influence on groundwater recharge and, ultimately, on the amount of groundwater in storage in the local groundwater basins. Urban development in ULARA over time has resulted in a significant portion of the rainfall being collected and routed into stormdrains and/or lined channels that discharge directly into the Los Angeles River. To partially offset the increased runoff due to urbanization, Pacoima, Big Tujunga and Hansen dams, originally built for flood control, are now utilized to regulate storm flows and to allow recapture of a portion of the flow in downstream spreading basins operated by the LACDPW and the City of Los Angeles.

The LACDPW operates the Branford, Hansen, Lopez, and Pacoima spreading grounds. The LACDPW, in cooperation with the City of Los Angeles, operates the Tujunga Spreading Grounds (TSG). These spreading grounds are primarily used for the artificial recharge of native water (stormwater runoff). Table 2-4 summarizes the spreading operations at all spreading basins for the 2011-12 Water Year, and Table 2-4A summarizes recharge since the 1968-69 Water Year. Plate 8 shows the locations of these spreading grounds.

TABLE 2-4: 2010-11 SPREADING OPERATIONS IN THE SAN FERNANDO BASIN

(Acre-feet)

Agency	Spreading Facility	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
LACDPW														
	Branford	65	98	61	73	22	84	56	12	12	14	16	16	529
	Hansen	1,100	1,200	1,070	1,070	986	1,080	718	655	472	419	326	261	9,357
	Lopez	0	0	0	64	40	0	0	0	0	0	0	0	104
	Pacoima	1,280	124	66	224	192	288	761	350	197	0	0	0	3,482
	Tujunga	0	0	0	9	0	68	24	0	0	0	0	0	101
	Total	**2,445**	**1,422**	**1,197**	**1,440**	**1,240**	**1,520**	**1,559**	**1,017**	**681**	**433**	**342**	**277**	**13,573**
City of Los Angeles														
	Tujunga [1]	0.47	0.34	0.12	0.31	1.26	0.25	0.03	0.00	0.00	0.00	0.97	0.00	4
	Headworks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
	Total	**0.47**	**0.34**	**0.12**	**0.31**	**1.26**	**0.25**	**0.03**	**0.00**	**0.00**	**0.00**	**0.97**	**0.00**	**4**
City of Burbank														
	Pacoima [2]	1,219	0	0	0	42	0	110	0	0	0	0	0	**1,371**
Basin Total		**3,664**	**1,422**	**1,197**	**1,440**	**1,283**	**1,520**	**1,669**	**1,017**	**681**	**433**	**343**	**277**	**14,948**

1. This water derived from backwashing of the Tujunga GAC vessels and discharged into Tujunga spreading basin.
2. This is MWD water imported by Burbank & spread at Pacoima Spreading Grounds.

TABLE 2-4A: ANNUAL SPREADING OPERATIONS IN THE SAN FERNANDO BASIN

1968-69 through 2011-12
(Acre-feet)

Water	Los Angeles County Department of Public Works (Native)						City of Los Angeles (Imported)			City of Burbank (Imported)[1]	GRAND	Rainfall (inches)
Year	Branford	Hansen	Lopez	Pacoima	Tujunga	TOTAL	Headworks	Tujunga	TOTAL	Pacoima	TOTAL	Weighted Average Valley/Mtns.
2011-12	529	9,357	104	3,482	101	13,573	0	4	4	1,371	14,948	11.55
2010-11	690	19,064	3,922	24,164	31,476	79,316	0	4	4	11,187	90,507	25.21
2009-10	535	16,766	274	9,080	12,849	39,504	0	7,509	7,509	34	47,047	20.55
2008-09	706	0	1	2,000	7,233	9,940	0	0	0	---	9,940	12.58
2007-08	570	10,517	634	5,025	4,892	21,638	0	0	0	---	21,638	17.27
2006-07	532	5,762	44	436	1,200	7,974	0	0	0	---	7,974	5.36
2005-06	576	20,840	958	7,346	14,895	44,615	0	0	0	---	44,615	17.42
2004-05	1,448	33,301	940	17,394	21,115	74,198	0	0	0	---	74,198	45.66
2003-04	444	6,424	144	1,731	1,322	10,065	0	0	0	---	10,065	12.21
2002-03	932	9,427	518	3,539	1,914	16,330	0	0	0	---	16,330	21.22
2001-02	460	1,342	0	761	101	2,664	0	0	0	---	2,664	6.64
2000-01	562	11,694	172	3,826	1,685	17,939	0	0	0	---	17,939	22.29
1999-00	468	7,487	578	2,909	2,664	14,106	0	0	0	---	14,106	16.77
1998-99	547	8,949	536	696	3,934	14,662	0	0	0	---	14,662	10.83
1997-98	641	28,129	378	20,714	11,180	61,042	0	77	77	---	61,119	38.51
1996-97	415	9,808	724	5,768	6,406	23,121	0	51	51	---	23,172	17.65
1995-96	345	8,232	363	4,532	7,767	21,239	0	0	0	---	21,239	14.48
1994-95	585	35,137	1,086	14,064	18,236	69,108	0	0	0	---	69,108	33.08
1993-94	462	12,052	182	3,156	4,129	19,981	0	0	0	---	19,981	11.86
1992-93	389	26,186	1,312	17,001	19,656	64,544	114	0	114	---	64,658	41.26
1991-92	653	15,461	1,094	12,914	9,272	39,394	230	0	230	---	39,624	32.39
1990-91	509	11,489	241	3,940	2,487	18,666	52	0	52	---	18,718	7.69
1989-90	327	2,029	90	1,708	0	4,154	0	0	0	---	4,154	9.55
1988-89	255	3,844	308	1,306	0	5,713	0	0	0	---	5,713	9.72
1987-88	352	17,252	1,037	4,520	0	23,161	0	0	0	---	23,161	21.36
1986-87	0	7,311	141	467	0	7,919	0	33	33	---	7,952	7.70
1985-86	290	18,188	1,735	6,704	0	26,917	0	1,433	1,433	---	28,350	23.27
1984-85	244	13,274	104	3,375	0	16,997	0	5,496	5,496	---	22,493	13.31
1983-84	213	10,410	0	3,545	0	14,168	0	24,115	24,115	---	38,283	11.18
1982-83	883	35,192	1,051	22,972	10,580	70,678	10	32,237	32,247	---	102,925	46.07
1981-82	345	14,317	243	5,495	0	20,400	3,853	0	3,853	---	24,253	20.16
1980-81	245	14,470	335	3,169	0	18,219	4,652	9,020	13,672	---	31,891	12.89
1979-80	397	31,087	1,097	15,583	0	48,164	5,448	19,931	25,379	---	73,543	33.66
1978-79	295	24,697	1,018	12,036	0	38,046	2,463	31,945	34,408	---	72,454	24.07
1977-78	2,142	28,123	445	20,472	12,821	64,003	3,200	18,247	21,447	---	85,450	44.84
1976-77	377	2,656	63	1,943	0	5,039	3,142	16	3,158	---	8,197	16.02
1975-76	470	3,128	562	1,308	0	5,468	3,837	5,500	9,337	---	14,805	14.20
1974-75	681	5,423	915	2,476	0	9,495	4,070	9,221	13,291	---	22,786	---
1973-74	672	6,287	946	2,378	0	10,283	6,205	0	6,205	---	16,488	---
1972-73	1,271	9,272	0	6,343	2,274	19,160	5,182	0	5,182	---	24,342	---
1971-72	161	1,932	0	1,113	0	3,206	7,389	0	7,389	---	10,595	---
1970-71	507	11,657	727	4,049	0	16,940	6,804	399	7,203	---	24,143	---
1969-70	674	11,927	0	1,577	2,380	16,558	11,021	0	11,021	---	27,579	---
1968-69	461	32,464	893	14,262	13,052	61,132	6,698	3,676	10,374	---	71,506	---
AVG.	551	13,917	589	6,847	5,128	27,033	1,690	3,839	5,529	4,197	32,848	

1. Spreading by Burbank began in 2009-10 Water Year following completion of the Burbank MWD connection.

2.5 Groundwater Extractions

The original Trial Court adjudication of groundwater rights in ULARA, effective October 1, 1968, restricted all groundwater extractions to a total maximum safe yield value of approximately 104,040 AFY for the four ULARA groundwater basins. This value amounted to a reduction of approximately 50,000 AF from the average groundwater extractions by all Parties for the six years prior to 1968. The State Supreme Court's opinion, as implemented on remand in the Judgment dated January 26, 1979, further restricted groundwater pumping from each groundwater basin, and by each Party within each basin.

Figure 2.2 illustrates the imported water used in ULARA and annual groundwater extractions, beginning with the 1954-55 Water Year. It can be noted that for the 14 years prior to pumping restrictions (1954-55 to 1967-68), imported water volumes exceeded annual groundwater extractions by 50,000 to 90,000 AFY. In contrast, annual imported water volumes exceeded extractions by 110,000 to 250,000 AFY in the past 43 years (1968-69 to 2011-12).

A total of 79,313 AF of groundwater was pumped from the four ULARA groundwater basins during the 2010-11 Water Year, as follows: 69,767 AF from the SFB; 4,295 AF from the Sylmar Basin; 5,082 AF from the Verdugo Basin; and 169 AF from the Eagle Rock Basin. The respective extraction rights for the 2012-13 Water Year for each basin are: 93,655 AF [Native Safe Yield of 43,660 AF plus an import return credit (or "return water extraction right") of 49,995 AF] for the SFB; 7,140 AF for the Sylmar Basin; and 7,150 AF for the Verdugo Basin. The Groundwater Extractions Report provided in Appendix A summarizes the groundwater extractions by each Party during Water Year 2011-12. Plate 8 shows the locations of the various wellfields owned by the five principal Parties in ULARA, whereas Plate 11 displays the computer-simulated changes in groundwater elevations in the local groundwater basins; these simulated groundwater elevations have resulted from changes in groundwater extractions and annual rainfall and recharge during the 2011-12 Water Year.

Of the total amount of groundwater pumped in ULARA (79,313 AF in 2011-12), the majority (70,810 AF) was extracted by the Parties to the Judgment; 1,209 AF are considered a non-consumptive use or minimal consumption; and 1,413 AF were pumped for physical solutions, groundwater cleanup, water well development and testing, and dewatering activities by other parties (Appendix E). Table 2-5 summarizes private party pumping in the SFB for Water Year 2011-12, whereas Plate 3 shows the locations of the individual producers.

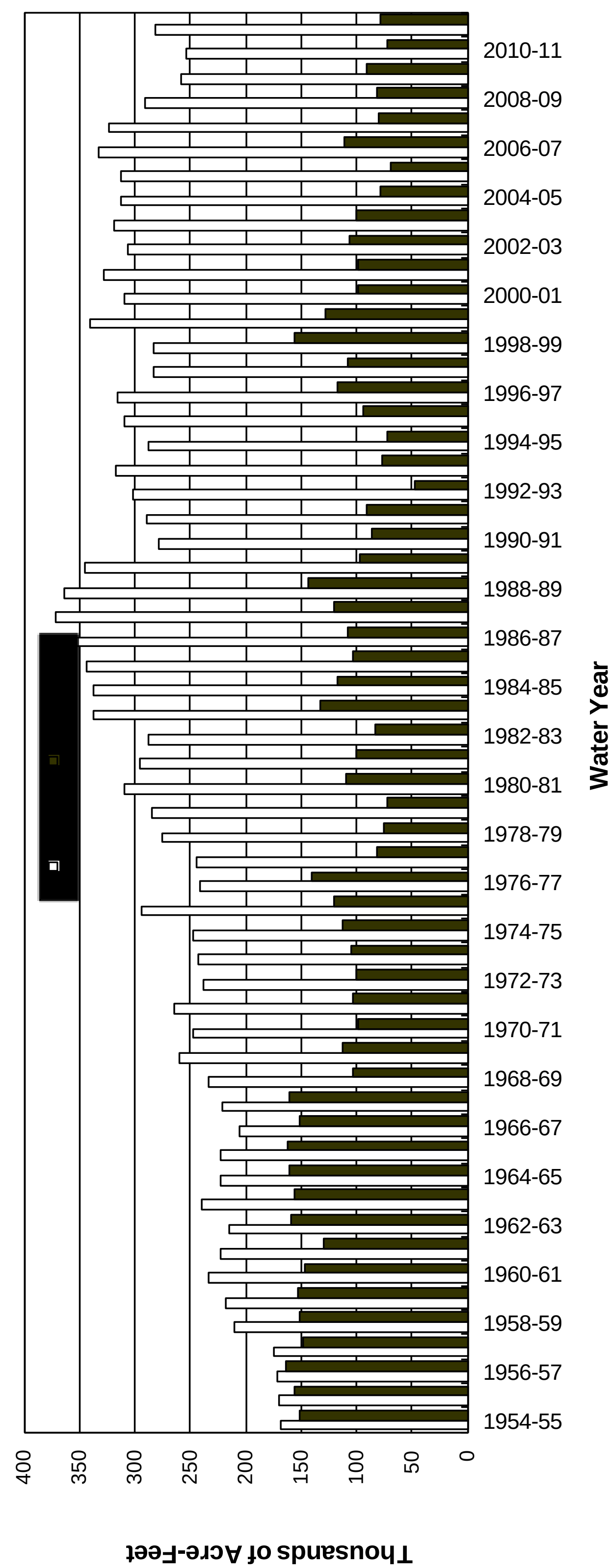


FIGURE 2.2 - YEARLY IMPORTS USED IN ULARA AND TOTAL ULARA EXTRACTIONS

TABLE 2-5: 2011-12 PRIVATE PARTY PUMPING – SAN FERNANDO BASIN

(Acre-feet)

Nonconsumptive Use or Minimal Consumption	
Sears, Roebuck and Company (Air Conditioning; well disconnected 2000)	0.00
Sportsmens' Lodge	8.95
Toluca Lake Property Owners	0.00
Vulcan (CalMat)* (Gravel washing)	1,200.52
Walt Disney Productions (3 wells inactive/ Not abandoned)	0.00
Total	**1,209.47**

Groundwater Dewatering	
Charged to Los Angeles' water rights	
Avalon Encino	0.00
BFI Sunshine Canyon Landfill	92.21
Glenborough Realty (First Financial)	12.70
Mercedes Benz Encino (formerly known as Auto Stiegler)	8.65
Metropolitan Transportation Agency	30.12
Metropolitan Water District	158.60
Trillium Corporation	33.75
Warner Properties Plaza 6 and 3	19.23
Total	**355.26**

Groundwater Cleanup	
Charged to Burbank's water rights	
B.F.Goodrich (Menasco/Coltec)	0.19
Home Depot U.S.A. Inc.	0.54
Subtotal	*0.73*
Charged to Los Angeles' water rights	
3M-Pharmaceutical	43.73
Boeing Santa Susana Field Lab	17.14
Honeywell International, Inc.	170.57
Micro Matics USA, Inc.	0.00
Tesoro	0.00
Subtotal	*231.44*
Total	**232.17**

Physical Solution	
Charged to Burbank's water rights	
Valhalla Memorial Park	338.45
Subtotal	*338.45*
Charged to Glendale's water rights	
Forest Lawn Cemetery Assn.	420.93
Subtotal	*420.93*
Charged to Los Angeles' water rights	
Hallelujah Prayer Ctr (Hathaway/deMille)	32.28
Middle Ranch (deMille)	6.69
Toluca Lake Property Owners	21.45
Water Licenses	2.69
Wildlife Waystation	3.57
Subtotal	*66.68*
Total	**826.06**

Total Extractions **2,622.96**

* Water pumped by Vulcan (Calmat) excludes 117.6 AF of water lost through evaporation.

2.6 Imports and Exports of Water

The continued growth of residential, commercial, and industrial developments has required that more water be imported to supplement the local groundwater supplies in ULARA over time.

Imported supplies to ULARA are from the Los Angeles Aqueduct and from MWD. Imported water in the Los Angeles Aqueduct consists of runoff from the Eastern Sierra Nevada and groundwater from Owens Valley. The imported MWD supplies consist of State Water Project and water from the Colorado River Aqueduct.

Exports from ULARA include imported Los Angeles Aqueduct water and MWD water (pass-through water), and groundwater extracted from the San Fernando Basin by LADWP. Exports of wastewater not treated and released into the Los Angeles River are delivered via pipeline to the Hyperion Treatment Plant in the Playa Del Rey area of the City of Los Angeles.

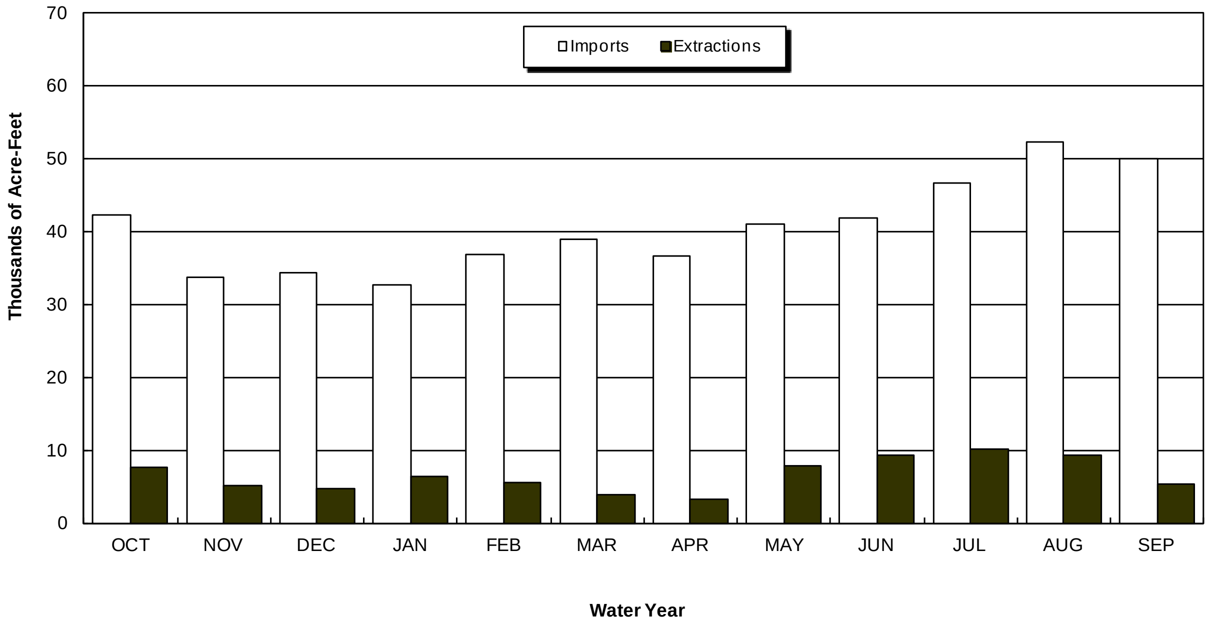
Table 2-6 summarizes the imports and exports from ULARA during the 2010-11 and 2011-12 Water Years, whereas Figure 2.3 shows the monthly extractions and imports for 2011-12. Recent constraints on water supply sources available to Los Angeles from the Eastern Sierra Nevada and Owens Valley have reduced the amounts of water from these sources that can be imported into ULARA; however, the Parties have tried to manage this water supply challenge, in part, by enacting water conservation measures to help reduce the overall water demand.

TABLE 2-6: ULARA WATER IMPORTS AND EXPORTS
(Acre-feet)

Source and Agency	Water Year 2010-11	Water Year 2011-12
Gross Imported Water		
Los Angeles Aqueduct		
City of Los Angeles	334,294	213,043
MWD Water		
City of Burbank [1]	18,563	9,973
Crescenta Valley Water District	1,437	1,534
City of Glendale	17,357	17,284
City of Los Angeles	97,455	237,686
La Canada Irrigation District [2]	994	1,090
Las Virgenes Municipal Water District [2]	7,082	7,092
City of San Fernando	17.58	106
MWD Total	**142,906**	**274,765**
Grand Total	**477,200**	**487,808**
Exported Water (Pass-Through)		
Los Angeles Aqueduct		
City of Los Angeles	156,219	93,638
MWD Water		
City of Los Angeles	56,742	120,547
Total	**212,961**	**214,185**
Net Imported Water	**264,238**	**273,623**

1. Total includes water imported for potable use and for groundwater replenishment (spreading).
2. Deliveries to those portions of these agency service areas that are within ULARA.

FIGURE 2.3 – TOTAL MONTHLY EXTRACTIONS AND GROSS IMPORTS



Note – “Imports” includes water imported for potable use and for groundwater replenishment (spreading).

2.7 Wastewater Recycling

Wastewater recycling currently provides an additional source of water for irrigation, industrial, and recreational uses. In the future, wastewater recycling should be able to provide additional water for groundwater recharge at existing and/or new spreading basins, and/or at new aquifer storage and recovery wells (ASR wells, a method to inject water directly into the aquifer systems). Four water reclamation plants (WRPs) are currently in operation in ULARA: the Tillman, Burbank, Los Angeles-Glendale, and the Las Virgenes Municipal Water District plants. The latter facility is located west of the southwestern boundary of ULARA but a part of the water treated at this facility is used in ULARA. Table 2-7 summarizes the operations at these four WRPs in Water Year 2011-12 whereas Plate 5 shows the locations of these facilities.

TABLE 2-7: 2011-12 WASTEWATER RECYCLING OPERATIONS
(Acre-feet)

Plant/Agency	Plant Influent [1]	Effluent to L.A. River	Flow to Hyperion	Recycled Water Use	Recycled Water Use [9] (%)	Recycled Water Delivered to SFB
City of Burbank	9,236	7128	0[4]	2,000 [5]	22%	2,000
Los Angeles-Glendale	22,278 [2]	14602	2,323	4,632	21%	
Los Angeles				3,273 [6]		319
Glendale				1,359 [7]		1,184
Donald C. Tillman	51,999	34293	15,961	6,834 [8]	13%	1,638
Las Virgenes MWD				1,589		1,589
Total	**83,513**	**56023**	**18,284**	**15,055**		**6,730**

1. Does not include plant overflow/ by pass.
2. Plant influent does not equal to the effluent due to metering error and/or plant use.
3. Total effluent to LA River includes 18,432 AF supplied to Balboa Lake; 5,507 AF supplied to Wildlife Lake; 4,442 AF supplied to the Japanese Garden; discharged to LA River after beneficial re-use, in addition to 5,912 AF plant effluent discharged directly to the L.A. River.
4. Erroneous meter readings show a negative flow from Burbank to Los Angeles Hyperion; the parties are aware of the problem and exploring a solution.
5. Of the total recycled water (2,000 AF), 1165 AF was delivered to the Burbank power plant, 835 AF was used by CalTrans, Media City Center, landfill, DeBell Golf Course, Muir School, McCambridge Park, Burbank High School, AMC theater complex, Costco, Empire Center, Chandler Bikeway, Robert Gross Park, Empire landscape, Airport, M. David Paul, BWP Landscape, Castaway, Stough Park, Starlight Bowl, 5-Points Park, Wildwood Canyon Park, Northeastern extension, Northern extension, Valhalla extension, Studio District extension, and water trucks.
6. Total includes 937 AF for in-plant use; 855 AF delivery to Griffith Park for irrigation; 1,166 AF deliveries to CalTrans, Lakeside, Mt. Sinai Memorial Park, Forest Lawn H.H., and Universal City for irrigation; 250.6 AF delivery to former Headworks Spreading Grounds for construction dust control; and 65.3 AF exported from ULARA delivered to Taylor Yard for irrigation.
7. Of the total recycled water delivered, 1,284 AF was delivered to Glendale for use in Glendale's Power Plant and for irrigation water for CalTrans, Forest Lawn Memorial Park, miscellaneous usage by Galndale Public Works, and other recycled water users in the City of Glendale.
8. Includes deliveries of 1,638 AF of recycled water by Los Angeles to valley fill for irrigation, 3,050 AF of Tillman in-plant use discharged to Hyperion, and 2,146 AF delivered to Valley Generation Station discharged to Hyperion.
9. Recycled water use is calculated as a percentage (%) of plant effluent.

2.8 Groundwater Elevations and Hydrographs

The simulated groundwater elevation contour maps for the Spring (April) and the Fall (September) of 2012 for the San Fernando Basin were created by the ULARA Watermaster Support Staff at LADWP using the SFB Groundwater Flow Model. The SFB model was initially developed during the Remedial Investigation (RI) study of groundwater contamination in the eastern portion of the San Fernando Valley in the early-1990s, and was funded through the USEPA's Superfund program.

The model is comprised of up to four hydrostratigraphic layers established by others in the deepest portion of the eastern SFB, and includes 6,883 cells, ranging in size from 1,000 by 1,000 feet to 3,000 by 3,000 feet. The model parameters were calibrated by matching the simulated hydraulic-head fluctuations with the historical water level fluctuations measured at selected key monitoring wells for a 10-year period. The simulated 2012 contours for San Fernando Basin were estimated by incorporating the actual monthly recharge (e.g., the amount of spread water, precipitation, etc.) and groundwater extraction values for the 2011-12 Water Year as model input. The model was then run to simulate the actual operations in the San Fernando Basin during the period October 2011 to September 2012. The simulated head values (simulated groundwater elevations) at the end of the months of April and September of the 2010-11 Water Year for SFB were then plotted by utilizing groundwater contouring software.

The simulated Groundwater Elevation Contour Maps for Spring and Fall 2012 are shown on Plates 9 and 10, respectively, to depict the regional direction of groundwater flow within the San Fernando Basin during these periods, as simulated by the LADWP flow model. Current groundwater elevations in different portions of the four ULARA groundwater basins may be obtained by contacting the Watermaster Support Staff at LADWP at (213) 367-2117. Additional water level data may also be available from Los Angeles County via http://gis.dpw.lacounty.gov/wells/viewer.asp.

Plate 11 has been prepared to illustrate the simulated change in groundwater elevations from Fall 2011 to Fall 2012 for the San Fernando Basin. The decrease in simulated groundwater elevations ranged between 20 feet and 30 feet in the portion of the SFB near the Hansen, Pacoima, and Tujunga spreading grounds. This decrease is attributed to the relatively low volume (13,573 AF) of native runoff water that was able to be artificially spread at these spreading grounds during that time period. In addition, Burbank spread only 1,371 AF of imported water from MWD at Pacoima spreading grounds. The long-term average annual volume of native runoff water spread within SFB has been approximately 26,000 AF.

Simulated groundwater elevations decreased by 2 feet to 12 feet near the LADWP-owned Rinaldi-Toluca and North Hollywood wellfields due to: the increase in total extraction from these two LADWP-owned wellfields; and the decreased volume of water that was able to be artificially spread and recharged at the spreading basins that lie upgradient from these wellfields. Pumping at these major wellfields during this same period was increased by 42 percent, from 10,946 AF in 2010-11 to 18,915 AF in 2011-12. The amount of recharge at these upgradient spreading basins decreased by about 84 percent, from 90,507 AF in 2010-11 to 14,944 AF in 2011-12. .

Similarly, due to decreased recharge at the Tujunga spreading grounds and other upgradient spreading grounds, the simulated groundwater elevations near the LADWP-owned Tujunga Wellfield (TWF) decreased as much as 28 feet.

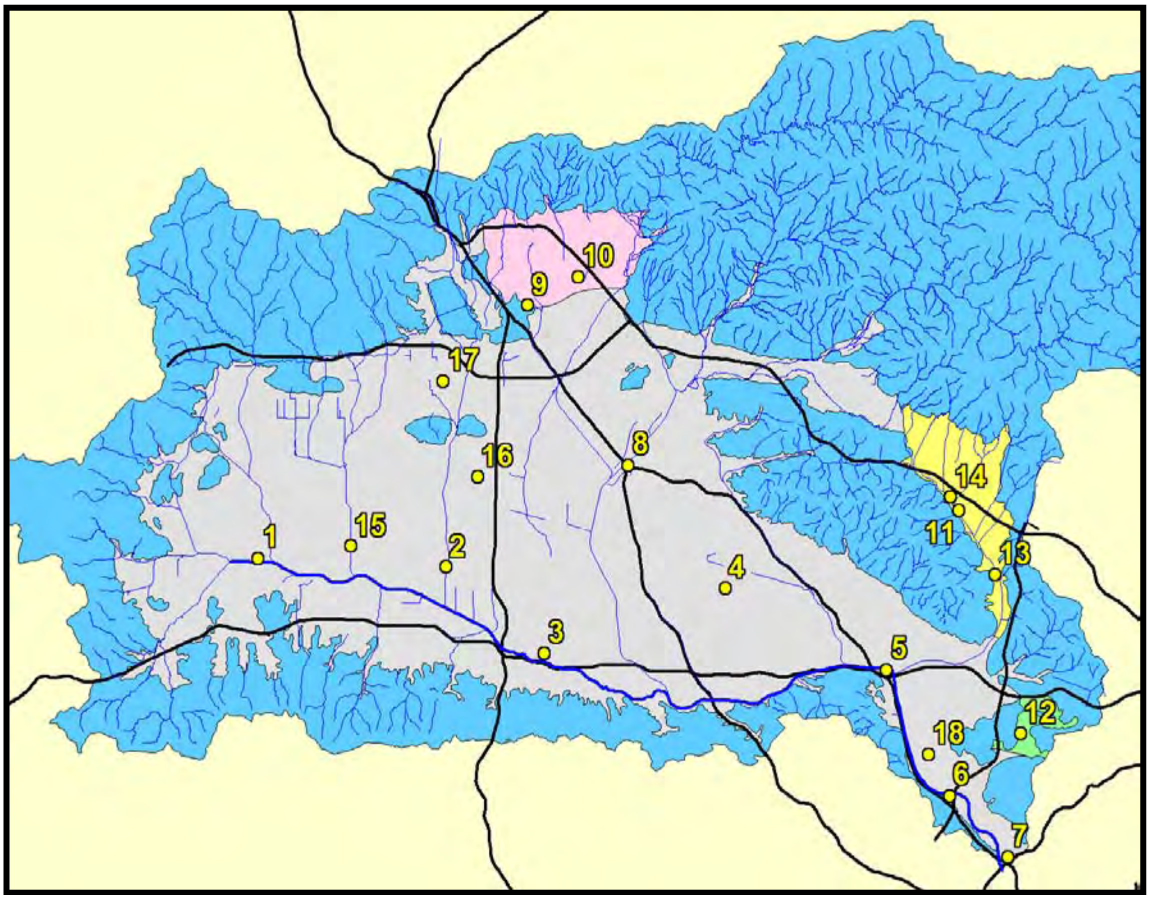
In general, simulated groundwater elevations decreased in most areas of the SFB, mainly due to the significant decrease in the artificial recharge at the spreading grounds, the below-average rainfall, and the minor increase in municipal-supply groundwater extractions by the purveyors in Water Year 2011-12.

Over the years, the water level data collected from 11 wells within the valley fill areas of ULARA have been used to create hydrographs; these graphs illustrate the fluctuations in water levels in these wells on a seasonal basis for each year and also on a year to year basis in response to variations in seasonal/annual groundwater extractions and annual recharge. Actual water levels for each well are plotted on the hydrographs as depth to water for each available data point; the ground surface elevation (GSE) of each well is listed on each respective hydrograph. Starting with the Annual Report for the 2009-2010 Water Year, the Watermaster began to collect water level data for another ±20 wells in ULARA, as available from LADWP and the Los Angeles County Department of Public Works – Water Resources Division. Using available location data for each of those ±20 wells, the Watermaster staff plotted their locations and their respective period of available water level data on a map for in-house use; well depth and casing perforation records were also listed, if available, for each well. The locations and water level database for those ±20 additional wells were then reviewed and compared to the locations of the 11 original wells for which hydrographs have been presented for many years in the prior Annual Watermaster reports.

As a result, the Watermaster has begun including the hydrographs for 7 additional wells (a total now of 18 wells) in the ULARA groundwater basins, beginning with the Annual Report for the 2009-10 Water Year. One of these additional and newly-plotted wells (shown as No. 12 on Figure 2.4) provides the fluctuations in water levels in the Eagle Rock Groundwater Basin.

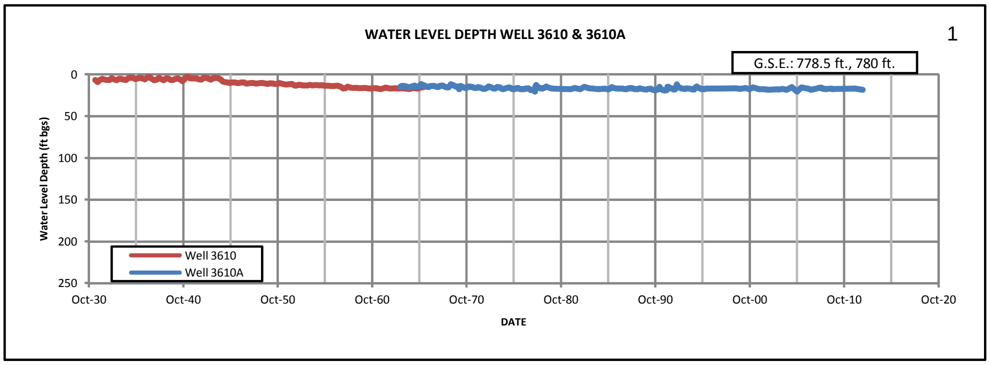
Figure 2.4 illustrates the locations of the 18 wells for which hydrographs are now being prepared, whereas the hydrographs for each respective well are shown on the ensuing pages.

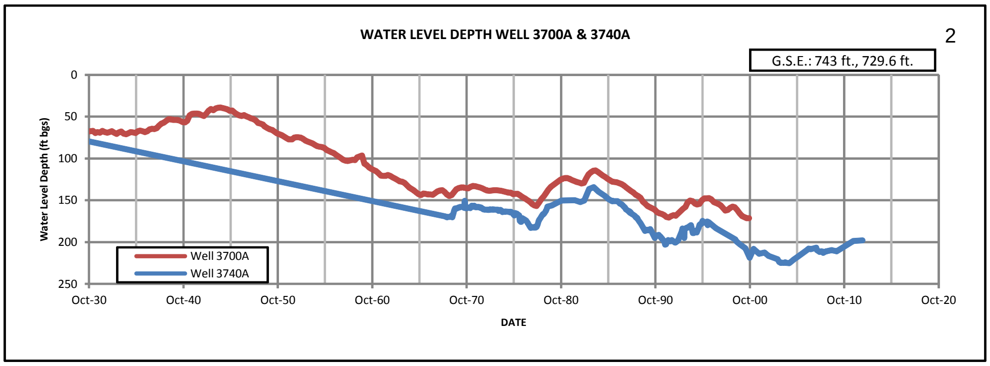
FIGURE 2.4 LOCATIONS OF WELLS WITH HYDROGRAPHS

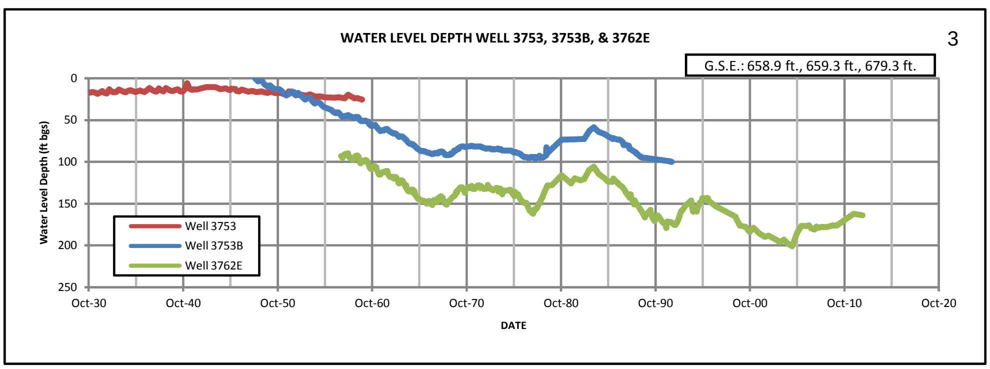


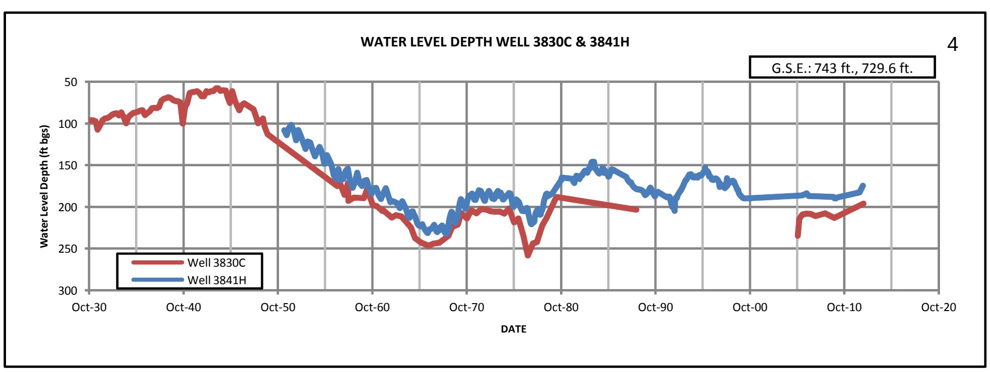
NOTE: See Hydrographs for each well shown above in the accompanying figures.

SAN FERNANDO BASIN

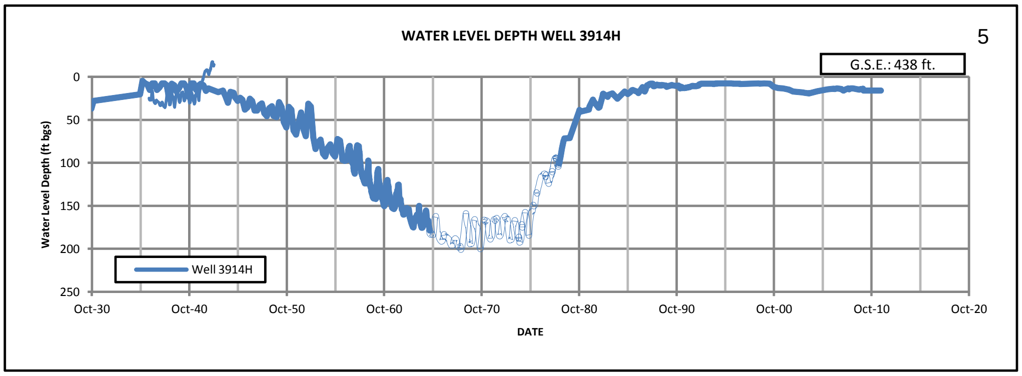


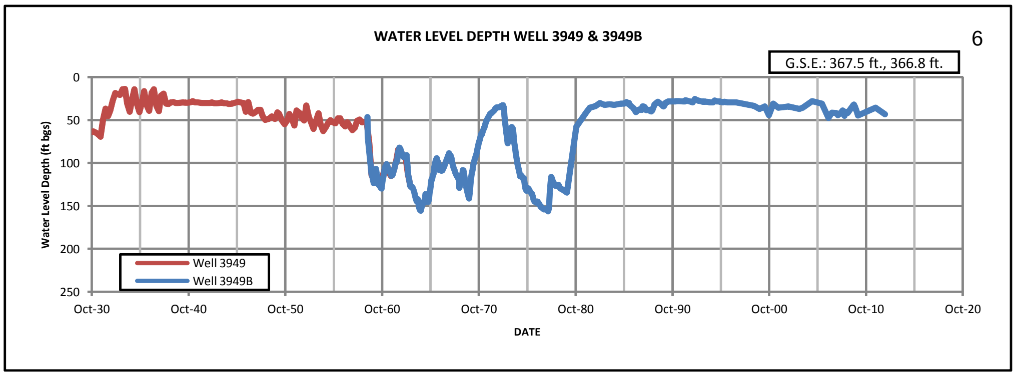


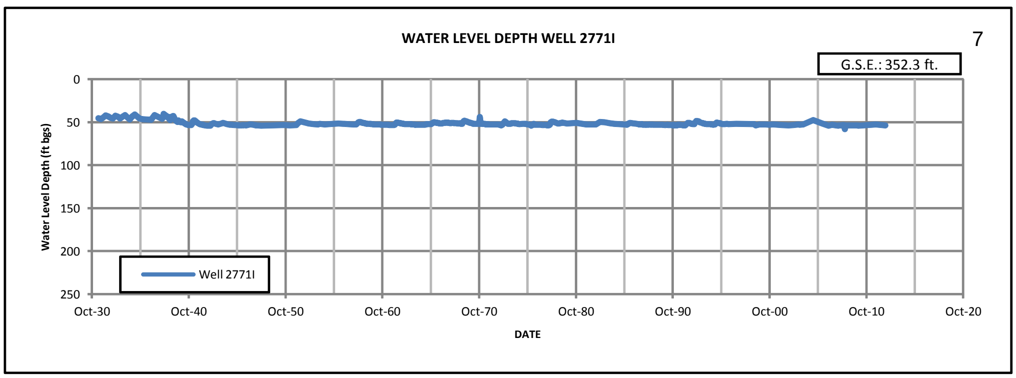


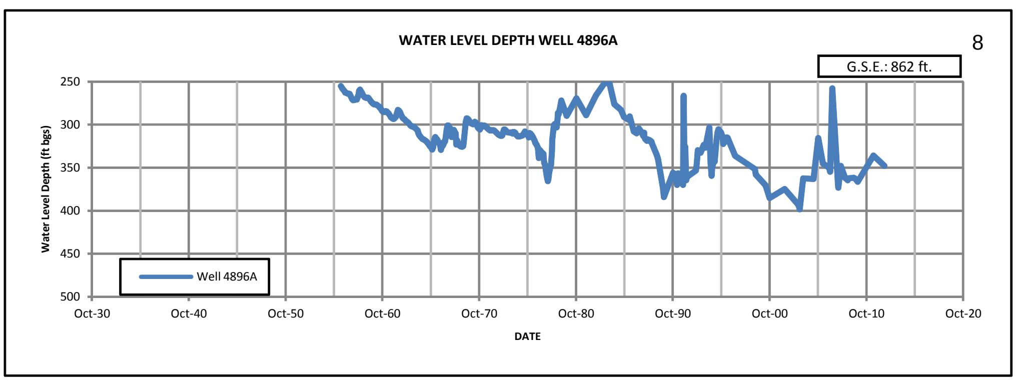


SAN FERNANDO BASIN









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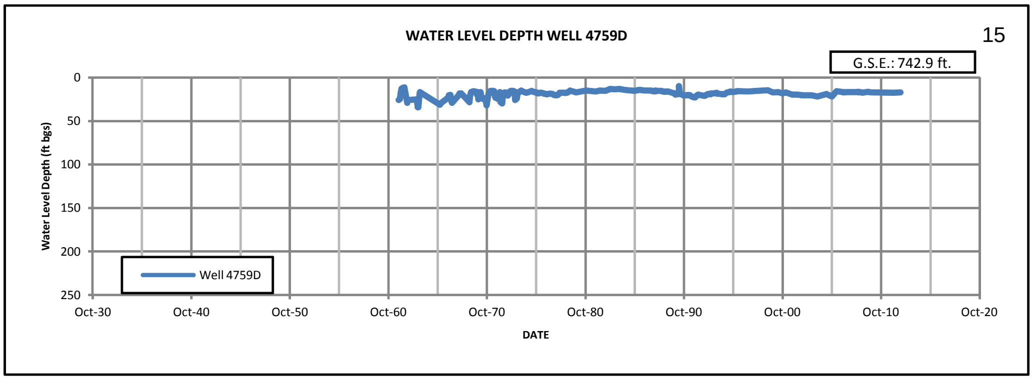
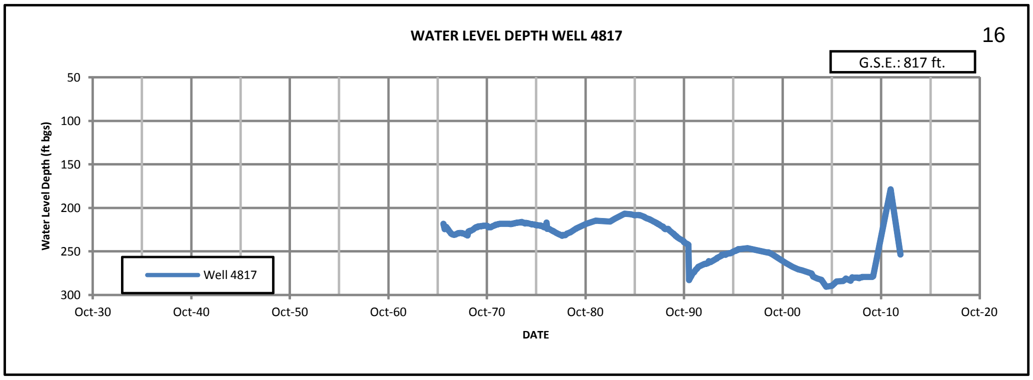
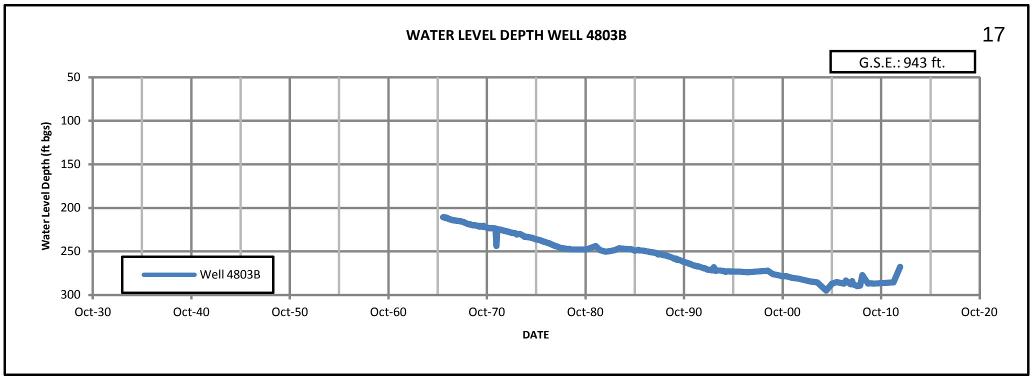
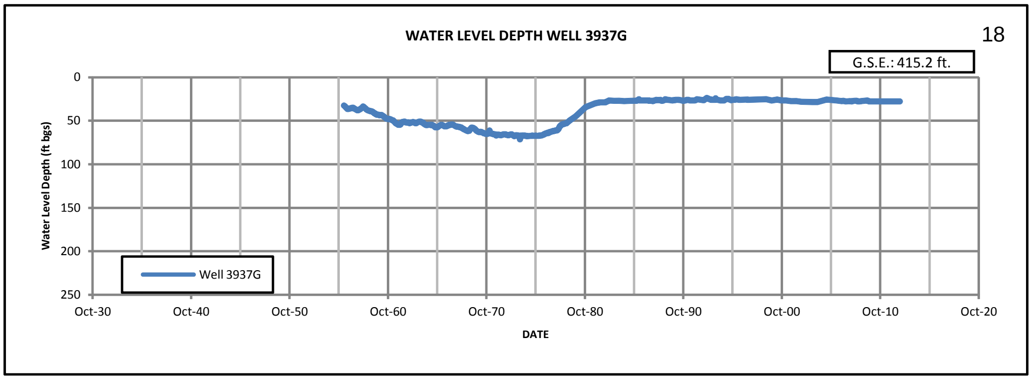
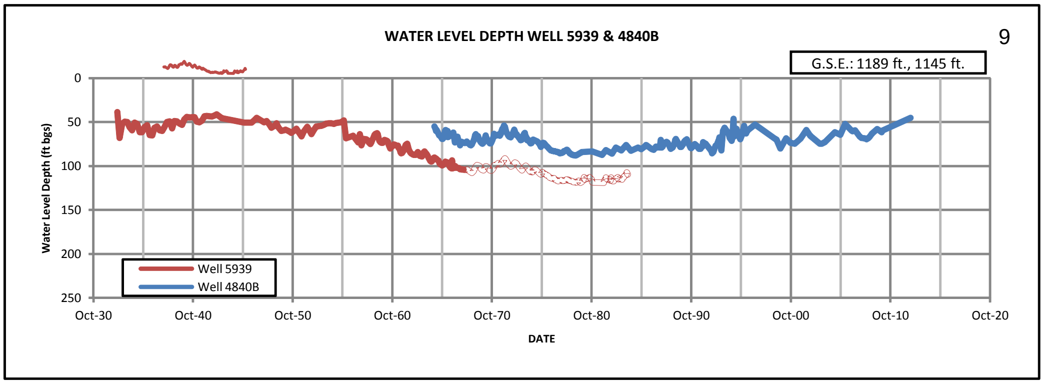


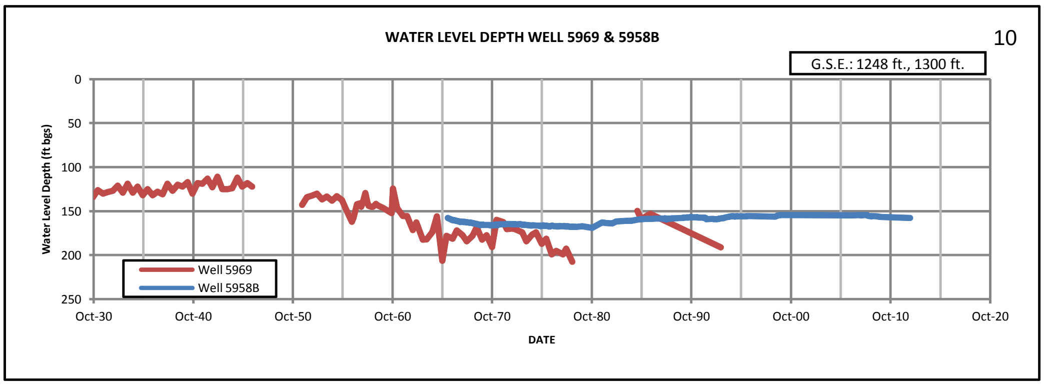




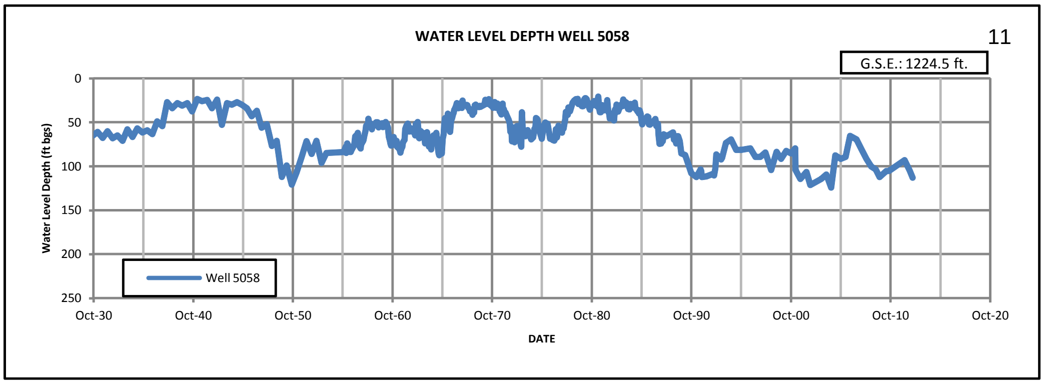


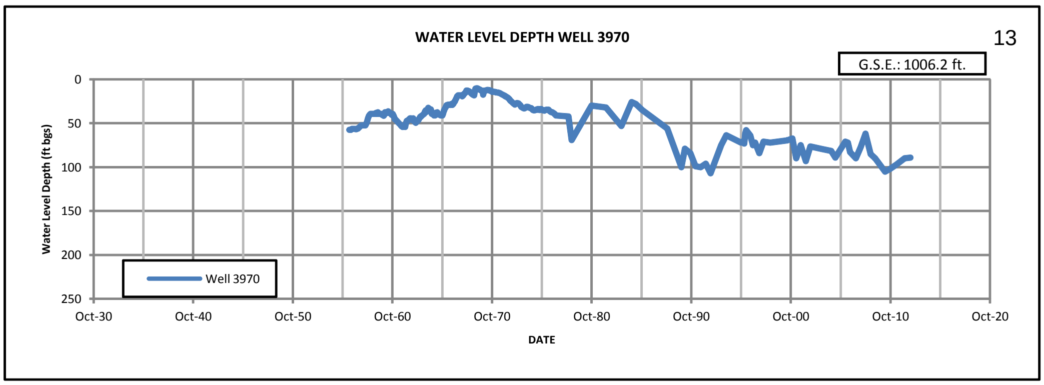
SYLMAR BASIN

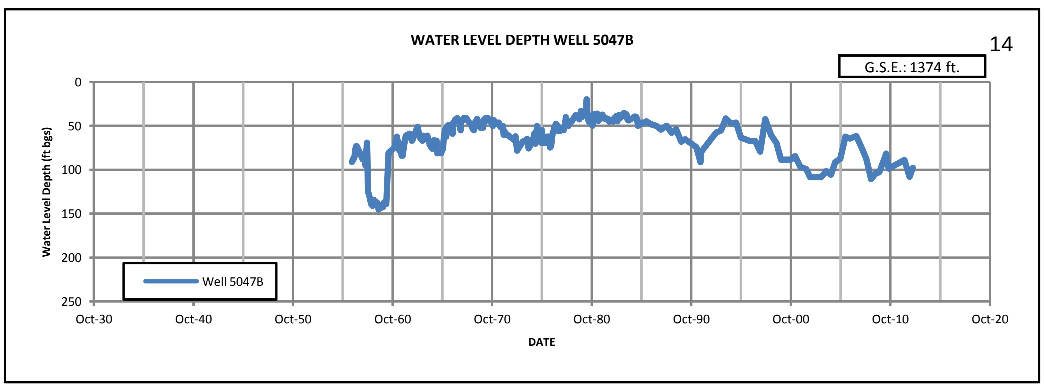




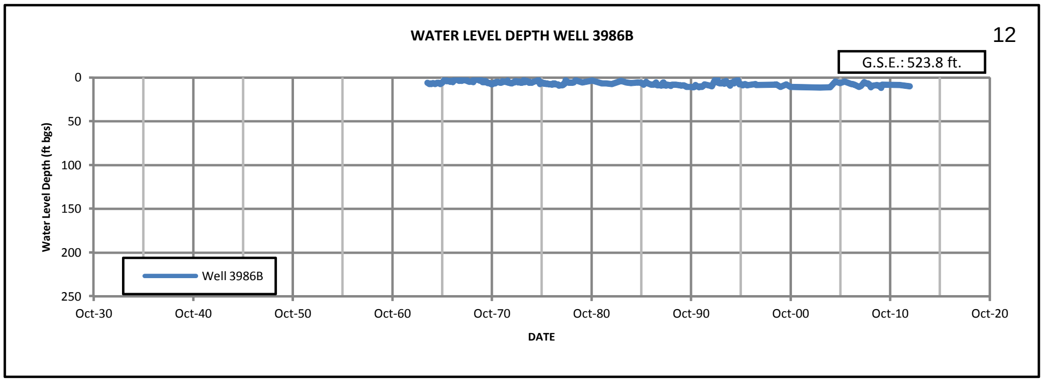
VERDUGO BASIN







EAGLE ROCK BASIN



2.9 Groundwater In Storage

San Fernando Basin

Each year, the change in the amount of groundwater stored in the San Fernando Basin is evaluated in three ways: between the current water year and the previous water year; for the cumulative change since Safe Yield Operation began in 1968; and, for the cumulative change since 1928, the date at which sufficiently detailed records are considered to have become available for the calculation.

In Fall 1968, following the Trial Court decision, Safe Yield Operation was implemented by the Court in an effort to halt the overdraft of the San Fernando Basin that began in 1954 (refer to the blue-colored line on Plate 13). Methodology established by the State Water Rights Board, also referenced in Appendix R of the 1962 Report of Referee, was used to derive a regulatory requirement for groundwater in storage of 360,000 AF for the SFB that considered normal wet-dry cycles, operational flexibility, and annual pumping based on the calculated safe yield. The upper regulatory storage limit of 210,000 AF above the 1954 storage volume was established to help prevent excess rising groundwater from leaving the basin, whereas the lower regulatory storage limit of 150,000 AF below the 1954 storage level was established to help provide additional storage space for groundwater in wet years. It was determined that the amount of stored groundwater should be kept between the upper and lower limits of the regulatory storage range (indicated on Plate 13 by the horizontal-dashed red line). As shown on Plate 13, and with only a few brief exceptions, the San Fernando Basin has rarely been operated within the regulatory storage range after 1968.

Plate 13 illustrates two important items:

1. The estimated change in groundwater in storage within the San Fernando Basin is presented graphically by the blue line on Plate 13, and in tabular form on Table 2-8. Each year, groundwater levels are measured in numerous wells throughout the SFB and these groundwater levels are used to calculate the overall increase or decrease in the volume of groundwater stored in this basin; the resulting change in storage is plotted annually on the graph. This blue line on Plate 13 depicts the fluctuations in the calculated change in groundwater storage beginning in approximately 1980; the very slight but overall declining trend from 1980 to 2011-12 has occasionally been reversed during years of above-average rainfall and/or years of above-average spreading operations, and/or periods of decreased groundwater extractions. The long-term decline in groundwater in storage since 1944 (see Plate 13) has been caused by more water leaving the basin than has been recharged on a long-term average annual basis. Causes of this decline include: pumping in excess of long-term recharge; reduced

natural recharge caused by increased urbanization and runoff leaving the basin; additional amounts of groundwater underflow and rising groundwater leaving the basin; and reductions in the volumes of artificial recharge due to restrictions at the spreading grounds located on the northeastern side of SFB.

2. For the San Fernando Basin, the Judgment provides a right to the cities of Burbank, Glendale, and Los Angeles (the "Parties") to reduce their pumping and to store, or "carry over", any unused water rights into future years. These "un-pumped" water rights are accounted for as Stored Water Credits. The red line on Plate 13 represents the calculated change in storage minus the total combined Stored Water Credits that these three Parties have accumulated over time in San Fernando Basin. In other words, the red line illustrates what the change in storage would have been in this basin had these Parties fully pumped their annual water rights each year beginning in 1968. As depicted by this scenario, groundwater levels in the SFB would be far below the level at which the Court declared Safe Yield Operation in 1968. This concept clearly demonstrates that the San Fernando Basin cannot supply the total amounts of groundwater to which these Parties are entitled under the Judgment, and that there is a significant shortfall between water rights and actual hydrologic conditions.

Compounding this problem is the fact that the Judgment does not limit either the amount of Stored Water Credits that a Party can accumulate or the time period over which those Stored Water Credits are allowed to accumulate in SFB. As of October 1, 2012, the three Parties had accumulated a total of 570,031 AF of Stored Water Credits in SFB. If the Parties were to have pumped their full water rights beginning in 1968, the San Fernando Basin (as of October 1, 2012) would be 364,234 AF below the 1968 level at which the Court imposed Safe Yield Operation (Plate 13, red line); this would return SFB to a condition of overdraft. Clearly, basin recharge is not keeping up with the pumping rights defined in the 1979-dated Judgment. Because more than about 364,234 AF of these Stored Water Credits are below the level at which Safe Yield Operation was mandated by the Court in 1968, it has been the opinion of each Watermaster that this groundwater does not actually exist in the San Fernando Basin. These Stored Water Credits in question currently represent about 64% of the total credits accumulated over time by the cities of Burbank, Glendale, and Los Angeles.

The challenges facing the three Parties, the Watermaster, and the Court for the San Fernando Basin continue to be the following: a long-term decline in the actual volume of stored groundwater; and an accumulation of a large quantity of Stored Water Credits for which there is an insufficient volume of "real" groundwater in storage in this basin. The three Parties and the

Watermaster continue to work together to discuss potential strategies and to gain consensus on possibly reducing future pumping to match the actual basin recharge.

Furthermore, in September 2007, the three Parties entered into a 10-year Stipulated Agreement entitled "Interim Agreement for the Preservation of the San Fernando Basin Water Supply" ("Agreement") to begin to address the problems and to develop solutions to those issues where agreement had been attained. The Agreement, importantly, contained several key provisions designed to help address the imbalance between the decline in stored groundwater and the large accumulation of Stored Water Credits (a copy of this Stipulated Agreement is in Appendix G). Three key provisions of the Stipulated Agreement are the following:

- First, the Agreement, which is for 10 years, segregates total Stored Water Credits into "Available Credits" and "Reserved Credits". Reserved Credits are the amounts of Stored Water Credits that lie below the 1968 storage level (represented on Plate 13 by the horizontal-dashed brown line). Reserved Credits are not supported by actual groundwater in storage and, with the exception of the EPA OUs, emergencies, or operational events, such credits may not be pumped until stored water within the SFB recovers sufficiently to allow their use. Conversely, Available Credits are the amount of Stored Water Credits that lie above the 1968 storage level, and may be pumped by the Parties without restriction.
- Second, the Agreement memorializes the support of the City of Los Angeles to work closely with Los Angeles County to restore and enhance artificial recharge of stormwater runoff within the SFB.
- Third, beginning October 1, 2007, an estimated volume of the loss from the SFB due to rising groundwater and underflow is being debited on an annual basis from the Stored Water Credits of each Party, in accordance with Section 8.2.9 of the Judgment. The importance of this provision of the Stipulated Agreement is to help bring the water rights of each Party back into balance with basin hydrology. These losses from the basin are estimated to be 1% of the total Stored Water Credits and the Stipulated Agreement provides that this amount is to be subtracted each year from all Stored Water Credits until the determination of the volume of rising groundwater is better defined.

Fortunately, in recent years, the City of Los Angeles (through LADWP) and the Los Angeles County Department of Public Works (LACDPW) have been working together to seismically retrofit and/or enlarge the reservoir capacity of certain dams and to rehabilitate and/or enlarge the existing spreading basins in the eastern portion of ULARA; refer to Chapter 1 of this report for additional details. These projects are oriented, in part, to capture and store additional amounts of surface water runoff in the eastern portion of the San Fernando Basin. Those agencies are also considering additional plans, such as optimizing the methods and/or timing for operating those reservoirs and spreading basins, to further enhance recharge opportunities.

Current programs already in progress between these two agencies and the respective annual volume of increased recharge at each facility are as follows:

Project	LADWP's Project Partner	Construction Start Date	Expected End Date	Expected Increase in Recharge (AFY)
Big Tujunga Dam Seismic Retrofit Project[1]	LACFCD	2007	2016[1]	4,500[2]
Hansen Spreading Grounds Enhancement	LACFCD	2008	Dec 2012	2,100
Tujunga Spreading Grounds Enhancement	LACFCD	2014	2016	8,000
Pacoima Spreading Grounds Enhancement	LACFCD	2014	2016	2,000
Sheldon-Arleta Project[3]	LACFCD	2007	Nov 2009	4,000
LADWP's Distributed Recharge Efforts	LACFCD	2009	Ongoing	200

1. Seismic retrofit work was completed in July 2011. Future work includes removal of sediment fill from behind dam.
2. This volume includes volume regained by removing sediment fill from behind dam.
3. Construction completed, remaining task includes facility performance testing.

The volume of groundwater in storage in San Fernando Basin is estimated to have increased by only 10,338 AF between Water Years 2010-11 and 2011-12; this is a much smaller increase in storage compared to that in the prior water year. This is due, in part, to the below-average rainfall and the resultant decrease in stormwater spreading . Based on the 2011-12 calculation for change in storage, there remains approximately 449,573 AF of groundwater storage space available in the SFB. This space can be used to capture and store additional native water or imported water supplies during wet (above-average rainfall) years. Basin storage space is a valuable resource, and it has been the opinion of all ULARA Watermasters that the use of this storage space should be available for use by the Parties.

TABLE 2-8: CHANGE IN GROUNDWATER IN STORAGE
SAN FERNANDO BASIN

Water Year	Valley Floor Precipitation (in)	Artificial Recharge (acre-feet)	Change in Storage (acre-feet)	Cumulative Change in Storage (acre-feet)	Groundwater Extractions (acre-feet)
2011-12	10.83	14,948	10,338	205,797	69,764
2010-11	24.44	90,507	71,081	216,135	64,313
2009-10	19.08	47,013	17,856	145,054	80,487
2008-09	11.64	9,940	(15,750)	127,198	72,140
2007-08	15.10	21,638	9,443	142,948	67,228
2006-07	4.39	7,974	(33,693)	133,505	94,430
2005-06	16.46	44,615	16,303	167,198	59,375
2004-05	42.64	74,198	66,476	150,895	67,865
2003-04	9.52	10,065	(22,367)	84,419	89,346
2002-03	19.41	16,330	(15,835)	106,786	95,431
2001-02	5.95	2,664	(27,094)	122,621	87,992
2000-01	19.52	17,939	(6,930)	149,715	86,946
1999-00	14.84	14,106	(31,044)	156,645	116,357
1998-99	9.81	14,662	(82,673)	187,689	141,757
1997-98	37.04	61,119	44,113	270,362	94,682
1996-97	15.17	23,172	(35,737)	226,249	105,899
1995-96	12.03	21,239	(49,223)	261,986	82,862
1994-95	33.36	69,108	79,132	311,209	58,121
1993-94	10.19	19,981	(22,238)	232,077	62,990
1992-93	36.62	64,658	106,317	254,315	36,419
1991-92	30.05	39,624	411	147,998	76,213
1990-91	14.38	18,718	(14,122)	147,587	71,065
1989-90	8.20	4,154	(29,941)	161,709	81,466
1988-89	9.12	5,713	(30,550)	191,650	127,973
1987-88	18.62	23,161	(5,000)	222,200	105,470
1986-87	5.99	7,952	(31,940)	227,200	91,632
1985-86	20.27	28,350	(7,980)	259,140	86,904
1984-85	11.00	22,493	(31,690)	267,120	101,591
1983-84	9.97	38,283	(63,180)	298,810	115,611
1982-83	39.64	102,925	121,090	361,990	68,394
1981-82	17.18	24,253	(530)	240,900	84,682
1980-81	11.04	31,891	(32,560)	241,430	92,791
1979-80	30.25	73,543	99,970	273,990	58,915
1978-79	21.76	72,454	78,080	174,020	59,843
1977-78	35.43	85,450	136,150	95,940	66,314
1976-77	14.19	8,197	(50,490)	(40,210)	125,445
1975-76	9.90	14,805	(30,090)	10,280	103,740
1974-75	14.74	22,786	(22,580)	40,370	95,830
1973-74	15.75	16,488	(21,820)	62,950	88,017
1972-73	20.65	24,342	17,020	84,770	82,004
1971-72	8.10	10,595	(17,090)	67,750	84,140
1970-71	15.57	24,143	15,340	84,840	79,010
1969-70	10.50	27,579	(9,740)	69,500	88,856
1968-69	29.00	71,506	79,240	79,240 [1]	84,186
44 Year Average	**17.94**	**32,847**	**5,147**		**85,329**

4. Accumulation of Storage commenced as of October 1, 1968.

Sylmar Basin

The groundwater storage capacity of the Sylmar Basin has been previously calculated by others to be approximately 310,000 AF. The volume of groundwater in storage in this basin is estimated to have increased by 1,941 AF between Water Year 2010-11 and 2011-12.

Verdugo Basin

The groundwater storage capacity of the Verdugo Basin, as previously determined by others, is approximately 160,000 AF; the volume of groundwater in storage in this basin is estimated to have increased by 1,998 AF between Water Year 2010-11 and 2011-12.

Whereas there was a calculated increase in the volume of groundwater in storage in 2011-12, the overall decline in storage observed in Verdugo Basin since 1968 is likely caused by: increased urbanization and a resulting increase in runoff leaving the basin; and a significant reduction in annual groundwater recharge from the deep percolation of fluids from former cesspools and septic systems that were removed from service following the installation of sewers in much of this area beginning in the mid-1980s.

Eagle Rock Basin

The volume of groundwater in storage is estimated to have decreased by 81 AF from Water Year 2010-11 to 2011-12.

2.10 Water Supply and Disposal - Basin Summaries

Tables 2-9A, 2-9B, 2-9C, and 2-9D summarize water supply and disposal activities in the San Fernando, Sylmar, Verdugo, and Eagle Rock basins, respectively. Outflows are based on computations originally made by the State Water Rights Board in the 1962 Report of Referee.

TABLE 2-9A: SUMMARY OF 2011-12 WATER SUPPLY AND DISPOSAL, SAN FERNANDO BASIN

(Acre-feet)

Water Source and Use	City of Burbank	City of Glendale	City of Los Angeles	City of San Fernando	All Others	Total
Extractions						
Municipal Use	9,997	7,876	49,273	---	0	67,146
Basin Account	0	0	0	---	0 [1]	0
Physical Solution	---	---	---	---	826 [2]	826
Cleanup/Dewaterers	---	---	---	---	587	587
Non-consumptive Use	---	---	---	---	1,209	1,209
Total	**9,997**	**7,876**	**49,273**	**0**	**2,622**	**69,768**
Imports						
LA Aqueduct Water	---	---	213,043	---	---	213,043
MWD Water	8,602 [7]	17,284	211,244	96	7,092 [3]	244,325
Groundwater from						
Sylmar Basin	---	---	1,093	2,914	---	4,007
Verdugo Basin	---	316	---	---	---	316
Total	**8,602**	**17,600**	**425,380**	**3,010**	**7,092**	**461,691**
Delivered Reclaimed Water	2,000	1,098	1,957 [4]	0	1,589 [3]	6,644
Exports						
LA Aqueduct Water						
out of ULARA	---	---	89,898	---	---	89,898
to Verdugo Basin	---	---	320	---	---	320
to Sylmar Basin	---	---	4,678	---	---	4,678
to Eagle Rock Basin	---	---	417	---	---	417
MWD Water						
out of ULARA	---	---	89,138	---	---	89,138
to Verdugo Basin	---	1,966	317	---	---	2,283
to Sylmar Basin	---	---	4,638	---	---	4,638
to Eagle Rock Basin	---	---	413	---	---	413
Groundwater	15 [5]	117 [5]	43,724	---	---	43,866
Total	**15**	**2,083**	**233,543**	**0**	**0**	**235,651**
Delivered Water						
Hill & Mountain Areas	---	---	46,044	---	---	46,044
Total - All Areas	20,584	24,491	243,067	3,010	11,303	302,455
Water Outflow						
Storm Runoff (F-57C-R)	---	---	---	---	36,603	36,603
Rising Groundwater (F-57C-R)	---	---	---	---	3,121	3,121
Subsurface	---	---	---	---	391	391
Recycled Water to the LA River	7,128	4,445	10,157	---	349 [3]	22,079
Wastewater to Hyperion	0 [8]	707 [6]	1,616 [6]	---	---	2,323

1. Basin Account water is not charged to any party.
2. Includes pumping from Hill and Mountain areas tributary to SFB.
3. Las Virgenes Municipal Water District.
4. LA total recycled water is 10,107 AF of which 1,957 AF were delivered to valley fill and 8,150 delivered to hill/mountains and other uses.
5. Glendale OU and Burbank OU treated groundwater discharged to Los Angeles River or sewer.
6. Water discharged from Tillman and LA-Glendale plants. Annual cities' portion from LAG based on proportion of reclaimed water.
7. Does not include water imported for groundwater replenishment (spreading)
8. Erroneous meter readings show a negative flow from Burbank to Los Angeles Hyperion; the parties are aware of the problem and exploring a solution

TABLE 2-9B: SUMMARY OF 2011-12 WATER SUPPLY AND DISPOSAL SYLMAR BASIN

(Acre-feet)

Water Source and Use	City of Los Angeles	City of San Fernando	All Others	Total
Total Extractions	1,093	3,202	0 [1]	4,295
Imports				
LA Aqueduct Water	4,678	--	--	4,678
MWD Water	4,638	10	--	4,648
Total	**9,316**	**10**	**0**	**9,326**
Exports - Groundwater to San Fernando Basin	1,093	2,914	0	4,007
Total Delivered Water	9,316	298	0	9,614
Water Outflow				
Storm Runoff	5,000 [2]	--	--	5,000
Subsurface	250 [3]	--	--	250
Total	**5,250**	**0**	**0**	**5,250**

1. Pumping for landscape irrigation by Santiago Estates. The well was capped in 1999.
2. Surface outflow is not measured. Estimate based on Mr. F. Laverty – SF Exhibits 57 and 64.
3. Estimated in the Report of Referee, and later revised by the Watermaster.

TABLE 2-9C: SUMMARY OF 2011-12 WATER SUPPLY AND DISPOSAL VERDUGO BASIN

(Acre-feet)

Water Source and Use	Crescenta Valley Water District	City of Glendale	La Canada Irrigation District	City of Los Angeles	Other	Total
Total Extractions	3,090	1,982	---	---	10	5,082
Imports						
LA Aqueduct Water	---	---	---	320		320
MWD Water	1,534	1,966	1,090	317		4,907
Total	1,534	1,966	1,090	637		5,227
Exports to San Fernando Basin	0	316	0	0		316
Delivered Reclaimed Water		261				261
Total Delivered Water	4,624	3,893	1,090	637	10	10,254
Water Outflow						
Storm Runoff (Sta. F-252)					2,662	2,662
Rising Groundwater (Sta. F-252)					2,068	2,068
Subsurface to:						
Monk Hill Basin	---	---	---	---	300	300
San Fernando Basin	---	---	---	---	80	80
Total	**0**	**0**	**0**	**0**	**5,110**	**5,110**

1. Private party extractions.
2. Estimated.
3. Includes rising groundwater.

TABLE 2-9D: SUMMARY OF 2011-12 WATER SUPPLY AND DISPOSAL EAGLE ROCK BASIN

(Acre-feet)

Water Source and Use	City of Los Angeles	DS Waters	Total
Total Extractions	0	169 [1]	169
Imports			
LA Aqueduct Water from SFB	4,157	--	4,157
MWD Water (LA25+LA35) [3] from SFB	4,122		4,122
MWD Water (LA17) [3]	26,442		26,442
Groundwater from SFB	0	--	0
Total	**34,721**	**0**	**34,721**
Exports			
LA Aqueduct Water out of ULARA	3,740		3,740
MWD Water (LA17) [3] out of ULARA	23,791		23,791
MWD Water (LA25_LA35) [3] out of ULARA	3,709		3,709
Groundwater	0	169	169
Total	**31,240**	**169**	**31,409**
Total Delivered Water	3,481	0	3,481
Water Outflow			
Storm Runoff	--	--	--
Subsurface	50 [2]	--	50
Total	**50**	**0**	**50**

1. DS Waters (formed by the merger of Suntory/Deep Rock Water Co. and McKesson/Danone Water Products) is allowed to pump as successor to Deep Rock and Sparkletts, under a stipulated agreement with the City of Los Angeles and export equivalent amounts.
2. Estimated in Supplement No. 2 to Report of Referee.
3. LA25, LA35, and LA17 are connections between the MWD and LADWP water systems where MWD imported water is supplied to Los Angeles.

2.11 Extraction Rights and Stored Water Credits - Basin Summaries

San Fernando Basin

Tables 2-10A and 2-11A show the calculation of extraction rights for SFB for the 2012-13 Water Year and for Stored Water Credits (as of October 1, 2012), respectively, for the cities of Burbank, Glendale, and Los Angeles. All rights are based on the Judgment in City of Los Angeles vs. City of San Fernando, et al., dated January 26, 1979 and the "Interim Agreement for the Preservation of the San Fernando Basin Water Supply, 2008" (provided in Appendix G).

Sylmar Basin

Tables 2-10B, 2-11B and 2-11C show the calculation of Sylmar Basin extraction rights for the 2011-12 Water Year and Stored Water Credits (as of October 1, 2012), respectively, for the cities of Los Angeles and San Fernando. These rights are based on: the March 22, 1984 Stipulation between the City of San Fernando and the City of Los Angeles; and the action by the Administrative Committee on July 16, 1996 to temporarily increase the safe yield of this basin from 6,210 AFY to 6,510 AFY. The 1996 temporary increase expired on October 1, 2005 but the safe yield was re-evaluated by the former Watermaster in 2006. Another stipulation, dated December 13, 2006, increased the safe yield of the Sylmar Basin to 6,810 AFY (effective October 1, 2006), subject to certain conditions and currently provides the basis for these water rights.

In July 2012, the Watermaster prepared a new re-assessment of the safe yield of this basin titled "Final Report – Sylmar Basin Safe Yield, 5-Year Re-assessment"; the resulting document will be filed with the Court in June 2013. A copy of that document is included in Appendix L of this report. In this recent re-assessment, the Watermaster temporarily and conditionally increased the safe yield of Sylmar Basin from 6,810 AFY to 7,140 AFY.

In addition to the increase in the safe yield value, the method of groundwater credit calculation has also been revised by the Watermaster in his July 2012 report. Specifically, groundwater credits in Sylmar Basin will now begin to be calculated according to the Judgment; that is, credits can no longer be carried over for more than 5 years (Judgment, January 26, 1979; Subsection 5.2.2.3, p. 19-20). Table 2-11C shows the new method of groundwater credit calculation for this basin.

To address the potential loss of credits accumulated over time via the method of credit calculation utilized in the past, and as described in the July 2012 re-evaluation report (see Appendix L), each Party will remain credited with "frozen" groundwater credits (9014 AF and 404 AF for the City of Los Angeles and the City of San Fernando, respectively); the initial accounting of these “frozen credits” is shown on Table 2-11B. Both Parties will be able to exercise their right to use those accumulated but now “frozen” groundwater credits. However, neither City will be able to exercise its 5-year credits (shown on Table 2-11C), even if they do not or cannot pump their new safe yield value, until such time as their individual, newly “frozen” credits are used entirely. Note that, at any time, either Party may permanently abandon its “frozen” credits and begin accessing its stored water credits accrued via the 5-year credit calculation method.

Verdugo Basin

Glendale and CVWD have rights to extract 3,856 and 3,294 AFY, respectively, from this basin. Los Angeles has a right to extract its Import Return water in the Verdugo Basin, but has never exercised this right. No Stored Water Credits are currently permitted by the Judgment in the Verdugo Basin.

Eagle Rock

Los Angeles has the right to extract, or cause to be extracted, the entire safe yield of this basin. This safe yield consists mostly of return flows of delivered water by Los Angeles. Neither Los Angeles nor any other Parties pump groundwater from the Eagle Rock Basin. DS Waters, as successor to the Sparkletts and the Deep Rock water companies, has a physical solution right to extract groundwater to supply its bottled drinking water facility in this basin. DS Waters pumped 169 AF in the 2011-12 Water Year from this basin.

TABLE 2-10A: CALCULATION OF 2012-13 EXTRACTION RIGHTS SAN FERNANDO BASIN

(Acre-feet)

	City of Burbank	City of Glendale	City of Los Angeles
Total Delivered Water, 2011-12.	20,584	24,491	243,067
Water Delivered to Hill and Mountain Areas, 2011-12	---	---	46,044
Water Delivered to Valley Fill, 2011-12	20,584	24,491	197,023
Percent Recharge Credit	20.0%	20.0%	20.8%
Return Water Extraction Right	4,117	4,898	40,981
Native Safe Yield Credit	---	---	43,660
Annual Extraction Right for the 2012-13 Water Year[1]	**4,117**	**4,898**	**84,641**

1. Does not include Stored Water Credit and Physical Solution.

TABLE 2-10B: CALCULATION OF 2012-13 EXTRACTION RIGHTS SYLMAR BASIN

(Acre-feet)

	City of Los Angeles	City of San Fernando	All Others
Annual Extraction Right for the 2012-13 Water Year[1]	3,570	3,570	--- [2]

1. Does not include Stored Water Credit. The safe yield of the Sylmar Basin was increased to 7,140 AFY effective October 1, 2012. Effective October 1, 1984 safe yield less pumping by Santiago Estates is equally shared by Los Angeles and San Fernando.
2. Santiago Estates (Home Owners Group) capped well in 1999.

TABLE 2-11A: CALCULATION OF STORED WATER CREDITS SAN FERNANDO BASIN

(Acre-feet)

Item Number and Description	City of Burbank	City of Glendale	City of Los Angeles
1. Stored Water Credit (as of Oct. 1, 2011)	17,530	50,272	486,740
1a. Credits and Debits	0	0	0
1b. Credits and Debits	0	0	0
1c. Prior Year Adjustments	0	0	0
1d. Prior Year Adjustments	0	0	0
2. Extraction Right for the 2011-12 Water Year	3,864	4,716	79,830
3. 2011-12 Extractions			
Party Extractions	9,997	7,876	49,273
Physical Solution Extractions	338	421	67
Clean-up/Dewaterers	1	0	567
Total	10,336	8,297	49,907
4. Spread Water 2011-12 Water Year	1,371	0	4
5. Stored Water Credits [1] per City (as of Oct. 1, 2012)	12,429	46,691	516,668
6. 1% Basin Loss Factor [2]	124.29	466.91	5,166.68
7. **Stored Water Credits** (less Basin Loss) **for each City** (as of Oct. 1, 2012)	**12,305**	**46,224**	**511,501**
8. **Total Stored Water Credits** (less Basin Loss)		**570,030**	
9. **Total Available Stored Water Credits** [2] (from Plate 13)		**205,797**	
10. Percentage of Total Credits per City	2.159%	8.109%	89.732%
11. **Available Stored Water Credits for each City** (as of Oct. 1, 2012) (Item 9 x Item 10)	**4,442**	**16,688**	**184,666**
12. **Total Reserved Stored Water Credits** [2] (Item 8 - Item 9)		**364,233**	
13. **Reserved Stored Water Credits for each City** (as of Oct. 1, 2012) (Item 7 - Item 11)	**7,863**	**29,536**	**326,835**

1. Item 5 = 1 +1a + 1b + 1c + 1d + 2 – 3 + 4.
2. Basin Loss Factor, Available and Reserved Stored Water Credits are determined pursuant to Interim Agreement for the Preservation of the San Fernando Basin Water Supply, 2008 (see Appendix G)

TABLE 2-11B: CALCULATION OF "FROZEN" STORED WATER CREDITS SYLMAR BASIN

(Acre-feet)

	City of Los Angeles	City of San Fernando
1. "Frozen" Water Credit (as of Oct. 1, 2011)	9,014	404
2. Extraction Right for the 2011-12 Water Year [1]	3,570	3,570
3. Total 2011-12 Extractions	1,093	3,202
Santiago Estates[2]	0.0	0.0
4. Total Extractions Less Extraction Right (= Item 3 - Item 2)	(2,477)	(368)
5. Remaining "Frozen" Water Credits[3] (as of Oct. 1, 2012)	**9,014**	**404**

1. The safe yield of the Sylmar Basin was increased to 7,140 AFY as of 10/1/12.
2. Santiago Estates pumping is subtracted equally from the rights of San Fernando and Los Angeles. Santiago Estates capped well in 1999.
3. If Item 4 > 0, then Item 4 is deducted from "Frozen" Water Credits, otherwise, "Frozen" Water Credits remain unchanged. Per the Sylmar Basin Safe Yield re-evaluation, "Frozen" Stored Water Credits no longer accumulate, and can only be consumed (See Appendix L)

TABLE 2-11C: CALCULATION OF STORED WATER CREDIT, 5-YEAR METHOD SYLMAR BASIN

(Acre-feet)

Party	Water Year	Annual Extraction Right (AF)	Total Extractions (AF)	Credits Consumed Due to Previous Year Overpumpage	Annual Volume of Accrued Credits (AF)	Remarks
City of Los Angeles	2007-08	3405	2996	0	409	Total extraction was less than annual extraction right.
	2008-09	3405	868	0	2537	Total extraction was less than annual extraction right.
	2009-10	3405	2544	0	861	Total extraction was less than annual extraction right.
	2010-11	3405	964	0	2441	Total extraction was less than annual extraction right.
	2011-12	3570	1093	0	2477	Total extraction was less than annual extraction right.
			STORED WATER CREDITS (5-Year Method) =	**8725**		
City of San Fernando	2007-08	3405	3670	0	0	Total extraction exceeded annual extraction right by 256 AF.
	2008-09	3405	3473	(256)	0	Total extraction exceeded annual extraction right by 68 AF.
	2009-10	3405	3143	(68)	262	Total extraction was less than annual extraction right.
	2010-11	3405	3082	0	323	Total extraction was less than annual extraction right.
	2011-12	3570	3202	0	368	Total extraction was less than annual extraction right.
			STORED WATER CREDITS (5-Year Method) =	**629**		

Note: Stored water credits in Table 2-11C are calculated by summing the "Annual Volume of Accrued Credits" column and subtracting the sum of the "Credits Consumed due to Previous Year Overpumpage" column.

3. WATER QUALITY, TREATMENT, AND REMEDIAL INVESTIGATION ACTIVITIES

3. WATER QUALITY, TREATMENT, AND REMEDIAL INVESTIGATION ACTIVITIES

3.1 Water Quality

Imported Water

1. *LOS ANGELES AQUEDUCT* water is sodium bicarbonate in character and is the highest quality water available to ULARA. Total Dissolved Solids (TDS) concentration in this water source averaged about 210 milligrams per liter [mg/L; equivalent to parts per million, ppm] for 30 years before 1969. The highest TDS value on record was 320 mg/L and this occurred on April 1, 1946. The average TDS concentration for Fiscal Year 2011-12 was 287 mg/L.

2. *COLORADO RIVER* water is predominantly sodium-calcium sulfate in character, but this water supply changes to a sodium sulfate character after it has been treated to reduce total hardness. Samples taken at the MWD Burbank Turnout between 1941 and 1975 showed that TDS concentrations ranged from a high of 875 mg/L in August 1955, to a low of 625 mg/L in April 1959. The average TDS concentration over this 34-year period was approximately 740 mg/L. Tests conducted of Colorado River water at the Eagle Rock Reservoir showed an average TDS concentration of 548 mg/L for Fiscal Year 2011-12.

3. *NORTHERN CALIFORNIA* Water (delivered via the State Water Project) is sodium bicarbonate-sulfate in character. It generally contains lower concentrations of TDS and is softer than local groundwater and imported Colorado River water. Since the time that State Project water was first imported to Southern California in April 1972, the TDS concentrations of this water have ranged from a high of 410 mg/L to a low of 247 mg/L. Laboratory tests of this water conducted at the Joseph Jensen Filtration Plant showed an average TDS concentration of 449 mg/L during Fiscal Year 2011-12.

4. *COLORADO RIVER/NORTHERN CALIFORNIA* waters were first blended at the Weymouth Plant beginning in May 1975. Blending ratios have varied over time, and laboratory tests conducted at the Weymouth Plant after treatment

and blending processes during Fiscal Year 2011-12 showed an average TDS concentration of 659 mg/L.

Surface Water

Surface runoff contains salts dissolved from sediments and rocks in the tributary areas of ULARA and is considered to display a sodium-calcium to sulfate-bicarbonate water character. Tests taken in September 1995 from flows in the Los Angeles River at the Arroyo Seco showed a TDS concentration of 666 mg/L and a total hardness (TH) of 270 mg/L. These values also reflect the inclusion of rising groundwater in the Los Angeles River between Los Feliz Blvd and Gage F-57C-R.

Chlorides in Surface Water

In 1997 the Los Angeles Regional Water Quality Control Board (LARWQCB) adopted Resolution No. 97-02 in order to help develop a long-term solution to the chloride compliance problems stemming from elevated concentrations of chloride along the Los Angeles River in the SFB. These increased chloride concentrations were likely caused by drought conditions and the use of water softeners in water imported into the Los Angeles region. Water Quality Objectives for chloride within the reach of the Los Angeles River between Sepulveda Flood Control Basin and Figueroa Street (including Burbank Western Channel only) have been raised from 100 mg/L to 190 mg/L; chloride concentrations are reported in Appendix D.

Nitrogen in Surface Water

As part of a Total Maximum Daily Load (TMDL) program, the LARWQCB ordered the cities of Burbank and Los Angeles to determine the source of nitrogen in the Los Angeles River Narrows. The resulting studies, which included laboratory testing for nitrogen from rising groundwater into the Los Angeles River, were completed in 2007 by an outside consultant. The 2007 report concluded that nitrogen levels present in groundwater rising into the Los Angeles River were well below the target loadings for the receiving water and may be considered a *de minimus* source with no loading allocation necessary.

Groundwater

Groundwater in ULARA is considered to be moderately hard to very hard. The character of groundwater from the major water-bearing formations is of two general types, each reflecting the composition of the surface runoff in the area. In the western part of the San Fernando Basin, the groundwater is calcium sulfate-bicarbonate in character, whereas in the eastern part of SFB (and also the Sylmar and Verdugo basins), groundwater displays a calcium bicarbonate character.

The overall quality of the groundwater is generally within the recommended limits of the California Title 22 Drinking Water Standards, except for:

- areas in the eastern SFB which display high concentrations of trichloroethylene (TCE), perchloroethylene (PCE), hexavalent chromium, and nitrate as NO_3 (or nitrogen as N);
- areas in the western portion of the SFB which tend to have high concentrations of naturally-occurring sulfate and TDS;
- areas within the Verdugo Basin that have shown high concentrations of a gasoline additive, methyl-tertiary-butyl-ether (MTBE), and nitrate as NO_3, and
- areas within the Sylmar Basin that have elevated concentrations of nitrate as NO_3 and certain VOCs.

In each area, the pumped groundwater is being treated or blended to meet State Drinking Water Standards, or the impacted wells in each basin have been temporarily removed from service.

A summary of the TDS concentrations and the general mineral analyses of imported water, surface water and groundwater are contained in Appendix D.

3.2 Groundwater Quality Management Plan

A report titled "Groundwater Quality Management Plan - San Fernando Valley Basins" was issued in July 1983, in part to protect and improve the quality of stored water within the groundwater basins of ULARA. Special emphasis on the overall management of these basins in that report was placed on monitoring and removing the VOCs (TCE and PCE), along with hexavalent chromium; these contaminants have been encountered in the local groundwater. Table 3-1 summarizes the number of ULARA wells that are currently considered to be contaminated; also shown are the concentrations of TCE and PCE that are above their common MCL of 5 micrograms per liter (µg/L, which is equivalent to parts per billion, ppb).

TABLE 3-1: NUMBER OF WELLS IN THE ULARA WELLFIELDS EXCEEDING STATE MCL FOR TCE AND PCE – 2011-12 WATER YEAR

Wellfield	Number of Wells													
	City of Los Angeles[3]									Sub-	Others[2]			Grand
	NH	RT	P	HW	E	W	TJ	V	AE	Total	B	G	C	Total
Total No. of Wells[2]	**35**	**15**	**3**	**4**	**7**	**8**	**12**	**5**	**7**	**96**	**14**	**14**	**12**	**136**
No. of Active Wells	**14**	**15**	**2**	**4**	**2**	**3**	**12**	**2**	**7**	**61**	**8**	**14**	**12**	**95**
No. of Wells Sampled	**13**	**15**	**2**	**0**	**2**	**3**	**12**	**2**	**6**	**55**	**10**	**14**	**12**	**91**
Number of Wells Exceeding Maximum Contaminant Level[1]														
TCE Levels ppb														
5-20	3	3	1	-	0	0	7	0	3	**17**	1	0	0	**18**
20-100	1	4	0	-	1	0	1	0	2	**9**	5	2	0	**16**
>100	0	0	0	-	0	0	0	0	1	**1**	2	5	0	**8**
Total	4	7	1	-	1	0	8	0	6	**27**	8	7	0	**42**
PCE Levels ppb														
5-20	0	0	1	-	0	0	5	0	4	**10**	0	2	0	**12**
20-100	0	0	0	-	0	0	0	0	1	**1**	1	2	0	**4**
>100	0	0	0	-	0	0	0	0	0	**0**	7	2	0	**9**
Total	0	0	1	-	0	0	5	0	5	**11**	8	6	0	**25**

1. Wells were included in these categories based upon the maximum concentrations of TCE and PCE measured during the 2011-12 Water Year.
2. Includes active, inactive, and standby wells
3. Wellfields:
   - NH - North Hollywood
   - P - Pollock
   - HW - Headworks
   - E - Erwin
   - W - Whitnall
   - RT Rinaldi Toluca
   - TJ - Tujunga
   - V - Verdugo
   - AE - LADWP Aeration Tower Wells
   - B - City of Burbank
   - G - City of Glendale
   - C - Crescenta Valley Water District

3.3 Underground Tanks, Sumps, and Pipelines

The City of Los Angeles Fire Department (LAFD) continues to implement the State-mandated Underground Storage Tank (UST) Program and continues to conduct a program to bring the large number of underground tanks in the San Fernando Valley into compliance with current law. During Water Year 2011-12, a total of 39 sites were remediated under the direction of the LAFD. Currently, the Environmental Unit of the LAFD is monitoring the remediation of 57 other sites. The main focus of the LAFD UST Program in ULARA has been the monitoring and removal of gasoline, diesel, and their related constituents from the soil to help prevent contamination of the underlying groundwater. If a site investigation indicated contamination of the underlying groundwater, then the site would be referred to the LARWQCB for further action. Since October 1, 2011, 25 sites in the City of Los Angeles have been re-assigned from the Underground Tank Plan Check Unit to the LARWQCB.

3.4 Private Sewage Disposal Systems (PSDS)

To reduce the potential for groundwater contamination from septic tanks, the City of Los Angeles enacted Ordinance No. 160388, on September 17, 1985, of the Los Angeles Municipal Code Section 64.26 [LAMC Section 64.26]. This Ordinance is entitled "Mandatory Abandonment of Private Sewage Disposal Systems (PSDS)."

LAMC Section 64.26 requires all owners of industrial, commercial, and multiple dwelling residential (five or more units) properties to connect to the public sewer when the sewer becomes available, and to discontinue use of their PSDS within one year of the date of the issuance of a "Notice to Connect" by the City of Los Angeles. In addition, LAMC Section 64.26 requires the Director of the Los Angeles Bureau of Sanitation (Director) to issue a "Reminder Notice" and a "Final Notice to Connect" to the owner of the property four months and one month, respectively, prior to the compliance deadlines. LAMC Section 64.26 further requires the Director to take the following actions whenever a property is found to be in violation of the Code requirements:

a) Request that the City's Department of Water and Power to discontinue water service to the subject property;
b) Request the Superintendent of Buildings to order any building(s) on the subject property to be vacated; and,
c) Request the City Attorney to take the necessary legal action(s) against the property owner.

In June 2005, the Wastewater Engineering Services Division (WESD) identified a list of approximately 840 properties owning and operating a PSDS that had access to a City sewer. These properties were subsequently referred to the Bureau's Industrial Waste Management Division (IWMD) for further investigation and to determine applicability of the provisions of the LAMC Section 64.26 to these properties.

IWMD staff conducted its own investigation before requiring the referred properties to be connected to the City sewer. Investigations included: contacting the property owner or tenant; site visits and, if necessary, conducting "dye tests" to ensure that each of the property owners in question did own and operate a PSDS; and verifying that the property had access to a City sewer.

Following IWMD investigations of the 840 referred properties, 413 were found to fit the criteria such as being an industrial site or a commercial facility, or a multiple dwelling residential building (with five or more units) subject to LAMC Section 64.26 provisions. Of the 413 properties that were subject to LAMC Section 64.26, 234 properties were found to be already connected to the City sewer, leaving 179 properties not connected to a public sewer. In 2012, IWMD received referrals from the Financial Management Division (FMD) and WESD to investigate 25 properties owning and operating a PSDS that had access to a City sewer.

As of October 2012, IWMD issued 204 "Notice to Connect to the City Sewer and Abandonment of the PSDS" (NTC) letters to those properties subject to LAMC Section 64.26. Of the 204 properties that were issued a NTC letter, 179 have already connected to the City sewer and seven are still within the one-year requirement to connect to the City sewer. Eighteen NTC letters were returned to IWMD for various reasons including change of business ownership, incorrect property owners, or refusal to accept the certified letter containing the NTC letter. These properties are being investigated further by IWMD.

Historically, the Los Angeles Bureau of Sanitation also identified areas of the City within ULARA in which sewer contruction could help to protect groundwater quality in areas dominated by commercial developments. These areas, known as "Groundwater Improvement Distrcits" (GIDs) are shown on Plate 7.

3.5 Landfills

The Solid Waste Assessment Test (SWAT) reports for major SWAT Rank 1 to Rank 4 landfills in the Los Angeles area have been completed and submitted to the LARWQCB for approval. The reports reviewed by the LARWQCB are listed in Table 3-2. As stipulated by Article 5 of Title 27, a follow-up sampling program under an Evaluation Monitoring Plan was required for some landfills due to the presence of VOCs in the underlying groundwater. Further updates to the SWAT would be triggered by post-closure land use. Landfill locations in ULARA are shown on Plate 6.

Bradley Landfill closed in April 2007 and construction of its final cover was completed in the summer of 2010. Waste Management, Inc., the owner of that landfill, is currently operating a green waste composting facility at the site. Furthermore, several groundwater monitoring wells at this landfill are actively monitored for water levels and water quality data in conformance with the existing LARWQCB Monitoring and Reporting Program No. 6434 for this facility.

TABLE 3-2: LANDFILLS WITH SWAT INVESTIGATIONS

Name	Rank	Current Owner	Location	SWAT Report Completed	Final SWAT Submitted	Phase II SWAT Req.	Approved by RWQCB	Site Leak -1	Type of Emission -2	Further Monitoring
Open										
CalMat (Sun Valley #3)	2	CalMat Properties	Sun Valley District, NE of Glenoaks Blvd	Jul-88	Nov-90		Jun-92	N	Inert site	N,7
Scholl Canyon	1	City of Glendale	San Rafael Hills, 1 mile West of Rose Bowl	Jul-87	Apr-88		Aug-90	G	NHA (I/O)	3
Stough Park	2	City of Burbank	Bel Air Drive & Cambridge Drive	Jun-88	Dec-88		Apr-90	G	NHA Inert Site	3
Sunshine Cyn. LA City/LA County	2	Browning - Ferris Industries	SE Santa Susana Mtns W of Golden State Fwy	Jul-88	Jul-89		Apr-94		MSW	6
Closed										
Bradley East	2	WMDSC	SE of Sheldon St	Jun-87	Nov-90		Apr-92	G	NHA (I/O)	4, 8
Bradley West	1	WMDSC	Sun Valley, SE of Sheldon St.	Jun-87	Nov-90		Apr-92	G	NHA (I/O)	3
Bradley West Extension	3	WMDSC	Near Canyon Blvd & Sheldon St	Jul-88	Jul-89		Apr-92	G	MSW	3, 8
Branford	2	City of Los Angeles Bureau of Sanitation	Sun Valley District, NW of Tujunga Wash	Jul-88	Oct-90	X	Jun-92		MSW	4,7
Gregg Pit/Bentz	2	CalMat Properties	Between Pendleton St & Tujunga Ave	Jul-89	Jul-89		Feb-90	G	NHA	4
Hewitt Pit	2	CalMat Properties	North Hollywood District Hollywood Fwy, Laurel	Jun-88	Jul-89		May-91	G	NHB (I)	N
Lopez Canyon	2	City of Los Angeles Bureau of Sanitation	N of Hansen Dam near Lopez and Kagel Cyn	Jun-88	Jun-88	X				8
Newberry	3	Los Angeles (LA By-Products Co.)	N of Strathern St, Tujunga Ave	Jun-88	Jul-89		Sep-89	G	NHB (I/O)	4
Pendleton St.	4	City of Los Angeles Bureau of Sanitation	Sun Valley, Pendelton St & Glenoaks Blvd	Jul-90	May-91		Jun-92	N	Inert Site	5
Penrose	2	Los Angeles (LA By-Products Co.)	N of Strathern St, Tujunga Ave	Jun-88	Jul-89		Sep-89	G	NHB (I/O)	4
Scholl Canyon	2	City of Glendale	San Rafael Hills, 1 mile West of Rose Bowl	Jul-87	Aug-90		Dec-93	G	NHA	5
Sheldon-Arleta	1	City of Los Angeles Bureau of Sanitation	Sun Valley District near Hollywood & Golden State Fwys	May-87	May-87		Feb-90	G	MSW	4,7
Sunshine Cyn. LA City	2	Browning - Ferris Industries	SE Santa Susana Mtns W of Golden State Fwy	Jul-88	Jul-89		Apr-94	G	MSW	6
Toyon Canyon	2	City of Los Angeles Bureau of Sanitation	Griffith Park	Jun-88	Mar-89		Apr-91	L	NHA (I/O MSW)	3
Tuxford Pit	2	Aadlin Bros. (LA By-Products Co.)	Sun Valley District, SW of Golden State Fwy & Tujunga Ave	Jun-88	Dec-90		Jun-92		MSW	4, 8, 9
Incomplete										
Strathern		Never completed. Application 12/88.	Strathern St. & Tujunga Ave							10

1. G – Gas, L – Liquid.
2. MSW – Municipal Solid Waste
   NHA - Non-Hazardous but above state drinking water regulatory levels
   NHB - Non-Hazardous but below state drinking water regulatory levels
   I – Inorganic, O – Organic; N-No, Y-Yes
3. Under Title 27 Corrective Action Program (CAP), after completion of EMP.
4. Closed landfills with groundwater monitoring required under Title 27. Monitoring results are submitted to the LARWQCB periodically.
5. Subject to SWAT requirements. Further monitoring may be required under Title 27.
6. All open landfills are required to have groundwater monitoring under Title 27. Monitoring results are submitted to the LARWQCB quarterly or semi-annually.
7. Semi-annual groundwater monitoring.
8. Groundwater contamination Evaluation Monitoring Program (EMP) required under Title 27.
9. USEPA involved in evaluation.
10. Under permit as Inert Landfill.

3.6 San Fernando Valley Remedial Investigation Activities

A remedial investigation (RI) was initiated in July 1987 by the USEPA to characterize groundwater conditions and groundwater quality in the San Fernando and the Verdugo groundwater basins due to the presence of TCE and PCE contamination in the soils and/or groundwater. The LADWP was selected by the USEPA to serve as the lead agency in conducting the RI and they entered into a cooperative agreement that has provided over $22 million in federal funding to LADWP beginning July 1987. In August 1987, the LADWP selected James M. Montgomery, Consulting Engineers (JMM), to serve as its consultant to perform various RI tasks.

The resulting JMM report, "Remedial Investigation of Groundwater Contamination in the San Fernando Valley," was completed in December 1992 and it is a comprehensive, five-volume report that presented the findings and hydrogeologic characterization of the San Fernando and Verdugo basins with regard to their geologic and hydrogeologic conditions, and to the nature and extent of contamination known at that time. The RI report also provided: a description, along with the documentation, of the SFB Groundwater Flow Model; a summary of the RI field investigation activities; and an evaluation of potential risks to human health and the environment.

The existing SFB Groundwater Flow Model was developed as a part of the San Fernando Valley RI and is a comprehensive, three-dimensional, regional-scale model, which was developed using the MODFLOW (version 2005) software package. A three-dimensional mass transport model has also been developed for the SFB. The model has been utilized for various groundwater projects to help analyze the storage and physical characteristics of groundwater in the SFB. The main purposes for the development of the basinwide model include:

- Helping to forecast the potential consequences of changes in groundwater management in the SFB (pumping and recharge regimes) by the major water purveyors.
- Assessing the potential for contaminated groundwater to impact production and extraction wells in SFB.
- Aiding in predicting groundwater elevation contours for projected basinwide withdrawal and recharge (i.e., as a planning tool for LADWP and the Watermaster).

USEPA's existing consultant, CH2M HILL, continues to periodically sample the 87 groundwater monitoring wells that were originally installed as part of the RI. CH2M HILL also obtains groundwater quality and groundwater elevation data from the various municipalities and from the various facilities in the San Fernando Valley to update the SFV Basinwide database in electronic format. CH2M HILL utilizes the data to produce contaminant plume maps.

The RI Report and the semi-annual sampling reports are available for public review at the Superfund Primary Information Repositories, which are located in the following local libraries: City of Glendale; City of Burbank; LADWP; California State University-Northridge; and the University of California at Los Angeles. Data are also available from the USEPA Region 9 Superfund website (http://www.epa.gov/region9/superfund/superfundsites.html).

The LADWP also maintains a current SFB database for use with the SFB groundwater flow model and continues to generate simulated groundwater elevation contour maps and contaminant plume maps for the SFB. CH2M HILL continues to provide updated groundwater quality data for incorporation into the LADWP database. The Watermaster has established a program to collect and scan geologic logs, driller's logs and electric logs of all groundwater monitoring wells constructed in ULARA, and also to collect and scan the electric logs of the numerous wildcat and producing oil wells drilled in the San Fernando Valley over the years. All of these scanned documents are to be eventually incorporated into a new electronic database for subsurface data within the ULARA groundwater basins.

3.7 Water Treatment

USEPA Operable Units

The USEPA is proceeding with enforcement actions against Potentially Responsible Parties (PRPs) as part of their overall, long-term groundwater remediation activities in the SFB. Below is a brief summary of the various Operable Units (OUs) in SFB:

1. *NORTH HOLLYWOOD OPERABLE UNIT (NHOU)* - NHOU construction was funded by the USEPA, CDPH, and LADWP; operations and maintenance activities of the constructed facilities in the NHOU are funded by the USEPA and LADWP. In Water Year 2011-12, approximately 1,248 AF of groundwater containing VOCs were treated by air stripping at this facility.

   Air discharged to the atmosphere from the treatment process continues to be monitored for VOCs. Air quality samples are taken six times a year and the results are reported to the South Coast Air Quality Management District on a quarterly basis. Air emissions were in compliance with permit requirements for all four quarters of Water Year 2011-12.

LADWP continues to operate the NHOU under the direction of the USEPA pursuant to the Cooperative Agreement between these two agencies. Whereas the facility was designed to contain and remediate highly-concentrated VOC plumes, the remedy has failed to achieve this primary objective. High concentrations of VOC contaminants have been encountered in other LADWP water-supply wells, forcing their closure. Additional contaminants have also emerged, such as hexavalent chromium and 1,4-dioxane which are not removed by the existing air stripping process at the NHOU.

The nearby hexavalent chromium plume has reached the NHOU facility. In the fall of 2006, chromium levels began to increase in NHOU Aeration Well No. 2, forcing the closure of this OU extraction well. Suspected of being a major contributor to this chromium plume is the former Honeywell site in North Hollywood. Under a Cleanup and Abatement Order of the LARWQCB, Honeywell resumed operating NHE-2 in 2009 to contain the plume while discharging the highly contaminated effluent to the sanitary sewer. Unfortunately this approach did not provide effective containment of the hexavalent chromium plume. In 2012, concentrations of hexavalent chromium in NHE-3 became elevated and currently exceed the MCL of 50 µg/L established for this consitituent. This recent detection has forced the closure of NHE-3 and requires further attention by the LARWQCB and the other state and federal regulators. Steps taken by Honeywell to address the chromium problem have included submitting a remedial action plan to the LARWQCB, and construction of 31 groundwater monitoring wells to further characterize the water quality and hydrogeology in the eastern area of the SFB.

The 15-year Consent Decree for the NHOU expired at the end of 2004. USEPA conducted a Focused Feasibility Study and issued its Record of Decision (ROD) for the NHOU Second Interim Remedy (NHOU2IR) in September 2009. This new remedy will replace the existing facility by deepening several existing OU extraction wells, adding new OU extraction wells, and providing groundwater remediation facilities that will treat VOCs and other emerging contaminants of concern, including hexavalent chromium and 1,4-dioxane. The ROD also calls for construction of additional monitoring wells to further characterize the water quality and hydrogeology of the area.

The basic consensus is that the current remedy needs to be replaced on an expedited basis with the NHOU2IR. The new remedy should provide extractions at a substantially higher flow rate to help provide for further plume containment and to permit extraction from deeper portions of the aquifer; these activities will help address the vertical and horizontal extent of the contaminant mass. This, in combination with additional strategically located extraction wells, should broaden the containment area and further help to prevent the continued migration of contaminants toward the nearby LADWP wellfields.

2. *BURBANK OPERABLE UNIT (BOU)* - The BOU, funded by Lockheed-Martin under a USEPA Consent Decree and operated by the City of Burbank, uses air stripping and liquid-phase GAC to remove VOCs from groundwater (local groundwater also contains elevated concentrations of nitrate and chromium), and then blends the treated water with imported water from the MWD for delivery within the City of Burbank.

   Burbank assumed operation and maintenance of the BOU in 2001. Initially, the facility had difficulty in sustaining operation at the designed treatment rate of 9,000 gpm. Burbank, Lockheed-Martin, and the USEPA cooperated in efforts to determine the cause(s) of the reduced production. Over the past few years, several process enhancements and repairs have been made to the liquid-phase GAC vessels and to the vapor-phase GAC vessels at the factory.

   As part of the requirement to close the first consent decree, USEPA required the City of Burbank to demonstrate that the BOU would operate at its design capacity. In the summer of 2010, Burbank successfully completed a 60-day performance test at the BOU by pumping the wells at a combined rate of 9000 gpm. To ensure the effectiveness of the remedy EPA monitored drawdown and the extent of the cone of depression by conducting a multi-well pumping test for 30 days during the demonstration time frame. EPA used water levels and pumping rate data monitored during this pumping test to update its values for the hydraulic conductivity, transmissivity, and storativity in the BOU area for the Basinwide Groundwater Model.

   The City of Burbank is also concerned about hexavalent chromium in groundwater produced at the BOU and has been blending its pumped groundwater with imported water to keep the concentration of total chromium at or below the City's goal of 5 µg/L; the BOU treatment facility was not designed to treat chromium.

A total of 9,993 AF of contaminated groundwater was treated by the BOU in the 2011-12 Water Year, a decrease of 401 AF over the prior year's volume of groundwater treated by this facility.

3. *GLENDALE NORTH AND SOUTH OPERABLE UNITS (now referred to as one single "GOU")* – Construction of the GOU was completed and this allowed for treated water to be available for delivery on August 1, 2000. The system includes four Glendale North OU extraction wells (with a total pumping capacity of 3,300 gpm) and four Glendale South OU extraction wells (with a total capacity of 1,700 gpm). The treatment process uses aeration and liquid-phase GAC to treat VOC-contaminated groundwater and then blends the treated water with imported MWD water at the Grandview Pump Station. A total of 7,830 AF of contaminated groundwater was treated in 2011-12.

4. *GLENDALE CHROMIUM OPERABLE UNIT* – Established in 2007, the GCOU was created to help charachterize the extent of chromium contamination in the groundwater in the area, and to determine appropriate remedial action. EPA is working with the California Department of Toxic Substances Control and the LARWQCB to identify and clean up sources of chromium contamination. Remedial investigation of chromium contamination in groundwater in the GCOU began in 2011. During 2012, field work began to construct as many as 30 new groundwater monitoring wells to help evaluate the location and extent of the chromium contamination in the area.

<u>Other Treatment Facilities</u>

1. *VERDUGO PARK WATER TREATMENT PLANT (VPWTP)* – Glendale's VPWTP serves as a filtration and disinfection facility. A total of 316 AF of groundwater was treated in the 2011-12 Water Year.

2. *GLENWOOD NITRATE WATER TREATMENT PLANT* - CVWD's Glenwood Nitrate Water Treatment Plant, which uses an ion-exchange process for nitrate removal, treated 447 AF in the 2011-12 Water Year

3. *POLLOCK WELLS TREATMENT PLANT* (PWTP) – The 3,000-gpm PWTP was dedicated on March 17, 1999. This treatment plant uses four liquid phase

GAC vessels to remove VOCs from Pollock Well Nos. 4 and. 6. The operation of these production wells helps reduce the amount of groundwater lost to the Los Angeles River by reducing the amount of groundwater rising into the unlined reaches of the drainage channel. A total of 2,957 AF of groundwater was treated in the 2011-12 Water Year.

To respond to the emergence of hexavalent chromium near the Pollock Wellfield, LADWP will construct groundwater monitoring wells in the nearby areas to characterize the extent of this and other contaminants of concern. Findings of this study may warrant an urgent response to augment the current treatment systems to provide additional technology that will remove hexavalent chromium from groundwater pumped by the Pollock wells.

4. *BURBANK GAC TREATMENT PLANT* - The City of Burbank GAC system (Lake St. wells) was shut down in March 2001 due to the elevated concentrations of hexavalent chromium in the groundwater and remained out of service throughout the 2007-08 Water Year. The plant saw limited use for non-potable purposes in Water Year 2008-09, whereas in Water Years 2009-10, 2010-11, and 2011-12 the plant was used only when necessary to obtain water quality data from the wells. The total water treated at Lake Street GAC and sent to City of Burbank's power plant for non-potable beneficial use in Water Year 2011-12 was 4.17 AF. The City of Burbank has a goal of accepting a maximum of 5 µg/L of total chromium after blending for distribution within its water system. If the plant is returned to service, production may be considered as part of the average pumping goal of 9,000 gpm for the Burbank OU.

5. *TEMPORARY TUJUNGA WELLFIELD TREATMENT STUDY PROJECT* – This project, which restored 12,000 AFY of pumping capacity that had become unavailable due to water quality constraints, provided for treatment of the two most contaminated production wells at the Tujunga wellfield with liquid-phase granular activated carbon. Each production well has five pairs (trains) of granular activated carbon treatment vessels. Approximately one-fifth of the produced groundwater flows through the first vessel (lead vessel) and then the second vessel (lag vessel) of each train. The treatment process removes VOCs like TCE, PCE, carbon tetrachloride, and 1,1 dichloroethene. Operational testing began in November 2009 and the CDPH permit for

conveying treated groundwater into the distribution system was issued in May 2010. A total of 4,680 AF of groundwater was treated by this project during the 2011-12 Water Year..

3.8 Groundwater Quality Investigations

There are several ongoing groundwater quality investigations in ULARA. Some of the major sites and related activities are summarized below.

Boeing/Rocketdyne Santa Susana Field Lab, Simi Hills

This 2,850-acre former rocket engine and nuclear research facility, which was operated until the 1980s, is located in the hills above the western end of the San Fernando Valley. As a result of past site activities/operations, soil, bedrock and groundwater became contaminated; key constituents of concern include VOCs, perchlorate, and radionuclides. Over 350 monitoring wells have been constructed at this site and these are monitored for water levels, and groundwater samples from these wells are collected and tested for key water quality constituents on a regular basis. Contaminated soil and groundwater are also being remediated at select locations throughout the 2,850-acre site. Construction of an interim groundwater treatment system was completed in December 2009 and is currently operating with eight source-zone extraction wells. Soil and groundwater characterization efforts are ongoing throughout the entire site. A public comment period for the In-Situ Chemical Oxidation (ISCO) field experiment for the treatment of VOCs in bedrock beneath the site is currently being conducted through mid-April, 2013.

CVWD-MTBE Investigation

In February 2004, MTBE was detected in CVWD Well No. 5 during the annual VOC water quality sampling program of all CVWD active water-supply wells. MTBE is a gasoline additive that was used from 1990 to 2003; gasoline containing MTBE has reportedly leaked from underground storage tanks and contaminated local soils and groundwater. In 2005, CDPH directed CVWD to continue monitoring Well No. 5 on a quarterly basis. As a result, MTBE continued to be detected. CVWD retained McGuire Malcolm Pirnie Environmental Consultants (McGuire) to provide an evaluation of possible MTBE sources for the contamination encountered in CVWD Well No. 5. In addition, the prior Watermaster requested the LARWQCB to perform an investigation into potential sources of MTBE. LARWQCB met with CVWD in 2005 and began the investigation. In March 2006, the McGuire report, which identified several potential source sites, was completed and forwarded to LARWQCB.

In August 2006, MTBE concentrations in CVWD Well No. 7 increased to 29 µg/L which is significantly above the Primary MCL of 13 µg/L for this constituent, and, as a result, this well was shut down. CVWD then began testing all its wells on a weekly basis and the MTBE concentration in Well No. 7 rose to values as high as 50 µg/L in October 2006. After that, the MTBE levels in this well have dropped to a low of 0.50 µg/L in October 2007.

In October 2006, CVWD retained McGuire to evaluate and prioritize the available methods to treat groundwater from this well and other nearby water-supply wells in order to begin cleanup of groundwater before the MTBE plume spreads to other wells in the system. The final report of January 2007 determined that a granulated active carbon (GAC) treatment system would be the best treatment method. In addition, as part of the study, groundwater samples were tested with different types of GAC to determine the optimum type of GAC to be used. It was determined that a "coconut shell" based GAC would provide the best medium for MTBE removal. It was also discovered that groundwater that also contained high levels of nitrate would see “spikes” in nitrate concentrations in the effluent stream after the GAC system was shut down for a period of time. This has been referred to as "nitrate adsorption", or release of nitrates from the GAC into the water.

In November 2006, the prior Watermaster, at the request of CVWD, formed the Verdugo Basin MTBE Task Force to expedite the MTBE investigation and cleanup of the contamination in order to return CVWD’s wells to full operational capacity. Since November 2006, LARWQCB has been aggressively continuing its investigation and has been meeting on an occasional basis with CVWD, potentially responsible parties and the Watermaster. The Task Force determined that 11 of the 27 potential contamination sites needed additional site investigation and remedial action work. To date, the following activities occurred: cleanup work at two sites has been completed and the sites have been closed; five sites continue clean-up activities; one case will be closed due to low risk; and three of the sites have shown no progress.

CVWD received a grant from the CDPH’s Drinking Water Research and Treatment Fund for the cost to build and operate the proposed GAC treatment system at CVWD's Mills Facility. The grant was for $1.1 million, however, money for the Drinking Water Fund has not become available and CDPH has included the project under Proposition 84.

In 2009-10, concentrations of MTBE in Well 5 rose above the MCL for MTBE, and CVWD requested and received approval to utilize the Drinking Water Research and Treatment grant for a proposed GAC treatment facility at the Well 5 site. During 2010, CVWD retained AECOM to design the facility and the project was originally to be under construction during 2010-11. However, MTBE levels decreased in Well 5 during Water Year 2010-11. A 5-day pumping test was then performed in this well in February 2011 to determine if the MTBE levels would increase during a period of constant pumping. Results of this pumping test showed that the MTBE level in Well 5 remained at 0.20 μg/L during the entire test; this value is below the current MCL for MTBE. In March 2011, Well 5 was approved by CDPH to be put back into service. As a result of the test, CVWD’s grant under CDPH's "Drinking Water Treatment and Research Fund" for a GAC treatment system was put on hold by CDPH. Even if the MTBE levels increase in Well 5 in the future, it is not known whether or not the grant would be reinstated. No wells were taken out of service by CVWD due to MTBE contamination in the 2011-12 Water Year.

DriLube, 711 W. Broadway and 718 W. Wilson, Glendale

DriLube Company, a plating facility located in Glendale, was issued a Cleanup and Abatement Order (CAO) by the LARWQCB in 2002. DriLube was named a Responsible Party by the USEPA as a source responsible for discharging contaminants from its site into the groundwater within the Glendale South Operable Unit. The results of subsurface investigations to date have detected chlorinated solvents, petroleum hydrocarbons, PCBs, and heavy metals (including chromium) within the underlying soils and groundwater to date. On November 15, 2002 a fire at the DriLube Company totally destroyed the Plant 1 facility and records.

Although previously considered to be a single site, the two known addresses for the property have been separated for cleanup management purposes. USEPA, which previously managed the entire site, returned the 711 W. Broadway site back to the LARWQCB; this site has been determined to have no metals contamination, and is contaminated with VOCs only. The LARWQCB may issue a cleanup and abatement order for this address.

Management of the 718 W. Wilson site remains within the purview of the USEPA due to chromium contamination; VOC contamination also exists at this site. In 2010, approximately 460 tons of hexavalent chromium-contaminated soils were removed from the site. During this removal work, infrastructure (piping) was installed to facilitate future in-situ remediation of hexavalent chromium. This in-situ treatment will focus on adding amendments to the site to reduce hexavalent chromium to trivalent chromium.

PRC-DeSoto (formerly Courtaulds Aerospace), 5430 San Fernando Road, Glendale

The LARWQCB issued a Cleanup and Abatement order (CAO) to PRC-DeSoto (formerly Courtaulds Aerospace) on August 22, 2002. This facility has been named a responsible party and was identified by USEPA as a source for releasing chlorinated organic solvents within the groundwater in the Glendale South Operable Unit. Additionally, the USEPA has issued a General Notice Letter and a 104E Letter to the site owners; this facility is considered a PRP for the Glendale Operable Unit. Historically, the facility's principal industrial activities involved chemical formulation of adhesives and sealants used by the U.S. Department of Defense for various aerospace applications. Trichloroethane (1,1,1-TCA), dichloroethane (DCA), TCE, PCE, chromium, hexavalent chromium, and nickel have been found in soil and groundwater beneath the facility. Three down-gradient wells were constructed in May 2006 and are sampled on a quarterly basis as required by the CAO. PRC-DeSoto has submitted a Remedial Action Plan (RAP) for the in-situ reduction of hexavalent chromium. The RAP was approved and is being implemented. As part of the implementation, LARWQCB issued a General Waste Discharge Requirement (WDR) permit to the facility in February 2009 for the remediation of the hexavalent chromium. A soil gas investigation was completed and submitted for this facility and a final report has been reviewed by the LARWQCB. Groundwater monitoring continues on a quarterly basis as part of the CAO.

Other activities at this site included the demolition of buildings and the excavation and removal of potential contaminant sources (underground storage tanks, clarifiers, sumps, etc); this work was completed in December 2009. A geosynthetic clay liner was installed at the bottom of excavations within potential chromium source areas, and then the excavations were backfilled with clean materials.

Cleanup operations regarding chromium and VOCs in soil have been completed. Work toward closure of the site in regard to soils contamination will begin with the LARWQCB. Work regarding chromium contamination of the local groundwater will be transferred to the USEPA. PRC DeSoto has been identified as a PRP for chromium contamination.

Excello Plating, 4057 Goodwin Ave., Los Angeles

The LARWQCB issued a CAO to Excello Plating on June 20, 2003. The CAO was revised and re-issued, on June 2, 2005. The facility's owners were identified under CERCLA as having responsibility for releasing VOCs, hexavalent chromium, nickel, cadmium, zinc and lead into the subsurface. The purpose of issuing this CAO was to ensure that Excello Plating completes the onsite and offsite assessment to help delineate the lateral and vertical extent of heavy metal contamination (specifically chromium) and, as necessary, undertake remediation of the affected soil and groundwater, both onsite and offsite. Additionally, the USEPA has issued a General Notice Letter and a 104E Letter and the facility is considered as a source of the contaminants that impact the GOU.

On September 23, 2004 the Los Angeles City Attorney charged Excello with a violation of the Federal Clean Water Act for failure to comply in a timely manner with the CAO. In 2006 there was an out-of-court settlement that included a plan for siting and constructing more monitoring wells for additional plume delineation. The facility has completed its onsite soil and groundwater assessment and has submitted a Remedial Action Plan (RAP) for the remediation of heavy metals including hexavalent chromium and for VOCs, including TCE and PCE. As part of the RAP, the facility plans to apply for a General Waste Discharger Requirement (WDR) permit for the remediation of hexavalent chromium. In April 2008, three additional groundwater monitoring wells were constructed at the facility; two of these wells were constructed downgradient and offsite to help define the contaminant plumes that may have migrated offsite. Groundwater monitoring continues on a semi-annual basis.

The property has been sold. The new property owner is conducting soil cleanup in exchange for a Prospective Purchaser Agreement intended to declare that the new property ownerr is not responsible for the underlying groundwater contamination caused by historical operations during previous ownership of the property.

B.F. Goodrich (formerly Menasco/Coltec Industries, Inc.) 100 E. Cedar Ave., Burbank

The LARWQCB issued a CAO to Coltec Industries, Inc on July 5, 2002. This facility was identified as a Responsible Party by the USEPA as a source of discharging contaminants to the groundwater, and affecting Glendale North Operable Unit. Additionally, the USEPA has issued a General Notice Letter and a 104E Letter and the facility is considered a Principal Responsible Party for the Glendale Chromium Operable Unit. The facility's former industrial activities involved machining, manufacturing, metal plating, and anodizing of parts and equipment used by the U.S. Department of Defense for various aerospace applications. Volatile organic compounds including TCE, PCE, 1,1-dichloroethylene (1,1-DCE) 1,1,1-trichloroethane (1,1,1 TCA) and hexavalent chromium have been detected in the soil and in the groundwater underlying the site. Groundwater monitoring wells constructed in certain offsite areas are being sampled on a quarterly basis. The amended General Waste Discharge Requirement has been performed (the facility has completed a pilot study for the remediation of hexavalent chromium in the soil and groundwater). The facility is now implementing a site-wide program to remediate the hexavalent chromium; a Soil Vapor Extraction (SVE) system has been used to help remediate the VOCs. A risk assessment report was prepared and the results have been approved by OEHHA and the LARWQCB; groundwater monitoring continues on a semi-annual basis. Currently the soil clean-up operations are managed by the LARWQCB. Once complete, the site will be turned over to the USEPA for groundwater remediation purposes. Specifically, this site has been identified as a PRP for chromium contamination.

ITT/Home Depot, 1200 S. Flower St., Burbank

Home Depot has completed construction of a store and parking lot on the site of this former ITT Aerospace Controls property. By agreement between Home Depot and ITT, Home Depot is responsible for the soil assessment and remediation from ground surface down to the depth of an underlying continuous clay layer. The contamination beneath the clay layer, which includes the saturated zone (i.e., groundwater), is the responsibility of ITT Aerospace Controls, a former parts manufacturer and metal finisher and plater. Groundwater contamination at the site consists of VOCs, petroleum hydrocarbons, nickel, and hexavalent chromium. In 2004, Home Depot built a slurry wall around the site to help prevent lateral migration of groundwater contamination. A naturally occurring low-permeability zone located 50 feet below ground surface is expected to reduce vertical migration of the contaminants. ITT is responsible for cleanup of the area below the Home Depot's slurry wall barrier.

A Cleanup and Abatement Order (CAO) issued to ITT in 2004 is being revised to require development and submittal of a Remedial Action Plan for the cleanup of the underlying groundwater contamination. Groundwater monitoring continues on a semi-annual basis. Additionally, the USEPA has issued a General Notice Letter and a 104E Letter to ITT because this facility is considered a source of contamination affecting the GOU. Soil vapor extraction treatment at the site is ongoing.

Honeywell (formerly Allied Signal/Bendix) 11600 Sherman Way, North Hollywood

Honeywell was issued a CAO on February 21, 2003, and an amended CAO followed in September 2004. The facility was directed to prepare a work plan for additional subsurface assessment of the underlying soil and groundwater. This work plan was submitted and approved, and the field work has been completed. A final report has been submitted and is presently undergoing review by the LARWQCB. The facility prepared and submitted a Remedial Action Plan (RAP) for in-situ chromium remediation. The RAP has been approved and is being implemented in conjunction with the facility's General WDR permit. The construction of additional offsite groundwater monitoring wells was approved by the USEPA and LARWQCB, and these wells have been constructed. The facility was required to submit a wellhead treatment work plan for treating hexavalent chromium and 1,4-dioxane at LADWP's extraction well NHE-2. This extraction well was shut down by LADWP because elevated concentrations of total chromium were detected in the pumped groundwater. Honeywell's work plan was approved as well as their short-term remediation plan. Recently, Honeywell signed an Administrative Order on Consent with the USEPA to develop the long-term remediation plan for the NHE-2 wellhead treatment to the LARWQCB for their review and comment/approval.

In September 2008, Honeywell began pumping NHE-2 and processing the groundwater through a wellhead treatment system to remove VOCs before discharging the effluent to the sanitary sewer system. Because the VOC and other contaminant concentrations were below the limits identified in the sewer discharge permit, Honeywell was allowed to remove the wellhead treatment system, and to discharge the effluent from well NHE-2 directly into the sanitary sewer. Honeywell is currently working with LADWP and CDPH to comply with CDPH Policy Memorandum 97-005 by preparing a Source Water Assessment and Treatment Report. This would recommend construction of a wellhead treatment system to remove VOCs and chromium and allow the treated effluent to be in compliance with Title 22; thereafter, the groundwater could be distributed by LADWP into its service area.

Former Price Pfister site, Pacoima, California

The Price Pfister site was previously used for manufacturing plumbing fixtures involving casting, machining, and chrome plating. Since 2002, the LARWQCB has been the lead agency overseeing the investigation, monitoring and remediation of the soil and groundwater contamination at the former Price Pfister, Inc. site, located at 13500 Paxton Street. Current soil remediation activities include a soil vapor extraction system, and removal of free hydrocarbon products. This Brownfield site was redeveloped in 2010 into a Costco, a Lowe's, and a Best Buy shopping center.

Hexavalent chromium concentrations of 8,300 µg/L were detected in the groundwater beneath the Price Pfister site in August 2010. During the same period, 1,4-dioxane levels were at/near 85 µg/L (950 µg/L of 1,4-dioxane were detected in August 2007). Price Pfister has completed a pilot study to treat chromium; and also submitted a Microcosm Study Remedial Action Plan for 1,4-dioxane. Emulsified vegetable oil was injected in three wells at the Former Price Pfister Site in November 2012 to implement an approved hexavalent chromium pilot test Work Plan. The report on the findings of the pilot test by the site consultant is to be submitted to the LARWQCB two months after the collection of 6-month post-injection groundwater samples.

General Electric (formerly Pacific Airmotive), 2940 North Hollywood Way, Burbank

The LARWQCB has identified an apparent continuing source of VOCs at the former site of the Pacific Airmotive (PAC) property that is currently owned by General Electric. The soil vapor extraction system has been removing PCE soil vapors from underneath an adjacent property (2960 No. Hollywood Way). PAC owned the subject property from 1947 until 2006 and their activities (such as testing, maintenance, repair and overhaul of commercial and military aircraft engines) resulted in VOC impacts (primarily PCE) to soil and groundwater. As of September 2011, PAC water quality data are now included in the Lockheed-Martin semi-annual groundwater report for the BOU.

Raytheon (formerly Hughes Missile Systems Company), 8433 Fallbrook Avenue, Canoga Park

Contaminants at the site reportedly include 1,1-DCE, TCE, PCE, 2,4,6 trichloroanisole (TCA), benezene, toluene, ethyl benzene and zylene (BTEX), and 1,1-dichloroethane (DCA). Because TDS concentrations are in excess of the Basin Plan objectives promulgated by the LARWQCB, the treated water may not be discharged to the Los Angeles River. As a result of the high TDS concentrations, the treatment plant effluent is stored in holding tanks, and used for onsite irrigation. Raytheon continues to utilize and has expanded its use of Enhanced In-Situ Bioremediation to reduce contaminants with the shallow groundwater beneath the site.

3M (formerly Riker Lab), 19901 Nordhoff, Northridge

Contaminants at this site include chloroform, 1,2-DCE, 1,2-DCA, and Freon 11. A groundwater treatment system has been in operation since 1997. At least 15 groundwater extraction wells and two air-stripping towers in series capable of treating 60,000 gallons per day have been in operation at the site. In March 2005, 3M and its consultant, Weston Solutions, Inc. completed installation of a system to re-use the discharged portion of the treated groundwater for landscape irrigation. All of the treated groundwater is now beneficially used onsite.

Micro Matics, 19791 Bahama St., Northridge

The soil and groundwater beneath a portion of the Micro Matics property have been contaminated with PCE and 1,1,1-TCA. One or more contaminant plumes have reportedly migrated offsite to the west beneath a portion of the former 3M property, and also to the south beneath Bahama Street. The 3M parcel contaminated by Micro Matics was sold to a developer, Nordhoff Industrial, in December 2004.

Soil vapor extraction (SVE) was initiated in 2006 to remediate the VOC-impacted soil beneath the site and this effort was continued for at least 29 months. Soil closure was requested in 2009 from the LARWQCB.

Interim groundwater remediation have included pump and treat activities and injection of the hydrogen-donating compound (HRCTM) between 1999 and 2005. In October 2007, a containment treatment line using ozone gas was operating on the north side of Nordhoff Street. In April 2009, a full-scale groundwater treatment system using ozone gas began operation. The full-scale system includes numerous ozone sparge points in the source area, and several treatment lines downgradient of the source area. Groundwater treatment continues using an expanded ozone gas injection system.

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Tesoro Petroleum (former Fast Fuel, 11051 Victory Blvd., N. Hollywood)

Tesoro Petroleum is the owner of a gasoline station in North Hollywood. A large, leaking underground tank caused a plume of gasoline hydrocarbons containing MTBE to move downward into the local groundwater. Over time, this contamination plume has migrated offsite toward several municipal-supply wells in LADWP's Whitnall Wellfield. Tesoro and its consultants have been performing soil remediation using soil vapor extraction.

Working with its consultants, and with LADWP, LARWQCB, and the former Watermaster, Tesoro implemented a groundwater cleanup plan that utilizes ex-situ bioremediation and re-injection of the treated groundwater. Full-scale re-injection began in October 2005 and is now complete, restoring groundwater quality and allowing LADWP's Whitnall wells to begin active pumping again. Work on this site was designed to test alternative MTBE restoration methods, resulting in a dramatic reduction in MTBE in the groundwater. Upon review of the data, the LARWQCB determined that the groundwater influent into the remediation system showed substantial reduction in MTBE concentrations; thus, the LARWQCB approved the permittee's request to discontinue water treatment operations. On September 30, 2011, the Executive Officer of the LARWQCB granted a low-risk closure for the site. During the entire process of the site investigation and cleanup, approximately 43.4 million gallons of contaminated groundwater and approximately 233,800 pounds of vapor hydrocarbon and/or oxygenates (such as MTBE) were removed from the site. All water treatment equipment has been decommissioned and removed from the site. Some of the groundwater monitoring wells have been destroyed and/or will be destroyed in the near future.

Taylor Yard (Los Angeles River Narrows Area)

Taylor Yard is located on San Fernando Road between the Glendale Freeway (Route 2) and the Harbor Freeway (Route 110). The 243-acre Taylor Yard site is divided into two areas: a

174-acre Sale Parcel, formerly used mainly to classify and hook up rail cars; and a 69-acre Active Yard, which continues to be used for locomotive service and maintenance. These areas have been contaminated with petroleum hydrocarbons, organic solvents and metals. The Sale Parcel soil has reportedly been cleaned up. Several types of activities have been performed on the Active Yard to remove contaminated soil. Spills have been cleaned up by using absorbent blankets or pumps to collect the liquid, or by excavating the contaminated soil; remediation is under the jurisdiction of the DTSC. A Risk Assessment and Feasibility Study was approved for the Active Yard and a Remedial Action Plan is currently being prepared for this area.

Status on the existence of Hexavalent Chromium in the San Fernando Basin

In January 2003, the original Watermaster published a report on hexavalent chromium contamination in the SFB. Later, the LARWQCB published a report (December 2002) based on its four-year investigation of hexavalent chromium . The presence of this contaminant threatens the use of SFB groundwater as a reliable source of water for Burbank, Glendale and Los Angeles, and also jeopardizes the remedy (i.e., the cleanup plan) and the treatment plants which had been constructed with funding from the USEPA to only clean up VOCs on a regional basis; none of the treatment plants that treat VOCs in the groundwater in the SFB were designed to treat chromium.

On July 27, 2011 the California Office of Environmental Health Hazard Assessment (OEHHA) published a final Public Health Goal (PHG) for hexavalent chromium of 0.02 µg/L (or 0.02 ppb). With the final PHG published, a Maximum Contaminant Level (MCL) will eventually be established by the CDPH. The Federal and State drinking water MCLs for total chromium are currently 100 µg/L and 50 µg/L, respectively. There are no separate standards for hexavalent chromium at this time.

Hexavalent chromium affects the operation of the treatment plants, because, as noted above, they were designed to treat only for VOCs. The Consent Decrees between the USEPA and the responsible parties require that certain pumping rates be maintained in the OUs to control VOC plume migration and to provide contaminant removal. As these OU wells are pumped, the chromium plumes tend to migrate toward the wells, likely at a slower rate than the VOCs. Hexavalent chromium has now been detected in all of the OUs in the SFB. Fortunately, its concentrations are currently low enough to meet current drinking water standards, under certain operational controls. High hexavalent chromium concentrations have caused several wells to be pumped at reduced rates (particularly in the GOU), and at least one well has been shut down in the NHOU. Should hexavalent chromium concentrations become excessive, the operation of the OUs will be compromised.

In October 2006 the results of pilot studies by Malcolm Pirnie were presented to an expert panel that identified two promising technologies for chromium treatment: weak-base anion exchange (WBA) and reduction-coagulation-filtration (RCF). Funding from EPA, California Proposition 50, and local industry allowed for the construction of the facilities. The treatment facilities using the two technologies identified in the Malcolm Pirnie study were constructed and placed into service in March and April 2010; these facilities have been effective in removing chromium in the groundwater to concentrations below 5 µg/L.

In a meeting of the Project Advisory Committee in September 2010, where the preliminary results were presented, it was recommended that microfiltration be tested as an enhancement to the RCF dual media filters to see if 1 µg/L chromium levels could be achieved. This was in light of the draft PHG of 0.06 µg/L (a final PHG of 0.02 µg/L was adopted in July 2011). The microfiltration study received funding from the State, the WaterRF, and the US Bureau of Reclamation, and began in February 2012.

On February 28, 2013, Glendale released the Final version of the "Hexavalent Chromium Removal Research Project" Report to the CDPH. That report details Glendale's research efforts to identify viable treatment technologies for the removal of hexavalent chromium. According to CDPH, an enforceable MCL may be established sometime between July 2014 and July 2015.

General Waste Discharge Requirements Permit (WDR)

On March 1, 2007 the LARWQCB adopted a revision to the General Waste Discharge Requirements Permit. This marks significant progress in the effort to expedite cleanup of chromium and other contaminants in ULARA. In the Notice of Preparation of Mitigated Negative Declaration, the LARWQCB proposed:

> "to adopt General Waste Discharge Requirements for groundwater remediation at sites impacted by petroleum fuel, volatile organic compounds and/or hexavalent chromium. The adoption of WDRs for in-situ groundwater remediation/cleanup or the extraction of polluted groundwater with above ground treatment and the return of treated groundwater to the same aquifer zone would: a) simplify the application process for discharges; b) allow more efficient use of LARWQCB staff time; c) reduce LARWQCB time by enabling the Executive Officer to notify the discharger of the applicability of the general WDRs; d) enhance the protection of surface water quality by eliminating the discharge of

wastewater to surface waters; and e) provide a level of protection comparable to individual, site-specific WDRs."

Former Chase Chemical/Holchem Site, 3540 and 13546 Desmond Street, Pacoima

A significant VOC contaminant plume was identified in the Pacoima area near the intersection of the Simi Valley Freeway (118 Freeway) and San Fernando Road. This area is approximately 3 miles upgradient of LADWP's Tujunga wellfield, which originally could pump groundwater at a total combined rate of 47,000 gpm. LADWP constructed two monitoring wells downgradient of the contaminant plume.

The former Chase Chemical/Holchem site is located on approximately two acres of land. Chase Chemical Company used the site from 1967 to 1987 to store industrial chemicals in underground storage tanks, aboveground storage tanks and other containers for packaging and resale. Holchem, Inc. leased the property in 1987, purchased it in 1999, and continued the storage and re-sale of industrial chemicals; site operation ended in 2001. In 2003, an interim remedial action (IRA) consisting of a Soil Vapor Extraction System began to clean the contaminated soil. To date, approximately 27,725 pounds of VOCs have been removed from the subsurface by SVE and bioventing systems, according to ARCADIS, the consultant for Soco West Inc. (current owner of the site). These systems were turned off in March 2010 in preparation for collecting confirmation soil samples. According to a May 2010 report, "ARCADIS is requesting from the DTSC that the Site IRA remain off as they have reached asymptotic levels, and requests a no further action status for soil at the site." DTSC denied their request as there are still contaminants of concern above an acceptable level in soil. DTSC also indicated that a groundwater pump and treat system should be installed to remediate remaining contaminants in the local groundwater. However, operation of a groundwater treatment system has not yet begun as ARCADIS is identifying alternatives and required permits for discharging the treated effluent from the site. Quarterly groundwater monitoring is ongoing. In the first quarter of 2013, PCE and TCE were detected at concentrations as high as 33 µg/L and 36 µg/L, respectively (each of these VOCs has an MCL of 5.0 µg/L). These recent concentrations are much lower than their historic concentrations (by two orders of magnitude). Additional VOCs, such as cis-1,2-DCE, 1,1, DCE and 1,4-dioxane, also continue to be detected.

3.9. EPA Shallow Zone Contamination Maps

The EPA typically provides the Watermaster with contamination "plume" maps for the Shallow aquifer zone in the eastern portion of the San Fernando Groundwater Basin. Plates 14, 15, 16, and 17 show contaminant contours within the Shallow Aquifer Zone in SFB, as interpreted by EPA and/or their subcontractors, for the contaminants TCE, PCE, NO_3, and total chromium, respectively. Typically, these maps are updated annually. However, at the time of this current Watermaster Report, the updated plume maps have not yet been received from the EPA. Hence, the contour data shown on Plates 14, 15, 16, and 17 in this report are based on data from 2010; these are the same maps that were published in the 2010-11 Water Year Annual ULARA Watermaster Report.

3.10. LID Projects (Formerly SUSMP)– San Fernando and Sylmar Basins

Since becoming ULARA Watermaster in January 2009, this Watermaster has been reviewing information and reports from various private engineers and/or owners in regard to Standard Urban Stormwater Mitigation Plan (SUSMP) requirements for all proposed developments and re-developments of existing properties within those portions of the City of Los Angeles that overlie the San Fernando and Sylmar basins. Note that, in May 2012, the City of Los Angeles implemented a Low Impact Development Ordinance (LID) that expanded/revised the original SUSMP requirements; hence, SUSMP projects are now referred to as LID projects. Plate 18, "Locations of LID (SUSMP) Projects – San Fernando & Sylmar Basins", illustrates the approximate locations of the ±150 such LID properties that have been reviewed by the Watermaster to date. The background of LID projects and the role of the Watermaster in the LID approval process are described below. LID projects in the cities of Burbank, Glendale and San Fernando have not been reviewed to date by this Watermaster, but rather only by representatives of those cities.

The State Regional Water Quality Control Board-Los Angeles Region (RWQCB-LA) promulgated its National Pollutant Discharge Elimination System (NPDES) permit process in 1990 to help minimize the impacts of stormwater and urban runoff on the receiving water bodies in its sphere of influence (i.e., local rivers and the Pacific Ocean). The goal of their NPDES process was to minimize the impacts on the river, and ultimately to the ocean, by reducing the amount and improving the quality of surface water runoff from each storm event. For the ULARA region, the main receiving waters are the Los Angeles River and the Pacific Ocean.

Several years after the implementation of the NPDES process, the City of Los Angeles, Department of Public Works, Bureau of Sanitation – Watershed Protection Division (LAWPD), promulgated a series of guidelines intended to increase onsite infiltration of stormwater at all proposed developments and re-developments throughout the City. These guidelines established the requirements and limitations for infiltration (and recharge) of onsite stormwater and also specified an order of preference (via a set of Best Management Practices---BMPs) for providing LID improvements at each development and/or re-development site in the City.

The specific order of the BMP preference list was established by the LAWPD to collect and provide basic "treatment" of onsite stormwater runoff, and to help increase the amount of infiltration (i.e., deep percolation) from the initial ¾-inch of rainfall from each storm event at all new development and re-development sites in the City. The end result is intended to reduce the volumes of stormwater runoff that enter the storm drain system (from each new storm event) and simultaneously help reduce the volume and enhance the quality of the runoff that enters the Los Angeles River and ultimately the Pacific Ocean. Potential urban-derived contaminants and turbidity in the captured runoff could be reduced by the "treatment" effects of the various stormwater infiltration systems proposed via the BMPs. From a hydrogeologic perspective, and in the opinion of this Watermaster, whenever and wherever deep percolation (infiltration) of "treated" stormwater can be appropriately enhanced, then recharge to the local groundwater basin can be beneficially increased.

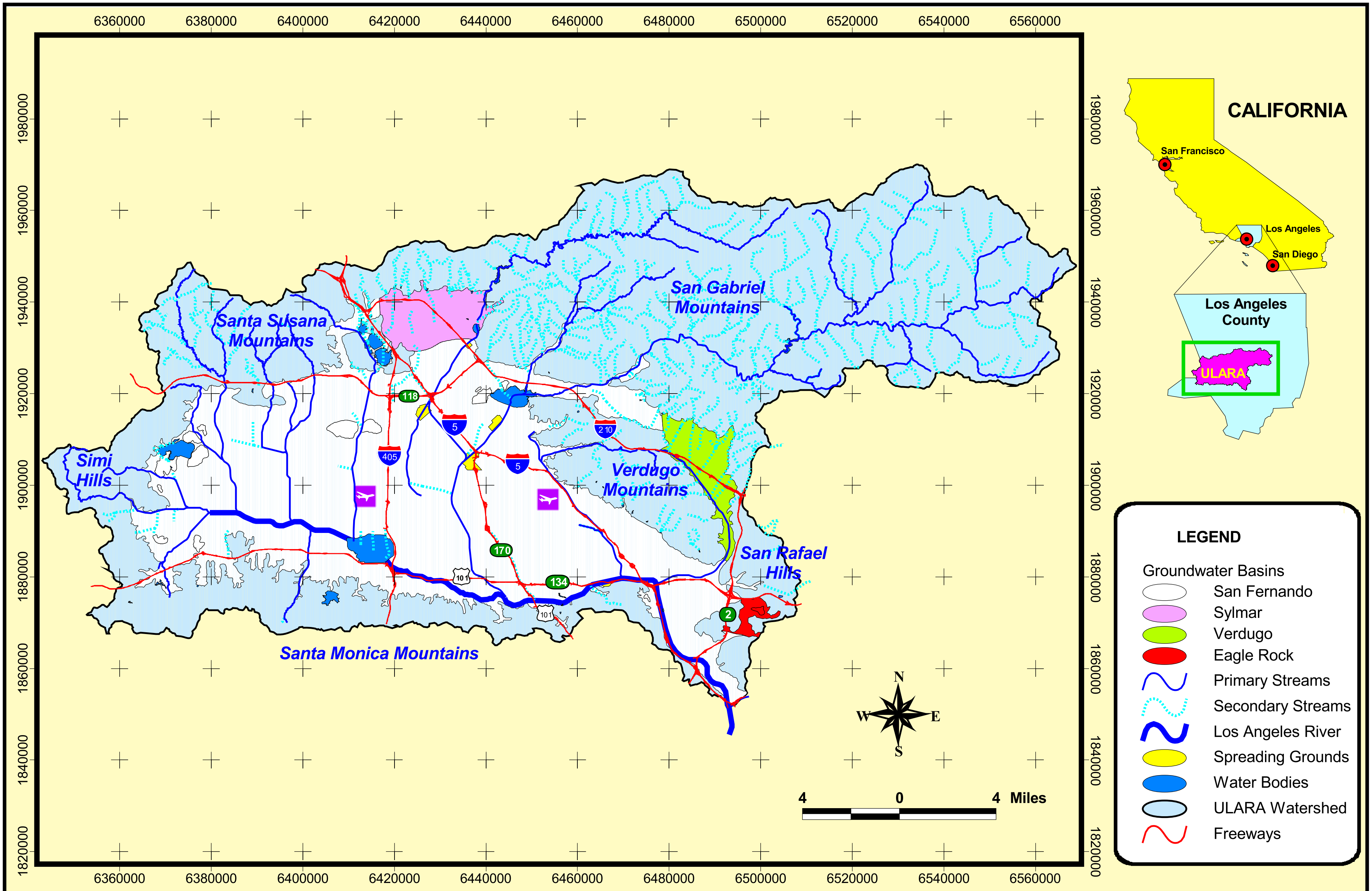
Per the LID Information Guidelines of the LAWPD, the five BMP options, in order of preference, are:

1. Infiltration Systems (design based on the volume of stormwater);
2. Bio-Filtration/Retention Systems (design based on flow of stormwater);
3. Stormwater Capture and Re-Use (optional; subject to County Health Department approval);
4. Mechanical/Hydrodynamic Units;
5. Combination of any of the above.

As a result, this Watermaster has been working with Mr. Ammar Eltawil of the LAWPD as part of the LID approval process for each new development/redevelopment site in those portions of the City of Los Angeles that overlie the San Fernando and Sylmar groundwater basins. Plate 18, as noted above, shows the approximate locations of the ±150 such LID sites reviewed to date by this Watermaster within those two groundwater basins. As part of the LID permit application process, Mr. Eltawil of LAWPD also provides each applicant with a 2-page Memorandum prepared by the Watermaster (current version is dated December 18, 2012) that lists the types of data and reports requested by the Watermaster from each LID applicant. The approval process is basically as follows:

a. Applicant provides substantial reports, data and LID-defined runoff calculations as required by the LAWPD.
b. LAWPD provides applicant with the 2-page Watermaster data request Memorandum.
c. LAWPD reviews, evaluates and provides approval or denial of the specific LID and the runoff calculations provided by the applicant.
d. The Watermaster reviews the information on subsurface conditions, etc, as provided by the applicant, and provides an opinion letter with his approval or denial of the LID based on the potential of the infiltration potential of the LID to enhance recharge to the local groundwater basin without interfering with proximal area(s) of groundwater contamination and/or area(s) of groundwater remediation.

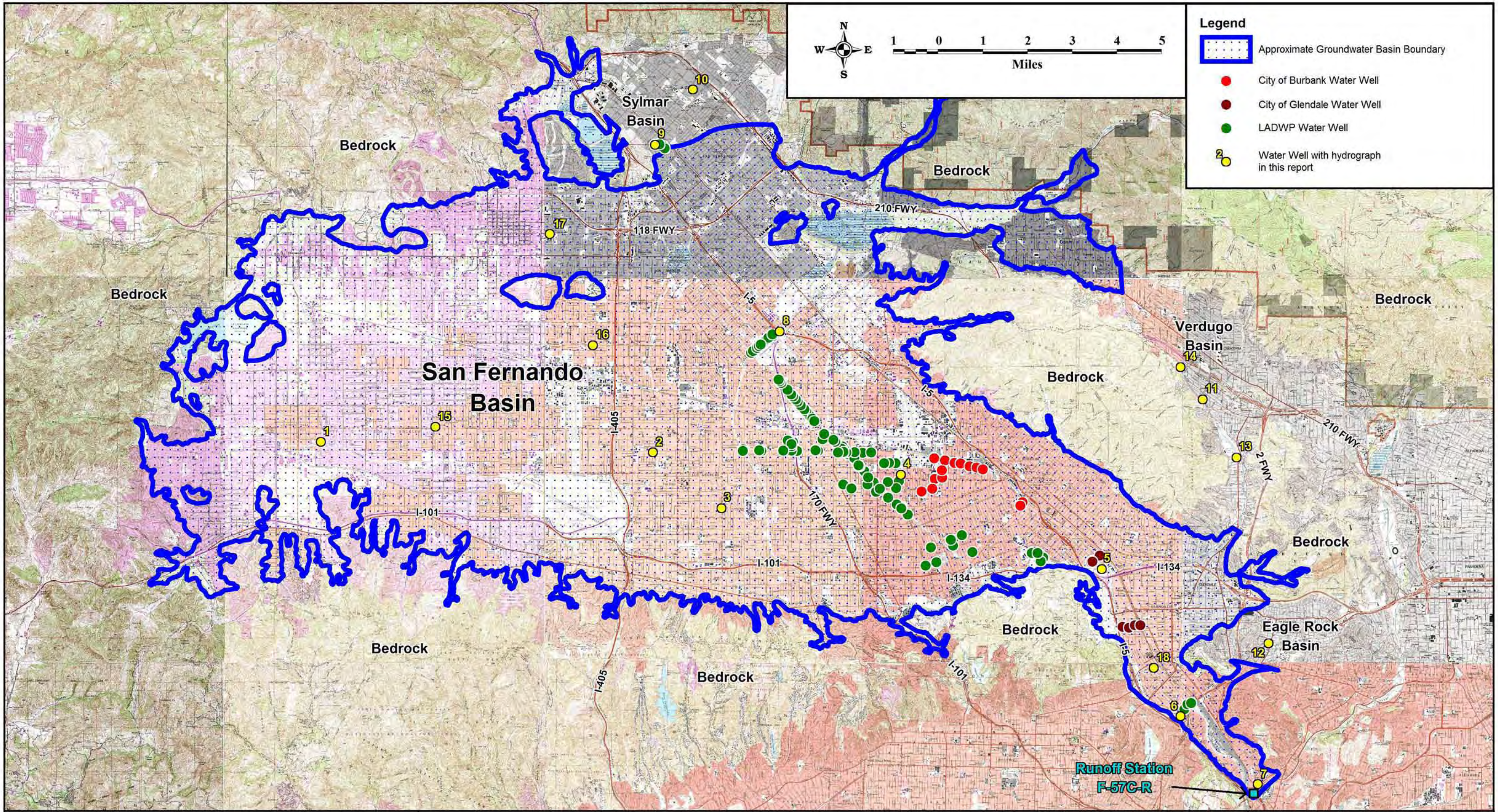
PLATES



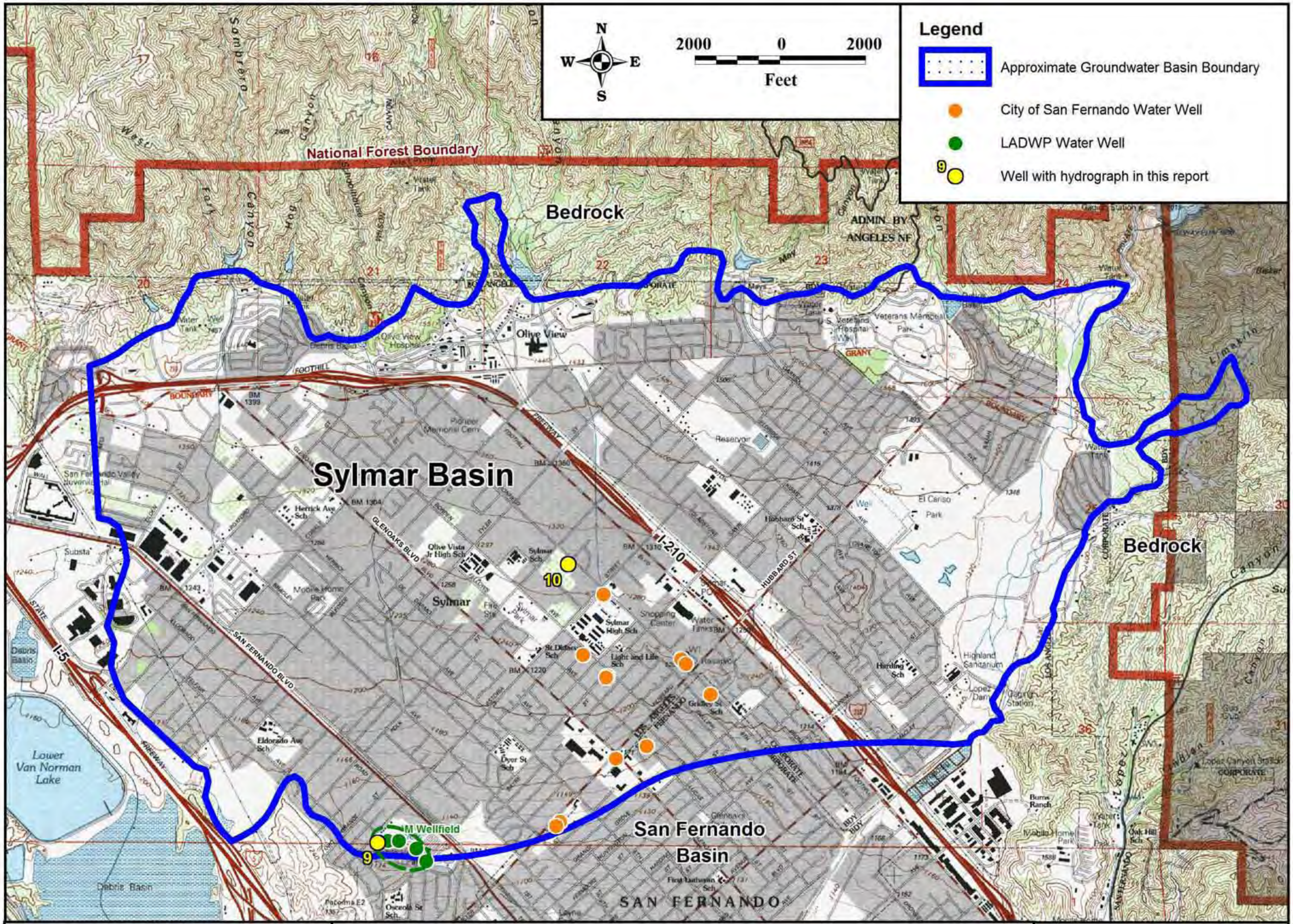
2011-12 Water Year
ULARA Watermaster
Report

Upper Los Angeles River Area: Vicinity and Location Map

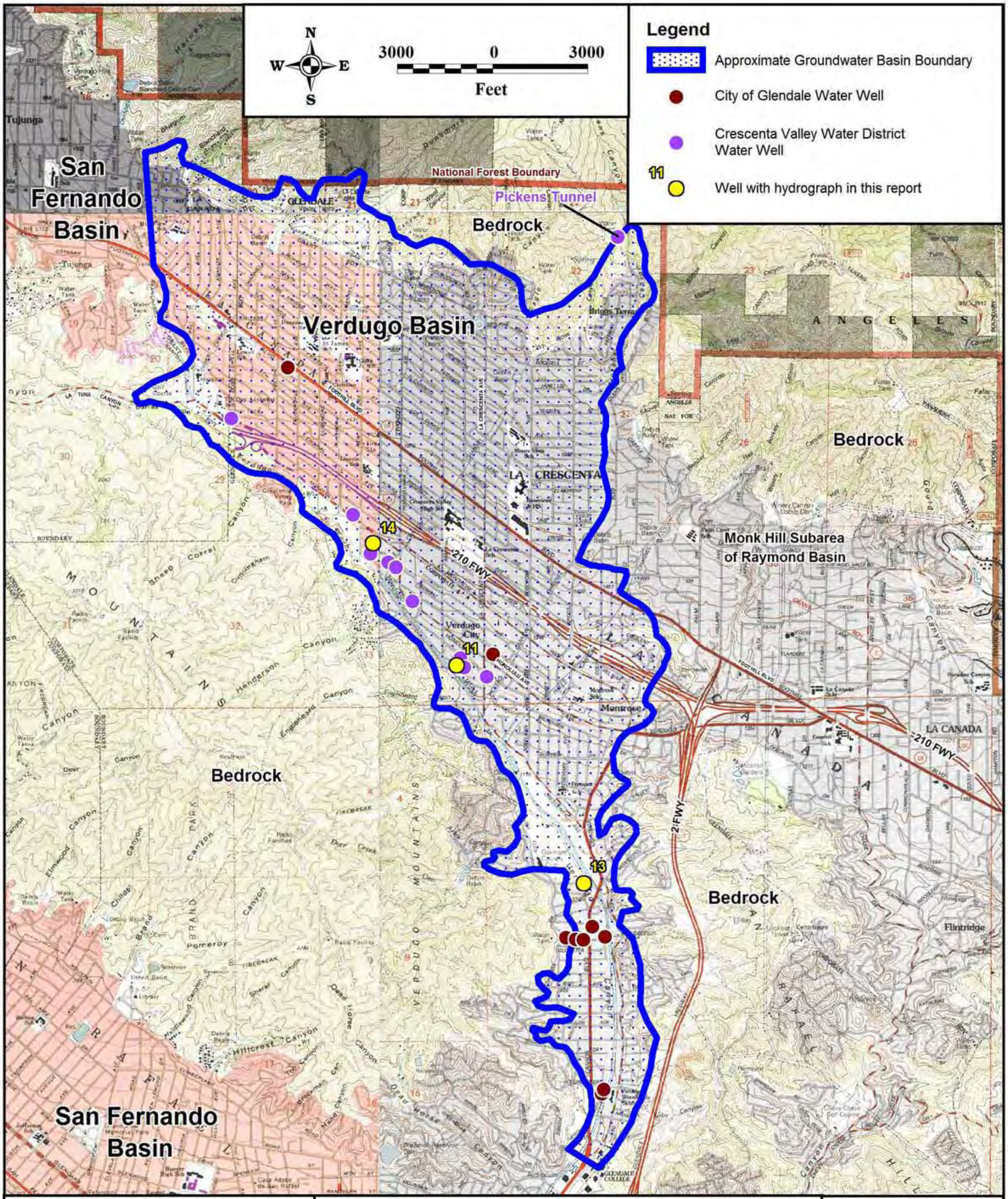
PLATE
1



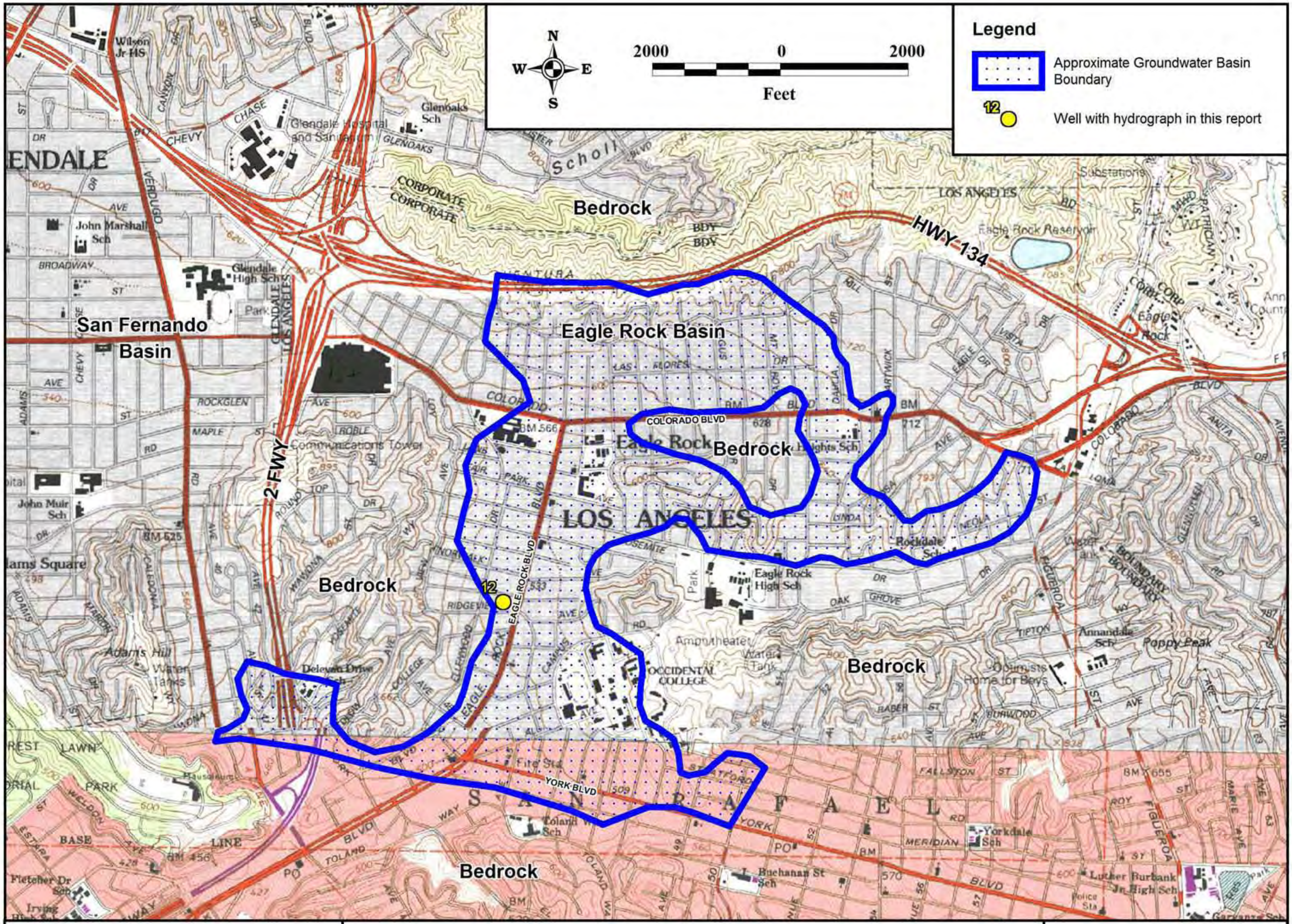
2011-2012 Water Year ULARA Wastermaster Report	Upper Los Angeles River Area: San Fernando Groundwater Basin	PLATE 1A



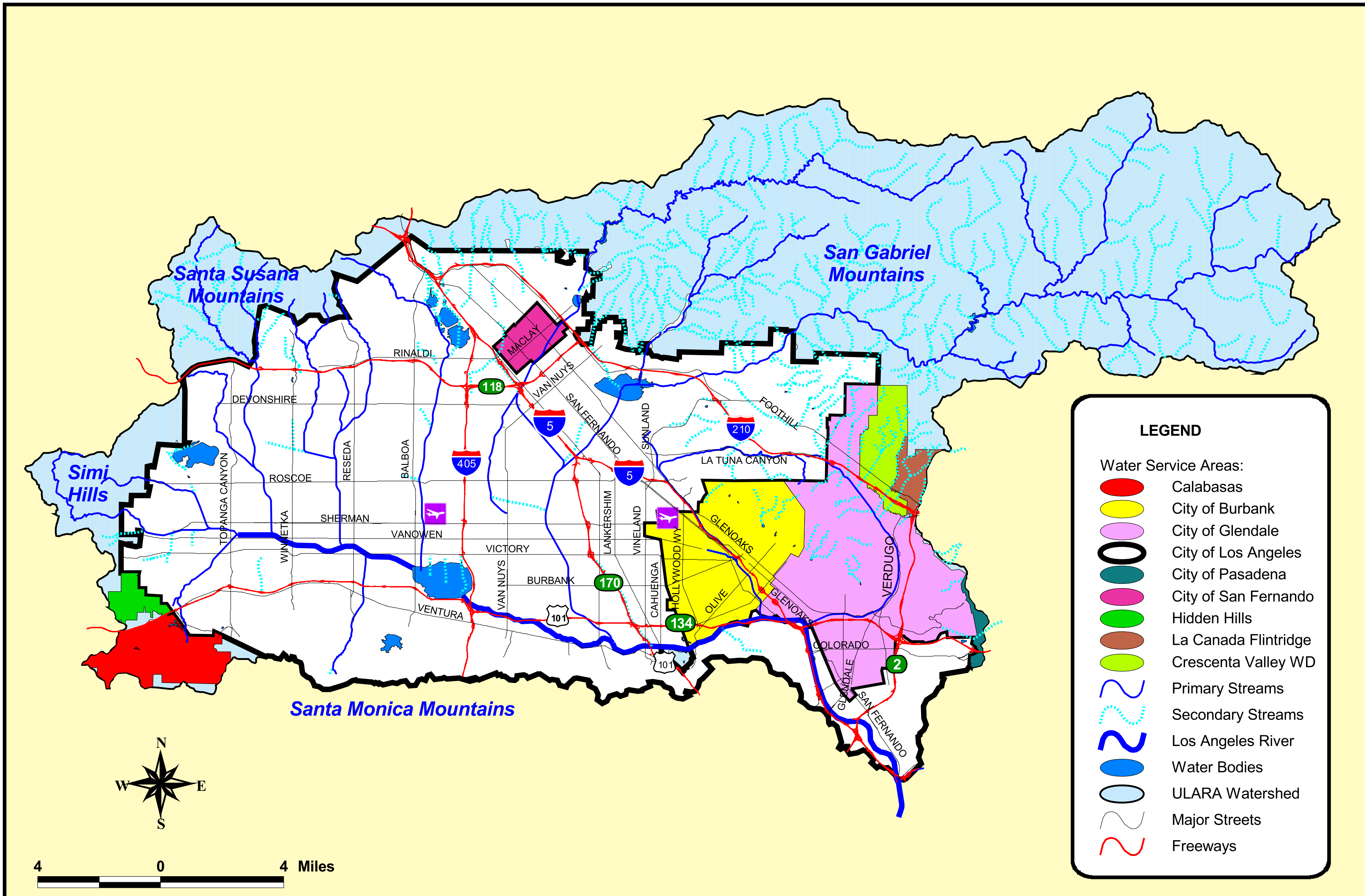
2011-2012 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Sylmar Groundwater Basin Map	PLATE 1B



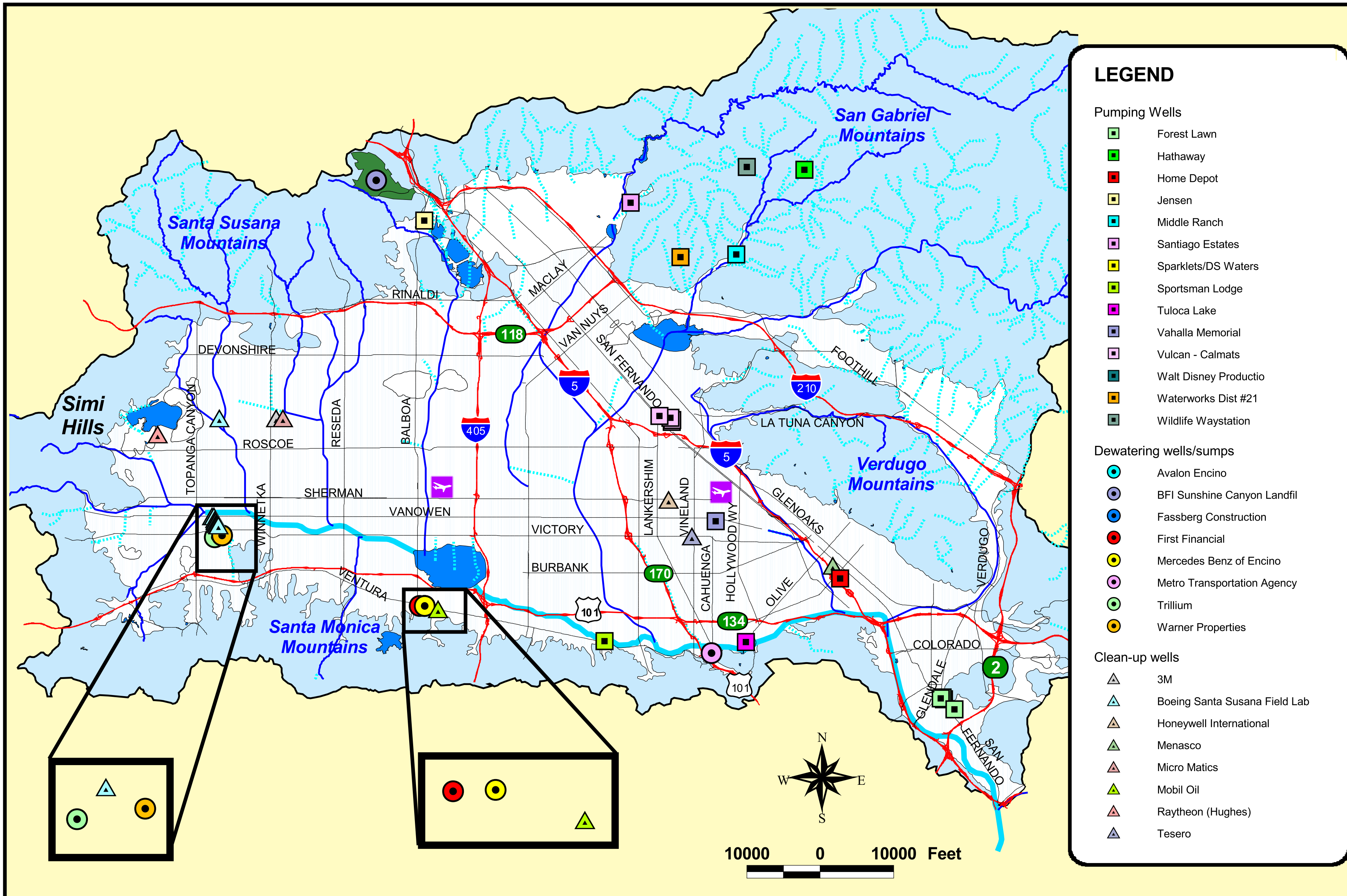
2011-2012 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Verdugo Groundwater Basin Map	PLATE 1C



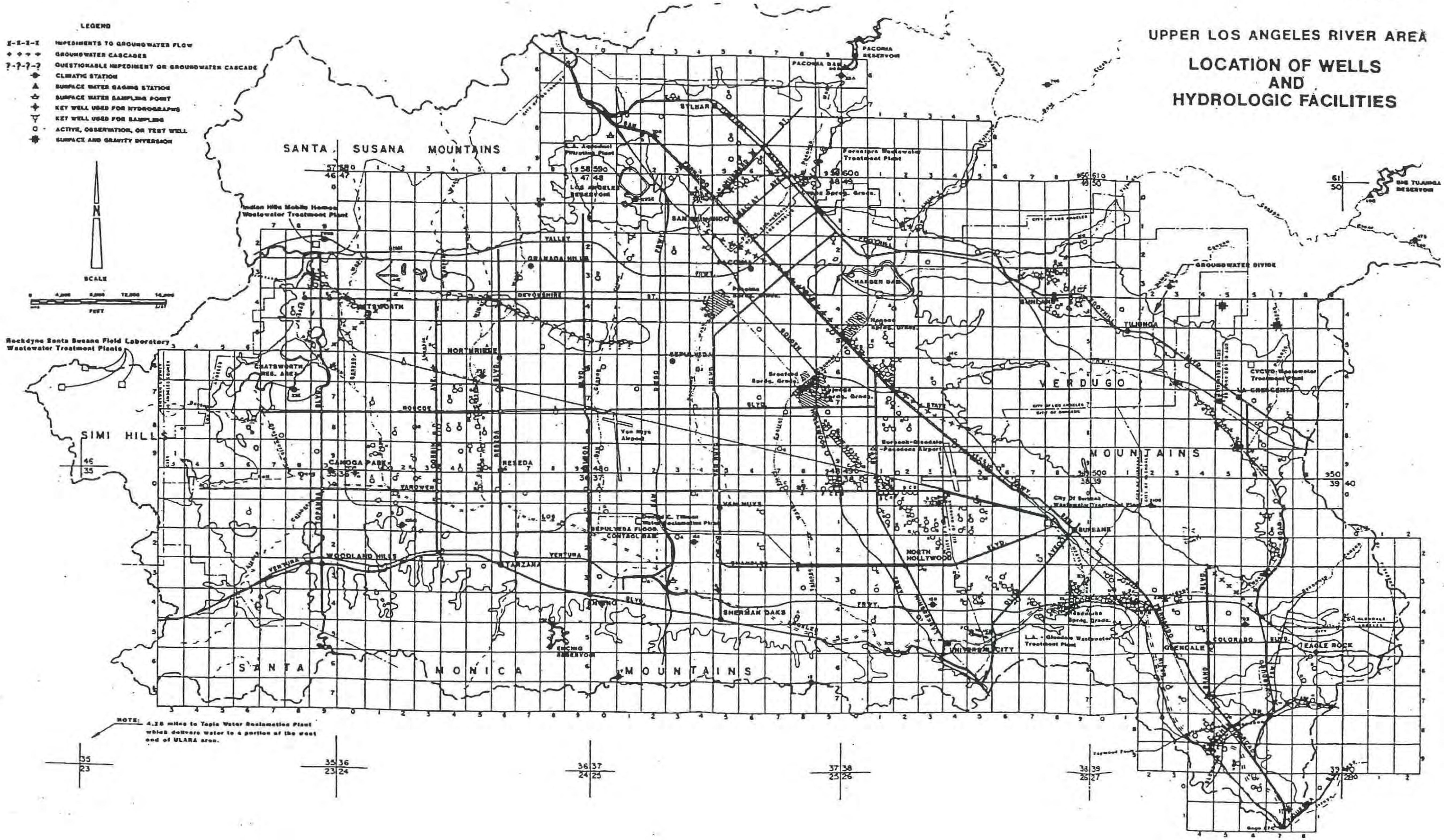
2011-2012 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Eagle Rock Groundwater Basin Map	PLATE 1D

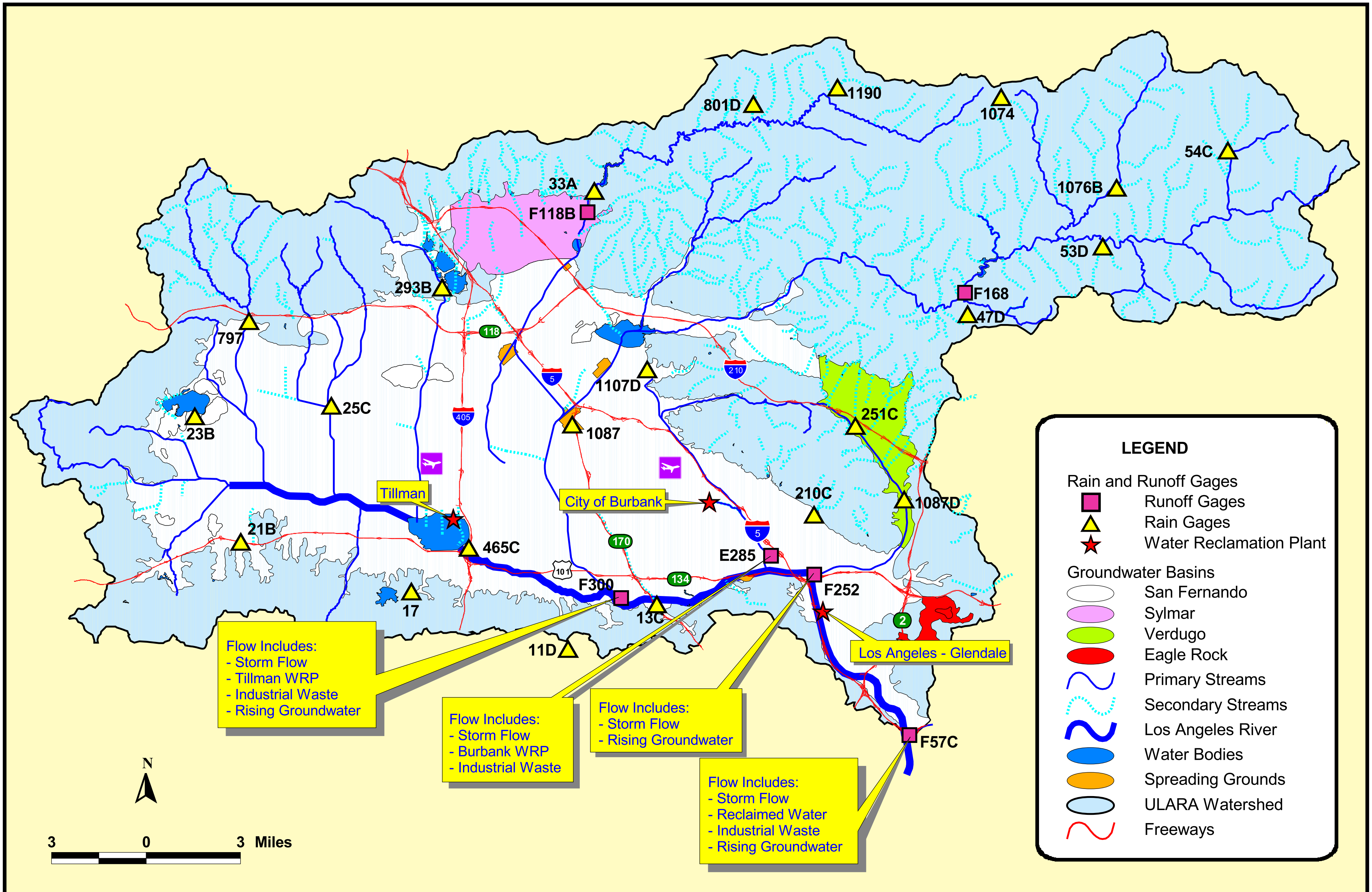


2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Water Service Areas of Public Agencies	PLATE 2

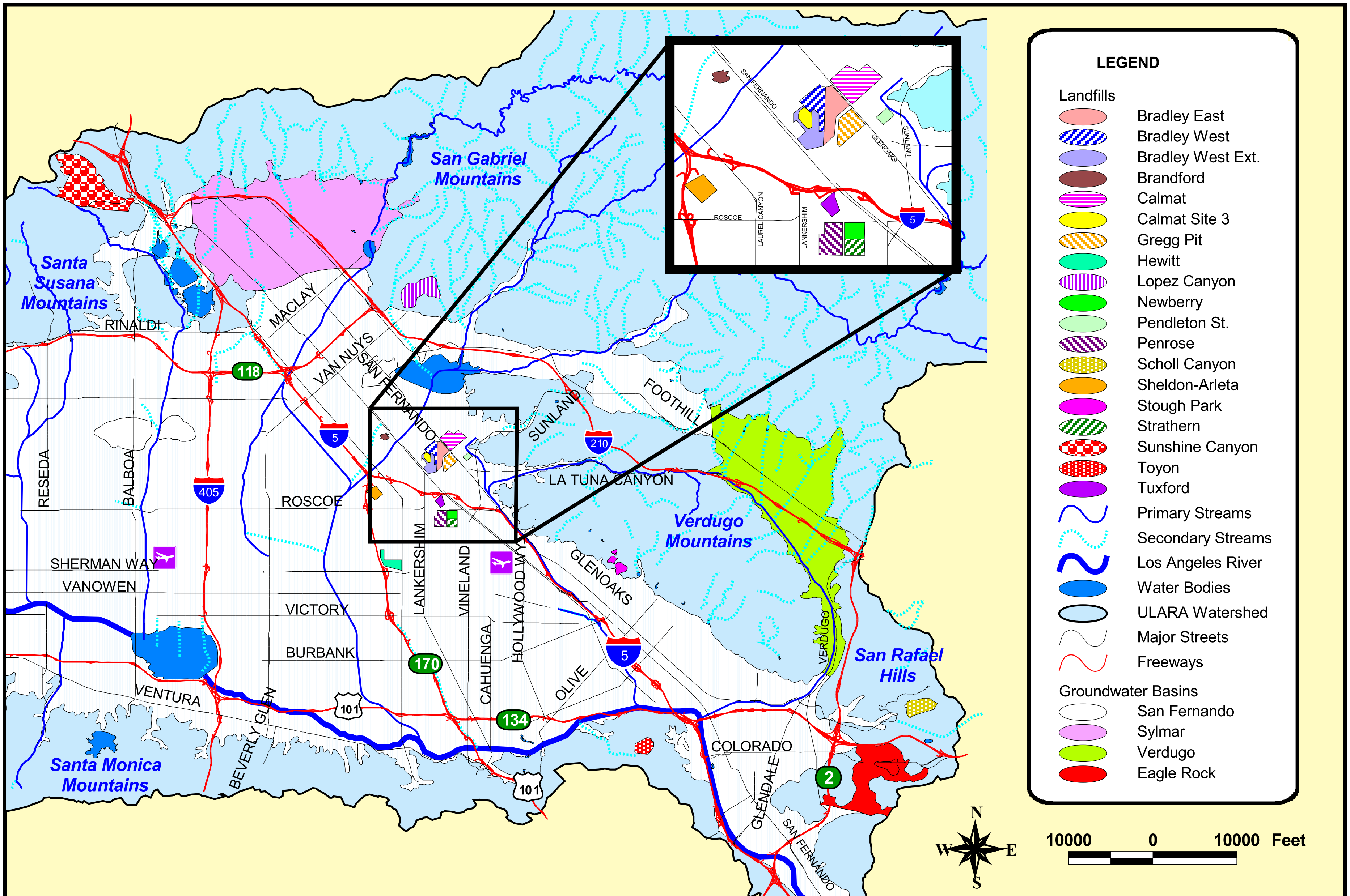


2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Location of Individual Producers	PLATE 3

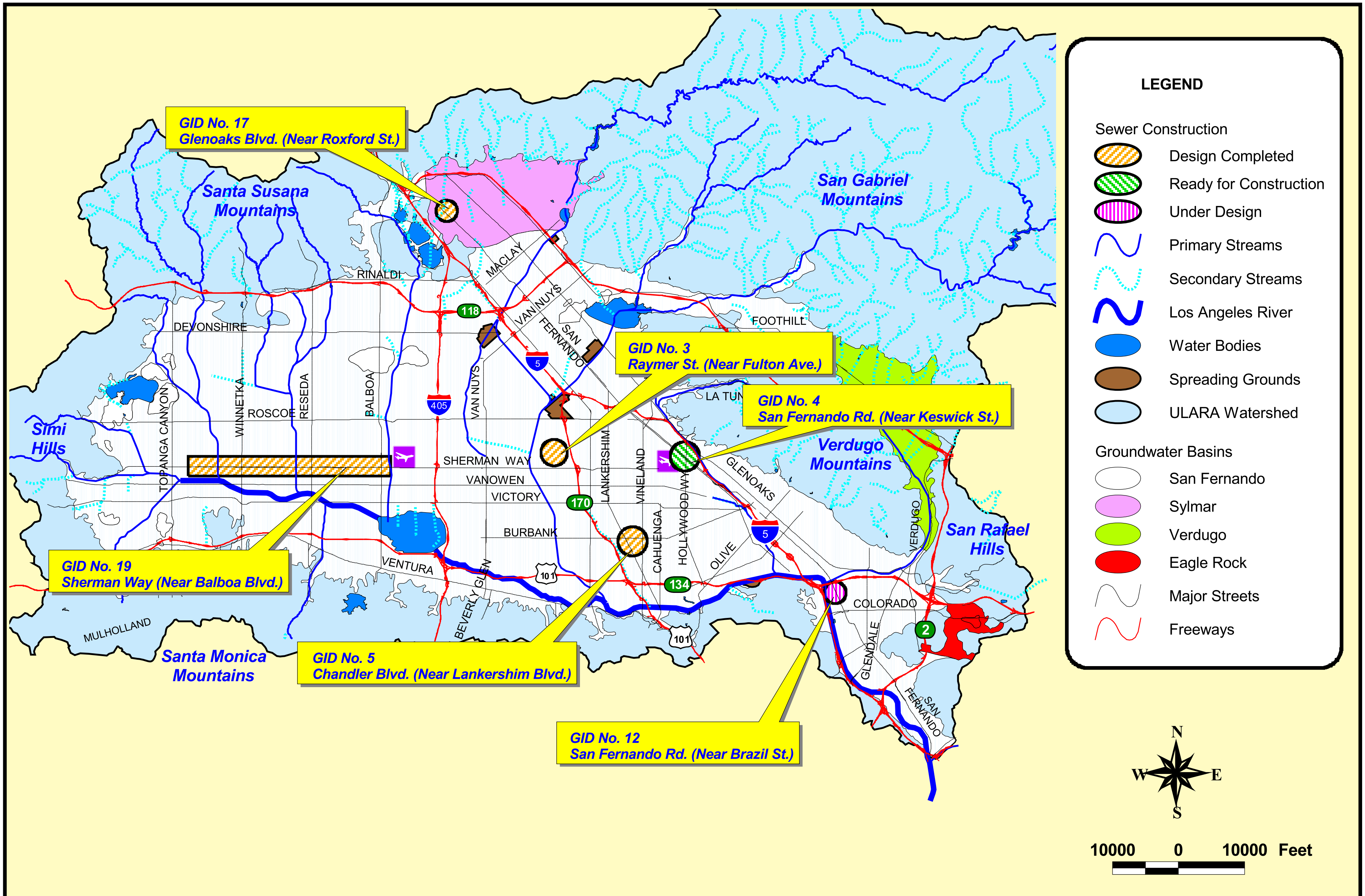

UPPER LOS ANGELES RIVER AREA
LOCATION OF WELLS AND HYDROLOGIC FACILITIES
LEGEND
IMPEDIMENTS TO GROUNDWATER FLOW
GROUNDWATER CASCADES
QUESTIONABLE IMPEDIMENT OR GROUNDWATER CASCADE
CLIMATIC STATION
SURFACE WATER GAGING STATION
SURFACE WATER SAMPLING POINT
KEY WELL USED FOR HYDROGRAPHS
KEY WELL USED FOR SAMPLING
ACTIVE, OBSERVATION, OR TEST WELL
SURFACE AND GRAVITY DIVERSION
N
SCALE
FEET
SANTA SUSANA MOUNTAINS
SIMI HILLS
SANTA MONICA MOUNTAINS
VERDUGO MOUNTAINS
PACOIMA RESERVOIR
PACOIMA DAM
SYLMAR
SAN FERNANDO
PACOIMA
HANSEN DAM
LOS ANGELES RESERVOIR
GRANADA HILLS
CHATSWORTH
CHATSWORTH RES. AREA
NORTHRIDGE
CANOGA PARK
RESEDA
SEPULVEDA
VAN NUYS
NORTH HOLLYWOOD
BURBANK
GLENDALE
EAGLE ROCK
LA CRESCENTA
TUJUNGA
SUNLAND
WOODLAND HILLS
TARZANA
ENCINO
ENCINO RESERVOIR
SHERMAN OAKS
UNIVERSAL CITY
SEPULVEDA FLOOD CONTROL DAM
Van Nuys Airport
Burbank-Glendale-Pasadena Airport
GROUNDWATER DIVIDE
BIG TUJUNGA RESERVOIR
VALLEY
DEVONSHIRE
ROSCOE
VANOWEN
VENTURA
VICTORY
COLORADO
Indian Hills Mobile Homes Wastewater Treatment Plant
Rockdyne Santa Susana Field Laboratory Wastewater Treatment Plants
City of Burbank Wastewater Treatment Plant
L.A. - Glendale Wastewater Treatment Plant
CVCWD Wastewater Treatment Plant
NOTE: 4.25 miles to Tapia Water Reclamation Plant which delivers water to a portion of the west end of ULARA area.



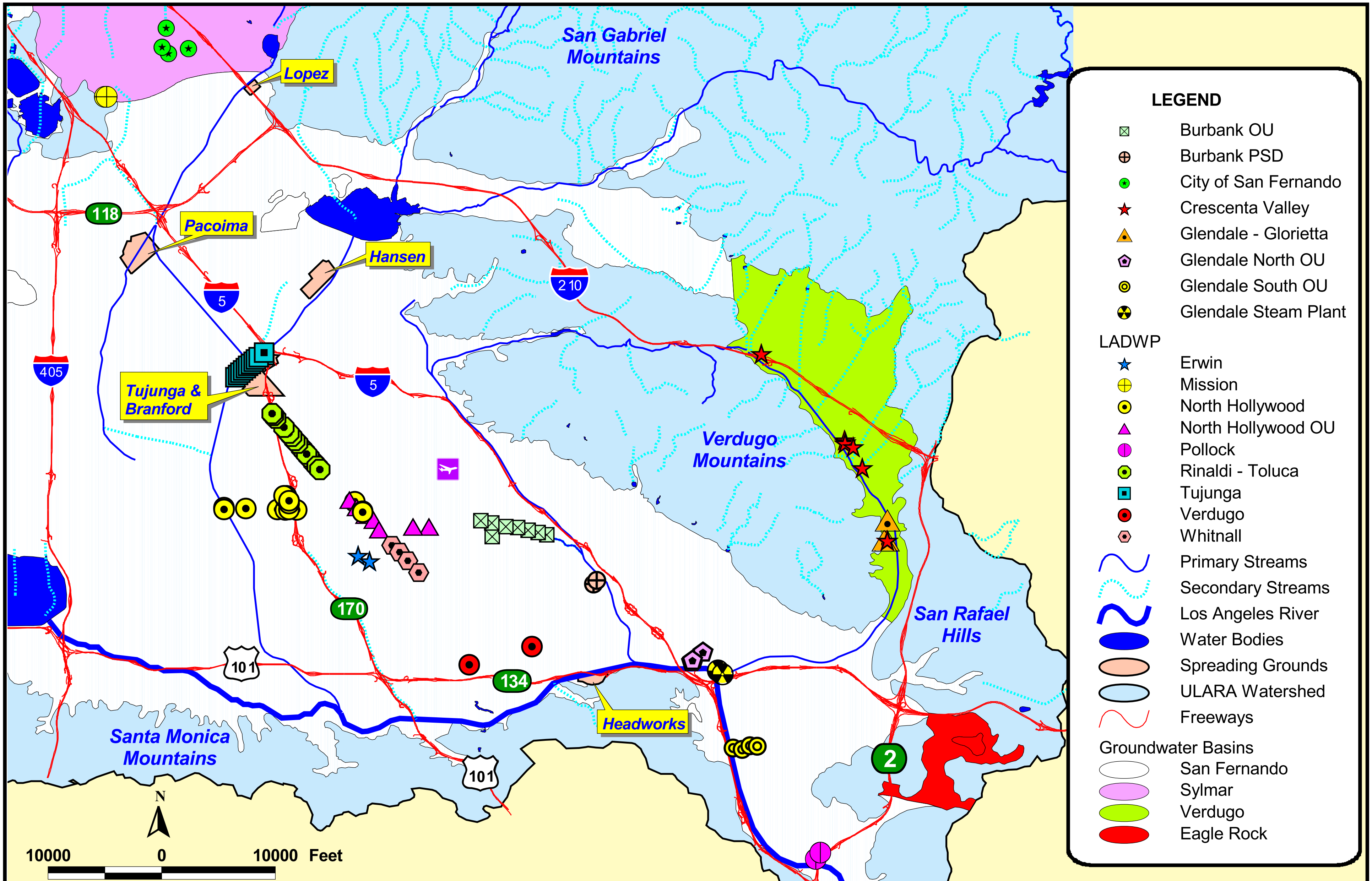
2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Components of Los Angeles River	PLATE 5



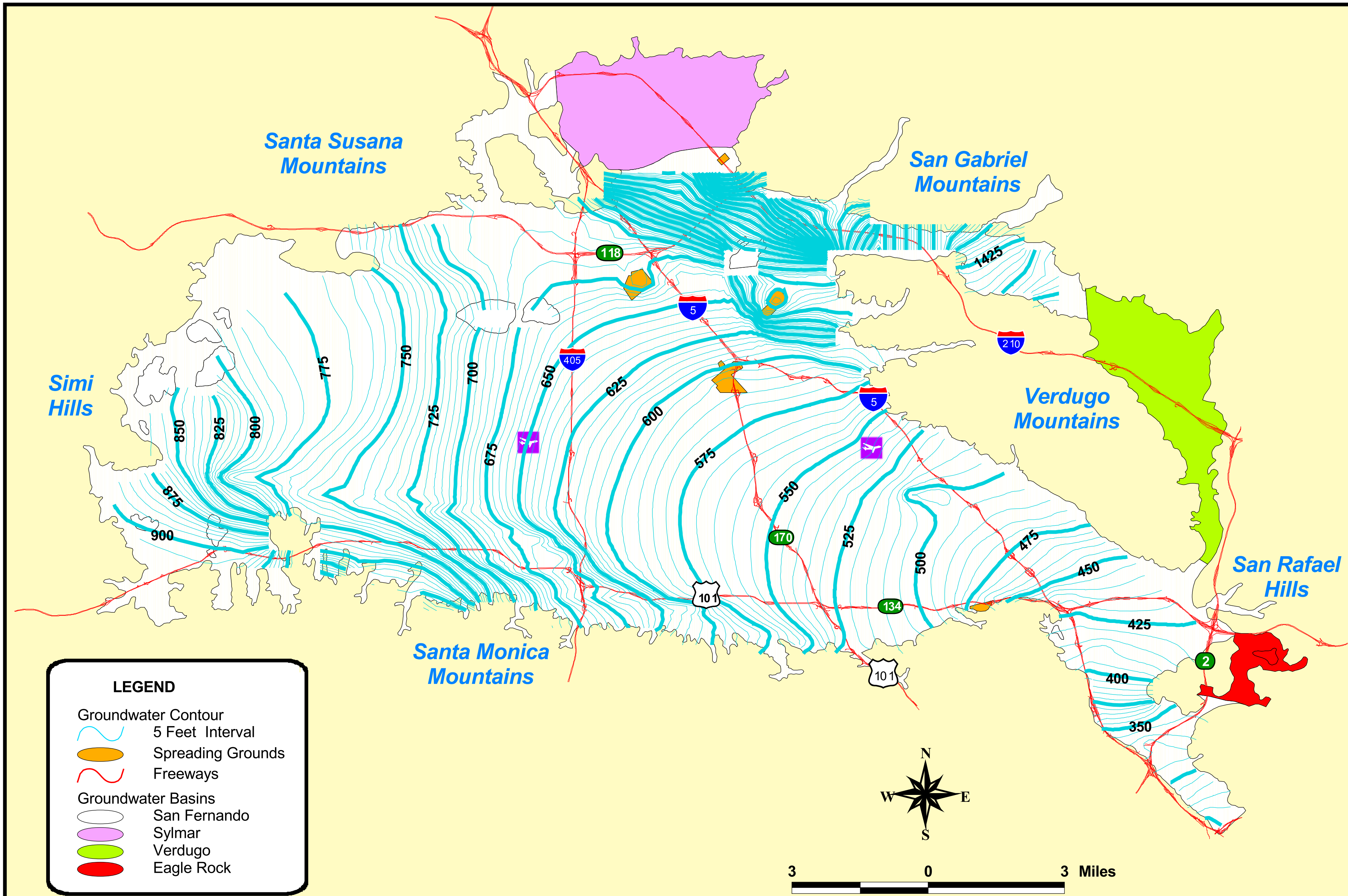
2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Landfill Locations	PLATE 6



20011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Los Angeles Bureau of Sanitation Sewer Construction Program for Commercial Parcels	PLATE 7



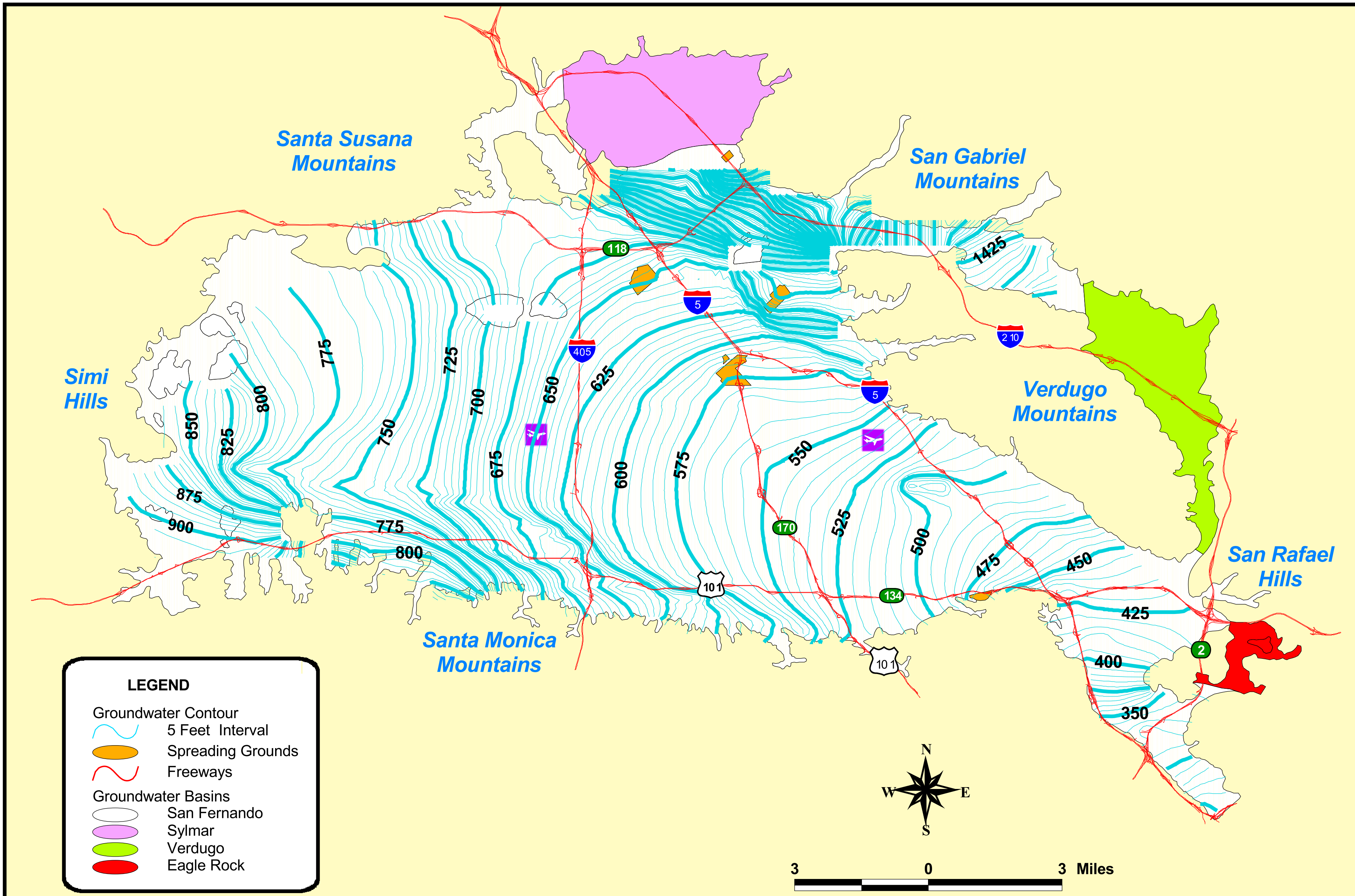
2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Major Wellfields and Spreading Grounds	PLATE 8



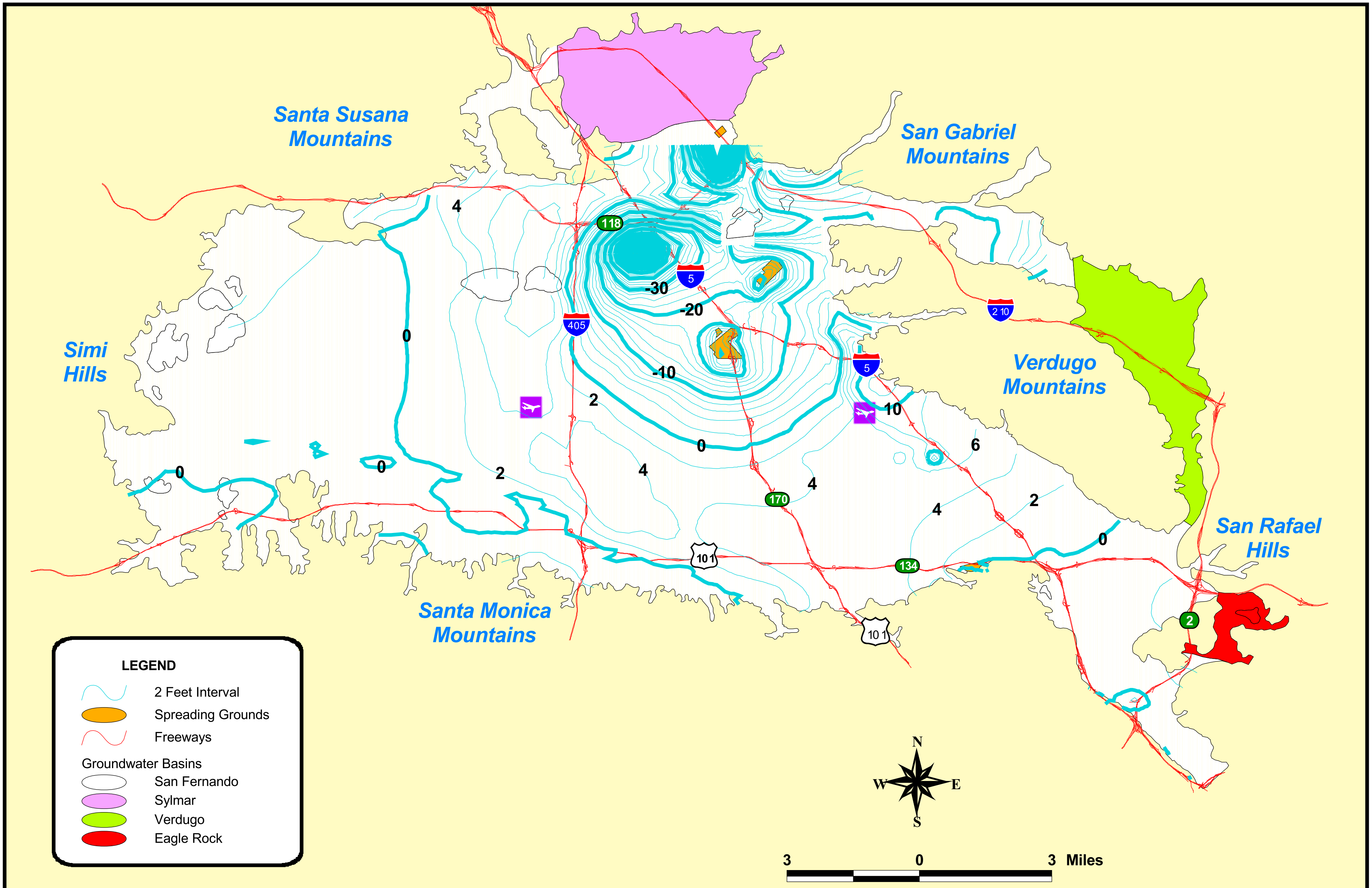
2011-12 Water Year ULARA Watermaster Report

Simulated Groundwater Elevation Contours Spring (April) 2012

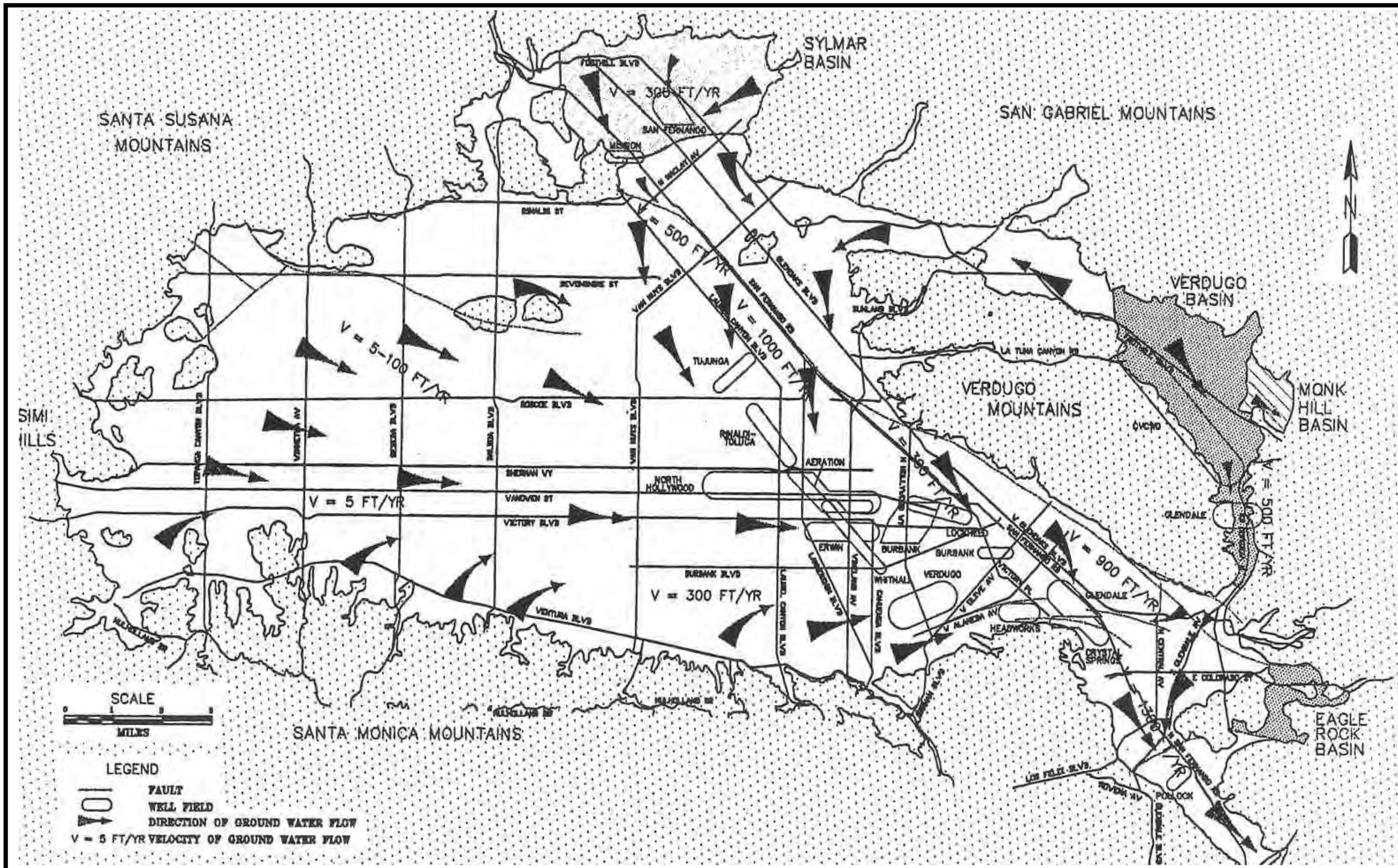
PLATE 9



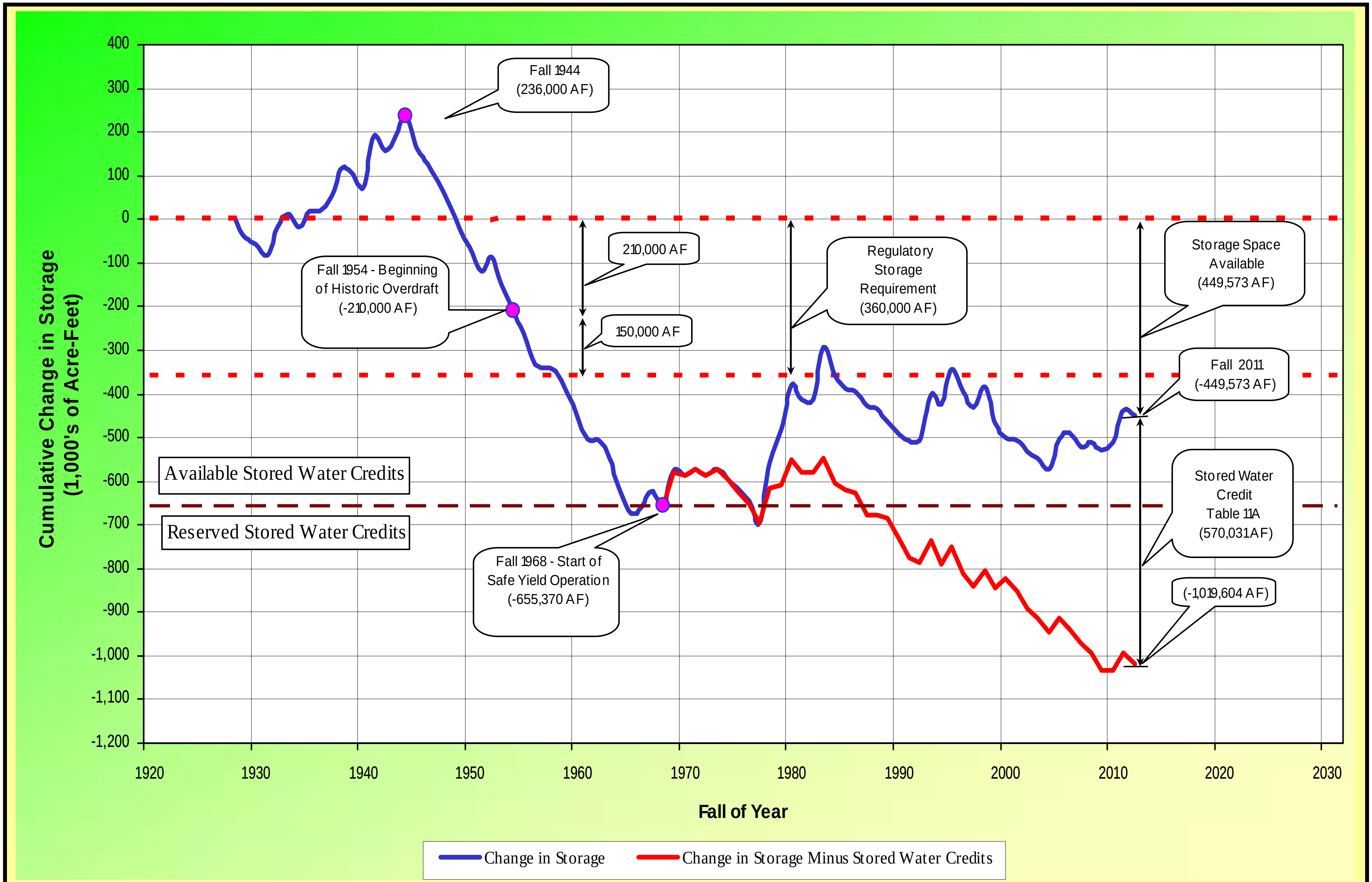
2011-12 Water Year ULARA Watermaster Report	**Simulated Groundwater Elevation Contours** **Fall (September) 2012**	**PLATE** **10**



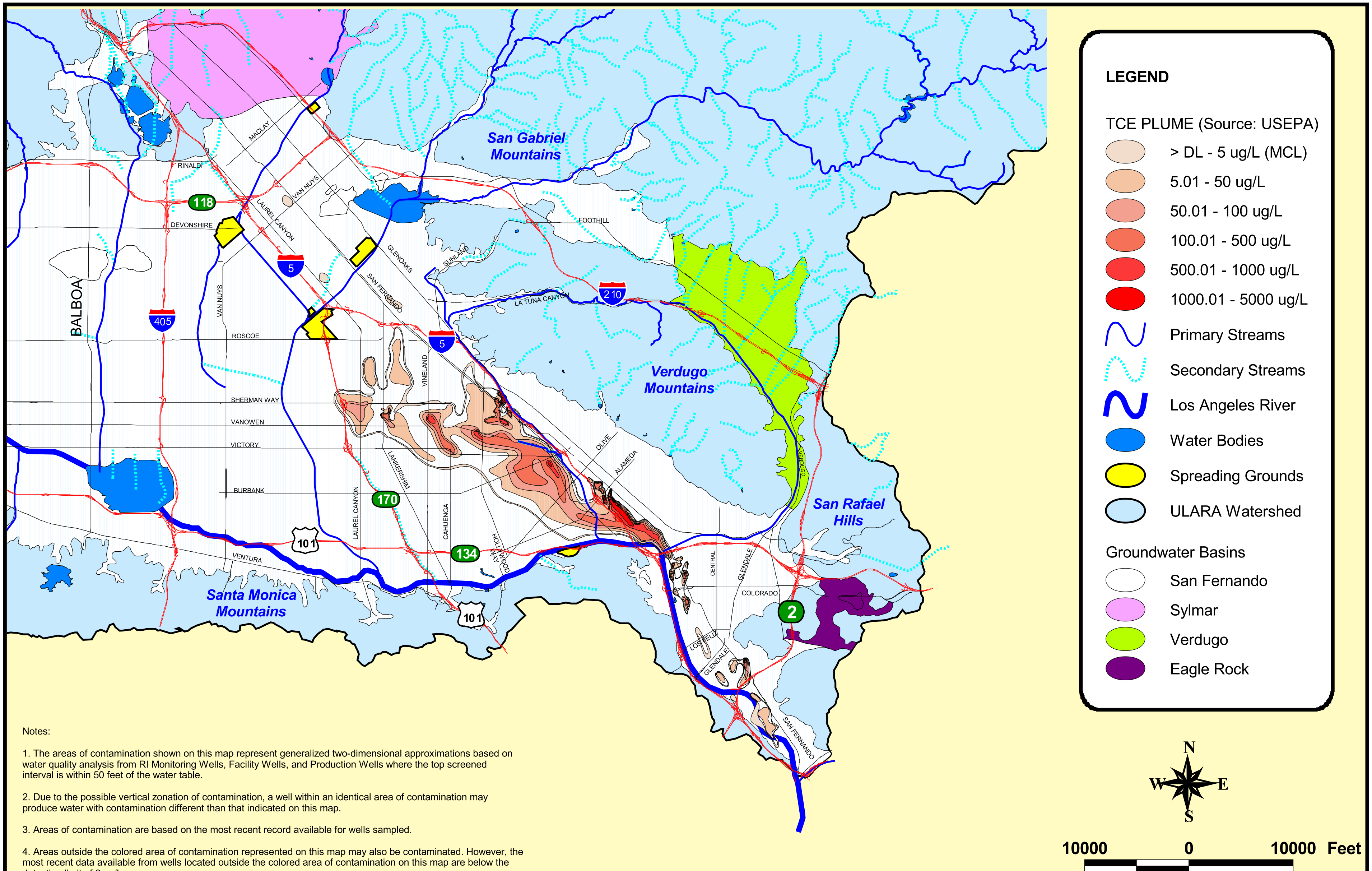
2011-12 Water Year ULARA Watermaster Report	**Simulated Change in Groundwater Elevations Fall 2011 - Fall 2012**	PLATE 11



2011-12 Water Year ULARA Watermaster Report	**Upper Los Angeles River Area: Estimated Directions and Velocities of Groundwater**	PLATE 12



2011-12 Water Year ULARA Watermaster Report	San Fernando Basin: Cumulative Change in Groundwater Storage	PLATE 13



Notes:

1. The areas of contamination shown on this map represent generalized two-dimensional approximations based on water quality analysis from RI Monitoring Wells, Facility Wells, and Production Wells where the top screened interval is within 50 feet of the water table.

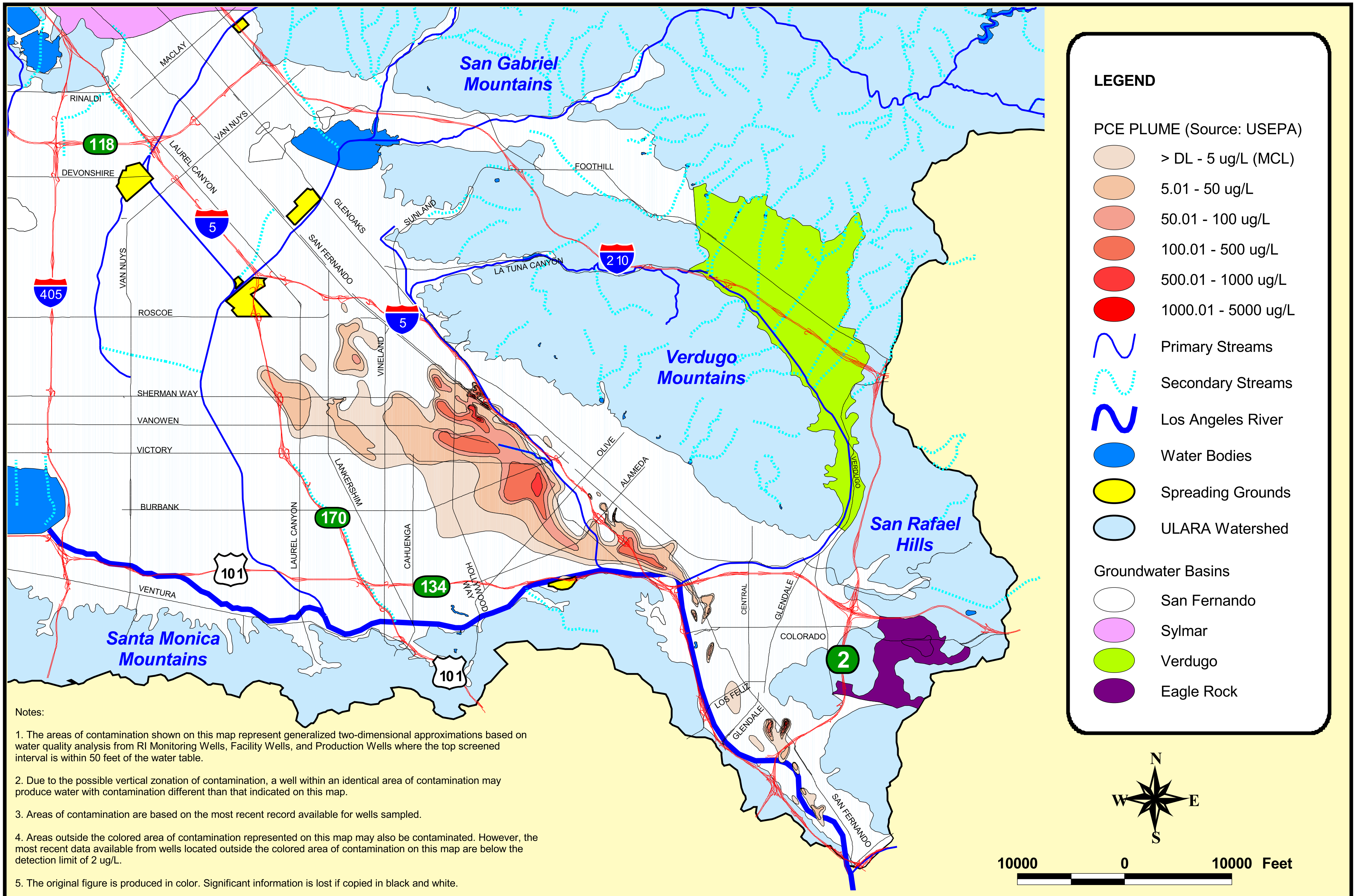
2. Due to the possible vertical zonation of contamination, a well within an identical area of contamination may produce water with contamination different than that indicated on this map.

3. Areas of contamination are based on the most recent record available for wells sampled.

4. Areas outside the colored area of contamination represented on this map may also be contaminated. However, the most recent data available from wells located outside the colored area of contamination on this map are below the detection limit of 2 ug/L.

5. The original figure is produced in color. Significant information is lost if copied in black and white.

2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: TCE Contamination (ug/L) in Shallow Zone in 2010	PLATE 14



Notes:

1. The areas of contamination shown on this map represent generalized two-dimensional approximations based on water quality analysis from RI Monitoring Wells, Facility Wells, and Production Wells where the top screened interval is within 50 feet of the water table.

2. Due to the possible vertical zonation of contamination, a well within an identical area of contamination may produce water with contamination different than that indicated on this map.

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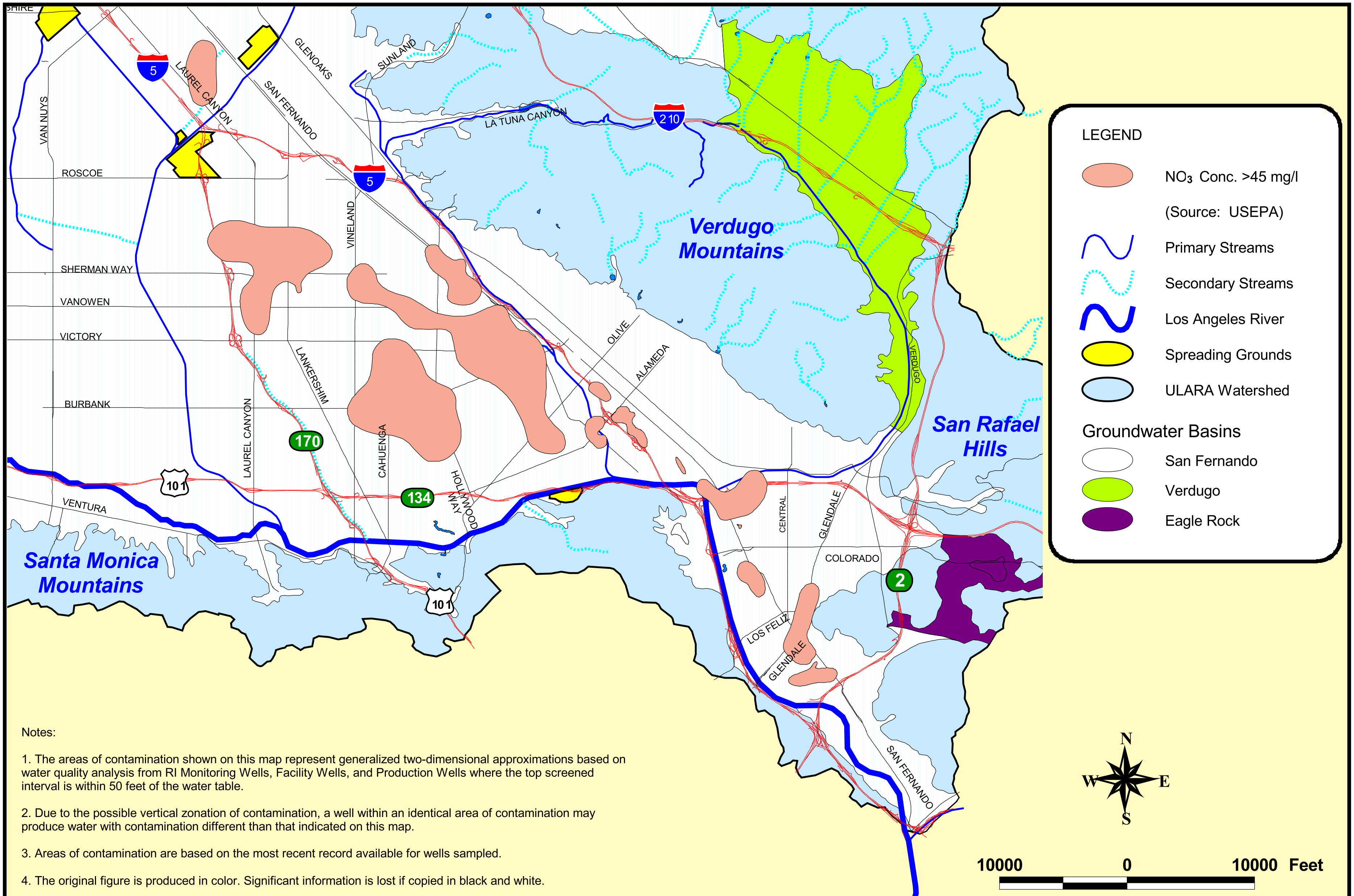
4. Areas outside the colored area of contamination represented on this map may also be contaminated. However, the most recent data available from wells located outside the colored area of contamination on this map are below the detection limit of 2 ug/L.

5. The original figure is produced in color. Significant information is lost if copied in black and white.

2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: PCE Contamination (ug/L) in Shallow Zone in 2010	PLATE 15



Notes:

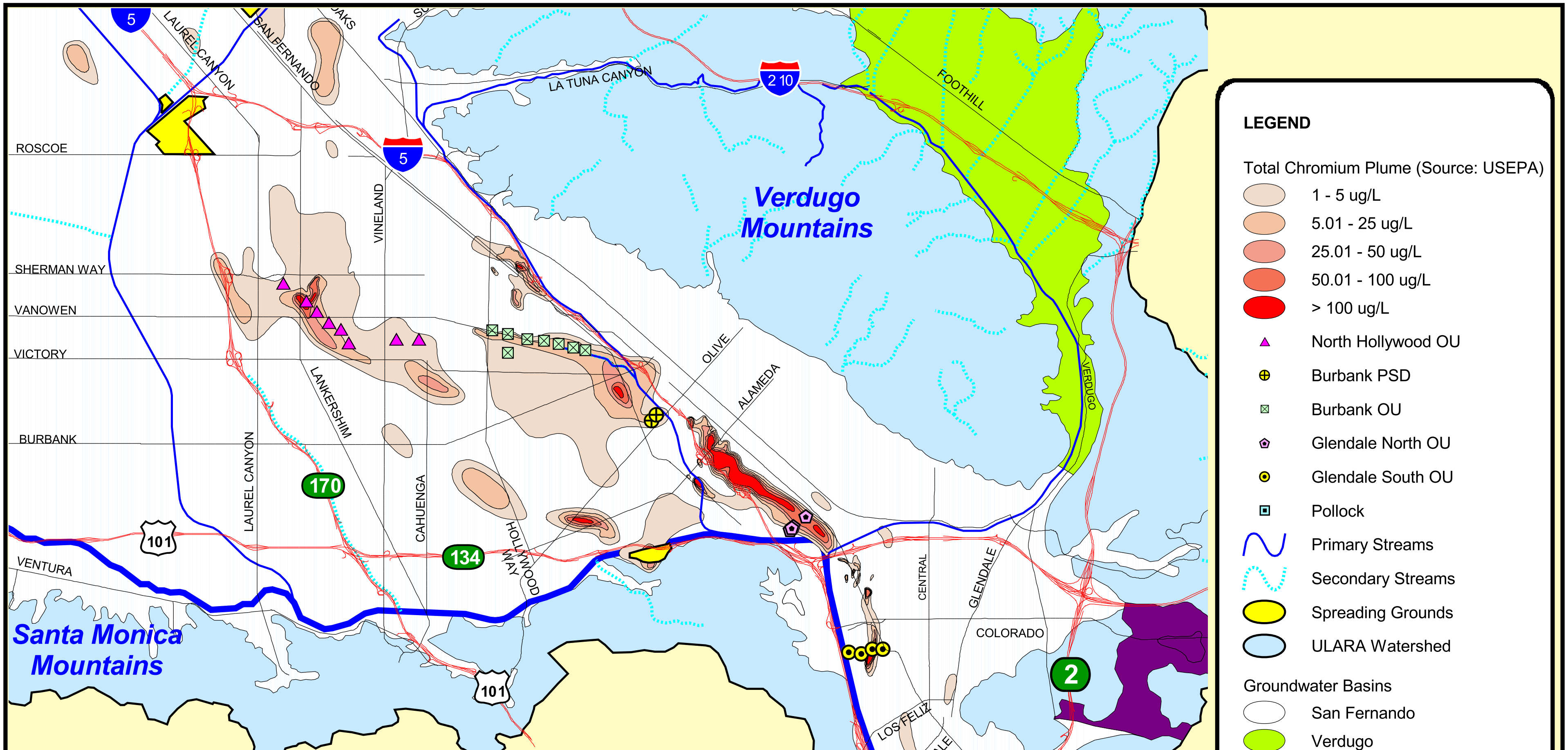
1. The areas of contamination shown on this map represent generalized two-dimensional approximations based on water quality analysis from RI Monitoring Wells, Facility Wells, and Production Wells where the top screened interval is within 50 feet of the water table.

2. Due to the possible vertical zonation of contamination, a well within an identical area of contamination may produce water with contamination different than that indicated on this map.

3. Areas of contamination are based on the most recent record available for wells sampled.

4. The original figure is produced in color. Significant information is lost if copied in black and white.

2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: NO_3 Contamination (mg/L) in Shallow Zone in 2010	PLATE 16



Notes:

1. The areas of contamination shown on this map represent generalized two-dimensional approximations based on water quality analysis from RI Monitoring Wells, Facility Wells, and Production Wells where the top screened interval is within 50 feet of the water table.

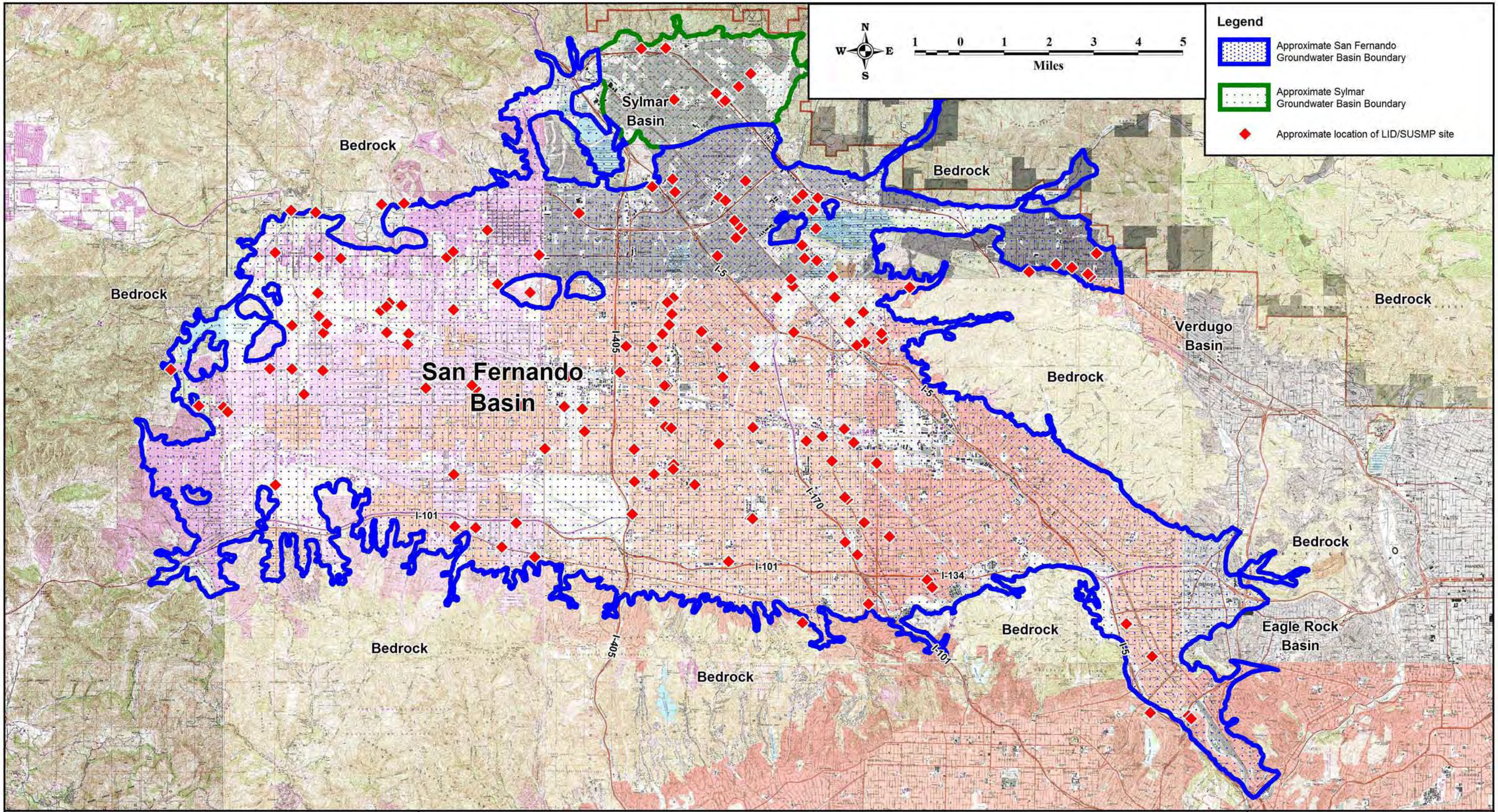
2. Due to the possible vertical zonation of contamination, a well within an identical area of contamination may produce water with contamination different than that indicated on this map.

3. Areas of contamination are based on the most recent record available for wells sampled.

4. Areas outside the colored area of contamination represented on this map may also be contaminated. However, the most recent data available from wells located outside the colored area of contamination on this map are below the detection limit of 2 ug/L.

5. The original figure is produced in color. Significant information is lost if copied in black and white.

2011-12 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Total Dissolved Chromium Contamination (ug/L) in Shallow Zone in 2010	PLATE 17



2011-2012 Water Year ULARA Watermaster Report	Locations of LID (SUSMP) Projects San Fernando & Sylmar Basins	PLATE 18

APPENDIX A
GROUNDWATER EXTRACTIONS

2011-12 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	2011 Oct.	Nov.	Dec.	2012 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	TOTAL
							San Fernando Basin							
A. W. Warner Properties														
Plaza Six		0.91	0.88	0.83	1.00	0.88	0.93	0.91	0.95	0.90	0.83	0.74	0.71	10.47
A. W. Warner Properties														
Plaza Three		0.73	0.71	0.87	0.69	0.73	0.76	0.81	0.79	0.71	0.74	0.63	0.59	8.76
Angelica Healthcare Services			(abandoned 12/97)											
3934A	M050A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avalon Encino														
---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bally, Nico														
---	---	0.06	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.70
BFI Sunshine Canyon Landfill														
---	---	8.09	7.05	7.89	8.71	6.39	8.27	8.26	8.46	7.41	7.54	6.73	7.41	92.21
Boeing (Rockwell International)														
---	E-1 to E-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boeing Santa Susana Field Laboratory														
Delta	WS-09A	0.51	1.94	0.00	0.01	0.21	2.71	2.29	2.64	2.62	1.70	1.32	1.19	17.14
	RD-24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	0.51	1.94	0.00	0.01	0.21	2.71	2.29	2.64	2.62	1.70	1.32	1.19	17.14
Burbank, City of														
3841C	6A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3882P	7	0.00	0.56	0.00	0.00	0.00	0.49	0.00	0.00	0.53	0.00	0.00	0.53	2.11
3851E	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3851K	13A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3882T	15	0.00	0.38	0.00	0.00	0.00	0.49	0.00	0.00	0.66	0.00	0.00	0.53	2.06
3841G	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	0.00	0.94	0.00	0.00	0.00	0.98	0.00	0.00	1.19	0.00	0.00	1.06	4.17
Burbank Operable Unit														
3871L	VO-1	24.33	82.91	113.61	109.08	57.35	90.57	92.83	128.75	155.04	106.25	107.44	87.13	1,155.29
3861G	VO-2	0.30	45.68	1.08	0.00	0.00	23.76	37.51	8.05	1.07	31.37	37.37	111.90	298.09
3861K	VO-3	140.57	58.33	121.57	136.74	30.11	49.32	118.35	134.78	126.99	97.09	121.20	88.55	1,223.60
3861L	VO-4	112.32	111.75	54.88	109.15	21.09	61.81	98.02	77.26	167.73	137.60	154.01	161.88	1,267.50
3850X	VO-5	169.75	120.50	170.21	96.48	51.80	134.96	110.08	74.98	100.13	126.52	161.53	153.39	1,470.33
3850Z	VO-6	0.07	0.00	0.00	0.00	0.00	0.13	4.91	188.50	109.46	118.56	156.87	139.47	717.97
3850AB	VO-7	187.12	174.05	174.81	119.39	61.67	183.17	150.23	151.36	161.57	222.34	185.41	163.09	1,934.21
3851C	V0-8	118.87	162.73	138.71	185.51	81.02	176.45	154.26	174.64	195.28	177.09	167.14	194.42	1,926.12
	Total:	753.33	755.95	774.87	756.35	303.04	720.17	766.19	938.32	1,017.27	1,016.82	1,090.97	1,099.83	9,993.11
Douglas Emmett Management, LLC (Trillium)														
Well #1	---	1.75	3.28	2.15	1.85	2.52	2.64	2.57	2.16	2.13	1.65	0.34	0.00	23.04
Well #2	---	1.21	1.38	1.34	1.31	0.75	0.00	0.00	0.46	0.00	1.01	1.46	1.79	10.71
	Total:	2.96	4.66	3.49	3.16	3.27	2.64	2.57	2.62	2.13	2.66	1.80	1.79	33.75
Fassberg Construction														
N/A		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
First Financial Plaza Site														
N/A	F.F.P.S.	0.93	0.98	1.70	0.82	0.75	0.79	1.13	1.38	1.38	1.12	1.02	0.70	12.70
Forest Lawn Memorial Park														
3947B	3	4.58	2.02	0.00	0.00	0.00	0.00	0.05	10.58	20.58	14.08	11.15	0.41	63.45
3947C	4	4.31	1.91	0.00	0.00	0.00	0.00	0.00	0.00	5.95	14.34	9.62	0.00	36.13
3947M	8	16.66	7.47	0.00	1.57	23.37	17.36	18.96	45.50	86.76	57.17	44.92	1.61	321.35
	Total:	25.55	11.40	0.00	1.57	23.37	17.36	19.01	56.08	113.29	85.59	65.69	2.02	420.93

2011-12 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	2011 Oct.	2011 Nov.	2011 Dec.	2012 Jan.	2012 Feb.	2012 Mar.	2012 Apr.	2012 May	2012 June	2012 July	2012 Aug.	2012 Sept.	TOTAL
							San Fernando Basin (cont'd)							
Glendale, City of														
3924N	STPT 1	1.44	0.60	6.54	9.44	4.63	2.43	4.53	3.47	1.07	2.93	4.04	4.08	45.20
3924R	STPT 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GVENT	GVENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	1.44	0.60	6.54	9.44	4.63	2.43	4.53	3.47	1.07	2.93	4.04	4.08	45.20
Glendale North/South														
	GN-1	89.48	95.15	88.49	101.53	76.95	94.07	97.60	87.78	89.02	78.37	79.41	86.85	1,064.70
	GN-2	89.73	92.06	81.85	98.34	97.67	94.70	85.25	68.05	87.81	79.59	80.31	87.27	1,042.63
	GN-3	46.88	24.58	38.33	35.40	21.87	45.26	30.11	35.30	41.24	44.12	31.92	53.16	448.17
	GN-4	234.83	221.76	227.91	225.15	108.99	229.00	223.57	171.19	221.88	229.71	230.45	221.45	2,545.89
	GS-1	54.47	50.57	11.93	13.33	24.44	51.19	52.90	40.83	52.20	54.54	54.67	53.03	514.10
	GS-2	57.99	58.73	60.91	73.97	64.03	54.14	66.85	74.26	67.67	67.03	65.47	66.93	777.98
	GS-3	56.53	57.27	50.24	59.64	49.11	58.17	50.60	56.94	44.50	59.54	59.40	57.41	659.35
	GS-4	58.05	58.10	62.42	75.63	63.73	64.38	56.24	72.37	67.71	67.02	65.28	66.74	777.67
	Total:	687.96	658.22	622.08	682.99	506.79	690.91	663.12	606.72	672.03	679.92	666.91	692.84	7,830.49
Greeff Fabrics														
----	-----	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grigsby, Wood														
----	-----	0.02	0.02	0.01	0.02	0.02	0.01	0.01	0.07	0.05	0.05	0.08	0.02	0.38
Hallelujah Prayer Center of USA (Hathaway - successor to deMille)														
----	1	0.91	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	1.02	9.23
	2	1.08	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	1.67	23.05
	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	1.99	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.76	2.69	32.28
Home Depot U.S.A., Inc.														
----		0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54
Honeywell International, Inc.														
----		18.01	16.23	15.51	13.91	10.79	10.90	4.07	15.37	15.10	18.71	15.67	16.30	170.57
Jose Diaz (010022)														
---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Khatcher Atamian (010006)														
----		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Lopez-Zamarripa (010007T)														
---	---	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.07	0.07	0.07	0.71
Menasco/Coltec Site														
---	---	0.00	0.01	0.01	0.00	0.01	0.00	0.02	0.06	0.02	0.02	0.02	0.03	0.19
Mercedes Benz of Encino (Auto Stiegler)														
---	---	1.18	1.14	1.18	1.18	1.55	1.41	0.33	0.14	0.13	0.14	0.14	0.13	8.65
Metropolitan Transportation Authority														
---	1065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
---	1075	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
---	1130	0.41	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.27	0.50	0.74	0.41	5.76
---	1140	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
---	1150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
---	1070	2.21	1.85	1.85	1.85	1.85	1.85	1.85	1.85	0.93	2.29	3.64	2.34	24.36
---	1075	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	2.62	2.34	2.34	2.34	2.34	2.34	2.34	2.34	1.20	2.79	4.38	2.75	30.12

2011-12 WATER YEAR
(acre-feet)

LACDPW	Owner	2011			2012									
Well No.	Well No.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	TOTAL
							San Fernando Basin (cont'd)							
Metropolitan Water District														
	Jensen	14.60	13.60	13.80	14.20	12.90	12.80	12.40	13.20	13.20	13.00	12.70	12.20	158.60
Micro Matics														
JEW	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JEW	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Middle Ranch (Successor to deMille)														
4931 x	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4940-1	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
new	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4940-3	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4940-2	7	0.37	0.08	0.46	0.23	0.40	0.23	0.25	0.26	0.77	1.38	0.82	0.66	5.91
new	8	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.22	0.14	0.46
Spring 1&2		0.02	0.03	0.03	0.02	0.03	0.03	0.02	0.02	0.03	0.04	0.03	0.02	0.32
	Total	0.40	0.11	0.50	0.26	0.44	0.27	0.28	0.29	0.81	1.44	1.07	0.82	6.69
Mobil Oil Corporation														
---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(NEIS) Northeast Interceptor Sewer City of LA BOS														
---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Raytheon (Formerly Hughes Missile Systems)														
----	-----	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Quaranto, John (010004)[1]														
----	----	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Sears Roebuck & Co. (Well disconnected 10/2000)														
3945	3945	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sportsmen's Lodge														
3785A	1	0.84	0.43	0.42	0.55	1.35	0.00	1.05	0.86	0.76	1.05	0.84	0.80	8.95
Stallcup, Jackosn & Susan (010021)														
---	---	0.11	0.01	0.01	0.01	0.01	0.04	0.02	0.14	0.09	0.09	0.08	0.08	0.69
3M-Pharmaceuticals														
---	---	3.90	4.18	4.32	4.03	4.02	4.34	3.83	1.13	3.72	3.05	2.71	4.50	43.73
Tesoro Petroleum Corporation														
---	MW-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toluca Lake Property Owners Association														
3845F	3845F	1.01	0.40	0.44	0.45	0.41	0.38	0.45	2.37	4.06	2.36	7.52	1.60	21.45
Valhalla Memorial Park and Mortuary														
3840K	4	29.52	3.89	12.38	22.32	18.96	21.38	20.35	29.93	69.06	35.95	39.54	35.17	338.45
Vulcan Materials														
4916A	3	19.81	19.82	14.53	17.10	19.04	22.89	20.17	22.31	18.82	18.36	20.27	16.81	229.93
4916	2	31.01	31.62	22.88	27.57	29.75	35.60	31.64	34.52	27.95	27.68	29.43	23.86	353.51
4916(x)	1	29.86	35.36	25.13	30.00	31.29	38.11	34.24	33.23	0.27	27.35	29.23	23.87	337.94
Sheldon Pond		10.17	11.32	3.11	0.64	0.65	5.84	9.11	32.02	62.45	62.44	28.13	53.26	279.14
	Total:	90.85	98.12	65.65	75.31	80.73	102.44	95.16	122.08	109.49	135.83	107.06	117.80	1,200.52

2011-12 WATER YEAR
(acre-feet)

LACDPW	Owner	2011			2012									
Well No.	Well No.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	TOTAL
						San Fernando Basin (cont'd)								
Waste Management Disposal Services of Calif.														
4916D		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Walt Disney Pictures and Television														
3874E	EAST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3874F	WEST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3874G	NORTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Walt Disney Riverside Building														
---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Waterworks District No. 21														
---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wildlife Waystation														
Rehab Canyon		0.13	0.16	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	1.09
Foreman Hill Spring		0.26	0.42	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	2.48
	Total:	0.39	0.58	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	3.57
Los Angeles, City of														
Aeration (A)														
3800E	A-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810U	A-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810V	A-3	2.18	10.10	8.91	10.24	2.27	5.28	8.26	7.76	9.62	11.78	10.35	0.00	86.75
3810W	A-4	15.38	15.13	14.23	16.67	3.51	8.22	12.86	11.78	14.51	16.21	14.72	0.00	143.22
3820H	A-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821J	A-6	14.53	0.00	35.15	30.95	9.23	21.44	33.45	31.18	0.00	0.00	18.66	0.00	194.59
3830P	A-7	42.61	43.39	40.29	46.79	9.92	23.44	36.41	35.10	44.01	49.24	46.26	0.00	417.46
3831K	A-8	43.32	42.52	38.48	45.80	10.19	23.99	37.28	35.93	45.55	35.84	46.72	0.00	405.62
	A Total:	118.02	111.14	137.06	150.45	35.12	82.37	128.26	121.75	113.69	113.07	136.71	0.00	1,247.64
Erwin (E)														
3831H	E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821I	E-2A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3831G	E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821F	E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3831F	E-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821H	E-6	183.08	92.58	0.00	0.44	55.35	73.16	0.00	56.15	144.08	229.09	206.50	33.43	1,073.86
3811F	E-10	138.82	71.37	0.00	0.48	61.71	85.40	0.00	65.61	171.37	279.38	257.53	42.13	1,173.80
	E Total:	321.90	163.95	0.00	0.92	117.06	158.56	0.00	121.76	315.45	508.47	464.03	75.56	2,247.66
Headworks (H)		Inactive Well Field												
3893Q	H-27A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893R	H-28A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893S	H-29A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893T	H-30A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	H Total:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2011-12 WATER YEAR
(acre-feet)

LACDPW	Owner	2011			2012									
Well No.	Well No.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	TOTAL
						San Fernando Basin (cont'd)								
North Hollywood (NH)														
3800	NH-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3780A	NH-4	154.45	63.41	0.25	0.37	106.54	10.63	1.12	47.61	0.23	0.00	0.23	0.00	384.84
3770	NH-7	31.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.22
3810	NH-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810A	NH-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810B	NH-14A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790B	NH-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3820D	NH-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3820C	NH-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3820B	NH-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3830D	NH-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3830C	NH-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3830B	NH-21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790C	NH-22	0.18	0.00	0.41	0.00	0.00	0.30	0.00	0.62	1.33	0.00	0.28	0.00	3.12
3790D	NH-23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.44	0.28	0.00	1.25
3800C	NH-24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790F	NH-25	170.48	45.75	0.23	0.16	99.43	10.17	0.34	115.98	133.59	191.37	154.87	89.97	1,012.34
3790E	NH-26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3820F	NH-27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810K	NH-28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810L	NH-29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3800D	NH-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3770C	NH-32	175.94	72.13	0.28	0.25	43.37	0.00	0.51	139.39	163.34	235.67	195.36	115.20	1,141.44
3780C	NH-33	0.16	0.00	0.25	0.25	0.00	0.25	2.64	0.00	0.00	0.00	0.23	0.00	3.78
3790G	NH-34	508.36	86.62	0.55	0.32	233.59	23.09	0.62	260.93	303.05	423.88	344.47	202.34	2,387.82
3830N	NH-35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790H	NH-36	478.54	80.72	1.17	0.37	214.14	21.72	0.34	0.34	0.37	0.32	0.39	0.00	798.42
3790J	NH-37	0.34	0.00	0.69	0.85	0.00	0.78	0.25	0.21	0.16	0.25	0.16	0.00	3.69
3810M	NH-38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810N	NH-39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810P	NH-40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810Q	NH-41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810R	NH-42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790K	NH-43A	0.37	0.00	0.94	0.44	0.00	0.90	0.69	0.00	0.37	0.55	0.28	0.00	4.54
3790L	NH-44	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.67	0.41	0.51	0.34	0.00	2.37
3790M	NH-45	30.65	0.00	1.15	0.53	0.00	0.90	0.71	220.02	356.96	591.00	503.60	293.99	1,999.51
	NH Total:	1,550.69	348.63	5.92	3.54	697.07	68.74	7.66	785.77	960.34	1,443.99	1,200.49	701.50	7,774.34
Pollock (P)														
3959E	P-4	0.00	166.99	171.18	179.91	163.29	149.70	0.00	18.20	126.90	184.96	172.48	171.30	1,504.91
3958H	P-6	0.00	147.29	176.12	183.20	169.60	153.99	0.00	0.01	92.67	182.22	172.03	175.14	1,452.27
3958J	P-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	P Total:	0.00	314.28	347.30	363.11	332.89	303.69	0.00	18.21	219.57	367.18	344.51	346.44	2,957.18

2011-12 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	2011 Oct.	2011 Nov.	2011 Dec.	2012 Jan.	2012 Feb.	2012 Mar.	2012 Apr.	2012 May	2012 June	2012 July	2012 Aug.	2012 Sept.	TOTAL
							San Fernando Basin (cont'd)							
Rinaldi-Toluca (RT)														
4909E	RT-1	0.00	1.54	0.00	0.00	0.00	0.48	0.46	0.32	0.60	0.51	1.10	0.00	5.01
4898A	RT-2	0.00	0.90	0.00	0.00	0.00	1.31	0.57	0.55	0.85	0.76	1.10	0.00	6.04
4898B	RT-3	0.00	0.90	0.00	0.00	0.00	1.33	0.44	0.34	1.33	1.10	1.47	0.00	6.91
4898C	RT-4	0.00	0.90	0.00	0.00	0.00	1.91	0.44	0.41	0.57	0.57	1.95	0.00	6.75
4898D	RT-5	0.00	104.45	0.00	0.00	303.79	164.92	0.41	398.09	470.91	525.55	520.68	7.09	2,495.89
4898E	RT-6	0.00	102.80	0.00	0.00	325.64	354.68	452.53	457.00	467.08	519.83	515.75	6.15	3,201.46
4898F	RT-7	0.00	1.72	0.00	0.00	0.00	1.29	0.51	0.53	0.76	0.85	1.19	0.00	6.85
4898G	RT-8	0.00	0.90	0.00	0.00	0.00	1.08	0.41	438.06	435.58	583.98	579.59	7.71	2,047.31
4898H	RT-9	0.00	107.62	0.00	0.00	314.16	384.57	468.43	475.96	489.37	547.27	544.86	7.37	3,339.61
4909G	RT-10	0.00	0.78	0.00	0.00	0.00	1.58	0.57	0.60	0.94	0.87	1.40	0.00	6.74
4909K	RT-11	0.00	0.60	0.00	0.00	0.00	1.22	0.48	0.41	0.46	0.00	0.85	0.00	4.02
4909H	RT-12	0.00	1.42	0.00	0.00	0.00	1.17	0.55	0.60	0.80	0.00	1.38	0.00	5.92
4909J	RT-13	0.00	0.64	0.00	0.00	0.00	1.24	0.55	0.55	0.78	0.00	1.29	0.00	5.05
4909L	RT-14	0.00	0.41	0.00	0.00	0.00	1.33	0.44	0.39	0.51	0.00	0.71	0.00	3.79
4909M	RT-15	0.00	0.05	0.00	0.00	0.00	0.11	0.05	0.05	0.07	0.00	0.11	0.00	0.44
	RT Total:	0.00	325.63	0.00	0.00	943.59	918.22	926.84	1,773.86	1,870.61	2,181.29	2,173.43	28.32	11,141.79
Tujunga (T)														
4887C	T-1	534.53	177.55	502.23	759.83	265.75	0.00	0.00	326.19	1.42	0.00	0.00	333.82	2,901.32
4887D	T-2	564.97	185.74	519.03	783.91	273.19	0.00	0.00	484.62	566.55	3.47	0.00	0.00	3,381.48
4887E	T-3	117.40	1.08	0.71	167.79	115.91	0.00	0.00	468.16	546.49	662.81	664.60	499.72	3,244.67
4887F	T-4	0.48	0.53	0.48	153.47	97.84	0.00	0.00	96.53	460.17	587.97	235.33	49.59	1,682.39
4887G	T-5	91.60	2.30	1.06	3.63	0.73	0.00	0.00	0.00	2.18	0.73	0.73	0.73	103.69
4887H	T-6	467.10	478.74	442.40	759.96	241.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,389.73
4887J	T-7	519.17	410.97	379.78	680.05	300.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,290.11
4887K	T-8	0.53	2.09	83.08	2.23	0.00	0.73	0.00	0.00	2.23	0.69	0.60	0.62	92.80
4886B	T-9	0.55	0.00	0.00	1.56	0.00	0.00	0.00	389.07	461.32	111.46	2.30	0.00	966.26
4886C	T-10	0.96	0.90	0.71	0.00	0.00	0.00	0.00	4.45	1.49	0.00	1.49	0.73	10.73
4886D	T-11	0.39	0.48	0.62	1.40	0.00	0.00	0.00	0.00	0.71	1.40	0.69	0.00	5.69
4886E	T-12	442.42	0.67	83.38	316.12	250.67	0.00	0.00	436.62	518.43	622.57	621.07	287.10	3,579.05
	T Total:	2,740.10	1,261.05	2,013.48	3,629.95	1,545.76	0.73	0.00	2,205.64	2,560.99	1,991.10	1,526.81	1,172.31	20,647.92
Verdugo (V)														
3863H	V-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3863P	V-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3863J	V-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3863L	V-11	233.29	117.22	0.00	0.34	142.61	81.04	0.00	181.52	163.93	270.41	257.83	44.61	1,492.80
3853G	V-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3854F	V-22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3844R	V-24	200.51	92.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	292.52
	V Total:	433.80	209.23	0.00	0.34	142.61	81.04	0.00	181.52	163.93	270.41	257.83	44.61	1,785.32

2011-12 WATER YEAR
(acre-feet)

LACDPW	Owner	2011			2012									
Well No.	Well No.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	TOTAL
						San Fernando Basin (cont'd)								
Whitnall (W)														
3820E	W-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821B	W-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821C	W-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821D	W-4	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
3821E	W-5	0.71	0.00	0.00	0.00	1.12	0.00	0.28	0.18	0.00	0.67	0.00	0.00	2.96
3831J	W-6A	195.43	93.41	0.00	0.37	145.18	79.75	0.00	174.79	204.36	264.92	183.86	31.01	1,373.08
3832K	W-7	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.09	0.00	0.00	67.75	26.33	94.31
3832L	W-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3832M	W-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3842E	W-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W Total:	196.44	93.41	0.00	0.37	146.30	79.75	0.42	175.06	204.36	265.59	251.61	57.34	1,470.65
Los Angeles, City of Total:		5,360.95	2,827.32	2,503.76	4,148.68	3,960.40	1,693.10	1,063.18	5,383.57	6,408.94	7,141.10	6,355.42	2,426.08	49,272.50
San Fernando Basin Total:		7,009.48	4,414.59	4,041.72	5,751.14	4,947.12	3,300.49	2,675.43	7,196.11	8,449.76	9,158.58	8,390.23	4,433.57	69,768.23

						Sylmar Basin								
Los Angeles, City of														
Plant	Mission													
4840J	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4840K	6	0.00	164.33	153.95	23.83	0.05	0.00	44.93	12.90	190.38	193.64	125.83	180.56	1,090.40
4840S	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.99	0.25	0.53	2.44
		0.00	164.33	153.95	23.83	0.05	0.00	44.93	12.90	191.05	194.63	126.08	181.09	1,092.84
Santiago Estates														
5998	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						Sylmar Basin (cont'd)								
San Fernando, City of														
5969D	2A	236.73	190.31	198.14	208.98	186.80	202.17	196.14	250.52	266.83	278.01	271.14	272.67	2,758.44
5959	3	0.15	0.00	0.00	0.10	0.00	0.00	0.09	0.06	0.05	0.10	0.00	0.00	0.55
5969	4	37.95	31.34	35.27	35.36	32.41	34.87	33.67	39.12	40.10	41.59	41.08	40.18	442.94
5968	7A	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.21	0.00	0.00	0.00	0.00	0.29
	Total:	274.83	221.65	233.41	244.44	219.21	237.04	229.98	289.91	306.98	319.70	312.22	312.85	3,202.22
Sylmar Basin Total:		274.83	385.98	387.36	268.27	219.26	237.04	274.91	302.81	498.03	514.33	438.30	493.94	4,295.06

2011-12 WATER YEAR
(acre-feet)

LACDPW	Owner	2011			2012									
Well No.	**Well No.**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**June**	**July**	**Aug.**	**Sept.**	**TOTAL**
						Verdugo Basin								
Crescenta Valley County Water District														
5058B	1	3.96	1.18	6.10	12.41	13.33	18.20	23.71	19.63	25.47	32.07	29.50	18.06	203.62
5036A	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5058H	5	58.03	61.97	65.64	65.70	59.81	62.04	55.30	44.85	55.71	56.05	54.96	50.01	690.07
5058	6	7.73	7.46	7.00	1.80	1.65	0.01	2.73	3.97	7.22	0.72	10.30	12.20	62.79
5047B	7	9.87	1.83	12.47	18.88	20.35	25.51	21.36	27.85	34.22	40.16	42.11	38.64	293.25
5069J	8	32.52	30.73	29.98	31.94	29.89	32.27	30.38	31.74	30.36	31.17	31.94	30.01	372.93
5047D	9	8.14	1.19	5.40	11.03	12.00	15.32	13.04	16.73	20.71	23.57	24.54	20.73	172.40
5058D	10	22.10	22.88	24.90	6.05	2.90	0.00	9.29	17.56	33.54	37.69	39.78	37.82	254.51
5058E	11	32.72	25.91	34.00	33.65	29.45	26.27	32.73	33.00	31.19	32.11	31.17	28.02	370.22
5058J	12	30.00	27.97	28.67	32.44	27.50	34.23	32.28	34.07	31.63	29.40	4.39	0.00	312.58
5069F	14	33.31	31.36	30.67	31.25	26.75	28.28	24.98	25.57	17.13	0.00	1.54	37.15	287.99
	15	3.34	0.88	0.02	0.83	3.95	0.82	0.70	0.21	0.21	0.02	4.59	4.79	20.36
	PICKENS (CVWD)	4.30	4.11	3.19	4.43	4.14	4.36	4.02	4.29	4.18	4.27	4.24	4.14	49.67
	Total:	246.02	217.47	248.04	250.41	231.72	247.31	250.52	259.47	291.57	287.23	279.06	281.57	3,090.39
Knowltons														
	PICKENS	0.79	0.79	0.79	0.82	0.77	0.96	0.66	0.82	0.68	0.82	0.82	0.80	9.52
Glendale, City of														
3961-3971	GL3-4	92.47	74.91	77.40	77.40	86.51	77.40	79.55	68.50	66.29	68.50	61.64	59.09	889.66
3970	GL-6	48.27	45.15	47.67	47.48	43.90	48.86	45.22	47.95	46.80	48.37	46.40	45.03	561.10
---	VPCKP	26.12	35.55	5.37	0.00	14.39	40.71	37.70	36.56	33.47	33.15	30.27	22.67	315.96
---	MM-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FHM	21.27	19.60	19.63	19.27	17.59	18.24	17.18	17.35	16.40	17.00	16.38	15.80	215.71
	Total:	188.13	175.21	150.07	144.15	162.39	185.21	179.65	170.36	162.96	167.02	154.69	142.59	1,982.43
Verdugo Basin Total:		434.94	393.47	398.90	395.38	394.88	433.48	430.83	430.65	455.21	455.07	434.57	424.96	5,082.34
						Eagle Rock Basin								
Sparkletts														
3987A	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3987B	2	2.74	2.72	2.45	3.37	2.70	2.32	2.97	2.67	3.10	3.12	2.90	3.33	34.39
3987F	3	4.47	2.97	3.56	5.06	3.67	3.33	3.98	3.78	3.30	2.38	1.36	1.35	39.21
3987G	4	8.51	12.82	4.08	6.62	7.54	6.80	7.63	7.35	8.32	8.59	8.02	9.26	95.54
	Total:	15.72	18.51	10.09	15.05	13.91	12.45	14.58	13.80	14.72	14.09	12.28	13.94	169.14
Eagle Rock Basin Total:		15.72	18.51	10.09	15.05	13.91	12.45	14.58	13.80	14.72	14.09	12.28	13.94	169.14
ULARA Total:		7,734.97	5,212.55	4,838.07	6,429.84	5,575.17	3,983.46	3,395.75	7,943.37	9,417.72	10,142.07	9,275.38	5,366.41	79,314.77

1. Quaranto John, and Khatcher Atamian did not report any extractions for the 2011-12 Water Year despite numerous attempts to contact them. LADWP and the Watermaster are working to bring these parties back into reporting compliance. It is noteworthy that these two parties extracted 0.01 AF and 0.12 AF respectively during the previous 2010-11 Water Year. When reporting by these parties resumes, the Watermaster will reflect the changes in a future Annual Report.

APPENDIX B
KEY GAGING STATIONS OF SURFACE RUNOFF

Summary Report

Site: F57C Los Angeles River Above Arroyo Seco
USGS #:
Beginning Date: 10/01/2011
Ending Date: 09/30/2012

Daily Mean Discharge in Cubic feet/second Water Year Oct 2011 to Sep 2012

Day	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	98.2	90.1	70.1	99.7	102	78.0	140	95.1	87.2	86.7	97.9	107
2	100	89.5	84.8	100	101	77.5	107	97.1	86.8	86.3	99.2	108
3	95.6	91.0	85.3	102	99.5	74.0	111	97.4	86.8	85.6	98.6	109
4	96.7	355	87.8	105	97.6	75.4	114	93.7	86.6	86.4	99.0	109
5	1440	112	88.1	107	95.9	77.3	118	95.6	86.5	86.2	98.1	109
6	117	621	91.4	112	96.6	80.4	119	93.3	86.9	86.5	98.4	109
7	102	95.6	90.0	115	99.6	81.4	120	90.6	87.1	86.3	98.6	109
8	98.5	89.5	90.7	117	96.4	87.6	126	65.3	88.7	86.0	97.9	107
9	95.9	88.5	93.5	122	94.1	95.4	128	46.1	89.5	85.5	96.9	108
10	96.9	88.0	92.9	128	95.8	110	133	78.8	90.4	85.8	97.5	107
11	99.7	86.3	94.3	134	103	122	2650	82.4	90.6	85.2	97.8	106
12	95.6	340	1250	155	100	124	138	85.0	91.6	84.8	98.2	107
13	91.3	90.8	522	156	141	122	2590	90.5	92.3	85.9	97.6	107
14	90.4	89.0	92.6	163	110	131	181	91.4	93.8	86.3	97.7	101
15	97.1	88.7	103	172	167	136	120	89.5	95.0	85.8	97.4	94.2
16	101	83.0	95.5	179	98.5	135	103	82.9	96.1	85.7	97.8	94.1
17	102	88.2	88.5	191	84.8	1900	94.2	80.1	97.0	85.9	98.0	93.6
18	99.1	88.0	94.3	201	95.4	170	92.4	77.1	97.3	85.1	98.1	93.1
19	90.8	90.3	90.6	198	94.9	74.3	93.9	82.2	97.0	85.0	98.1	93.9
20	86.8	2020	90.9	203	88.3	75.8	89.8	80.5	95.8	86.2	97.3	93.8
21	88.0	115	89.9	1450	85.9	76.9	79.2	87.0	94.5	85.6	97.6	93.3
22	88.0	86.2	90.6	130	85.7	78.6	76.4	93.4	94.4	85.4	97.5	93.6
23	88.8	84.5	90.2	1690	86.5	80.9	88.6	86.4	94.2	85.8	97.9	93.8
24	89.7	80.2	91.7	165	86.6	83.7	87.3	86.3	92.5	85.1	98.1	93.5
25	92.0	79.2	92.5	105	74.3	2680	92.2	87.5	90.9	85.3	97.2	92.9
26	88.0	76.0	93.5	104	76.6	706	421	87.1	89.5	90.0	97.9	93.0
27	85.4	77.5	94.9	102	82.4	90.8	93.0	87.1	88.1	96.4	95.7	94.5
28	85.2	83.9	95.6	101	78.6	84.1	89.8	86.6	87.0	95.3	93.2	94.2
29	86.0	80.0	95.7	100	76.4	104	89.6	86.7	87.1	97.1	93.4	94.5
30	86.6	82.9	97.3	102	------	100	92.5	86.5	86.7	95.9	120	94.0
31	87.7	------	98.6	102	------	108	------	87.0	------	95.8	109	------
Total	4260.0	5629.9	4426.8	7010.7	2794.4	8020.1	8577.9	2656.2	2727.9	2714.9	3057.6	3003.0
Mean	137	188	143	226	96.4	259	286	85.7	90.9	87.6	98.6	100
Max	1440	2020	1250	1690	167	2680	2650	97.4	97.3	97.1	120	109
Min	85.2	76.0	70.1	99.7	74.3	74.0	76.4	46.1	86.5	84.8	93.2	92.9
Acre-Ft	8450	11170	8780	13910	5540	15910	17010	5270	5410	5380	6060	5960

Wtr Year 2012	Total	54879.4	Mean	150	Max	2680	Min	46.1	Inst Max	2680	Acre-Ft	108900
Cal Year 2011	Total	71604.4	Mean	196	Max	11500	Min	70.1	Inst Max	11500	Acre-Ft	142000

Los Angeles County Dept of Public Works USDAY V91 Output 10/29/2012

Summary Report

Site: F118C Pacoima Creek below Pacoima Dam
USGS #:
Beginning Date: 10/01/2011
Ending Date: 09/30/2012

Daily Mean Discharge in Cubic feet/second Water Year Oct 2011 to Sep 2012

10/29/12

Day	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1										0	0	0
2										0	0	0
3										0	0	0
4										0	0	0
5										0	0	0
6										0	0	0
7										0	0	0
8										0	0	0
9										0	0	0
10										0	0	0
11										0	0	0
12										0	0	0
13										0	0	0
14										0	0	0
15										0	0	0
16										0	0	0
17										0	0	0
18										0	0	0
19										0	0	0
20										0	0	0
21										0	0	0
22										0	0	0
23										0	0	0
24										0	0	0
25										0	0	0
26										0	0	0
27										0	0	0
28										0	0	0
29										0	0	0
30					------					0	0	0
31		------			------		------		------	0	0	------
Total										0	0	0
Mean										0	0	0
Max										0	0	0
Min										0	0	0
Acre-Ft										0	0	0

Wtr Year 2012	Total	0	Mean	0	Max	0	Min	0	Inst Max	0	Acre-Ft	0
Cal Year 2011	Total		Mean		Max		Min		Inst Max		Acre-Ft	

F118B moved/changed to F118C | Logger was removed from F118B by the Instrument shop.
JL

Los Angeles County Dept of Public Works

USDAY V91 Output 10/22/2012

Summary Report

Site: F300 Los Angeles River at Tujunga Avenue
USGS #:
Beginning Date: 10/01/2011
Ending Date: 09/30/2012

JT 10/22/12

Daily Mean Discharge in Cubic feet/second Water Year Oct 2011 to Sep 2012

Day	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	51.7	72.1	71.6	65.3	61.1	77.2	78.0	43.7	40.7	51.5	54.7	51.4
2	52.5	66.5	74.9	67.2	63.3	71.8	63.7	44.1	40.4	51.6	54.7	51.0
3	53.8	73.3	71.7	66.9	63.5	70.6	63.0	45.0	40.7	51.4	54.7	50.9
4	54.4	624	73.4	69.0	58.9	73.0	64.6	42.7	41.1	51.5	54.7	50.9
5	1070	91.5	76.5	66.5	57.4	72.7	66.2	42.8	41.8	51.8	54.7	50.9
6	84.9	831	80.9	66.7	64.4	75.2	64.7	42.5	42.2	52.4	54.5	50.9
7	63.3	100	70.5	63.2	63.6	69.3	65.4	41.7	35.9	52.7	54.3	50.9
8	59.3	82.9	72.6	61.6	64.8	69.6	67.6	32.5	38.7	52.6	54.2	50.8
9	56.3	84.8	68.6	65.2	58.6	68.5	64.7	25.5	42.2	52.3	53.8	50.9
10	57.1	83.7	65.2	64.7	61.9	66.1	57.2	32.7	43.7	52.3	53.5	50.7
11	60.7	80.5	56.8	66.3	64.8	67.8	1340	37.3	44.2	52.3	53.3	50.8
12	55.4	550	1310	68.4	59.3	65.6	69.2	39.9	44.0	52.1	53.2	50.7
13	51.4	93.3	434	66.8	158	61.4	2230	40.9	43.7	52.5	52.6	50.7
14	50.1	87.6	67.8	67.2	73.9	65.5	161	41.2	44.2	52.8	52.4	50.8
15	54.3	84.7	79.9	66.9	143	63.8	73.2	40.1	45.4	52.9	52.3	50.6
16	56.0	79.4	63.9	66.9	81.1	67.8	68.1	33.6	46.9	52.8	52.0	50.6
17	52.8	81.8	66.3	67.9	78.2	1600	62.6	33.4	47.9	52.9	52.0	50.7
18	71.1	77.7	74.5	72.2	102	428	59.2	33.3	48.5	52.5	51.8	50.5
19	98.6	84.7	62.1	69.1	102	79.9	59.2	34.0	49.3	52.6	51.7	50.5
20	105	1870	59.4	67.9	80.7	72.7	56.7	34.3	49.7	53.6	51.6	50.6
21	96.7	156	57.3	850	79.7	67.7	54.9	34.4	50.1	54.0	51.5	51.3
22	89.1	84.9	59.5	72.6	76.1	65.4	51.0	35.6	50.5	54.5	51.4	52.2
23	82.1	81.2	57.9	1380	82.3	63.0	51.7	35.9	50.9	54.8	51.4	52.8
24	75.6	78.0	60.5	131	85.4	60.2	50.5	36.0	51.2	54.9	51.4	52.9
25	69.4	74.3	58.6	82.7	75.5	2540	50.3	36.2	51.2	55.0	51.3	52.4
26	68.0	75.7	60.2	80.8	75.0	476	227	36.5	51.6	54.7	51.4	53.4
27	73.9	74.1	61.2	75.2	79.6	80.3	52.6	36.9	52.0	54.6	51.4	55.3
28	71.0	78.5	60.4	70.8	76.9	72.0	46.3	37.0	51.5	54.5	51.1	57.4
29	72.7	74.9	56.0	69.5	74.4	71.8	45.0	37.3	51.6	54.6	51.1	59.1
30	70.6	77.0	54.8	68.9	------	64.4	45.6	38.3	51.5	54.5	51.4	59.7
31	73.3	------	55.7	63.2	------	84.9	------	39.7	------	54.5	51.6	------
Total	3101.1	6054.1	3642.7	4280.6	2265.4	6932.2	5509.2	1165.0	1383.3	1647.7	1631.7	1562.3
Mean	100	202	118	138	78.1	224	184	37.6	46.1	53.2	52.6	52.1
Max	1070	1870	1310	1380	158	2540	2230	45.0	52.0	55.0	54.7	59.7
Min	50.1	66.5	54.8	61.6	57.4	60.2	45.0	25.5	35.9	51.4	51.1	50.5
Acre-Ft	6150	12010	7230	8490	4490	13750	10930	2310	2740	3270	3240	3100

Wtr Year 2012	Total	39175.3	Mean	107	Max	2540	Min	25.5	Inst Max	2540	Acre-Ft	77700
Cal Year 2011	Total	71682.1	Mean	196	Max	10600	Min	42.9	Inst Max	10600	Acre-Ft	142200

Los Angeles County Dept of Public Works USDAY V91 Output 11/13/2012

Summary Report

Site: F168B Big Tujunga Creek below Big Tujunga Dam
USGS #:
Beginning Date: 10/01/2011
Ending Date: 09/30/2012

JL revised 11/13/12

Daily Mean Discharge in Cubic feet/second Water Year Oct 2011 to Sep 2012

Day	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1									12.5	10.7	9.20	10.0
2									12.6	11.1	9.76	10.0
3									12.3	11.4	11.8	10.1
4									12.3	11.6	14.2	10.0
5									12.1	11.8	13.3	10.1
6									10.7	10.9	9.98	10.3
7									10.4	10.1	8.34	10.4
8									10.5	10.1	8.08	10.5
9									10.7	10.1	10.9	10.6
10									10.8	10.1	13.6	10.7
11									10.9	10.1	13.4	10.6
12									11.1	10.4	12.8	10.6
13									11.0	11.0	12.5	10.5
14									11.0	11.3	12.5	10.5
15									11.0	11.6	11.6	10.5
16									11.2	11.5	11.3	10.5
17									11.1	11.7	11.2	10.7
18									11.2	11.7	11.1	10.1
19									11.1	11.9	11.0	10.0
20									10.3	11.5	10.8	10.8
21									8.48	9.42	10.8	10.7
22									8.34	7.95	10.7	10.4
23									8.69	8.03	10.7	10.4
24									9.00	8.31	10.6	10.7
25									9.23	8.27	10.5	10.9
26									9.40	7.95	10.4	10.9
27									9.61	7.80	10.3	10.9
28									9.74	7.12	10.2	10.7
29									9.99	7.27	10.1	10.5
30					------				10.2	6.85	10.0	10.4
31		------			------		------		------	8.45	10.0	------
Total									317.48	308.02	341.66	314.0
Mean									10.6	9.94	11.0	10.5
Max									12.6	11.9	14.2	10.9
Min									8.34	6.85	8.08	10.0
Acre-Ft									630	611	678	623

Wtr Year 2012 Total 1281.16 Mean 10.5 Max 14.2 Min 6.85 Inst Max 24.7 Acre-Ft 2540
Cal Year 2011 Total Mean Max Min Inst Max Acre-Ft

* The new station starts from Junne 2012.

This replaces F168 JL

Los Angeles County Dept of Public Works　　USDAY V91 Output 10/29/2012

Summary Report

Site: E285 Burbank-Western Storm Drain
USGS #:
Beginning Date: 10/01/2011
Ending Date: 09/30/2012

Daily Mean Discharge in Cubic feet/second Water Year Oct 2011 to Sep 2012

9/20/12

Day	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.97	11.6	12.3	11.7	13.0	17.4	6.46	14.3	10.7	9.67	12.0	7.33
2	10.7	13.0	13.8	10.5	12.5	16.5	6.66	13.4	11.2	9.45	12.5	8.97
3	11.9	13.3	12.6	11.8	12.3	15.2	7.19	13.4	14.4	10.0	12.8	9.02
4	10.6	30.9	14.1	13.8	11.5	15.0	7.30	13.8	16.2	8.74	13.4	13.6
5	103	12.2	12.7	16.6	11.9	16.1	7.90	13.0	9.47	6.97	13.0	14.0
6	13.4	50.2	12.7	13.6	11.0	15.4	9.58	13.4	15.9	5.18	12.4	16.5
7	13.0	12.7	13.5	12.8	11.9	14.5	12.5	11.9	14.8	7.26	11.6	19.9
8	11.7	12.3	12.0	12.9	13.1	12.7	13.7	6.78	13.0	7.80	10.4	21.2
9	11.4	12.1	12.3	13.8	11.3	11.1	11.7	11.3	12.4	9.12	10.5	23.9
10	11.3	12.1	12.6	13.3	10.7	10.6	10.3	11.4	10.8	11.1	9.25	25.2
11	10.9	11.5	14.0	13.5	10.5	10.4	138	10.6	10.1	11.9	9.02	25.8
12	10.6	21.9	92.5	13.7	10.8	6.20	5.76	10.2	9.96	13.4	8.45	23.4
13	9.72	11.0	21.5	13.5	11.3	7.52	136	11.0	8.95	13.4	8.56	21.3
14	10.6	12.7	13.6	13.0	11.2	10.2	4.09	10.5	9.94	14.0	9.12	19.2
15	11.6	11.6	18.0	13.5	16.6	7.81	4.38	10.6	9.75	12.7	6.22	17.5
16	11.4	12.3	13.4	13.1	14.2	8.27	5.22	11.8	9.44	12.2	6.76	16.8
17	11.8	12.4	15.3	13.7	14.0	166	4.46	10.2	9.26	12.7	6.30	16.2
18	11.9	13.0	14.2	14.5	13.3	6.89	4.94	9.56	8.34	14.1	6.36	13.9
19	12.0	12.0	14.5	14.6	14.7	6.49	5.26	9.27	9.47	12.0	6.16	11.8
20	11.1	208	13.3	14.3	14.5	8.28	5.65	9.29	8.54*	13.5	6.21	10.4
21	12.4	12.6	13.8	57.7	16.5	6.97	5.24	8.74	10.4*	12.5	7.04	10.5
22	12.2	11.6	13.7	13.7	17.0	7.78	5.74	9.52	9.14	13.3	6.40	10.0
23	12.9	13.0	13.4	79.9	15.9	8.26	5.95	9.44	9.46*	14.9	6.20	11.2
24	13.2	12.3	13.4	15.1	15.7	9.80	6.03	9.60	9.79*	12.6	4.90	11.2
25	12.1	12.9	13.5	14.3	16.1	333	9.82	9.55	9.05*	13.0	4.95	11.0
26	12.3	11.7	11.8	13.9	16.7	14.4	36.2	9.27	8.91	12.5	5.05	10.9
27	12.5	12.7	13.7	13.7	19.4	7.43	5.85	9.21	7.85*	12.6	4.24	12.8
28	12.5	12.2	11.9	13.1	16.3	6.92	7.16	8.23	8.52	11.5	4.15	12.3
29	12.3	10.9	11.9	13.9	17.4	7.14	8.50	9.48	8.71	11.8	4.83	11.4
30	11.5	10.7	13.0	14.2	------	7.62	11.5	9.68	8.87*	11.1	7.65	12.0
31	12.1	------	12.1	13.4	------	12.9	------	9.60	------	10.6	6.77	------
Total	453.59	627.4	501.1	531.1	401.3	804.78	509.04	328.02	313.32	351.59	253.19	449.22
Mean	14.6	20.9	16.2	17.1	13.8	26.0	17.0	10.6	10.4	11.3	8.17	15.0
Max	103	208	92.5	79.9	19.4	333	138	14.3	16.2	14.9	13.4	25.8
Min	8.97	10.7	11.8	10.5	10.5	6.20	4.09	6.78	7.85	5.18	4.15	7.33
Acre-Ft	900	1240	994	1050	796	1600	1010	651	621	697	502	891

Wtr Year 2012	Total	5523.65	Mean	15.1	Max	333	Min	4.09	Inst Max	333	Acre-Ft	10960
Cal Year 2011	Total	11321.91	Mean	31.0	Max	1180	Min	7.49	Inst Max	1180	Acre-Ft	22460

Summary Report

Site: F252 Verdugo Wash At Estelle Avenue
USGS #:
Beginning Date: 10/01/2011
Ending Date: 09/30/2012

Daily Mean Discharge in Cubic feet/second Water Year Oct 2011 to Sep 2012

Day	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.18*	7.48	5.27	2.39	2.18	1.14	5.86	10.1	1.39	.94	.77	1.15
2	2.50	6.35	4.61	2.06	1.12	.61	2.99	10.4	1.00	.96	.78	1.01
3	2.43	6.20	4.65	1.75	.93	1.04	1.81	4.89	1.10	1.01	.82	1.03
4	1.97	46.6	4.18	1.33	1.11	1.42	1.01	4.35	1.29	1.01	.79	1.07
5	163	6.06	3.89	1.22	1.31	2.06	1.68	4.04	1.24	1.02	.79	1.07
6	14.6	67.8	3.82	1.44	1.63	2.50	2.04	3.83	1.23	1.01	.76	1.14
7	10.3	8.02	3.67	1.67	1.92	2.08	2.13	3.56	1.20	1.06	1.44	1.15
8	8.31	4.91	3.55	1.80	2.30	3.21	1.98	3.17	1.22	1.15	2.03	1.11
9	7.35	4.05	3.45	1.70	3.70	3.21	1.99	3.09	1.26	1.01	1.97	1.22
10	6.52	4.33	3.31	2.08	4.21	3.21	1.99	3.04	1.23	1.00	1.94	1.20
11	6.30	4.29	3.19	2.70	7.29	3.21	105	2.67	1.19	1.01	1.84	1.18
12	5.32	12.4	56.7	3.04	5.71	3.66	5.45	2.47	1.44	1.06	1.81	1.21
13	4.88	4.02	19.7	3.01	4.14	4.16	147	2.31	1.29	1.01	1.70	1.14
14	5.10	5.27	5.79	3.10	2.28	4.10	6.52	2.12	1.23	.88	1.57	1.03
15	5.32	5.41	13.3	3.31	8.41	2.21	4.95	2.37	1.25	.82	1.50	1.01
16	4.95	4.24	5.62	3.93	3.26	1.98	4.48	1.95	1.28	.76	1.41	1.01
17	5.30	4.40	2.70	5.69	2.50	239	4.40	1.92	1.30	.75	1.36	1.08
18	5.77	4.73	2.42	6.22	1.87	13.3	5.21	3.06	1.23	.80	1.20	1.02
19	6.23	4.79	4.89	4.20	1.75	3.80	4.83	2.27	1.38	.78	1.16	1.16
20	6.27	115	5.21	4.03	1.46	2.03	6.65	2.13	1.39	.81	1.07	1.74
21	6.25	8.05	5.02	61.3	1.50	1.68	5.26	2.17	1.35	.70	1.15	1.31
22	6.30	6.02	4.04	5.07	3.25	1.60	5.60	1.96	1.42	.63	1.07	1.36
23	6.43	5.65	3.29	42.1	3.21	1.49	9.51	1.93	1.44	.70	1.05	1.56
24	6.38	4.97	3.60	6.86	3.81	1.47	6.62	1.90	1.39	.79	.92	1.61
25	8.53	4.94	4.08	2.48	3.41	149	14.4	3.24	1.31	.63	.84	1.38
26	7.72	5.10	4.16	1.58	3.21	34.3	38.7	1.62	1.30	.64	.74	1.26
27	7.63	5.27	4.03	1.40	7.52	3.77	5.68	1.43	1.42	.63	.68	1.46
28	7.51	5.40	4.47	1.22	3.01	5.46	5.04	1.36	1.24	.63	.88	1.55
29	7.64	4.93	2.99	1.43	1.72	2.72	4.96	1.26	1.06	.63	1.01	1.95
30	7.55	4.99	2.92	1.84	------	2.58	4.94	1.08	.92	.68	1.99	1.95
31	7.04	------	2.90	2.17	------	20.8	------	1.08	------	.71	1.24	------
Total	354.58	381.67	201.42	184.12	89.72	522.80	418.68	92.77	37.99	26.22	38.28	38.12
Mean	11.4	12.7	6.50	5.94	3.09	16.9	14.0	2.99	1.27	.85	1.23	1.27
Max	163	115	56.7	61.3	8.41	239	147	10.4	1.44	1.15	2.03	1.95
Min	1.97	4.02	2.42	1.22	.93	.61	1.01	1.08	.92	.63	.68	1.01
Acre-Ft	703	757	400	365	178	1040	830	184	75	52	76	76

Wtr Year 2012	Total	2386.37	Mean	6.52	Max	239	Min	.61	Inst Max	239	Acre-Ft 4730
Cal Year 2011	Total	5687.06	Mean	15.6	Max	326	Min	.20	Inst Max	326	Acre-Ft 11280

10/22/12

APPENDIX C
COMPONENTS OF LOS ANGELES RIVER FLOW

UPPER LOS ANGELES RIVER AREA: COMPONENTS OF LOS ANGELES RIVER FLOW

2011-12 WATER YEAR

TOTAL FLOW AT GAGE F-57C-R		F-57C-R: Storm, Reclaimed, Industrial, Rising Ground Water
		F300-R: Storm, Tillman, Industrial Waste, and Rising Water
Total:	108,900	E285-R :Storm, Burbank WRP, Industrial Waste
		F252-R: Storm, Rising Water
I. RECLAIMED WATER DISCHARGED TO L.A. RIVER IN ULARA		
Tillman:	34,293	: Record
L.A.-Glendale:	14,602	: Record
Burbank WRP:	7,128	: Record
Total:	**56,023**	
II. INDUSTRIAL WATER and STORM FLOWS DISCHARGED TO L.A. RIVER IN ULARA		
Upstream of F300-R		
Industrial Water	112	: From F300-R separation of flow
F168	2,752	
F118	3,675	
Storm Flows @300	27,498	Storm flows less F168 and F118
	34,037	
Between F300-R and E-285		
Burbank OU	15	Burbank Operable Unit
MTA	30	
Storm Drains and Unaccounted water	4,852	: 6.7 cfs assumes 4,852
Headworks:	0	: pilot project record
Western Drain:	402	: From E285-R separation of flow
Storm Flows @285	2,633	
	7,932	
Between E-285 and F57C-R		
Storm Flows, DryWeather Flow, perennial stream flow, VPWTP @ 252	2,588	: From F252-R separation of flow
Glendale Operable Unit	117	
Eagle Rock Blow Off	0	
Pollock Treatment	0	
Sycamore Canyon	1,100	Estimated from historic flows
Storm Drains and Unaccounted water	3,982	: 5.5 cfs assumes 3,982
	7,787	
Total Part II	**49,756**	
III. RISING WATER IN L.A. RIVER IN ULARA		
Total:	3,121	: See Section 2.3 of the Watermaster's Report

APPENDIX D
WATER QUALITY DATA

REPRESENTATIVE MINERAL ANALYSES OF WATER

Well Number or Source	Date Sampled	Spec. Cond. µS/cm	Mineral Constituents in milligrams per liter (mg/l) pH	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	NO_3	F	B	TDS mg/l	Hardness as $CaCO_3$ mg/l
Imported Water																
Colorado River Water at Eagle Rock Reservoir	2011/12 FY	548	7.9	49	19	65	3.6	-	117	152	71	1.5	0.9	0.1	435	198
State Water Project at Joseph Jensen Filtration Plant (effluent)	2011/12 FY	449	8.3	25	12	47	2.5	-	97	52	55	1.8	0.8	0.2	256	110
Colorado River/ State Water Project Blend Point at the Weymouth Treatment Plant	2011/12 FY	659	8.1	40	17	65	3.3	-	105	122	70	1.6	0.9	0.1	380	170
LA Aqueduct No 1. Influent	2011/12 FY	268	8.2	26	6.5	35	4.3	6	141	25	22	-	0.6	0.5	200	91
LA Aqueduct Filtration Plant Influent	2011/12 FY	306	8.0	24	6.4	34	4.4	0.0	111	25	26	0.8	0.4	0.3	182	82
Surface Water																
Tillman Rec. Plant Discharge to LA River	2011/12 FY	-	7.1	-	-	-	-	-	-	93	103	5.8	0.8	0.4	491	142
Los Angeles River at Arroyo Seco	9/95	981	8.0	68	24	97	9.8	ND	171	191	108	7.4	0.3	0.6	666	270
LA/Glendale Rec. Plant Discharge to LA River	2011/12 FY	-	7.4	-	-	-	-	-	-	103	124	5.4	0.7	0.4	584	215
Groundwater																
(San Fernando Basin - Western Portion)																
4757C (Reseda No. 6)	10/13/83	944	7.8	115	31	43	2.1	-	301	200	33	2.6	0.31	0.24	595	416
(San Fernando Basin - Eastern Portion)																
3800 (No. Hollywood No. 33)	5/19/2004	-	7.6	82	27	134	4.9	-	204	336	66	3.3	0.4	0.5	781	317
3851C V0-8/Burbank No. 10	2011-12 WY	730	7.8	87	24	32	4.8	3.4	285	78	32	24	0.5	0.2	473	313
Glendale OU GN-1	2011/12 FY	-	7.9	-	-	-	-	<2	280	-	-	38	0.3	0.2	580	-
(San Fernando Basin - L.A. Narrows)																
3959E (Pollock No. 6)	2011/12 FY	-	-	-	-	-	-	-	-	-	83	37	0.3	-	648.75	-
(Sylmar Basin)																
4840K (Mission No. 6)	2011/12 FY	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-
5969 (San Fernando No. 4A)	2011/12 FY	500	7.7	54	10	33	4.3	ND	180	50	21	22	0.3	-	320	180
(Verdugo Basin)																
3971 (Glorietta No. 3)	2011/12 FY	1000	6.7	99	37	48	3.2	<2	-	140	0	34	0.2	-	660	400
5069F (CVWD No. 14)	2011/12 FY	810	7.3	88	30	33	3.1	ND	200	120	69	44	0.4	ND	540	340

APPENDIX E
DEWATERING AND REMEDIATION PROJECTS

DEWATERING PROJECTS

No.	Company	Contact	Address	Start Date
		Permanent Dewatering Required		
1	A H Warner Properties Plaza 3	Bernier, Dave	21650 Oxnard	June 4, 1997
2	A H Warner Properties Plaza 6	Bernier, Dave	21700 Oxnard	June 4, 1997
3	BFI Sunshine Canyon Landfill	Dave Hauser	14747 San Fernando Rd.	October 1, 2006
4	Brent & Miller	Brent, Stanley	4328 Mammoth Ave	January 13, 2000
5	Commercial Project	Helfman, Haloosim & Assoc.: Varadi, Ivan	5550 Topanga Canyon	June 19, 1989
6	Encino Spectrum Project	Helfman, Haloosim & Assoc.: Varadi, Ivan	15503 Ventura Blvd.	June 14, 1989
7	Glenborough Realty (First Financial)	Slade, Richard	16830 Ventura Blvd.	October 9, 1987
8	Home Savings of America	Eli Silon & Associates	13949 Ventura Blvd.	June 14, 1989
9	LAMCO	O'Neil, John	21300 Victory Blvd	April 27, 1988
10	La Reina Fashion Plaza	Blumenfeld, Dolores	14622 Ventura Blvd.	April 27, 1988
11	Mercedes Benz of Encino (formerly Auto Stiegler)	Bucnis, Mark	16721 Ventura Blvd.	October 31, 1987
12	Metropolitan Transportation Authority	Laury, Victor	Metro Red Line	April 1, 1995
13	Park Hill Medical Plaza	Anjomshoaa, Mahmoud	7303 Medical Center Dr.	December 27, 1989
14	Trillium	Arnold, Daryl	6310 Canoga Ave.	April 27, 1988
15	Warner Center Ent. Complex	Tsuchiyama and Kaino	5955 Owensmouth Ave.	June 26, 1989
		Potential for Future Dewatering		
1		Carter, Dennis	4547 Murietta Ave	
2		Eccleston, C. W.	22020 Clarendon St.	
3		Henkin, Doug	8806 Etiwanda Ave.	
4		Marks, Ronald	5348 Topanga Canyon	
5	Danalex Engineering		12050 Ventura Blvd.	
6	Danalax Engineering Corp.	Krell, Alex	11239 Ventura Blvd.	
7	Delta Tech. Engineering	Abbasi, Z. A.	12800 Ventura Blvd.	
8	Ellis Plumbing Co.	Ellis, Chris	4235 Mary Ellen Ave.	
9	Ellis Plumbing Co.	Ellis, Chris	19951 Roscoe Blvd.	
10	Helfman, Haloosim & Assoc.	Varadi, Ivan	21820 Burbank Blvd.	
11	Helfman, Haloosim & Associates	Varadi, Ivan	5350 White Oak Ave.	
12	Sherway Properties	Vasquez, Rodney	4477 Woodman Ave.	
13	Tarzana Office Plaza	Varadi Engineering	18701 Burbank Ave.	
14	T Violes Construction Company	Viole, Tim, Jr.	15840 Ventura Blvd.	
		Temporary Dewatering		
1	Avalon Bay	Rob Salkovitz	16350 Ventura Blvd	January 26, 2006
2	Eagle Rock Interceptor Sewer	Baron Miya	Bureau of Engineering	May 8, 2003
3	Fassberg Construction [2]	Jeff Hawthorne	16710 Ventura Blvd	May 1, 2009
4	Glendale Sewer Project	Andre Haghverdian	800 Air Way	October 17, 2007
5	MTA Underground Pedestrian Crossing	Tim Lindholm	MTA	November 1, 2001
6	MWD Sepulveda Feeder Pipeline Const.	David Dean	Jensen Plant	August 1, 1998
7	Northeast Interceptor Sewer	Nick Demos	Bureau of Engineering	October 1, 2001

Notes:

1) Start Date - Date project was brought to the attention of the ULARA Watermaster.
2) Fassberg Construction ended temporary dewatering operations during the 2010-11 Water Year

APPENDIX F
WHITE PAPER – "Is the San Fernando Groundwater Basin Undergoing a Long – Term Decline in Storage?"
(ATTACHMENTS ON FILE IN ULARA WATERMASTER OFFICE)

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP
Frederic A. Fudacz (SBN 050546)
Alfred E. Smith (SBN 186257)
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Attorneys for Upper Los Angeles River Area Watermaster

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF LOS ANGELES

THE CITY OF LOS ANGELES, Plaintiff, v. CITY OF SAN FERNANDO, et al., Defendants.	Case No. C650 079 **NOTICE OF LODGING OF WATERMASTER WHITE PAPER RE: QUARTERLY STATUS CONFERENCE** Conference: Date: April 27, 2007 Time: 8:30 a.m. Dept: 52 Before the Hon. Susan Bryant-Deason

NOTICE IS HEREBY GIVEN that the court-appointed Watermaster hereby lodges with the Court the attached White Paper in connection with the quarterly Upper Los Angeles River Area Watermaster status conference scheduled for April 27, 2007, in Department 52 of the above-entitled Court.

DATED: March 23, 2007

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP
Frederic A. Fudacz
Alfred E. Smith

By: ______________________
Alfred E. Smith
Attorneys for Upper Los Angeles River Area Watermaster

PROOF OF SERVICE

The undersigned declares:

I am employed in the County of Los Angeles, State of California. I am over the age of 18 and am not a party to the within action; my business address is c/o Nossaman, Guthner, Knox & Elliott, LLP, 445 S. Figueroa Street, 31st Floor Los Angeles, California. 90071-1602.

On March 23, 2007, I served the foregoing **NOTICE OF LODGING OF WATERMASTER WHITE PAPER RE: QUARTERLY STATUS CONFERENCE** on parties to the within action by placing ( ) the original (x) a true copy thereof enclosed in a sealed envelope, addressed as shown on the attached service list.

(XX) (By U.S. Mail) On the same date, at my said place of business, said correspondence was sealed and placed for collection and mailing following the usual business practice of my said employer. I am readily familiar with my said employer's business practice for collection and processing of correspondence for mailing with the United States Postal Service, and, pursuant to that practice, the correspondence would be deposited with the United States Postal Service, with postage thereon fully prepaid, on the same date at Los Angeles, California.

( ) (By Facsimile) I served a true and correct copy by facsimile pursuant to C.C.P. 1013(e), to the number(s) listed on the attached sheet. Said transmission was reported complete and without error. A transmission report was properly issued by the transmitting facsimile machine, which report states the time and date of sending and the telephone number of the sending facsimile machine. A copy of that transmission report is attached hereto.

( ) (By Overnight Service) I served a true and correct copy by overnight delivery service for delivery on the next business day. Each copy was enclosed in an envelope or package designated by the express service carrier; deposited in a facility regularly maintained by the express service carrier or delivered to a courier or driver authorized to receive documents on its behalf; with delivery fees paid or provided for; addressed as shown on the accompanying service list.

Executed on _March 23, 2007.

(XX) (STATE) I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

( ) (FEDERAL) I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Charlyn Jones

ATTORNEYS OF RECORD

Name	Party
Ms. Julie Conboy Assistant City Attorney Office of the City Attorney Department of Water and Power 111 N. Hope Street, Suite 340 P.O. Box 5111 Los Angeles, CA 90051-5700 Telephone: 213-367-4579	Los Angeles
Mr. Dennis Barlow City Attorney 275 East Olive Avenue Burbank, CA 91502 Telephone: 818-238-5700	Burbank
Mr. Scott Howard City Attorney 613 East Broadway Glendale, CA 91205 Telephone: 818-548-2080	Glendale
Steven R. Orr, Esq. Richards, Watson & Gershon 355 South Grand Avenue, 40th Floor Los Angeles, CA 90071 Telephone: 213-626-8484	San Fernando
Mr. H. Jess Senecal, Special Counsel Lagerlof, Senecal, Swift and Bradley 301 North Lake Avenue - 10th Floor Pasadena, CA 91101 Telephone: 626-793-9400	Crescenta Valley, Vulcan-CalMat

ADMINISTRATIVE COMMITTEE AND ALTERNATES

Name	Party
Mr. Thomas M. Erb (Member) Director of Water Resources Department of Water and Power 111 North Hope Street, Room 1463 P. O. Box 51111 Los Angeles, CA 90051-5700 Telephone: 213-367-0873	Los Angeles
Mr. Mario Acevedo (Alternate) Groundwater Group Manager Department of Water and Power 111 North Hope Street, Room 1450 P. O. Box 51111 Los Angeles, CA 90051-5700 Telephone: 213-367-0932	Los Angeles
Mr. William Mace (Member) Assistant General Manager Water System Burbank Water and Power 164 West Magnolia Boulevard P. O. Box 631 Burbank, CA 91503 Telephone: 818-238-3550	Burbank
Mr. Bassil Nahhas (Alternate) Burbank Water and Power 164 West Magnolia Boulevard P. O. Box 631 Burbank, CA 91503	Burbank
Mr. Peter Kavounas (Member) Water Services Administrator City of Glendale 141 North Glendale Avenue Glendale, CA 91206-4496 Telephone: 818-548-2137	Glendale

Name	Party
Mr. Raja Takidin (Alternate) City of Glendale 141 North Glendale Avenue Glendale, CA 91206-4496 Telephone: 818-648-3906	Glendale
Mr. Tony Salazar (Member) Operations Manager City of San Fernando 117 Macneil Street San Fernando, CA 91340 Telephone: 818-898-7350	San Fernando
Mr. Dennis Erdman (Member) General Manager Crescenta Valley Water District 2700 Foothill Boulevard La Crescenta, CA 91214 Telephone: 818-248-3925	Crescenta Valley Water District
Mr. David Gould (Alternate) District Engineer Crescenta Valley Water District 2700 Foothill Boulevard La Crescenta, CA 91214 Telephone: 818-248-3925	Crescenta Valley Water District

UPPER LOS ANGELES RIVER AREA WATERMASTER

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

MARK G. MACKOWSKI – WATERMASTER

OFFICE LOCATION:
111 North Hope Street, Room 1450
Los Angeles, CA 90012
TELEPHONE: (213) 367-0896
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MAILING ADDRESS:
ULARA WATERMASTER
P.O. Box 51111, Room 1450
Los Angeles, CA 90051-0100

March 22, 2007

The Honorable Susan Bryant-Deason
Judge of the Los Angeles County Superior Court
111 N. Hill Street, Dept. 52
Los Angeles, CA 90012

Dear Judge Bryant-Deason:

Subject: Meeting on April 27, 2007 to discuss the Decline in Storage in the San Fernando Groundwater Basin (basin)

At our last meeting with the Court on December 13, 2006 you generously offered to spend some time with the Watermaster and the Cities of Los Angeles, Burbank, and Glendale (Cities) to discuss the decline in groundwater storage in the basin during our next meeting on April 27.

As Watermaster for the Upper Los Angeles River Area (ULARA), I have been regularly informing the Court and the Cities regarding my growing concern over declining water levels and accumulating groundwater pumping credits in the basin.

In July 2005, I distributed a DRAFT White Paper to the Cities titled "Is the San Fernando Groundwater Basin Undergoing a Long-Term Decline in Storage?" describing the problems, causes, and some possible solutions. Since then, we have been meeting with the Cities in an attempt to resolve these issues.

In preparation for the April 27 meeting, I feel it is appropriate to share the enclosed White Paper with the Court so that you may become more familiar with the background and details regarding the decline in storage.

We look forward to meeting with you at 8:30 a.m. on April 27, 2007 to explore the challenges we face regarding the decline in groundwater storage in the basin.

If you have any questions or comments, please call me at (213) 367-0896.

Sincerely,

MARK G. MACKOWSKI
ULARA Watermaster

MGM:mm

c:
Mr. Bill Mace, City of Burbank
Mr. Peter Kavounas, City of Glendale
Mr. Thomas Erb, City of Los Angeles
Mr. Dennis Erdman, Crescenta Valley Water District
Mr. Ron Ruiz, City of San Fernando

Watermaster Staff
Mr. Mark G. Mackowski, Watermaster
Ms. Patricia T. Kiechler, Assistant Watermaster
Mr. Fred Fudacz, Special Counsel
Mr. Melvin Blevins, Consultant

Is the San Fernando Groundwater Basin Undergoing a Long-Term Decline in Storage?
by
Mark Mackowski, ULARA Watermaster
March 2007

Executive Summary

This report addresses the long-term decline in storage in the San Fernando Groundwater Basin (hereinafter SFB or "basin") caused by over-pumping due to an excessive allocation of water rights; reduced natural and artificial recharge; unaccounted underflow and rising groundwater leaving the basin; and unaccounted or under-accounted pumping by third parties. It also addresses the large accumulation of stored water credits for which there is insufficient actual water in storage, and makes recommendations to reverse these trends.

The Watermaster has discussed this issue in the Annual Watermaster Report for the last four years; has informed and updated the Court during the last two years; and in July 2005 presented a draft of this paper to the Cities of Los Angeles, Burbank, and Glendale (hereinafter "parties"). Subsequently, several workshops were held with the parties to answer their questions and discuss potential solutions.

The parties have responded by proposing to study several projects to increase long-term artificial recharge of the basin. The Watermaster fully supports those studies, but does not believe that the current proposed projects will be either timely enough or adequate to completely address the serious and ongoing decline in storage and avoid the potential for the basin to re-enter overdraft.

Introduction

This paper addresses the question: "Is the San Fernando Groundwater Basin undergoing a long-term decline in storage?"

Plate 13 (Attachment 1) of the 2004-05 Annual Watermaster Report illustrates the change in storage in the SFB between 1928 and Fall 2005.

It is clear that the SFB has experienced a progressive decline of real water in storage (Plate 13 blue line) since 1928. The decline began in 1944, and overdraft was eventually declared beginning in 1954 when water in storage had reached 210,000 acre-feet (AF) below the 1928 level. Litigation over water rights commenced in 1955, and continued until 1979 when the Judgment was entered. Section 4.2.6.1 of the Judgment states that the SFB **"...remained in overdraft continuously until 1968, when an injunction became effective. Thereafter, the basin was placed on safe yield operation."** (Safe yield operation means that extractions from the basin do not exceed recharge on a long-term average.) When safe yield operation was ordered by the Court in 1968 the basin was 655,370 AF below the 1928 level.

From 1968 until 1977, the amount of real water in storage (Plate 13 blue line) declined an additional 40,210 AF, to 695,580 AF below the 1928 level, despite the fact that the basin was supposedly under safe yield operation. Fall 1977 was the historically lowest level of basin storage.

Plate 13 shows a sharp increase in stored water beginning in 1977, suggesting that the basin began to recover. However, a large portion of the increase was due to water imported by Los Angeles to the SFB from outside sources such as the Owens Valley and spread at Tujunga Spreading Grounds, and was not part of the safe yield of the basin. Table 2-22 from Watermaster Relevant Data (Attachment 2) shows spreading from 1968-2005. Under the column "City of Los Angeles – Tujunga", 142,457 AF were spread from 1977-1987. Therefore, because Plate 13 (blue line) does not differentiate between various water sources that recharge the basin, the water level increase beginning in 1977 *does not* represent a significant recovery of the basin.

Furthermore, beginning in the late 1970s, groundwater extractions began to decline as a result of the decision in San Fernando that restricted pumping, especially by Glendale and Burbank, followed in the early 1980s by the discovery of widespread groundwater contamination that affected all the parties' ability to pump their full adjudicated rights (Relevant Data Table 2-1, Attachment 3). As a result, stored water credits began to accumulate rapidly, and continue to accrue whenever a party does not pump its full right. As of October 1, 2005 a combined total of 410,033 AF of stored water credits in the SFB belonged to Los Angeles, Burbank, and Glendale.

Section 8.2.10 of the Judgment requires the effects of stored water to be excluded from consideration when evaluating the safe yield. Judgment Section 8.2.10 states, **"Upon request of the Administrative Committee, or on motion of any party and subsequent Court order, Watermaster shall recalculate safe yield of any basin within ULARA. If there has been a material long-term change in storage over a base period (excluding any effects of stored water) in San Fernando Basin the safe yield shall be adjusted by making a corresponding change in native safe yield of the basin."**

The graph shown in red on Plate 13 is the result of subtracting stored water credits from the change in storage shown in blue, as required by Judgment Section 8.2.10. When stored water credits are subtracted from the change in storage, the basin is 914,508 AF below the 1928 level, and 259,138 AF below the 1968 level when safe yield operation was required to be implemented.

In summary, Plate 13 clearly shows that the SFB is undergoing a long-term decline in storage that is temporarily interrupted during above-normal rainfall or below-normal pumping. However, spread imported water from 1977-1987 and an ongoing large accumulation of stored water credits obscures this decline.

Import Return Credits

Import return water is defined by the Judgment as "Ground water derived from percolation attributable to delivered imported water."

The Judgment allows the parties to recapture a portion of delivered imported water based on the reasonable assumption that some of it percolates into the aquifer and is available for pumping once it reaches the groundwater table. This water accrues to the parties as import return credits using formulas provided in Section 5.2.1.3 of the Judgment.

The California Supreme Court decision (1975, Vol. 14-3d, p. 261-262, Attachment 4) states, **"Defendants contend that if any party is given rights to a return flow from delivered *imported* water, it is 'obvious' and 'axiomatic' that the same rights should be given to the return flow from delivered water derived from all other sources, including native water extracted from local wells. This argument misconceives the reason for the prior right to return flow from imports. Even though all deliveries produce a return flow, only deliveries derived from imported water add to the ground supply...Returns from deliveries of extracted native water do not add to the ground supply but only lessen the diminution occasioned by the extractions."**

Despite the unequivocal language in the Supreme Court decision, the Cities of Los Angeles, Burbank, and Glendale negotiated an agreement to use *all* delivered water in the formulas for calculating import return credits. In the "Memorandum re Proposed Settlement with Cities of Glendale and Burbank, City of Los Angeles v. City of San Fernando, et al., and Damage Cases" dated November 22, 1978, Item 4 on page 5 (Attachment 5) states, **"A fixed formula for determining Glendale and Burbank rights to return flow from delivered imported water, including recirculation rights, as being equivalent to 20% of all delivered water in the immediate watershed of the San Fernando Basin. This has been determined to be a better administrative method than the method based on 20.8% of delivered imported water to valley-fill lands, which method was presented to the Supreme Court and approved by that Court in this case. Los Angeles' return flow rights will be determined by a comparable fixed formula, also somewhat a [sic] variance with the Supreme Court language, but consistent with simple future administration."**

Furthermore, the language in the Judgment addressing import return credits is contradictory and appears to have been influenced by the aforementioned agreement. Section 5.2.1.1 states, **"Each of said parties has a right to extract from San Fernando Basin that portion of the safe yield attributable to such import return waters."** Section 5.2.1.3 states, **"The extraction rights of Los Angeles, Glendale, and Burbank...shall only extend to the amount of any accumulated import return water credit of such party by reason of imported water delivered after September 30, 1977."** The foregoing language is consistent with the Supreme Court decision, and implies that only delivered waters that are imported from outside the basin (such as from the Los Angeles/Owens Valley Aqueduct and the Metropolitan Water District) would qualify for import return credits. However, the formulas in Judgment Section 5.2.1.3 for calculating import return credits apparently contradict the Supreme Court decision, namely, "**Los Angeles: 20.8% of all delivered water...Burbank: 20.0% of all delivered water...Glendale: 20.0% of all delivered water...**"

Since 1979 the Watermaster Office has used the latter, more generous interpretation of the Judgment, giving the parties import return credits for *all* water delivered to their applicable service areas regardless of its source. This has caused the pumping of groundwater that would not have been allowed under the Supreme Court decision, and has also contributed to the accumulation of a large amount of stored water credits that are not supported by actual water in storage.

Thus, the Supreme Court decision and the technical issues related to basin hydrology were misunderstood, or not fully considered, in an effort to simplify the administration of the parties' rights, resulting in excessive groundwater pumping and an accumulation of pumping credits for which there is insufficient actual water in storage.

<u>Changed Conditions in the SFB</u>

Probable causes of the decline in storage also include changes in land and water use in the SFB.

The Report of Referee (1962) was accepted as prima facie evidence in <u>San Fernando</u>. Data for the Report of Referee was obtained in the late 1950s and early 1960s, which was used to calculate the safe yield of the SFB.

At that time, a significant portion of the land in the San Fernando Valley was still being used for agricultural purposes, or had not yet been developed. Rainfall runoff and irrigation water had a much better opportunity to percolate and re-enter the groundwater basin compared to the present, when much of the land has subsequently been developed and covered by rooftops, sidewalks, streets, and other "hardscape".

In addition, at the time the Report of Referee was prepared sewers had not yet been installed in much of the San Fernando Valley, and overflow from cesspool/septic systems was a significant source of recharge to the basin aquifer. During the 1956-57 Water Year, the Report of Referee estimated that 16,750 acre-feet per year (AF/Y) re-entered the groundwater basin from septic systems located in the SFB west of Burbank (Appendix N, Table N-7, p. N-32). Nearly everywhere in the SFB septic systems have been replaced by sewers, with a resulting decrease in recharge from this source. This has had the beneficial effect of eliminating a significant source of nitrate contamination, but has also contributed to the decline in storage. We have observed a similar phenomenon in the Verdugo Basin.

Present-day land and water use have changed in the intervening 40-50 years since the Report of Referee was researched and written, but provisions in the Judgment require the basin to be managed as if those conditions still exist.

Reduced Artificial Recharge

Artificial recharge capacity has declined in the basin during the past 20-25 years. 'Artificial recharge' means collecting rainfall runoff or imported water and percolating it into the groundwater basin at spreading grounds designed for that purpose.

Headworks Spreading Grounds (Headworks) is located on the Los Angeles River near Griffith Park. Headworks was operated until the early 1980s, when volatile organic compound (VOC) contamination was discovered in the underlying groundwater, and treated sewage effluent began to be discharged from Tillman Treatment Plant into the Los Angeles River. Headworks has not been used as a spreading ground since approximately 1982.

In the late 1990s, methane gas was detected at a school adjacent to the Sheldon-Arleta Landfill (SAL) and Tujunga Spreading Grounds (TSG). When stormwater is spread heavily at TSG, it compresses the air within the underlying vadose zone. Some of this air moves laterally and displaces methane gas from the adjacent SAL. The methane migrates out of the SAL, and some of it surfaces in the nearby neighborhood. To control this methane migration, spreading at TSG has been restricted to less than 100 cubic feet per second (cfs), or about 40% of the historic spreading capacity of 250 cfs. When storms produce runoff in excess of 100 cfs in the adjacent Tujunga Wash, this extra water cannot be diverted into TSG and is instead wasted to the ocean.

In addition, during past wet years, the Los Angeles County Department of Public Works (LACDPW) has curtailed spreading at Hansen Spreading Grounds (HSG) to prevent rising groundwater from inundating trash in the nearby Bradley Landfill. Alert levels were established nearby monitoring wells to monitor groundwater levels near the landfill. During the exceptionally wet winter of 2004-05 these alert levels were reached and spreading at HSG was stopped for a while, resulting in additional runoff being wasted to the ocean.

As a result of the elimination of Headworks and reduced spreading at TSG and HSG, a significant amount of stormwater runoff cannot be recharged into the SFB and is wasted to the ocean, especially during above-average rainfall years.

Safe Yield and Native Safe Yield

Safe Yield is defined by the Judgment as "The maximum amount of water which can be extracted annually from a ground water basin under a given set of cultural conditions and extraction patterns, based on the long-term supply, without causing a continuing reduction of water in storage."

Safe yield in the SFB consists of two parts: the aforementioned import return credits, and the native safe yield consisting of "native water", which the Judgment defines as "Surface and ground waters derived from precipitation within ULARA". The Judgment affirmed Los Angeles' exclusive Pueblo water right to all native groundwater in the SFB.

The safe yield and native safe yield of the basin were determined to be 90,680 AF/Y and 43,660 AF/Y, respectively, in 1964-65 (Judgment Section 4.2.4) but have not been re-evaluated since then.

Each year, the Judgment gives Los Angeles a native safe yield pumping credit of 43,660 AF/Y based on studies performed for the Report of Referee. In dry years, it is doubtful whether 43,660 AF actually recharge the SFB. In wet years the amount can be substantially larger. The long-term average native recharge is unknown. However, as previously mentioned, the hydrologic conditions that existed when the Report of Referee was written may no longer be present in the SFB today.

If the long-term native safe yield is lower than 43,660 AF/Y; it would contribute proportionally to the decline in storage we observe on Plate 13 (blue line) and an increase in stored water credits (Plate 13 red line) for which there is insufficient water in storage.

Basin Losses from Rising Groundwater and Underflow

Groundwater constantly flows out of the basin in two ways: via underflow in the Los Angeles River Narrows area, and through groundwater rising into the Los Angeles River channel that subsequently leaves the SFB as surface flow. (The City of Los Angeles recognized this, and constructed the Pollock Wells Treatment Plant to reduce the amount of excess rising groundwater leaving the basin by pumping and treating groundwater in the Narrows that is contaminated with VOCs.)

The average annual loss due to rising groundwater was approximately 3,442 AF/Y from 1979-2005. The average annual loss due to underflow through the Narrows area was approximately 400 AF/Y. The total average loss from the basin was therefore approximately 3,842 AF/Y from 1979-2005.

Although Judgment Section 8.2.9 requires the Watermaster to "...record and verify additions, extractions and losses..." there is no clear mechanism in the Judgment to debit the parties for groundwater that leaves the basin in ways other than through pumping. With the exception of minor losses debited from Los Angeles due to under-pumping at the Pollock Wells, losses due to rising groundwater and underflow have never been debited from the parties.

In summary, stored water credits accumulate indefinitely until they are pumped by the parties, but a portion of the actual groundwater is constantly leaving the SFB unaccounted through underflow and rising groundwater.

Hill and Mountain Pumping

Unauthorized pumping in the hill and mountain areas tributary to the SFB reduces the amount of underflow from these regions to the basin. The City of Los Angeles claims this native water as part of its Pueblo water right, and the Watermaster has begun a program to identify these pumpers, quantify their water use, and require them to enter a water license agreement with Los Angeles. Under the license agreement, licensees report their pumping to the Watermaster Office and pay Los Angeles for the amount pumped, and the Watermaster debits Los Angeles. There are unauthorized pumpers who do not have license agreements and who do not report their pumping to the Watermaster Office.

Dewatering

There are areas within the SFB that have a high water table. Projects within these areas sometimes pump groundwater to maintain dry excavations during construction. In addition, there are some dewatering operations that keep subterranean parking and other below-ground structures dry on a permanent basis. This water is typically discharged to the storm drain or sewer, and is thereby lost from the basin. The Watermaster has identified several permanent dewatering systems, and the owners of these properties report their pumping monthly to the Watermaster Office. However, our efforts to institute a reliable program to account for temporary construction dewatering within the basin have not been effective.

Conclusions

The Watermaster has historically calculated import return credits based on all delivered water. This is clearly inconsistent with the Supreme Court decision, and in the Watermaster's opinion is the single largest contributor to the imbalance between actual water in storage and the parties' stored water credits. The 1978 agreement among all three parties with respect to import return credits departed from the Supreme Court decision (Attachment 5) and, as applied under today's circumstances, is seemingly inconsistent with Section 5.2.1.1 of the Judgment.

Furthermore, import return credits of 20% may have been appropriate for hydrologic conditions in the late 1950s and early 1960s, but may now be too high considering the urbanization that has occurred in the San Fernando Valley during the last 40-50 years. However, Section 7.1 of the Judgment explicitly precludes the Watermaster, or even the Court, from modifying these formulas.

Although real water in storage has increased by 150,895 AF since safe yield operation was declared in 1968, stored water credits have accumulated to 410,033 AF since 1978. When stored water credits are subtracted from real storage (Plate 13 red line), the SFB is more than 914,000 AF below the 1928 level.

In other words, if the parties had pumped their full adjudicated rights, the basin would be more than 259,000 AF below the 1968 level at which safe yield operation was supposed to begin (Plate 13).

This clearly indicates that groundwater rights in the SFB are significantly "oversubscribed", and the basin is undergoing a long-term decline in storage that is effectively masked by the accumulation of stored water credits. An argument could be made that the basin re-entered a condition of overdraft in the late 1980s when the red line fell below the 1968 level.

The general downward trend of the change in real storage (Plate 13 blue line), beginning in the early 1980s and interrupted only temporarily during wet years, is also disturbing. Although we observed a significant rebound in basin storage in the 2004-05 Water Year due to above-normal rainfall and below-normal pumping by Los Angeles, similar occurrences in the past suggest that this effect will be temporary and short-lived.

The downward trend in real storage coincides with the cessation of spreading at Headworks Spreading Grounds in the early 1980s and has accelerated with a significant reduction of spreading capacity at Tujunga Spreading Grounds due to the migration of methane gas from the nearby Sheldon-Arleta Landfill. The decline in actual storage due to reduced basin recharge has been exacerbated because the parties have received pumping rights since their negotiated settlement in 1978 that the basin cannot support.

Recommendations

The Watermaster recommends that the safe yield of the SFB be re-evaluated. The 1979 San Fernando Judgment was based on a safe yield study conducted in 1964-65, more than 40 years ago. At that time, the SFB safe yield was calculated to be 90,680 AF/Y. However, basin hydrology can change significantly over time, and we do not know the existing safe yield of the SFB. If we are to resolve this problem and manage the basin properly in the future it is imperative that we re-evaluate the safe yield of the SFB, and continue to re-evaluate it periodically.

As a component of the safe yield, the native safe yield of 43,660 AF/Y may be too large, which would contribute to a continuing decline in stored water and exacerbate the imbalance between actual water in storage and stored water credits. A safe yield study, as recommended above, would determine whether the existing native safe yield is appropriate for current hydrologic conditions in the SFB.

The parties and the Watermaster could agree to allocate pumping rights consistent with the language and intent of the Supreme Court decision, namely, giving the parties import return credits only for the amount of *imported* water served to their customers.

Or, following a safe yield re-evaluation, the Watermaster could implement Judgment Section 8.2.10 to correct any imbalance in the basin by adjusting the native safe yield of the SFB. This solution would affect only Los Angeles' water rights, since it has the exclusive right to the entire native safe yield of the SFB under its Pueblo right. However, it is the Watermaster's opinion that implementing Section 8.2.10 of the Judgment in this manner would fail to address the major hydrologic cause of the current imbalance, and that the parties would continue to be given rights to water that are inconsistent with the Supreme Court decision.

A hydrologic study should be performed in the Narrows area to determine the actual amount of water lost due to underflow and excess rising groundwater, and the Watermaster and the parties should consider ways to account for this lost water. To that end, in March 2007 the ULARA Administrative Committee requested the Watermaster to conduct a study to determine ways to improve the methodology for the calculation of losses from the basin due to rising groundwater and underflow. While it is not practical to stop all rising groundwater and underflow, keeping water levels low in the Narrows through diligent pumping and monitoring would minimize these losses. As a related matter, Los Angeles should operate the Pollock Wells Treatment Plant at least 2,000 AF/Y to reduce the amount of rising groundwater that leaves the basin.

Tujunga Spreading Grounds should be restored to its full capacity without delay. Additional spreading and/or storage facilities, such as Boulevard Pit, should be acquired whenever possible. They may not be needed during dry-to-normal rainfall years, but their additional capacity would be invaluable during years when runoff exceeds our ability to store it using existing infrastructure.

Modernizing and upgrading facilities and operations at the spreading grounds might result in increased basin recharge. The Watermaster, LADWP, and LACDPW have begun to explore these opportunities within the framework of the Basin Recharge Task Force.

The parties and Watermaster should take advantage of opportunities such as the upcoming Los Angeles River Revitalization Master Plan to build projects that enhance basin recharge.

Hill and mountain pumping should be fully accounted. It may not be politically feasible to restrict it, but it is probably a component, albeit a small one, of the decline in stored water in the basin.

Likewise, permanent and temporary construction dewatering should be fully accounted. The Watermaster and the cities of Los Angeles, Burbank, and Glendale should develop a program to more closely track water lost from the basin due to dewatering.

It is the duty of the Watermaster to inform the parties and the Court about issues affecting the groundwater basins in ULARA. We look forward to working closely with the parties to reverse the decline in storage and ensure the long-term reliability of the SFB.

APPENDIX G
INTERIM AGREEMENT FOR THE PRESERVATION OF THE SAN FERNANDO BASIN WATER SUPPLY, 2008

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SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF LOS ANGELES

THE CITY OF LOS ANGELES,

Plaintiff,

vs.

CITY OF SAN FERNANDO, et al.,

Defendants.

CASE NO. **C 650 079**

Assigned for All Purposes to the Honorable Susan Bryant-Deason

STIPULATION AND [~~PROPOSED~~] ORDER RE. INTERIM AGREEMENT FOR THE PRESERVATION OF THE SAN FERNANDO BASIN WATER SUPPLY

This Stipulation re. Interim Agreement for the Preservation of the San Fernando Basin Water Supply ("Stipulation") is entered into this 19th day of Sept., 2007, by and among the City of Los Angeles, the City of Glendale and the City of Burbank (individually, "Party," and collectively, the "Parties"), all of whom are parties to this action, with reference to the following facts:

WHEREAS, on September 20, 2007, the Parties have entered into the *Interim Agreement for the Preservation of the San Fernando Basin Water Supply* ("Agreement"), a true and correct copy of which is attached hereto as Exhibit A.

WHEREAS, the Agreement is consistent with the 1979 judgment entered by stipulation in this action ("Judgment").

NOW, THEREFORE, the Parties hereby stipulate as follows and respectfully request that the Court enter the proposed Order submitted herewith:

The Parties stipulate that they have entered into the Agreement, the terms of which are hereby adopted and incorporated by this reference as though fully set forth herein.

The Parties further stipulate that the terms of the Agreement shall be judicially enforceable.

The Parties further stipulate to, and request that, the Court enter an order the terms of which are the same as the Agreement.

IN WITNESS WHEREOF, this Stipulation is entered into as of the first date set forth above.

Dated: Sept. 20, 2007

HATCH & PARENT, A LAW CORPORATION

BY Amy Steinfeld FOR:
SCOTT S. SLATER
STEPHANIE OSLER HASTINGS
ATTORNEYS FOR DEFENDANTS, CITY OF BURBANK AND CITY OF GLENDALE

Dated: Sept 24, 2007

CITY OF BURBANK

By:
Carolyn A. Barnes

Dated: Sept. 24, 2007

CITY OF GLENDALE

By: Christine Godinez
Christine A. Godinez

Dated: 24 Sept., 2007

CITY OF LOS ANGELES

ROCKARD J. DELGADILLO, City Attorney
RICHARD M. BROWN, General Counsel, Water and Power
JULIE CONBOY RILEY, Deputy City Attorney

By: Julie Conboy Riley
Julie Conboy Riley

INTERIM AGREEMENT
FOR THE PRESERVATION OF THE SAN FERNANDO BASIN WATER SUPPLY

This Interim Agreement for the Preservation of the San Fernando Basin Water Supply (Agreement) is entered into as of ________________ , 2007 between and among the City of Los Angeles acting by and through the Los Angeles Department of Water and Power (Los Angeles), the City of Glendale, a municipal corporation (Glendale) and the City of Burbank, a municipal corporation (Burbank) (each a Party and collectively, the Parties), with reference to the following facts and intentions, which the Parties agree are true and correct to the best of their knowledge and belief:

RECITALS

A. The Parties are parties to the 1979 judgment entered by stipulation in *City of Los Angeles v. City of San Fernando* (California Superior Court Case No. 650079) (the Judgment). Each Party holds rights in and to the San Fernando Basin (Basin), one of the several groundwater basins subject to the Judgment, as set forth in the Judgment. The Parties are also all of the voting members of the Administrative Committee of the Basin, which is authorized by Section 8.3 of the Judgment.

B. The Basin has been, and continues to be, operated in accordance with the terms and conditions of the Judgment. The Superior Court of the County of Los Angeles (Court) retains continuing jurisdiction over the Judgment and the parties to it.

C. On March 23, the Upper Los Angeles River Area Watermaster (Watermaster), which is authorized by Section 8 of the Judgment to assist the Court in its administration and enforcement of the provisions of the Judgment, filed a White Paper with the Court expressing two concerns that the Parties seek to redress by agreement: (i) a reduction in the stored water in the Basin; and (ii) the accumulation of Stored Water credits, as that term is defined in Section 5.2 of the Judgment, by the Parties in excess of the quantity of water available to be pumped by them.

D. The Parties wish to enter into this Agreement to promote a physical solution to the observed falling groundwater levels by promoting artificial replenishment of the Basin in a manner that ensures the viability of the Basin as a long-term reliable water supply. The Parties also wish to enter into this Agreement to provide interim guidelines on the Parties' exercise of their Stored Water credits so as to avoid harm to the Basin.

E. The Parties wish to coordinate their actions to circumvent unnecessary and potentially protracted litigation over the meaning and implementation of the Judgment.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals, which are incorporated into the operative provisions of this Agreement by this reference, and for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the **PARTIES HERETO AGREE** as follows:

1. **Purpose.** The purpose of this Agreement is to address two issues: (a) reduction in the stored groundwater in the Basin; and (b) the accumulation of Stored Water credits by the Parties in excess of the quantity of water available to be pumped by them. By entering into this Agreement, and by undertaking the actions described herein, the Parties seek to ensure that necessary long-term improvements are made to capture and recharge sufficient quantities of rainfall whenever available to correct declining water levels and to guard against any short-term deficiencies in Basin replenishment as might be associated with drought conditions. In the interim, while these Projects are being implemented, the Parties also agree that some guidelines must be established to avoid harm to the Basin and all Parties.

2. **Term.** The term of this Agreement shall be ten years and shall commence with the 2007-08 Water Year (beginning October 1, 2007). The 2007-08 Water Year shall be Year 1; the 200 8-09 Water Year shall be Year 2, and so on. At the conclusion of the term of this Agreement, on or about September 30, 2017, the Parties, in coordination with the Watermaster, will evaluate the effectiveness of this Agreement including, but not limited to, the status of the Projects, and determine whether this Agreement shall be extended.

3. **Enhancement of Recharge Capacity.** Los Angeles has previously expressed its support for several artificial recharge projects. The Parties acknowledge that if implemented as planned, these projects, individually and collectively, will augment replenishment of the Basin in a manner that arrests the observed decline in groundwater levels. The projects presently being pursued include, but are not limited to: the Sheldon-Arleta Project, the Big Tujunga Dam Seismic Restoration Project, the Hansen Spreading Grounds Project, and the Tujunga Spreading Grounds Project (collectively, the Projects).

3.1 By the conclusion of Year 10, Los Angeles, in collaboration with the Los Angeles County Department of Public Works (a separate public agency which is not a party to this Agreement), intends to support and contribute resources towards the design, construction and implementation of the Projects in a manner that increases the Basin's total artificial recharge capacity over conditions existing as of the date of this Agreement. By taking these actions, Los Angeles anticipates that the long-term average native replenishment of the Basin may be increased by at least 12,000 acre-feet per year. Although the exact quantity of additional recharge that will be derived from these Projects, when completed, is unknown and is dependent ultimately on the quantity and variability of precipitation, it is reasonable to assume the additional recharge of the Basin made possible by these Projects will be substantial. While Los Angeles may also elect to contribute funding towards these Projects, this Agreement does not obligate Los Angeles to fund any of the Projects either in part or in whole.

3.2 Mutual Cooperation. Burbank and Glendale agree to coordinate and cooperate with Los Angeles and the Los Angeles County Department of Public Works as may be necessary to increase the likelihood of timely implementation of the Projects.

3.3 Reporting. Within 60 days of the conclusion of each Water Year during the term of this Agreement, Los Angeles shall file a report with the Administrative Committee, the Watermaster and the Court documenting the status of the Projects, including but not limited to the extent by which the Projects have increased the Basin's total artificial recharge capacity.

4. Pumping Limitation. For the term of this Agreement, the Parties agree not to pump their pro-rata share of the total Stored Water credits held by the Parties collectively that, if pumped, would cause the total quantity of water in storage to fall below -655,370 acre-feet (the 1968 level). The quantity of water that the Parties otherwise could have pumped pursuant to their respective Stored Water credits shall be placed in a reserve, and not lost, until such time as there is sufficient water in storage to permit the pumping of those credits without causing the quantity of water in storage to fall below the 1968 level.

4.1 Calculation of Available Stored Water Credits and Reserved Stored Water Credits. The Parties authorize the Watermaster to calculate, annually, the quantity of Stored Water credits available to be pumped by each Party (Available Stored Water credits) and the quantity of Stored Water credits reserved for later use by each Party (Reserved Stored Water credits), as agreed upon herein.

(a) For purposes of making this calculation, the Watermaster shall: (1) compute each Party's Stored Water credits as of the first day of each Water Year for the term of this Agreement, including the one percent (1%) loss described in Section 5 below; (2) assign a percentage to each Party that reflects the relative proportion of each Party's Stored Water credits to the total quantity of credits available to all Parties; (3) determine the quantity of Stored Water available to be pumped by all Parties and calculate each Party's relative proportion of that total quantity; and (4) calculate the quantity of Stored Water Credits not available to be pumped in that Water Year and reserved for later use. For the 2006-07 Water Year (beginning October 1, 2006), which is not subject to this Agreement, the calculation would be as follows:

Party	Stored Water Credits (AF), Minus 1% Losses	Percentage of Total Quantity of Stored Water Credits for Each Party	Available Stored Water Credits (AF)	Reserved Stored Water Credits (AF)
Los Angeles	370,350	83.146%	139,018	231,334
Glendale	61,215	13.743%	22,978	38,236
Burbank	13,859	3.111%	5,202	8,656
Total	**445,424**	**100%**	**167,198**	**278,226**

4.2 Exception to Satisfy Consent Decree Obligations. Nothing herein shall be construed as causing Burbank or Glendale to pump less groundwater from the Basin than required by the United States Environmental Protection Agency's Consent Decrees for the Burbank Operable Unit [Civil Action 91-4527-MRP (Tx), dated 06-22-1998] and the Glendale North and South Operable Units [CV99-00552 MRP (ANx), dated 05-17-2000], respectively, all of which are incorporated by this reference as if fully set forth herein, and as may be modified or amended from time to time during the term of this Agreement (collectively, Consent Decrees). In the event that the pumping limitations set forth in Section 4 above are triggered by a decline in storage, Burbank and Glendale may pump Reserved Stored Water credits to meet their Consent Decree obligations subject to the following conditions:

(a) In the event Los Angeles is able to produce the full quantity of its Extraction Right to meet the water requirements of its inhabitants for the Water Year in which Glendale's or Burbank's Available Stored Water Credits are not sufficient to meet that Party's Consent Decree obligations, Glendale or Burbank shall be required to purchase Physical Solution water pursuant to Section 9.4 of the Judgment as necessary to meet their respective Consent Decree obligations. For purposes of this Agreement, "Extraction Right" shall mean the total quantity of Los Angeles' Return Water Extraction Right plus Native Safe Yield Credit, as set forth in Table 2-1 1A of the Watermaster's most recent annual report prepared pursuant to section 8.2.11 of the Judgment.

(b) In the event the conditions of paragraph 4.2(a) above are not satisfied, Los Angeles may elect to exchange water or stored water credits with the Party requiring additional water to meet its Consent Decree obligations upon such terms and conditions as the affected Parties may agree upon. In the event an agreement to exchange water or stored water credits sufficient to permit either Glendale or Burbank to satisfy their Consent Decree obligations cannot be reached, Glendale or Burbank may pump Reserved Stored Water credits as necessary to meet their Consent Decree obligations, subject to Paragraph 4.2(c) below.

(c) Any pumping by Glendale and Burbank of Reserved Stored Water credits pursuant to this exception shall not exceed a maximum combined total of 2,000 acre-feet per year over the term of this Agreement. Any pumping in excess of a combined total of 2,000 acre-feet per year over the term of this Agreement shall be pursuant to Section 9.4 of the Judgment.

4.3 Exception for Unforeseen Circumstances. Additionally, to the extent that any Party is required to pump water in excess of that Party's Available Stored Water credits and in reliance upon that Party's Reserved Stored Water credits, to meet presently unspecified federal or state regulatory obligations that may be established in the future or unforeseen material changes in the Parties' operations or Basin conditions, the affected Party(ies) shall coordinate with the Administrative Committee and the Watermaster to determine whether and to what extent additional quantities of groundwater may be extracted in a manner that does not cause harm to the Basin or any other Party.

5. Account for Groundwater Losses. The Parties acknowledge that Stored Water losses may occur from the Basin. The Parties further acknowledge that Section 8.2.9 of the Judgment requires the calculation of such losses from Stored Water. The Parties estimate that as much as one percent (1%) of all Stored Water is lost from the Basin annually.

5.1 For the term of this Agreement, or until such time as the Basin loss calculation is re-evaluated, the Parties authorize Watermaster to deduct one percent (1%) annually from each Parties' respective Stored Water credits account.

6. Basin Safe Yield Study. The Parties acknowledge that, from time to time, it may be appropriate to study information regarding the hydrology of the Basin, including the Basin's Safe Yield, as that term is defined in the Judgment.

6.1 Within six months of the date of execution of this Agreement, the Parties, in coordination and consultation with the Watermaster, will develop a proposal for conducting a study of the Basin's Safe Yield. The proposal will include each of the following elements: (1) timing for designing, conducting and implementing the study and each of its phases, (2) trigger(s) and parameters for implementing the study, or any part or phase, (3) procedures for managing and allocating costs and for authorizing expenditures during and throughout the study; (4) methods and manner for conducting the study; and (5) anticipated goals or outcomes of the study. Thereafter, the Parties will commence a study of the Basin's Safe Yield that is consistent with the proposal required by this Section, as may be agreed upon by the Parties.

6.2 In the event the Parties are unable to agree to a proposal for studying the Basin's Safe Yield within six months of the date of execution of this Agreement, the Parties, individually or collectively, shall lodge their respective proposals, if any, with the Court. The Court, upon at least 30 days notice thereof and after a hearing, shall make such further or supplemental orders as may be necessary or appropriate and consistent with the Judgment.

7. Recalculation of Safe Yield. Regardless of any information collected or reports made pursuant to Section 6 above, the Parties agree to forebear from exercising any and all rights they may have arising under or related to Section 8.2.10 of the Judgment for the term of this Agreement, except as may be necessary to respond to, support or oppose any Watermaster recommendation or action that may be inconsistent with this Agreement, the provisions herein, or any Party's respective rights, remedies and defenses arising under the Judgment or applicable law. After the expiration of this Agreement, the rights of any and all Parties arising under or related to Section 8.2.10 will not be prejudiced by the existence of this Agreement or their agreement to forebear pursuant to its terms.

8. Annual Accounting by Watermaster. Watermaster will collect, record and verify, or otherwise arrange for the collection, recordation and verification of, any and all data and information as may be required or generated by this Agreement and as may be otherwise directed by the Administrative Committee or the Court. Upon written request by any Party, all such data and information shall be made available to the Parties. The

Watermaster shall include such data and information in its annual Watermaster Report, prepared pursuant to Section 8.2.11 of the Judgment, a copy of which is filed with the Court.

9. Administrative Committee and Watermaster Authority. Watermaster and the Administrative Committee are not Parties to this Agreement. This Agreement is made among the Parties and nothing herein shall be construed as a limitation on the powers and responsibilities of the Administrative Committee or the Watermaster arising under the Judgment.

10. Reservation of All Rights. Subject to Section 7 above, neither this Agreement, nor any provision herein, shall be construed as a waiver or limitation on any Party's respective rights, remedies and defenses arising under the Judgment or applicable law including, but not limited to, the right to respond to, support or oppose further Watermaster recommendations.

11. Consistency with Judgment and Continuing Jurisdiction. The actions contemplated by this Agreement, if implemented, facilitate a physical solution and are intended as measures that arise under, are consistent with, and in furtherance of, the Judgment. Accordingly, this Agreement shall be subject to the Court's continuing jurisdiction as provided by Section 7 of the Judgment.

12. Further Actions. The Parties contemplate that additional opportunities may arise to further augment the available yield of the Basin during the term of this Agreement. Upon a request by any Party, the Watermaster or the Administrative Committee, the Parties will exercise good faith to fairly evaluate opportunities to exchange water, enhance recharge, evaluate a replenishment program and conserve water. Further, Burbank is actively pursuing an inter-connection with the Metropolitan Water District of Southern California to permit the delivery of replenishment water to Burbank for storage in the Basin. Burbank will file annual status reports with the Watermaster, the Administrative Committee and the Court in a manner similar to Los Angeles' reporting as provided in Section 3.3 above.

13. General Provisions.

13.1 Assignment. This Agreement shall not be assigned by any Party.

13.2 Attorneys' Fees. Should legal action be instituted by any Party to this Agreement, to enforce or interpret any provision of this Agreement, each Party shall bear its own attorneys' fees.

13.3 Authorizations. All individuals executing this Agreement on behalf of the respective Parties certify and warrant that they have the capacity and have been duly authorized to so execute this Agreement on behalf of the entity so indicated.

13.4 Construction. The provisions of this Agreement shall be liberally construed to effectuate its purposes. The language of this Agreement shall be construed simply according to its plain meaning and shall not be construed for or against any Party, as each Party has participated in the drafting of this Agreement.

13.5 Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

13.6 Entire Agreement and Amendment. In conjunction with the matters considered herein, this Agreement contains the entire understanding and agreement of the Parties and there have been no promises, representations, agreements, warranties or undertakings by any of the Parties, either oral or written, of any character or nature binding except as stated herein. This Agreement may be modified, altered or amended only by an instrument in writing, executed by the Parties to this Agreement and by no other means. Each Party waives its right to claim, contest or assert that this Agreement was modified, canceled, superseded or changed by any oral agreement, course of conduct, waiver or estoppel.

13.7 Good Faith. The Parties agree to exercise their reasonable best efforts and utmost good faith to effectuate all the terms and conditions of this Agreement and to execute such further instruments and documents as are necessary or appropriate to effectuate all of the terms and conditions of this Agreement.

13.8 Notices. All notices, approvals, acceptances, demands and other communication required or permitted under this Agreement, to be effective, shall be in writing and delivered in person or by U.S. Mails (prepaid postage, certified, return receipt requested) or by overnight delivery service to the Party to whom the notice is directed at the addresses identified below:

To Los Angeles:

Director of Water Resources
Los Angeles Department of Water and Power
111 N. Hope Street, Room 1460
Los Angeles, CA 90012

With copy to:

Julie Conboy Riley, Deputy City Attorney
Office of the City Attorney
City of Los Angeles
111 N. Hope Street, Room 340
Los Angeles, CA 90012

To Glendale:

Peter Kavoumas, Water Services Administrator
Glendale Water and Power
City of Glendale
141 North Glendale Ave., 4th Level
Glendale, CA 9 1206-4496

With copy to:

Christine Godinez, Assistant City Attorney
City of Glendale
613 East Broadway, Suite 220
Glendale, CA 91206-4394

To Burbank:

William Mace, Assistant General Manager
Burbank Water and Power
City of Burbank
164 West Magnolia Boulevard
P.O. Box 631
Burbank, CA 91503-063 1

With copy to:

Carolyn Barnes, Senior Assistant City Attorney
City of Burbank
275 East Olive Avenue
Burbank, CA 91510-6459

To the Watermaster:

Mark Mackowski
Upper Los Angeles River Area Watermaster
111 N. Hope Street, Room 1450
Los Angeles, CA 90012

To the Court:

The Honorable Susan Bryant-Deason
Judge of the Los Angeles County Superior Court
111 N. Hill Street, Dept. 52
Los Angeles, CA 90012

Any written communication given by mail shall be deemed delivered two (2) business days after such mailing date. Any communication given by overnight delivery service shall be deemed delivered one (1) business day after the dispatch date. Either Party may change its address by giving the other Party written notice of its new address as provided above.

13.9 Recitals. The recitals set forth at the beginning of this Agreement of any matters or facts shall be conclusive proof of the truthfulness thereof and the terms and conditions set forth therein shall be deemed a part of this Agreement.

13.10 Successors and Assigns. This Agreement shall be binding on and shall inure to the benefit of the Parties and their respective successors.

13.11 Court Approval. The Parties hereto shall seek Court approval of this Agreement prior to September 30, 2007.

14. Waiver. No waiver of any provision or consent to any action shall constitute a waiver of any other provision or consent to any other action, whether or not similar. No waiver or consent shall constitute a continuing waiver or consent or commit a Party to provide a waiver or consent in the future except to the extent specifically stated in writing. No waiver shall be binding unless executed in writing by the Party making the waiver, based on a full and complete disclosure of all material facts relevant to the waiver requested.

[continued on next page]

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement.

DEPARTMENT OF WATER AND POWER OF
THE CITY OF LOS ANGELES BY
BOARD OF WATER AND POWER COMMISSIONERS
OF THE CITY OF LOS ANGELES

AUTHORIZED BY RES. 008 048
SEP 04 2007

Date: 9/19/07 By: ____________________
ROBERT K. ROZANSKI
Acting General Manager

And: Barbara E. Moschos
Secretary

APPROVED AS TO FORM AND LEGALITY
ROCKARD J. DELGADILLO, CITY ATTORNEY

AUG 22 2007

BY ____________________
JULIE CONBOY RILEY
Deputy City Attorney

CITY OF GLENDALE

Date: 9/13/07

James E. Starbird, City Manager

Approved as to Form:

By
City Attorney

CITY OF BURBANK

Date: 9/13/07

Ronald E. Davis, General Manager,
Burbank Water and Power

Attest:

By Margarita Campos
Margarita Campos, City Clerk

Approved as to Form:

By ___
Carolyn Barnes, Senior Assistant City Attorney

SB 440012 v1:011538.0001

ORDER

Having read and reviewed the foregoing stipulation, **IT IS HEREBY ORDERED** that the terms of the *Interim Agreement for the Preservation of the San Fernando Basin Water Supply*, dated September 20, 2007 ("Agreement"), which is entered into by and between the City of Los Angeles, the City of Glendale and the City of Burbank, all of whom are parties to this action, a copy of which is attached hereto and incorporated herein by this reference, shall be the Order of the Court. The Parties are hereby ordered to comply with the terms of the Agreement.

DATED: October 2, 2007 Judge Susan Bryant-Deason
JUDGE OF THE SUPERIOR COURT

PROOF OF SERVICE

I am employed in the County of Los Angeles; I am over the age of eighteen years and am not a party to the within entitled action; my business address is 111 North Hope Street, Suite 340, Los Angeles, California 90012-2694. On September 25, 2007, I served the within documents:

STIPULATION AND [PROPOSED] ORDER RE. INTERIM AGREEMENT FOR THE PRESERVATION OF THE SAN FERNANDO BASIN WATER SUPPLY

[ ] by transmitting via facsimile the document(s) listed above to the fax number(s) set forth below on this date.

[X] by placing the document(s) listed above in a sealed envelope with postage thereon fully prepaid, in the United States mail at Los Angeles, California addressed as set forth below.

[ ] by personally delivering the document(s) listed above to the person(s) at the address(es) set forth below.

PLEASE SEE THE ATTACHED LIST.

I am readily familiar with the firm's practice of collection and processing correspondence for mailing. Under that practice it would be deposited with the U.S. Postal Service on that same day with postage thereon fully prepaid in the ordinary course of business.

I declare under penalty of perjury under the laws of the State of California that the above is true and correct.

Executed on September 25, 2007, at Los Angeles, California.

Lillian M. Catena

Lillian M. Catena

THE CITY OF LOS ANGELES v. CITY OF SAN FERNANDO, ET AL.
LASC CASE NO. C 650 079

SERVICE LIST

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Julie Conboy Riley Deputy City Attorney Office of the City Attorney Department of Water and Power P. O. Box 5111- Room 340 (Mailing) 111 N. Hope Street, Room 340 Los Angeles, CA 90051-0100	Attorneys for Plaintiff, THE CITY OF LOS ANGELES, acting by and through the DEPARTMENT OF WATER AND POWER
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Dennis Erdman (Member)
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asmith@nossaman.com

Attorneys for
Upper Los Angeles River Area Watermaster

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF LOS ANGELES

THE CITY OF LOS ANGELES, Plaintiff, v. CITY OF SAN FERNANDO, et al., Defendants.	Case No. C650 079 **WATERMASTER STATEMENT RE: INTERIM AGREEMENT FOR THE PRESERVATION OF THE SAN FERNANDO BASIN WATER SUPPLY** Before the Hon. Susan Bryant-Deason

The court-appointed Watermaster hereby submits the following statement regarding the Stipulation and [Proposed] Order re: Interim Agreement for the Preservation of the San Fernando Basin Water Supply, submitted by the Cities of Los Angeles, Glendale and Burbank ("Agreement").

The Watermaster supports this Court's approval of the Agreement. The Watermaster appreciates the efforts on the part of the Cities of Los Angeles, Glendale and Burbank to reach a negotiated solution to the complex issues affecting the declining stored groundwater levels in the San Fernando Basin. The Watermaster believes the Agreement represents significant progress in addressing the issues set forth in the Watermaster White Paper lodged with this Court on March 23, 2007. The Agreement contains many elements that will help restore the long-term sustainability of the Basin, and the Agreement expressly provides for the preservation of all Watermaster authority under the Judgment.[1]

While the Watermaster supports approval of the Agreement, and while the Watermaster is hopeful that the Agreement will facilitate improved storage levels in the Basin, the Watermaster is obligated to raise several issues that may materialize in the future.

First, the Watermaster believes that a Basin Safe Yield Study is a critical component of understanding the true and correct hydrologic conditions in the Basin. It has been over 40 years since a Basin Safe Yield Study has been performed. Section 6 of the Agreement provides that the Parties will develop a proposal for a Basin Safe Yield Study. This paragraph further provides that if the Parties do not come to an agreement on a single proposal, then the Parties will submit their separate proposals to this Court. The Agreement therefore has the potential to delay the Basin Safe Yield Study. The Watermaster agrees that a six month period is ample time for the Parties to agree upon the proposal for the Basin Safe Yield Study. Indeed, the Parties should endeavor to commence the study prior to the time allocated by the Agreement. In any case, the Safe Yield Study should begin no later than the completion of the six month study period.

Second, the Watermaster believes that actual losses must be calculated, not merely estimated. Section 5.1 of the Agreement provides that for the 10-year term of the Agreement, the Parties authorize Watermaster to deduct one-percent annually from each Party's respective Stored Water Credit, or until such time as the Basin loss calculation is re-evaluated. The Watermaster believes the one-percent estimate is reasonable on an interim basis. However, Section 8.2.9 of the Judgment requires that Watermaster shall calculate and

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1 Paragraph 9 of the Agreement provides: "Watermaster and the Administrative Committee are not Parties to this Agreement. This Agreement is made among the Parties and nothing herein shall be construed as a limitation on the powers and responsibilities of the Administrative Committee or the Watermaster arising under the Judgment."

account for stored water losses.[2] It is therefore imperative that Watermaster calculate the true and correct Basin losses from rising groundwater and underflow. Upon obtaining the necessary data to accurately perform that calculation, Watermaster believes it is necessary and appropriate to deduct actual losses, not estimated losses, from the Parties' Stored Water Credits. Therefore, the Watermaster will recommend that the calculation for determining Basin losses be re-evaluated as part of the Basin Safe Yield Study, and implemented upon completion of the Study.

Third, Section 4.2.6.1 of the Judgment states that the San Fernando Basin "...remained in overdraft continuously until 1968, when an injunction became effective. Thereafter, the basin was placed on safe yield operation." The Parties anticipate that the actions required of them under the Agreement will forestall the Basin's decline and prevent groundwater levels from slipping below the 1968 benchmark. However, if progress does not materialize as anticipated and groundwater levels fall below the 1968 level, the Watermaster may be obligated to declare overdraft and consider further options consistent with the Judgment to protect the Basin.

The Watermaster is hopeful that the Parties will reach consensus on the implementation of a Basin Safe Yield Study, the calculation of losses, and conjunctive use projects to replenish the Basin. In that regard, the Watermaster hopes that the reservations expressed herein will not need to be addressed by this Court. Nonetheless, in light of the Agreement's dependence on additional action by the Parties over the next 10 years, and in particular the next six months, the Watermaster is obligated to inform this Court of the aforementioned issues.

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[2] Section 8.2.9, in relevant part, provides: "Watermaster shall record and verify additions, extractions and losses and maintain an annual and cumulative account of all (a) stored water and (b) import return water in San Fernando Basin."

The Watermaster expresses its appreciation to the Parties and this Court for their attention in developing solutions to enhance the long-term sustainability of the San Fernando Basin.

DATED: September 25, 2007

NOSSAMAN, GUTHNER, KNOX & ELLIOTT, LLP
Frederic A. Fudacz
Alfred E. Smith

By: ______________________
Alfred E. Smith
Attorneys for Upper Los Angeles River Area Watermaster

PROOF OF SERVICE

The undersigned declares:

I am employed in the County of Los Angeles, State of California. I am over the age of 18 and am not a party to the within action; my business address is c/o Nossaman, Guthner, Knox & Elliott, LLP, 445 S. Figueroa Street, 31st Floor Los Angeles, California 90071-1602.

On September 25, 2007, I served the foregoing **WATERMASTER STATEMENT RE: INTERIM AGREEMENT FOR THE PRESERVATION OF THE SAN FERNANDO BASIN WATER SUPPLY** on parties to the within action by placing ( ) the original (x) a true copy thereof enclosed in a sealed envelope, addressed as shown on the attached service list.

(X) (By U.S. Mail) On the same date, at my said place of business, said correspondence was sealed and placed for collection and mailing following the usual business practice of my said employer. I am readily familiar with my said employer's business practice for collection and processing of correspondence for mailing with the United States Postal Service, and, pursuant to that practice, the correspondence would be deposited with the United States Postal Service, with postage thereon fully prepaid, on the same date at Los Angeles, California.

( ) (By Facsimile) I served a true and correct copy by facsimile pursuant to C.C.P. 1013(e), to the number(s) listed on the attached sheet. Said transmission was reported complete and without error. A transmission report was properly issued by the transmitting facsimile machine, which report states the time and date of sending and the telephone number of the sending facsimile machine. A copy of that transmission report is attached hereto.

( ) (By Overnight Service) I served a true and correct copy by overnight delivery service for delivery on the next business day. Each copy was enclosed in an envelope or package designated by the express service carrier; deposited in a facility regularly maintained by the express service carrier or delivered to a courier or driver authorized to receive documents on its behalf; with delivery fees paid or provided for; addressed as shown on the accompanying service list.

Executed on September 25, 2007.

(X) (STATE) I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

( ) (FEDERAL) I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Charlyn Jones

ATTORNEYS OF RECORD

Name	Party
Ms. Julie Riley Deputy City Attorney Office of the City Attorney Department of Water and Power 111 N. Hope Street, Suite 340 P.O. Box 5111 Los Angeles, CA 90051-5700 Telephone: 213-367-4579	Los Angeles
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Mr. Scott Howard City Attorney 613 East Broadway Glendale, CA 91205 Telephone: 818-548-2080	Glendale
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Mr. H. Jess Senecal, Special Counsel Lagerlof, Senecal, Swift and Bradley 301 North Lake Avenue - 10th Floor Pasadena, CA 91101 Telephone: 626-793-9400	Crescenta Valley, Vulcan-CalMat
Greg Chafee, Esq. 5660 New Northside Drive, Suite 500 Atlanta, GA 30328 Telephone: 770-933-1447	DS Waters

ATTORNEYS OF RECORD (CONT'D)

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Michael C. Martinez, Esq. Haight, Brown & Bonesteel LLP 6080 Center Drive, Suite 800 Los Angeles, CA 90045-1574 Telephone: 310-215-7715	Valhalla Memorial Park
Mr. Patrick Holleran General Manager 12833 Ventura Boulevard Studio City, CA 91604 Telephone: 818-984-0202	Sportsmen's Lodge
Mr. Fritz Tegatz Middle Ranch 11700 No. Little Tujunga Canyon Road Lake View Terrance, CA 91342	Middle Ranch Parties

ADMINISTRATIVE COMMITTEE and ALTERNATES

Name	Party
Mr. Thomas M. Erb (Member) Director of Water Resources Department of Water and Power 111 North Hope Street, Room 1463 P. O. Box 51111 Los Angeles, CA 90051-5700 Telephone: 213-367-0873	Los Angeles
Mr. Mark J. Aldrian (Alternate) Groundwater Group Manager Department of Water and Power 111 North Hope Street, Room 1450 Los Angeles, CA 90012 Telephone: 213-367-0932	Los Angeles
Mr. William Mace (Member) Assistant General Manager Water System Burbank Water and Power 164 West Magnolia Boulevard P. O. Box 631 Burbank, CA 91503 Telephone: 818-238-3550	Burbank
Mr. Peter Kavounas (Member) Water Services Administrator City of Glendale 141 North Glendale Avenue Glendale, CA 91206-4496 Telephone: 818-548-2137	Glendale
Mr. Raja Takidin (Alternate) City of Glendale 141 North Glendale Avenue Glendale, CA 91206-4496 Telephone: 818-648-3906	Glendale

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Mr. David Gould (Alternate) — Crescenta Valley Water District
District Engineer
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2700 Foothill Boulevard
La Crescenta, CA 91214
Telephone: 818-248-3925

APPENDIX H
WELLS DRILLED, REACTIVATED, ABANDONED, OR DESTROYED

ACTIVITIES INVOLVING THE CONSTRUCTION, REHABILITATION, AND/OR DESTRUCTION OF WATER WELLS

2011-12 WATER YEAR

No municipal wells were drilled, rehabilitated or destroyed.

APPENDIX I
ACTION ITEMS 2012-13 WATER YEAR

ACTION ITEMS

WATERMASTER ACTIVITIES FOR 2012-13 WATER YEAR

1. Begin the work needed for the four ULARA groundwater basins to be in conformance with the new DWR regulations regarding the California Groundwater Elevation Monitoring (CASGEM) program.

2. Continue to work with the cities of Los Angeles and San Fernando to finalize the Watermaster's recent Safe Yield Re-assessment of the Sylmar Basin; part of this effort will also be to make the new re-assessment more consistent with the provisions in the Judgment for this basin.

3. Initiate work efforts on a Salt and Nutrient Management Plan (SNMP) for the 4 groundwater basins within ULARA. This SNMP is a new program promulgated by the State Water Resources Control Board for all groundwater basins in the State.

4. Continue to meet with the City of Los Angeles Recycled Water Group and begin to work with the California Department of Public Health and other regulators to assess the feasibility of either the direct recharge or the spreading of recycled water into the ULARA groundwater basins, via the use of ASR wells and/or artificial spreading basins, respectively.

5. Continue to support ways to maximize the spreading of native water and increase the infiltration of urban runoff in the SFB.

6. Continue to work with the City of Los Angeles Department of Water and Power--Watershed Protection Division and their Standard Urban Stormwater Mitigation Program (SUSMP) for the proposed development and/or the re-development of properties within the City portion of the San Fernando Valley.

7. Collect, organize, convert to electronic format, and correlate the driller's logs, geologic logs and electric logs for new water wells and groundwater monitoring wells in the ULARA groundwater basins.

8. Collect, organize, convert to electronic format, and correlate electric logs of wildcat and/or producing oil wells in the San Fernando and Sylmar groundwater basins.

9. Collect, scan, and convert to electronic format all prior Annual Watermaster Reports and 5-year Pumping and Spreading Plans, the ULARA Judgment and the 2-volume set of the Report of Referee; post all to the ULARA website.

10. Continue to work with the Parties and regulatory agencies, such as the USEPA and RWQCB – Los Angeles, to enforce chromium cleanup in the SFB.

11. Continue to work with the Parties to implement a meter calibration program to verify the accuracy of the flowmeter at each of their active pumping wells within ULARA. This program will include the replacement of meters that cannot be re-calibrated or properly repaired.

12. Continue to assess groundwater extractions by private pumpers in the hill and mountain areas within ULARA.

13. Continue to attend meetings of technical groups, such as the Association of Groundwater Agencies (AGWA) and the Groundwater Resources Association (GRA), to exchange ideas and information regarding water quality and groundwater basin management.

14. Conduct field visits to selected contamination sites and meet with regulators and site owners and/or their consultants in an effort to help accelerate the time schedules and effectiveness of cleanup activities at these sites.

15. Continue to attend meetings with community and civic groups in favor of utilizing the Los Angeles River as a recreational area and animal habitat.

APPENDIX J
WATER EQUIVALENTS

WATER EQUIVALENTS

Volume

1 gallon* …………………………….	= 3.7854 liters (L)	= 231** cubic inches (in^3)
…………………………….	= 0.003785 cubic meters (m^3)	= 0.132475 cubic feet (ft^3)
100 cubic feet (HCF)**** …….…...	= 748 gallons (gal)	= 2.83317 cubic meters (m^3)
…….…...	= 2,832 liters (L)	= 3.70386 cubic yards (yd^3)
…….…...	= 6,230.8 pounds of water (lb)	= 2,826.24 kilograms (kg)
1 acre-foot (AF)*** ………………..	= 43,560** cubic feet (ft^3)	= 1233.5 cubic meters (m^3)
………………..	= 325,851 gallons (gal)	= 1,233,476.3754 liters (L)
………………..	= the average amount of water used by two families for one year.	

Flow

1 cubic foot per second (cfs) …	= 448.83 gallons per minute (gpm)	= 0.028317 cubic meters/sec (m^3/s)
…	= 646,317 gallons per day (gal/day)	= 1.70 cubic meters/min
…	= 1.98 AF/day	= 2446.6 cubic meters/day
1,000 gallons per Minute(gpm) …	= 2.23 cubic feet per second (cfs)	= 0.063 cubic meters/sec (m^3/s)
...	= 4.42 AF/day	= 5452.6 cubic meters/day
...	= 11,613.01 AF/year	= 1.99 million cubic meters/yr
1 million gallons per day (mgd) …	= 3.07 AF/day	= 3785 cubic meters/day
...	1,120.14 AF/year	= 1.38 million cubic meters/yr

Concentration

…	= 1.0 milligrams per liter (mg/L)	= 1.0 part per million (ppm)
…	= 1.0 micrograms per liter (μg/L)	= 1.0 part per billion (ppb)

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* U.S. gallons
** Exact Value
*** An acre-foot of water covers one acre of land one foot deep
**** This is a billing unit of DWP

APPENDIX K
LIST OF ABBREVATIONS

LIST OF ABBREVIATIONS

AF	Acre-feet
AF/Y	Acre-feet per Year
BOU	Burbank Operable Unit
BTEX	Benzene, tolulene,ethylbenzene,and total xylene
CVWD	Crescenta Valley Water District
Cal-EPA	California Environmental Protection Agency
DCA	Dichloroethane
DCE	Dichloroethylene
CDPH	California Department of Public Health
DTSC	California Department of Toxic Substances Control
DWP	Department of Water and Power (see also LADWP)
EPA	Environmental Protection Agency (see also USEPA)
EVWRP	East Valley Water Recycling Project
LAFD	Los Angeles Fire Department
GAC	Granular Activated Carbon
GOU	Glendale Operable Unit
GNOU	Glendale North Operable Unit
GSOU	Glendale South Operable Unit
gpm	Gallons Per Minute
LACDPW	Los Angeles County Department of Public Works
LADWP	Los Angeles Department of Water and Power
MCL	Maximum Contaminant Level
mg/L	Milligrams per Liter, same as PPM
MTA	Metropolitan Transportation Authority
MWD	Metropolitan Water District of Southern California
NHOU	North Hollywood Operable Unit
OEHHA	Office of Environmental Health Hazard Assessment
OU	Operable Unit
PCE	Tetrachloroethylene
PHG	Public Health Goal
PPB	Parts Per Billion, same as micrograms per liter
PPM	Parts Per Million, same as milligrams per liter
PSDS	Private Sewage Disposal Systems
RAW	Removal Action Workplan
RI	Remedial Investigation
RWQCB	Regional Water Quality Control Board
SFB	San Fernando Basin
SUSMP	Standard Urban Stormwater Mitigation Plan
SWRCB	State Water Resouces Control Board
SWAT	Solid Waste Assessment Test
TCA	1,1,1- Trichloroethane
TCE	Trichloroethylene
TDS	Total Dissolved Solids
TSG	Tujunga Spreading Grounds
µg/L	Micrograms per Liter, same as PPB
ULARA	Upper Los Angeles River Area
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound

LIST OF ABBREVIATIONS

VPWTP	Glendale-Verdugo Park Water Treatment Plant
USGS	United States Geological Survey

APPENDIX L
SYLMAR BASIN SAFE YIELD, 5-YEAR RE-ASSESSMENT
JULY 31, 2012

Re: City of Los Angeles vs. City of San Fernando, et. al.
Case No. 650079 – County of Los Angeles

July 31, 2012

To: Mr. Ron Ruiz
Public Works Director
City of San Fernando
117 MacNeil Street
San Fernando, CA 91340-2993

Job No. 500-LAS10

Mr. Milad Taghavi
Assistant Director of Water Quality,
Los Angeles Department of Water and Power
111 N. Hope Street
Los Angeles, CA 90012

Re: Final Report –
Sylmar Basin Safe Yield, 5-Year Re-assessment

In order to comply with an approximate 5-year timing requirement for an updated assessment of the safe yield of the Sylmar Groundwater Basin, I have prepared this final report, along with its tables and figures, to document my current re-assessment of the safe yield value for this basin. This final report includes: an initial discussion in the Background section of key documents prepared for the Final ULARA Judgment of January 26, 1979 and of other key documents prepared by the two prior ULARA Watermasters; a discussion of the construction of two groundwater monitoring wells drilled at/near the Sylmar notch by the City of San Fernando; my analysis of numerous water level hydrographs prepared for several water wells owned by Los Angeles and San Fernando in the basin; and my findings and conclusions regarding this updated assessment of the safe yield of Sylmar Basin.

This 5-year assessment of the safe yield of Sylmar Basin (including analyses of available data) has been prepared by the Watermaster with the assistance of key support services by Mr. Anthony Hicke, Assistant to the Watermaster and a senior groundwater geologist with Richard C. Slade & Associates LLC, Consulting Groundwater Geologists. A copy of the Final Updated Draft of this report has been previously reviewed and approved by key representatives of the cities of Los Angeles and San Fernando, and by Mr. Melvin Blevins, Consultant to the Watermaster.

BACKGROUND

The following paragraphs list the documents reviewed for this updated assessment, and summarizes the principal findings and conclusions of each in regard to the safe yield of the Sylmar Groundwater Basin.

1. <u>ULARA Judgment</u> Subsection 4.2.4 of Section 4 “Declaration Re: Geology and Hydrology” of the 1979-dated ULARA Judgment originally established the safe yield of the Sylmar Groundwater Basin to be 6,210 acre feet per year (AF/yr) for the 1964-65 Water Year. Further, Subsection 4.2.5 “Separate Basins – Separate Rights” in the Judgment stated that “the rights of the parties to extract groundwater within ULARA are separate and distinct…” Originally, and at the time of the 1979 Judgment, the Sylmar Basin “[was] not in overdraft” (subsection 4.2.6.2 “Sylmar Basin”). The Judgment defined overdraft to be “a condition which exists when the total annual extractions of groundwater from a basin exceed its safe yield, and when any temporary surplus has been removed” (Section 2 “Definitions and Attachments”).

2. <u>August 26, 1983 Watermaster Letter to Court</u>

According to an August 26, 1983 letter from then ULARA Watermaster, Melvin Blevins, to the Superior Court (Honorable Harry L. Hupp, presiding), the Watermaster is to notify the Court and parties concerned in the event the San Fernando Groundwater Basin entered a condition of overdraft (Section 10.2 of the Final Judgment). Further, in this same letter, the then-Watermaster opined that the Sylmar Basin “is in a condition of overdraft …based on the hydrologic data available for the past ten years and the present rate of groundwater extractions.”

Section 7 “Continuing Jurisdiction” and in particular subsections 7.1 “Jurisdiction Reserved”, allows the Court to retain jurisdiction to enforce the 1979-dated Judgment in Case No. 650079, City of Los Angeles vs City of San Fernando, et al. As the then-Watermaster, Mr. Blevins further stated in this letter to the Court that the Watermaster [including the current ULARA Watermaster, Richard C. Slade] has the [ongoing] responsibility of assisting the Court in the administration and enforcement of the Judgment, and <u>also</u> in the reporting of changed hydrologic conditions within the Sylmar Basin (the Watermaster’s assistance and enforcement actions are described in Section 8 “Watermaster” and Section 10 “Miscellaneous Provisions” of the 1979 Judgment).

In this August 26, 1983 letter to the Court, Mr. Blevins stated that the “annual extraction of the groundwater in the Basin has exceeded this Safe Yield value in ten of the last 11 years [water years] 1971-72 through 1981-82.” Specifically, the “cumulative withdrawal from the groundwater storage has exceeded the Safe Yield by approximately 4,700 acre-feet”; a key table showing groundwater extractions was attached to that 1983 letter to document groundwater extractions of the parties at that time.

Mr. Blevins also noted that “it was uncertain at the date of the 1979 Judgment as to how much ‘temporary surplus’ was available in [Sylmar Basin], even though extractions have exceeded the Safe Yield continuously for the period 1971-72 through 1978-79.” From 1979 to 1981-82, the August 26, 1983 letter stated that "…approximately 2,700 acre-feet of groundwater have been extracted in excess of the Safe Yield value. This amount came from the temporary surplus. In my opinion, the temporary surplus has been exhausted and overdraft has begun [in Sylmar Basin]."

To help document his opinion, Mr. Blevins noted (pg. 2, August 26 1983 letter) that water levels in this basin have declined an average of 3 feet per year for the past 11 water years (1971-72 through 1981-82), although "water levels have shown an upward trend in recent years due to above-normal rainfall".

Finally, the August 26, 1983 letter (pgs. 2 and 3) to the Court by Mr. Blevins discussed then-recent groundwater extractions by the parties from the Sylmar Basin. Specifically, for the 14-year period 1968-69 through 1981-82, those extractions by all parties averaged 6,450 AF/yr. Virtually all of those extractions during that 14-year period were by the cities of Los Angeles and San Fernando. Total extractions for a then more-recent period (1978-79 through 1981-82) were noted in that letter to have averaged 6,885 AF/yr; Mr. Blevins stated that this average value was "675 AF/yr in excess of the Safe Yield value [that safe yield value was 6,210 AF/yr for the entire Sylmar Basin].

As an added conclusion to this referenced letter, Mr. Blevins opined (pg. 3) that "pumping in excess of Safe Yield at recent rates [annual volumes] [and] for a short period of time (5 to 10 years) would not be adverse to the basin. "However, eventually the total pumping should be reduced to the Safe Yield value of 6,210 AF/yr. "It may even be necessary to re-evaluate the Safe Yield value, in the event that parties in the basin feel that the number has changed."

A table titled "Sylmar Basin Groundwater Extractions" was appended to the August 26, 1983 letter by Mr. Blevins; data provided thereon were for all parties for the period 1968-69 through 1981-82. Review of that table revealed that total groundwater extractions from Sylmar Basin by all parties during that time period ranged from a low of 4,836 AF in 1970-71 to a high of 7,497 AF in 1980-81; other years of high production were 7,232 AF in 1977-78 and 7,164 AF in 1978-79. Further review of those tabulated values revealed that for the 7-year period of 1977-78 through 1983-84, average annual groundwater extractions by the 2 cities were 6,852 AF from Sylmar Basin.

3. <u>October 1, 1984 Superior Court Stipulation</u>

As a result of the above-referenced letter to the Court from Mr. Blevins, and in a Stipulation and Order to the Sylmar Basin Pursuant to Section 10.2 of the ULARA Judgment, Judge Harry L. Hupp, Judge of the Superior Court, wrote that the Court "has determined that pumping from the Sylmar Basin shall be reduced to the Safe Yield (6,210 AF/yr at present) of the basin, effective October 1, 1984"; the actual Court order was signed March 22, 1984 by Judge Hupp. The cities of Los Angeles and San Fernando were again noted to each have a right of 3,105 AF/yr of groundwater from this basin. Paragraph 7 of this Court Stipulation stated that in order to "provide for water shortages due to unusual circumstances, such as weather conditions or water system operational problems, Los Angeles and San Fernando shall [each] have the right in any year to over-extract from the Sylmar Basin an amount not to exceed 10 percent [about 310 AF/yr, under their then-current Safe Yield value] of then-allowed pumping. "The 10 percent annual over-extraction may continue from year to year, accumulatively not to exceed 1,000 acre-feet for each city, so long as the unusual circumstances persist."

4. March 29, 2006 Watermaster Letter

In a March 29, 2006 letter to Mr. Ronald Ruiz of the City of San Fernando and Mr. Thomas M. Erb of the City of Los Angeles Department of Water & Power, the then-ULARA Watermaster Mr. Mark Mackowski discussed the Sylmar Basin and provided his re-evaluation of the safe yield of this groundwater basin. The letter re-stated the following key information for Sylmar Basin:

- The original 1979 Judgment established the safe yield to be 6,210 AF/yr.
- The former Watermaster, Mr. Melvin Blevins, recommended in a letter to the Court, dated August 25, 1983, that the Sylmar Basin was in a condition of overdraft; a Stipulation was entered by the Court on March 22, 1984 acknowledging this overdraft and also limiting the pumping by the cities of Los Angeles and San Fernando to 3,105 AF/yr each (total, 6,210 AF/yr from the whole basin).
- In 1996, based on a motion by the City of San Fernando, the then-Watermaster Mr. Blevins reviewed the safe yield calculations for Sylmar Basin and recommended temporarily increasing its safe yield to 3,255 AF/yr for each city (6,510 AF/yr of total pumping by both cities); this period of temporary increase was to expire in 10 years (on or about October 1, 2005).

Based on the above, the March 29, 2006 Watermaster letter from Mr. Mackowski then stated that he had recently retained former Watermaster Mr. Blevins (serving as "Watermaster Consultant" to Mr. Mackowski) to perform another re-evaluation of the safe yield of Sylmar Basin. That re-evaluation was to use the same methodology as had been used by the State Water Rights Board during its preparation of the Report of Referee; this methodology was also used for the subsequent update by Bookman–Edmonston for the Court (this latter update was presented in Court Exhibit GB-1). The 2006 updated re-evaluation by Mr. Blevins, a copy of which was appended to the March 29, 2006 letter by then-Watermaster Mr. Mackowski, concluded that the safe yield of Sylmar Basin could be temporarily increased (with certain restrictions) to a total of 6,810 AF/yr (3,405 AF/yr for each of the two municipal-supply purveyors).

Notably, the letter by Mr. Mackowski stated there are "certain significant uncertainties and limitations" related to the updated safe yield re-evaluation by his consultant Mr. Blevins in 2006, including:

a. The import return flow value of 35.7%, as defined for Sylmar Basin in the Judgment, Subsection 5.2.2.1 ("Rights to Recapture Import Return Waters"), was once again used by Mr. Mackowski to calculate the amount of delivered imported water that was considered to be capable of deep percolating back into the groundwater basin as return flow. However, for the first time, an acting Watermaster acknowledged that this value was possibly "too large"; Mr. Mackowski did use this same value again in his 2006 re-evaluation "to be consistent" with all former safe yield evaluations and "to provide a direct comparison" with those prior calculations.
b. The 2006 re-evaluation by Watermaster Consultant Mr. Blevins used a combined groundwater "underflow through the Sylmar and Pacoima notches of 540 AF/yr, rather than 560 AF/yr as stated in the Report of Referee."
c. The 2006 letter acknowledged that "it is difficult, if not impossible, to accurately calculate [groundwater in] storage in a confined or semi-confined aquifer system such as [exists in] the Sylmar Basin." In essence, water wells in this basin were recognized to be perforated in the confined aquifers of the Saugus Formation, and, as a result, this 2006 letter stated that hydrographs of water levels in these wells "do not directly reflect change in [the volume of groundwater in] storage, which is needed to perform an accurate safe yield evaluation."
d. There "are few available non-pumping monitoring wells with long-term hydrographs in the Sylmar Basin that can be used for determining change in [the groundwater in] storage over the past 10 years. "We have partly based our recommendation to increase the safe yield on just one recent well hydrograph (4840B)"; this well number is recognized to be LADWP Mission Well No. 2 (refer to location on Figure 1B).
e. "The actual amount of underflow [subsurface flow of groundwater in the alluvium] through the subsurface Sylmar Notch and Pacoima Notch is not known. "To determine Safe Yield accurately, it is necessary to know how much water [groundwater] is leaving the basin from both pumping and underflow." The Report of Referee calculated the total loss through the [two] notches to be an average of 560 AF/yr, but this value needs to be confirmed."
f. "Stored water credits [in Sylmar Basin, for both cities] amount to a total of 8,787 AF as of October 1, 2005." There is a legal claim on this water and we do not know how long this basin would respond if the Stored Water Credits were pumped over a relatively short period of time."

The following two recommendations were also provided in this referenced March 29, 2006 letter by Mr. Mackowski, as caveats to his recommendation to increase the total safe yield of Sylmar Basin to 6,810 AF/yr (3,405 AF/yr for each city). These caveats were as follows:

- The Watermaster shall have the authority to perform a safe yield re-evaluation at any time, if, in his judgment, "the basin is being adversely affected by the [latest] temporary increase in Safe Yield." In any event, another Safe Yield re-evaluation shall be performed no later than five years after the beginning of the temporary increase to 6,810 AF/yr."

- "Two shallow [groundwater] monitoring wells shall be placed near each of the notches (four wells total) to measure water level elevations and gradients so that subsurface flow through the notches can be calculated and monitored. "There may be existing wells that could be utilized for this purpose, which would reduce the number of new wells needed."

5. Court Stipulation, Executed October 11, 2006
A new "Stipulation Between the Cities of San Fernando and Los Angeles regarding the safe yield of the Sylmar Basin…" was executed by the Superior Court on October 11, 2006, Judge Susan Bryant-Deason presiding, as a result of the March 29 2006-dated letter from then-Watermaster Mr. Mackowski; this is the letter to which was appended the March, 2006-dated "Sylmar Basin Safe Yield Re-Evaluation" by Mr. Blevins, Watermaster Consultant. This particular Court stipulation, among other items, acknowledged the latest safe yield re-evaluation value of 6,810 AF/yr (total, for both cities), mentioned that the parties "agree to work with" the Watermaster [Mr. Mackowski] in locating, installing, and funding a total of four (4) shallow monitoring wells in the Sylmar Basin…", and stated that a "recalculation of the safe yield can be requested by any Party in the event such recalculation appears to be necessary… "In addition, another safe yield re-evaluation shall be performed within five years after the adoption of this Stipulation, and as otherwise requested by the Watermaster."

FINDINGS

Hydrogeology of the Sylmar Basin
Based upon the Report of Referee and the 1979 Judgment, the Sylmar Basin is the northernmost of the four groundwater basins in ULARA. Ground surface boundaries of this basin have been taken to be: the San Gabriel Mountains on the north and east; a topographic divide in the valley fill (alluvium) on the west between the Mission Hills and the San Gabriel Mountains; the Mission Hills on the southwest; the Saugus Formation on the east along the east bank of the Pacoima Wash; and the eroded south limb of the Little Tujunga syncline (and perhaps a fault also) on the south. Figure 1A "Well Location Map, Sylmar Basin" has been adapted from Attachment "A" in the 1979-dated Judgment to show the ground surface boundaries of the Sylmar Basin.

The Judgment (1979, subsection 4.1.3. "Sylmar Basin") also noted that the potentially water-bearing sediments within Sylmar Basin are comprised by the shallow alluvium (aka, the "valley fill" in the Report of Referee) and the Saugus Formation of Plio-Pleistocene geologic age. These potentially water-bearing sediments were further considered in the Judgment to extend to depths of 40 ft (alluvium) and at least 12,000 ft (the Saugus Formation) in this basin. Cross Section F-F (Plate 5B of the Report of Referee; not reproduced herein) depicts these materials on a geologic cross section across Sylmar Basin. These sedimentary deposits, which comprise the groundwater reservoir of Sylmar Basin, are directly underlain at depth by a very thick sequence of well-consolidated and/or cemented sedimentary rocks (sandstone, shale, siltstone, etc). This latter group of rocks is considered to be nonwater-bearing and to comprise the local bedrock.

Groundwater within the alluvium of this basin is considered to exist under water table (unconfined) conditions. Groundwater in the underlying Saugus Formation, however, is considered to exist under artesian (confined) conditions. Moreover, the 1962 Report of Referee (pgs. 53-55) notes that the alluvial aquifer system and the underlying Saugus Formation aquifer system are in "hydraulic continuity" wherever they jointly exist in the subsurface. Subsurface outflow of groundwater from Sylmar Basin to the San Fernando Groundwater Basin to the south occurs via underflow through two alluvial-filled notches in Sylmar Basin. As seen on Figure 1B, these 2 notches are the Sylmar notch in the southwest corner of this basin and the Pacoima notch in the southeastern corner of the basin.

The surface area of this basin, also known as the surface extent of the valley fill deposits, consists of 5,565 acres, as listed on p. 8 of the January 26, 1979-dated Judgment; Attachment "A" in that document illustrates the ground surface boundaries of the Sylmar Groundwater Basin on a small-scale base map of all of ULARA. Plate 5 of Volume 1 of the Report of Referee also illustrates those same ground surface boundaries for Sylmar Basin, whereas p. xxxv of the Report of Referee also actually states that this Sylmar Basin has a surface area of 5,565 acres. However, recent calculations by the current Watermaster of the surface area of this basin (using the Sylmar Basin boundary that was digitized by personnel from LADWP who were assisting the original Watermaster) yield a total of 6045 acres (refer to these LADWP-digitized boundaries on Figure 1B). This discrepancy in the surface area of this basin is likely due to changes in the basin boundary lines over time, possibly resulting from drafting those boundary lines onto different base maps; other boundaries were even subsequently imported into an electronic GIS database format by LADWP personnel.

Table 1, "Summary of Well Construction Data – City of San Fernando", and Table 2, "Summary of Well Construction Data – LADWP Mission Wellfield" have been prepared to document the key items, where currently available, for all, historically-known, municipal-supply wells in Sylmar Basin constructed for these 2 cities over the years. The locations for all of these historically-constructed municipal-supply wells are shown on Figure 1B. Notably, none of the wells listed on Tables 1 or 2 show perforated sections of casing shallow enough to produce water from the alluvium. Thus, the currently known active wells within the Sylmar Basin appear to pump groundwater directly from the Saugus Formation; no existing municipal-supply wells produce groundwater from the alluvial deposits.

The current Watermaster is still trying to fill-in the blank entries in different columns on both Tables 1 and 2; principal items still needed include the depth settings of the existing pump (if any), and the current status of each listed well. At this time, Tables 1 and 2 are to be considered as "In-Progress Drafts".

Rainfall

Public records for local raingages in ULARA are available from the website of the Western Regional Climate Center (WRCC; http://www.wrcc.dri.edu). Using the WRCC site, data for the nearby Burbank Valley Pump Plant Gage (Gage No. 041194) were downloaded. Data are available for this gage for the period January 1940 through December 2010. Figure 2A, "Annual Rainfall, Burbank Valley Pump Plant", shows a bar graph of the total rainfall for each year between 1940 and 2010 and a horizontal line showing the long-term average annual rainfall value; this long-term average annual rainfall was determined to be 16.3 inches.

Using the annual rainfall data from the Burbank Valley Pump Plant gage, Figure 2B "Accumulated Rainfall Departure Curve" was prepared to illustrate the results of calculating the accumulated departure of each year of rainfall relative to the long-term average annual rainfall at this rain gage. The purpose of this analysis is to help identify trends in rainfall over time. Review of the graph on Figure 2B reveals:

- Whenever the graph ascends upward to the right, such as the period of 1976 through 1983 on the rainfall curve, a period of above-average rainfall (i.e., an overall "wet" period) has occurred. That is, on average, most individual years of annual rainfall in this period were at or above the long-term average for rainfall. Wet periods during the period of available data for this gage are denoted with a "W" on Figure 2B
- Whenever the graph descends downward to the right (e.g., 1944 through 1976), an overall period of below average (deficient) rainfall has occurred. That is, on average, most individual years of annual rainfall during this period were at or below the long-term average rainfall. Periods of deficient rainfall for this rainfall gage are marked with a "D" on Figure 2B.

Groundwater Extractions

Figure 3, "Total Annual Groundwater Extractions, Sylmar Basin", provides a bar chart to summarize the total annual groundwater extractions (i.e., by Water Year) by the cities of Los Angeles and San Fernando from the Sylmar Basin, as reported in the historic Annual ULARA Watermaster Reports; the graphed data begin with the 1973-74 water year. The total extraction is comprised by the groundwater pumping from active water wells owned by both the City of Los Angeles and the City of San Fernando. As shown on Figure 3, the total groundwater extractions during this graphed period ranged from a low of 3514 AF in the 1992-93 water year, to a high of 8064 AF during the 1998-1999 water year. Also shown on Figure 3 is a short horizontal line denoting the safe yield value for each group of years for which each respective year the particular safe yield value was applicable. As can be seen on Figure 3, annual groundwater extractions from the Sylmar Basin have often exceeded the prior safe yield determined by the two prior Watermasters, particularly in the early portion of the record.

A summary of the annual groundwater extractions by both cities, on a Water Year basis, from 1973-74 through 2009-10, is shown on Table 3, "Summary of Groundwater Extractions – Sylmar Basin". Readily noticed on Table 3 (and Figure 3) is that the total annual groundwater extractions by both parties in several prior years have exceeded even the current total safe yield value for Sylmar Basin of 6,810 AF/yr. For example, in 1977-78, 1980-81 and 1998-99, total combined groundwater extractions by the 2 cities were 7,109 AF/yr, 7,497 AF/yr, and 8,064 AF/yr, respectively. As discussed below under "Water Level Data", water levels in existing wells for which long-term data are available have either remained relatively stable or have even risen (i.e., become more shallow) over time, in spite of the fact that total groundwater extractions had occasionally exceeded the then-existing safe yield value for this basin.

The unusually low <u>total</u> annual volume of groundwater pumpage by both cities shown on Table 3 for 2008-09 (4,341 AF) and 2009-10 (5,687 AF) is noted herein to be mainly a result of the known groundwater contamination in Sylmar Basin. That is, the detection of nitrate (as NO_3) in certain City of San Fernando wells, and the detection of trichloroethylene (TCE, a volatile organic compound) in certain City of Los Angeles wells at concentrations that have been near or above their respective CDPH Primary Maximum Contaminant Levels (MCLs), have caused both cities to curtail or otherwise reduce their annual groundwater extractions from this basin.

Water Level Data

For this project, the Watermaster has acquired long-term data for static (non-pumping) water levels that are available for existing water wells owned by LADWP and the City of San Fernando; these water levels are considered to represent depths to the confined (piezometric or pressure) surface in the Saugus Formation, due to the fact that available data for these wells show they all are perforated solely within this formation. These water level data have then been graphed for each well versus the accumulated rainfall departure curve (adapted from Figure 3B herein) and also versus the <u>total</u> combined annual groundwater extractions by both LADWP and the City of San Fernando onto Figures 4A.1 through 4E.2 for LADWP wells and Figures 5A.1 through 5D.2 for the City of San Fernando wells. Also shown on the right side of each figure, based on information listed on the driller's log (if available) for each well, is a schematic of the well casing and casing perforation depths (if known); Tables 1 and 2 summarize the known (available) construction data for each well owned by the cities of San Fernando and Los Angeles, respectively.

Key items shown on these figures for water levels vs. accumulated rainfall departure include:

a. Water levels fluctuate both seasonally and from year to year in each well.
b. Seasonal fluctuations vary by well but typically display a maximum of 10 to 15 ft of water level decline from the spring high to the fall low of each year.

c. Over time, from year to year, water levels tend to respond to changes in the accumulated rainfall departure curve. That is, when the red-colored rainfall departure curve on the figures (see, for example, Figure 5A.1) ascends to the right (i.e., a period of above-average rainfall), the water levels in the well rise over time; see for example the period of 1992 to 1999. Conversely, when the accumulated rainfall departure curve descends to the right, the water levels in the wells tend to decline over time (see, for example, the period of 1965-1977 on Figure 4A.1).

d. Most importantly, <u>none</u> of the hydrographs for any of the LADWP or City of San Fernando wells show a long-term, progressive or increasing rate of decline over time. In fact, current water levels in virtually all of the wells for which hydrographs have been prepared are at or near the water level highs dating from the earliest available data of the 1960s. This is reasonable evidence to indicate that overdraft is <u>not</u> occurring in Sylmar Basin at this time.

In regard to the remaining graphs which show water levels versus the total combined annual groundwater extractions by both LADWP and the City of San Fernando, there does <u>not</u> appear to be any strong correlation between the combined annual pumping by all wells and the resulting water levels in any single well. Some of the large fluctuations in seasonal water levels (see Figure 4D.1, for LADWP Mission Well #5, for example) likely result from the monitoring of partial water level recovery data and/or an actual pumping water level, rather than a true non-pumping static water level. Such data could readily result from long-term, continuous operational use of these wells (and with only short periods of non-pumping), and/or from the monitoring of a non-pumping water level that has been impacted by mutual water level drawdown interference from a nearby, actively-pumping well.

New Groundwater Monitoring Wells

As part of the October 11, 2006 Court stipulation discussed above, two new groundwater monitoring wells were constructed near the Sylmar notch in October 2007, via a contract between the City of San Fernando and the drilling contractor that was awarded the bid (Water Development Corporation). These 2 new monitoring wells, as seen on Figure 1B, include: Well MW-1 (south well), and MW-2 (north well). A packet of data for each of these two monitoring wells, including a driller's log for each well, was provided to the Watermaster by LADWP; those two data packets are provided in the appendix of this report.

Well MW-1, the southernmost of the 2 monitoring wells for the Sylmar notch (see Figure 1B), was constructed to a depth of 121 ft below ground surface (ft bgs), and contains perforations between the depths of 56 ft bgs and 111 ft bgs. Well MW-2 (the northernmost of the 2 monitoring wells) was constructed to a depth of 125 ft bgs, with casing perforations between the depths of 60 ft and 115 ft bgs. Drill cuttings of the earth materials encountered during drilling of each monitoring well were logged only by the drilling contractor; a geophysical electric log survey was not performed in either borehole. A cement sanitary seal was provided in each monitoring well to a depth of 50 ft bgs and 54 ft bgs, respectively. As discussed above, the purpose of the wells was to allow for the measurement of the water level in the alluvium in the area of the Sylmar notch. However, because the cement sanitary seals in these monitoring wells were placed to depths deeper than the reported thickness of the alluvium in this notch (estimated to be ±40 ft in the Report of Referee), then the monitoring wells cannot measure the water levels directly and solely within the alluvium. But, because the alluvium and the underlying Saugus Formation are likely to be in hydraulic communication in the area of this notch, then the water level data from MW-1 and MW-2 may represent a reasonable estimate of the elevation of the water level surface in the alluvial sediments in the area of the Sylmar notch.

Water level data collected over time for these two monitoring wells, using either manual electric tape water level sounders and/or automatically-recording water level pressure transducers, are presented as hydrographs on Figure 6, "Water Level Measurements, Groundwater Monitoring Wells, Sylmar Basin". To the right of the hydrographs, the casing construction data for the two monitoring wells are shown. Unfortunately, due to multiple instances of transducer malfunction, and a lack of regular manual water level monitoring, the water level data records for both MW-1 and MW-2 are somewhat sparse over time. As shown on Figure 6, the transducer equipment originally purchased and installed in May 2010 by LADWP personnel functioned properly for less than two months. Thereafter, in September 2011, the Assistant Watermaster installed a new transducer in each of these monitoring wells to once again begin the automatic collection of water level data at these sites.

Available data on Figure 6 show that water levels in both monitoring wells have varied over time. Further, and recognizing that the transducer data are more accurate and consistent than the early manual water level measurements of December 2007, water levels in the 2 monitoring wells are seen to have risen 10 to 15 ft in each well between mid-2009 and late-2011. Also, the two short segments of transducer data show curve shapes that appear similar to those resulting from the recovery of water levels over time. Based on the shape of the curves, it appears that water levels in the monitoring wells are affected by nearby municipal-supply wells owned by LADWP and/or the City of San Fernando. Because the water level records for these two monitoring wells show a dynamic water level surface that fluctuates during the year, then it can be reasonably assumed that the groundwater surface elevation is variable within the Sylmar notch. The fact that the Report of Referee (Appendix P, 1962), the 1979 Judgment, and even the March 29, 2006-dated letter by the former Watermaster (Mr. Mackowski) all mention changes in the amount of underflow through the Sylmar and Pacoima notches further corroborates the existence of fluctuating groundwater levels in both the Sylmar and Pacoima notches (see below).

Other Groundwater Outflows

In addition to the annual groundwater extractions by each party (city) shown on Figure 3 and Table 3, groundwater is also known to leave Sylmar Basin via subsurface outflow through the shallow alluvial sediments which have been deposited in the Sylmar and Pacoima notches (see notch locations on Figure 1B).

- *Sylmar Notch*

  To calculate the subsurface outflow from the Sylmar Groundwater Basin into the San Fernando Groundwater Basin to the south, the subsurface geometry of the alluvium overlying the Saugus Formation within the Sylmar notch must be estimated. As described in the Report of Referee (Volume I, Text and Plates, by State Water Rights Board, Referee, 1962), the subsurface geometry within this notch was originally defined via an exploratory drilling program. For that program, twenty bucket auger boreholes were drilled in the area of the Sylmar notch at that time. During the auger work, representatives of the Referee were onsite to observe the drilling and log the drill cuttings. Based on the results of the logging, a profile (or cross section) of the Sylmar notch was created as shown on Plate 5H in the Report of Referee, Volume 1; the alignment of the original profile is shown on Plate 5 of the Report of Referee (neither of these original plates are included herein). However, that original profile was adapted herein onto Figure 7, "Profile of Sylmar Notch", for this safe yield re-assessment project. As shown on Figure 7, the alluvium is shown as a triangular-shaped wedge which overlies the potentially water-bearing strata within the Saugus Formation (refer to Figure 1B for location of this notch).

  The location of Sylmar notch monitoring Well MW-1 has been superimposed onto the Figure 7 profile to show its location relative to the boreholes drilled for the original subsurface exploration program for the 1962 Report of Referee. Also shown on Figure 7 are the perforated interval (shown in blue-green color), and the depth of the cement seal (shown in red color) in MW-1.

  Figure 7 has also been updated to illustrate five separate water level elevations measured historically for the area of the Sylmar notch. These measurements are for the following dates: May 1959; January 2006; December 2007; June 2010; and September 2011. The May 1959 water level is from the 1962 Report of Referee, whereas the remaining 4 water level elevations have been determined by the current Watermaster using more recent water level data acquired from newly-available sources. Below is a summary of each of the approximate groundwater level elevations displayed on Figure 7:

  - <u>May 1959</u> – This water level elevation of 1090 ft above mean sea level (ft amsl) is taken from the Report of Referee, and was presented on the original Plate 5H in the 1962 document. As discussed in the Report of Referee, this water surface elevation was determined using water level data from the original exploratory drilling work described above. Using this water level elevation, the cross sectional area of the saturated alluvium was calculated, along with other aquifer parameters in the Report of Referee (1962). This May 1959 water surface elevation was considered to be a “low groundwater surface condition” as stated in the Report of Referee, Volume II, Appendix P, page P-17. The text in the Report of Referee stated that, at this “low” groundwater surface elevation, the subsurface outflow through the Sylmar notch was about 300 AF/yr in 1959. Page P-17 in that same document further stated: underflow through this notch “for high groundwater surface conditions [was] estimated to be approximately 500 AF/yr”; and “an average value for the base period 1928-29 through 1956-57 is…400 AF/yr”.

- January 2006 – Using available water level data from two shallow, privately-owned monitoring wells south of the Sylmar notch, a calculation was performed by this Watermaster to estimate the water level in the Sylmar notch in January 2006 to be 1070 ft amsl (see Figure 1B for the locations of the monitoring wells used); see also Figure A-1, “Calculation of Approximate January 2006 Water Level Elevation in the Sylmar Notch”, in the Appendix for an explanation of the calculation. These water levels were collected from monitoring wells constructed by others as part of the characterization and/or cleanup of groundwater contamination in a nearby portion of the San Fernando Groundwater Basin; the Watermaster obtained these data from the Regional Water Quality Control Board – Los Angeles (RWQCB-LA). Inherent in this “new” water level elevation estimation is the assumption that the water table gradient south of the notch is constant between the locations of these two privately-owned monitoring wells for which water level data were available, and the Sylmar notch. Note that this January 2006 water level elevation reveals that, at the date of the water level measurements, the saturated area of the alluvium was much less than that in 1959 (see Figure 7). Therefore, subsurface flow through the notch was greatly reduced in January 2006, to only a small percentage of the average amount of 400 AF/yr that had been previously estimated by others from this notch.
- December 2007 – This water level surface elevation of 1058 ft amsl is based on the first manual measurements collected shortly after the two Sylmar notch monitoring wells were constructed. As shown on Figure 7, the elevation of this water surface was deeper than the bottom elevation of alluvium (i.e., it is below the base of the alluvium), and is interpreted to be within the Saugus Formation. Therefore, for this study, and because no other water level data exist for the alluvium, it is interpreted that when the elevation of the water surface for a particular year is deeper than the elevation of the base of the alluvium, there is no subsurface outflow from the Sylmar Basin to the San Fernando Basin.
- June 2010 – Based on the data collected by the LADWP transducer installed into the Sylmar notch Monitoring Well MW-1, a groundwater surface elevation of 1058 ft amsl is interpreted. At an elevation of approximately 1063 ft amsl, the

water level in MW-1 is interpreted to be lower than the basal elevation of the alluvium, and therefore this water level would represent the water surface within the immediately underlying Saugus Formation. As described above, this suggests that, at the June 2010 date of this water level measurement, no groundwater was moving through the alluvium within the Sylmar notch.

- September 2011 – Data collected from the Watermaster's transducers installed into the two Sylmar notch monitoring wells (MW-1 and MW-2) yield a recent groundwater surface elevation for this date of 1081 ft asl. As shown on Figure 7, this groundwater surface is slightly below the May 1959 groundwater surface elevation reported in the Report of Referee.

Although the water level record at the Sylmar notch is sparse, the available data clearly show that the elevation of the groundwater surface in the alluvium is variable within the notch; that is, water levels in that alluvial notch are known to fluctuate seasonally and also from year to year depending on seasonal and long-term changes and trends in rainfall. Also, water level data suggest that water level fluctuations in the notch may occur due to the pumping of nearby wells owned by LADWP and/or the City of San Fernando. Further, as shown on Figure 7, there have been a number of occasions when there was likely no subsurface flow through the alluvium within the notch, because the groundwater level surface elevation was actually lower than the elevation of the base of the alluvium in the notch (based on available monitoring well data). Hence, it appears that there are periods of time throughout the year when there is no subsurface flow through the Sylmar notch.

As discussed above, the original profile on Figure 7 shows the shape of the alluvial notch (in a light yellow color on the figure) to have the basic shape of an inverted triangle. This is important because as the groundwater elevation decreases in the notch, the saturated area of the alluvium decreases by a greater amount. Hence, decreases in groundwater surface elevation over time within the Sylmar notch can yield greatly-reduced subsurface flow volumes through the notch.

The 1962 Report of Referee (Appendix P, page P-17) computed underflow through this notch to be about 300 AF/yr in the "low groundwater surface conditions in 1959", and contrasted that value with the 500 AF/yr value they determined for "high groundwater conditions". For its 29-year base period of 1928-29 through 1956-57, the Report of Referee (p. P-17) estimated that the average groundwater underflow through the alluvium of Sylmar notch was about 400 AF/yr.

- *Pacoima Notch*

  A smaller, less laterally-extensive, alluvial-filled notch known as the Pacoima notch occurs in the eastern part of the Sylmar Basin, in the area of the Pacoima Wash; Figure

1B shows the location of the Pacoima notch. A cross section of the Pacoima notch, which is shown on Plate 5H in the Report of Referee, Volume I (not included herein), reveals that this notch has a maximum alluvial thickness of 55 ft (see also page P-12, Appendix P, in Report of Referee). As stated in the Report of Referee, a submerged dam had been constructed in Pacoima notch many years prior to preparation of that report but, at the date of the Report of Referee, only the lower portion of this structure was still considered to remain. This remaining portion of the submerged dam has been, and will continue to be, considered to reduce the subsurface outflow of groundwater through this notch and into the San Fernando Basin to the south.

Pages P-15 and P-16 and Table P-3 in Appendix P of Volume II of the Report of Referee (not reproduced herein) reveal that underflow through the earth materials lying above the top of this remaining dam was calculated to range from 241 to 482 AF/yr and that the mean underflow for their 29-year base period of 1928-29 through 1956-57 was determined to be 160 AF/yr. Clearly, the annual amount (volume) of underflow through the alluvium in the Pacoima notch will vary, similar to that in the Sylmar notch, depending on water levels in the alluvium and rainfall recharge.

No groundwater monitoring wells have been constructed to date at/near the Pacoima notch.

Combined Underflow Leaving Sylmar Basin Through the Alluvial Notches

In summary, the average groundwater outflows through the two alluvial-filled notches, as calculated in the Report of Referee (Volume II, Appendix P) for the 29-year base period of 1928-29 through 1956-57 were 400 AF/yr for Sylmar notch and 160 AF/yr for Pacoima notch; hence the total average groundwater outflow to the south (based on the 1962-dated Report of Referee) from Sylmar Basin into the San Fernando Basin was estimated to be 560 AF/yr. Further, previous analyses by former Watermasters have kept the total combined average subsurface flows through the Sylmar and Pacoima notches at a constant value of 540 AF/yr during those prior times when they re-assessed the Sylmar Basin safe yield (see Table 4). As specifically reported by the former Watermaster, Mr. Mackowski, on page 3 of his March, 29, 2006 letter (which was reviewed by his consultant, Mr. Blevins), prior safe yield calculations for the Sylmar Basin have used a total underflow through both alluvial notches of "540 AF/yr, rather than 560 AF/yr stated in the Report of Referee." The reason for this 20-AF/yr decline in outflow was not identified in that document.

Groundwater Credits

Each Annual Watermaster Report for ULARA provides an ongoing calculation of the stored groundwater credits by the cities of Los Angeles and San Fernando in the Sylmar Basin. In the most recent such annual report (dated May 2012), the combined stored groundwater credits totaled 16,762 AF for both cities, as of October 1, 2011 (based on data from Water Year

2010/11); this value included credits of 1,500 AF for San Fernando and 15,262 AF for Los Angeles. The prior Watermaster, Mr. Mackowski, in his March 2006 letter to the Court, stated that the accrued groundwater credits totaled 8,787 AF as of October 1, 2005 (based on data from Water Year 2004/05). Hence, in the 6-year period of 2004/05 – 2010/11, the groundwater credits accrued by both cities increased by a total of about 7,975 AF; this calculates to an average rate (volume per year) for the accumulation of groundwater credits by the 2 cities of about 1,329 AF per year during this 6-year period. It is noteworthy and unusual that this average total rate (volume) of groundwater credits accrued by both cities in each of the past six years represents nearly 20% of the current annual safe yield value (6,805 AF/yr) of the entire Sylmar Basin.

The Judgment (Section 5.2.2.3), however, states that the accumulation of stored water credits "can be carried over for not to exceed five years, if the underflow through Sylmar notch does not exceed 400 acre-feet per year."

Conclusions

1. The safe yield of Sylmar Basin has been increased a few times since the 1962 date of the Report of Referee. Specifically, these previously-calculated values were 5,610 AF/yr in the Report of Referee, then 6,210 AF/yr for the 1979 Judgment, then 6,510 AF/yr in 1994/95 by then-Watermaster Mr. Blevins, and more recently 6,810 AF/yr in 2004/05 by then-Watermaster Mr. Mackowski (who was assisted at that time by his consultant Mr. Blevins).

2. Review of new water level data from the Sylmar notch monitoring wells by this Watermaster suggest that subsurface flow from the Sylmar Basin is variable throughout the year, and seems to be impacted primarily by changes in rainfall and recharge over time, and likely also by pumping activities from nearby wells. Hence, there can be times each year and from year to year that no subsurface outflow occurs into the San Fernando Basin to the south through the alluvium within the Sylmar notch (and perhaps through the alluvium in Pacoima notch also). Also, decreases in subsurface outflow through these 2 notches are not proportional to decreases in groundwater surface elevation due to the general V-shape of the alluvial sediments within each notch. Because of the geometry of both the Sylmar and Pacoima notches, decreases in groundwater elevation result in much greater decreases in subsurface outflow through these notches. Hence, this Watermaster believes that assigning a constant value for the total combined subsurface outflow of 540 AF/yr (or 560 AF/yr) through the Sylmar and Pacoima notches is an over-simplification of the subsurface outflow issue.

3. Water level data presented in hydrographs on Figures 4A.1 through 4E.2 and Figures 5A.2 though 5D.2 show that water levels in those municipal-supply wells have been relatively stable over most of the period of record. Importantly, fluctuations in water levels over time

have a clear correlation to changes in rainfall, as evidenced by the close relationship of the water levels on each hydrograph with trends in the accumulative rainfall departure curve over time. As such, it is the opinion of this Watermaster that overdraft is <u>not</u> occurring in the Sylmar Basin at this time.

4. Figure 3 shows the total extractions from the Sylmar Basin for the years of available record. Also shown on Figure 3 are the safe yield values calculated by others over time. Analysis of the graph shows that the total groundwater extractions by LADWP and the City of San Fernando have exceeded the current safe yield value of 6810 AF/yr during several prior individual years (e.g., 1977-78 and 1998-99) and also during at least one extended period of time (i.e., the 7-year period of 1977-78 through 1983-84; in fact, that 7-year period displayed an average production rate of 6,852 AF/yr). Despite these exceedances and as discussed in point 3 above, water level hydrographs show water levels in the basin have been and continue to be relatively stable over time, and fluctuate principally in response to changes in rainfall in the area. None of the hydrographs show any long-term, progressive or increasing rate of water level decline over time; hence, in the opinion of this Watermaster, and as stated above, the Sylmar Basin is not in a condition of overdraft at this time.

5. Because subsurface outflow of groundwater from the Sylmar Basin is now considered to have been overestimated in previous reports, and because water level trends for wells constructed in the Sylmar Basin have been relatively stable over time, then it is this Watermaster's opinion that the safe yield of the Sylmar Basin can be increased at this time.

   Table 4 "Prior and Current Watermaster Calculations, Sylmar Basin" provides the calculations for this increase in the safe yield value and also compares the current calculations to those by the 2 prior Watermasters. As shown on Table 4, the value on Item 6, "Subsurface outflow" has been reduced to 250 AF/yr from 540 AF/yr; this is a reduction of roughly 50% from all previously used values. This change is appropriate because: a total combined constant subsurface outflow of 540 AF/yr from the Sylmar and Pacoima notches has been determined to be an overestimate; and the groundwater surface elevation in the Sylmar notch has been shown to be highly variable, based on the water level data available to this re-assessment. Even though recent water level data are <u>not</u> available from water wells or groundwater monitoring wells at/near Pacoima notch, it can be reasonably assumed that groundwater levels and subsurface underflow through the Pacoima notch are as variable over time as they are in the Sylmar notch.

   Further, this Watermaster, in order to be consistent with prior studies, will accept, for the purpose of this safe yield re-assessment, the 35.7% value for the "percentage of delivered water becoming recharge", per Item 3 on Table 4 herein (as originally presented in the 1979 Judgment, p. 19, 1979).

6. As shown on Table 4 (Item 7), it is the current opinion of this Watermaster that the safe yield of the Sylmar Basin can be temporarily increased to 7,140 AF/yr at this time; this represents an increase of 330 AF/yr over the current total safe yield value for this basin. As a result, the cities of Los Angeles and San Fernando may each have the right to temporarily pump as much as 3,570 AF/yr (½ of 7,140 AF/yr) from their active wells in Sylmar Basin, based on the recognized 50%-50% share of the groundwater rights in this basin. This pumping may continue for the period of Water Years 2011-12 through 2015-16, unless in-progress data evaluation by the Watermaster reveals the basin is being adversely affected by this temporary increase in safe yield (e.g., in case of basin-wide declines in static groundwater levels).

7. Due to the existence of the 2 city-owned monitoring wells near the Sylmar notch (MW-1 and MW-2), and because a few other but more shallow privately-owned monitoring wells currently exist in/near this notch (these were constructed by others for local groundwater contamination sites), it is the opinion of this Watermaster that no additional monitoring wells need to be constructed for Sylmar notch at this time. This Watermaster will try to contact the owners of and consultants for the existing privately-owned groundwater monitoring wells near Sylmar Basin in an attempt to allow their monitoring wells to hopefully serve as future monitoring wells for the Watermaster, after all clean-up activities at those sites have been performed and the sites have been recommended for closure by the local regulatory agency.

   Due to the limited outflows expected through Pacoima notch, to the lack of publicly-drilled or privately-owned monitoring wells near this notch, and to current economic conditions, it is the opinion of this Watermaster that new monitoring wells are not required at/near this notch at this time.

8. This temporary increase in the safe yield of the Sylmar Basin can be considered useable for the next 5 years (Water Years 2011-12 through 2015-16), but ONLY with the following provisions:

   a. Groundwater credit accumulation will be suspended at the values presented in the May 1, 2012-dated Annual Watermaster Report (i.e., at the end of Water Year 2010-2011); this means that neither Party will accumulate any further groundwater credits for a period of time in the future (discussed below), even if they do not or cannot pump up to their safe yield value each year.

   b. Beginning in the WY 2011-12 Annual Watermaster report (to be published May 1, 2013), groundwater credits will begin to be calculated according to the Judgment; that is, credits can no longer be carried over for more than 5 years (Judgment, January 26, 1979; Subsection 5.2.2.3, p. 19-20). An example of this calculation presented through the 2010-11 Water Year is shown on Table 5, "Proposed 5-Year Method for Accounting for Water Credits, Sylmar Basin."

c. To address the difference in credit accounting between the method prescribed in the Judgment, and the cumulative method previously used by the prior Watermasters, I have prepared Table 5, "Proposed 5-Year Method for Accounting for Water Credits, Sylmar Groundwater Basin". As shown on that table, the difference in the volumes of accumulated credits between the new 5-year calculation method and the previous cumulative calculation presented in prior Annual Watermaster Reports is 9014 AF for the City of Los Angeles and 404 AF for the City of San Fernando; refer to "C" in the "Summary" for each city on Table 5. These volumes now represent the maximum volume of the "frozen" credits for each City.

d. Moving forward, the difference in credits of 9014 AF and 404 AF for the City of Los Angeles and the City of San Fernando, respectively, will remain credited to each Party. Both Parties will be able to exercise their right to use those accumulated but now "frozen" groundwater credits. However, neither City will be able to exercise its 5-year credits, even if they do not or cannot pump their new safe yield value, until such time as their individual, newly "frozen" credits are used entirely.

   Hence, this Watermaster, solely for this safe yield re-assessment of the Sylmar Basin, and solely because these accrued credits are fairly small, is preserving these accumulated credits (as otherwise might not have occurred, per the requirements in the Judgment for Sylmar Basin).

   It should be noted that the 5-year provision for credit accrual in the Judgment for the Sylmar Basin was not known to this Watermaster until the process of re-assessing the safe yield of this basin had begun.

e. Groundwater credit accrual will resume for each individual Party once the total "frozen" groundwater credits described in point "c", above, are entirely consumed by each individual Party. This may take several years and will likely occur at different times for each Party. The Watermaster will account for both the remaining "frozen" credits and the new, 5-year credit calculation method in each future Annual Watermaster Report, beginning at the end of Water Year 2011-12, and will continue this accounting until such time as the "frozen" credits have been entirely consumed by each Party. After such time when the "frozen" credits are completely consumed by each City, credit calculation will switch to the ongoing 5-year credit calculation method, and this method will continue to be used for future Annual Watermaster Reports. Alternatively, at any time, either Party may permanently abandon its "frozen" credits and begin accessing its stored water credits accrued via the 5-year credit calculation method.

f. If a Party plans to pump in excess of its "new" safe yield value in any year, then that Party must notify the Watermaster in advance, or as is reasonably practical. In an emergency situation (such as unusual weather conditions or water system operations problems), and if a Party has no remaining credits, then the Watermaster may consider granting permission to that Party, in writing, to pump in excess of its safe yield so long as the unusual circumstances persist. However, when the unusual circumstances cease, the accumulated overextractions shall be replaced by underpumping within a 6-year period.

g. Pumping by either Party in any given single year cannot exceed its "new" safe yield value of 3570 AF by more than 600 AF. For the sole purpose of consuming "frozen" credits, either Party may exceed its own 600-acre foot allotment in a given year with the prior approval of the Watermaster. However, the sum of the overage extraction by both Parties in any given year must not exceed 1200 AF.

   As part of the determination process, the Watermaster may also communicate between the two Parties to obtain additional facts and information on such issues as the intent and ability of each Party to pump above its safe yield in a given Water Year.

   Based on the available facts, the Watermaster can make a decision to approve with or without conditions, or deny the request. The Watermaster may present the preliminary decision to both Parties and provide an opportunity for the Parties to respond with possible comments. This would be followed by a final, written determination by the Watermaster.

h. Static (non-pumping) water levels must continue to be monitored on a regular basis in all existing wells owned by LADWP and the City of San Fernando, and also in the 2 City-owned groundwater monitoring wells and in the other privately-owned monitoring wells at/near Sylmar notch.

i. Total groundwater production by each city must continue to be monitored on a regular basis in each active well, via a properly installed and accurately calibrated totalizer flow dial near each wellhead.

j. The acquired data are to be reviewed on a regular basis by the Watermaster and then analyzed for possible trends versus total groundwater extractions in the basin and also versus the accumulative rainfall departure curve.

k. If at any time during the forthcoming five years (i.e., from Water Year 2011-12 through 2015-16), the Watermaster determines that groundwater levels in the basin are declining and/or not responding to rainfall recharge, then the "new" safe yield of the Sylmar Basin may need to be re-evaluated and/or reduced as necessary.

Respectfully submitted,

Richard C. Slade,
ULARA Watermaster

TABLE 1
SUMMARY OF WELL CONSTRUCTION DATA - CITY OF SAN FERNANDO
SYLMAR GROUNDWATER BASIN

City of San Fernando Well No.	LACFCD Well No.	State Well No.	State Well Completion Report No.	Date Drilled	Method of Drilling	Pilot Hole Depth (ft)	Casing Type & Depth (ft)	Casing Diameter (in)	Borehole Diameter (in)	Sanitary Seal Depth (ft)	Perforation Intervals (ft)	Type of Perforations	Slot Opening of Perforations (in)	Type of Gravel Pack	Data Reported by Driller at Date of Construction				Depth of Existing Pump Intake (ft)	Current Status
															Date	Type of Test	Approximate Pumping Rate (gpm)	Static Water Level (ft)		
1	4850B	3N/15W - ?	LADWP log form	5/1901	cable tool	566	steel, 541	12	12	none	ND	Mills Knife	ND	none	ND	ND	ND	ND	--	destroyed
2	5969A	3N/15W -34B1	older style State log form	1/1910	cable tool	250	steel, 250	ND	ND	none	ND	Mills Knife	ND	none	ND	ND	ND	ND	--	destroyed in 3/73
2A	5969D	3N/15W -34B3	31088	5/73	direct rotary	500	steel, 500	14	28	55	110-500	louvers	0.125	#4 & #5	5/73	pump	Q=1000 s=8' Q/s=125	153	280	active
3	5959	3N/15W -34C1	ND	5/26	cable tool	310	steel, 310	18	18	none	ND	ND	ND	none	ND	ND	ND	ND	--	Inactive due to N03
4	5969	3N/15W -34A1	older style State log form	6/26	cable tool	481	steel, 481	18	18	none	ND	ND	ND	none	6/26	ND	ND	80	ND	destroyed in 7/79
4A	ND	3N/15W - 34A2	Corps of Engineers log form	9/79	Reverse circulation	620	steel, 600	18	30	60	280-580	louvers	0.096	ND	9/79	pump	Q=700 s=251' Q/s= 2.8	134	370	active
5	5969B	3N/150W -35E1	older style State log form	8/50	direct rotary	612	steel, 612	14	24(?)	ND	178-504 512-612	louvers (?)	ND	ND	ND	ND	ND	ND	ND	Destroyed 1971
6	4850M	3N/15W - 34P7	11586	5/55	cable tool	300	steel, 300	18	18	none	52-110 120-128 149-152 196-197	Mills Knife	0.375	none	5/55	pump	Q=600 s=28' Q/s=21.4	30	--	Destroyed 1971
7	ND	3N/15W -34K4	54399	7/60	cable tool	376	steel, 376	18	18	none	88-209 286-292 313-319	Mills Knife	0.250	none	8/60	pump	Q=1000 s=78' Q/s=12.8	69	--	Destroyed 1971
7A	5968 (?)	3N/15W -27Q1	Corps of Engineers log form	6/71	direct rotary	380	steel, 380	18	ND	±150	250-355	louvers	0.096	ND	6/71	pump	Q=1050 s=45' Q/s=23.3		--	Inactive due to $N0_3$
8	ND	3N/15W - ?	ND	3/69	direct rotary	600	steel, 600	16	ND	50	100-600	louvers (?)	different sizes at depth	#3 to #16	3/69	pump	Q=38 s=347' Q/s=0.1	78	--	Destroyed

Notes: ND = No data
N/A = data not available (not listed) on log
Q/s= specific capacity of well, in units of gpm per foot of water level drawdown
LACFCD well numbers for City Well Nos. 5 and 6 are from Mann report of January 1959.

IN PROGRESS DRAFT

TABLE 2
SUMMARY OF WELL CONSTRUCTION DATA - LADWP MISSION WELLFIELD
SYLMAR GROUNDWATER BASIN

LADWP Well No.	LACFCD Well No.	State Well No.	State Well Completion Report No.	Date Drilled	Method of Drilling	Pilot Hole Depth (ft)	Casing Type & Depth (ft)	Casing Diameter (in)	Borehole Diameter (in)	Sanitary Seal Depth (ft)	Perforation Intervals (ft)	Type of Perforations	Slot Opening of Perforations (in)	Type of Gravel Pack	Data Reported by Driller at Date of Construction				Depth of Existing Pump Intake (ft)	Current Status
															Date	Type of Test	Approximate Pumping Rate (gpm)	Static Water Level (ft)		
Mission Well 1	4840A	2N/15W -4B2	LADWP Well Log	9/24	cable tool	195	steel 195	24	24	none	ND/NA	Mills Knife	ND/NA	none	--	--	--	--	--	status unknown
Mission Well 1A	4840F	--	ND/NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Capped in 1958; used as monitoring well??
Mission Well 2	4840B	2N/15W -4B3	LADWP Well Log	11/26	cable tool	209	steel 209	20	20	none	36-53 57-102 152-186	Mills Knife	3/8	none	1926	pump	1600 to 2600	ND/NA		used as water level monitoring well
Mission Well 2A	4840C	--	LADWP Well Log	9/26	cable tool	156	steel 156	none installed	--	--	none	--	--	--	--	--	--	--	--	destroyed
Mission Well 3	4840G	--	ND/NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	destroyed; used as monitoring well ??
Mission Well 4	4840H	--	ND/NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	"idle"
Mission Well 5	4840J	2N/15W -4C1	LADWP Well Log and State No. 30696	1/60	cable tool	450	steel 450	20	20	none	64-83 145-153 200-236 285-293 349-359 370-385 386-415	Mills Knife	3/8	none	1960	ND/NA	ND/NA	32		inactive (TCE)
Mission Well 6	4840K	2N/15W -4B	LADWP Well Log and State No. 41657	12/61	cable tool	488	steel 508	20	20	none	230-262 413-435	Mills Knife	1/4	none	1961	pump	Q=1410 s=42 Q/s=33.6	73		active
Mission Well 7	4840S	2N/15W -4B1	64556 & 64557 & 64558	7/77	cable tool	660	steel 646	20	20	50	145-168 212-248 260-265 267-283 306-324 326-333 410-423 495-505 509-516	Mills Knife	1/2	none	1977	pump	Q=1818gpm s=109 Q/s=16.7	80		active

Notes: ND = No data
N/A = data not available (not listed) on log
Q/s= specific capacity of well, in units of gpm per foot of water level drawdown
This table will be considered as a DRAFT until all blank zones above can be in-filled, particularly those for the depth of the existing pump and the current status of each well.

Table 3
Summary of Groundwater Extractions - Sylmar Basin -
for Water Years 1973-1974 to 2009-2010

Water Year	LADWP (AF)	City of San Fernando (AF)	Total Extractions (AF)
1973/74	2,839	3,103	5,942
1974/75	2,993	3,135	6,128
1975/76	2,880	3,667	6,547
1976/77	3,446	2,773	6,219
1977/78	4,192	2,917	7,109
1978/79	3,772	3,087	6,859
1979/80	3,111	2,991	6,102
1980/81	4,117	3,380	7,497
1981/82	3,486	3,290	6,776
1982/83	3,047	3,133	6,180
1983/84	3,106	3,907	7,013
1984/85	3,130	3,102	6,232
1985/86	3,075	3,166	6,241
1986/87	3,114	2,754	5,868
1987/88	3,134	2,804	5,938
1988/89	3,259	2,199	5,458
1989/90	2,626	2,763	5,389
1990/91	3,281	2,266	5,547
1991/92	3,292	2,826	6,118
1992/93	1,369	2,145	3,514
1993/94	2,052	3,398	5,450
1994/95	2,311	3,421	5,732
1995/96	2,767	2,985	5,752
1996/97	2,482	3,259	5,741
1997/98	3,642	3,308	6,950
1998/99	4,536	3,528	8,064
1999/2000	2,634	3,807	6,441
2000/01	2,606	3,695	6,301
2001/02	1,240	3,766	5,006
2002/03	3,549	3,358	6,907
2003/04	3,033	3,454	6,487
2004/05	1,110	3,143	4,253
2005/06	2,175	2,857	5,032
2006/07	3,919	2,894	6,813
2007/08	2,996	3,670	6,666
2008/09	868	3,473	4,341
2009/10	2,544	3,143	5,687

Table 4
Prior and Current Watermaster Calculations - Sylmar Basin
Gross and Net Groundwater Recharge
(acre-feet)

		Safe Yield Year				
		1964-65	Jan 26, 1979	1994-95	2004-05	2010-11
Item	Plaintiff	Revised by Bookman-Edmonston	ULARA Judgment (p.11) *	Revised by original Watermaster Melvin Blevins	Revised by former Watermaster Mark Mackowski	Revised by current Watermaster Richard Slade
1. Average gross groundwater recharge of native supply	3850	3850	--	3850	3850	3850
2. Average import	6140	6140	--	8960 [a]	9810[b]	9917[c]
3. Percentage of delivered import becoming recharge (per Judgment, p. 19, 1979)	37.5%	35.7%	--	35.7%	35.7%	35.7%
4. Gross recharge of average import [d]	2300	2190	--	3200	3500	3540
5. Total average gross groundwater recharge of native and import supply[e]	6150	6040	--	7050	7350	7390
6. Subsurface outflow	540	540	160	540	540	250[g]
7. Net groundwater recharge (Safe Yield)[f]	5610	5500	6210	6510	6810	7140

Notes:

a. 16-yr average from 1979-80 through 1994-95
b. 10-yr average from 1995-96 through 2004-05
c. 5-yr average from water year 2005-06 through 2009-10, as reported in the Annual Watermaster Report for those years.
d. Item 2 x Item 3
e. Item 1 + Item 4
f. Item 5 - Item 6
g. Opinion of current Watermaster, based on available water level data in Sylmar Notch, as shown on Figure 7.

***** Judgment and the "Stipulation and Order Sylmar Basin Pursuant to Section 10.2 of Judgment"; original filed with County Clerk on March 22, 1984.

Table 5
Proposed 5-Year Method for Accounting for Water Credits,
Sylmar Groundwater Basin

Party	Water Year	Annual Extraction Right [50% of Total Existing Safe Yield Value of 6810 AF] (AF)	Total Volume of Groundwater Extracted (AF)	Annual Volume of Accrued Credits (AF)	Remarks
City of Los Angeles	2006-07	3405	3919	Ø	514 AF credits used; total extraction exceeded City of L.A. annual extraction right.
	2007-08	3405	2996	409	Total extraction was less than annual extraction right.
	2008-09	3405	868	2537	Total extraction was less than annual extraction right.
	2009-10	3405	2544	861	Total extraction was less than annual extraction right.
	2010-11	3405	964	2441	Total extraction was less than annual extraction right.
				= 6248 AF	

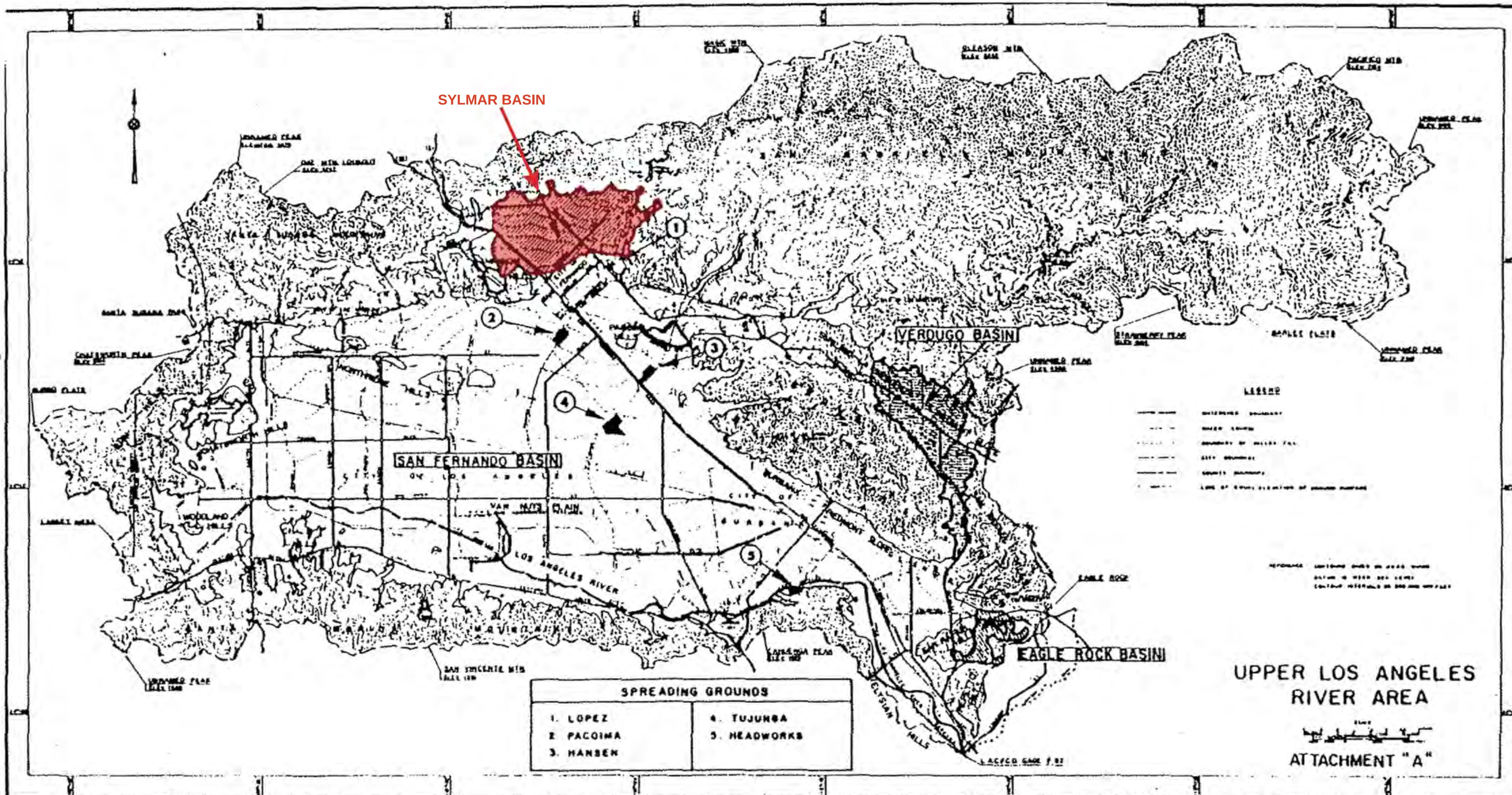
SUMMARY

A - **City of L.A.** Total volume of accrued credits as of October 1, 2011, as listed in new Annual Watermaster Report for WY 2010-11 = **15,262 AF**
B - Total Volume of accrued credits from WY 2006-07 through WY 2010-11 using "5-Year Method" = **6248 AF**
C - Maximum ("frozen") remaining Groundwater Credits: C = (A-B) = **9014 AF**

Party	Water Year	Annual Extraction Right [50% of Total Existing Safe Yield Value of 6810 AF] (AF)	Total Volume of Groundwater Extracted (AF)	Annual Volume of Accrued Credits (AF)	Remarks
City of San Fernando	2006-07	3405	2894	511	Total extraction was less than annuall extraction right.
	2007-08	3405	3670	Ø	265 AF credits used; total extraction exceeded City of S.F. annual extraction right.
	2008-09	3405	3473	Ø	68 AF credits used; total extraction exceeded City of S.F. annual extraction right.
	2009-10	3405	3143	262	Total extraction was less than annual extraction right.
	2010-11	3405	3082	323	Total extraction was less than annual extraction right.
				= 1096 AF	

SUMMARY

A - **City of S.F.** Total volume of accrued credits as of October 1, 2011, as listed in the Annual Watermaster Report for WY 2010-11 = **1500 AF**
B - Total Volume of accrued credits from WY 2006-07 through WY 2010-11 using "5-Year Method" = **1096 AF**
C - Maximum ("frozen") remaining Groundwater Credits: C = (A-B) **= 404 AF**



Note: Adapted from Attachment A to the City of Los Angeles vs. City of San Fernando et. al. Judgement, January 26, 1979.

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Figure 1A
Sylmar Basin Location Map

Job No. 500-LAS10 **July 2012**

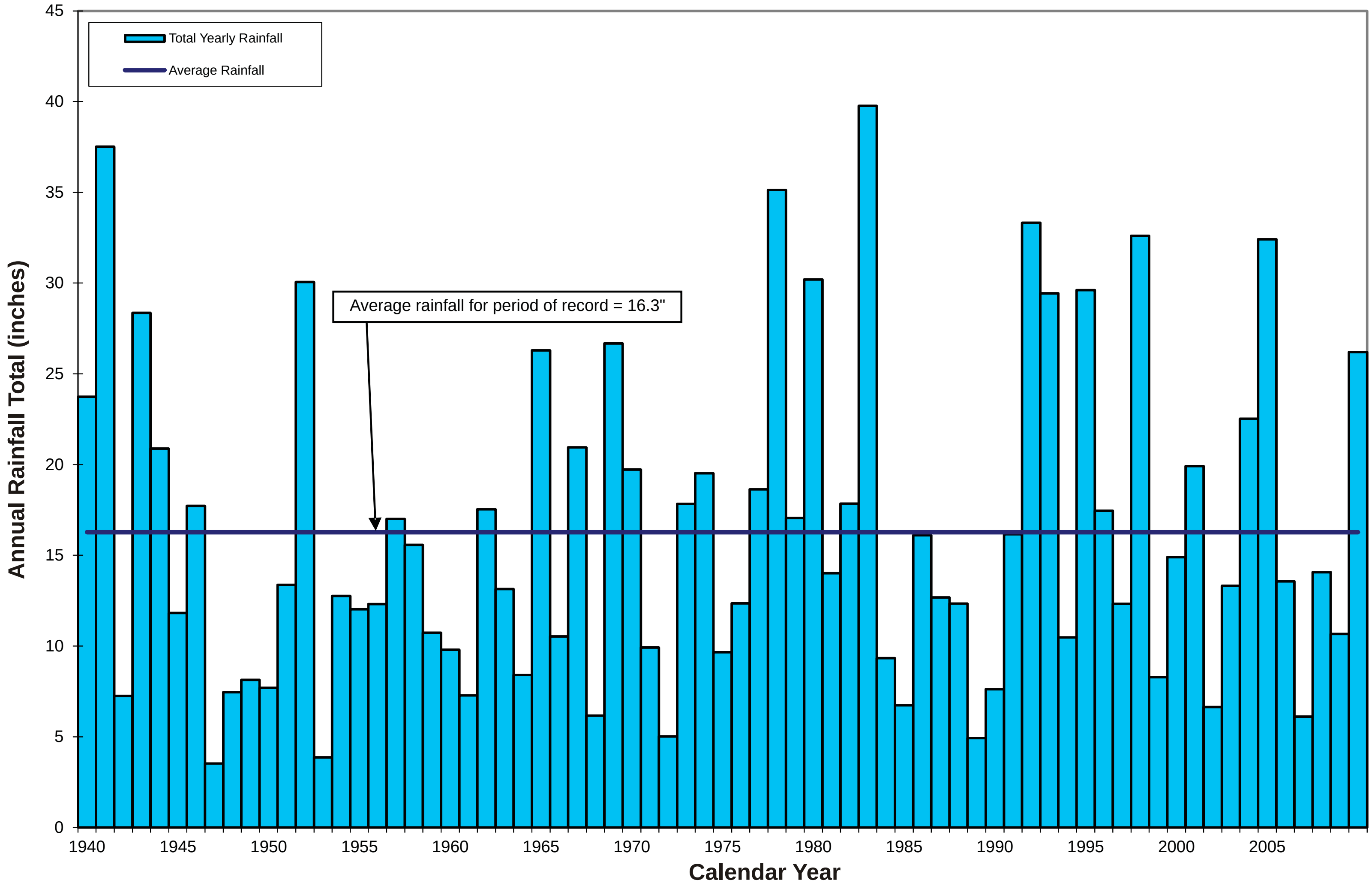

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Figure 2A
Annual Rainfall
Burbank Valley Pump Plant (Gage No. 041194)

Job No. 500-LAS10 **July 2012**

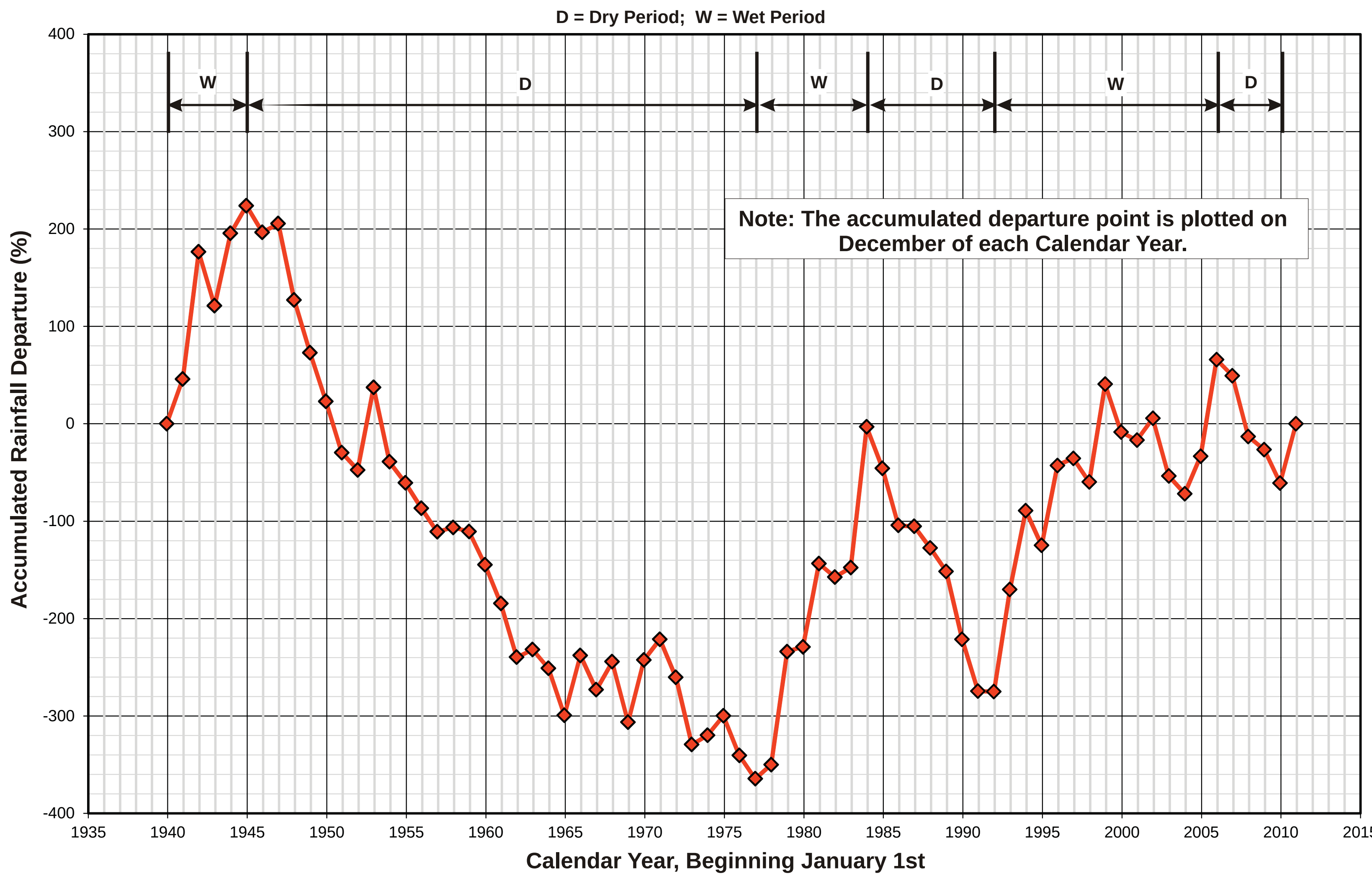

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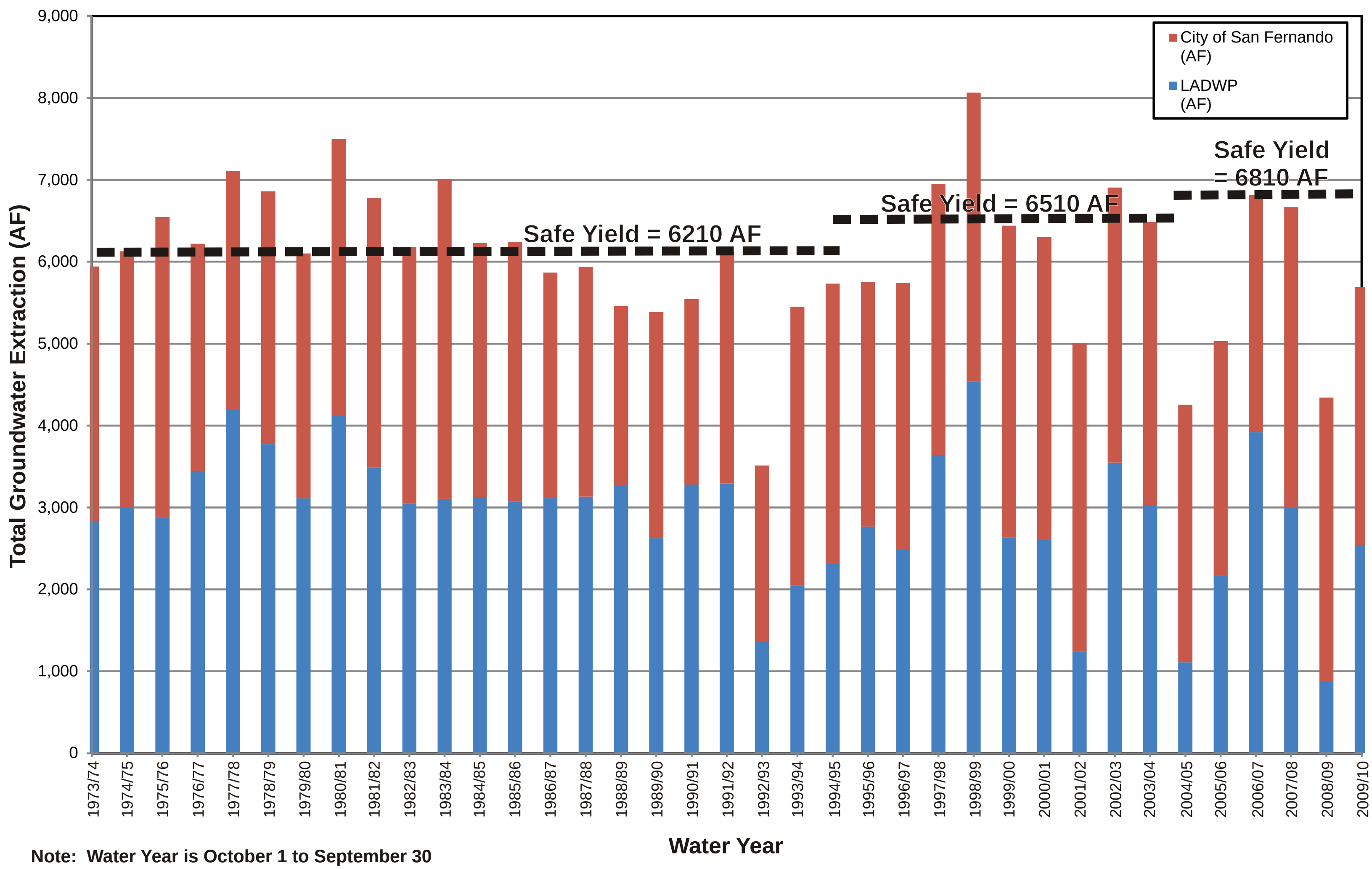
Figure 2B
Accumulated Rainfall Departure Curve
Burbank Valley Pump Plant (Gage No. 041194)

Job No. 500-LAS10 **July 2012**



Note: Water Year is October 1 to September 30

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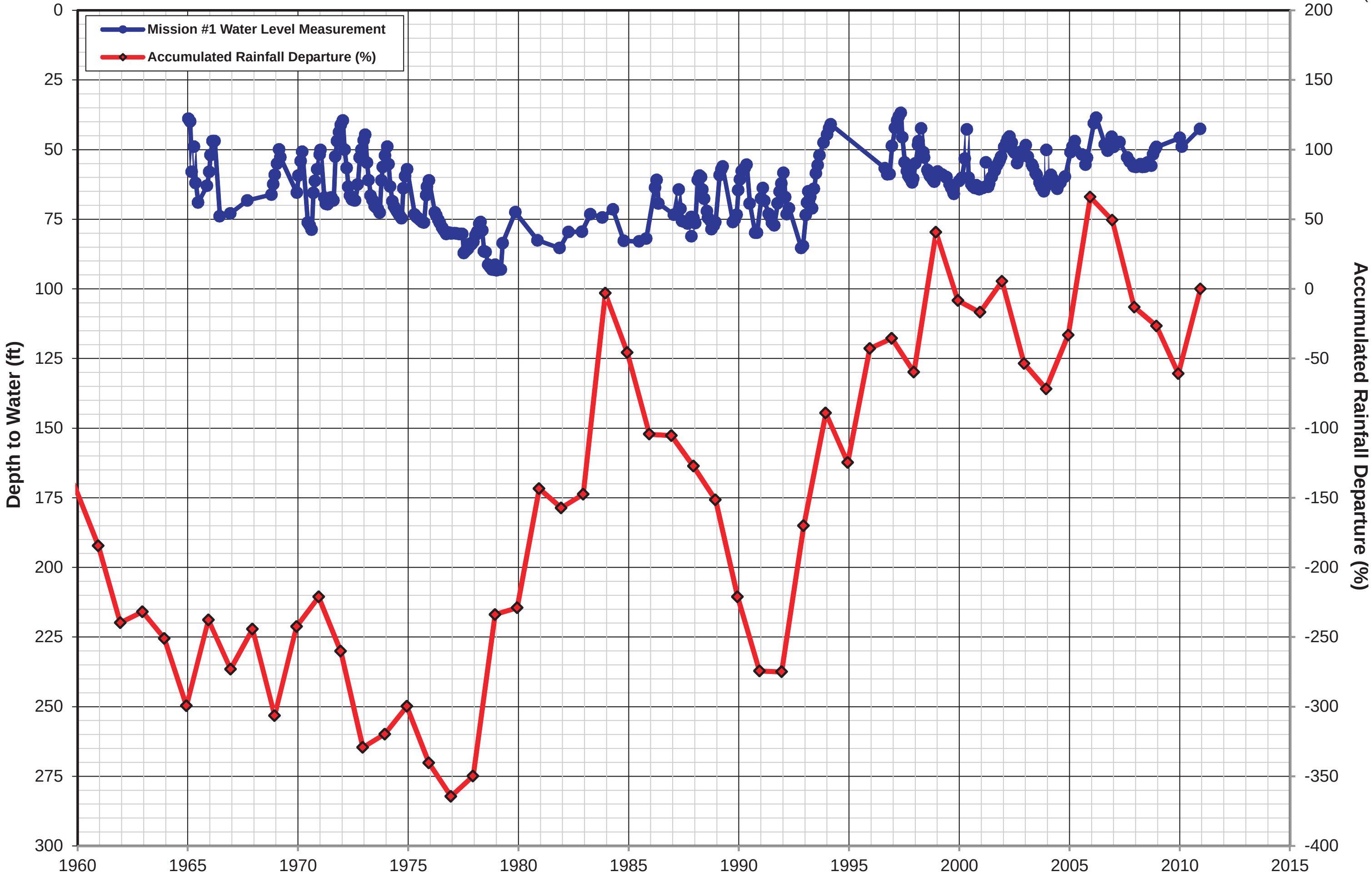
Figure 3
Total Annual Groundwater Extractions
Sylmar Basin

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.

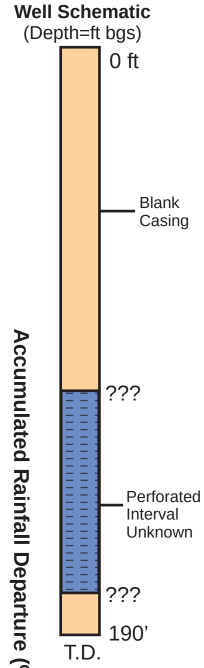


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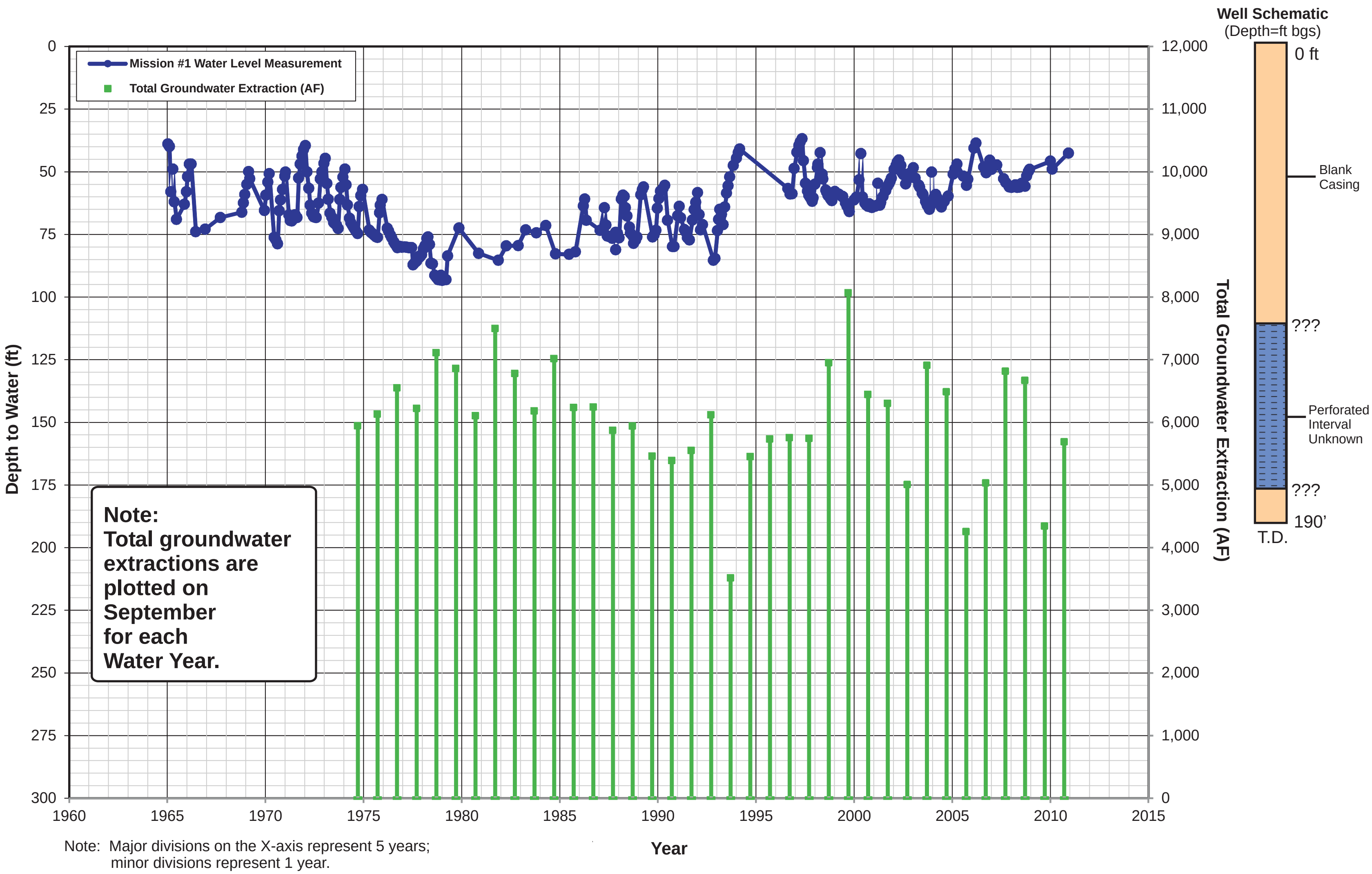
FIGURE 4A.1
Water Levels in LADWP Mission Well M-4 vs. Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.

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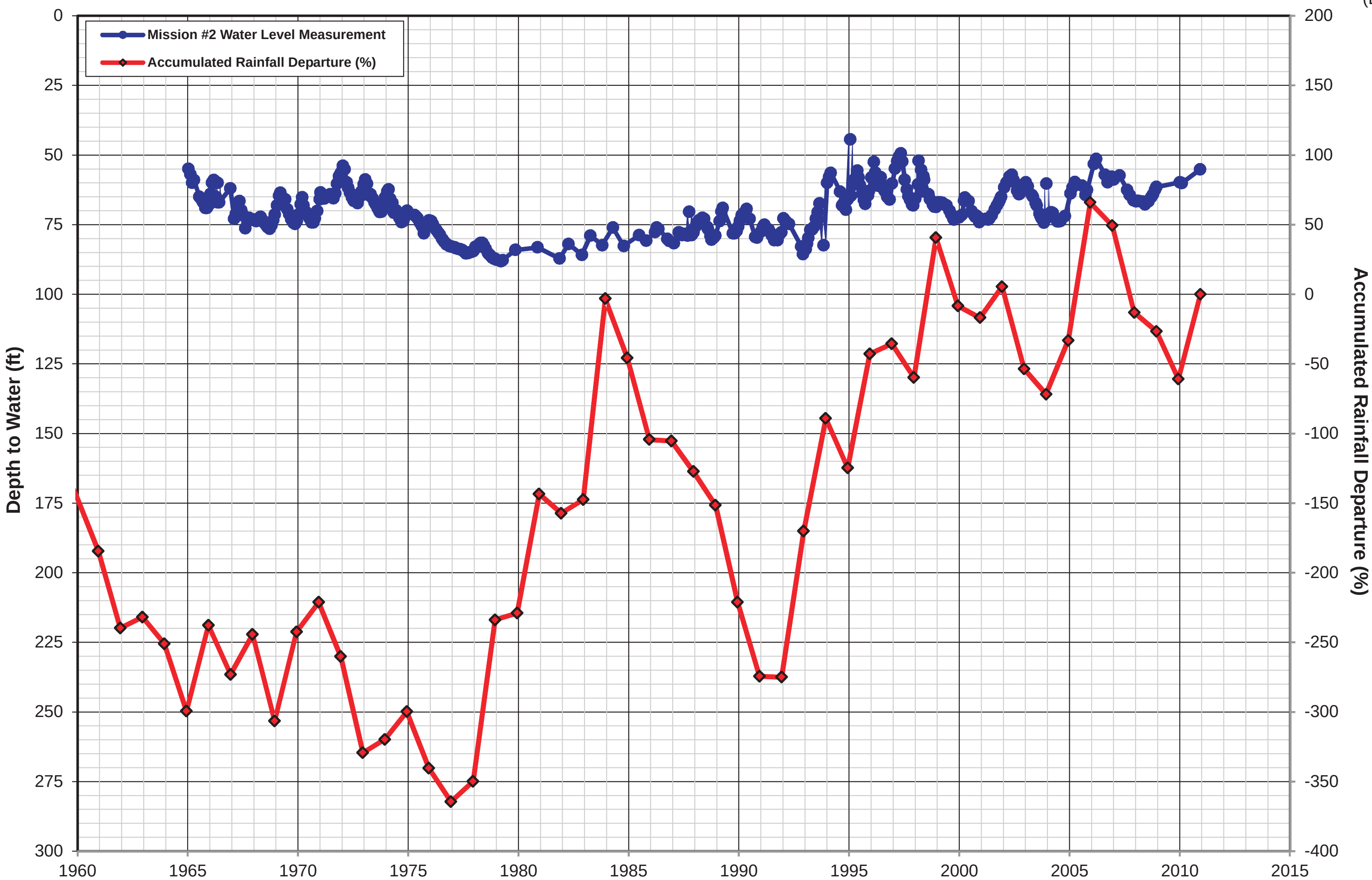
FIGURE 4A.2
Water Levels in LADWP Mission Well M-1
vs. Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.

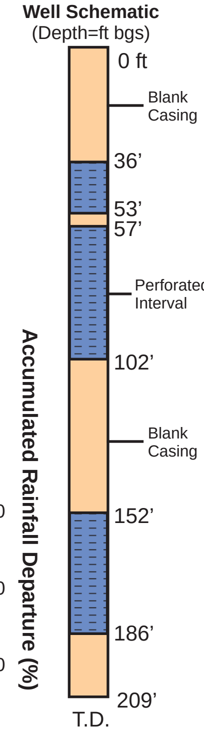


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FIGURE 4B.1
Water Levels in LADWP Mission Well M-2
vs Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**

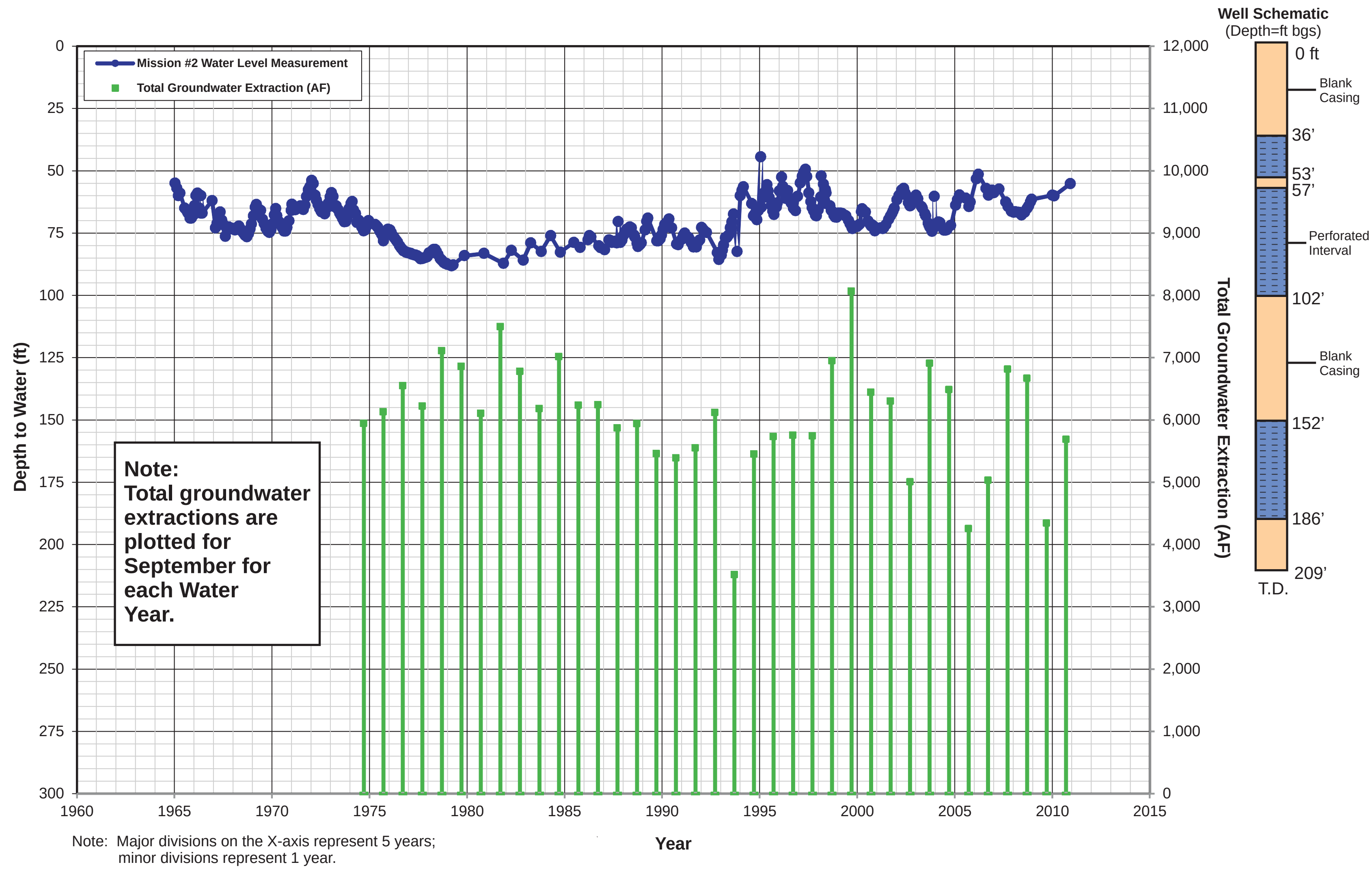

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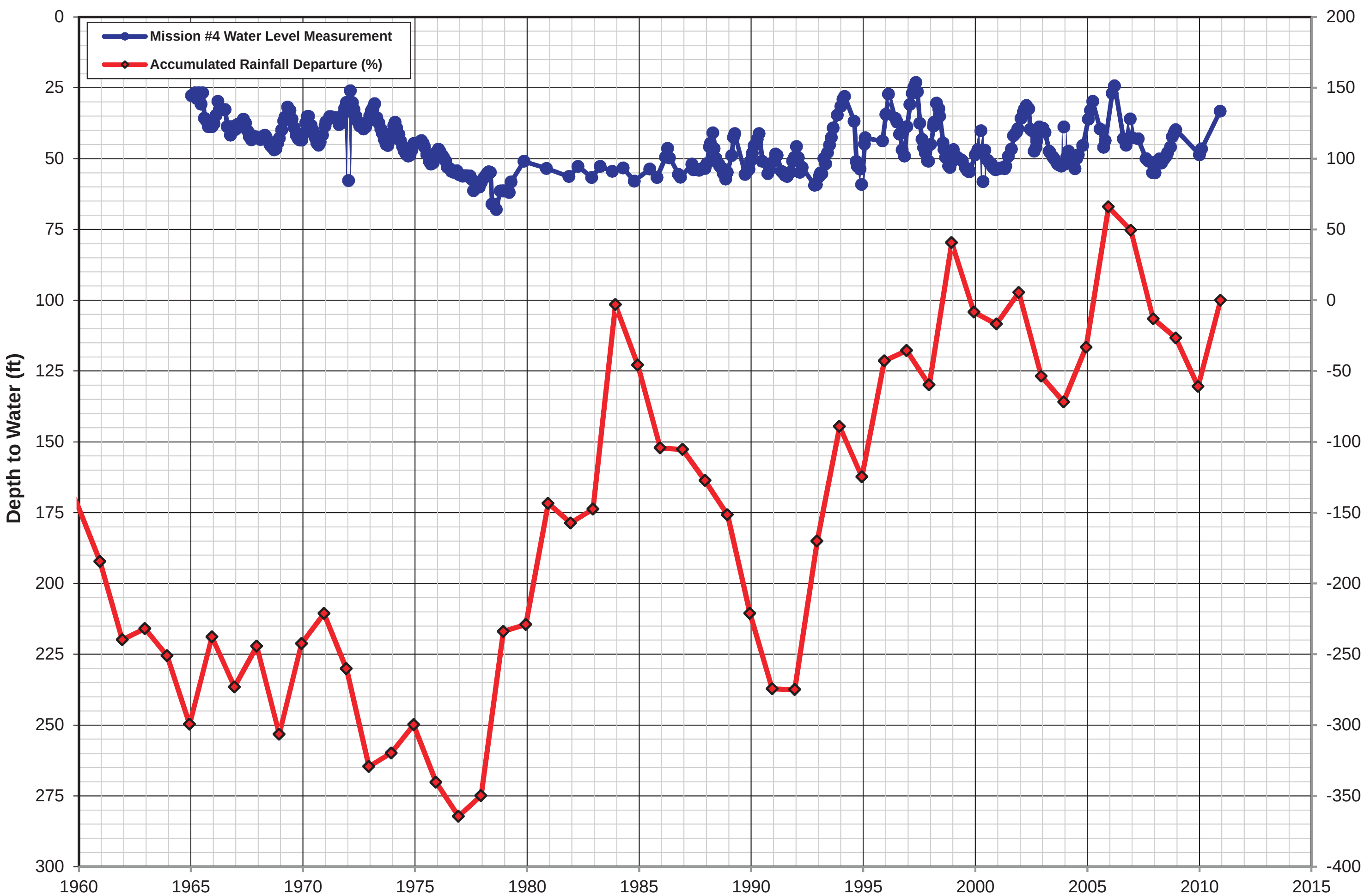
FIGURE 4B.2
Water Levels of LADWP Mission Well M-2 vs Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.

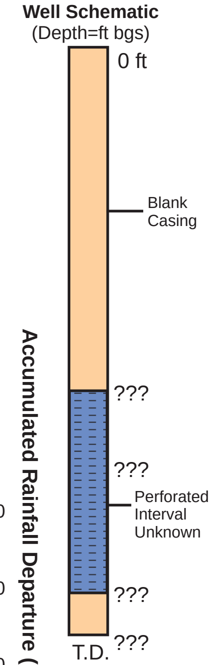


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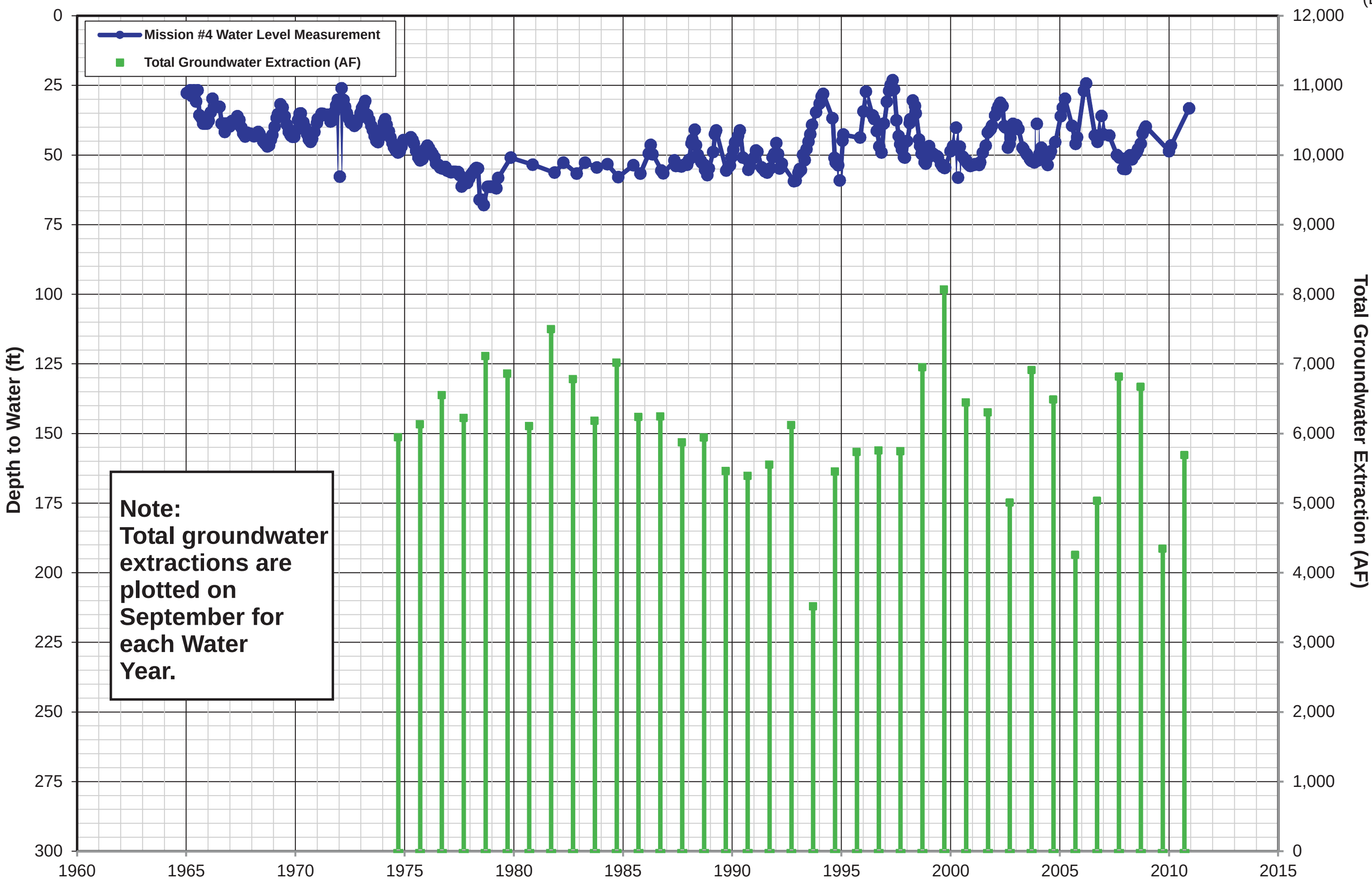
FIGURE 4C.1
Water Levels in LADWP Mission Well M-4 vs Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.

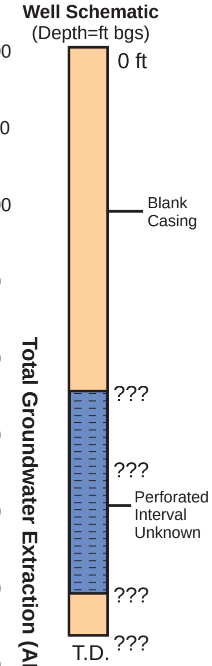


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FIGURE 4C.2
Water Levels in LADWP Mission Well M-4 vs Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**

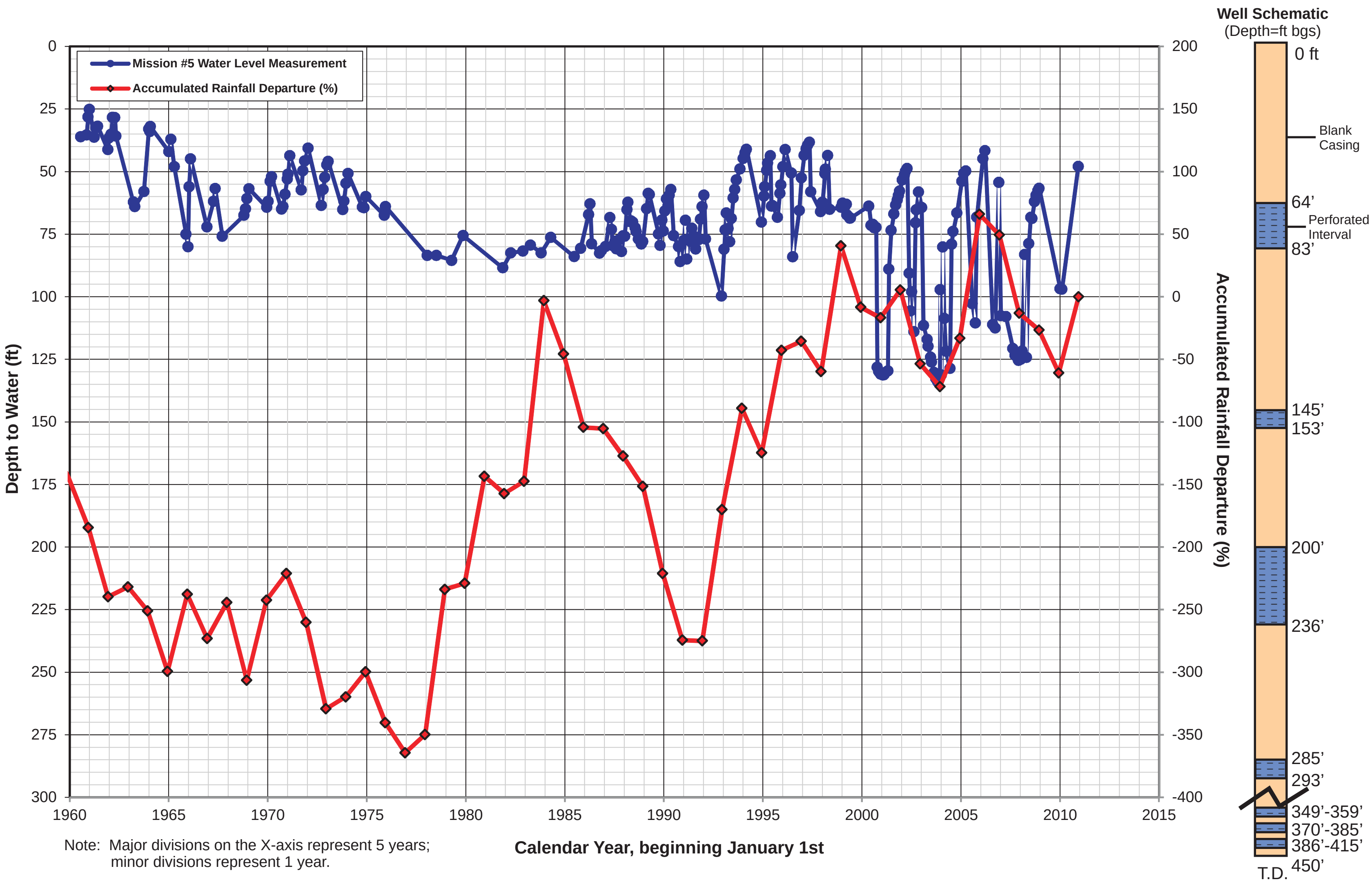

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FIGURE 4D.1
Water Levels in LADWP Mission Well M-5
vs Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**

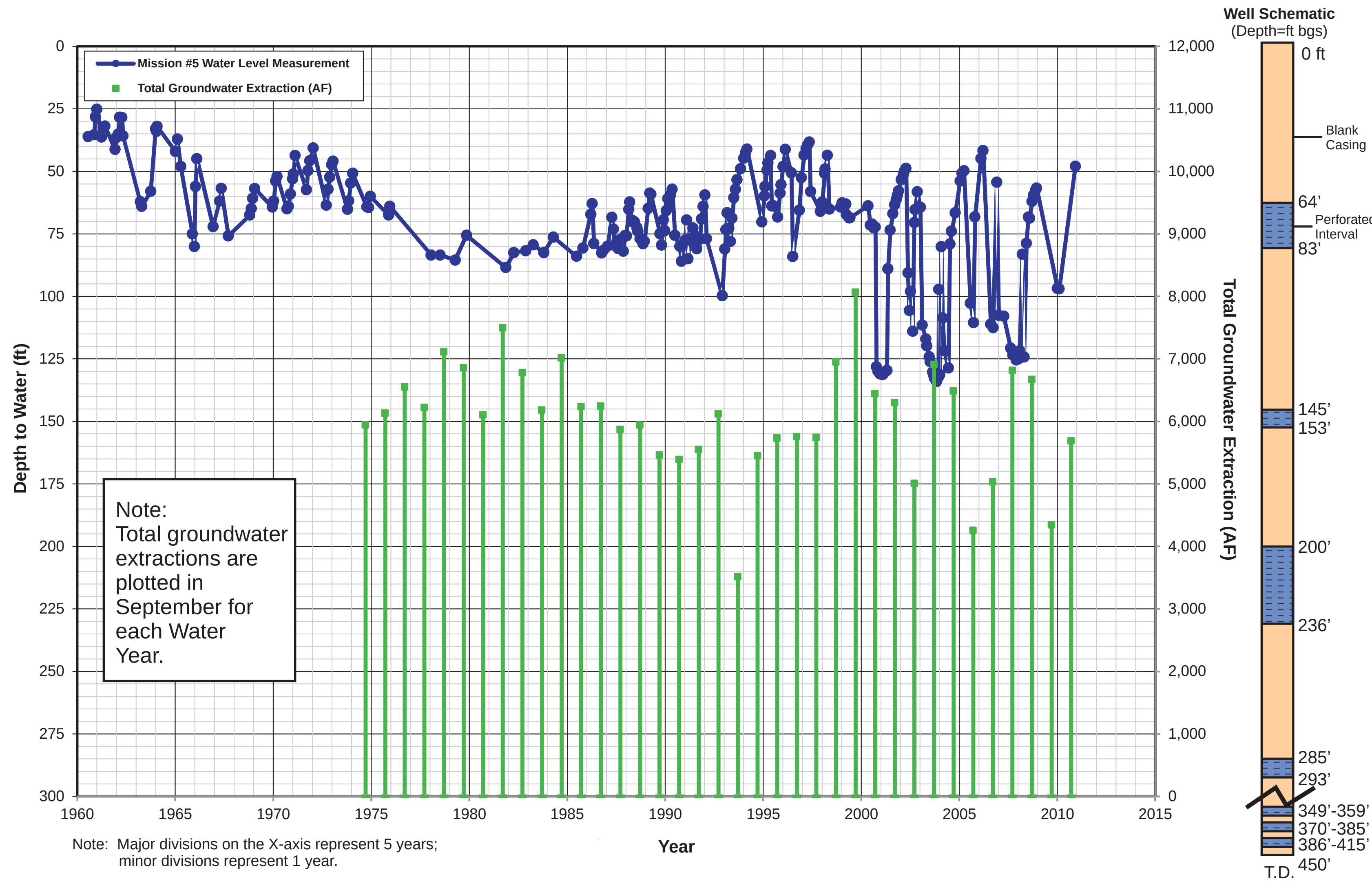

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FIGURE 4D.2
Water Levels for LADWP Mission Well M-5 vs Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**

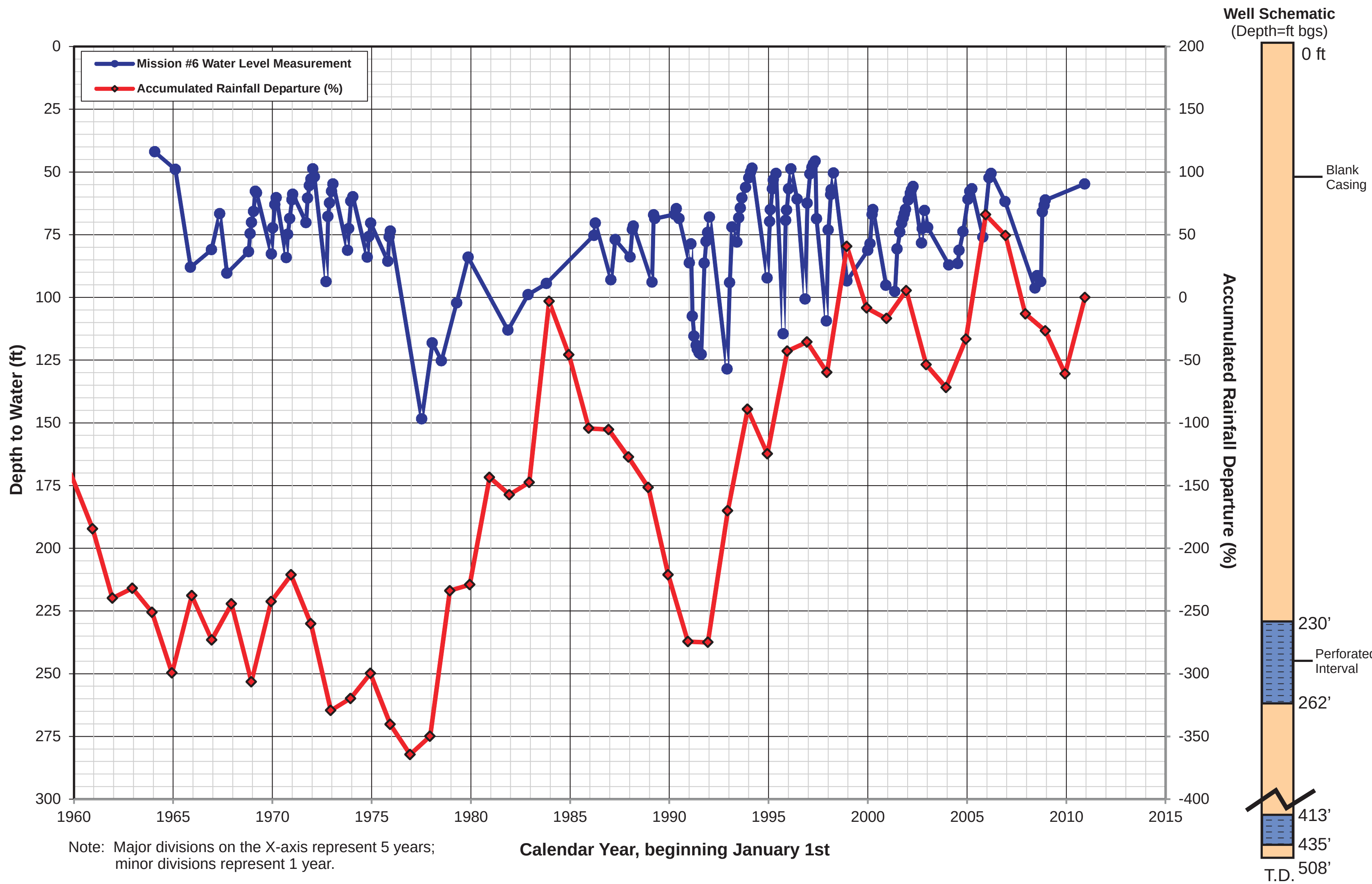

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FIGURE 4E.1
Water Levels in LADWP Mission Well M-6 vs Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**

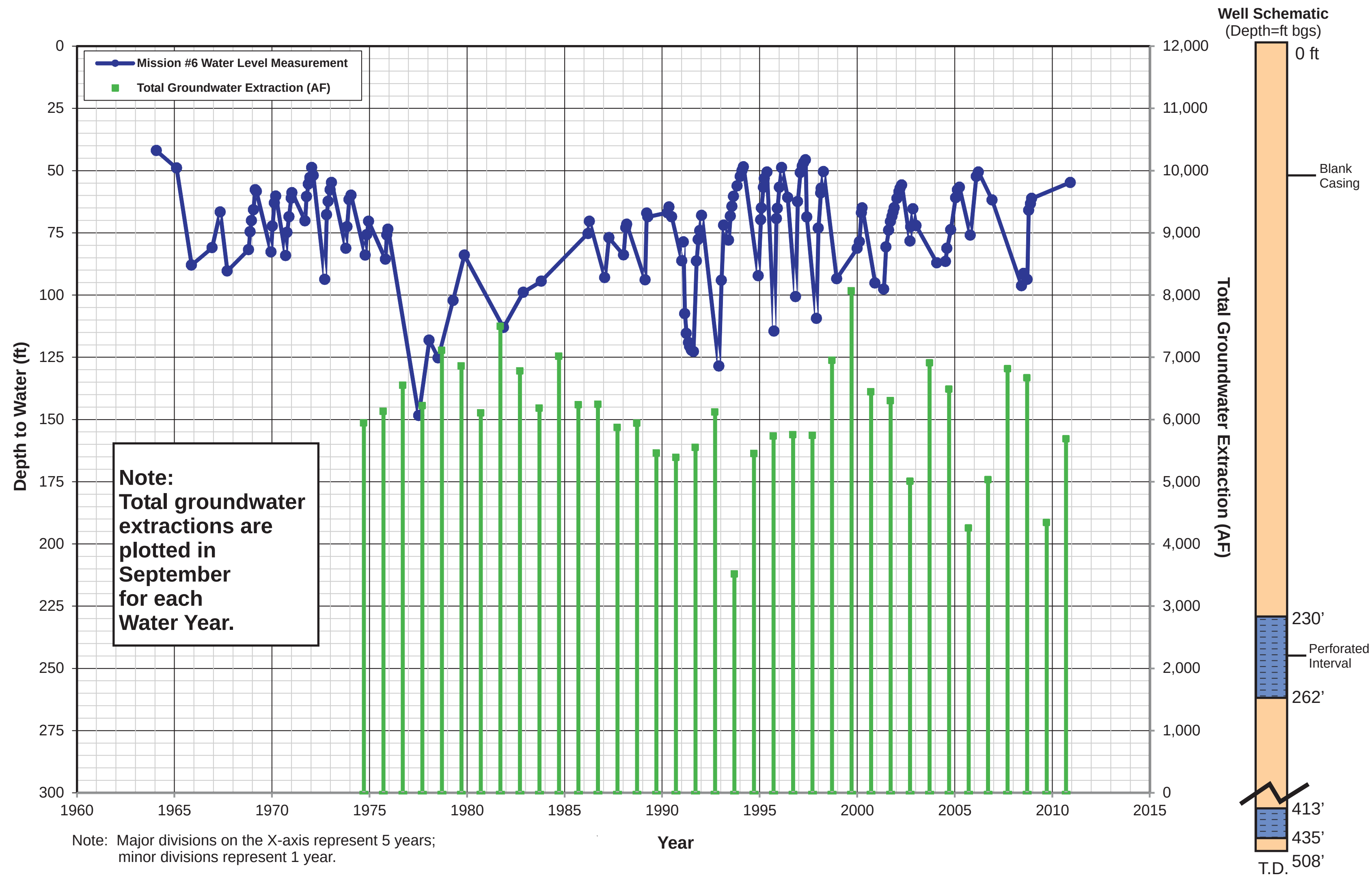

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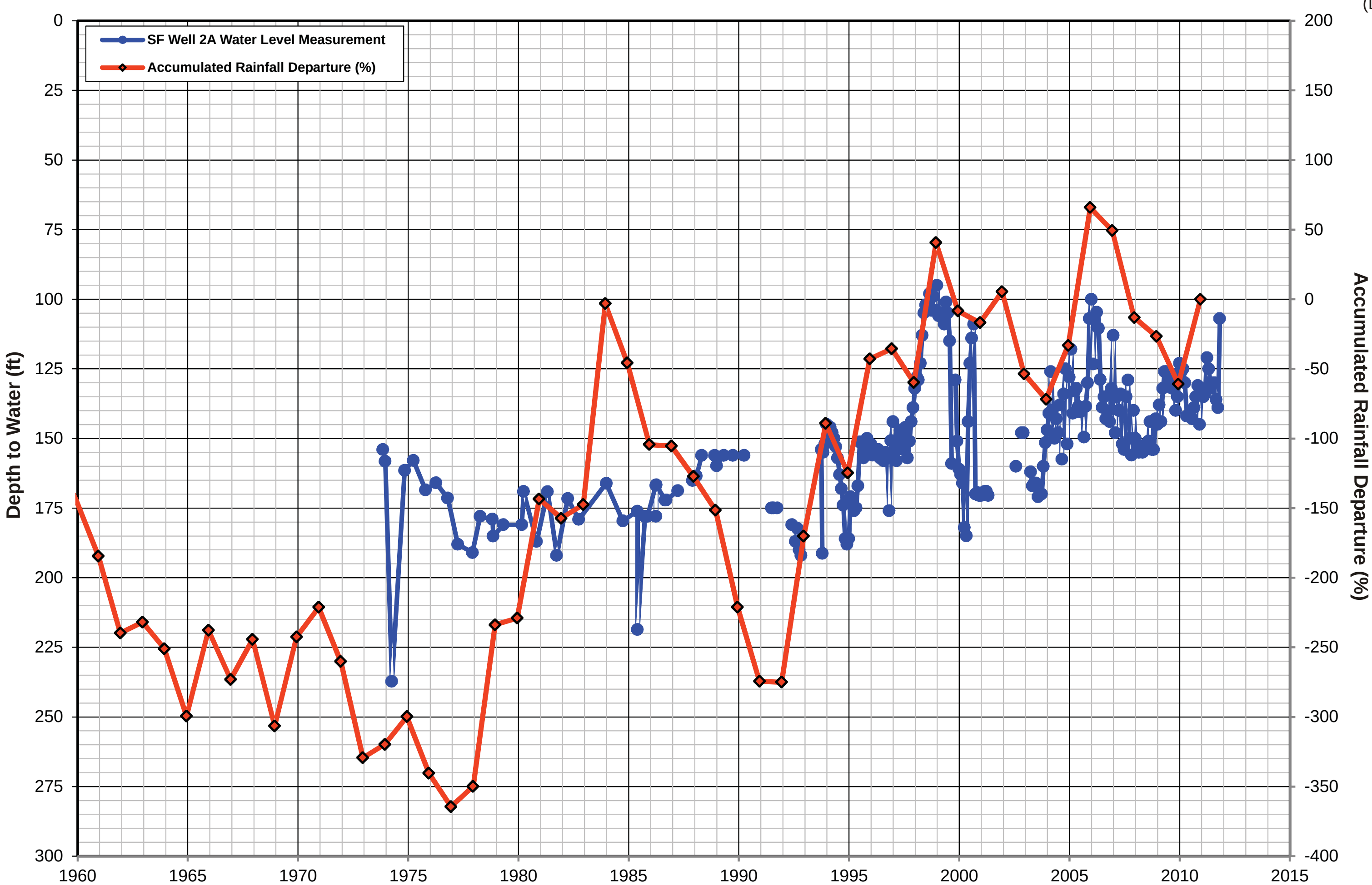
FIGURE 4E.2
Water Levels in LADWP Mission Well M-6
Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.

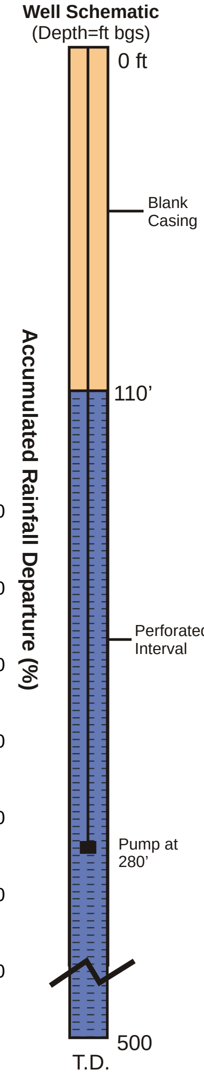


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FIGURE 5A.1
Water Levels in City of San Fernando Well 2A vs Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**

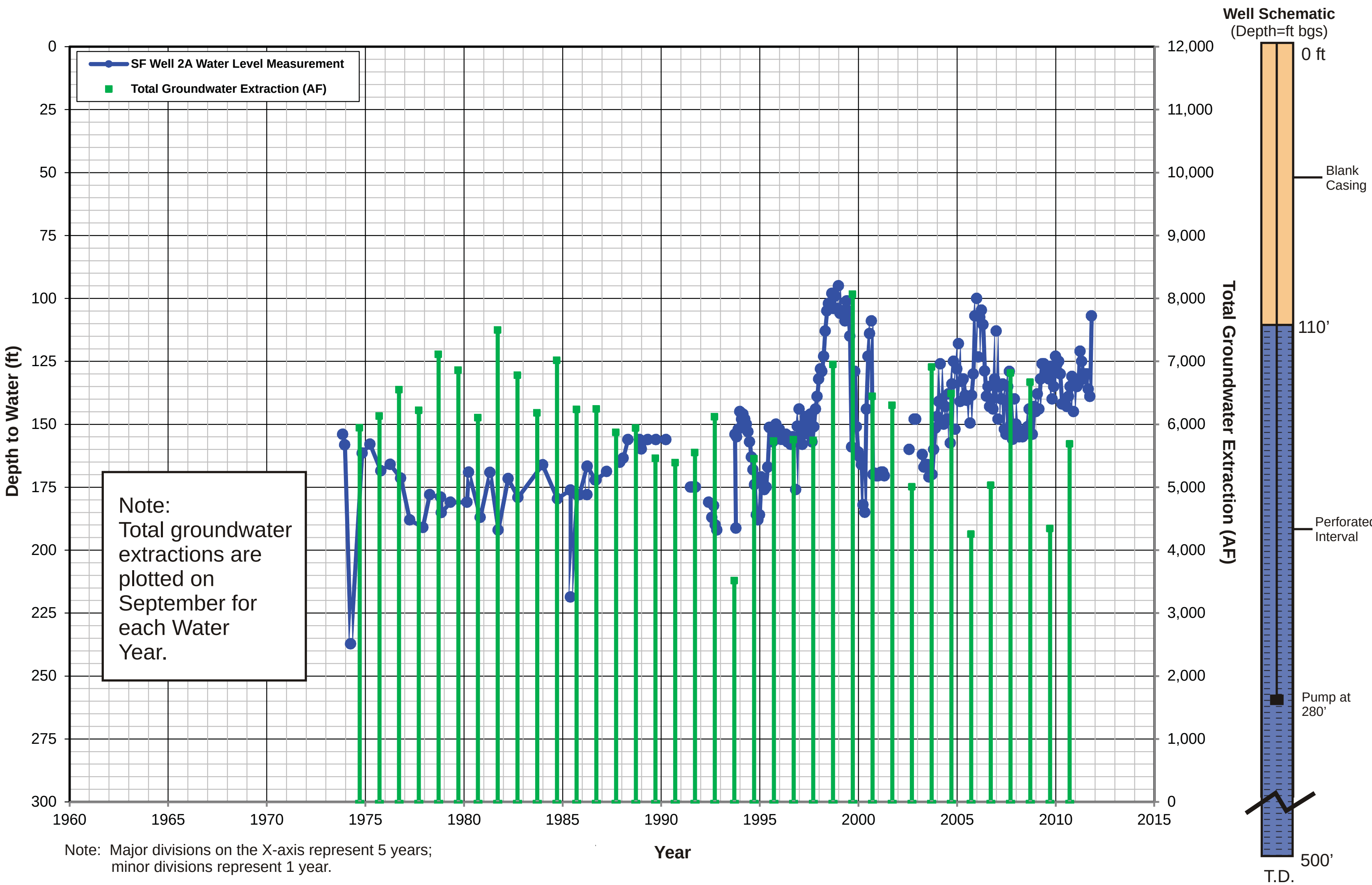

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FIGURE 5A.2
Water Levels in City of San Fernando Well 2A vs Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**

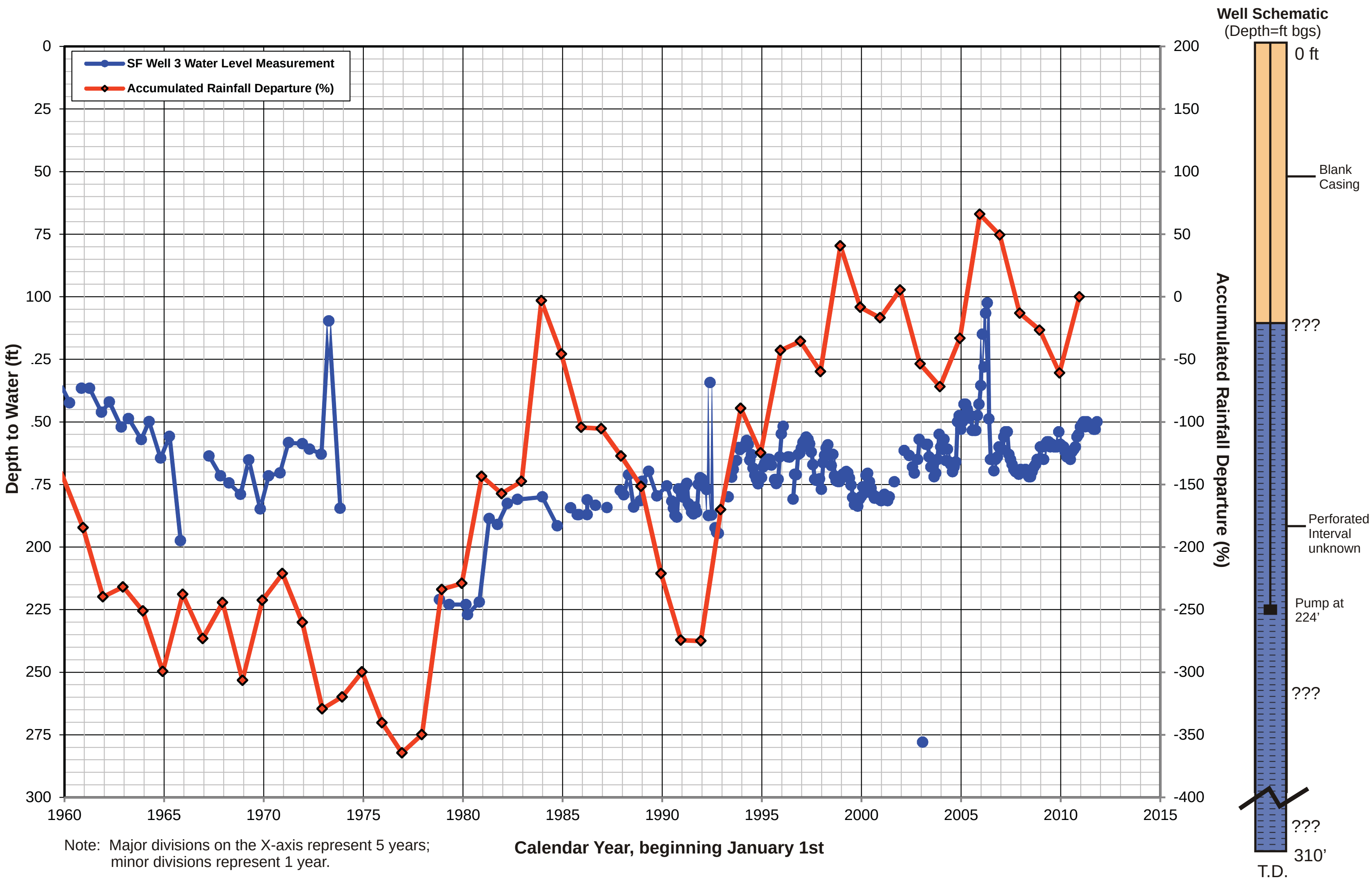

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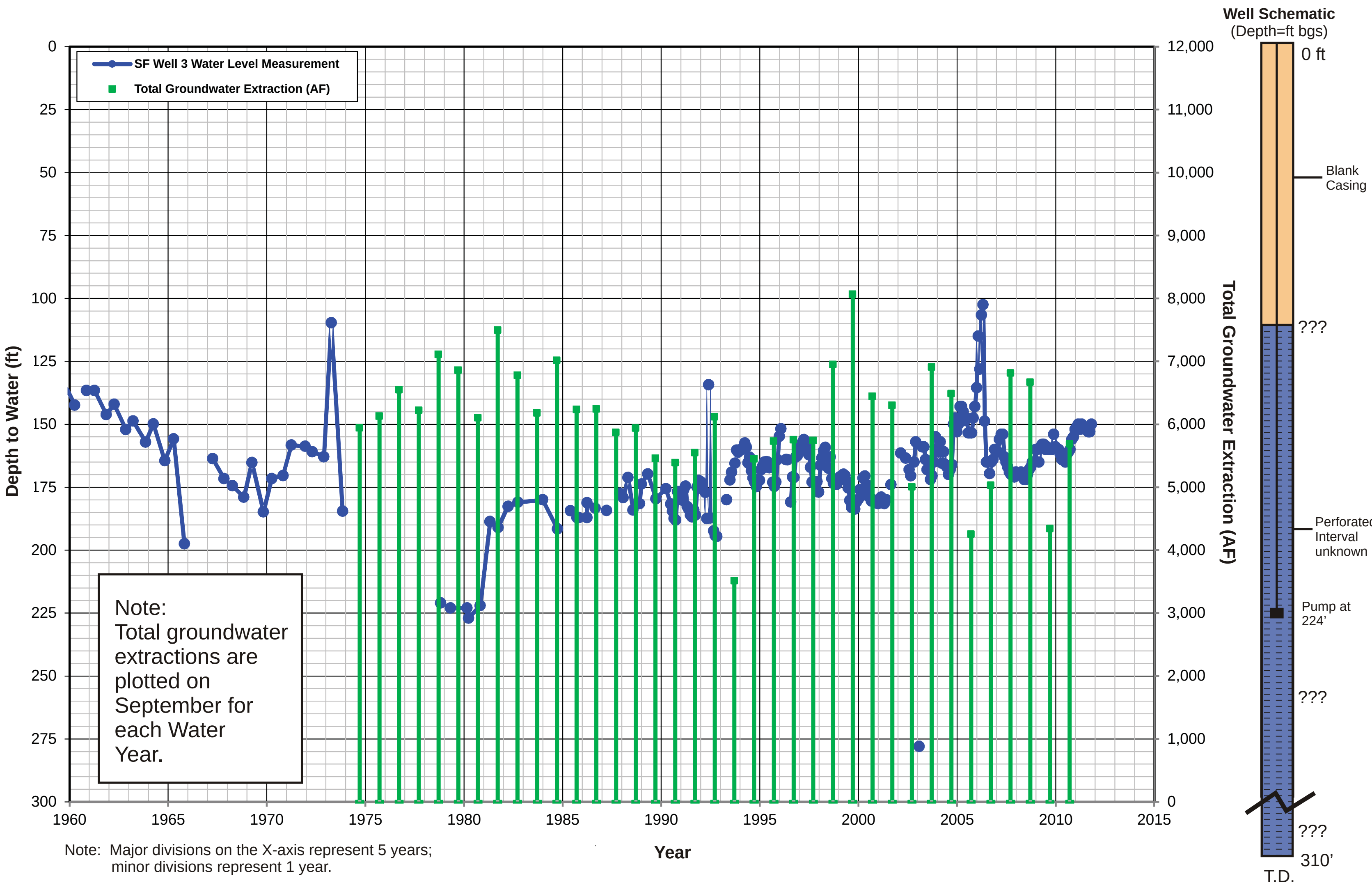
FIGURE 5B.1
Water Levels in City of San Fernando Well 3 vs Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.

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FIGURE 5B.2
Water Levels in City of San Fernando Well 3 vs Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**

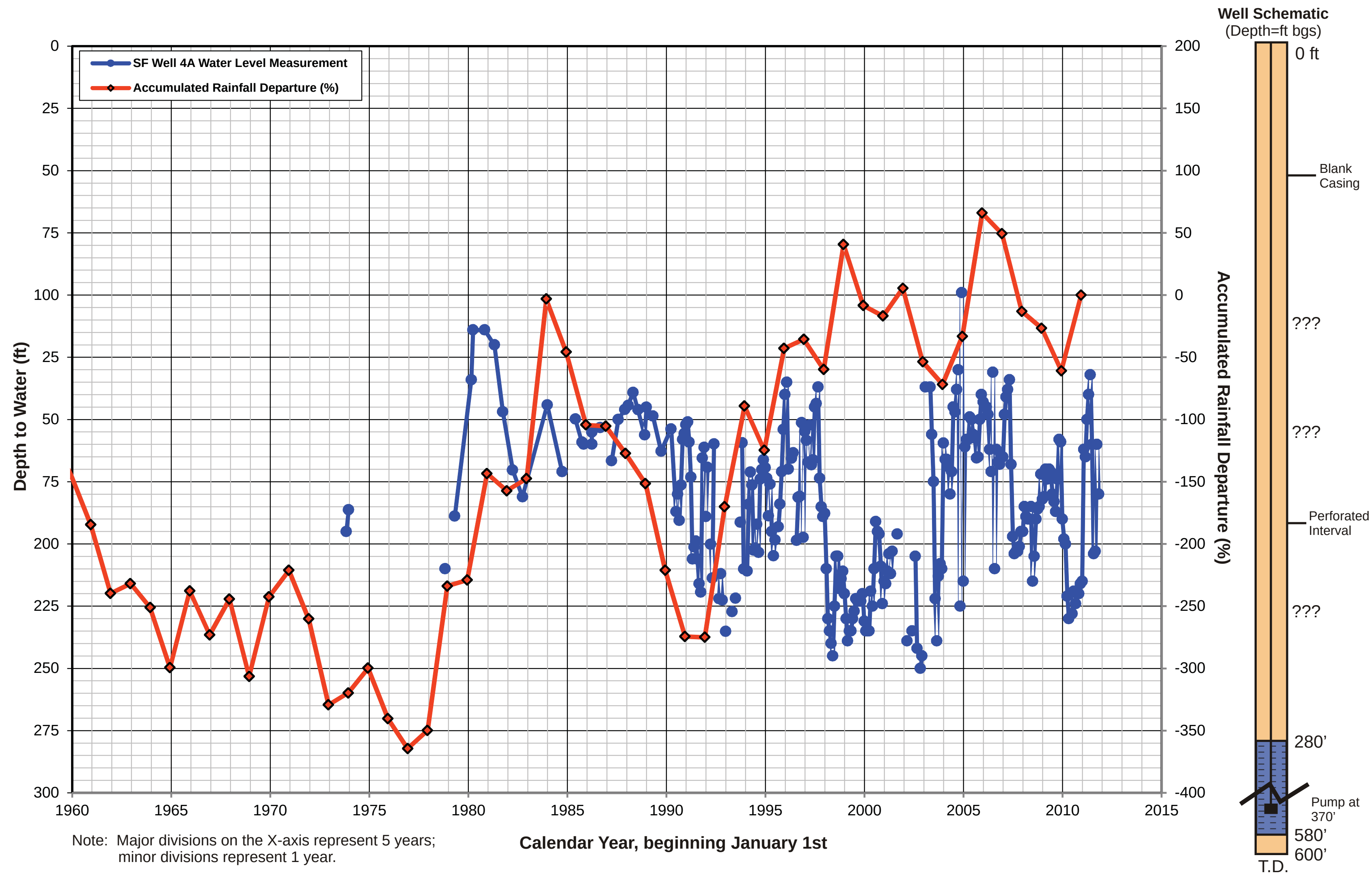

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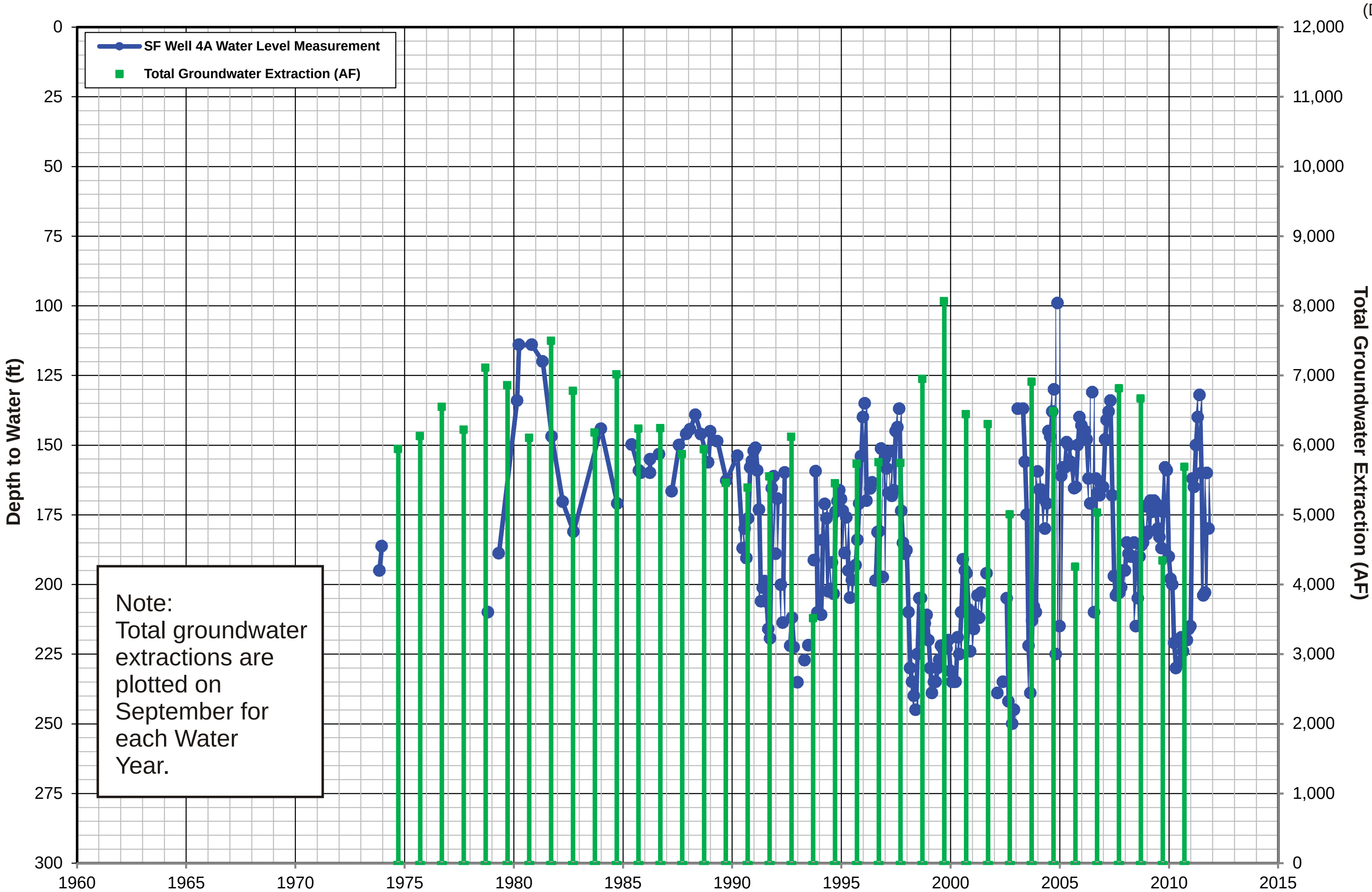
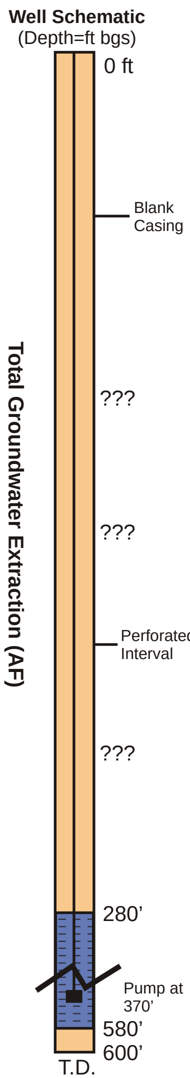
FIGURE 5C.1
Water Levels in City of San Fernando Well 4A vs Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.



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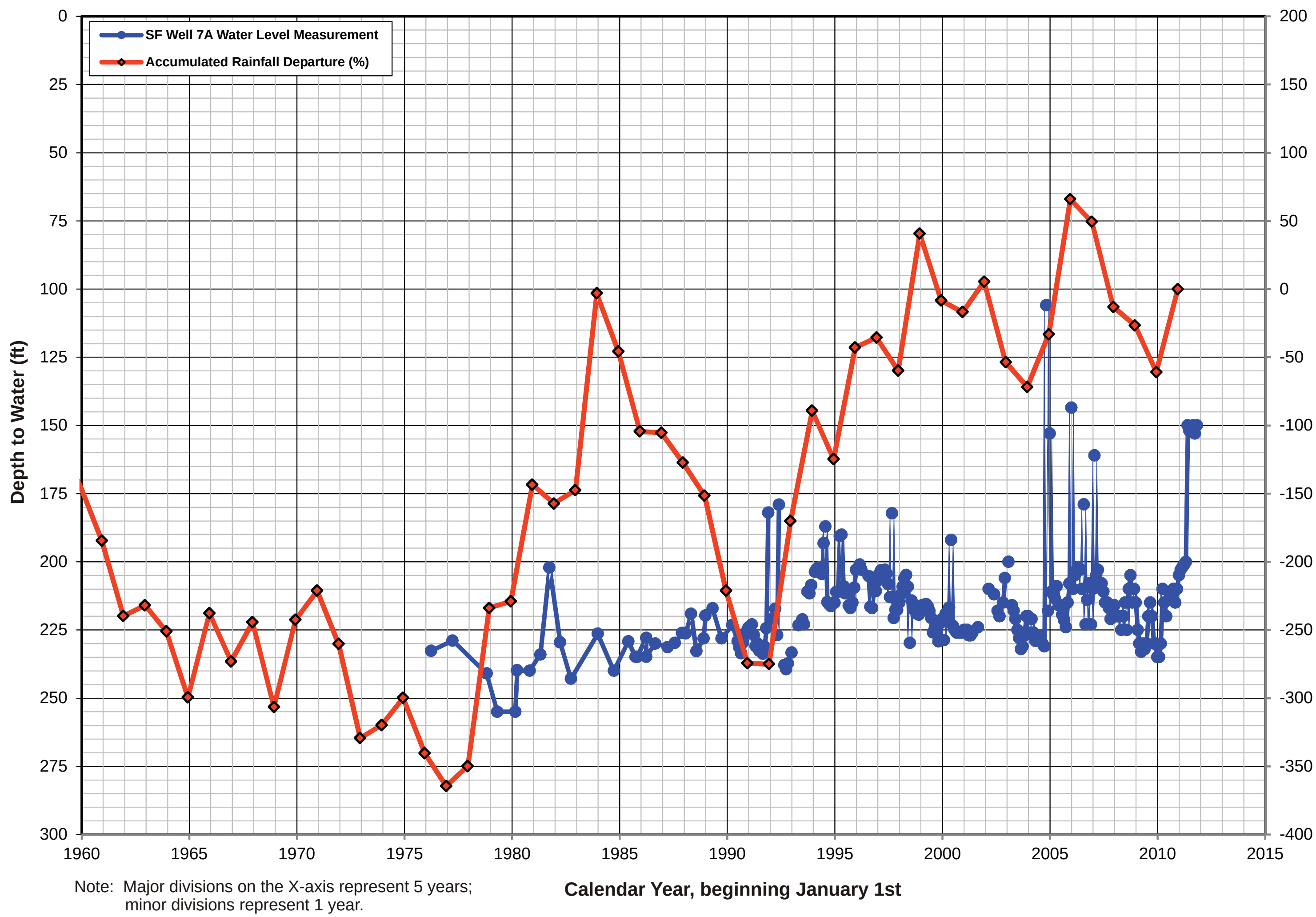
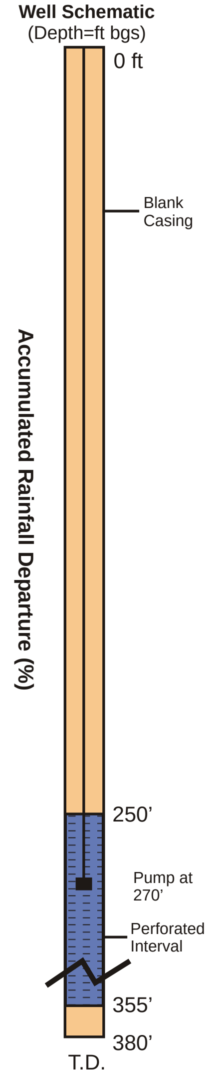
Napa Phone (707) 963-3914
Fax (818) 506-1343

FIGURE 5C.2
Water Levels in City of San Fernando Well 4A vs Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**

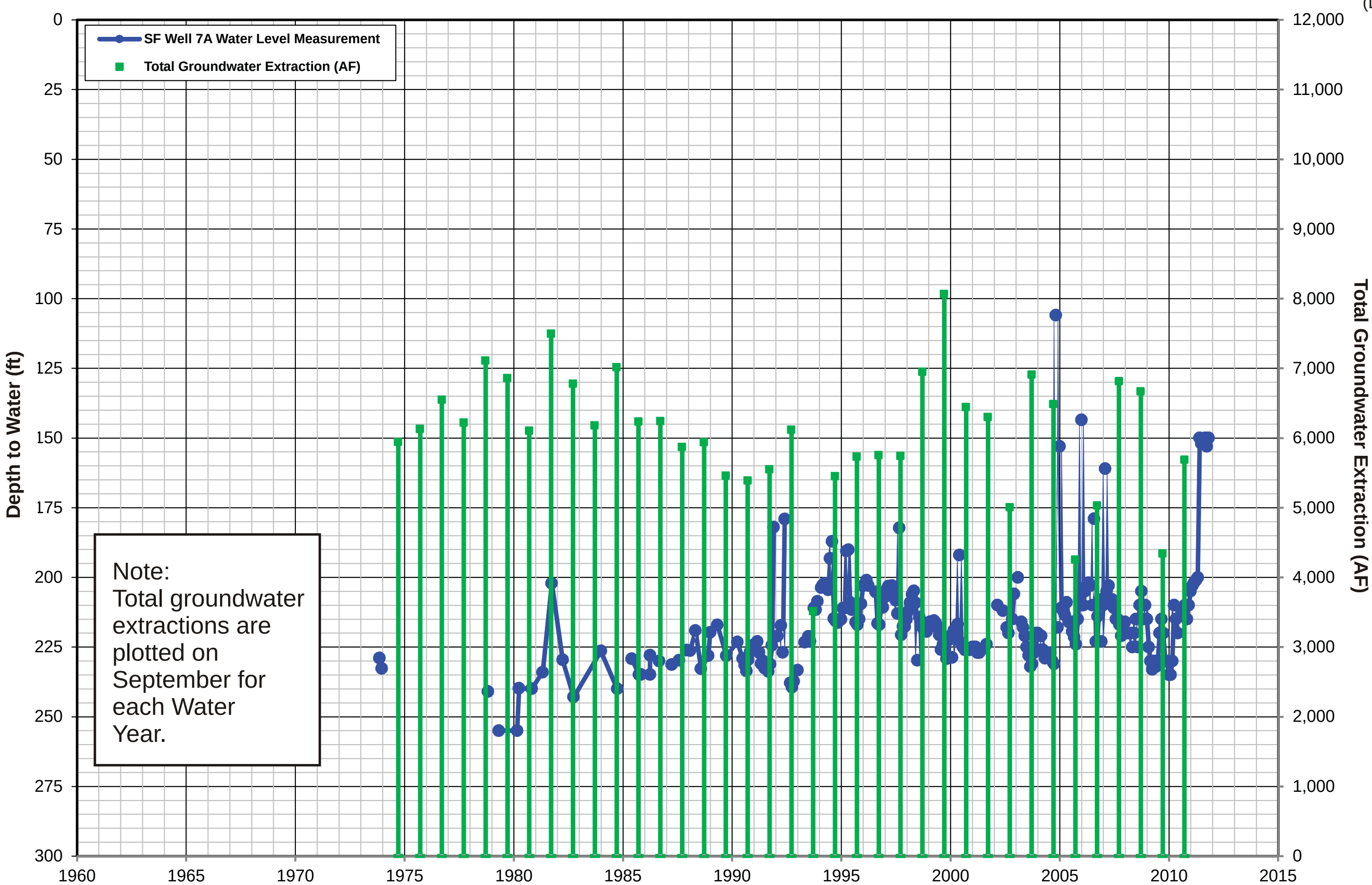




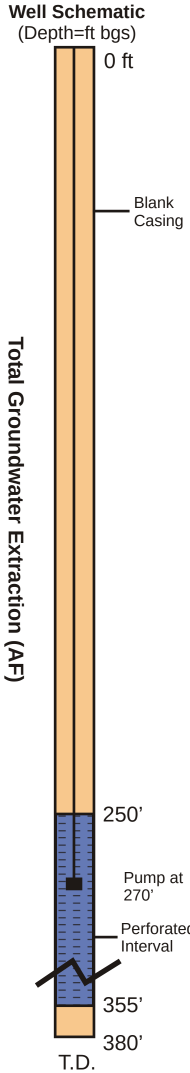
RICHARD C. SLADE & ASSOCIATES LLC
CONSULTING GROUNDWATER GEOLOGISTS
12750 Ventura Blvd., Suite 202
Studio City, CA 91604
Studio City Phone (818) 506-0418
Napa Phone (707) 963-3914
Fax (818) 506-1343

FIGURE 5D.1
Water Levels in City of San Fernando Well 7A
vs Accumulated Rainfall Departure

Job No. 500-LAS10 **July 2012**



Note: Major divisions on the X-axis represent 5 years; minor divisions represent 1 year.



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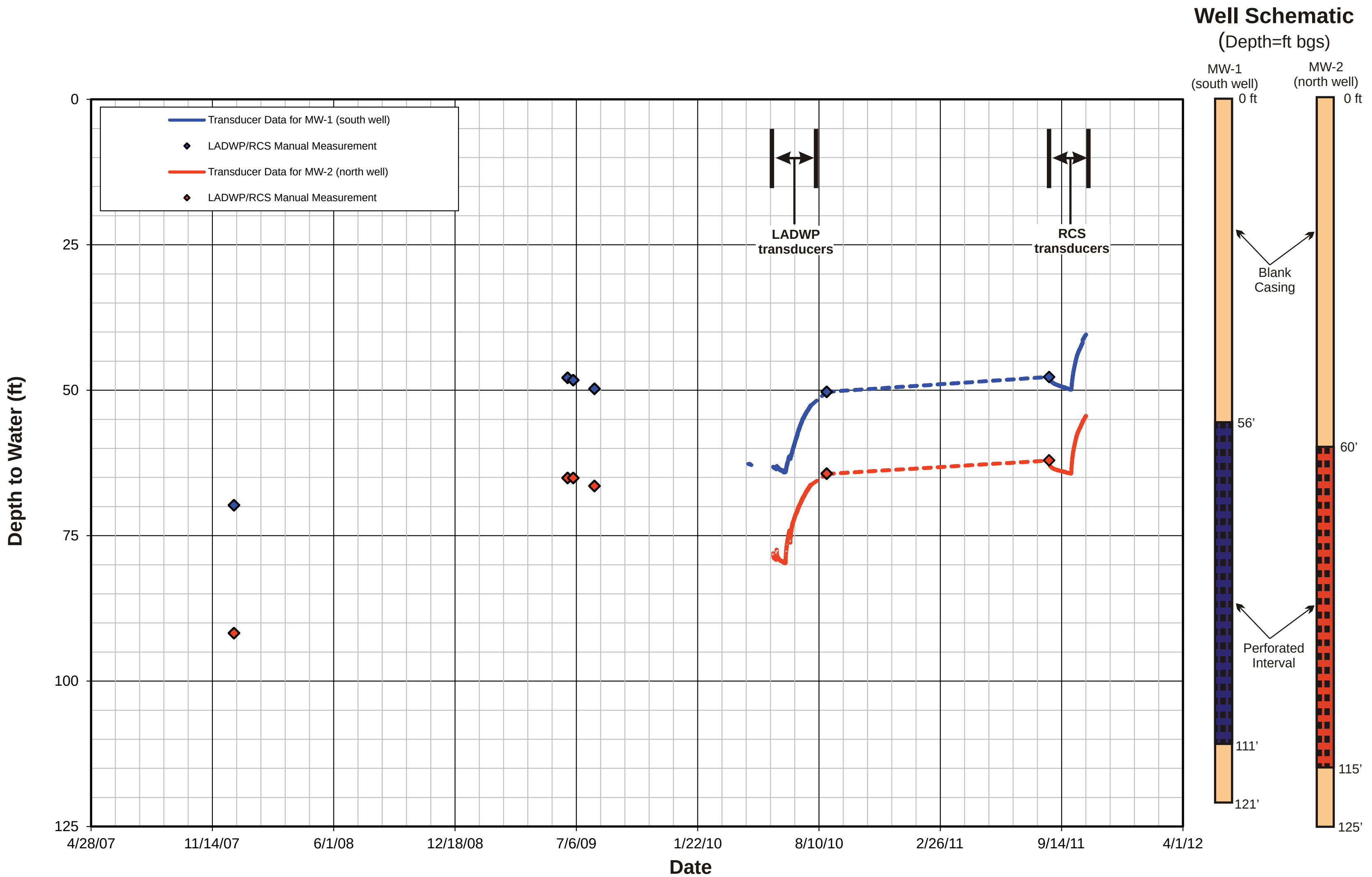
Studio City Phone (818) 506-0418
Napa Phone (707) 963-3914
Fax (818) 506-1343

FIGURE 5D.2
Water Levels in City of San Fernando Well 7A vs Total Annual Groundwater Extractions

Job No. 500-LAS10 **July 2012**



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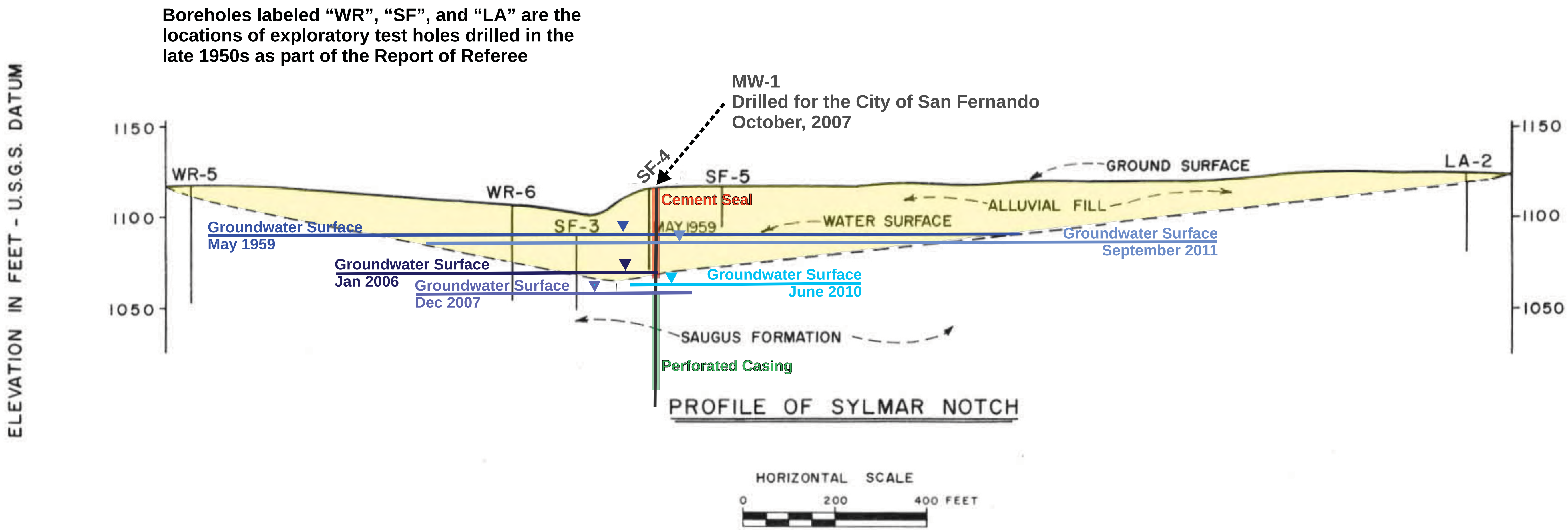
Studio City, CA 91604
Studio City Phone (818) 506-0418
Napa Phone (707) 963-3914
Fax (818) 506-1343

FIGURE 6
WATER LEVEL MEASUREMENTS
GROUNDWATER MONITORING WELLS
SYLMAR BASIN

Job No. 500-LAS10 **July 2012**



NOTE: 1) Profile adapted from The City of Los Angeles vs. City of San Fernando et al., Report of Referee, Volume I, Text and Plates, by State Water Rights Board, Referee, July, 1962
The alignment of the profile is shown on Plate 5 of the Report of Referee (not included herein).
The entire Report of Referee can be downloaded in PDF format from http://www.ULARAwatermaster.com
2) See text for discussions of water levels and new groundwater monitoring wells.

RCS
RICHARD C. SLADE & ASSOCIATES LLC
CONSULTING GROUNDWATER GEOLOGISTS
12750 Ventura Blvd. Suite 202
Studio City, CA 91604
Phone (818) 506-0418
Fax (818) 506-1343

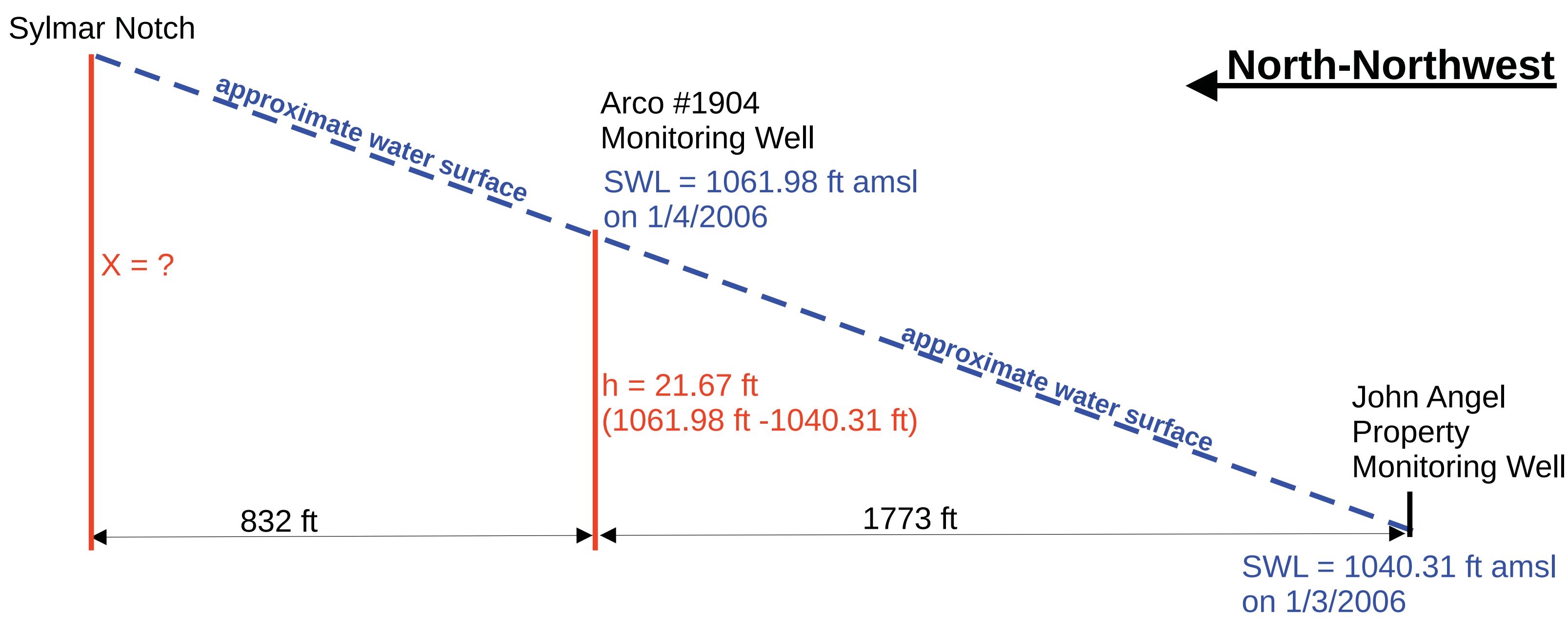
Figure 7
Profile of Sylmar Notch

Job No. 500-LAS10

July 2012

APPENDIX

1. Figure A1, “Calculation of Approximate January 2006 Water Level Elevation in Sylmar Notch”
2. MW-1 & 2 Well Completion Report
3. MW-1
4. MW-2
5. Drill Tickets
6. Sylmar Notch



$$\frac{X}{(832' + 1773')} = \frac{21.67'}{1773'} \longrightarrow$$

$$X = 31.84'$$

Estimated SWL in Sylmar Notch in Jan 2006 =
1040.31 ft amsl + 31.84 ft =
1072.15 ft amsl

NOTE: Drawing not to scale
SWL = Static Water Level
ft amsl = feet above mean sea level

RCS
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Studio City, CA 91604
Studio City Phone (818) 506-0418
Napa Phone (707) 963-3914
Fax (818) 506-1343

Figure A1
Calculation of Approximate January 2006 Water Level Elevation in Sylmar Notch

Job No. 500-LAS10 **July 2012**

ORIGINAL
File with DWR
Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. e0083892

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Owner's Well No. MW-2
Date Work Began 10/22/2007, Ended 10/23/2007
Local Permit Agency County of Los Angeles
Permit No. ______ Permit Date 10/9/2008

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD AIR FLUID NONE

DEPTH FROM SURFACE Ft. to	Ft.	DESCRIPTION Describe material, grain, size, color, etc.
0	20	Soil
20	40	Sand & Gravel
40	60	Sand, Gravel & Clay
60	90	Sand
90	100	Sand & Clay
100	115	Sand & Gravel
115	125	Sand Gravel & Clay

TOTAL DEPTH OF BORING 125 (Feet)
TOTAL DEPTH OF COMPLETED WELL 125 (Feet)

WELL OWNER

Name City of San Fernando
Mailing Address 117 Macneil Street
San Fernando CA 91340
CITY STATE ZIP

WELL LOCATION

Address 14621 & 14627 Sayre Street
City Sylmar CA
County LOS ANGELES
APN Book ______ Page ______ Parcel ______
Township 3 N Range 15 W Section 3
Latitude ___ DEG. MIN. SEC. Longitude ___ DEG. MIN. SEC.

LOCATION SKETCH

NORTH
WEST
EAST
SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)

WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ✓
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 93 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL ______ (Ft.) & DATE MEASURED ______
ESTIMATED YIELD * ______ (GPM) & TEST TYPE ______
TEST LENGTH ______ (Hrs.) TOTAL DRAWDOWN ______ (Ft.)
May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE Ft. to	Ft.	BORE-HOLE DIA. (Inches)	BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	60	10	✓				PVC	4.5	SCH80	
60	115	10		✓			PVC	4.5	SCH80	0.020
115	125	10	✓				PVC	4.5	SCH80	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to	Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	48	✓			
48	54		✓		
54	125			✓	

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analysis
✓ Other LOCATION MAP
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME WDC Exploration & Wells
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
5566 Arrow Highway Montclair CA 91763
ADDRESS CITY STATE ZIP
Signed ______ WELL DRILLER/AUTHORIZED REPRESENTATIVE 12/15/08 DATE SIGNED 283326 C-57 LICENSE NUMBER

DWR 188 REV. 11-97
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ORIGINAL
File with DWR

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. e0083891

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./ STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Owner's Well No. MW-1
Date Work Began 10/17/2007, **Ended** 10/19/2007
Local Permit Agency County of Los Angeles
Permit No. ______ **Permit Date** 10/9/2007

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD AIR ROTARY FLUID NONE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain, size, color, etc.*
0	20	Soil
20	40	Soil & Gravel
40	60	Gravel & Sand
60	125	Sand, clay & gravel

TOTAL DEPTH OF BORING 125 (Feet)
TOTAL DEPTH OF COMPLETED WELL 121 (Feet)

WELL OWNER

Name City of San Fernando
Mailing Address 117 Macneil Street
San Fernando CA 91340
CITY STATE ZIP

WELL LOCATION

Address 1220 Frank Modugno Dr.
City Sylmar CA
County LOS ANGELES
APN Book ______ Page ______ Parcel ______
Township 3 N Range 15 W Section 3
Latitude ___ DEG. MIN. SEC. ___ DEG. MIN. SEC.

LOCATION SKETCH

NORTH
WEST
EAST
SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. **PLEASE BE ACCURATE & COMPLETE.**

ACTIVITY (✓)

✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)
WATER SUPPLY
___ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ✓
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 92 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL ______ (Ft.) & DATE MEASURED ______
ESTIMATED YIELD * ______ (GPM) & TEST TYPE ______
TEST LENGTH ______ (Hrs.) TOTAL DRAWDOWN ______ (Ft.)
May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	56	10	✓				PVC	4.5	SCH80	
56	111	10		✓			PVC	4.5	SCH80	0.020
111	121	10	✓				PVC	4.5	SCH80	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	45	✓			
45	50		✓		
50	121			✓	

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analysis
✓ Other LOCATION MAP

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME WDC Exploration & Wells
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
5566 Arrow Highway Montclair CA 91763
ADDRESS CITY STATE ZIP
Signed ______ 12/15/08 283326
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

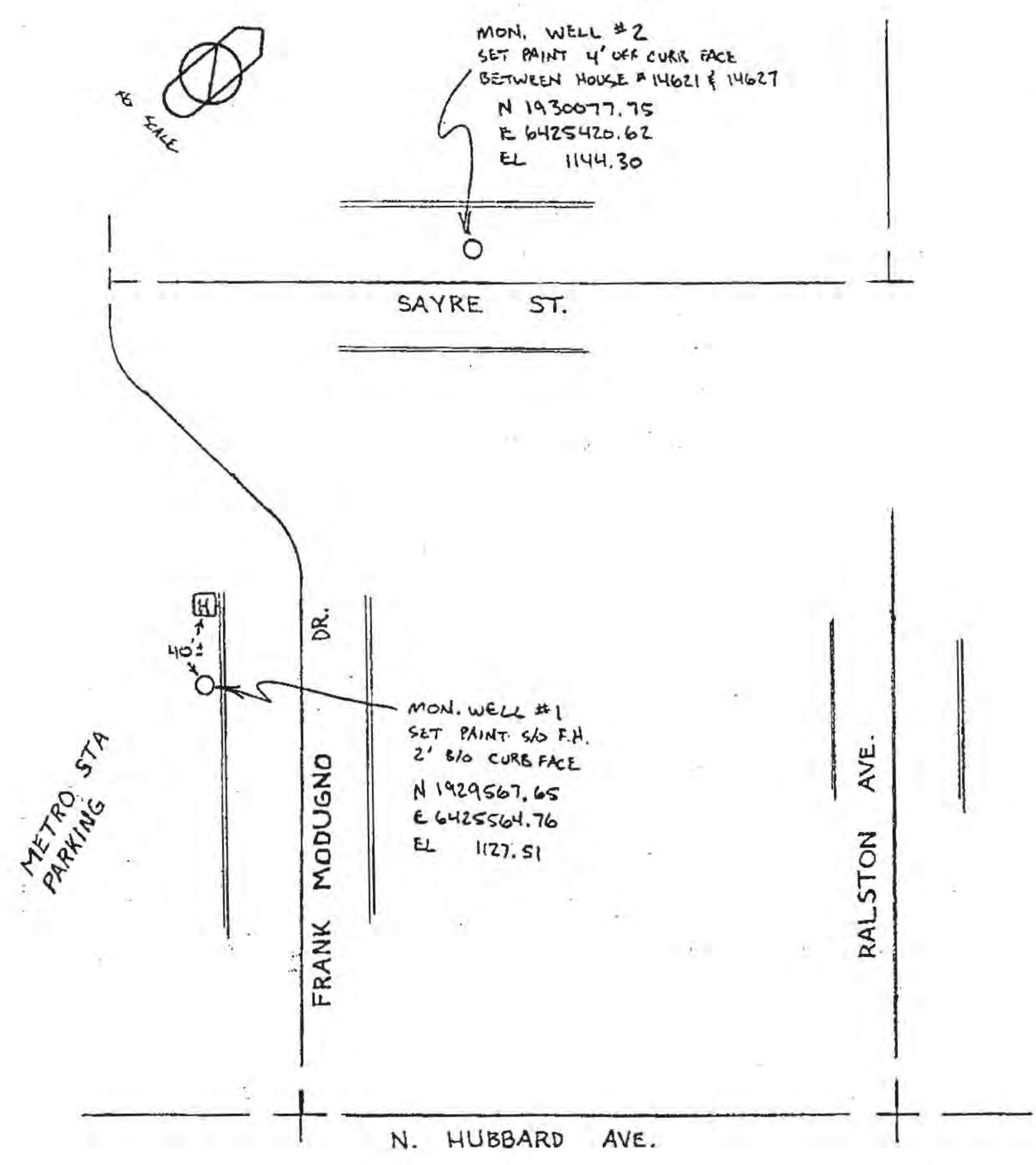
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Sheet 2 of 2

SURVEY OF MONITORING WELLS SAN FERNANDO AREA / UCG02K / 218-150 /
FACILITY/WO RFS/FB PAGE

SURVEYOR · CASTILLO DATE 1-26-07

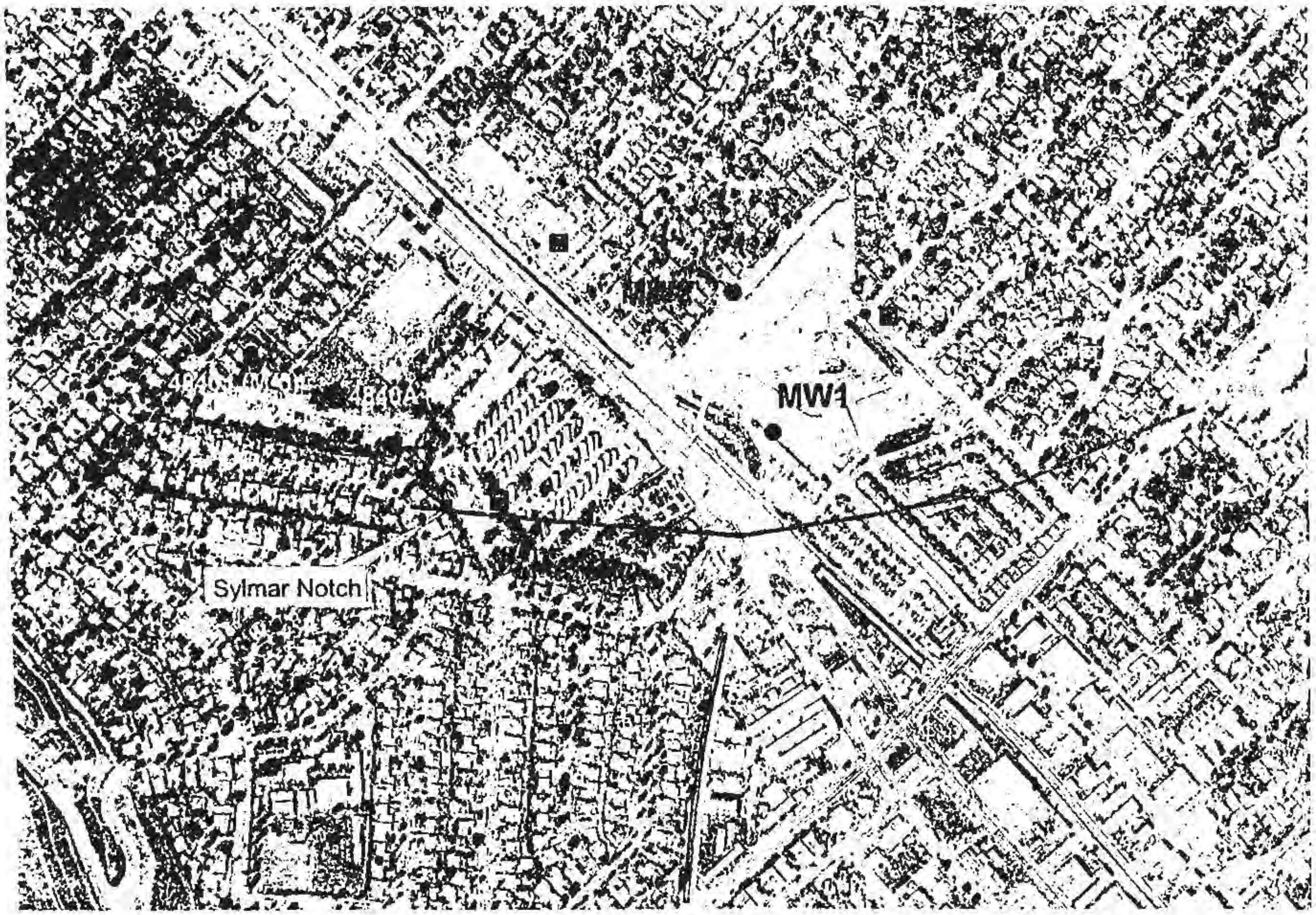
Los Angeles Department of Water and Power
LAND SURVEYS



NOTE: SET RTK BASE UNIT ON LA41 (PK IN CAREY VIEW ST. CUL-DE-SAC)
N. 1928049.11 E 6422042.74 EL 1299.25 △

PLATE. 1

SYLMAR NOTCH
LOCATION OF THE NEW PROPOSED MONITORING WELLS



Proposed Monitoring Wells

Report of Referee Buried Monitoring Wells

Existing Monitoring Wells

Destroyed or Abondoned Monitoring Wells

N

300 0 300 600 Feet

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. XXXXXXX

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N Latitude W Longitude

APN/TRS/Other

Page 1 of 1

Owner's Well Number MW-1

Date Work Began 10/17/2007 Date Work Ended 10/19/2007

Local Permit Agency

Permit Number Permit Date

Geologic Log

Orientation (●) Vertical ( ) Horizontal ( ) Angle Specify

Drilling Method Drill Through Casing Drilling Fluid Air

Depth from Surface Feet	to Feet	Description (Describe material, grain size, color, etc)
0	20	soil
20	40	soil & gravel
40	60	gravel & sand
60	125	sand, clay & gravel

Total Depth of Boring 125 Feet

Total Depth of Completed Well 121 Feet

Well Owner

Name City of San Fernando - Public Works

Mailing Address 117 Macneil Street

City San Fernando State CA Zip 91340

Well Location

Address 1220 Frank Modugno Dr.

City Sylmar County Los Angeles

Latitude Deg. Min. Sec. N Longitude Deg. Min. Sec. W

Datum Decimal Lat. Decimal Long.

APN Book Page Parcel

Township 3N Range 15W Section 3

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

West

East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

(●) New Well
( ) Modification/Repair
( ) Deepen
( ) Other
( ) Destroy
Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

( ) Water Supply
☐ Domestic ☐ Public
☐ Irrigation ☐ Industrial
( ) Cathodic Protection
( ) Dewatering
( ) Heat Exchange
( ) Injection
( ) Monitoring
( ) Remediation
( ) Sparging
( ) Test Well
( ) Vapor Extraction
( ) Other

Water Level and Yield of Completed Well

Depth to first water 92 (Feet below surface)

Depth to Static Water Level 92 (Feet) Date Measured 11/29/2007

Estimated Yield * (GPM) Test Type

Test Length (Hours) Total Drawdown (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	56	10	Blank	PVC Sch. 80	.337	4.5		
56	111	10	Screen	PVC Sch. 80	.337	4.5	Milled Slots	0.020
111	121	10	Blank	PVC Sch. 80	.337	4.5		

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	45	Cement	
45	50	Bentonite	
50	121	Filter Pack	

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name
Person, Firm or Corporation

Address City CA State Zip

Signed
C-57 Licensed Water Well Contractor Date Signed C-57 License Number

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. XXXXXXX

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N W

Latitude Longitude

APN/TRS/Other

Owner's Well Number MW-1

Date Work Began 10/17/2007 Date Work Ended 10/19/2007

Local Permit Agency

Permit Number Permit Date

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Drill Through Casing Drilling Fluid Air

Depth from Surface Feet	to Feet	Description (Describe material, grain size, color, etc)
0	20	soil
20	40	soil & gravel
40	60	gravel & sand
60	125	sand, clay & gravel

Total Depth of Boring 125 Feet

Total Depth of Completed Well 121 Feet

Well Owner

Name City of San Fernando - Public Works

Mailing Address 117 Macneil Street

City San Fernando State CA Zip 91340

Well Location

Address 1220 Frank Modugno Dr.

City Sylmar County Los Angeles

Latitude Deg. Min. Sec. N Longitude Deg. Min. Sec. W

Datum Decimal Lat. Decimal Long.

APN Book Page Parcel

Township 3N Range 15W Section 3

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

West

East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

◉ New Well
○ Modification/Repair
○ Deepen
○ Other
○ Destroy
Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

○ Water Supply
☐ Domestic ☐ Public
☐ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
◉ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other

Water Level and Yield of Completed Well

Depth to first water 92 (Feet below surface)

Depth to Static Water Level 92 (Feet) Date Measured 11/29/2007

Estimated Yield * (GPM) Test Type

Test Length (Hours) Total Drawdown (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	56	10	Blank	PVC Sch. 80	.337	4.5		
56	111	10	Screen	PVC Sch. 80	.337	4.5	Milled Slots	0.020
111	121	10	Blank	PVC Sch. 80	.337	4.5		

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	45	Cement	
45	50	Bentonite	
50	121	Filter Pack	

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name
Person, Firm or Corporation

Address City CA State Zip

Signed
C-57 Licensed Water Well Contractor Date Signed C-57 License Number

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

DAILY TOUR REPORT

WDC JOB #: 217325 LOCATION: Sylmar RIG #: 105 DATE: 10/18/07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7.00	9.30	2.5	Drill + drive 80 - 125
9.30	11-30	2	wait for 10' sump . Set-up jacks
11.30	4.00	4.5	Run well, sand, swab, seal
4.00	4.30	.5	clean up
			Sump 121 - 111
			0.20 Screen - 111 - 55
			Sand 121 - 50.7
			Seal 50.7 - 45.4

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	42 / 71
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	/
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	3 / 5
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	3
Threaded Cap	Each	1
Slip Cap	Each	
Expansion Plug	Each	1
____" Monument	Each	
____" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls			
Support Truck	5000 Mls.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes
First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels
Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves
Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses
Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls
Emergency Triangles Fire Extinguishers MSDS Book Safety Manual
Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump
Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total
#1	80	125	45

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80	4	66	Per Diem	Prsn Day	3
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80	4	55			

CLIENT REP:
CLIENT JOB #:
OPERATOR: [signature]
RIG HAND: Valentine RIG HAND: Gardner

DAILY TOUR REPORT

WDC

WDC JOB #: 3i7325 LOCATION: Sylmar RIG #: 105 DATE: 10 / 19 / 07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7.00	8:30	1.5	grout well
8:30	1100	2.5	Teardown, completion #1 well
1100	5:00	6	standby Site access
			Site Access - not ready until monday 7am

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	/
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	15 / 95
Bentonite Powder	Sack/Foot	1.5 /
Bentonite Chips	Sack/Foot	/
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
____" Monument	Each	
12 " Flush Cover	Each	1
Asphalt	Sack	
Concrete	Sack	5
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.	105	3193	3214
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls	209	26431	28279
Support Truck	5000 Mls.	309	56095	56300
Forklift	250 Hrs.	509	3608	3816
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.	105	4200	4542
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.	709	1113	1192
Steamcleaner	100 Hrs.	809	74	124

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes

First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels

Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves

Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses

Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls

Emergency Triangles Fire Extinguishers MSDS Book Safety Manual

Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump

Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80			Per Diem	Prsn Day	
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80					

CLIENT REP:

CLIENT JOB #:

OPERATOR: [signature]

RIG HAND: Valenton RIG HAND: Cardner

Daily Billing Sheet

Client	Operator	Rig Number
City of San Fernando Public Works Department	**Lee Aylmer**	**105**
Project Location	WDC Contact/Ops Manager	
Frank Modugno Dr., Sayr Street	**Roger Langley**	

Contract Number	P.O./Authorization Number	Week Ending	WDC Job Number	
		10-20-07	21732S	

Billible Items	Date / U/M	Sun	Mon	Tue	10-17 Wed	10-18 Thu	10-19 Fri	10-20 Sat	Weekly Total
Equipment Mobilization	EA				1				1
Well Permits	EA								
Traffic Control (per site)	EA				1				1
Per Diem (3 Man Crew)	DY								
Drill 10" ARCH	FT				80	45			125
4" Sch. 80 PVC Well Casing	FT					66			66
4" Sch. 80 PVC Well Screen (.020 Slot)	FT					55			55
Annular Materials	FT					76	45		121
Traffic Rated Well Box	EA						1		1
Davis Bacon / Prevailing Wage Surcharge	DY				1	1	1		3
Roll Off Bins Delivery	EA				1				1
Roll Off Bin Rental Each Per Day	DY				1	1	1	1	4
Waste Profiling	LS								
Non-Hazardous Waste Disposal	TN								
Disposal Transportation	HR								
Standby and Site Access	HR						6		
Well Development (Portal to Portal)	HR								
Per Diem (1 Man Crew)	DY								
Please Remit Payment To:									
WDC Exploration & Wells									
500 Main Street									
Woodland, California 95695									
		Initials WDC / Client	Initials WDC / Client	Initials WDC / Client	Initials WDC / Client	Initials WDC / Client	Initials WDC / Client	Initials WDC / Client	

Comments:

DAILY TOUR REPORT

WDC JOB #: 21732C LOCATION: San Fernando RIG #: 105 DATE: 10/22/07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7.00	9.00	2	Standby
9.00	12.00	3	Set-up traffic control. Set up rig. Cookie cut
			hand auger. Found pipe. Teardown move over
			2 feet Set up rig, cookie cut, hand auger
12.00	12.30	.5	lunch
12.30	4.00	3.5	Drill + drive 0 - 125, trip out
4.00	5.30	1.5	Run well, Sand 125 - 100

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	10 / 25
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	/
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	/
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	3
Threaded Cap	Each	1
Slip Cap	Each	
Expansion Plug	Each	1
______" Monument	Each	
______" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls.			
Support Truck	5000 Mls.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes
First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels
Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves
Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses
Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls
Emergency Triangles Fire Extinguishers MSDS Book Safety Manual
Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump
Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total
#2	0	125	125

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80	4	70	Per Diem	Prsn Day	3
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80	4	55			

CLIENT REP:

CLIENT JOB #:

OPERATOR: [signature]

RIG HAND: Valentine RIG HAND: West

DAILY TOUR REPORT

WDC JOB #: 217326 LOCATION: San Fernando RIG #: 105 DATE: 10/23/07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7.00	9.00	2	Finish Sanding well, Swab, Seal
9.00	10:30	1.5	Grout well
10.30	11.30	1	Teardown + complete well
11.30			Lee off site with rig
11.30	1.00	1.5	Load water truck, forklift, Tie down.
1.00	4.30	3.5	~~[illegible]~~ Reload in yard, Tie down
			020 Screen 115 - 60
			Sand 125 - 54
			Seal 54 - 48
			Cement 48 - 0

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	26 / 45
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	16 /
Bentonite Powder	Sack/Foot	2 /
Bentonite Chips	Sack/Foot	4 / 6
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
______" Monument	Each	
12" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	8
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls			
Support Truck	5000 Mls.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes
First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels
Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves
Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses
Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls
Emergency Triangles Fire Extinguishers MSDS Book Safety Manual
Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump
Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet
Blank	PVC MS SS HDPE	5 10 40 80		
Blank	PVC MS SS HDPE	5 10 40 80		
Screen	PVC MS SS HDPE	5 10 40 80		

Misc.	Unit	Quan:
Per Diem	Prsn Day	
Level C	Prsn Day	

CLIENT REP:
CLIENT JOB #:
OPERATOR: [signature]
RIG HAND: Valentine RIG HAND: West

Daily Billing Sheet

Client	Operator	Rig Number
City of San Fernando Public Works Department	**Lee Aylmer**	**105**
Project Location	WDC Contact/Ops Manager	
Frank Modugno Dr., Sayr Street	**Roger Langley**	

Contract Number	P.O./Authorization Number	Week Ending	WDC Job Number
		10-26-07	217326

Billible Items	Date / U/M	Sun	10-22 Mon	10-23 Tue	10-24 Wed	10-25 Thu	10-26 Fri	Sat	Weekly Total
Equipment Mobilization	EA								
Well Permits	EA								
Traffic Control (per site)	EA		1						
Per Diem (3 Man Crew)	DY		1						
Drill 10" ARCH	FT		125						
4" Sch. 80 PVC Well Casing	FT		70						
4" Sch. 80 PVC Well Screen (.020 Slot)	FT		55						
Annular Materials	FT		25	100					125
Traffic Rated Well Box	EA			1					
Davis Bacon / Prevailing Wage Surcharge	DY		1	1					
Roll Off Bins Delivery	EA								
Roll Off Bin Rental Each Per Day	DY		1	1					
Waste Profiling	LS								
Non-Hazardous Waste Disposal	TN								
Disposal Transportation	HR								
Standby and Site Access	HR		2						
Well Development (Portal to Portal)	HR								
Per Diem (1 Man Crew)	DY								

Please Remit Payment To:
WDC Exploration & Wells
500 Main Street
Woodland, California 95695

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
	Initials	Initials	Initials	Initials	Initials	Initials	Initials
	WDC / Client	WDC / Client	WDC / Client	WDC / Client	WDC / Client	WDC / Client	WDC / Client

Comments: 10-22 7am - 9am cars still on street
unable to access location.

WDC EXPLORATION & WELLS

DAILY TOUR REPORT

WDC JOB #: 21732C LOCATION: Azusa RIG #: 105 DATE: 10 /29 /07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7.00	2.00	7	Breakdown hammer and bit, set-up jacks, Jack out
			120' casing, set rig back on hole
2.00	5.30	3.5	Drill 117 - 187

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	/
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	/
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	/
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
_____" Monument	Each	
_____" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls			
Support Truck	5000 Mls.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes

First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels

Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves

Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses

Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls

Emergency Triangles Fire Extinguishers MSDS Book Safety Manual

Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump

Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total
PDZB-21	117	187	70

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80			Per Diem	Prsn Day	3
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80					

CLIENT REP: [signature]

CLIENT JOB #: 7190.006

OPERATOR: [signature]

RIG HAND: Valentine RIG HAND: Gomez

DAILY TOUR REPORT

WDC

WDC JOB #: 21732C LOCATION: Azusa RIG #: 105 DATE: 10 /29 /07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7.00	2.00	7	Breakdown hammer and bit, set-up jacks, Jack out 120' casing, set rig back on hole
2.00	5.30	3.5	Drill 117 - 187

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	/
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	/
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	/
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
______" Monument	Each	
______" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls			
Support Truck	5000 Mls.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes
First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels
Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves
Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses
Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls
Emergency Triangles Fire Extinguishers MSDS Book Safety Manual
Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump
Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total
PDZ8-21	117	187	70

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80			Per Diem	Prsn Day	3
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80					

CLIENT REP: [signature]

CLIENT JOB #: 7190.006

OPERATOR: [signature]

RIG HAND: Valentine RIG HAND: Gomez

DAILY TOUR REPORT

WDC JOB #: 21732c LOCATION: Azusa RIG #: 105 DATE: 10 / 30 / 07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7:00	10:00	3	Drill 187-230, trip out
10:00	5:30	7.5	Back fill 230'-60'

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	/
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	/
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	136/170
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
______" Monument	Each	
______" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls			
Support Truck	5000 Mls.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes

First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels

Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves

Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses

Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls

Emergency Triangles Fire Extinguishers MSDS Book Safety Manual

Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump

Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total
PDZB-21	187	230	43

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80			Per Diem	Prsn Day	
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80					

CLIENT REP:

CLIENT JOB #: 7190.006

OPERATOR:

RIG HAND: Valentino RIG HAND: Gomez

DAILY TOUR REPORT

WDC

WDC JOB #: 21732C LOCATION: Azusa RIG #: 105 DATE: 10/31/07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7:00	10:00	3	Backfill 60-0
10:00	3:00	5	Teardown, decon, set-up. (cement 2' plug)
3:00	5:30	2.5	Drill 0-20

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	/
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	/
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	77 / 60
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
______" Monument	Each	
______" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	3
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls			
Support Truck	5000 Mls.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes
First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels
Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves
Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses
Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls
Emergency Triangles Fire Extinguishers MSDS Book Safety Manual
Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump
Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total
PDZB-20	0	20	20

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80			Per Diem	Prsn Day	3
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80					

CLIENT REP: [signature]
CLIENT JOB #: 7190.006
OPERATOR: [signature]
RIG HAND: Valentine RIG HAND: Gomez

NOTSTRATEX

DAILY TOUR REPORT

WDC

WDC JOB #: 21732C LOCATION: AZUSA RIG #: ~~109~~ 105 DATE: 11 / 1 / 07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7:00	3:00	8	Drill 20 - 140
3:00	5:30	2.5	Trip out, Set up jacks Jack 20' casing set rig
			back on hole.

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	/
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	/
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	/
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
______" Monument	Each	
______" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls			
Support Truck	5000 Mls.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes
First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels
Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves
Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses
Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls
Emergency Triangles Fire Extinguishers MSDS Book Safety Manual
Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump
Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total
PDZB-20	20	140	120

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80			Per Diem	Prsn Day	
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80					

CLIENT REP: [signature]
CLIENT JOB #: 7190.006
OPERATOR: [signature]
RIG HAND: Valentino RIG HAND: Gomez

NOT STRATEX

DAILY TOUR REPORT

WDC

WDC JOB #: 21732C LOCATION: Azusa RIG #: 105 DATE: 1/12/07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
7:00	10:30	3.5	Drill 140-200,
10:30	11:30	1	Trip out, breakdown bits
11:30	5:30	6	Backfill 200-70
5:30	6:00	.5	Secure site.

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	/
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	/
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	122 / 140
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
______" Monument	Each	
______" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.	105	3195	3305
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mls	209	26431	28361
Support Truck	5000 Mls.	309	56095	57097
Forklift	250 Hrs.	509	3608	3842
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.	105	4200	4598
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen	100 Hrs.	709	1113	1193
Steamcleaner	100 Hrs.	809	74	119

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes
First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels
Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves
Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses
Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls
Emergency Triangles Fire Extinguishers MSDS Book Safety Manual
Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump
Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None
509	~~Slide~~ Sideshift bar
105	pipe spinner

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total
2028-20	140	200	60

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80			Per Diem	Prsn Day	
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80					

CLIENT REP: [signature]
CLIENT JOB #: 7190.006
OPERATOR: [signature]
RIG HAND: Valentine RIG HAND: Gomez

MATT STRATEX

DAILY TOUR REPORT

WDC

WDC JOB #: 21732C LOCATION: Azusa RIG #: 105 DATE: 11/5/07

FROM	TO	TOTAL	DESCRIPTION OF ACTIVITIES
~~7:00~~ 6:30	9:00	2.5	Finish backfill 70-0 patch 2 holes
9.00	11.00	2	Teardown + Decon
11.00	12.00	1	Demob
12.00	5.30	5.5	Inyard Unloading, reloading.
			2 drums for decon water

MATERIALS

Record Materials Provided by WDC Exploration & Wells

Item	Unit	Quantity
Gravel Pack Sand	Sack/Foot	/
Transition Sand	Sack/Foot	/
Bentonite Pellets	Bucket/Feet	/
Cement	Sack/Foot	4 /
Bentonite Powder	Sack/Foot	/
Bentonite Chips	Sack/Foot	94 / 70
Volclay Grout	Sack/Foot	/
Sand Grout	Yard/Foot	/
Enhanced Grout	Sack/Foot	/
Centralizers	Each	
Threaded Cap	Each	
Slip Cap	Each	
Expansion Plug	Each	
______" Monument	Each	
______" Flush Cover	Each	
Asphalt	Sack	
Concrete	Sack	
Rapid Set Grout	Sack	
Lock	Each	
PVC Gloves	Pair	
Tyvek Suits	Each	
Sample Liners	Each	
Core Boxes	Each	
Drums	Each	
Visqueen	Roll	

EQUIPMENT SERVICE RECORD

Record At End Of Shift At The End Of Each Week

Description	Srvc Int.	Equip. #	Last Service	Hours/Miles
Carrier Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Deck Engine	Fltr 250 Hrs. Oil 1000 Hrs.			
Rig Tender	10000 Mis			
Support Truck	5000 Mis.			
Forklift	250 Hrs.			
Forklift	250 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Compressor	Fltr 250 Hrs. Oil 1000 Hrs.			
Shaker	250 Hrs.			
Mud Pump	250 Hrs.			
Mud Pump	250 Hrs.			
Generator	250 Hrs.			
Welder/Gen.	100 Hrs.			
Steamcleaner	100 Hrs.			

SAFETY & MECHANICAL INSPECTION

Circle Item(s) in Need of Repair or Replacement

Windows Tires Gauges Lights Slings Cables Clamps Brakes
First Aid Kit Fall Device Safety Harness Safety Labels Operating Labels
Equipment Gaurds Back-Up Alarms Safety Shutdowns Relief Valves
Discharge Hoses Hydraulic Hoses Water Hoses Mud Hoses Air Hoses
Breakout Tongs Pipe Wrenches Chain Tongs Dog Collar Slips/Bowls
Emergency Triangles Fire Extinguishers MSDS Book Safety Manual
Mud Pump Injection Pump Grout Pump 2" Transfer Pump Fuel Transfer Pump
Casing Hammer Sample Hammer Mini-Dumpster Tooling Bit Subs

Equip. #	Action Needed ( ) Check If None

EXPLANATION OF STANDBY

RECORD OF INJURY/ACCIDENT/NEAR MISS

DAILY SAFETY TOPIC

DRILLING STATISTICS

Hole #	From	To	Total

COMMENTS

TOTAL RIG HOURS WORKED

Casing	Type	Schedule	Diameter	Feet	Misc.	Unit	Quan:
Blank	PVC MS SS HDPE	5 10 40 80			Per Diem	Prsn Day	
Blank	PVC MS SS HDPE	5 10 40 80			Level C	Prsn Day	
Screen	PVC MS SS HDPE	5 10 40 80					

CLIENT REP: [signature]
CLIENT JOB #: 7130.0016
OPERATOR: [signature]
RIG HAND: Valentine RIG HAND: Gomez

WDC EXPLORATION & WELLS

WELL DEVELOPMENT LOG

PROJECT NAME:

WELL NUMBER: MW-1

JOB NUMBER: 21732 C

SITE: SAN FERNANDO

PREPARED BY: KATT

METHOD:

PUMP 3"SQ

BAILER

OTHER

DEVELOPMENT CRITERIA: BAIL, SWABB & PURGED

REPMARKS:

DEVELOPMENT LOG					TOTAL	WATER QUALITY					COMMENTS
DATE	TIME	FLOW RATE (gpm)	DEPTH TO WATER (ft-btoc)	WATER REMOVAL (gal)	WATER REMOVAL (gal)	pH	SPECIFIC Conductivity (mS/cm)	TURBIDITY (NTU)	Temparture (Degrees C)		pump on @ 9:00 SWL @ 91.9
11-29-07	9:05	8	92.43	40		5.72	.744	92	19.5		@ 100' ALITTLE CLOUDY
"	9:15	8	92.43	120		7.13	.654	17	20.0		CLEAR
"	9:25	8	92.43	200		7.36	.650	158	19.9		CLOUDY
"	9:35	8	92.43	280		7.40	.648	12	20.0		CLEAR MOVED TO THE MIDDLE SCREEN
"	9:45	8	92.43	360		7.44	.648	9	20.1		CLEAR
"	9:55	8	92.43	440		7.45	.648	8	20.1		CLEAR (BOTTOM)
"	10:05	8	92.43	520		7.42	.647	5	20.1		CLEAR
"	10:15	8	92.43	600		7.43	.647	4	20.0		CLEAR (PUMP OFF)

WDC EXPLORATION & WELLS		PROJECT NAME:		WELL NUMBER: MW-2
WELL DEVELOPMENT LOG	JOB NUMBER: 21732 C		SITE: SAN FERNANDO	PREPARED BY: KATT
METHOD: PUMP 3" SQ; BAILER; OTHER	DEVELOPMENT CRITERIA: BAILED, SWABB, & PURGED.			
	REPMARKS:			

DEVELOPMENT LOG					TOTAL	WATER QUALITY				COMMENTS
DATE	TIME	FLOW RATE (gpm)	DEPTH TO WATER (ft-btoc)	WATER REMOVAL (gal)	WATER REMOVAL (gal)	pH	SPECIFIC Conductivity (mS/cm)	TURBIDITY (NTU)	Temparture (Degrees C)	pump on AT 3:00 @ 93'
11-29-07	3:10	5.5	82	55		8.27	.296	372	21.9	very cloudy
"	3:20	5.5	84.2	110		7.93	.313	999	21.7	really cloudy
"	3:30	5.5	85.65	165		7.72	.312	999	21.3	really cloudy
"	3:40	5.5	86.8	220		7.68	.307	999	21.2	really cloudy
"	3:50	5.5	87.35	275		7.66	.300	999	21.3	Stop the pump to add 20' @ (120') now
"	400	5.5	82.4	330		7.64	.357	999	20.7	pump on very cloudy
"	4:10	5.5	85.25	385		7.73	.295	357	21.0	cloudy
"	4:20	5.5	86.8	440		4.98	.390	607	21.2	cloudy
"	4:30	5.5	87.8	495		6.90	.312	363	21.3	cloudy
"	4:40	5.5	88.4	550		7.24	.307	145	21.2	cloudy
"	4:50	5.5	88.8	605		7.50	.311	678	20.6	cloudy
										pump off @ 4:51

WDC EXPLORATION & WELLS			PROJECT NAME:			WELL NUMBER: MW-2
WELL DEVELOPMENT LOG	JOB NUMBER: 21732 C			SITE: SAN FERNANDO		PREPARED BY: KATT

METHOD:
PUMP 3"SQ
BAILER
OTHER

DEVELOPMENT CRITERIA: BAILED, SWABB & PURGED

REPMARKS:

DEVELOPMENT LOG					TOTAL	WATER QUALITY					COMMENTS
DATE	TIME	FLOW RATE (gpm)	DEPTH TO WATER (ft-btoc)	WATER REMOVAL (gal)	WATER REMOVAL (gal)	pH	SPECIFIC Conductivity (mS/cm)	TURBIDITY (NTU)	Temparture (Degrees C)		PUMP ON AT 920 RATE @ 17 GPM
11-30-07	9:55	7	85.4	221		5.18	.381	0	20.4		THE WELL WAS PRETTY CLOUDY
11	10:05	7	88.55	291		6.95	.299	94	20.8		@ 9:33 AJUST THE FLOW RATE A 7 GPM
11	10:15	7	91.25	361		7.41	.291	168	20.9		CLOUDY
11	10:20	7	92.95	411		7.58	.290	40	20.9		CLEAR
11	10:30	7	94.25	481		7.65	.290	37	21.0		CLEAR
11	10:40	7	94.4	551		7.69	.287	0	21.1		CLEAR
11	10:50	7	95.15	621		7.71	.289	0	21.1		CLEAR

Groundwater Monitoring Program for Sylmar Notch

Purpose:

To install two monitoring wells (MW1 and MW2) upgradient of the Sylmar Notch to calculate the total volume of groundwater that may flow from Sylmar Basin to San Fernando Basin through the Sylmar Notch. These two wells should only penetrate the unconfined portion of the aquifer system. Sylmar Basin is composed of two aquifers, one unconfined and another confined. Groundwater elevations data from the unconfined portion of the aquifer is only needed to perform this calculation.

Geology and Hydrogeology of the site:

Table.1 summarizes the estimated depths of the unconfined aquifer upgradient of the Sylmar Notch. These depths were estimated from the driller logs of 5 monitoring wells. The driller logs of these wells are attached. Most of these wells are buried or destroyed except Monitoring Wells Nos. 4840J and 4840A which are located close to each other at Mission Well Field Yard. Historical groundwater elevation data for the Mission monitoring wells indicate that Monitoring Well No. 4840A data is representing the level of the unconfined aquifer while the data for Well No.4840J is representing the level of the confined aquifer. There is always about 20 feet difference between the groundwater elevation measurements for these two wells. The estimated range of the depth to the groundwater table in the unconfined aquifer is about 48.7 feet to 94 feet below ground surface.

Monitoring Wells Locations:

Plate 1 shows the map location of the proposed new and the existing and destroyed monitoring wells that were used to estimate the depth of the unconfined aquifer and the range of depth to water table. Also attached is the survey field notes for the locations of the new proposed monitoring wells, which includes coordinates in NAD 83 Grid, elevations and addresses and the distance from the center of the major street. Only Monitoring Wells MW1 and MW2 are selected to be drilled because they are located perpendicular to the Sylmar Notch.

Well Construction Details:

Figure No. 1 shows a schematic diagram of the construction detail for Monitoring Wells MW1 and MW2. Total depth and screen interval are estimated from the evaluation of existing monitoring wells. Actual depth, blank casing intervals, screen intervals, screen slot size and filter pack grain size will be based on the lithologic conditions encountered during drilling and performing sieve analysis. The following is a summary of each well construction detail (estimated):

- Total Depth ~125 Feet below ground surface (bgs)
- Casing size 4 inch
- Bore hole size ~ 10 inch
- Screen Interval ~ 60-115 ft bgs and screen slot size ~ 0.02 inch
- Each well should have a filter pack material installed in the annulus surrounding the screen and the casing and extending from the bottom of the well annulus to approximately 5 feet above the top of the screen followed by 5 feet of bentonite seal and the rest of the annulus filled with cement grout to the surface of the well. In addition each will have a locking cap, bottom cap and a Traffic-Rated street box as shown in Figure 1.
- All the PVC material should be Schedule 80

<u>Well Drilling, Soil Sampling and Development</u>:

Its recommended to use a drilling method that preserve the quality of the soil sampling during the well drilling like air rotary or augur rigs.

Each hole will be drilled as a pilot hole to an approximate depth of 125 ft bgs. The geologist on the site needs to collect a sample every 5 feet to locate the bottom of the aquatard (clay zone). If the drilling passes the bottom of the clay zone and penetrates the upper portion of the confined aquifer, the bore hole should be backfilled with bentonite grout to approximately 5-10 feet above the bottom of the clay zone. The well then will be installed and completed as indicated in the well construction details.

Following installation, the well will be developed using standard development methods like bailing, surging and pumping. The criteria that should be used is to stop development when the water becomes clean and the static water level measurements taken during development at different times become constant. This is an indication that the static water level inside the well is equal to the water level in the aquifer.

ENGINEERING DATA SHEET

Sheet No.		Date
Prepared		3-19-07
Checked		
Approved		

MONITORING WELL

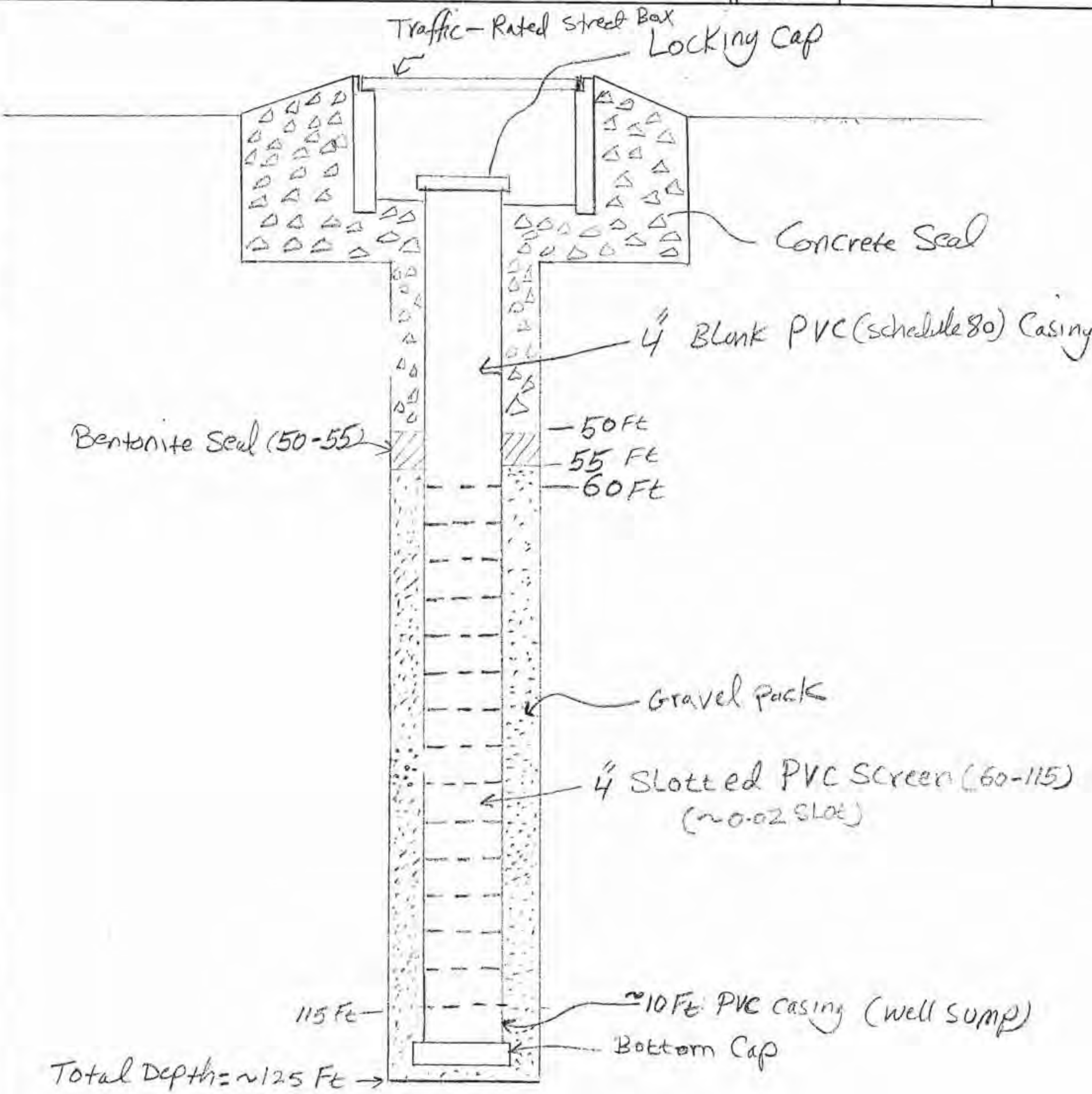


FIGURE. I
Not to Scale

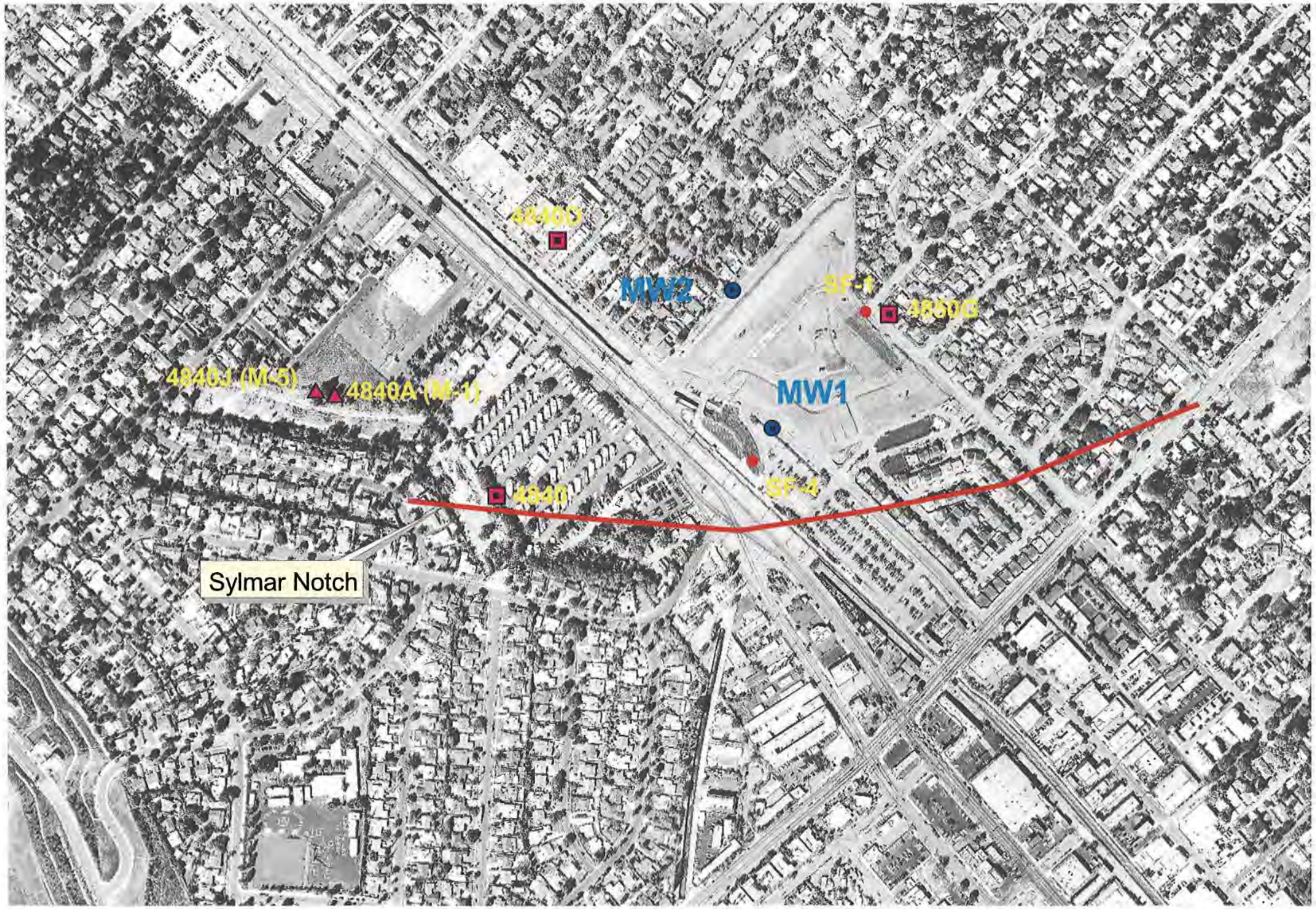
TABLE 1

Sylmar Notch

Hydrogeologic Data from Existing and Abandoned Wells located upgradient and in the Vicinity of the Notch

Well No	Location	Total Depth (FT)	Year Drilled	Perforation Dapth (FT)	Clay Zone Thickness (FT)	Estimate Depth to the Top of the Confined Zone (FT)	Refrence Point Elev (FT)	Depth to Water Table Low (FT)	Date of Measurements FT	Depth to Water Table High (FT)	Date of Measurements FT	Monitoring Well Status
4840	Close to Sylmar Notch	190	1927	No Data	32-122	122	1120	22.23	10/1/1951	3.5	12/15/1932	Destroyed
4840A (M-1)	Mission Wells Yard	195	1924	No Data	77-125	125	1130.9	94	2/14/1979	48.7	10/18/2006	Active
4840D	North West of the new proposed Monitoring well M2	112	1933	No Data	40-112	112	No Data	No Data	No Data	No Data	No Data	Abandoned Cannot be Measured
4840J (M-5)	Mission Wells Yard	450	1960	64-415	82-128	128	1131.5	110.6	9/22/1982	66.6	10/24/2004	Active
4850G	North West of the new proposed Monitoring well M3	186	1904	No Data	36-126	126	No Data	No Data	No Data	No Data	No Data	Abondoned

SYLMAR NOTCH
LOCATION OF THE NEW PROPOSED MONITORING WELLS



Proposed Monitoring Wells

Report of Referee Buried Monitoring Wells

Existing Monitoring Wells

Destroyed or Abondoned Monitoring Wells

N

300 0 300 600 Feet

Sheet 1 of 2

SURVEY OF MONITORING WELLS SAN FERNANDO AREA / UCG02K / 218-150 /

FACILITY/WO RFS/FB PAGE

SURVEYOR CASTILLO DATE 1-26-07

SAN FERNANDO AREA

STAKE MONITORING WELLS

JAN. 26, 2007

F. CASTILLO
C. WASHINGTON
F. MORTON

EQUIP: TRIMBLE RTK

REF: 1 W.S. FB 220-138-4/19

HORIZ. NAD83 GRID
VERT. NAVD88

NOTE: MET WITH DAN RESCH AT METRO STA. PARKING LOT. MR. RESCH POINTED OUT THE PROPOSED LOCATIONS OF THE MONITORING WELLS. WE THEN PROCEEDED TO MARK THEM ON THE GROUND AND MEASURE COORDINATES BY RTK.

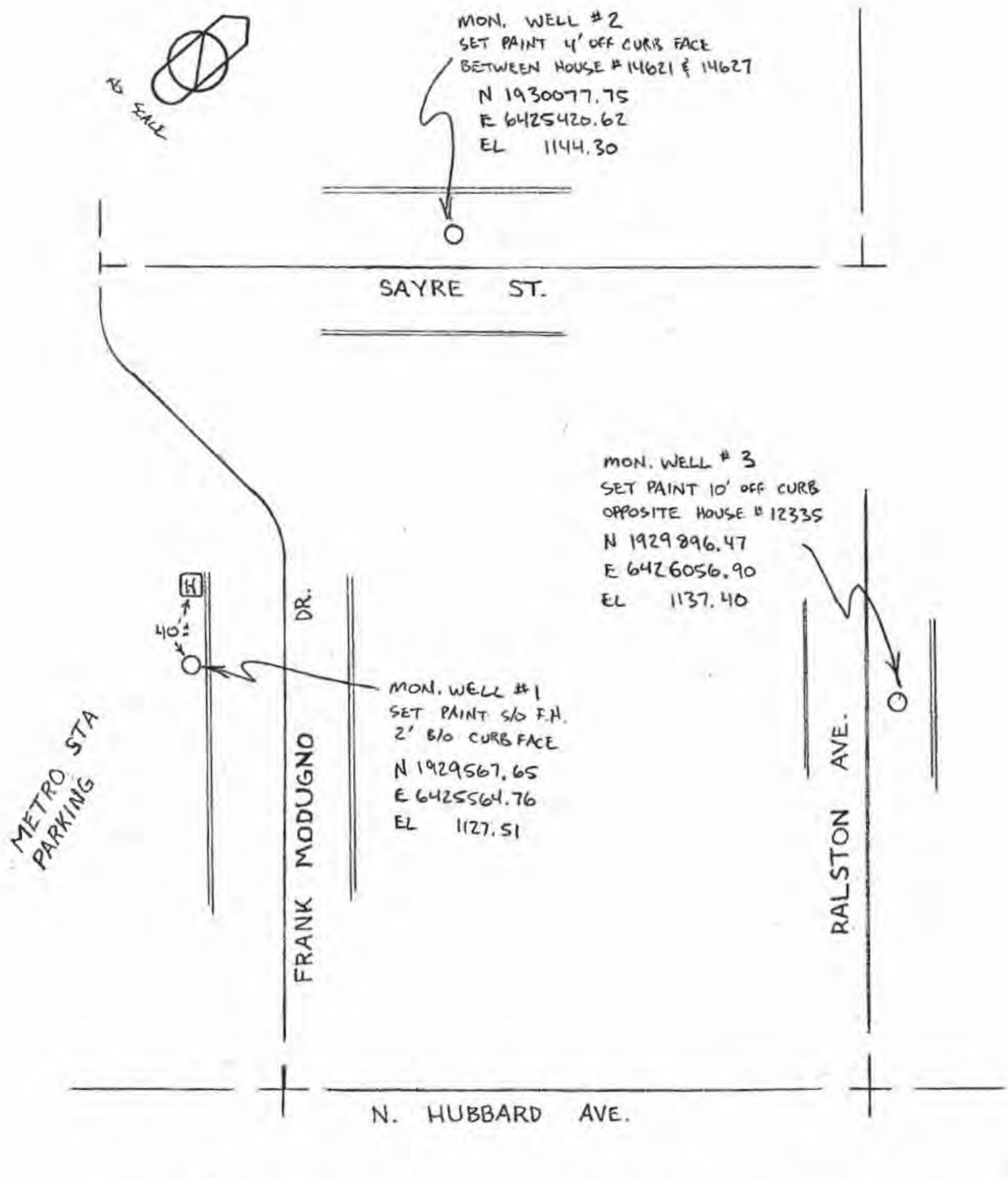
Sheet 2 of 2

SURVEY OF MONITORING WELLS SAN FERNANDO AREA / UCG02K / 218-150 /

FACILITY/WO RFS/FB PAGE

SURVEYOR · CASTILLO DATE 1-26-07

Los Angeles Department of Water and Power LAND SURVEYS



NOTE: SET RTK BASE UNIT ON LA41 (PK IN CAREY VIEW ST. CUL-DE-SAC)
N. 1928049.11 E 6422042.74 EL 1299.25

p7

FORM 1452 CODE 15181

WELL LOG

DEPARTMENT OF WATER & POWER OF THE CITY OF LOS ANGELES

4840A

1863-73-
218-150

Well Number or Name Mission Well #1

LOCATION Approx. 2400' No. of North City Boundary of San Fernando
1100±' S.E. of Oro Grande St., 800±' S.W. of San Fernando Rd. MAP No.

WORK STARTED .... WORK COMPLETED 9-3-24

195 ft. of 24 in. ....lb./ga. casing .... left in well

Type of perforator used

Perforated ....ft. to ....ft. ....holes per ft.

Diameter of perforations ....in., length ....in.

Depth at which water was first found ....ft.

Standing level before perforating ....ft.

Standing level after perforating ....ft.

Note your observation of any change in water level while drilling

Date tested ...., 19....

Water level when first started test ....ft.

Draw down from standing level ....ft.

G. P. M. at beginning of test

G. P. M. at completion of test

Draw down at completion of test ....ft.

If reducing strings of casing were cut off, state how cut

Depth from surface cut ....ft.

Size of casing cut ....in.

Lap in larger casing ....ft.

Was adapter or cement used?

If casing was swedged or repaired, state depth, describe repairs and condition in which casing was left and probable future effect:

Is well straight top to bottom, if not, what is the variation?

Will there be any detrimental effect on pump, and if so, what?

Give any additional data which may be of future value:

Total depth of well 195 ft.

Formation: Mention size of water gravel—

ft.	to ft.	
0	8	Black adobe
8	29	Yellow cemented gravel
29	45	Clay & boulders
45	77	Gravel & boulders
77	125	Hard, red clay
125	155	Coarse sand & fine gravel
155	195	Clay & shale

Date of Report ...., 19....

S. F. Gatey

Driller.

FORM 1452 CODE (5181

WELL LOG

DEPARTMENT OF WATER & POWER
OF
THE CITY OF LOS ANGELES

4840

A-24a

Well Number or Name Owner: General Petroleum Corp.

LOCATION 0.3 mi. N.W. of Hubbard Ave., and 600' S.W. of San Fernando Road

MAP No.

WORK STARTED .... WORK COMPLETED ....

......ft. of 12 in. ......lb./ga. casing ......left in well

Type of perforator used ....

Perforated ......ft. to ......ft ......holes per ft.

Diameter of perforations ......in., length ......in.

Depth at which water was first found ......ft.

Standing level before perforating ......ft.

Standing level after perforating ......ft.

Note your observation of any change in water level while drilling

Date tested ......, 19......

Water level when first started test ......ft.

Draw down from standing level ......ft.

G. P. M. at beginning of test ....

G. P. M. at completion of test ....

Draw down at completion of test ......ft.

If reducing strings of casing were cut off, state how cut ....

Depth from surface cut ......ft.

Size of casing cut ......in.

Lap in larger casing ......ft.

Was adapter or cement used? ....

If casing was swedged or repaired, state depth, describe repairs and condition in which casing was left and probable future effect:

Is well straight top to bottom, if not, what is the variation?

Will there be any detrimental effect on pump, and if so, what?

Give any additional data which may be of future value: ....

Total depth of well ......ft.

Formation: Mention size of water gravel— G.S. Elev. 1120'

ft.	to ft.	Formation
0	21	Adobe and clay
21	32	Sand and boulders
32	122	Clay
122	133	Gravel
133	137	Sand
137	190	Concrete sandstone

Date of Report ......, 19......

Driller.

FORM 1452 CODE 15161

4840D

WELL LOG

DEPARTMENT OF WATER & POWER OF THE CITY OF LOS ANGELES

#476

Well Number or Name E. F. Allerd

LOCATION 500' W. of Sayre St. and 500' N. S.F. Rd. near San Fernando but in L.A. City limit

MAP No.

WORK STARTED May 1933 WORK COMPLETED

1/2 ft. of 8 in. casing left in well

Type of perforator used

Perforated ft. to ft. holes per ft.

Diameter of perforations in., length in.

Depth at which water was first found ft.

Standing level before perforating ft.

Standing level after perforating 20' May 1933

Note your observation of any change in water level while drilling
Pump was pulled for repairs in June 1935. W. S. was 27'

Date tested 19

Water level when first started test ft.

Draw down from standing level ft.

G. P. M. at beginning of test

G. P. M. at completion of test

Draw down at completion of test ft.

If reducing strings of casing were cut off, state how cut

Depth from surface cut ft.

Size of casing cut in.

Lap in larger casing ft.

Was adapter or cement used?

If casing was swedged or repaired, state depth, describe repairs and condition in which casing was left and probable future effect:

Is well straight top to bottom, if not, what is the variation?

Will there be any detrimental effect on pump, and if so, what?

Give any additional data which may be of future value:

Total depth of well 112.00 ft.

Formation: Mention size of water gravel—

From (ft.)	To (ft.)	Formation
0	20	Top soil
20	40	Sand & gravel
40	60	Clay
60	80	Hard sand
80	100	Sand & clay
100	110	Hard sand & gravel
110	112	Clay

Equipment as of May 1938

3 H.P. Engine-horizontal belt drive
Capacity 16-20 gals. per min.
8" casing

2 1/2" plunger pump
2" Discharge line

Information and log obtained from Mr. Allerd (Owner & operator) by W.P. Maly - May 1938.

Date of Report 19

Driller.

FORM 1452 CODE 15181 20 PADS 12-55 P.O. 24323

WELL LOG

DEPARTMENT OF WATER & POWER
OF
THE CITY OF LOS ANGELES

4840J
(Sheet 1 of 2)

Well Number or Name Mission Well #5

LOCATION 432' E. of ℄ Astoria Street
178' N. of ℄ Genoa Street MAP No.

WORK STARTED September 24, 1959 WORK COMPLETED January 27, 1960

450 ft. of 20 in. 8 lb./ga. casing left in well

Type of perforator used Mills knife

Perforated (ft.)	to (ft.)	holes per ft.
64	83	18
145	153	18
200	236	18
285	293	18
349	359	18
370	385	18
386	415	18

Diameter of perforations 3/8 in., length 3 in.

Depth at which water was first found 38 ft.

Standing level before perforating 37 ft.

Standing level after perforating 32 ft.

Note your observation of any change in water level while drilling

Date tested , 19

Water level when first started test ft.

Draw down from standing level ft.

G. P. M. at beginning of test

G. P. M. at completion of test

Draw down at completion of test ft.

If reducing strings of casing were cut off, state how cut

Depth from surface cut ft.

Size of casing cut in.

Lap in larger casing ft.

Was adapter or cement used?

If casing was swedged or repaired, state depth, describe repairs and condition in which casing was left and probable future effect:

Is well straight top to bottom, if not, what is the variation?

Will there be any detrimental effect on pump, and if so, what?

Give any additional data which may be of future value:

Cement plug at bottom of well

Total depth of well 450 ft.

Formation: Mention size of water gravel—

ft.	to ft.	Formation
0	1	Decomposed granite fill
1	22	Gray clay
22	48	Boulders 4" to 6"
48	64	Gravel and sand, tight
64	82	Sand and gravel, water-bearing
82	128	Yellow clay
128	130	Gravel 1/2" to 1"
130	138	Yellow clay
138	145	Clay and gravel
145	152	Gravel, water-bearing
152	186	Yellow clay
186	193	Red clay
193	197	Sand and gravel
197	200	Yellow clay
200	235	Sand and gravel
235	246	Sand and gravel, streaks of clay
246	250	Sand and clay
250	265	Sand and gravel
265	276	Red clay
276	285	Brown clay
285	292	Gravel and sand, tight
292	302	Yellow clay
302	318	Conglomerate
318	321	Yellow clay
321	330	Yellow clay, small amount of gravel
330	349	Yellow clay
349	358	Sand and gravel, tight
358	370	Yellow clay
370	384	Sand and gravel, tight
384	386	Yellow, sandy clay
386	408	Gravel and coarse sand, water-bearing
408	410	Yellow clay
410	414	Gravel and sand
414	417	Yellow clay
417	418	Cemented sand
		(cont'd)

Date of Report , 19

Driller.

In charge

FORM 1452 CODE 15181 20 PADS 12-55 P.O. 24323

4840J
(Sheet 2 of 2)

WELL LOG
DEPARTMENT OF WATER & POWER
OF
THE CITY OF LOS ANGELES

Well Number or Name Mission Well #5

OCATION

MAP No.

WORK STARTED WORK COMPLETED

ft. of in. lb./ga. casing left in well

Type of perforator used

Perforated ft. to ft. holes per ft.

Diameter of perforations in., length in.

Depth at which water was first found ft.

Standing level before perforating ft.

anding level after perforating ft.

Note your observation of any change in water level while drilling

Date tested , 19

Water level when first started test ft.

Draw down from standing level ft.

G. P. M. at beginning of test

G. P. M. at completion of test

Draw down at completion of test ft.

If reducing strings of casing were cut off, state how cut

Depth from surface cut ft.

Size of casing cut in.

Lap in larger casing ft.

Was adapter or cement used?

If casing was swedged or repaired, state depth, describe repairs and condition in which casing was left and probable future effect

Is well straight top to bottom, if not, what is the variation?

Will there be any detrimental effect on pump, and if so, what?

Give any additional data which may be of future value:

Total depth of well ft.

Formation: Mention size of water gravel—

From (ft.)	To (ft.)	Formation
418	422	Yellow clay
422	426	Clay and gravel
426	434	Yellow clay, small amount of gravel
434	443	Yellow clay
443	447	Gravel
447	450	Yellow clay

Date of Report June 28, 1960

Fred Alcantar

Driller.

In charge

FORM 1452 CODE 15181

48508

WELL LOG

DEPARTMENT OF WATER & POWER OF THE CITY OF LOS ANGELES

520

Well Number or Name Frankhouse Well (San Fernando)

LOCATION 1000± N. W. ℄ Hubbard; on ℄ of Ralston Produced
12" well, drilled and abandoned May 1904 MAP No.

WORK STARTED WORK COMPLETED May 1904

ft. of 12 in. lb./ga. casing left in well

Type of perforator used

Perforated ft. to ft. holes per ft.

Diameter of perforations in., length in.

Depth at which water was first found ft.

Standing level before perforating ft.

Standing level after perforating ft.

Note your observation of any change in water level while drilling

Date tested , 19

Water level when first started test ft.

Draw down from standing level ft.

G. P. M. at beginning of test

G. P. M. at completion of test

Draw down at completion of test ft.

If reducing strings of casing were cut off, state how cut

Depth from surface cut ft.

Size of casing cut in.

Lap in larger casing ft.

Was adapter or cement used?

If casing was swedged or repaired, state depth, describe repairs and condition in which casing was left and probable future effect:

Is well straight top to bottom, if not, what is the variation?

Will there be any detrimental effect on pump, and if so, what?

Give any additional data which may be of future value:

Total depth of well ft.

Formation: Mention size of water gravel—

From (ft.)	To (ft.)	Formation
1	25	Common soil
25	26	Red clay
26	36	Water gravel
36	126	Red clay
126	130	Cement gravel
130	142	Hard red sand
142	150	Red clay, some gravel
		Water came to 7' of top
150	186	Cement clay

Information from small red notebook of F. A. Powell and now in possession of City of San Fernando Engineer's office, copied by Ross W. Mathews, Jan. 28, 1947.

Date of Report , 19

Driller.