RAYMOND BASIN
SALT AND NUTRIENT MANAGEMENT PLAN

FINAL REPORT

RAYMOND BASIN
MANAGEMENT BOARD

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STETSON ENGINEERS INC.
861 VILLAGE OAKS DRIVE – COVINA, CALIFORNIA 91724

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EXECUTIVE SUMMARY

The State Water Resources Control Board approved Resolution No. 2009-0011 to adopt the Recycled Water Policy in February 2009. Included in that resolution is a requirement for a Salt and Nutrient Management Plan (SNMP) to be prepared for all groundwater basins. The Raymond Basin Management Board is the lead agency for the preparation of the Raymond Basin SNMP. The primary stakeholders include the Metropolitan Water District of Southern California, the Los Angeles County Sanitation Districts, and the Los Angeles County Department of Public Works.

The SNMP reviewed the geology, hydrology and hydrogeology of the Raymond Basin, along with the institutional and management structure for the Raymond Basin. TDS, Nitrate, Sulfate, and Chloride were identified as the primary constituents of concern. Sources of loading (precipitation, subsurface inflow, infiltration of applied water, storm runoff and untreated imported water replenishment) and unloading (groundwater pumping and subsurface outflow) were included in a spreadsheet computer model, along with average water quality data for TDS, Nitrate, Sulfate, and Chloride, on an annual basis. The Raymond Basin Management Board developed this spreadsheet model as a tool to calculate the impacts of loading and unloading from numerous water supply components.

The SNMP determined the assimilative capacity of the primary constituents of concern and evaluated hypothetical groundwater replenishment projects in order to determine the loadings and impacts resulting from the projects. The loading and unloading calculations were performed for each of the three subareas (Monk Hill, Pasadena, and Santa Anita) of the Raymond Basin. The assimilative capacity was also determined for each subarea. The Recycled Water Policy sets an interim goal that no single project is to use more than 10 percent of the available assimilative capacity, or combination of projects to use more than 20 percent of the available assimilative capacity. Consequently, as part of this SNMP, the antidegradation analysis calculated the collective amount of water from potential future projects that could be replenished in the Basin without exceeding the very conservative value of 10 percent of the available assimilative capacity.

Using the assimilative capacity assessment tool and conservatively assuming a water quality similar to recycled water, the maximum annual recharge of new water allowed before exceeding 10 percent of the assimilative capacity was determined for each subarea in the Basin. Table III.18 indicates that approximately 225 acre-ft per year of new water with a particular quality would use 10 percent of the available assimilative capacity for TDS and the Monk Hill Subarea. Table III.19 indicates that approximately 405 acre-ft per year of new water with a particular quality would use 10 percent of the available assimilative capacity for sulfate in the Pasadena subarea. Table III.20 indicates that approximately 245 acre-ft per year of new water with a particular quality would use 10 percent of the available assimilative capacity for sulfate in the Santa Anita subarea.

The Raymond Basin has been managed for many decades by the Raymond Basin Management Board, in conjunction with other stakeholders, in order to control salt and nutrient loading to preserve the high quality groundwater supplies. The SNMP acknowledges the historical practice of replenishing the Raymond Basin with stormwater runoff which has high quality water, particularly regarding TDS. Existing programs include support of stormwater runoff replenishment conducted by LACDPW and a water quality monitoring program conducted by area water purveyors.

The Raymond Basin has experienced unprecedented drought conditions since calendar year 2006. As a result, the groundwater elevation in the three subareas has decreased. Since 1943, when the Raymond Basin was adjudicated, to present, the RBMB has actively managed water quality through existing implementation measures. Nonetheless, the SNMP acknowledges increasing water quality trends in the Monk Hill and Pasadena subareas. The SNMP identifies a variety of existing and potential implementation measures including continued basin management practices; pursuit of potential new replenishment sites; water quality monitoring; and coordination between agencies which will help manage salts and nutrients in the Raymond Basin.

The implementation of the SNMP will satisfy the requirements of the Recycled Water Policy by providing a framework for the long-term management of salts and nutrients in the Raymond Basin, while encouraging and allowing for increased use of recycled water areas.

CHAPTER I

INTRODUCTION

In February 2009, the State Water Resources Control Board of the State of California (State Water Board) approved the Resolution No. 2009-0011 adopting the Recycled Water Policy (Policy), as shown in Appendix A, to encourage the use of recycled water from municipal wastewater sources as a safe alternative source of water supply while complying with Resolution No. 68-16 to *"achieve the highest water quality consistent with maximum benefit to the people of the State."* The goal of this Policy is to increase the use of recycled water over 2002 levels by at least one million acre-feet per year (af/yr) by 2020 and at least two million af/yr by 2030. Recognizing that some groundwater basins in the state contain salt and nutrients that exceed or threaten to exceed water quality objectives established in the Water Quality Control Plans (Basin Plans), and that not all Basin Plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salt and nutrients, the State Water Board determined that the appropriate way to address salt and nutrient issues is through the development of regional or sub-regional salt and nutrient management plans (SNMPs) rather than through imposing requirements solely on individual recycled water projects. The SNMP development process should include compliance with the California Environmental Quality Act (CEQA) and participation by Regional Water Boards' staff, and the Plans should be submitted to the appropriate Regional Water Board within five years from the effective date of the Policy, i.e. May 14, 2014. The Raymond Basin Management Board (RBMB) has received an extension to submit the Raymond Basin SNMP by May, 2015. The Policy requires Regional Water Boards to review the plans and consider each for adoption as basin plan amendments within one year of submittal.

In accordance with the Policy, a science advisory panel (Panel) was convened to provide guidance on future actions related to monitoring constituents of emerging concerns (CECs) in recycled water. The Panel, in its June 25, 2010 report entitled *"Monitoring Strategies for Chemicals of Emerging Concern in Recycled Water – Recommendations of a Scientific Advisory Panel"* (Appendix A), provided recommendations for monitoring specific CECs in recycled water used for groundwater recharge reuse. The State Water Board incorporated the Panel's recommendations into a proposed revision of the Policy dated September 14, 2012 (Revised Policy).

Section 6.b(1)(a) of the Recycled Water Policy (see Appendix A) states in part "…the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans…" In compliance with the Policy, the Regional Water Boards act as an overseer and facilitator of the SNMP development process. In the Los Angeles Region, Board staff has attended stakeholder meetings for various groundwater basin/subbasin groups to provide support and information. In the Raymond Groundwater Basin (Basin), the RBMB is the lead agency for the development of the SNMP for the Basin (Raymond Basin SNMP) in conjunction with Raymond Basin Producers. In the Raymond Basin, the sources of salt/nutrient loading is recharge of stormwater runoff and imported water. The "local salt/nutrient contributing stakeholders" have been identified as the County of Los Angeles Department of Public Works (LACDPW) which is responsible for stormwater recharge; and Metropolitan Water District of Southern California (MWD) which collectively are responsible for the delivery of imported water in the Raymond Basin. RBMB staff has coordinated closely with the Regional Water Board/Los Angeles Region (LARWQCB) staff on the development progress and the contents of the Raymond Basin SNMP. Following the annual stakeholder workshop in November 2011, LARWQCB staff authorized RBMB to proceed with the development of the Raymond Basin SNMP.

RBMB has held numerous meetings with the "local salt/nutrient contributing stakeholders" including meetings held on October 7, 2010; March 7, 2013; December 11, 2014; and May 21, 2015. The primary source of salt and nutrient unloading is through groundwater extraction by Basin groundwater producers. RBMB staff regularly informed the Basin producers during the Pumping and Storage Committee meetings.

In the letter dated October 4, 2012 RBMB described its assimilative capacity approach to LARWQCB staff. Subsequently, in a letter dated December 21, 2012, LARWQCB staff provided a response approving the proposed assimilative capacity approach. Furthermore, RBMB staff participated in LARWQCB SNMP workshops held on November 15, 2010; November 15, 2011; November 15, 2012; November 14, 2013; and December 4, 2014.

The development of the Raymond Basin SNMP considers document entitled *“Regional Water Board Assistance in Guiding Salt and Nutrient Management Plan Development in the Los Angeles Region”* (Guidance). The final Guidance was dated June 28, 2012, and is included as Appendix B. The purpose of the Guidance is to provide information and guidance to assist on certain aspects of the SNMP development identified by stakeholder groups to ensure the final product is compliant with the specific requirements of the Policy, and state and federal water quality laws, but the *“stakeholders have the flexibility to apply any scientifically defensible methodology to make these determinations,”* i.e. estimates of basin/subbasin assimilative capacities and mass loadings. As a result, RBMB staff reorganized the Raymond Basin SNMP contents and developed an approach for determining the Raymond Basin salt/nutrient loading and assimilative capacities.

The RBMB has developed a spreadsheet computer model that assigns annual volume and concentration to the various components of loading and unloading. The annual quantity (volume) for each component has been taken from the draft report entitled “Raymond Basin Conjunctive Use Management Plan for the Foothill Communities Water Supply Reliability Study - 50 percent Model Update and Recalibration” (Water Supply Reliability Study – 50 percent Update). Components of loading include subsurface inflow, precipitation, percolation of applied water (irrigation), runoff from mountains, percolation of stormwater run-off in spreading grounds, and injection of treated imported water. Components of unloading include subsurface outflow and groundwater production.

Calculations of loading and unloading are performed on an annual basis Water quality data for Total Dissolved Solids (TDS), Nitrate, Chloride, and Sulfate have been researched and concentrations have been applied. In some cases, water quality data was not readily available. Loading and unloading calculations have been performed for the 18-year period of fiscal year 1994-95 through fiscal year 2011-12.

This SNMP was prepared to fulfill the Policy specific requirements. Chapter II describes the Policy's mandate for the use of recycled water. Chapter III describes the Raymond Basin SNMP including its goal and objectives; characterization of the Basin; sources of salt and nutrients including their fate and transport; methodology for determining salt/nutrient loadings and assimilative capacities; estimates for salt/nutrient loadings and assimilative capacities; and implementation measures for recycled water, stormwater recharge, and others. Chapter IV provides an antidegradation analysis. Chapter V describes the basinwide salt/nutrient monitoring plan including a description of the monitoring network, monitoring schedule and frequency, and responsible stakeholders. Recommendations for future activities are provided in Chapter VI.

CHAPTER II

MANDATE FOR THE USE OF RECYCLED WATER

II.1. BACKGROUND

On February 9, 2009, the State Water Board adopted Resolution 2009-0011 which created the "Recycled Water Policy". The Recycled Water Policy recognized that "…collapse of the Bay-Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River, and failing levees in the Delta, to create a new reality that challenges California's ability to provide the clean water need for a healthy environment, a healthy population and a healthy economy, both now and in the future." The Recycled Water Policy encourages appropriate water recycling, water conservation and use of stormwater to increase water supplies within California. The mandates contained within the Recycled Water Policy are briefly addressed below.

II.2. SUMMARY OF MANDATES

Section 4 of the Recycled Water Policy provides the "Mandate for the Use of Recycled Water" and is summarized below.

"*a. The State Water Board and Regional Water Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws.*

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy [acre-feet per year] by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The

State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

(2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

(3) The State Water Board hereby declares that, pursuant to Water Code sections 13550 et seq., it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject to the conditions established in sections 13550 et seq. The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible to enforce the mandates of this subparagraph.

b. These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.

c. The water industry and the environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.

d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC), and the California Department of Water Resources (CDWR) to use their respective authorities to the fullest extent practicable to assist the State Water Board and the Regional Water Boards in increasing the use of recycled water in California.” [1]

As a result of these mandates and coordination with LARWQCB staff, RBMB has taken the role of lead agency to develop the SNMP for the Raymond Basin. The SNMP, and the spreadsheets models which have been developed, will be used as a tool to evaluate the impacts of future projects on the existing water quality of the groundwater basin.

CHAPTER III

SALT AND NUTRIENT MANAGEMENT PLAN

III.1. GOAL AND OBJECTIVES

The primary goal of the Raymond Basin SNMP is to assist the RBMB and participating/potential stakeholders to comply with the Policy regarding the use of the recycled water from municipal wastewater treatment facilities as a safe source of water supply, while maintaining the water quality objectives for salt and nutrients in the Basin Plan established by the LARWQCB.

The primary objective of the Raymond Basin SNMP is to comply with the specific requirements described in the Policy. They include (1) characterization of the Basin, (2) identification of sources of salt, nutrients, and their fate and transport, (3) estimation of salt, nutrients loadings and assimilative capacities, (4) identification of water recycling and stormwater recharge/use goals and objectives, (5) verification of compliance with Resolution No. 68-16 through antidegradation analyses, and (6) monitoring plan to verify compliance with the Basin water quality objectives. The focus of the Raymond Basin SNMP is on Total Dissolved Solids (TDS), nitrate, chloride and sulfate.

III.2. BASIN PLAN WATER QUALITY OBJECTIVES

The Raymond Basin is one of 24 groundwater basins located within the Los Angeles Region under jurisdiction of the LARWQCB, extending from Rincon Point (on the coast of western Ventura County) to the eastern Los Angeles County line, as shown on Plate III.1. The LARWQCB adopts and implements the Basin Plan that serves as a basis for its regulatory program. The current Basin Plan, adopted in 1994 and as amended through 2011 [2], combines and replaces the earlier plans: the *Water Quality Control Plan: Santa Clara River Basin* [3] *and* the *Water Quality Control Plan: Los Angeles River Basin* [4].

The Basin Plan establishes water quality standards for the surface and ground waters of the Los Angeles Region based upon designated beneficial uses of water and numerical water quality objectives that must be maintained or attained to protect those uses. Beneficial uses for regional groundwater basins generally include:

- Municipal and Domestic Supply (MUN) for community, military, or individual water supply systems including, but not limited to, drinking water supply;
- Industrial Service Supply (IND) for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, geothermal energy production, hydraulic conveyance, gravel washing, fire protection, and oil well repressurization;
- Industrial Process Supply (PROC) for industrial activities that depend primarily on water quality;
- Agricultural Supply (AGR) for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, and support of vegetation for grazing stock; and
- Aquaculture Supply (AQUA) for aquaculture or mariculture operations including, but not limited to, propagation, cultivation, maintenance, and harvesting of aquatic plants and animals for human consumption or bait purposes.

The Basin designated beneficial uses (Table 2-2 of the Basin Plan [2]) include MUN, IND,] PROC, and AGR. The Basin groundwater is subject to the following objectives (Referenced tables in italics are included in the Basin Plan.):

Bacteria, Coliform

In ground waters designated as MUN, the concentration of coliform organisms over any seven-day period shall be less than 1.1/100 milliliters.

Chemical Constituents and Radioactivity

Ground waters designated as MUN shall not contain concentrations of chemical constituents and radionuclides in excess of the limits specified in the following provisions of Title 22 of the California Code of Regulations which are incorporated by reference into this plan: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 64431-B of Section 64431 (Fluoride), Table 64444-A of Section 64444 (Organic Chemicals), and Table 4 of Section 64443 (Radioactivity). This incorporation by reference is prospective including future changes to the incorporated provisions as the changes take effect. (See Tables 3-5, 3-6, 3-7, and 3-9.)

Ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial uses.

Mineral Quality

Numerical mineral quality objectives for individual groundwater basins are contained in Table 3-10.

Nitrogen (Nitrate, Nitrite)

Ground waters shall not exceed 10 mg/L nitrogen as nitrate-nitrogen plus nitrite-nitrogen (NO_3-N + NO_2-N), 45 mg/L as nitrate (NO_3), 10 mg/L as nitrate-nitrogen (NO_3-N), or 1 mg/L as nitrite-nitrogen (NO_2-N).

Taste and Odor

Ground waters shall not contain taste and odor or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses.

The numerical water quality objectives for the Basin groundwater, which are based on the June 21, 2012 update of Title 22 of the California Code of Regulations (CCRs) [5], are summarized in Table III.1. Neither the Basin Plan nor Title 22 of the CCRs has established the numerical water quality objectives for taste and odor.

The LARWQCB also implements State and federal antidegradation policies to maintain high quality of both surface and ground waters in California (Resolution No. 68-16 and 40 CFR 131.12 [6]). Under the State Nondegradation Objective, whenever the existing quality of water is better than that needed to protect all existing and probable future beneficial uses, the existing high quality shall be maintained until or unless it has been demonstrated to the State that any change in water quality will be consistent with the maximum benefit of the people of the State, and will not unreasonably affect present and probable future beneficial uses of such water. Therefore, unless conditions are met, background water quality concentrations (the concentrations of substances in natural waters which are unaffected by waste management practices or contamination incidents) are appropriate water quality goals to be maintained. If it is determined that some degradation is in the best interest of the people of California, some increase in pollutant level may be appropriate. However, in no case may such increases cause adverse impacts to existing or probable future beneficial uses of waters of the State.

III.3. RAYMOND GROUNDWATER BASIN

The Raymond Basin geology and hydrogeology was characterized in Bulletin No. 45, "South Costal Basin Investigation", prepared by the California Department of Public Works, Division of Water Resources in 1934 [7]. Subsequently the State of California released the "Report of Referee" in 1943 which expanded on the geology and hydrogeology of the area, and provided an emphasis on groundwater production, groundwater replenishment, and safe yield, and served as the basis for the Raymond Basin adjudication [8]. CDWR published Bulletin 104-6 which provided information regarding the future effective management of the groundwater supplies in coordination with surface water supplies and facilities [9]. The Raymond Basin SNMP contains information on geology and hydrology of the Raymond Basin which is referenced from these reports. Furthermore, since the publication of these reports, additional information on hydrogeology, water quality, and groundwater management has become available to provide a better understanding of the characteristics and responses of groundwater in the Raymond Basin.

III.3.1. Geography

The Raymond Basin underlies the northwesterly portion of the San Gabriel Valley and is located in Los Angeles County about 10 miles northeasterly of downtown Los Angeles (Plate III.1). Raymond Basin is a wedge in the northwestern portion of the San Gabriel Valley and is bounded on the north by the San Gabriel Mountains, on the west by the San Rafael Hills, and is separated from the Main San Gabriel Basin on the southeast by the Raymond Fault. The Raymond Basin is divided into an eastern unit, the Santa Anita Subarea, a central unit, the Pasadena Subarea, and a western unit, the Monk Hill Subarea (Plate III.2). The surface area of Raymond Basin is about 40.9 square miles. Within the Raymond Basin, the Monk Hill Subarea underlies the City of La Canada - Flintridge and the northwesterly portion of the City of Pasadena. The larger Pasadena Subarea underlies most of the City of Pasadena and the unincorporated area of Altadena. The Santa Anita Subarea underlies the Cities of Arcadia and Sierra Madre.

The principal streams in the Raymond Basin are the Arroyo Seco, which drains the Monk Hill Subarea to the Los Angeles River, the Eaton Wash which drains the Pasadena Subarea and flows to the Rio Hondo, a distributary of the San Gabriel River, and the Santa Anita Wash which drains the Santa Anita Subarea and flows to the Rio Hondo, as shown on Plate III.2.

III.3.2. Geology

The geology of the Raymond Basin is described in detail in the “Report of Referee” prepared in 1943 [8] by the State of California, Division of Water Resources, and the geology is summarized below.

The Raymond Basin is roughly triangular in shape. Its northerly boundary, about twelve miles in length, is formed by a portion of the southern front of the San Gabriel Mountains. The western boundary of the Raymond Basin is about eight miles long and is composed chiefly of the same

Basement Complex rocks which form the mountains, and which are continuous at depth, together with a small area of marine Tertiary sediment at the southern end. Raymond Fault, the southern boundary of the triangle, crosses the San Gabriel Valley floor for a distance of about nine miles, connecting a granitic spur from the San Gabriel Mountains at the eastern end of the Raymond Basin with Tertiary sediments outcropping in its southwestern corner. The Raymond Fault separates the Raymond Basin from the Main San Gabriel Basin in the vicinity of the southeasterly boundary. The fault zone is not impervious and groundwater can flow across this boundary into the Main Basin. The source of natural groundwater supply to the Raymond Basin is direct rainfall, percolation from surface runoff from the northern and western sides, underflow from the Verdugo Basin, and possibly some underground percolation of water from the mountain mass to the alluvium. The general geology of the Basin is shown on Plate III.3.

III.3.2.1 Nonwater-Bearing Formations

The nonwater-bearing formations include the Basement Complex rocks and Tertiary sediments of the Topanga, Modelo and Puente formations (Plate III.3). The nonwater-bearing formations do not absorb, transmit or yield water readily. The Basement Complex is comprised of old pre-Cretaceous series of crystalline rocks that comprise the basal formation of the region. These are chiefly igneous plutonic rocks of granitic type, together with their metamorphic phases, such as schists, gneisses, and also various intrusive dikes. The Basement Complex comprises the majority of San Gabriel Range to the north and the San Rafael Hills to the west. The Basement Complex protrudes above the alluvium at Monk Hill and near the head of Eaton Wash demonstrating that it is continuous beneath the area. The Topanga formation is of Tertiary age. In Raymond Basin, it is represented by fairly well bedded shales, sandstones, and conglomerates that are well consolidated and practically impervious. The exposed Topanga beds are limited to the southwesterly corner of the area along a fault block where the formation is exposed for a mile in the channel of Arroyo Seco just northerly of the Raymond Fault and for about one and one-quarter miles easterly from the Arroyo Seco to Raymond Hill.

III.3.2.2 Water-Bearing Formations

The CDWR Bulletin No. 45 [7] characterized the water-bearing formations of the Raymond Basin as alluvial fill having characteristics of the coarse deposits found in the small basins near the mountain margins. The deposits are coarsest at the base of the mountains where they contain boulders several feet in diameter, but even in the southerly part of the basin, cobbles, stones, and boulders are not uncommon. There are practically no true sand beds in the northerly part of Raymond Basin. The average sand content in the basin sediments as determined from well logs is only 2.8 percent. The deposits are characterized throughout by an abundance of weathered material. Decomposed yellowish gravels, clayey yellow and red gravels, and red or brown residual soil clays are the typical deposits (Plate III.3).

The older alluvium found within the area is practically continuous along the entire southerly flank of San Gabriel Range with little change in composition or structure. Within the Raymond Basin, it constitutes practically all of the water-bearing series and is not only dominant at the surface but appears to continue with depth to bedrock, although at depth, it may be in contact with some of the late Tertiary sediments. No attempt to differentiate these sediments has been attempted because of the similarity of material recorded in well logs. The older alluvial fill consists of a small portion of sand and almost equal proportions of gravel and clay. Older alluvial fill is of great thickness and its deposition has occurred through a long period. Weathering, disintegration, and cementation have been continuous and the results have varied with local conditions and there is considerable spatial variation in the water yielding characteristics of this formation.

Recent alluvium occupies channels, washes, and flood plains of Arroyo Seco, Eaton Creek, and Big and Little Santa Anita Creeks, and to a lesser extent, exists as veneers scattered along the slope of the valley resulting from flood discharges of ephemeral streams (Plate III.3). For the most part, the recent alluvium is believed to be shallow, but in the upper portions of Little Santa Anita Wash, the indications are that the recent alluvium may extend to a depth of about 150 feet. These sediments are similar to those found in the older alluvium but contain a much smaller proportion of clay and are unconsolidated.

III.3.2.3 Geological Features and Faults

According to the Report of Referee [8], the geologic structure of Raymond Basin is complicated. The rough surface topography of the Basement Complex outside the area indicates that the bedrock floor beneath the alluvium undulates, although the present mountain block undoubtedly exhibits a more rugged topography due to its recent rejuvenation with accompanying accentuation of erosive forces, then the old erosion surface was buried and protected by alluvial deposits of the area. However, within the area, except at the boundaries, and the granitic protrusions at Monk Hill and near the north end of Eaton Wash, there is no surface expression of undulations of bedrock which might indicate possible impediments to groundwater movement.

The San Gabriel Fault cuts through the central portion of San Gabriel Mountains and has an east-west trend. It is one of the main faults in the mountain block but is so distant that its effect upon the Raymond Basin area is only indirect.

The Sierra Madre Fault system is a broad zone of faulting with an east-west trend roughly parallel to the southern edge of the San Gabriel Mountains, swinging to the northwest in the vicinity of Sierra Madre. The main trace of this zone leaves the southern edge of the foothills at a point west of the mouth of Eaton Wash, penetrating the mountain block in a north-westerly direction for some distance before it again swings to the west. The bedrock contours as a result of the geophysical survey indicate a uniform northerly slope of the buried bedrock surface from San Rafael Hills.

The Raymond fault forms the boundary between the Raymond Basin and the Main San Gabriel Basin from the City of South Pasadena on the west to the City of Monrovia on the east. It is likely a thin, impervious gouge formed in alluvium because it creates a several hundred foot difference in water level elevation in approximately 2,700 feet between Del Mar Well of California American Water Company (CAWC) and Well No. 3 of San Gabriel County Water District (Plate III.4). In addition to the difference in water level elevation, the barrier effect of the Raymond fault is indicated by the presence of artesian conditions during periods of high water levels, and by the creation of ponds and swampy areas north of the fault line. As shown on semi-annual groundwater contour maps generated by the RBMB (Plate III.5), the Raymond fault appears to impede groundwater movement southward from the Raymond Basin into the Main San Gabriel Basin.

III.3.3. Hydrology

III.3.3.1 Precipitation

The Raymond Basin is located within a region of both semiarid and Mediterranean climate, with warm, dry summers and mild winters with intermittent rain. The majority of the annual rainfall occurs between December and March. Precipitation in the Raymond Basin area has been monitored by a network of precipitation stations operated by Los Angeles County, Department of Public Works (LACDPW). For the purposes of the Raymond Basin SNMP, stations with the longest continuous records (1924-25 to 2011-12 fiscal years) were selected (Plates III.6). The annual precipitation at the selected stations was obtained from LACDPW (Appendix C). Station Nos. 63, 175, 235, and 338, all of which are outside Raymond Basin, were used to calculate the mean annual precipitation for the mountain watershed, as shown on Plate III.7a. Station Nos. 167, 176, 591, and 610 were used to calculate the mean annual precipitation of the valley floor as shown on Plate III.7b. Annual precipitation within the Raymond Basin is more variable in the mountain watershed than in the valley floor. The mountain watershed (28.40 inches) averages about 7 inches more annual precipitation than the valley floor (21.33 inches).

Monk Hill Subarea

Recharge of the Monk Hill Subarea from precipitation occurs on the mountain watershed and on the valley floor. Precipitation in the mountain watershed has ranged from 760 acre-feet to 9,280 acre-feet during the period of 1994-95 through 2011-12, as shown in Appendix G. The long-term average annual recharge has been 3,500 acre-feet, as shown on Plate III.8a.

Recharge of the Monk Hill subarea from precipitation on the valley flow has ranged from 17 acre-feet to 3,220 acre-feet during the period 1994-95 through 2011-12, as shown in Appendix G. The long-term average annual recharge has been 790 acre-feet, as shown on Plate III.8a.

Pasadena Subarea

Recharge of the Pasadena Subarea from precipitation occurs on the mountain watershed and on the valley floor. Precipitation in the mountain watershed has ranged from 180 acre-feet to 2,250 acre-feet during the period of 1994-95 through 2011-12, as shown in Appendix H. The long-term average annual recharge has been 850 acre-feet, as shown on Plate III.8b.

Recharge of the Pasadena subarea from precipitation on the valley flow has ranged from 40 acre-feet to 8,620 acre-feet during the period 1994-95 through 2011-12, as shown in Appendix H. The long-term average annual recharge has been 2,120 acre-feet, as shown on Plate III.8b.

Santa Anita Subarea

Recharge of the Santa Anita subarea from precipitation occurs on the mountain watershed and on the valley floor. Precipitation in the mountain watershed has ranged from 410 acre-feet to 5,040 acre-feet during the period of 1994-95 through 2011-12, as shown in Appendix I. The long-term average annual recharge has been 1,900 acre-feet, as shown on Plate III.8c.

Recharge of the Santa Anita subarea from precipitation on the valley flow has ranged from 10 acre-feet to 1,480 acre-feet during the period 1994-95 through 2011-12, as shown in Appendix I. The long-term average annual recharge has been 370 acre-feet, as shown on Plate III.8c.

III.3.3.2 Surface Water System

The entire Raymond Basin area lies within the watershed of the Los Angeles River (CDWR Bulletin 104-6 [9]), and surface runoff from the San Gabriel Mountains enters the area through numerous streams, principally the Arroyo Seco, Eaton Wash, and Santa Anita Wash. About one-third of the surface runoff is conveyed by the Arroyo Seco, the largest of the streams, which flows across the Monk Hill Subarea and the Pasadena Subarea, and joins the Los Angeles River by cutting through the San Rafael Hills. Outflow from the western portion of the Monk Hill Subarea reaches the Los Angeles River through the Verdugo Wash. The balance of the surface runoff primarily flows in Eaton Wash and the Santa Anita Wash to the Rio Hondo and ultimately drains to the Los Angeles River.

Artificial recharge of stormwater runoff occurs in off-stream spreading grounds (Plate III.6). The Raymond Basin does not receive untreated imported water for groundwater replenishment; however, treated imported water has been injected into the Monk Hill Subarea for many years (Appendix D.

<u>Monk Hill Subarea</u>

Artificial recharge of the Monk Hill subarea historically has occurred as a result of infiltration of stormwater runoff and, to a lesser degree, injection of treated imported water. Artificial recharge has ranged from 450 acre-feet to 9,700 acre-feet during the period of 1994-95 through 2011-12, as shown in Appendix G. Injection of treated imported water has range from zero acre-feet to 1,480 acre-feet during the period of 1994-95 through 2011-12, as shown in Appendix G. The average combined annual recharge from artificial recharge and injection has been 3,400 acre-feet, as shown on Plate III.8a.

<u>Pasadena Subarea</u>

Artificial recharge of the Pasadena subarea historically has occurred as a result of infiltration of stormwater runoff and to a lesser degree, injection of treated imported water. Artificial recharge has ranged from 820 acre-feet to 8,740 acre-feet during the period of 1994-95 through 2011-12, as shown in Appendix H. Injection of treated imported water has ranged from zero acre-feet to 16 acre-feet during the period of 1994-95 through 2011-12, as shown in Appendix H. The average combined annual recharge from artificial recharge and injection has been 3,000 acre-feet, as shown on Plate III.8b.

<u>Santa Anita Subarea</u>

Artificial recharge of the Santa Anita subarea historically has occurred as a result of infiltration of stormwater runoff. Artificial recharge has ranged from 520 acre-feet to 4,540 acre-feet during the period of 1994-95 through 2011-12, as shown in Appendix I. The average annual recharge has been 2,000 acre-feet, as shown on Plate III.8c.

III.3.4. Hydrogeology

The Raymond Basin is a structural basin filled with permeable alluvial deposits, which is underlain and surrounded by relatively impermeable rock. It forms an aquifer, i.e. *"a geologic unit that can store and transmit water at rates fast enough to supply reasonable amounts to wells"* [10]. The Basin aquifer is stratified in some areas by confining or semi-confining layers consisting of impermeable or less-permeable materials such as clay or silt. In these areas, the Basin aquifer is an aquifer system that may include an unconfined or water-table aquifer overlying individual confined or artesian aquifers separated by semi-confining or confining layers. Groundwater in the confined aquifers is normally under pressure; therefore, water will rise in a well drilled to these aquifers to a level above their overlying confining layer, which is called the potentiometric surface [10]. In general, the Basin aquifer is classified as an unconfined to semi-confined aquifer system because the semi-confining or confining layers are not continuous across the Basin. The base of the water bearing zones is considered bedrock with elevations ranging from approximately 500 feet below sea level to 2,000 feet above mean sea level. Depth to bedrock ranges from 450 to 750 feet below ground surface (bgs) in the Monk Hill and Santa Anita subareas to more than 1,200 feet bgs in the Pasadena subarea. The total storage capacity of the Raymond Basin is estimated to be approximately 1.37 million AF [7]. The amount of water in storage in 2003 was approximately 800,000 AF, with an unused storage space of about 570,000 [11].

III.3.4.1 Aquifer Characteristics

Performance of an aquifer depends on two characteristics or parameters: transmissivity (T) and storage coefficient or coefficient storage or storativity (S). The transmissivity of an aquifer is defined as *"the amount of water that can be transmitted horizontally by the full saturated thickness of the aquifer under a hydraulic gradient [or slope] of 1"* [10]. It is the product of the hydraulic conductivity or permeability (K) and the saturated thickness of the aquifer (b), $T = bK$. Common units are gallons per day per square foot (gpd/ft^2) or feet per day (ft/d) for K and gallons per day per foot (gpd/ft) or square feet per day (ft^2/d) for T. The storage coefficient or storativity of an aquifer is defined as *"the volume of water that a permeable unit will absorb or expel from storage per unit surface area per unit change in head"* [10]. It is a dimensionless quantity and representative of the aquifer condition. It is usually less than 0.005 for confined aquifers and ranges from 0.02 to 0.30 for unconfined aquifers.

III.3.5. Groundwater Storage Capacity and Groundwater in Storage

The CDWR defines groundwater storage capacity of an individual basin as the product of the total volume of that basin (from ground surface to the base) and its average specific yield. The storage capacity is constant and is dependent on the geometry and hydrogeologic characteristics of the aquifer(s) [13]. As a result, the storage capacity defined by the CDWR is the amount of groundwater that can be drained by gravity from the completely saturated basin, i.e. the amount of groundwater that can be extracted from the basin. The CDWR groundwater storage capacity does not include the amount of groundwater that is retained in small pore spaces due to surface retention. The CDWR further defines groundwater in storage as the amount of groundwater that can be drained (or extracted) from a basin between the water table and its base.

According to CDWR Bulletin 104-6 [9], the total storage capacity of the Raymond Basin was calculated at 1,450,000 acre-feet applying specific yield values ranging from 3 to 35 percent to all aquifer material from 20 feet below the surface to the base of sediments. This value is consistent with an area of 26,200 acres, an average thickness of about 550 feet, and an average specific yield of about 10 percent. CDWR estimated the available stored water to be 1,000,000 acre-feet in 1970 [9], leaving about 450,000 acre-feet of storage space available. In the Baseline Ground Water Assessment of the Raymond Basin – Final Report, prepared by Geoscience [11], the Raymond Basin storage capacity was estimated at 1,370,000 acre-feet with an estimated stored water of 800,000 acre-feet, leaving about 570,000 acre-feet of storage space available. For the basin characterization for this salt and nutrient management plan, it was assumed that the water-bearing zones were uniform across the basin. Therefore, the volume of groundwater in storage for each subarea was determined as a percentage of the surface area, using 800,000 AF as the base water volume (Table III.2).

III.3.5.1 Groundwater Level and Movement

Raymond Basin historical groundwater levels are presented in Plates III.9a, III.9b, and III.9c. Groundwater levels in the Raymond Basin range from about 350 feet above Mean Sea Level (MSL) in Santa Anita subarea (Plate III.9c) to more than 1,050 feet above MSL in the Monk Hill Subarea (Plates III.9a). Groundwater generally flows southeast from the Monk Hill Subarea in the northwest to the Raymond fault in the southeast (Plates III.10a and III.10b).

<u>Monk Hill Subarea</u>

Groundwater levels in the Monk Hill subarea (Plate III.9a) have fluctuated, but remained relatively stable since 2000. In general, groundwater flows from the Monk Hill subarea into the Pasadena subarea, as shown on Plates III.10a and III.10b. The quantity of subsurface flow is discussed in Section III.3.5.2.

Pasadena Subarea

The Pasadena Subarea has experienced a significant decrease in the groundwater levels as shown on Plate III.9.b. As a result of the decreasing groundwater levels, RBMB adopted Resolution 42-0109 which put in place a self-imposed pumping reduction to allow more groundwater to remain in the Basin. During fiscal year 2008-09 to fiscal year 2012-13 the “1955 Decreed Rights” were reduced by 6 percent per year from each of the five years for a total of 30 percent.

In general, groundwater flows from the Pasadena subarea into the Santa Anita subarea, as shown on Plates III.10a and III.10b. As previously mentioned, there is very little no flow across the Raymond Fault into the Main Basin.

Santa Anita Subarea

Groundwater levels have been decreasing in the Santa Anita subarea, as noted on Plate III.9c. Groundwater from the southeasterly portion of the Santa Anita subarea historically flowed into the Main Basin as shown on Plates III.10.a and III.10.b. The quantity of subsurface flow is discussed in Section III.3.5.2.

III.3.5.2 Subsurface Flow

CDWR Bulletin 104-2 address subsurface inflow from the Raymond Basin into the Main Basin and states in part “*…Underflow into San Gabriel Valley across the Raymond fault varied from 2,000 to 12,000 acre-feet per year during the base period [from 1943-44 to 1959-60]. This subsurface flow did not occur at the same rate along the length of the fault, but varied from west to east. The lowest rates occurred near the western edge of the basin where the Raymond fault constitutes a nearly impervious barrier to groundwater movement, and the highest rates occurred near Santa Anita where the barrier effect is negligible. Estimates of underflow across the Raymond fault were based on values of groundwater gradients between water levels north of the fault”* [12].

The draft Raymond Basin Conjunctive Use Management Plan for the Foothill Communities Water Supply Reliability Study – 50 percent Model Update and Recalibration" [11], developed annual water budgets for each subarea based on the January 1981 to April 2012 study period. These values have been used in the Raymond Basin SNMP and included in Appendix G (Monk Hill Subarea), Appendix H (Pasadena Subarea), and Appendix I (Santa Anita Subarea), as described below.

Monk Hill Subarea

Subsurface inflow from the Verdugo Basin into the Monk Hill subarea has ranged from 890 acre-feet to 3,990 acre-feet over the period of 1994-95 to 2011-12 as shown in Appendix G. The long-term (31-year) average annual subsurface inflow has been 2,270 acre-feet, as shown on Plate III.8a. Subsurface outflow from the Monk Hill subarea into the Pasadena subarea has ranged from 5,750 acre-feet to 7,270 acre-feet over the period 1994-95 through 2011-12, as shown in Appendix G. The mean subsurface outflow to the Pasadena subarea was 6,700 acre-feet as shown on Plate III.8a.

Pasadena Subarea

Subsurface outflow from the Monk Hill subarea into the Pasadena subarea has ranged from 5,750 acre-feet to 7,270 acre-feet over the period of 1994-95 to 2011-12, as shown in Appendix H. The long-term average annual subsurface inflow has been 6,300 acre-feet, as shown on Plate III.8b. Subsurface outflow from the Pasadena subarea goes into the Santa Anita subarea and the Main San Gabriel Basin. The total outflow has ranged from 3,940 acre-feet to 5,910 acre-feet over the period 1994-95 to 2011-12, as shown in Appendix H. The mean subsurface outflow to the Santa Anita subarea was 900 acre-feet, and the mean subsurface outflow to the Main San Gabriel Basin was 3,950, as shown on Plate III.8b.

Santa Anita Subarea

Subsurface inflow for the Pasadena Subarea into the Santa Anita Subarea has ranged from 110 acre-feet to 1,840 acre-feet over the period 1994-95 to 2011-12, as shown in Appendix I. The long-term average annual subsurface inflow has been 950 acre-feet, as shown on Plate III.8c. Subsurface outflow from the Santa Anita subarea into the Main San Gabriel Basin has ranged from 350 acre-feet to 1,110 acre-feet, as shown in Appendix I. The mean subsurface outflow to the Main San Gabriel Basin was 860 acre-feet as shown on Plate III.8c.

III.3.6. Water Demands

Raymond Basin water supply is from groundwater extracted from the Raymond Basin, treated surface water diversion of runoff from the San Gabriel Mountains, and treated imported from the Weymouth Treatment Planted operated by MWD. A portion of the Raymond Basin groundwater production is also exported by producers for use in the Main San Gabriel Basin (Appendix E).

The following provides a summary of production in these subareas:

Monk Hill Subarea

Water production in the Monk Hill Subarea includes groundwater pumping, purchases of treated imported water and a minor amount of treated water from local surface water diversions. Groundwater production has ranged from 3,870 acre-feet to 12,970 acre-feet during the period 1994-95 to 2011-12 and has averaged 6,990 acre-feet, as shown on Plate III.8a. Treated imported water which comes from MWD's Weymouth Treatment Plant, is used in the Monk Hill subarea to augment local groundwater production. Treated imported water purchases have ranged from approximately 5,300 acre-feet to 25,200 acre-feet during the period 1994-95 to 2011-12 (Appendix F).

Pasadena Subarea

Water production in the Pasadena Subarea includes groundwater pumping, purchases of treated imported water and a minor amount of treated water from local surface water diversions. Groundwater production has ranged from 10,930 acre-feet to 21,120 acre-feet during the period 1994-95 to 2011-12 and has averaged 17,750 acre-feet, as shown on Plate III.8b. Treated imported water which comes from MWD's Weymouth Treatment Plant, is used in the Pasadena subarea to augment local groundwater production. Treated imported water purchases have ranged from approximately 1,200 acre-feet to 28,800 acre-feet during the period 1994-95 to 2011-12 (Appendix F).

Santa Anita Subarea

Water production in the Santa Anita Subarea includes groundwater pumping, purchases of treated imported water and a minor amount of treated water from local surface water diversions. Groundwater production has ranged from 5,320 acre-feet to 8,510 acre-feet during the period 1994-95 to 2011-12 and has averaged 6,330 acre-feet, as shown on Plate III.8c. Treated imported water which comes from MWD's Weymouth Treatment Plant, is used in the Santa Anita subarea to augment local groundwater production. Treated imported water purchases have ranged from approximately 0 acre-feet to 800 acre-feet during the period 1994-95 to 2011-12 (Appendix F).

III.3.7 Groundwater Quality

DDW Title 22 sampling requires all wells used for potable water supplies to be sampled at least once every three years for TDS, chloride and sulfate, and at least annually for Nitrate. In addition, all wells are sampled for General Mineral, General Physical, Inorganics, Radioactivity, VOCs, plus various emerging contaminants on a regular and continuous basis. All data is provided to DDW electronically.

Since fiscal year 1985-1986, RBMB has organized the collection of water quality data from producers within the Raymond Basin. The groundwater quality monitoring program has resulted in a large volume of water quality records that are currently stored in the databases managed by RBMB and CDPH.

Groundwater quality is described for each subarea of the Raymond Basin and addresses Nitrate, Chloride, Sulfate, and Total Dissolved Solids (TDS) for each subarea. Nitrate, Chloride, Sulfate, and TDS are typically sampled as part of DDW "General Mineral" compliance sampling, which typically occurs once every three years. Consequently, in the 18-year review period, there are about six sets of data for each well available for review, which are summarized on Table III.3. For all water quality data in a subarea from 1986-87 to 2011-12, mean annual constituent concentration was calculated as the arithmetic average concentration of all available water quality data at the production wells within subarea. Due to the 3-year sampling cycle, each annual data point was calculated as the mean of the previous six years (inclusive) data available in the production wells in the subarea.

There is considerable annual variation in water quality for each constituent. The water quality concentrations vary with many factors, including the volume of groundwater in storage. The water quality concentrations tend to be inversely related to groundwater in storage, increasing as groundwater levels decrease, and vice versa. Water quality data were presented as means for subareas. When data for an individual constituent was limited in a subarea due to the 3-year sampling cycling and few wells sampled, 6-yr or 9-yr means were determined and used in the loading/unloading models.

<u>Monk Hill Subarea</u>

Generally, the water quality in the Monk Hill subarea has degraded since 1984-1985, with almost 200 percent increase in Sulfate and 40 percent increase in TDS concentrations, as discussed below. The sources of the salts likely come from the use of imported water to supplement groundwater production to meet demands. The sources are discussed in greater detail in Section III.4.1.1.

Nitrate, NO_3

The mean nitrate concentrations from 1986-87 to 2011-12 in the production wells (excluding those of the Valley Water Company (VWC)) in the Monk Hill subarea varied from 14 mg/L to 35 mg/L, with an overall average of 27 mg/L, as determined from Appendix J and shown in Table III.4a. During the same period, the production wells of VWC varied from 17 mg/L to 60 mg/L, with an overall average of 42 mg/L, as determined from data in Appendix J. The water quality varies by purveyor, with the Lincoln Avenue Water Company (LAWC) and Rubio Canyon Land and Water Association (RCLWA) having lower nitrate concentrations than the Las Flores Water Company (LFWC) and La Canada Irrigation District (LCID), as shown in Plate III.11.

From 1986-87 to 2011-12, three patterns can be seen in the annual average nitrate concentration of the Monk Hill subarea (excluding VWC), i.e. the average concentration of groundwater extracted from the Monk Hill subarea. In the first period, until 1993-94, the nitrate concentration decreased about 15 percent, as shown in Plate III.12a. In the next period, from 1993-1994 through 2001-02, the nitrate concentration increased about 40 percent. Several years of data are missing, but following the trend from 2002-03 until 2011-12, the nitrate concentration decreased about 10 percent. For the entire observation period, the net change was an increase of about 6 percent. During the same period, the increase was more than 20 percent in VWC wells (determined from Appendix J). The average nitrate concentration for the most recent 5-year period is 27 mg/L, as shown in Table III.4a. Though the Monk Hill subarea mean groundwater nitrate concentration is well below the Basin Plan Water Quality Objective, the mean nitrate concentration in the LFWC and LCID wells is approaching 45 mg/L, and in the VWC wells exceeds 45 mg/L, as shown in Plate III.12a.

Chloride, Cl

The mean chloride concentrations from 1986-87 to 2011-12 in the production wells (excluding those of the VWC) in the Monk Hill subarea varied from 18 mg/L to 64 mg/L, with an overall average of 35 mg/L, as determined from Appendix K, and shown on Table III.4b. During the same period, the production wells of VWC varied from 78 mg/L to 116 mg/L, with an overall average of 97 mg/L, as determined from data in Appendix K. The water quality varies by purveyor, and is similar to the pattern observed with nitrates, with the LAWC and RCLWA having lower chloride concentrations than the LCID, as shown in Plate III.13a.

From 1986-87 to 2011-12, the annual average chloride concentration of the Monk Hill subarea (excluding VWC), i.e. the average concentration of groundwater extracted from the Monk Hill subarea, increased about 50 percent, as shown in Plate III.13a. The average chloride concentration for the most recent 5-year period is 45 mg/L, as shown in Table III.4b. Though the Monk Hill subarea mean groundwater chloride concentration is well below the Basin Plan Water Quality Objective, the mean chloride concentration in the LCID wells has been increasing rapidly, and in the VWC wells often exceeds 100 mg/L, as shown in Plate III.13b.

Sulfate, SO_4

The mean sulfate concentrations from 1986-87 to 2011-12 in the production wells (excluding those of the VCW) in the Monk Hill subarea varied from 23 mg/L to 78 mg/L, with an overall average of 50 mg/L, as determined from Appendix K, and shown on Table III.4c. During the same period, the production wells of VWC varied from 14 mg/L to 178 mg/L, with an overall average of 152 mg/L, as determined from data in Appendix K. The water quality varies by purveyor, with the LAWC and RCLWA having lower sulfate concentrations than the LFWC and LCID, as shown in Plate III.14a.

From 1986-87 to 2011-12, the annual average sulfate concentration of the Monk Hill subarea (excluding VWC), i.e. the average concentration of groundwater extracted from the Monk Hill subarea, more than doubled, as shown in Plate III.14a. The average sulfate concentration for the most recent 5-year period is 61 mg/L, as shown in Table III.4c. Though the Monk Hill subarea mean groundwater sulfate concentration is well below the Basin Plan Water Quality Objective, the mean sulfate concentration in the LFWC and LCID wells is essentially at 100 mg/L, and in the VWC wells exceeds 150 mg/L, or 150 percent of the objective as shown in Plate III.14b.

Total Dissolved Solids, TDS

The mean TDS concentrations from 1986-87 to 2011-12 in the production wells (excluding those of the VWC) in the Monk Hill subarea varied from 231 mg/L to 426 mg/L, with an overall average of 342 mg/L, as determined from Appendix K, and shown on Table III.4d. During the same period, the production wells of VWC varied from 521 mg/L to 820 mg/L, with an overall average of 670 mg/L, as determined from data in Appendix K. The water quality varies by purveyor, with the LAWC and RCLWA having lower TDS concentrations than the LFWC and LCID, as shown in Plate III.15a.

From 1986-87 to 2011-12, the annual average TDS concentration of the Monk Hill subarea, i.e. the average concentration of groundwater extracted from the Monk Hill subarea, increased about 40 percent, as shown in Plate III.15a. The average TDS concentration for the most recent 5-year period is 405 mg/L, as shown in Table III.4d. Though the Monk Hill subarea mean groundwater TDS concentration is still below the Basin Plan Water Quality Objective, the mean TDS concentration in the LFWC and LCID wells already exceeds 450 mg/L, and in the VWC wells is about 175 percent of the objective, as shown in Plate III.15b.

As noted above, the water quality data for VWC is measurably higher than other producers in the Monk Hill Subarea. VWC has insufficient 1955 Decreed Rights to produce groundwater to meet its demands. Consequently, VWC has implemented a conjunctive use program to take advantage of the availability of treated imported water. VWC historically has maintained an injection program whereby treated imported water from the MWD Weymouth Treatment Plant has been injected into the groundwater basin during the winter time, stored and then re-pumped during the summer. This program is reviewed by RBMB pursuant to the terms of the "Criteria for Delivery of Supplemental Water" (see Section V.3). In addition, DDW requires VWC to conduct monthly water quality sampling during the summer period when the injected treated imported water is pumped out of the Monk Hill Subarea. Much of the "groundwater" quality included in the Monk Hill Subarea water quality data set is likely indicative of the treated imported water quality which had been injected several months earlier. Consequently, it is questionable whether the Monk Hill Subarea is being "degraded". Nonetheless, MWD's goal is to blend sources of imported water to maintain TDS at or below 500 mg/l is discussed in Section III.6.1.

Pasadena Subarea

Nitrate, NO_3

The mean nitrate concentrations from 1986-87 to 2011-12 in the production wells in the Pasadena subarea varied from 13 mg/L to 37 mg/L, with an overall average of 30 mg/L, as shown in Table III.4a. In the same period, the annual average nitrate concentration of the Pasadena subarea, i.e. the average concentration of groundwater extracted from the Pasadena subarea, increased about 25 percent, as shown in Plate III.16a. The average nitrate concentration for the most recent 5-year period is 36 mg/L, as shown in Table III.4a. Though the Pasadena subarea mean groundwater nitrate concentration is still below the Basin Plan Water Quality Objective, the concentration in many of the test wells exceeds 45 mg/L, as shown in Plate III.16a.

Chloride, Cl

The mean chloride concentrations from 1986-87 to 2011-12 in the production wells in the Pasadena subarea varied from 18 mg/L to 57 mg/L, with an overall average of 34 mg/L, as shown in Table III.4b. In the same period, the annual average chloride concentration of the Pasadena subarea, i.e. the average concentration of groundwater extracted from the Pasadena subarea, increased about 15 percent, as shown in Plate III.16b. The average chloride concentration for the most recent 5-year period is 41 mg/L, as shown in Table III.4b. The Pasadena subarea mean groundwater chloride concentration is well below the Basin Plan Water Quality Objective, and none of the test has approached 100 mg/L, as shown in Plate III.16b.

Sulfate, SO_4

The mean sulfate concentrations from 1986-87 to 2011-12 in the production wells in the Pasadena subarea varied from 43 mg/L to 80 mg/L, with an overall average of 64 mg/L, as shown in Table III.4c. In the same period, the annual average sulfate concentration of the Pasadena subarea, i.e. the average concentration of groundwater extracted from the Pasadena subarea, increased about 60 percent, as shown in Plate III.16c. The average sulfate concentration for the most recent 5-year period is 77 mg/L, as shown in Table III.4c. Though the Pasadena subarea mean groundwater sulfate concentration is still below the Basin Plan Water Quality Objective, the concentration in many of the test wells exceeds 100 mg/L, as shown in Plate III.16c.

Total Dissolved Solids, TDS

The mean TDS concentrations from 1986-87 to 2011-12 in the production wells in the Pasadena subarea varied from 302 mg/L to 400 mg/L, with an overall average of 350 mg/L, as shown in Table III.4d. In the same period, the annual average TDS concentration of the Pasadena subarea, i.e. the average concentration of groundwater extracted from the Pasadena subarea, increased about 15 percent, as shown in Plate III.16d. The average TDS concentration for the most recent 5-year period is 361 mg/L, as shown in Table III.4d. Though the Pasadena subarea mean groundwater TDS concentration is still below the Basin Plan Water Quality Objective, the concentration in many of the test wells exceeds 450 mg/L, as shown in Plate III.16d. A distinct pattern is observable among the tested wells: 19 wells never had TDS concentrations exceeding 500 mg/L, while the other 12 wells had some observations exceeding 500 mg/L. The mean concentration in these 12 wells is about 50 percent more than in the other 19 wells. Further, the TDS increase in the observation period was about 20 percent compared to 15 percent in the wells with better water quality.

Santa Anita Subarea

Nitrate, NO_3

The mean nitrate concentrations from 1986-87 to 2011-12 in the production wells in the Santa Anita subarea varied from 14 mg/L to 37 mg/L, with an overall average of 22 mg/L, as shown in Table III.4a. In the same period, the annual average nitrate concentration of the Santa Anita subarea, i.e. the average concentration of groundwater extracted from the Santa Anita subarea, decreased about 50 percent, as shown in Plate III.17a. The average nitrate concentration for the most recent 5-year period is 16 mg/L, as shown in Table III.4a. The Santa Anita subarea mean groundwater nitrate concentration is well below the Basin Plan Water Quality Objective of 45 mg/L, as shown in Plate III.17a.

Chloride, Cl

The mean chloride concentrations from 1986-87 to 2011-12 in the production wells in the Santa Anita subarea varied from 8 mg/L to 25 mg/L, with an overall average of 16 mg/L, as shown in Table III.4b. In the same period, the annual average chloride concentration of the Santa Anita subarea, i.e. the average concentration of groundwater extracted from the Santa Anita subarea, decreased slightly, as shown in Plate III.17b. The average chloride concentration for the most recent 5-year period is 15 mg/L, as shown in Table III.4b. The Santa Anita subarea mean groundwater chloride concentration is well below the Basin Plan Water Quality Objective of 100 mg/L, as shown in Plate III.17b.

Sulfate, SO_4

The mean sulfate concentrations from 1986-87 to 2011-12 in the production wells in the Santa Anita subarea varied from 29 mg/L to 45 mg/L, with an overall average of 37 mg/L, as shown in Table III.4c. In the same period, the annual average sulfate concentration of the Santa Anita subarea, i.e. the average concentration of groundwater extracted from the Santa Anita subarea, decreased slightly, as shown in Plate III.17c. The average sulfate concentration for the most recent

5-year period is 34 mg/L, as shown in Table III.4c. The Santa Anita subarea mean groundwater sulfate concentration is well below the Basin Plan Water Quality Objective of 100 mg/L, as shown in Plate III.17c.

Total Dissolved Solids, TDS

The mean TDS concentrations from 1986-87 to 2011-12 in the production wells in the Santa Anita subarea varied from 230 mg/L to 305 mg/L, with an overall average of 273 mg/L, as shown in Table III.4d. In the same period, the annual average TDS concentration of the Santa Anita subarea, i.e. the average concentration of groundwater extracted from the Santa Anita subarea, has remained constant, as shown in Plate III.17d. The average TDS concentration for the most recent 5-year period is 268 mg/L, as shown in Table III.4d. The Santa Anita subarea mean groundwater TDS concentration is well below the Basin Plan Water Quality Objective of 450 mg/L, as shown in Plate III.17d.

III.4. SALT and NUTRIENTS SOURCES

III.4.1. Source Identification

III.4.1.1. Salt

Salts in the environment and hydrologic systems have natural and anthropogenic sources. Salts are soluble compounds of anions (negatively-charged particles) and cations (positively-charged particles) that are attracted to each other electrically, as the opposing poles of a magnet attract. Chemically, salts are composed of an acid and a base, though these acid-base mixtures vary greatly in strength of bonding, solubility, and activity in the solution. The solubility of salts in natural systems varies considerably, e.g. the solubility of salts based on the anion is, in decreasing order, nitrates, chlorides, sulfates, bicarbonate, and carbonate. The mobility of salts corresponds to their solubility.

Water moving through soil and the vadose zone always has dissolved salts in it. The concentration of these salts depends upon the concentration in the water and in the mineral solids through which the water travels. Everything in nature seeks an equilibrium. If the concentration of salts is greater in the mineral solids than in the water, salts will dissolve and increase the salt concentration in the water. If the concentration in the water is greater than in the surrounding solids, salts will precipitate from the water into the solid phase, decreasing the concentration of salts in the water.

Natural Sources

The Raymond Basin is situated on alluvial fans, terraces, and flood plains comprised of alluvium (river-deposited sediments) weathered from rocks and minerals from several sources: sedimentary, granitic, andesitic, volcanic, and mixed rocks. The associated watersheds in the mountains flow across weathering sediments of andesite, breccia, schist, and metamorphosed volcanic, basic igneous, granitic and metamorphic rocks. These weathering minerals are a primary source of salts in the Raymond Basin, though the solubility may vary, and the dominant salts found vary from one part of the watershed or basin to another, depending upon the specific mineralogy present.

Soils and geologic materials in the vadose (unsaturated zone above an aquifer) contain minerals of varying solubility that may dissolve in water. The most common salts in the Raymond Basin's soils include chlorides, sulfates, and carbonates of calcium, magnesium, potassium, and sodium. The weathered sedimentary materials have the greatest natural salinity of the rocks found in the Raymond Basin and associated watersheds.

Once dissolved, salts move with the water. If water flowing through soil and the vadose zone enters a river or stream, the salts enter surface water. If water percolates to the groundwater, the salts leach with it and enter the aquifer. If water is insufficient to leach the salts to the groundwater, the salts will accumulate at characteristic depths in the soil or vadose zone, as determined by their solubility. The solubility and mobility of salts in the soil and vadose zone from least to greatest is carbonates, sulfates, and chlorides. Due to its mobility, chloride is often used as an environmental tracer.

If atmospheric demand for water through evaporation and transpiration exceed precipitation and irrigation (or water spreading), salts will tend to accumulate at the surface. This process is accelerated in the case of shallow water tables that allow salts to wick upward with water through capillary action.

Atmospheric deposition is a minor source of salts, including nitrates, sulfates, chlorides, and fossil fuel combustion products.

Anthropogenic Sources

Many human activities may contribute salts to the environment. These include household sources such as detergents, water softeners, swimming pool treatment chemicals, runoff from washing cars, use of treated municipal drinking water or gray-water reuse in residential irrigation systems, and on-site wastewater treatment facilities, as well as centralized wastewater treatment facilities, and many industrial processes. Return-flow from water used for surface or subsurface irrigation of agricultural crops, golf courses, parks, sports fields and lawns contribute salt, especially when water is added in excess of the amount required to meet the combined evaporation and transpiration needs of a crop. This may be intentional in an effort to manage the salinity in the root zone to meet crop requirements, or unintentional due to inefficient or unmanaged irrigation systems. Salts from some sources may enter storm drains or surface water systems with no treatment. Others are directly applied to, or disposed in, the soil-vadose zone as a treatment media. These non-point sources salt sources are the most difficult to monitor. The most obvious salt contributors are the point-sources originating from industrial or municipal centralized waste treatment facilities.

The Raymond Basin water quality objective for salts is influenced by the maximum contaminant level (MCL) of TDS, a measure of the salts that dissolve in a water system. Because TDS is a measure of all dissolved solids, including nitrates, chlorides, sulfates, and their companion cations, the TDS increases with the concentration of these constituents. The TDS Basin Plan objective for each of the three subareas of the Raymond Basin is 450 mg/L, as shown on Table III.1.

Monk Hill Subarea

The Raymond Basin Judgment identifies the "1955 Decreed Rights" of each of the Pumpers from the Monk Hill Subarea. Any water demand in excess of the 1955 Decreed Rights historically has been met through the purchase of treated imported water from MWD's Weymouth Treatment Plant. Section III.3.6 notes that treated imported water purchases have ranged from about 5,300 acre-feet about 25,200 acre-feet. Since SWP Water became available in the early 1970's, MWD typically has attempted to maintain the TDS concentrations at a below 500 mg/l in the treated water from the Weymouth Treatment Plant. Historically this has been accomplished by providing a 50/50 blend of SWP water and Colorado River water. The blend goal of 500 mg/l for TDS is consistent with the Basin Plan Water Quality Objectives for the Monk Hill Subarea, as shown on Plate III.II. For example, MWD's 2007-08 Annual Report notes the blend averaged about 44 percent SWP water and TDS averaged about 490 mg/l. However, the average Sulfate concentration was reported as 166 mg/l, which the average Chloride concentration was reported as 91 mg/l. Both of these concentrations comply with DDW Title 22 regulations of 250 mg/l, but are close to, or exceed, the Basin Plan Water Quality Objectives of 100 mg/l. The annual mean water quality of treated imported water from Weymouth Treatment Plan for chloride, sulfate, and TDS has increased in the most recent five years as shown in Appendix O. These increases in constituent concentrations likely lead to an increase in groundwater concentrations in the Monk Hill Subarea.

In addition, VWC, which produces from the Monk Hill Subarea, historically maintains an injection program whereby treated imported water from MWD's Weymouth Treatment Plant was injected into the Monk Hill Subarea in the winter and extracted during the summer. Consequently, some of the water quality data from the Monk Hill Subarea may have been influenced by this injection program and the water quality data set may not have been indicative of solely groundwater quality.

The specific causes of the increasing trend for TDS, Sulfate, and Chloride in the Monk Hill Subarea is not clearly understood. However, it is likely influenced by the long-term direct use of treated imported water to meet consumer demand and comply with the groundwater production limitations required by the Raymond Basin Judgment. In addition, the injection program historically may have influenced water quality.

Pasadena Subarea

The Raymond Basin Judgment identifies the "1955 Decreed Rights" of each of the Pumpers from the Pasadena Subarea. Any water demand in excess of the 1955 Decreed Rights historically has been met through the purchase of treated imported water from MWD's Weymouth Treatment Plant. Section III.3.6 notes that treated imported water purchases have ranged from 1,200 acre-feet about 28,800 acre-feet. Since SWP Water became available in the early 1970's, MWD typically has attempted to maintain the TDS concentrations at a below 500 mg/l in the treated water from the Weymouth Treatment Plant. Historically this has been accomplished by providing a 50/50 blend of SWP water and Colorado River water. The blend goal of 500 mg/l for TDS is consistent with the Basin Plan Water Quality Objectives for the Pasadena Subarea, as shown on Plate III.II. For example, MWD's 2007-08 Annual Report notes the blend averaged about 44 percent SWP water and TDS averaged about 490 mg/l. However, the average Sulfate concentration was reported as 166 mg/l, which the average Chloride concentration was reported as 91 mg/l. Both of these concentrations comply with DDW Title 22 regulations of 250 mg/l, but are close to, or exceed, the Basin Plan Water Quality Objectives of 100 mg/l. As discussed in Section 4.1.1.1, the annual mean water quality of treated imported water from Weymouth Treatment Plan for chloride, sulfate, and TDS has increased in the most recent five years as shown in Appendix O. These increases in constituent concentrations likely lead to an increase in groundwater concentrations in the Pasadena Subarea.

The specific causes of the increasing trend for TDS, Sulfate, and Chloride in the Pasadena Subarea is not clearly understood. However, it is likely influenced by the long-term direct use of treated imported water to meet consumer demand and comply with the groundwater production limitations required by the Raymond Basin Judgment.

Santa Anita Subarea

The Raymond Basin Judgment identities the "1955 Decreed Rights" of each of the Pumpers from the Santa Anita Subarea. Any water demand in excess of the 1955 Decreed Rights must be met through the purchase of treated imported water from MWD's Weymouth Treatment Plant. However, Section III.3.6 notes that historically there have been essentially no treated imported water purchases.

III.4.1.2. Nutrients

At least 18 minerals are recognized as essential for plants, and at least 24 for animals, including humans. In surface water systems, the primary nutrients of concern are nitrogen as nitrate (NO_3^-) or nitrite (NO_2^-), and phosphorus as particulates in runoff water, or dissolved in water as orthophosphates (HPO_4^{2-}, $H_2PO_4^-$). Historically, nitrate has been the primary concern for groundwater quality, but recently more recently, it has been realized that phosphorus may become mobile in the soil and vadose zone, and therefore may be found in groundwater and aquifers [14].

The nutrients for which Raymond Basin water quality objectives exist are nitrate (as NO_3^-, 45 mg/L), nitrogen (nitrate + nitrite, 10 mg/L), sulfate (SO_4^{2-}, 100 mg/L), chloride (Cl^-, 100 mg/L), and boron (B, 0.5 mg/L) (Table III.1).

Nutrient additions include atmospheric deposition with precipitation of nitrogen as ammonium and nitrate, sulfur, and chloride. Some of these are by-products of fossil fuel combustion, while others are the result of natural phenomena, such as lighting converting atmospheric nitrogen into nitrate, or denitrification in wetlands which releases nitrogen into the atmosphere. Wildfires release nutrients into the atmosphere which may return to the surface through precipitation. Other nutrients remain on the surface after fires, and will enter surface waters during precipitation events that generate runoff. Other natural nutrient additions occur through natural biogeochemical nutrient cycles through microbial decomposition of plant and animal residues in the soil. Nutrients are released into the soil as minerals during decomposition of organic structures by soil microbes. Nutrient cycling is accelerated when lawns and turf areas are irrigated during the dry season. Boron, sulfates, and chlorides are constituents of naturally-occurring minerals, and that are released into the environment as the minerals weather.

Anthropogenic sources likely provide the greatest nutrient additions in the Raymond Basin. Municipalities, academic institutions, industrial parks, and homeowners maintain turf and lawns with fertilizer. The primary ingredient in most fertilizers is nitrogen, either as urea, ammonium or nitrate. Once in the soil, though, microbes generally convert other nitrogen forms into nitrate. Commercial fertilizers are soluble salts that dissolve in water. Chloride is a common component in many fertilizers due to its high solubility, especially those containing potassium. Sulfates and chlorides are common ingredients in fertilizers and soil amendments. Fertilizer nutrients may enter surface waters through runoff if high-intensity precipitation events occur soon after spreading. Nitrates and chlorides will leach readily if irrigation and/or precipitation exceed the combined atmospheric demand of water from evaporation and transpiration.

On-site wastewater treatment systems return nutrients to the soil throughout the Raymond Basin in areas not associated with a centralized treatment facility. Centralized municipal wastewater treatment systems and some industrial wastewater treatment systems release nutrients into the environment, particularly nitrates, sulfates, and chlorides.

Though agriculture is widely recognized as a contributor of nutrients to surface and groundwater, it is a minor contributor in the Raymond Basin, as agriculture currently occupies only a small portion of the land area.

III.4.2. Fate and Transport

III.4.2.1 Salt

Once salts are in the soil and vadose zone, there are three possible fates: remain where they are, wick upward to the surface with water, leach downward with water. For simplicity in the following discussion, all references to soil apply equally to the vadose zone (unsaturated zone between the soil and groundwater). On a landscape scale, salts remain in the soil, or they move to surface waters, or to aquifers.

Salts will remain at the same relative depth if the balance of water applied plus precipitation approximately equals atmospheric demand through evaporation from soil surfaces and transpiration from plant leaves.

Salts will move downward if the balance of water applied plus precipitation exceeds atmospheric demand through evaporation from soil surfaces and transpiration from plant leaves.

Salts will move upward if the balance of water applied plus precipitation approximately is less than atmospheric demand through evaporation from soil surfaces and transpiration from plant leaves. This situation is enhanced in the case of water tables within 4 to 6 feet of the soil surface, depending upon texture of the soils. Finer-textured soils (silts, loams, and clays) promote upward capillary movement of water in greater quantity, and from greater depths, resulting in greater salt accumulation at the surface than occurs on coarse-textured soils (sands and sandy loams).

Salts move with water, in the same direction, and generally at the same rate. The exception occurs when the soil chemistry alters the form and solubility of the salt. This may occur through several possible chemical reactions, including salts precipitating out of the water as a solid.

Most clay minerals in the soil are negatively charged, and may adsorb some cations (positively-charged ions), e.g., calcium, magnesium, potassium, and sodium to the mineral surfaces. Anions (negatively-charged ions) move through the soil more readily, though some will be attracted to the cations on soil surfaces. The result is preferential movement of anions, such as chloride sulfates, and nitrates through the soil.

The soils in the basin are typical of semiarid and arid region soils that typically have high concentrations of calcium, often in the form of calcium carbonate (often seen as caliche) and gypsum (calcium sulfate). These salts dissociate weakly in the soil solution, allowing the components to move with water, and to participate in chemical reactions. The most common salt reaction in the soil is precipitation. Some anions, such as chloride, moving through the soil solution may precipitate with cations, such as calcium, to form a salt, such as calcium chloride. Once precipitated, the salt does not move until it dissolves and the individual components enter the soil solution again.

All soils have a limit to the cations and anions they can adsorb. Precipitation of salts in the solid phase is controlled by the concentration of salts in the water, and the availability of minerals in the soil to react with the salts in the water. Salts always precipitate when the amount of water is insufficient to continue leaching them. When sufficient water is available, some salts will be dissolved in the water and leach as the water percolates.

If conditions in the soil become anaerobic, due to saturation and lack of free oxygen, some soil bacteria have the ability to "breathe" minerals such as nitrogen, iron and manganese. When this occurs, iron and manganese become more soluble, and also may participate in precipitation reactions in the soil. Precipitation removes ions from the soil solution. However, anaerobic conditions are associated with greater leaching, since these conditions occur with saturation.

Water moves from areas of high potential energy to areas of low potential energy, on a landscape, or in the soil or vadose zone. This is commonly stated as water flows downhill. Though gravity pulls water downward, there are other forces in soil that can pull water upward. A wet soil generally has higher potential energy than a dry soil, and so water typically moves toward drier soil. This is the reason that water moves upward from a water table through the capillary fringe. If the soil surface is within the capillary fringe, water will move to the surface. Salts move with water, so if the water goes to the surface, so do the salts. Once at the surface, the water evaporates, and the salts precipitate on the soil surface. This accumulation of salts is common in arid and semiarid regions with shallow water tables, or in areas where irrigation management does not incorporate necessary leaching fractions to leach the salts out of the root zone. When irrigation results in artificially high water tables, a drainage system must be installed to remove the water from the soil profile and root zone. The salts move with the water through the drainage system, typically into surface water, such as rivers.

The salts will move as far downward in the soil as does the water. In semiarid and arid regions, the long-term historic depth of water penetration from natural precipitation is identified by the presence of a zone of increased chloride concentration, often called chloride bulge. This is the reason chloride is used as a tracer; it is the most soluble, and moves the furthest with water. Other salts of lower solubility, such gypsum, precipitate above the chloride bulge, while calcium carbonate precipitates above the gypsum.

If sufficient water is added to the surface (precipitation and/or irrigation and/or water spreading) to move water through the soil to the groundwater table and aquifer, the salts reach the groundwater and aquifer, as well. Once in the aquifer, the salts remain there unless removed from the aquifer through groundwater pumping or outflow from one basin to another, if a hydraulic connection between aquifers exists.

III.4.2.2 Nutrients

Nutrients in the soil have been classified historically as mobile or immobile, referring to their solubility and tendency to move within the soil. Mobile nutrients have long been recognized as those with the potential to leach below the root zone. However, even "immobile" nutrients may be leached from the soil if sufficient water moves through the soil. Though initially high in calcium and other cations, soils in humid regions often have little calcium remaining because centuries of leaching have washed it out of the soil. More recently, ideas about other immobile nutrients, such as phosphorus, are being revisited as more is learned about the fixation (holding) capacity of soils for a given nutrient. Once the fixation capacity is reached, the nutrient becomes mobile and may leach into groundwater.

Nitrogen is involved in a complex, natural biochemical nutrient cycle, passing through inorganic solid and gas phases, and solid organic compounds through living organisms and decomposition products of dead organisms and waste products. There are no naturally-occurring soil minerals that contain nitrogen. Nitrogen in the soil is most commonly found in organic compounds, and as ammonium, and nitrate. Nitrite is seldom present in large concentrations in soil, except in anaerobic conditions. Naturally-occurring soil organisms readily convert ammonium to nitrite, and nitrite to nitrate, a process called nitrification. Other organisms decompose proteins in organic materials to release ammonium, which then undergoes nitrification. The abundance of these organisms decreases with soil depth, and so does the conversion of nitrogen from one form to another.

Once in the soil, nitrate may be taken up by plants, used by soil organisms, leached, or reduced. The same processes occur when nitrate is added directly to a soil as fertilizer or as a constituent of recycled water. Nitrate reduction occurs under anaerobic conditions when biological oxygen demand is great. Once all the oxygen is consumed by aerobic organisms during the decomposition of organic compounds, decomposition continues by organisms that "breathe" nitrate instead of oxygen. In these circumstances, nitrate is converted to nitrite. However, nitrite may be further converted to gaseous nitric or nitrous oxides, or dinitrogen gas. Depending upon the depth at which this conversion occurs, these gases may be released into the atmosphere, or may remain dissolved in water. Once in these gas forms, they are unusable to plants or animals, and to most soil organisms.

Nitrate and nitrate have the same solubility characteristics as chloride, and so all previous discussion about chloride transport applies equally to nitrate and nitrite.

Sulfur undergoes similar biological reactions in the soil as nitrogen, but also exists in chemical equilibrium with sulfur-containing soil minerals. Sulfates are soluble, but not quite as mobile as nitrate or chloride. Sulfates may be taken up by plants, used by soil microorganisms, leached, or reduced under anaerobic conditions with high biological oxygen demand. Reduced sulfur compounds are odorous gasses that are released into the atmosphere or remain dissolved in water.

Boron is present in soils as boric acid, which is highly soluble, and prone to leach in sandy soils. In fine-textured soils, boron leaching is less likely until the fixation capacity is reached.

III.5. LOADING ESTIMATES AND ASSIMILATIVE CAPACITY

To comply with Section 9(c)(1) of the Policy, which states "*the available assimilative capacity of a basin/subbasin shall be calculated by comparing the mineral water quality objective [Basin Plan objective] with the average concentration of the basin/sub-basin [background basin water quality conditions], either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer,*" models were developed to estimate the mineral loading/unloading, storage, and available assimilative capacity.

III.5.1. Loading Estimates

For the Raymond Basin SNMP characterization, loading is defined as the amount of a mineral component entering the groundwater already in storage via natural or artificial groundwater replenishment. Loading estimates using groundwater balance components of the 50 percent Model Update and Recalibration [11] and existing water quality data for those components (Tables III.4a, III.4b, III.4c and III.4d, and Appendices J, K, L, M, N, and O) have been tabulated. The inputs from the groundwater balance model include: precipitation on from the valley floor and the mountain watershed; direct spreading and injection of local runoff and imported water; return flow from applied surface, ground and imported water from MWD; subsurface flow into and out of each subarea; groundwater extraction and exported water (Appendices G, H, and I). For this characterization, it is assumed that all of the groundwater in storage in each subarea of the Raymond Basin is subject to mixing.

Because the format and availability of data for return flow (Basin-wide rather than subarea) did not precisely match the water quality data available, a technique was used to calculate the weighted average water quality in returned flow using the relative volume of diverted surface water, groundwater, and imported water that contributed to return flow in each subarea of the Basin. Then the water quality for each water component was multiplied by the relative return flow component to obtain the weighted average water quality for returned flow, as presented in Table III.4.

III.5.1.1 Precision of Estimates

Due to the uncertainty of the estimated quantities of water in each component of the groundwater balance model, all salt/nutrient quantities are rounded to the nearest 1,000 pounds (lbs). It is questionable even this level of precision exists because:

- The groundwater quality varies spatially and with depth, and the groundwater data are inadequate to accurately determine the quantity of each constituent salt present.
- The actual quantity of some components in the groundwater model are estimated, but not precisely measured.
- No data exist for the constituent salts at various depths from the soil surface in the vadose zone to the groundwater level. It is therefore impossible to predict or describe the potential chemical reactions that occur in the constituent salts as they move through the vadose zone to the groundwater table.
- The concentration of the constituent in recharge component when it reaches the aquifer/groundwater is estimated. There are no measurements of water quality parameters in the unsaturated zone immediately above the aquifer water level.
- The residence time of the constituent salts as they move through the vadose zone is not known, and varies spatially across the basin. Water from the spreading grounds moves rather quickly to the groundwater, while the time period for return flow to reach the groundwater level is not known. There is no correlation between the constituent salt concentrations added to the surface and changes in the groundwater concentration in periods less than 10 to 15 years, depending upon the constituent. Since only about 26 years of water quality data and 18 years of water balance data are available, it is not possible to identify a correlation for residence time of each mineral constituent in the vadose zone.
- Some components of the quantity of subsurface inflow and outflow from the Raymond Basin are estimated. The actual groundwater quality of subsurface inflow and outflow to is estimated.

- The aquifer exhibits some degree of concentration/dilution effects. In years when the aquifer level declines, the concentration of the constituent salts tends to increase (but not always). Conversely, in years when the aquifer levels rise due to increased recharge, the concentration of the constituent salts tends to decrease.
- Water quality for each constituent salt is not available for each groundwater balance component for each year. In this case, data from adjacent years or sampling events were averaged to provide a water quality value for each year. Due to the water sampling frequency, 6-year and 9-year intervals were used to obtain representative water quality data for each year.

The lack of water quality data that contributes to such uncertainties makes it impossible to accurately predict the concentration of groundwater constituent salts on a year-to-year basis. For this reason, the emphasis is on trends, and the models that will be described attempt to match the long-term trends of mineral concentration in the groundwater rather than the observed annual groundwater mineral concentration.

III.5.1.2 Loading/Unloading Estimation Models and Calibration

The quantity of groundwater in storage (ac-ft) and existing water quality data from wells (mg/L, concentrations of nitrate, chloride, sulfate, and TDS) were used to determine the quantity (in pounds) of each component stored in the groundwater. For each year, the quantity of each component of the groundwater balance model (ac-ft/yr) and the concentration of the constituent salts (mg/L) for that component were used to estimate the amount of the constituent salt that was added to, or removed from, the groundwater in storage. A separate loading/unloading spreadsheet model was prepared for each of the constituent salts and nutrients in each subarea. The full calculation process for each loading/unloading estimate using the volume of each groundwater balance component and the water quality for each constituent salt in that component is documented in Appendices P, Q, R, S, T, U, V, W, X, Y, Z, and AA. The discussion below explains how the loading/unloading estimation models were calibrated.

Long-term trends in the groundwater concentration of each constituent salt were used to calibrate the specific spreadsheet model. The following assumptions were used to calibrate the spreadsheet model for each constituent salt.

- The current groundwater concentration for the constituent salt represents the historical (geologic time frame) equilibrium for the amount of salt that dissolves as water moves through the vadose zone from natural recharge processes (precipitation, percolation from the watershed and surface waters, subsurface inflow and outflow from the Basin). The current groundwater quality also integrates recent changes to the equilibrium as a result of human activities in the past century.
- When the concentration of the constituent salt for components of precipitation, recycled water, return flow, or direct spreading in the groundwater balance model were less than the current groundwater concentration for that constituent, it generally was assumed the concentration of that constituent increased as it moved through the vadose zone so that the concentration matched the groundwater concentration upon recharging the aquifer.
- When the concentration of the constituent salt for components of precipitation, recycled water, return flow, or direct spreading in the groundwater balance model were greater than the current groundwater concentration for that constituent, it generally was assumed the concentration of that constituent decreased as it moved through the vadose zone so that the concentration matched the groundwater concentration upon recharging the aquifer. Exceptions were made for some return flow constituents, as noted below.
- Generally, the concentration of constituent salts in water used for direct spreading generally was assumed not to change as it passed through the vadose zone into the aquifer (the concentration stayed the same).
- The trend in groundwater quality (1994-95 to 2010-2011) for each constituent salt was determined using all of the groundwater in storage volume to estimate the quantity of loading/unloading (lbs/yr).

- Concentrations or coefficients (multipliers) for each of the groundwater balance components were adjusted to match the long-term trend identified. These values are reported in Tables III.5a (Monk Hill subarea), III.5b (Pasadena subarea), and III.5c (Santa Anita subarea).
    - There are complex interactions of salts with minerals and elements in the vadose zone. There is a lack of data available to describe these interactions. Though some approaches apply a concentration factor only to return flow to calibrate a model, this characterization does not use that approach. Such approaches ignore the interaction of precipitation and other good water quality sources as they move through the vadose zone toward the groundwater. Further those models may use concentration factors that defy physical and chemical equilibria points in nature, at which salts would precipitate out of solution.
    - As the recharge water often had better water quality than the groundwater, with some exceptions, the mean groundwater concentration provided the upper limit of concentration for any mineral component for any recharge or return flow component except direct spreading and injection. Water quality of the recharge water was more often considered when the water quality of the recharge water was poorer than the groundwater.
    - Ratios of the volume of annual recharge from precipitation to the mean recharge were used to adjust coefficients (multipliers). Similarly, ratios of the volume of annual surface spreading to the mean were used to adjust coefficients (multipliers). The logic behind adjusting the coefficients is dilution is more likely when a greater volume of water is moving through the vadose zone to the groundwater. With increasing volume of recharge, the coefficients were adjusted according to three assigned categories:
        - ratio less than 75 percent of the mean;
        - ratio between 75 percent and the mean;
        - ratio greater than the mean.
    - Ratios of the water quality (mineral concentration) of the returned flow to the mean groundwater quality for each constituent were used to adjust coefficients for the

weighted return flow factors. With increasing ratio, the coefficients were adjusted according to three assigned categories:

    - ratio less than 1, i.e., concentration in the returned flow component was less than the mean groundwater concentration;
    - ratio between 1 and 1.25;
    - ratio greater than 1.25, i.e., concentration in the returned flow component was 1.25 time greater than the mean groundwater concentration.

- Each subarea and mineral constituent required different coefficients to calibrate the models, as shown in Tables III.5a, III.5b and III.5c.

Particular challenges were encountered in calibrating the Pasadena model because the groundwater concentration was increasing while the groundwater in storage was decreasing, and the Santa Anita model because both the groundwater concentration and the groundwater in storage were decreasing.

The results of the calibrated models will be discussed in the next section in the context of allowable load and assimilative capacity.

III.5.2 Allowable Load and Assimilative Capacity

For this characterization, the allowable load is defined as the quantity (in pounds) of a constituent salt that may be present in the groundwater in storage without exceeding the Basin Plan water quality objective. This was determined using the total volume of groundwater in storage and the Raymond Basin water quality objectives for the constituent salt, TDS (450 mg/L), nitrate (as NO_3^-, 45 mg/L), chloride (Cl^-, 100 mg/L), and sulfate (SO_4^{2-}, 100 mg/L).

The assimilative capacity is defined as the difference between the quantity of the constituent salt stored in the groundwater, and the allowable load of that constituent. This was determined on an annual basis. As the assimilative capacity changed with time (decreasing for most constituents), the mean assimilative capacity of the last 10 years (2002-03 to 2011-2012) was used as the assimilative capacity for that constituent.

It is important to note the only ways in which assimilative capacity may increase are an increase in the groundwater in storage, or a decrease in the groundwater concentration of the mineral constituent. The latter case is indicative of net unloading of the mineral, i.e., more of the mineral constituent is unloaded through groundwater extraction and subsurface outflow than is loaded through the groundwater recharge components. If there is a long-term degradation of water quality, the assimilative capacity of the basin will decrease. It is possible that at some point in the future, the assimilative capacity will not be controlled by the amount of groundwater in storage, but by the annual loading/unloading balances.

The loading/unloading tables for each subarea and mineral constituent have the same format. The load from each component was determined, as shown in the worksheets in Appendices P through AA. These worksheets were condensed into the loading/unloading balance tables which show only the mass of the mineral constituent for each component of the water balance model, as shown in Tables III.6 through III.17. The process followed these steps.

1. The mineral constituent loading is estimated from precipitation, subsurface inflow, returned flow, and artificial recharge (injection and spreading).
2. The unloading is estimated from groundwater extraction and subsurface outflow.
3. The balance is the difference between the quantity of mineral constituent loaded and the quantity unloaded.
4. The quantity of the mineral constituent present in groundwater in storage was estimated as the product of the groundwater volume and the mineral constituent concentration in the groundwater.
5. The allowable loading was determined as the product of the volume of the amount of groundwater in storage and the basin plan water quality objective.

6. The assimilative capacity was determined as the difference between the quantity of the mineral constituent stored in the groundwater and the allowable loading. Positive values of assimilative capacity indicate the basin has the ability to receive more of the mineral constituent without exceeding the basin plan water quality objective.
7. All data were evaluated on an annual basis. For each component, the median (50 percent value) and overall mean of the observation period, and means for the last 10 years (2002-03 to 2011-02), and last 5 years (2007-08 to 2011-12) are presented. Because the assimilative capacity changes through time, the means of the last ten years are used to present the mineral component balances for each subarea (Plates III.18, III.19, and III.20), and the mean assimilative capacity from the last ten years is later used as the input into the assimilative capacity assessments.

It is important to realize the allowable load and the assimilative capacity are both dependent upon the quantity of groundwater in storage. Long-term changes in the quantity of groundwater in storage will have concomitant effects on the assimilative capacity. For the reporting period, the groundwater in storage in the Monk Hill subarea increased about 1,300 ac-ft/yr, while the groundwater in storage decreased in the Pasadena subarea by about 2,200 ac-ft/yr, and in the Santa Anita subarea by 900 ac-ft/yr.

The allowable loading and assimilative capacity for Nitrate, Chloride, Sulfate, and TDS for each of subarea is discussed in the following section.

Monk Hill Subarea

Comparing the mean of the first and last five years of the observation period, the volume of groundwater in storage increased about 5 percent, resulting in a 5 percent increase in allowable loading for each mineral constituent, as shown in Tables III.6, III.7, III.8, and III.9.

Nitrate, NO_3

The calibrated Monk Hill nitrate loading/unloading model is provided in Table III.6 (condensed from Appendix P). Though the allowable loading increased about 5 percent during the observation period, the nitrate concentration in the groundwater had a net increase of about 6 percent (Plate III.11). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about a 10 percent increase in assimilative capacity. The results of the nitrate loading/unloading model for the last 10 years (2002-03 to 2011-12) are presented in Plate III.18a. Over the last 10 years, deep percolation of water from precipitation accounts for the greatest nitrate contribution, contributing about 280,000 pounds per year which is more than additions from return flow, artificial recharge, and inflow from Verdugo Basin. Groundwater extraction removes about 380,000 pounds per year. There is a net addition of about 70,000 lbs nitrate annually. The current nitrate load is about 60 percent of the allowable load, leaving an assimilative capacity for nitrate of about 10 million pounds.

Chloride, Cl

The calibrated Monk Hill chloride loading/unloading model is provided in Table III.7 (condensed from Appendix Q). Though the allowable loading increased about 5 percent during the observation period, the chloride concentration in the groundwater had a net increase of about 50 percent (Plate III.13a). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about a 13 percent decrease in assimilative capacity. The results of the chloride loading/unloading model for the last 10 years are presented in Plate III.18b. Over the last 10 years, return flow accounts for the greatest chloride contribution, contributing about 580,000 pounds per year which is more than the additions from precipitation, artificial recharge, and inflow from Verdugo Basin. Groundwater extraction removes about 500,000 pounds per year from the Monk Hill subarea. There is a net addition of about 500,000 lbs chloride annually. The current chloride load is about 45 percent of the allowable load, leaving an assimilative capacity for chloride of about 31 million pounds.

Sulfate, SO_4

The calibrated Monk Hill sulfate loading/unloading model is provided in Table III.8 (condensed from Appendix R). Though the allowable loading increased about 5 percent during the observation period, the sulfate concentration in the groundwater had a net increase of about 200 percent (Plate III.14a). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about a 40 percent decrease in assimilative capacity. The results of the sulfate loading/unloading model for the last 10 years are presented in Plate III.18c. Over the last 10 years, return flow accounts for the greatest sulfate contribution, contributing about 980,000 pounds per year which is more than either additions from precipitation, artificial recharge, and inflow from Verdugo Basin. Groundwater extraction removes about 870,000 pounds per year. There is a net addition of about 750,000 lbs of sulfate annually. The current sulfate load is about 70 percent of the allowable load, leaving an assimilative capacity for sulfate of about 17 million lbs pounds.

Total Dissolved Solids, TDS

The calibrated Monk Hill TDS loading/unloading model is provided in Table III.9 (condensed from Appendix S). Though the allowable loading increased about 5 percent during the observation period, the TDS concentration in the groundwater had a net increase of about 40 percent (Plate III.15a). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about 50 percent decrease in assimilative capacity. The results of the TDS loading/unloading model for the last 10 years are presented in Plate III.18d. Over the last 10 years, additions from precipitation and return flow account for the greatest TDS contribution at about 4.3 million pounds per year. Groundwater extraction removes about 5.6 million pounds per year. There is a net addition of about 2.3 million lbs TDS annually. The current TDS load is about 90 percent of the allowable load, leaving an assimilative capacity for TD of about 30 million pounds.

Pasadena Subarea

Comparing the mean of the first and last five years of the observation period, the volume of groundwater in storage decreased about 8 percent, resulting in an 8 percent decrease in allowable loading for each mineral constituent, as shown in Tables III.10, III.11, III.12, and III.13.

Nitrate, NO_3

The calibrated Pasadena nitrate loading/unloading model is provided in Table III.10 (condensed from Appendix T). The allowable nitrate loading decreased about 8 percent during the observation period, while the nitrate concentration in the groundwater had a net increase of about 25 percent (Plate III.16a). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is almost a 30 percent decrease in assimilative capacity. The results of the nitrate loading/unloading model for the last 10 years are presented in Plate III.19a. Over the last 10 years, inflow from the Monk Hill subarea accounts for the greatest nitrate contribution, contributing about 470,000 pounds per year. Groundwater extraction removes about 500,000 pounds per year and is more than the combined outflow to the Main San Gabriel Basin and the Santa Anita subarea. There is a net addition of about 100,000 lbs nitrate annually. The current nitrate load is about 80 percent of the allowable load, leaving an assimilative capacity for Nitrate of about 14 million pounds.

Chloride, Cl

The calibrated Pasadena chloride loading/unloading model is provided in Table III.11 (condensed from Appendix U). The allowable chloride loading decreased about 8 percent during the observation period, while the chloride concentration in the groundwater had a net increase of about 15 percent (Plate III.16b). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about a 20 percent decrease in assimilative capacity. The results of the chloride loading/unloading model for the last 10 years are presented in Plate III.19b. Over the last 10 years, return flow accounts for the greatest chloride contribution, contributing about 760,000 pounds per year and is more than inflow from the Monk Hill subarea, precipitation and artificial recharge. Groundwater extraction removes about 540,000 pounds per year. There is a net addition of about 800,000 lbs chloride annually. The current chloride load is about 45 percent of the allowable load, leaving an assimilative capacity for chloride of about 73 million pounds.

Sulfate, SO_4

The calibrated Pasadena sulfate loading/unloading model is provided in Table III.12 (condensed from Appendix V). The allowable sulfate loading decreased about 8 percent during the observation period, while the sulfate concentration in the groundwater had a net increase of about 60 percent (Plate III.16c). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about a 45 percent decrease in assimilative capacity. The results of the sulfate loading/unloading model for the last 10 years are presented in Plate III.19c. Over the last 10 years, return flow accounts for the greatest sulfate contribution, contributing almost 1.5 million pounds per year which is more than inflow from the Monk Hill subarea, precipitation and artificial recharge. Groundwater extraction removes about one million pounds per year which is about the same quantity of sulfate as the outflow to the Main San Gabriel Basin and the Santa Anita subarea. There is a net addition of about 1.3 million lbs sulfate annually. The current sulfate load is almost 75 percent of the allowable load, leaving an assimilative capacity for sulfate of about 39 million pounds.

Total Dissolved Solids, TDS

The calibrated Pasadena TDS loading/unloading model is provided in Table III.13 (condensed from Appendix W). The allowable loading decreased about 8 percent during the observation period, the TDS concentration in the groundwater had a net increase of about 15 percent (Plate III.16d). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about 30 percent decrease in assimilative capacity. The results of the TDS loading/unloading model for the last 10 years are presented in Plate III.19d. Over the last 10 years, return flow accounts for about 3.1 million pounds which is more than inflow from the Monk Hill subarea, and artificial recharge. Groundwater extraction removes about 5.2 million pounds, which is more than the combined outflow to the Main San Gabriel Basin and the Santa Anita subarea. There is a net addition of about 2.2 million lbs TDS annually. The current TDS load is about 80 percent of the allowable load, leaving an assimilative capacity of TDS of about 139 million pounds.

Santa Anita Subarea

Comparing the mean of the first and last five years of the observation period, the volume of groundwater in storage decreased about 17 percent, resulting in a 17 percent decrease in allowable loading for each mineral constituent, as shown in Tables III.14, III.15, III.16, and III.17.

Nitrate, NO_3

The calibrated Santa Anita nitrate loading/unloading model is provided in Table III.14 (condensed from Appendix X). While the allowable nitrate loading decreased about 17 percent during the observation period, the nitrate concentration in the groundwater also decreased by about 50 percent (Plate III.17a). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about a 10 percent decrease in assimilative capacity. The results of the nitrate loading/unloading model for the last 10 years are presented in Plate III.20a. Over the last 10 years, nitrate loading from precipitation, inflow from the Pasadena subarea, and artificial recharge, are each about 80,000 pounds per year. Groundwater extraction removes almost about 320,000 pounds per year which is more than outflow to the Main San Gabriel Basin. There is a net removal of about 60,000 lbs nitrate annually. The current nitrate load is about 50 percent of the allowable load, leaving an assimilative capacity for nitrate of about 4 million pounds.

Chloride, Cl

The calibrated Santa Anita chloride loading/unloading model is provided in Table III.15 (condensed from Appendix Y). Though the allowable loading decreased about 17 percent during the observation period, the chloride concentration in the groundwater changed little (Plate III.17b). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about a 15 percent decrease in assimilative capacity. The results of the chloride loading/unloading model for the last 10 years are presented in Plate III.20b. Over the last 10 years, inflow from the Pasadena subarea accounts for the about 80,000 pounds per year and is more than the chloride additions from precipitation and artificial recharge. Groundwater extraction removes about 270,000 pounds per year which is more than outflow to the Main San Gabriel Basin. There is a net removal of about 70,000 lbs chloride annually. The current chloride load is about 15 percent of the allowable load, leaving an assimilative capacity for chloride of about 16 million pounds.

Sulfate, SO_4

The calibrated Santa Anita sulfate loading/unloading model is provided in Table III.16 (condensed from Appendix Z). Though the allowable loading decreased about 17 percent during the observation period, the sulfate concentration in the groundwater changed little (Plate III.17c). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about a 15 percent decrease in assimilative capacity. The results of the sulfate loading/unloading model for the last 10 years are presented in Plate III.20c. Over the last 10 years, the greatest sulfate contribution is from additions from precipitation, contributing about 200,000 pounds per year. Groundwater extraction removes about 540,000 pounds per year which is more than outflow to the Main San Gabriel Basin. There is a net addition of about 30,000 lbs sulfate annually. The current sulfate load is about 30 percent of the allowable load, leaving an assimilative capacity for sulfate of about 13 million pounds.

Total Dissolved Solids, TDS

The calibrated Santa Anita TDS loading/unloading model is provided in Table III.17 (condensed from Appendix AA). Though the allowable loading decreased about 17 percent during the observation period, the TDS concentration in the groundwater had a net increase of about 40 percent (Plate III.17d). Comparing the mean loading and assimilative capacity of the first and last 5-yr periods, the result is about 50 percent decrease in assimilative capacity. The results of the TDS loading/unloading model for the last 10 years are presented in Plate III.20d. Over the last 10 years, precipitation and artificial recharge each contribute about 1.5 million pounds per year. Groundwater extraction removes about 4.8 million pounds per year which is more than outflow to the Main San Gabriel Basin. There is a net removal of about 700,000 lbs TDS annually. The current TDS load is about 60 percent of the allowable load, leaving an assimilative capacity for TDS of about 33 million pounds.

III.5.3 Assimilative Capacity Assessment Tool (ACAT)

For the purpose of this characterization, these assessments of water management assume that new water will be recharged into the aquifer. In order to provide a conservative estimation of the assimilative capacity and loadings resulting from new water replenishment activities, the quality of the new water is assumed to be similar to recycled water quality found in the Basin. The recycled water quality characteristics used for the assessment were taken from the RMC Technical Memorandum (October 25, 2013) to the Pasadena Water and Power Recycled Water Program concerning "Planned Recycled Water Projects". These values are as follows: 26 mg/L nitrate, 163 mg/L chloride, 210 mg/L sulfate, 720 mg/L TDS. The TDS in the recycled water represents the highest water quality concentration, followed by sulfate (about 30 percent of the TDS concentration), chloride (about 20 percent of the TDS concentration), and nitrate (about 4 percent of the TDS concentration). Depending upon the treatment method, other combinations of water quality are possible that might have different ratios of chloride and sulfate to TDS, and chloride to sulfate.

The ACAT uses the allowable loading and assimilative capacity discussed in the previous section. It considers how much new water in a given year could be used to recharge the aquifer before using 10 percent of the existing assimilative capacity for the most limiting mineral constituent in each subarea, using this process:

1. The volume of groundwater stored in each Basin subarea is used to determine the allowable load and assimilative capacity.
2. The quantity of new water and water quality for each mineral constituent is used to determine the load.
3. Recharge and removal quantities are assumed constant and equal within each subarea and are used to determine the unloading and the remaining loading.
4. The net load is calculated as the difference between the total loading and unloading weights.
5. The net load is divided by the assimilative capacity to determine the percent of the assimilative capacity used for each mineral constituent.
6. The quantity of new water is adjusted in several iterations until one of the mineral constituents reaches 10 percent of the assimilative capacity.
7. That mineral component is the most limiting factor determining the use of new water of the stated quality for recharge in the subarea.
8. It is possible to develop other scenarios using different water quality.

As discussed earlier, the assimilative capacity changes with the water quality and volume of the groundwater in storage. Therefore, the allowable loading and assimilative capacity determinations should be revisited periodically.

<u>Monk Hill Subarea</u>

Using the assigned water quality for new water used for replenishment, the ACAT demonstrates that TDS will be the limiting mineral constituent controlling the use of new water for recharging the aquifer in the Monk Hill subarea, as shown in Table III.18. Assuming 190,400 ac-ft of groundwater in storage and 13,300 ac-ft of groundwater recharge and removal, 10 percent of the TDS assimilative capacity of the groundwater in the subarea will be utilized after 225 ac-ft of recharge with new water annually. The utilization of the assimilative capacity for nitrate chloride, and sulfate is less than TDS, and therefore, these constituents are not limiting. If water of a different quality is used, TDS will remain the limiting factor until the ratio of TDS to sulfate (TDS concentration divided by sulfate concentration) is less than 3.0, at which time sulfate will become the limiting factor.

Pasadena Subarea

Using the assigned water quality for new water used for replenishment, the ACAT demonstrates that sulfate will be the limiting mineral constituent controlling the use of new water for recharging the aquifer in the Pasadena subarea, as shown in Table III.19. Assuming 536,800 ac-ft of groundwater in storage and 19,700 ac-ft of groundwater recharge and removal, 10 percent of the sulfate assimilative capacity of the groundwater in the subarea will be utilized after 405 ac-ft of recharge with new water annually. The utilization of the assimilative capacity for nitrate chloride, and TDS is less than sulfate, and therefore, these constituents are not limiting. If water of a different quality is used, sulfate will remain the limiting factor until the ratio of TDS to sulfate (TDS concentration divided by sulfate concentration) is greater than 4.0, at which time TDS will become the limiting factor.

Santa Anita Subarea

Using the assigned water quality for new water used for replenishment, the ACAT demonstrates that sulfate will be the limiting mineral constituent controlling the use of new water for recharging the aquifer in the Santa Anita subarea, as shown in Table III.20. Assuming 72,800 ac-ft of groundwater in storage and 6,200 ac-ft of groundwater recharge and removal, 10 percent of the sulfate assimilative capacity of the groundwater in the subarea will be utilized after 245 ac-ft of recharge with new water annually. The utilization of the assimilative capacity for nitrate chloride, and TDS is less than sulfate, and therefore, these constituents are not limiting. If water of a different quality is used, sulfate will remain the limiting factor until the ratio of TDS to sulfate (TDS concentration divided by sulfate concentration) is less than 2.7, at which time sulfate will become the limiting factor.

The ACAT provides a valuable management tool that could be employed in decisions concerning use of new water for aquifer recharge. The ACAT identifies which of the mineral constituents in the water will most limit the volume of new water that can be used for recharge without passing a defined assimilative capacity threshold, e.g., 10 percent as in this example. Furthermore, the ACAT allows the evaluation of the effects of using new water with different water quality characteristics. The ACAT has the ability to identify the ratio of the concentration of the mineral constituents in the water that will be thresholds that will determine which constituent imposes the greatest limitation on the assimilative capacity in the subarea.

III.6. IMPLEMENTATION MEASURES

The Raymond Basin has been managed for many decades to control salt and nutrient loading to preserve the high quality groundwater supplies. Existing programs include support of stormwater runoff replenishment conducted by LACDPW and a water quality monitoring program conducted by area water purveyors. Raymond Basin management is conducted by the RBMB in conjunction with other Stakeholders including LACDPW and MWD. Historically, stakeholders have coordinated with the RBMB to replenish the groundwater supplies with the greatest amount of high quality water as possible which principally has been stormwater runoff. As a result, replenishment of the subareas with high quality (low TDS) water may actually result in an estimated net loading of the Raymond Basin during high storm runoff /replenishment. However, the additional groundwater volume from such replenishment dilutes the groundwater TDS concentration in the long-term.

The Raymond Basin has experienced unprecedented drought conditions since calendar year 2006. As a result, the groundwater elevation in the three subareas has decreased, as shown on Plates III.9a, III.9b, and III.9C. Since 1943, when the Raymond Basin was adjudicated, to present, the RBMB (and its predecessor prior to 1984) has actively managed water quality through existing implementation measures (described in greater detail below).

Section 6.b (3)(e) of the Recycled Water Policy states in part that a SNMP shall include "…implementation measures to manage salt and nutrient loading on a sustainable basis…" in the Basin.

Implementation measures to reduce salt and nutrient loading may have two types of impacts to a groundwater basin. Those impacts consist of 1) loading as the result of additional water replenished in the groundwater basin and 2) change to the concentration of salts and nutrients that are included in the water that is replenished. The following sections address existing and potential implementation measures that may impact salt and nutrient loading. Those implementation measures are summarized on Table III.21 and are briefly described below.

III.6.1 Groundwater Replenishment

LACDPW maintains a complex system of dams, retention basins, storm channels and off-stream spreading grounds to control stormwater runoff and to maximize replenishment of the stormwater flow. The existing spreading grounds are operated to enable stormwater run-off to be replenished into each of the subareas in an efficient and effective manner. A lesser source of replenishment is injection of treated imported water into the Monk Hill subarea. Local stormwater replenished in these facilities typically has the lowest concentrations of TDS, Nitrate, Sulfate, and Chloride of the various sources contributing to loading. As shown on Appendices P, Q, R, S, T, U, V, W, X, Y, Z, and AA the concentration of the TDS, chloride, nitrate, and sulfate in local stormwater is lower than the quality of the groundwater extracted. Consequently, the quality of the Raymond Basin will be maintained over time assuming replenishment is greater than or equal to extractions. During drought conditions with little stormwater runoff, this may not be the case.

Maintain Spreading Grounds (Existing) – Artificial recharge of stormwater runoff occurs in off-stream spreading grounds located off the Arroyo Seco, Eaton Wash, and Santa Anita Wash. The stormwater augments naturally occurring groundwater replenishment from precipitation.

Replenishment of high quality stormwater contributes to the long-term enhancement of groundwater quality.

<u>Groundwater Replenishment Coordinating Group (Existing) -</u> Representatives from the RBMB, LACDPW, and MWD meet approximately every two months to coordinate the replenishment of local water and the availability of groundwater replenishment facilities. As the highest quality source of water, stormwater run-off is typically given the highest priority for replenishment activities.

<u>Develop New Spreading Facilities (Potential)</u> – The RBMB and LACDPW continually investigate opportunities to expand the network of spreading grounds. Potential new sites include debris basins.

III.6.2 Reduce Stormwater Runoff (Potential)

Cities within the Raymond Basin are co-permittees for the new MS4 permit. As such, cities are directed to take proactive steps, both individually and collectively, to implement stormwater Best Management Practices (BMPs) to reduce or eliminate stormwater runoff from facilities and consequently reduce flow in storm channels. These practices may result in increased stormwater replenishment. As noted in Section III.6.1, stormwater runoff typically contains the highest (best) quality of water used to replenish the Basin. Increased replenishment of high quality will tend to improve Basin water quality over time.

III.6.3 Institutional

<u>Raymond Basin Judgment (Existing)</u> – The Raymond Basin was adjudicated in 1944 and groundwater rights were assigned to producers. The RBMB was created by the Court in 1984 (as an amendment to the original Judgment) to administer the Raymond Basin Judgment. The RBMB maintains records of all groundwater produced from the Raymond Basin, maintains a database of groundwater quality from all municipal water supply wells, and keeps track of all water entering and leaving the Raymond Basin.

Title 22 Water Quality Monitoring (Existing) - All municipal water suppliers are required to adhere to the provisions of Title 22 regarding water quality monitoring of municipal water supply wells. In general TDS, chloride, and sulfate samples are collected once every three years and nitrate samples are collected annually. Based on water quality results, municipal water suppliers may need to construct groundwater treatment facilities and/or develop water quality blending plans to maintain production from wells. In those situations, DDW may require more frequent water quality monitoring than those noted above. The municipal water supply wells are distributed throughout the Raymond Basin and water quality data from Title 22 water quality sampling will be incorporated into the Basin-wide Salt and Nutrient Monitoring Program described in Chapter V.

SNMP Monitoring Program (Future) - RBMB will implement a proposed monitoring plan as required by the Recycled Water Policy (See Section V.4). As required by the Recycled Water Policy Section 6.b(3)(a)(iii) water quality data will be reported to the LAWRWQCB at least every three years. The sampling frequency for salts and nutrients will be periodically evaluated and adjusted accordingly as necessary.

III.6.4 Regional Salinity Control

The Raymond Basin Judgment limits groundwater production to the 1955 Decreed Rights. Demand in addition to groundwater supplies historically has been met through the purchase of treated imported water from MWD's Weymouth Treatment Plant (along with the groundwater impaction/withdrawal program historically conducted by VWC). Return flow from domestic water usage contributes to loading of salts in the Raymond Basin. (Historically, there has not been an imported water groundwater replenishment program.) Consequently, it is critical the treated imported water quality be managed.

The MWD is responsible for all treated imported water used in the Raymond Basin and that water is from the Weymouth Treatment Plant. MWD has a goal to maintain the TDS concentrations at or below 500 mg/l. This is done through blending SWP water with Colorado River water. The RBMB will continue to coordinate with MWD and those water companies which use treated imported water to maintain records of the water quality, particularly TDS, Chloride, and Sulfate.

CHAPTER IV

ANTIDEGRADATION ANALYSIS

IV.1. REGULATORY BACKGROUND

In 1968, the SWRCB adopted Resolution No. 68-16 (Resolution) as the State's Anti-Degradation Policy:

1. *Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*
2. *Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) o pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.* [15]

The Policy acknowledges that groundwater recharge with recycled water benefits the public; however, the SWRCB finds that groundwater recharge with recycled water has the potential to degrade water quality in groundwater basins. Therefore, the Policy requires that an antidegradation analysis be included in each salt and nutrient management plan to demonstrate the projects included within the plan will, collectively, satisfy the requirements of the Resolution. The Policy states in part with regards to the Resolution:

- *The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:*

  (1) A project that utilizes less than 10 percent of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20 percent of the available assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board, until such time as the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the Regional Water Board shall calculate the impacts of the project or projects over at least a ten year time frame.

  (2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1), then a Regional Water Board-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the Regional Water Board to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. An integrated approach (using surface water,

groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

- *Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.*

  (1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

  (2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin). [Appendix A]

IV.2. PROJECT EVALUATION

An antidegradation analysis was conducted to identify the use of available assimilative capacity, as described in the Policy Section 9(c)(1). For this antidegradation analysis, mass-balance calculations were performed using the Basin annual groundwater in storage estimated by the spreadsheet groundwater balance model for the Monk Hill subarea (Appendix G) the Pasadena subarea (Appendix H) and the Santa Anita Subarea (Appendix I) the annual water quality data for all water used within the Raymond Basin (Appendices J and K). These mass-balance spreadsheets for nitrate, sulfate, chloride, and TDS are summarized in Tables III.6, III.7, III.8, III.9, III.10, III.11, III.12, III.14, III.15, III.16, and III.17.

Section III.5 of this SNMP identified the quantity of new water that could be introduced annually to the Basin before 10 percent of the available assimilative capacity for TDS would be used. The Nitrate, Chloride, and/or Sulfate concentrations in replenishment water are not sufficient for these compounds to become limiting to assimilative capacity before TDS. The antidegradation analysis consists of separate calculations for Nitrate, Chloride, Sulfate, and TDS showing the percentage utilization of each respective assimilative capacity after 1 year, 5 years, 10 years, 20 years, and when equilibrium is reached, as shown in Tables III.18, III.19, and III.20. The Recycled Water Policy sets an interim goal that no single project is to use more than 10 percent of the available assimilative capacity, or combination of projects to use more than 20 percent of the available assimilative capacity. Consequently, as part of this SNMP, the antidegradation analysis calculated the collective amount of water from potential future projects that could be replenished in the Basin without exceeding the very conservative value of 10 percent of the available assimilative capacity. These calculations are shown on Table III.18, III.19 and III.20 respectively for the Monk Hill, Pasadena, and Santa Anita subareas.

Monk Hill Subarea

The water quality of new water supplies is assumed to be 720 mg/l for TDS, 26 mg/l for nitrate, 163 mg/l for chloride and 210 mg/l for sulfate. Table III.18 shows the summary of the calculations and indicates TDS is the central constituent and will use 10.0 percent of the Monk Hill TDS assimilative capacity through annual replenishment of about 225 ac-ft of new water when equilibrium is reached.

Pasadena Subarea

The water quality of new water supplies is assumed to be 720 mg/l for TDS, 26 mg/l for nitrate, 163 mg/l for chloride and 210 mg/l for sulfate. Table III.19 shows the summary of the calculations and indicates sulfate is the central constituent and will use 10.0 percent of the Pasadena sulfate assimilative capacity through annual replenishment of about 405 ac-ft of new water when equilibrium is reached.

Santa Anita Subarea

The water quality of new water supplies is assumed to be 720 mg/l for TDS, 26 mg/l for nitrate, 163 mg/l for chloride and 210 mg/l for sulfate. Table III.20 shows the summary of the calculations and indicates sulfate is the central constituent and will use 10.0 percent of the Santa Anita sulfate assimilative capacity through annual replenishment of about 245 ac-ft of new water when equilibrium is reached.

The antidegradation analysis is extremely conservative, as it assumes no additional constituent removal beyond historical amounts. Additionally, the analysis only considers direct spreading where 100 percent of the water is assumed to reach the groundwater. A recycled water project utilizing direct use would only result in a fraction of the recharge water reaching the groundwater; therefore, a significantly greater volume of replenishment water could be used before utilizing 10 percent of the assimilative capacity. Recycled water quality in the Raymond Basin could potentially have a higher water quality than the assigned quality used in the antidegradation analysis, if, for example, a higher level a treatment is utilized, which would allow for a greater volume of water to be used for replenishment before exceeding 10 percent of the assimilative capacity.

Pasadena Water and Power has proposed the Pasadena Non-Potable Water Project which involves the installation of a new non-potable water distribution system to deliver recycled water and local stream water for direct use to customers within the Monk Hill and Pasadena subareas. Pasadena Water and Power has estimated that upon full buildout, there will be a recycled water demand of 2,700 ac-ft/yr for direct use irrigation between the Monk Hill and Pasadena subareas. Assuming that 10 percent of irrigated recycled water percolates to the groundwater table, approximately 270 ac-ft/yr may contribute to loading in the Raymond Basin, which should fall within the Policy's recommendations for a single project to utilize less than 10 percent of the available assimilative capacity.

IV.3. PREDICTIVE TRENDS

As discussed in Section III.3.7, the general water quality trends for chloride, sulfate, and TDS based solely on the period 1985-86 to 2011-12 are increasing in the Monk Hill Subarea and the water quality trends for nitrate, chloride, sulfate, and TDS are all increasing in the Pasadena subarea, excluding the impacts of potential future water projects. Therefore, an evaluation of the compiled historical water data for the period 1994-95 to 2011-12 was conducted to project future groundwater quality assuming no hypothetical scenarios are implemented. First, the linear interpolation of the annual mean extraction well quality was determined for each subarea over the long term time period (WY 1994-95 through WY 2011-12) to determine the historical trend. Next, the linear interpolation was extrapolated from WY 2011-12 to WY 2030-31 to plot the future predictive trends without taking into consideration any additional projects, future implementation measures, or changes in hydrology. Along with the long term trend of the constituent concentration, lines representing 10 percent and 20 percent of the baseline average assimilative capacity were also plotted to compare the constituent concentration trends to the recommended acceptable usage of the available assimilative capacity for a single project (10 percent) and multiple projects (20 percent). The baseline period is from WY 2002-03 to WY 2011-12.

VWC operates an injection program in the Monk Hill Subarea using treated imported water from MWD that is injected during the winter months and removed through pumping in the summer months during peak demand. Because of this program, water quality data from VWC wells does not reflect native groundwater quality. Therefore, water quality data from VWC extraction wells was omitted from the data set to remove any influence of the imported water injection program on mean groundwater extraction water quality.

The following is a summary of the groundwater trends by subarea:

Monk Hill Subarea

Nitrate concentration trends are gradually decreasing. Chloride concentrations are increasing, while sulfate and TDS concentrations are increasing more significantly. Monk Hill concentration trends are provided in Plates IV.1a, IV.1b, IV.1c, and IV.1d.

Pasadena Subarea

Nitrate and chloride concentration trends are increasing. Sulfate and TDS concentrations are increasing more significantly. Pasadena concentration trends are provided in Plates IV.2a, IV.2b, IV.2c, and IV.2d.

Santa Anita Subarea

Nitrate, chloride, sulfate, and TDS concentration trends are all decreasing. Santa Anita concentration trends are provided in Plates IV.3a, IV.3b, IV.3c, and IV.3d.

The specific causes of the increasing constituent trends in the Monk Hill and Pasadena Subareas are not clearly understood. However, one of the cause may be the results of long-term direct use of treated imported water to meet consumer demand, which has been necessary to comply with the groundwater production limitations required by the Raymond Basin Judgment. The Raymond Basin Judgment has established groundwater rights for groundwater producers in the basin. Any water demand in excess of the 1955 Decreed Rights historically has been met through the purchase of treated imported water from MWD's Weymouth Treatment Plant.

MWD has attempted to maintain the TDS concentrations in the treated imported water from Weymouth Treatment Plant to below 500 mg/l. However, the TDS concentrations can exceed the Basin Plan Water Quality Objective of 450 mg/l. The annual mean water quality of treated imported water from Weymouth Treatment Plan for chloride, sulfate, and TDS has increased in the most recent five years. These increases in constituent concentrations likely lead to an increase in groundwater concentrations in the Monk Hill Subarea and Pasadena subareas which rely heavily on imported water to meet water demands. As noted in Section III.3.6, the Santa Anita subarea historically has not required imported water purchases to meet demands. Therefore, the groundwater concentration has not been influenced by treated imported water, as reflected by the constituent trends. In addition, the VWC injection program historically may have influenced water quality in the Monk Hill Subarea.

As discussed in Section III.3.7, there is a considerable of degree of annual variation of water quality for each constituent. Salt concentrations vary with several different factors including the volume of groundwater in storage. TDS concentrations are typically inversely related to volume of groundwater in storage; therefore, the volume of groundwater in storage has the potential to greatly impact constituent concentration trends. The frequency of sampling impacts at certain impaired wells also affects the mean of the constituent concentration data set.

These predictive trends have limitations and are broad generalizations of the available data; however, they indicate potential areas of concern by subarea. Consequently, RBMB will update the data sets and trends annually and provide these trends to RWQCB staff for discussion and evaluation. In response to the increasing TDS concentrations trends in the Monk Hill and Pasadena subareas, RBMB will increase the frequency of monitoring of TDS in production wells to at least once annually to gather more annual data to evaluate future trends. This monitoring may also help confirm the source/cause of increasing concentrations and assist with identifying potential management measures to address them. As discussed in Section III.6, RBMB is managing current implementation measures and has proposed potential implementation measures with the aim of continuing to manage and maintain the water quality in the Raymond Basin.

CHAPTER V

BASIN-WIDE SALT AND NUTRIENT MONITORING PLAN

V.1 BACKGROUND

Section 6.b.(3)(a) of the Recycled Water Policy states in past "Each salt and nutrient management plan shall include the following components:

a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

    i. The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

    ii. The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.

    iii. The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years."

The Raymond Basin is a relatively small groundwater aquifer with a surface area of approximately 40.9 square miles. Raymond Basin contains approximately 800,000 acre-feet of fresh water and supports annual groundwater production of about 31,000 acre-feet. Municipal water supply companies (purveyors) collectively have about 50 active, producing wells. The wells are required to be sampled on a regular basis pursuant to Title 22, Chapter 15 “Domestic Water Quality and Monitoring” (Title 22). As described in the section below, water purveyors have the responsibility to collect water quality samples to satisfy Title 22 requirements.

The RBMB will be the primary stakeholder responsible for “…conducting, complying and reporting the monitoring data…” pursuit to Section 6.b(3)(a) of the Recycled Water Policy. RBMB has implemented a program in conjunction with water purveyors in the Raymond Basin, to collect TDS, Nitrate, Chloride, and sulfate samples from all active potable water supply wells at least once every three years.

TDS, sulfate and chloride samples from wells are collected once every three years to ensure there is a record of “salts” and “nutrient” data so that a long-term trend can be established. As noted in Section III.3.7, the average concentrations for the most recent 5-year period are about 405 mg/l TDS, 27 mg/l Nitrate, 45 mg/L Chloride, and 61 mg/L Sulfate for the Monk Hill subarea, about 361 mg/l TDS, 36 mg/l Nitrate, 41 mg/L Chloride, and 77 mg/L Sulfate for the Pasadena subarea, and about 268 mg/l TDS, 16 mg/l Nitrate, 15 mg/L Chloride, and 34 mg/L Sulfate for the Santa Anita subarea.

The RBMB adopted the “Criteria for Delivery of Supplemental Water” (Criteria) on October 18, 2006 (see Appendix BB). The Criteria sets forth procedures the RBMB follows to ensure the highest quality imported water is replenished in the Raymond Basin. At any time the highest quality of imported water is not available, the Criteria has established steps the RBMB follows to determine the impacts of delivering lesser quality imported water, including a potential option of not delivering untreated imported water until a time when the water quality improves and/or a different source becomes available. This SNMP proposes to use RBMB’s existing Title 22 water quality monitoring program for groundwater to satisfy the monitoring plan requirement of the SNMP.

V.2 TITLE 22 WATER QUALITY MONITORING PROGRAM

There are approximately 50 active and standby potable water supply wells in the Raymond Basin. The greatest amount of groundwater production occurs in the Pasadena subarea. Groundwater quality conditions vary throughout the Raymond Basin due to natural and human influences.

Water purveyors in the Raymond Basin conduct well water sampling and provide the water quality data to the RBMB. Water purveyors sample their potable supply wells for the following chemical groups regulated by the California Safe Drinking Water Act (California Health and Safety Code) under the specific drinking water standards contained in the California Code of Regulations: radioactivity, VOCs, Synthetic Organic Chemicals (SOCs are primarily pesticides and herbicides) and inorganics.

Water samples are collected from potable supply wells and then analyzed for a variety of constituents by a State-certified testing laboratory to demonstrate compliance with the requirements of the California Code of Regulations, Title 22, Chapter 15, "Domestic Water Quality and Monitoring" (Title 22). The Title 22 water quality test results summarized in this report have been submitted to the California Department of Public Health (CDPH), as required by the following sections of Title 22:

- Sections 64431-64432, Primary Standards -Inorganic Chemicals;
- Section 64449, Secondary Drinking Water Standards;
- Section 64442, MCL and Monitoring-Gross Alpha Particle Activity, Radium-226, Radium-228 and Uranium;
- Sections 64444 to 64445 Organic Chemicals (SVOCs only); and
- Sections 64530 to 64537 Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors.

A State-certified laboratory analyzes the samples and submits results to CDPH and Producers electronically. The Producers then provide the results to the RBMB. Title 22 establishes testing requirements and the format for reporting laboratory results of public water systems' water quality analyses. The regulations require all certified drinking water analytical laboratories to submit water quality data directly to CDPH in digital, electronic form. This submittal is referred to as Electronic Data Transfer (EDT). RBMB coordinates with Producers to obtain general mineral and general physical water quality results.

The Title 22 Producer monitoring program provides much of the source water data used develop the Raymond Basin SNMP and the data are incorporated into a database maintained by the RBMB.

V.2.1 Participating Purveyors

Purveyors who submit Title 22 water quality monitoring data to the RBMB are categorized according to the subarea from which they produce.

Monk Hill Subarea:

1. La Canada Irrigation Company
2. Las Flores Water Company
3. Lincoln Avenue Water Company
4. City of Pasadena
5. Pasadena Cemetery Association
6. Rubio Canon Land & Water Association
7. Valley Water Company

Pasadena Subarea:

1. City of Alhambra
2. City of Arcadia
3. California-American Water Company
4. East Pasadena Water Company
5. H.E. Huntington Library &Art Gallery

6. Kinneloa Irrigation District
7. City of Pasadena
8. San Gabriel County Water District
9. Sunny Slope Water Company

Santa Anita Subarea:

1. City of Arcadia
2. City of Sierra Madre

V.2.2 Title 22 Sampling Schedules

Title 22 source water monitoring frequencies are specified by DDW in "Vulnerability Assessment and Monitoring Frequency Guidelines", issued to Raymond Basin purveyors (by CDPH) every three years. Raymond Basin purveyors develop schedules for source water sample collection according to the monitoring frequencies specified in the "Vulnerability Assessment and Monitoring Frequency Guidelines" and incorporate more frequent monitoring into the schedules when required by Title 22 drinking water regulations.

General Mineral (GM) and General Physical (GP) – Raymond Basin purveyors are responsible for source water compliance monitoring of GM/GP constituents, including TDS, Chloride, Sulfate, and Nitrate.

Producers sample their wells based on requirements and frequencies prescribed in Title 22 and enforced by DDW. Based on the water quality concentration, DDW may require additional sampling. In the event a constituent in a well exceeds an MCL, DDW may require treatment, a blend plan, or that the well ceases production.

Historically, there have been no issues throughout the Basin with chloride and sulfate concentrations in production wells whereby DDW has required increased monitoring beyond once every three years. Any production well which has a nitrate concentration between 50 percent and 100 percent of the MCL (or pumps to a liquid-phase granular activated carbon treatment facility) must be sampled on a quantity basis. DDW has also approved numerous nitrate treatment facilities and blend plans to mainstream production from wells with nitrate at or above the MCL of 45 mg/l. TDS is required by DDW to be sampled at least once every three years. Similar to nitrate, DDW staff review water quality results and may require additional sampling based on the TDS concentrations. Historically, production wells in the Main Basin have not required blending or treatment for TDS.

Groundwater sources are required to be sampled at least once every three years for GM/GP constituents. Standby groundwater sources are sampled at least once every nine years. In accordance with CDPH regulations, a standby source shall be used only for short-term emergencies of five consecutive days or less, and for less than a total of fifteen days a year.

Inorganics - Groundwater sources are required to be sampled at least every three years for inorganic chemicals, except for nitrate, which is sampled at least annually. Approximately one-third of the groundwater sources are monitored for inorganic chemicals each year on a rotating basis. Standby groundwater sources are monitored at least once every nine years.

CDPH requires quarterly or more frequent nitrate testing of operating wells when 1) a well is being treated or blended to reduce the nitrate level below the MCL, 2) the nitrate concentration in a well exceeds one-half the MCL, or 3) a well supplies water to a Granular Activated Carbon treatment system. Purveyors collect quarterly nitrate samples at wells which meet the criteria above and collect annual nitrate samples for all other productions wells.

Radioactivity - On December 7, 2000, USEPA promulgated the final revised drinking water standards for radionuclides, which became effective on December 8, 2003. The CDPH adopted the federal standards. The radionuclide rule requires all community water systems to monitor gross alpha. Monitoring frequencies have been determined based on the results of the initial round of quarterly samples.

V.3 CRITERIA FOR DELIVERY OF SUPPLEMENTAL WATER

The RBMB adopted the "Criteria for Delivery of Supplemental Water" on October 18, 2006. A copy of the Criteria is included in Appendix BB. The Supplemental Water Criteria provides a background of regulatory and institutional requirements which, must be considered when delivering Supplemental Water, with an emphasis on delivery of the highest quality water at all times.

V.4 PROPOSED MONITORING PLAN

The Recycled Water Policy, Section 6.b(3)(a) requires a water quality monitoring plan to be developed. Specifically section 6.b(3)(a)(ii) states "…the preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located approximately to determine water quality throughout the most critical areas of the basin…"

The RBMB is the Court appointed agency which manages both the quality and quantity of water supplies in the Raymond Basin. The RBMB also coordinates the existing Title 22 Water Quality Monitoring Program described in Section V.2 of this SNMP. Consequently, RBMB will serve as the responsible agency to oversee collection of water quality data. Water quality data will be submitted to DDW pursuant to Title 22 requirements. As required by the Recycled Water Policy Section 6.b(3)(a)(iii) water quality data will be reported to the LAWRWQCB at least every three years.

Water quality samples for TDS, Nitrate, Chloride, and Sulfate will be collected at least once every three years at all production wells.

CHAPTER VI

SUMMARY AND RECOMMENDATIONS

VI.1 SUMMARY

The SWRCB approved Resolution No. 2009-0011 to adopt the Recycled Water Policy in February 2009. Included in that resolution is a requirement for a SNMP to be prepared for all groundwater basins. The Raymond Basin Management Board is the lead agency for the preparation of the San Gabriel Basin SNMP. The primary stakeholders include MWD, LACSD, and LACDPW.

The SNMP reviewed the geology, hydrology and hydrogeology of the Raymond Basin, along with the institutional and management structure for the Raymond Basin. TDS, Nitrate, Sulfate, and Chloride were identified as the primary constituents of concern. Sources of loading (precipitation, subsurface inflow, infiltration of applied water, storm runoff and untreated imported water replenishment) and unloading (groundwater pumping and subsurface outflow) were included in a spreadsheet computer model, along with average water quality data for TDS, Nitrate, Sulfate, and Chloride, on an annual basis.

The loading and unloading calculations were performed for each of the three subareas (Monk Hill, Pasadena, and Santa Anita) of the Raymond Basin. The assimilative capacity was also determined for each subarea. Table III.18 indicates that approximately 225 ac-ft of new water with a particular quality would use 10 percent of the available assimilative capacity for TDS and the Monk Hill Subarea once equilibrium is reached. Table III.19 indicates that approximately 405 ac-ft of new water with a particular quality would use 10 percent of the available assimilative capacity for sulfate in the Pasadena subarea once equilibrium is reached. Table III.20 indicates that approximately 245 ac-ft of new water with a particular quality would use 10 percent of the available assimilative capacity for sulfate in the Santa Anita subarea once equilibrium is reached.

The SNMP acknowledges the historical practice of replenishing the Raymond Basin with stormwater runoff which has high quality water, particularly regarding TDS. The SNMP identifies a variety of existing and potential activities including continued basin management practices; pursuit of potential new replenishment sites; water quality monitoring; and coordination between agencies which will help manage salts and nutrients in the Raymond Basin.

VI.2 RECOMMENDATIONS

The RBMB manages the Raymond Basin, in cooperation with other stakeholders, and has successfully managed the salt and nutrient loading. The RBMB recognizes the SNMP is a tool by which salts and nutrients can continue to be managed into the future. The following are recommendations for on-going salt and nutrient management in the Raymond Basin.

<u>On-going Activities</u>

- Regularly update the SNMP spreadsheet data so that impacts of potential future projects on salt and nutrient loading may be evaluated.
- Continue to collect water quality data throughout the Raymond Basin.
- Continue to meet with stakeholders on a regular basis to coordinate Raymond Basin management activities with an emphasis on stormwater runoff replenishment and continued use of SWP water for groundwater replenishment.

<u>Potential Activities</u>

- Develop new/expand existing groundwater replenishment facilities to increase stormwater replenishment capabilities.
- Encourage local planning efforts which result in reduced stormwater runoff.

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RAYMOND BASIN SNMP PLATES

SOURCE : Regional Water Board Assistance in Guiding Salt and Nutrient Management Plan Development in the Los Angeles Region. June 28, 2012.

STETSON ENGINEERS INC.
861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065

2171 E Francisco Blvd., Suite K
San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

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GROUNDWATER BASINS WITHIN THE LOS ANGELES REGION

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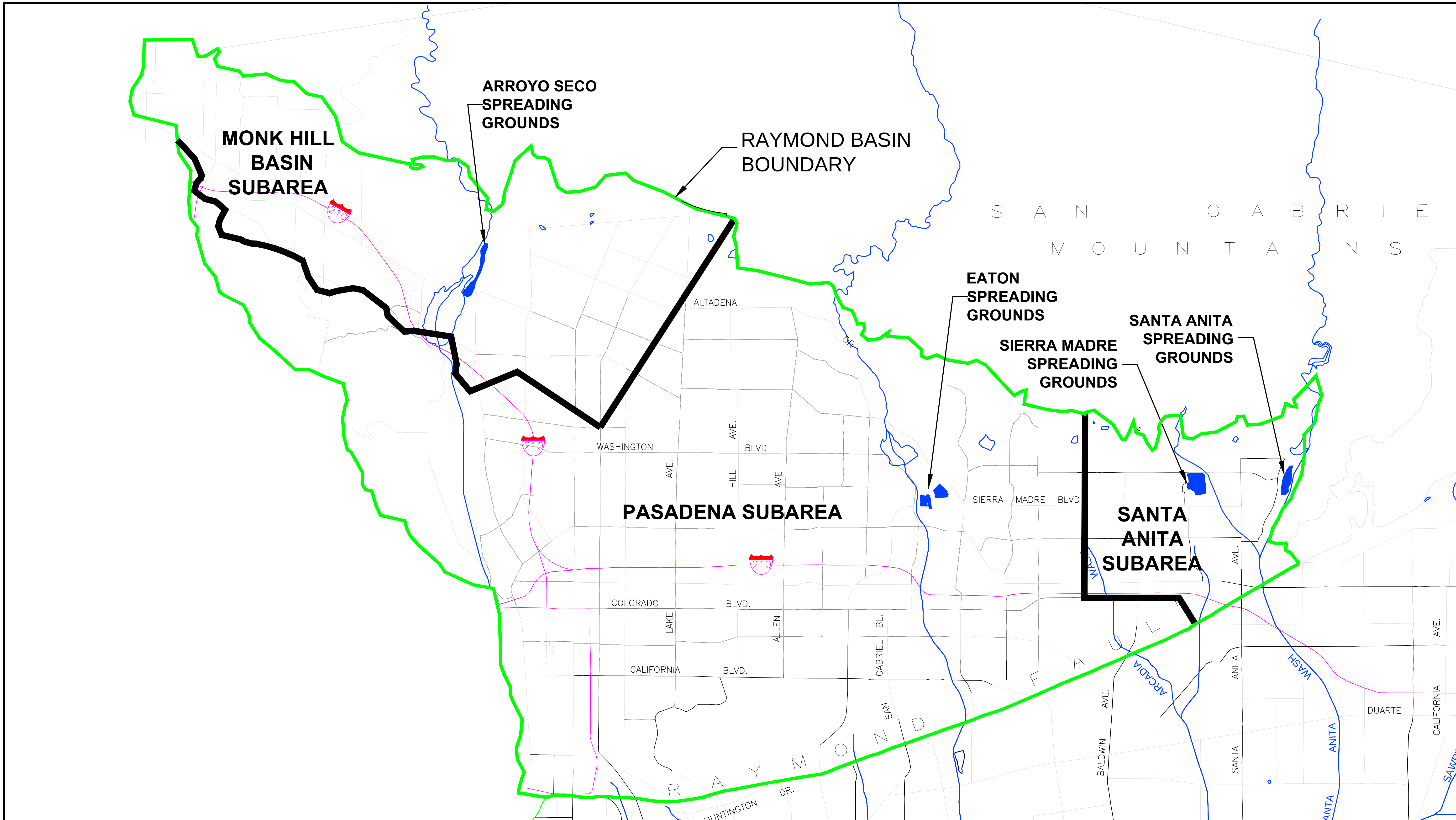

STETSON
ENGINEERS INC.
861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065

2171 E Francisco Blvd., Suite K
San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

NORTH

APPROX. SCALE :
0 2,500' 5,000'

RAYMOND BASIN MANAGEMENT BOARD

RAYMOND BASIN HYDROLOGIC SUBUNITS

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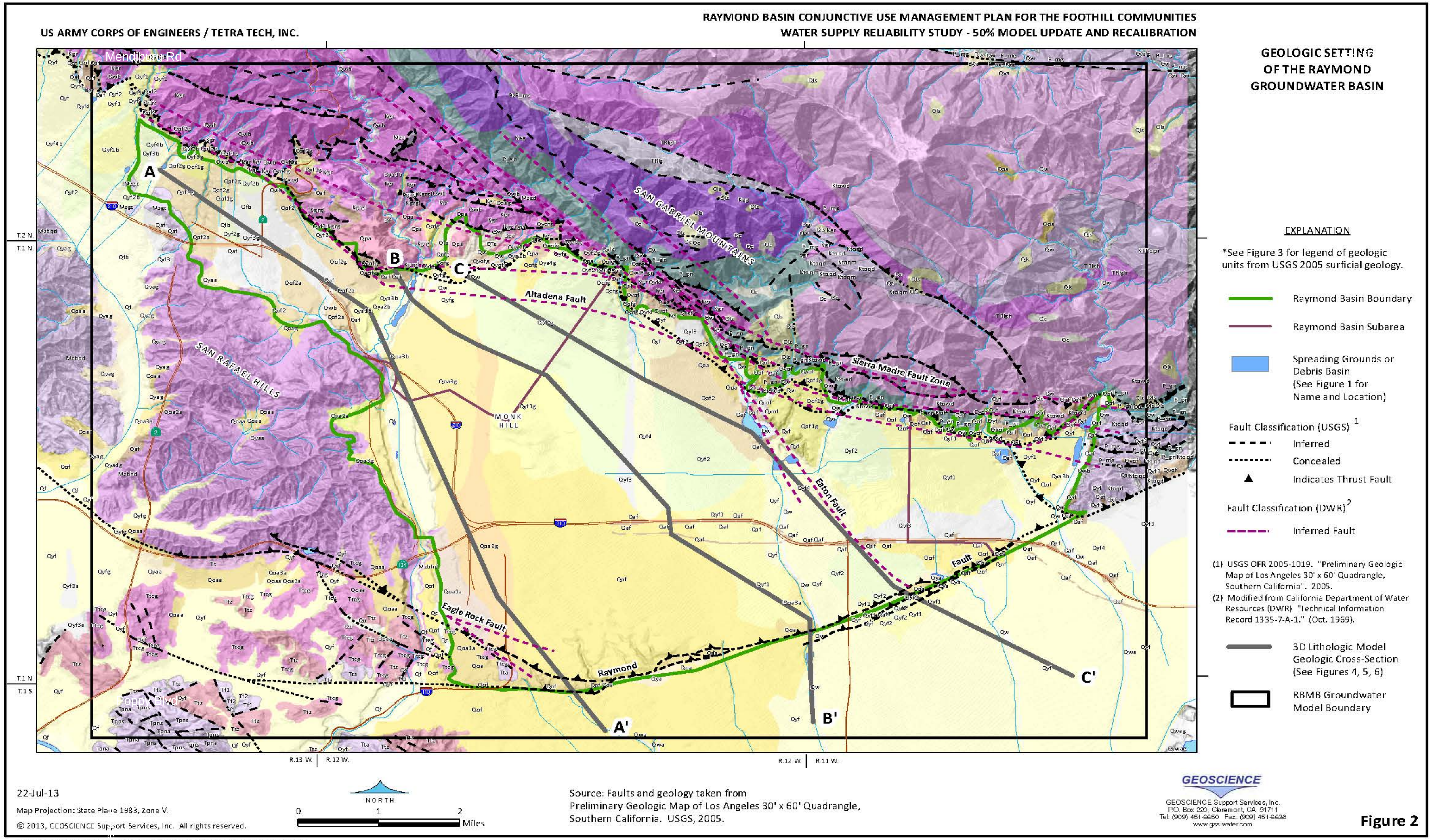

Qaf	Artificial fill (late Holocene)
Qa	Alluvium, undifferentiated (late Holocene)
Qw	Wash deposits (late Holocene)
Qf	Alluvial-fan deposits (Holocene)
Qc	Colluvium (Holocene and late Pleistocene?)
Qls	Landslide deposits (Holocene and late Pleistocene?)
Qu	Undifferentiated surficial deposits (Holocene and late Pleistocene?)
Qya	Young alluvium
Qyf	Young alluvial-fan deposits, undivided (Holocene and late Pleistocene)
Qoa	Old alluvium, undivided (late to middle Pleistocene)
Qof	Old alluvial-fan deposits, undivided (late to middle Pleistocene)
Qvof	Very old alluvial-fan deposits (middle to early Pleistocene)
Qpa	Pacoima Formation (middle to early Pleistocene)
QTs	Saugus Formation, undivided (early Pleistocene to late Pliocene)
Kgr	Granitic rocks (late Cretaceous)
Ktoqd	Tonalite and quartz diorite (late Cretaceous)
Ktoqm	Tonalite and monzogranite (late Cretaceous)
Ktowd	Tonalite (Wilson Diorite of Miller, 1934) (late Cretaceous)
Kgrl	Granitic rocks, leucocratic granodiorite (late Cretaceous)
KTrogn	Mixed tonalite and Mount Lowe intrusive suite (Cretaceous and Triassic)
Keg	Echo granite (Cretaceous)
Mzbhd	Biotite-hornblende diorite (Mesozoic?)
Mzbqd	Biotite-quartz diorite (Mesozoic?)
Mza	Alaskite (Mesozoic?)
Mzgd	Granodiorite (Mesozoic)
Mzgc	Granitic complex (Mesozoic?)
Tr1g	Mount Lowe intrusive suite, undivided (Triassic)
Trlgh	Mount Lowe intrusive suite, orthoclase-hornblende facies
Pzp	Placerita Formation (Paleozoic)
PzPms	Siliceous metasedimentary rock (Paleozoic or Proterozoic)
Pgn	Gneiss (Proterozoic?)
Pmg	Mendenhall Gneiss (Proterozoic)
Tf2	Fernando Formation, member 2 (Pliocene)
Tf1	Fernando Formation, member 1 (Pliocene)
Tpns	Puente Formation, siliceous shale (early Pliocene)
Tpna	Puente Formation, sandstone (late Miocene)
Ttcg	Topanga Group, conglomerate
Tta	Topanga Group, sandstone
Ttz	Topanga Group, siltstone

SOURCE: Figure 2 - Raymond Basin Conjunctive Use Management Plan for the Foothill Communities Water Supply Reliability Study - 50% Model Update and Recalibration, Geoscience. July 22, 2013

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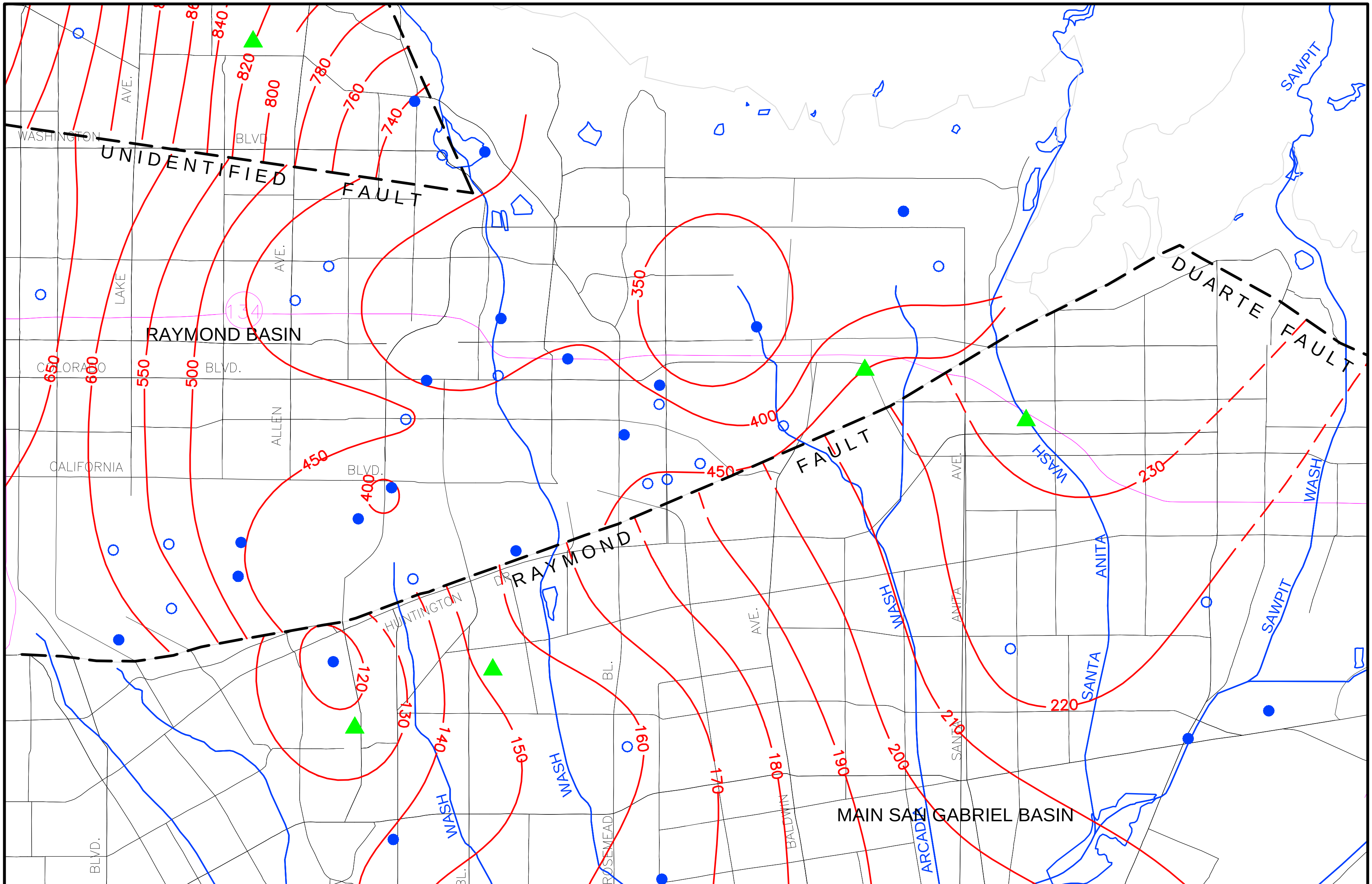
RAYMOND BASIN MANAGEMENT BOARD

GENERAL GEOLOGY OF THE RAYMOND BASIN

5/27/2016



861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065

2171 E Francisco Blvd., Suite K
San Rafael California 94901

2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

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APPROXIMATE SCALE:
2,500' 0 2,500'

RAYMOND BASIN MANAGEMENT BOARD

DIFFERENCES IN WATER LEVEL ELEVATIONS ACROSS RAYMOND FAULT (OCTOBER 2007)

PLATE III.4

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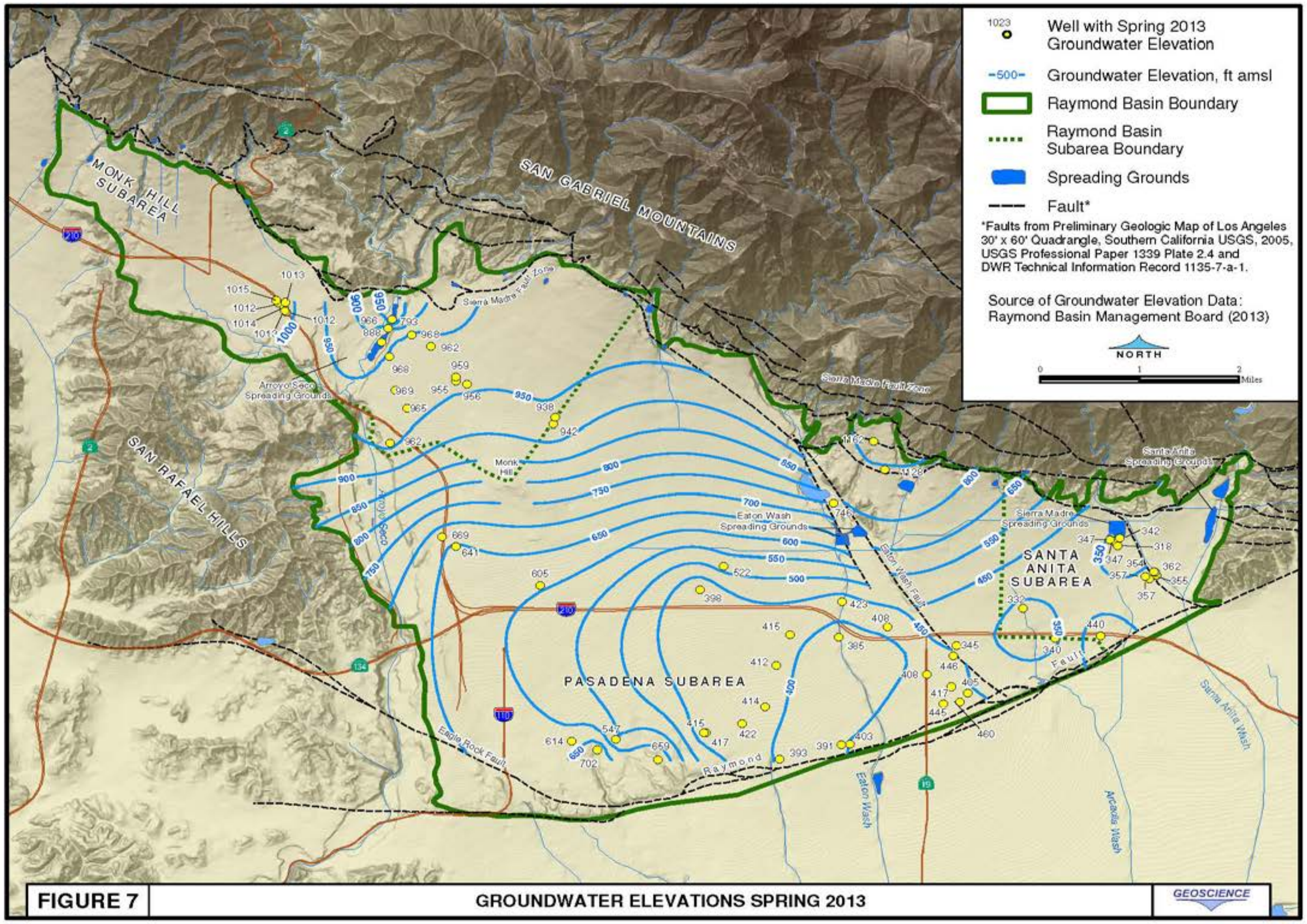

Source: Annual Report July 1, 2012 - June 30, 2013. Raymond Basin Management Board. September 2013.

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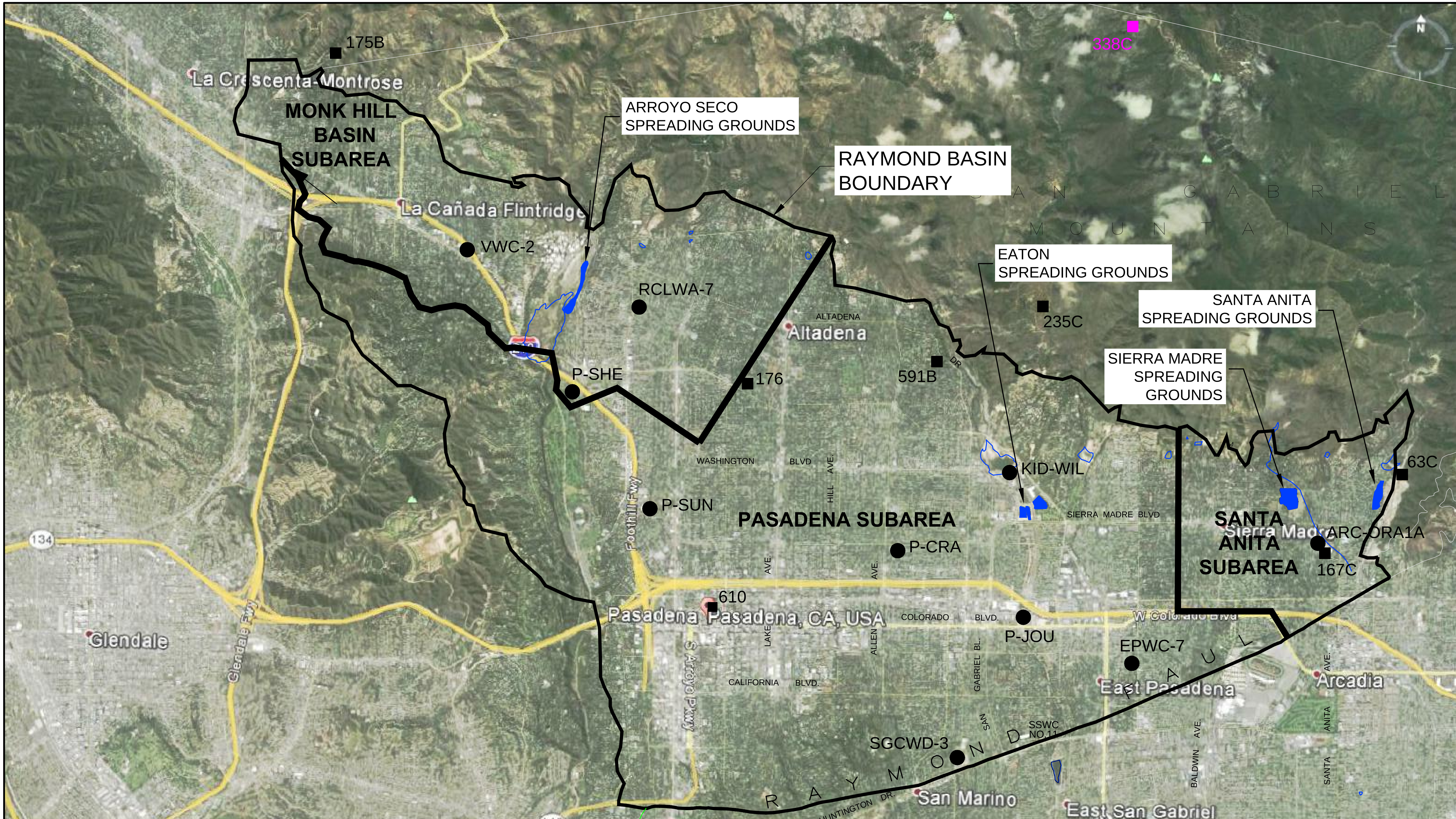
RAYMOND BASIN MANAGEMENT BOARD

GROUNDWATER CONTOURS FOR RAYMOND BASIN - SPRING 2013

PLATE III.5



STETSON
ENGINEERS INC.
861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065
2171 E Francisco Blvd., Suite K
San Rafael California 94901
2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

NORTH

APPROX. SCALE :

0 2,500' 5,000'

RAYMOND BASIN MANAGEMENT BOARD

RAYMOND BASIN PRECIPITATION STATIONS AND KEY WELLS LOCATION

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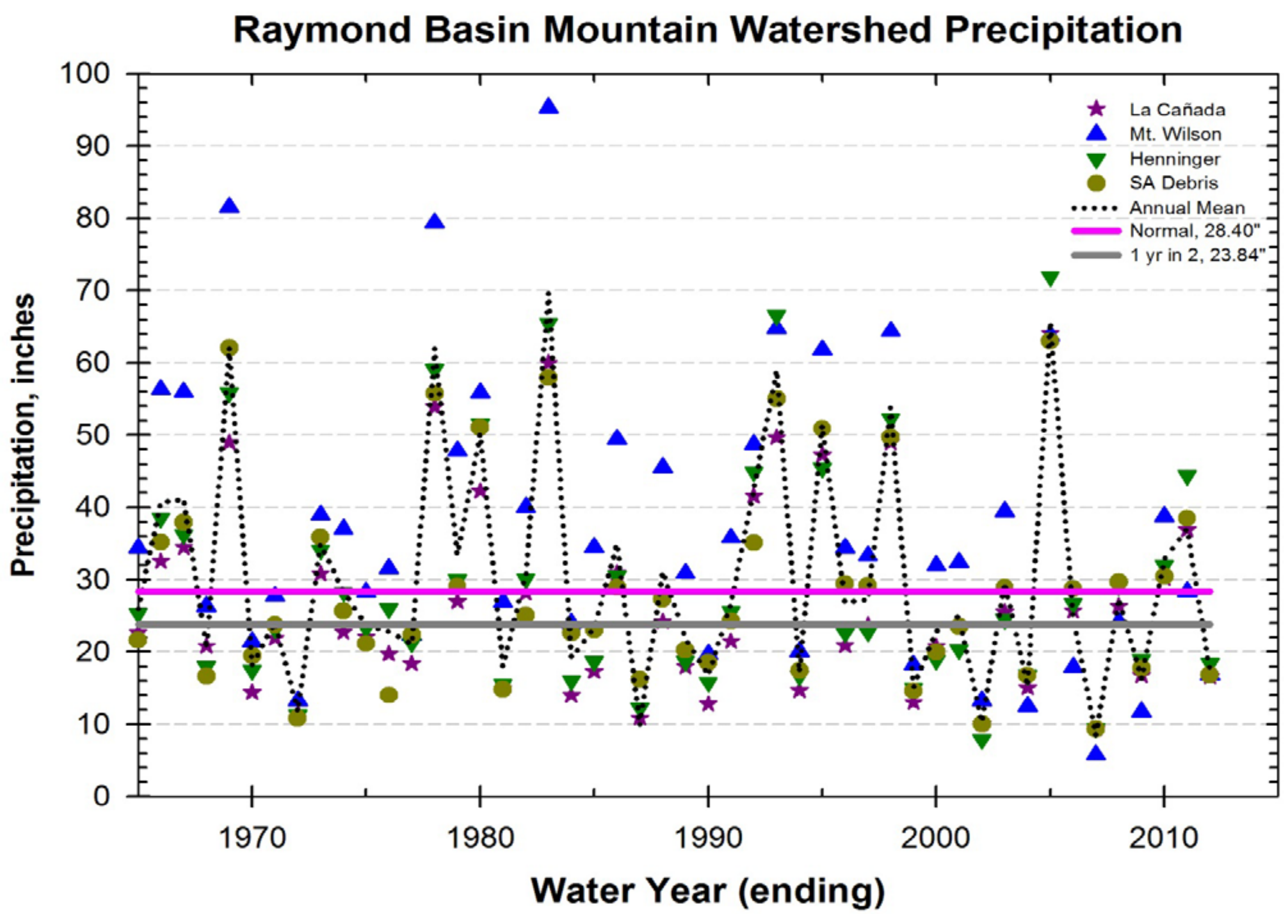

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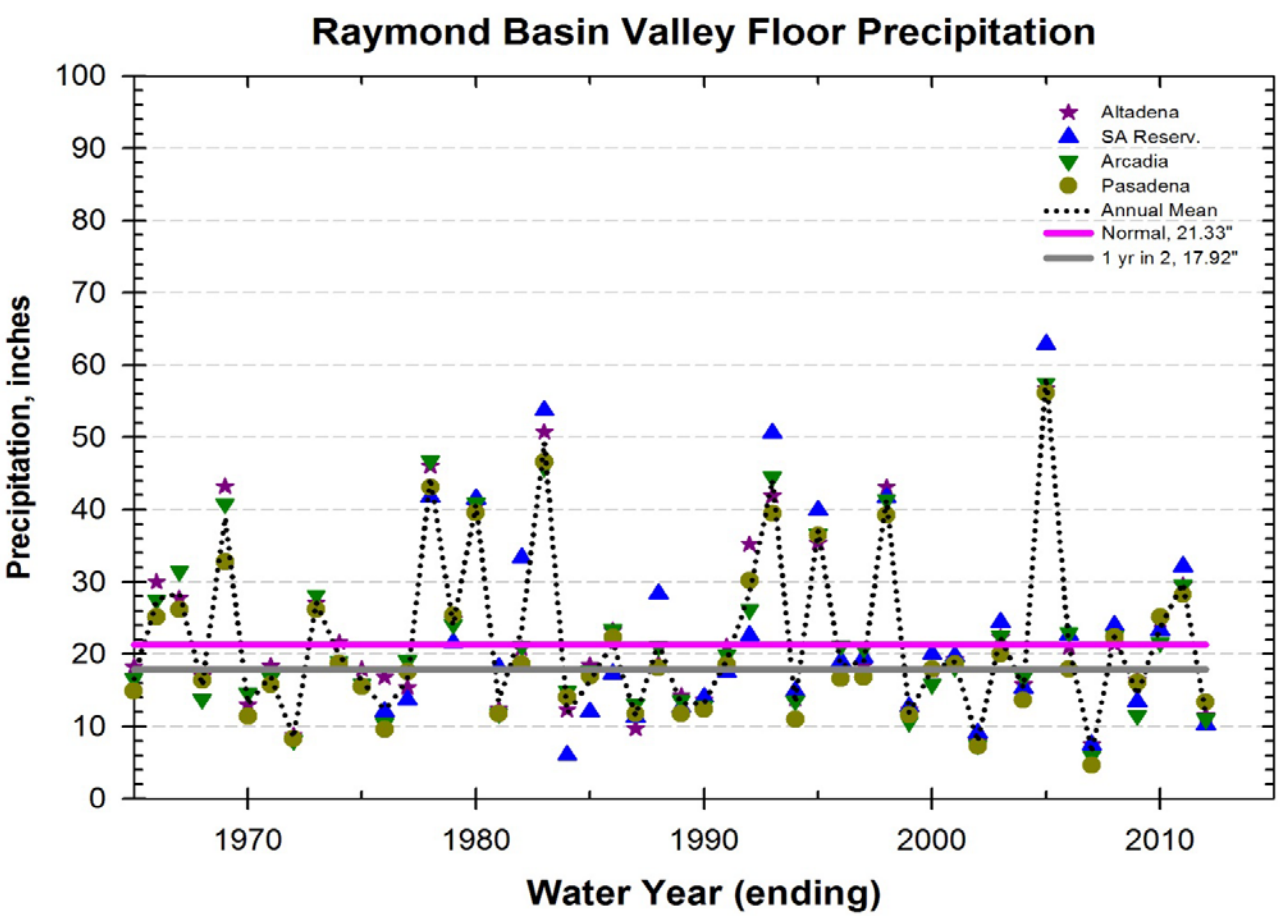
RAYMOND BASIN MANAGEMENT BOARD

PRECIPITATION IN RAYMOND BASIN (MOUNTAIN WATERSHED)

PLATE III.7a



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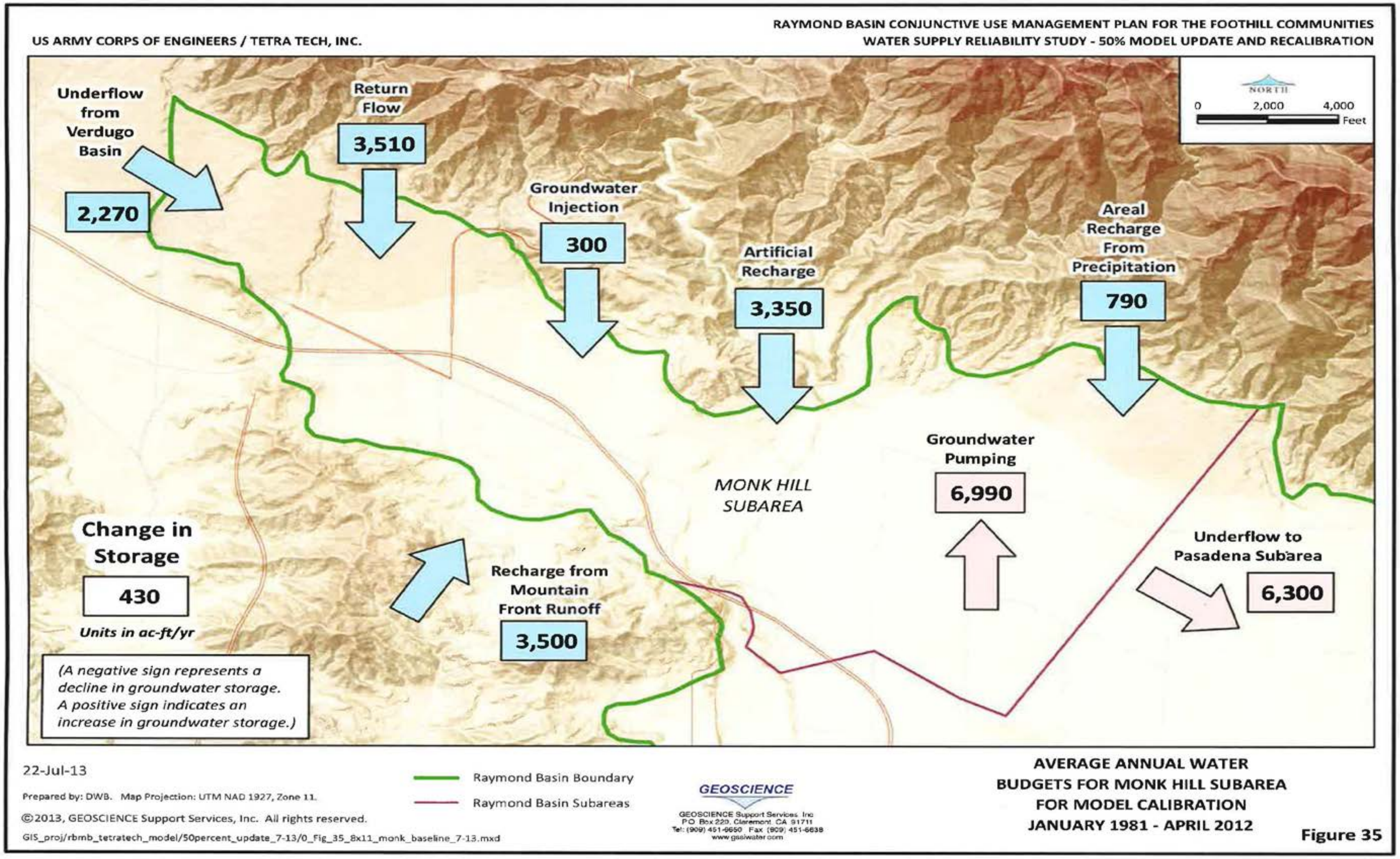
RAYMOND BASIN MANAGEMENT BOARD

PRECIPITATION IN RAYMOND BASIN (VALLEY FLOOR)

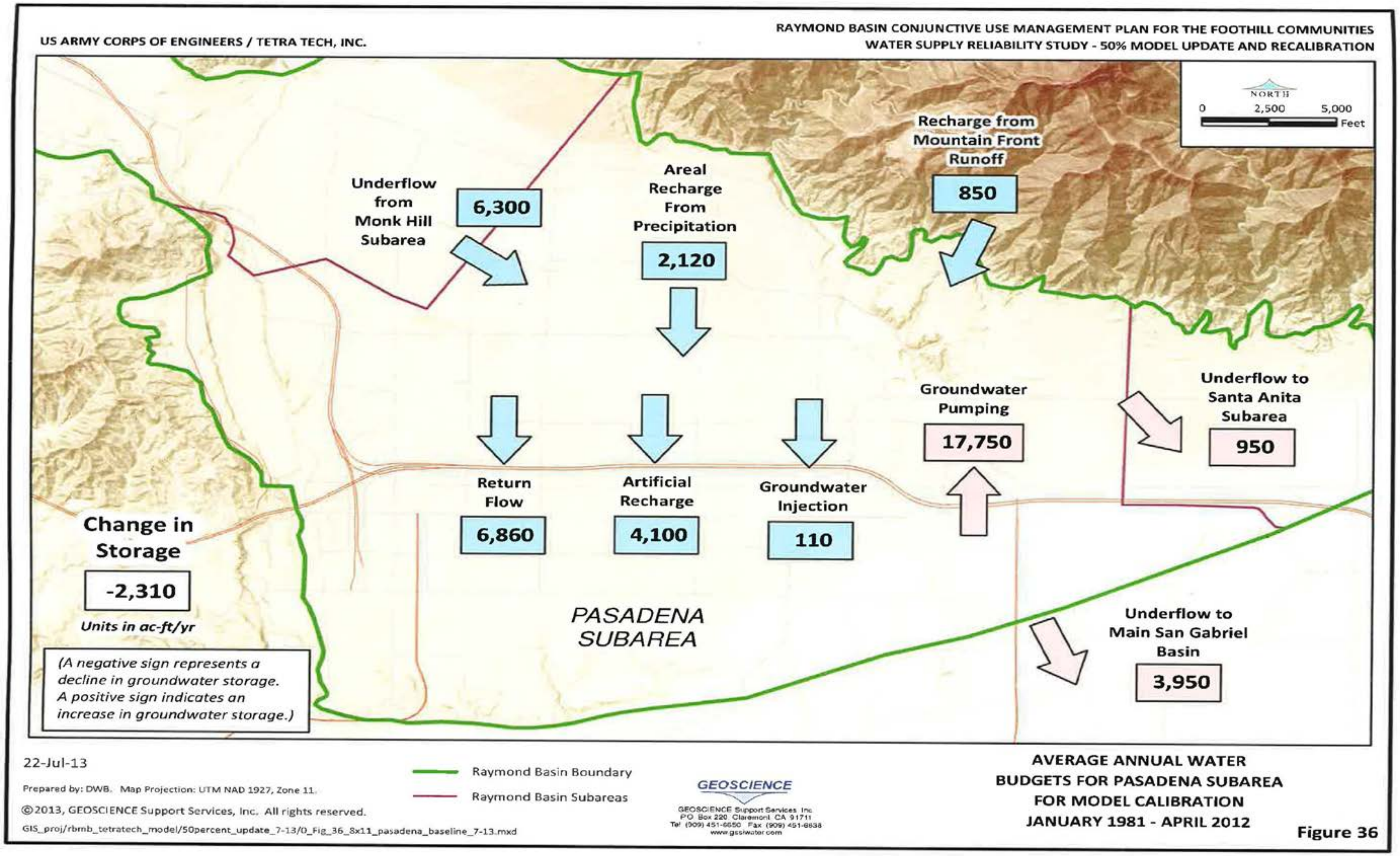
PLATE III.7b



Source: Raymond Basin Conjunctive Management Plan for the Foothill Communities Water Reliability Study 50% Model Update and Recalibration. Geoscience. July 22, 2013

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD ANNUAL WATER BUDGETS (MONK HILL SUBAREA)

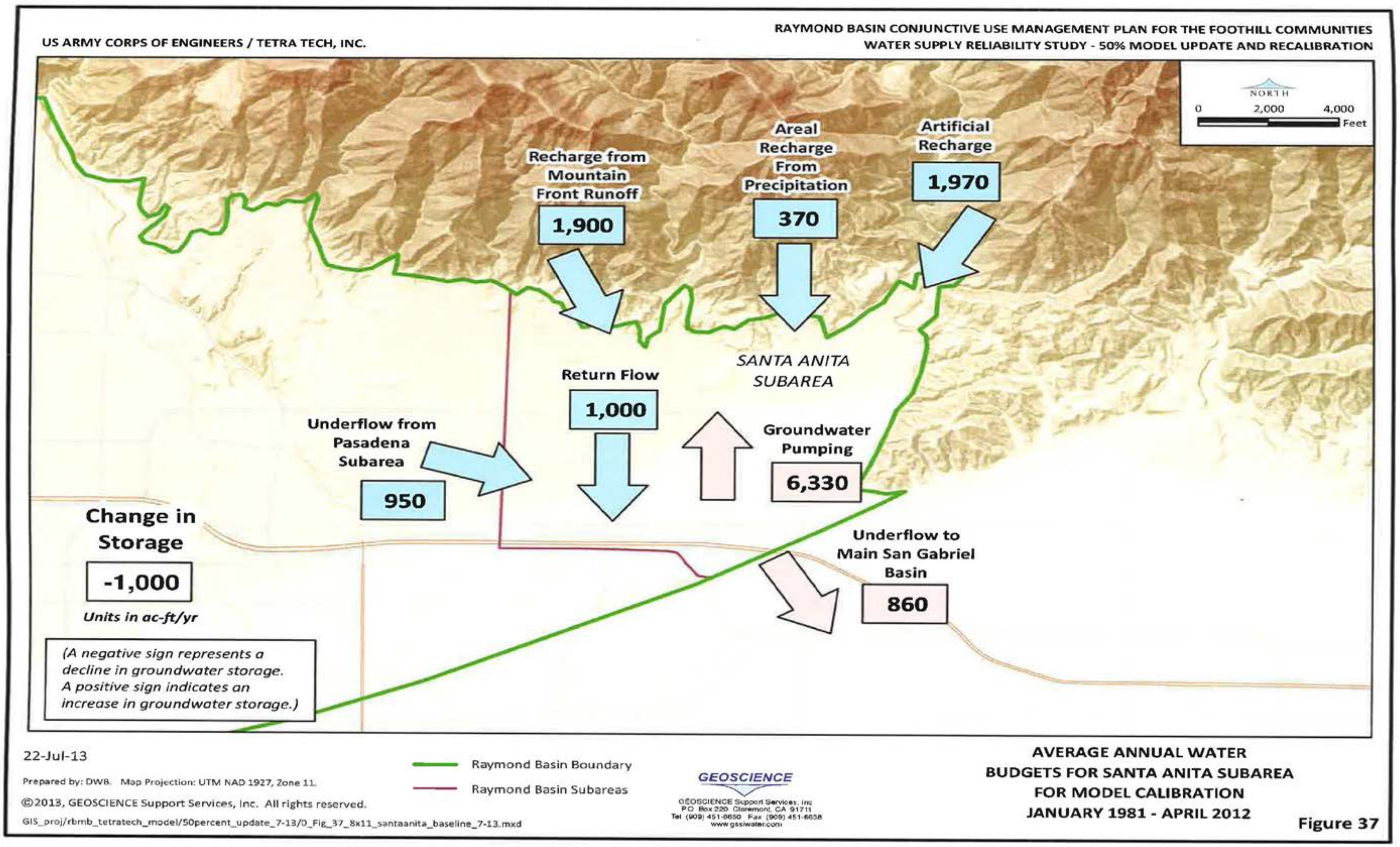
PLATE III.8a



Source: Raymond Basin Conjunctive Management Plan for the Foothill Communities Water Reliability Study 50% Model Update and Recalibration. Geoscience. July 22, 2013

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD ANNUAL WATER BUDGETS (PASADENA SUBAREA)

PLATE III.8b



Source: Raymond Basin Conjunctive Management Plan for the Foothill Communities Water Reliability Study 50% Model Update and Recalibration. Geoscience. July 22, 2013

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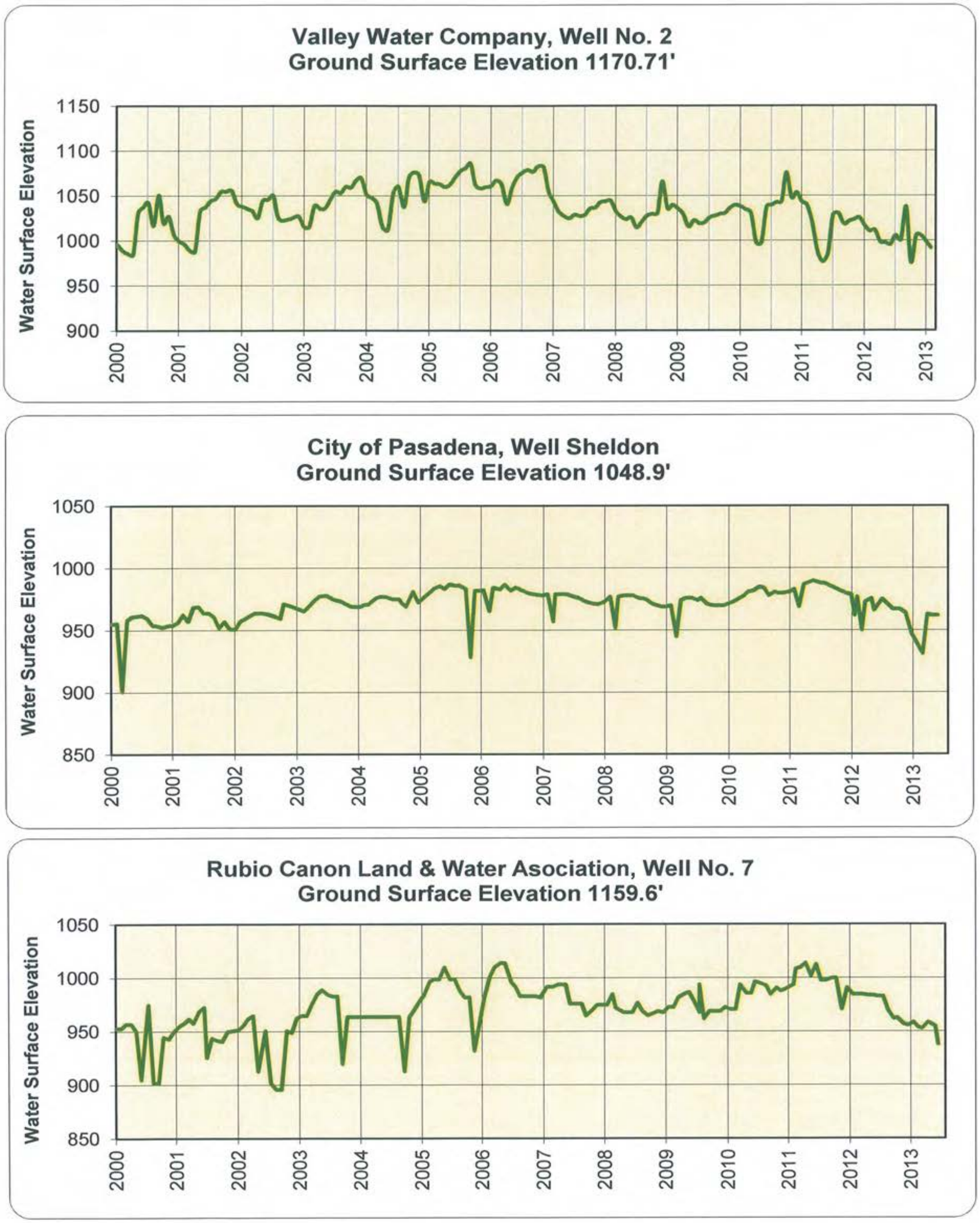
RAYMOND BASIN MANAGEMENT BOARD

ANNUAL WATER BUDGETS (SANTA ANITA SUBAREA)

PLATE III.8c

FIGURE 12 - FLUCTUATION OF WATER LEVELS AT WELLS IN THE MONK HILL SUBAREA



SOURCE: Raymond Basin Management Board Annual Report, September 2013

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	**RAYMOND BASIN MANAGEMENT BOARD** KEY WELLS ELEVATION HYDROGRAPHS (MONK HILL SUBAREA)

5/27/2016

PLATE III.9b

FIGURE 10a - FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA

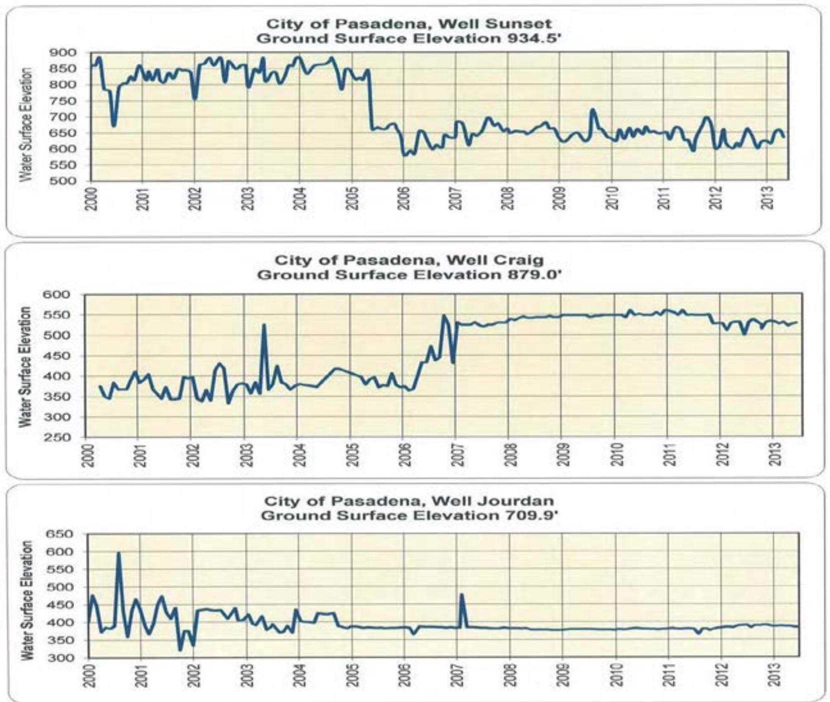
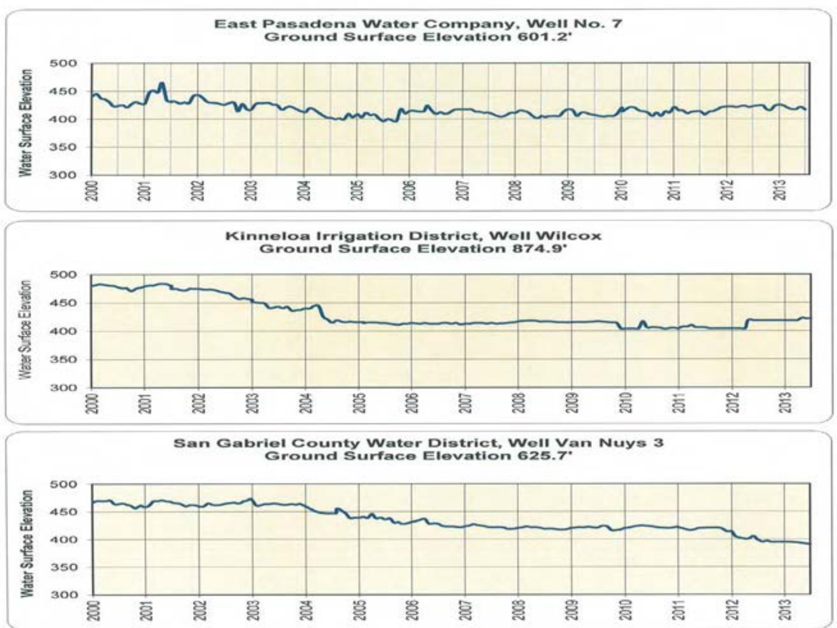


FIGURE 10b - FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA



SOURCE: Raymond Basin Management Board Annual Report, September 2013

STETSON ENGINEERS INC.

West Covina San Rafael Mesa, Arizona

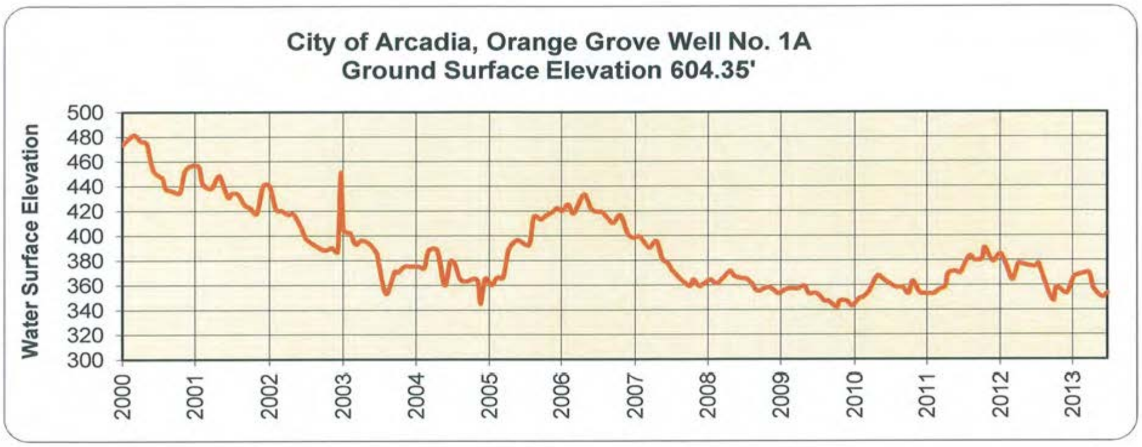
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

KEY WELLS ELEVATION HYDROGRAPHS
(PASADENA SUBAREA)

5/27/2016

FIGURE 11 - FLUCTUATION OF WATER LEVELS AT WELLS IN THE SANTA ANITA SUBAREA



SOURCE: Raymond Basin Management Board Annual Report, September 2013

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD KEY WELLS ELEVATION HYDROGRAPHS (SANTA ANITA SUBAREA)

5/27/2016

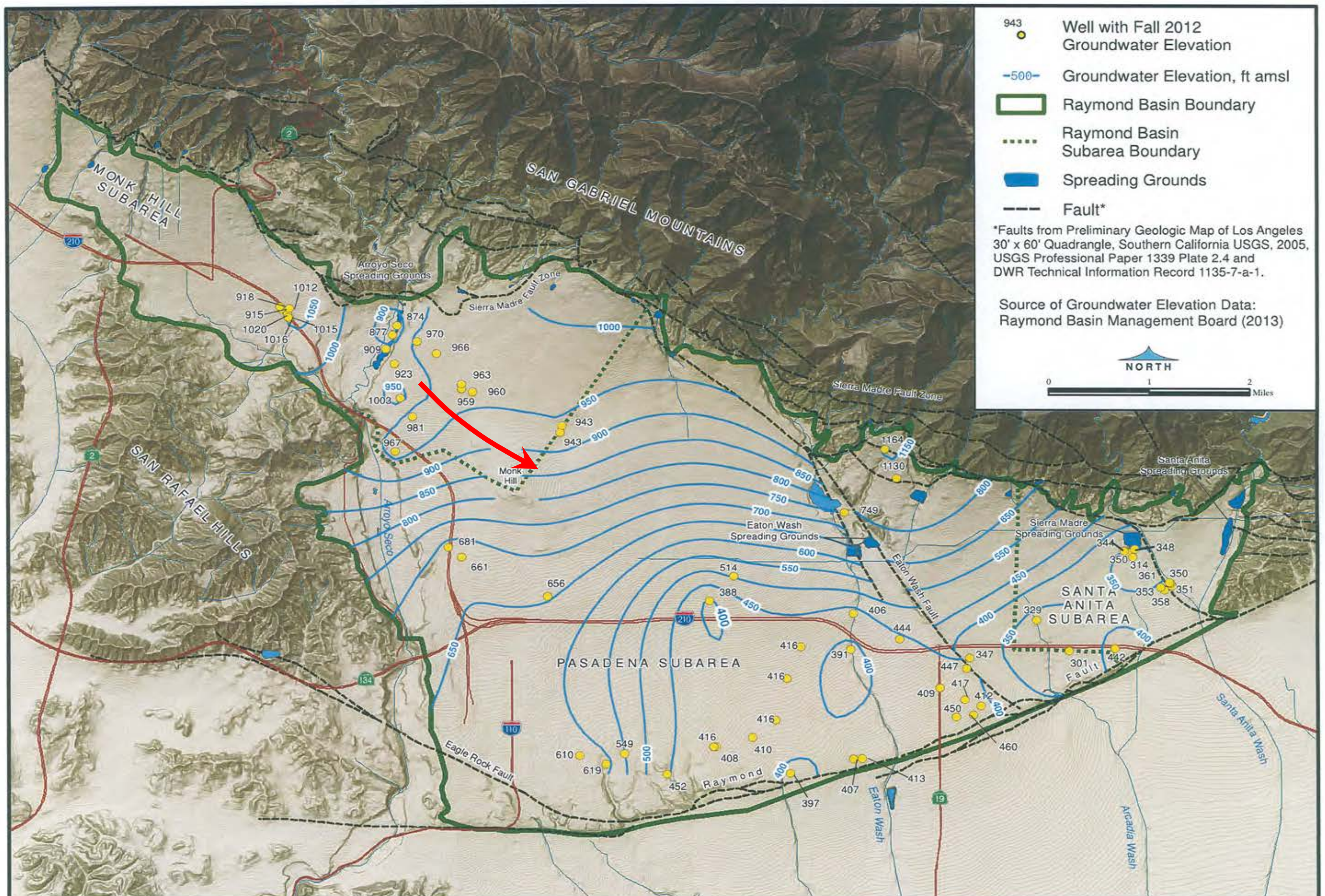


FIGURE 6 GROUNDWATER ELEVATIONS FALL 2012

Groundwater Flow Direction

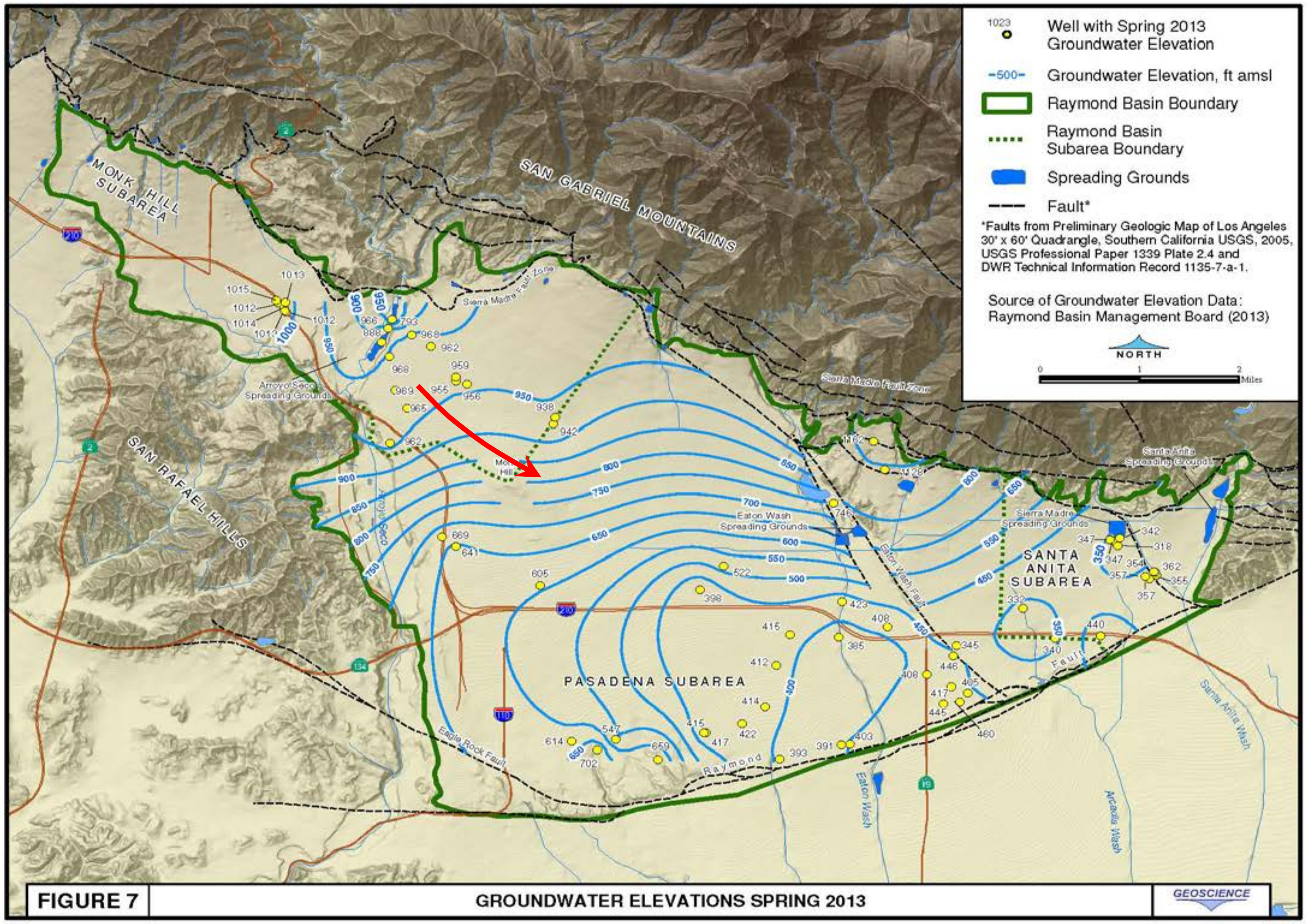
Source: Annual Report July 1, 2012 - June 30, 2013. Raymond Basin Management Board. September 2013.

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

GROUNDWATER FLOW DIRECTION IN RAYMOND BASIN - FALL 2012

PLATE III.10a



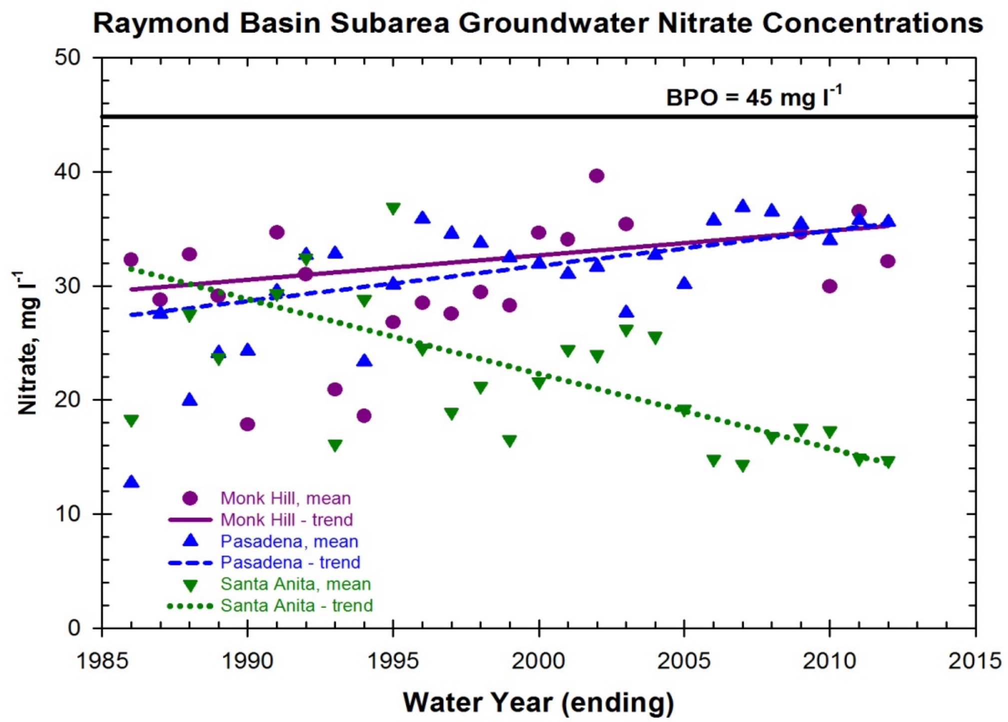
Source: Annual Report July 1, 2012 - June 30, 2013. Raymond Basin Management Board. September 2013.

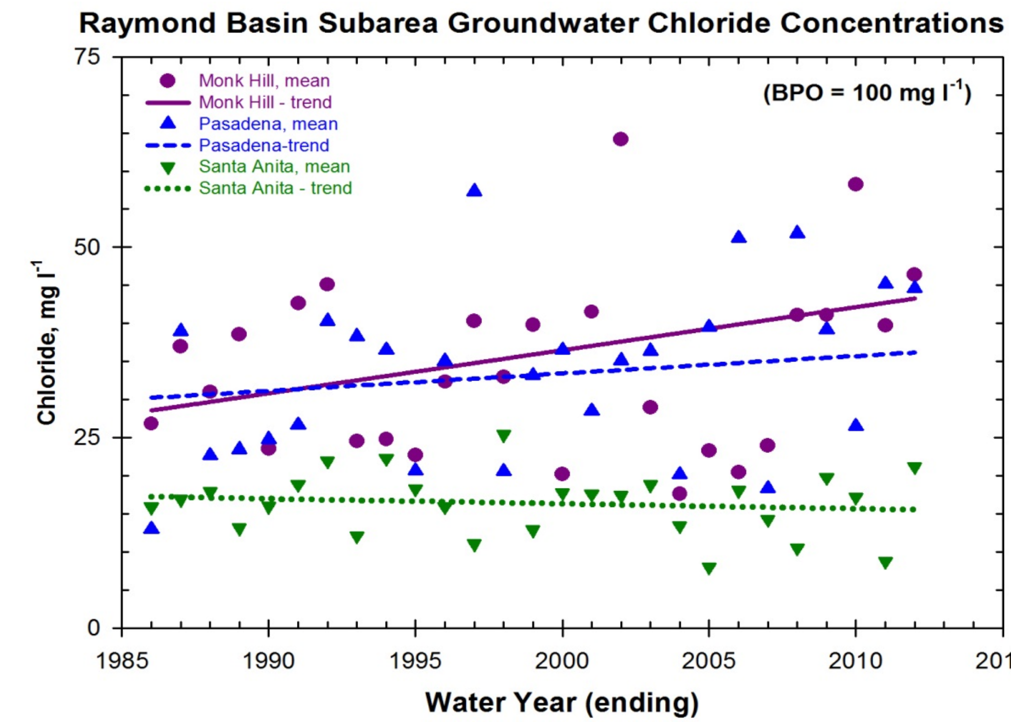
STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

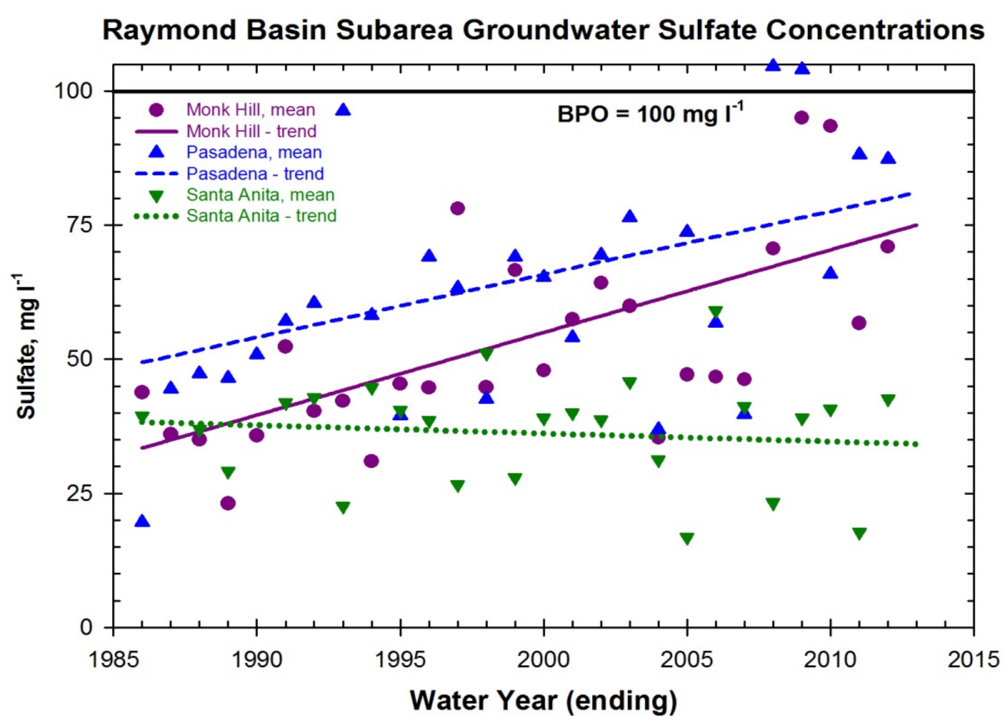
RAYMOND BASIN MANAGEMENT BOARD

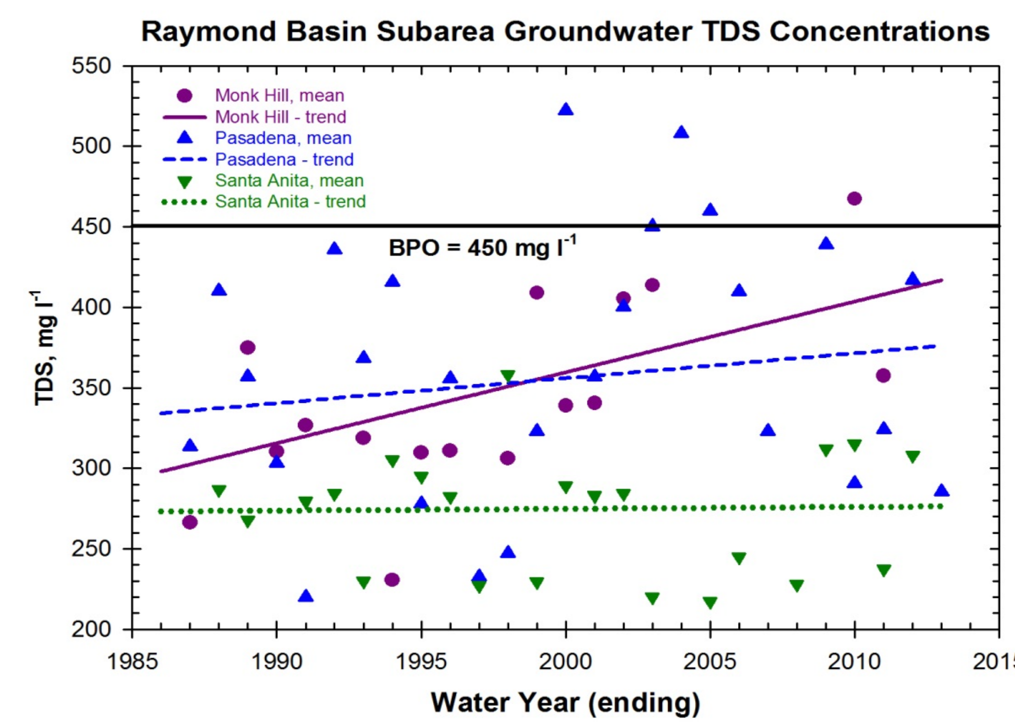
GROUNDWATER FLOW DIRECTION IN RAYMOND BASIN - SPRING 2013

PLATE III.10b









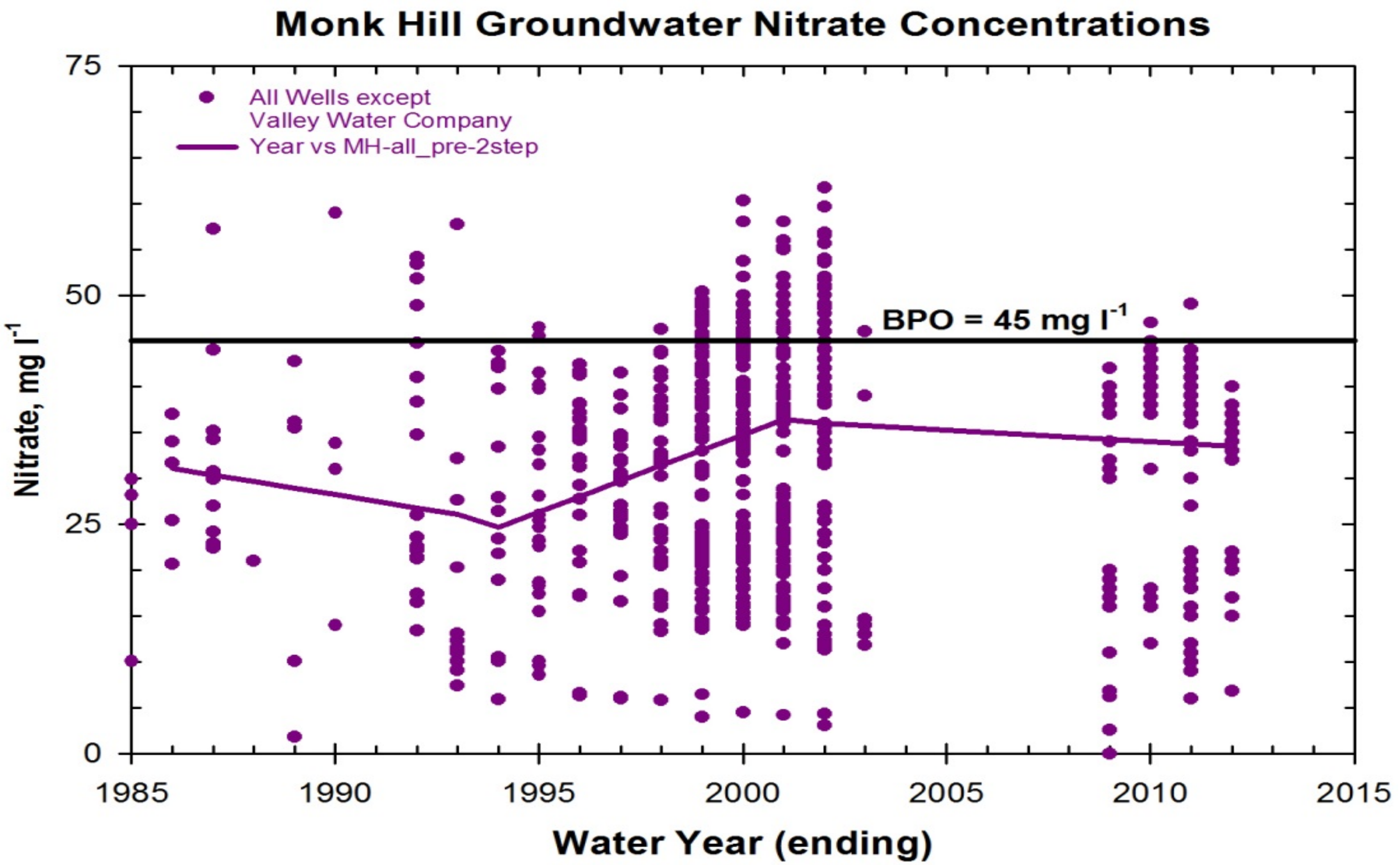
(complied from Table III.4 and Appendices J and K.)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

RAYMOND BASIN MEAN ANNUAL GROUNDWATER QUALITY CHARACTERISTICS BY SUBAREA

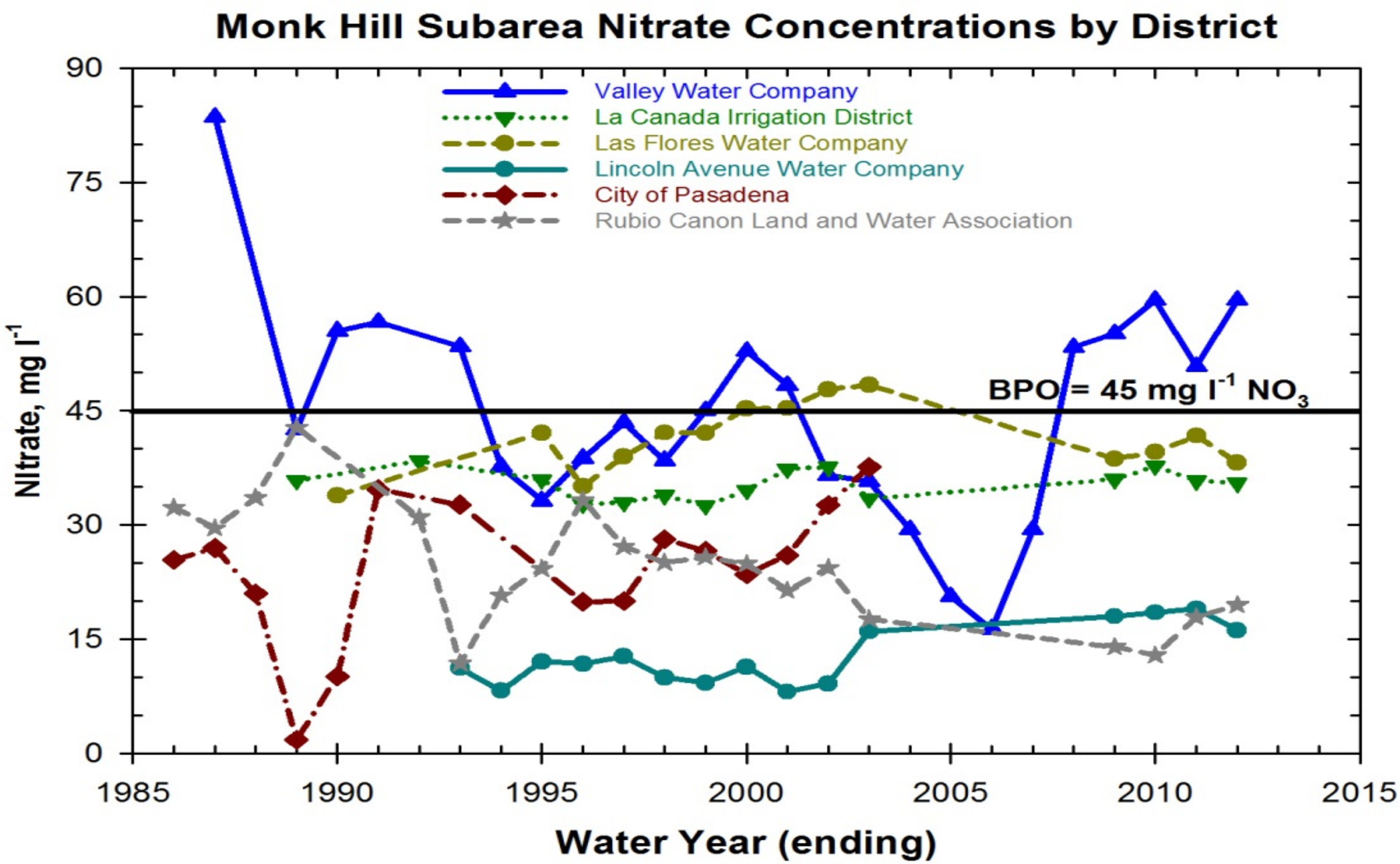
5/27/2016



(compiled from Table III.4 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD
	MONK HILL SUBAREA NITRATE GROUNDWATER QUALITY CHARACTERISTICS

PLATE III.12a



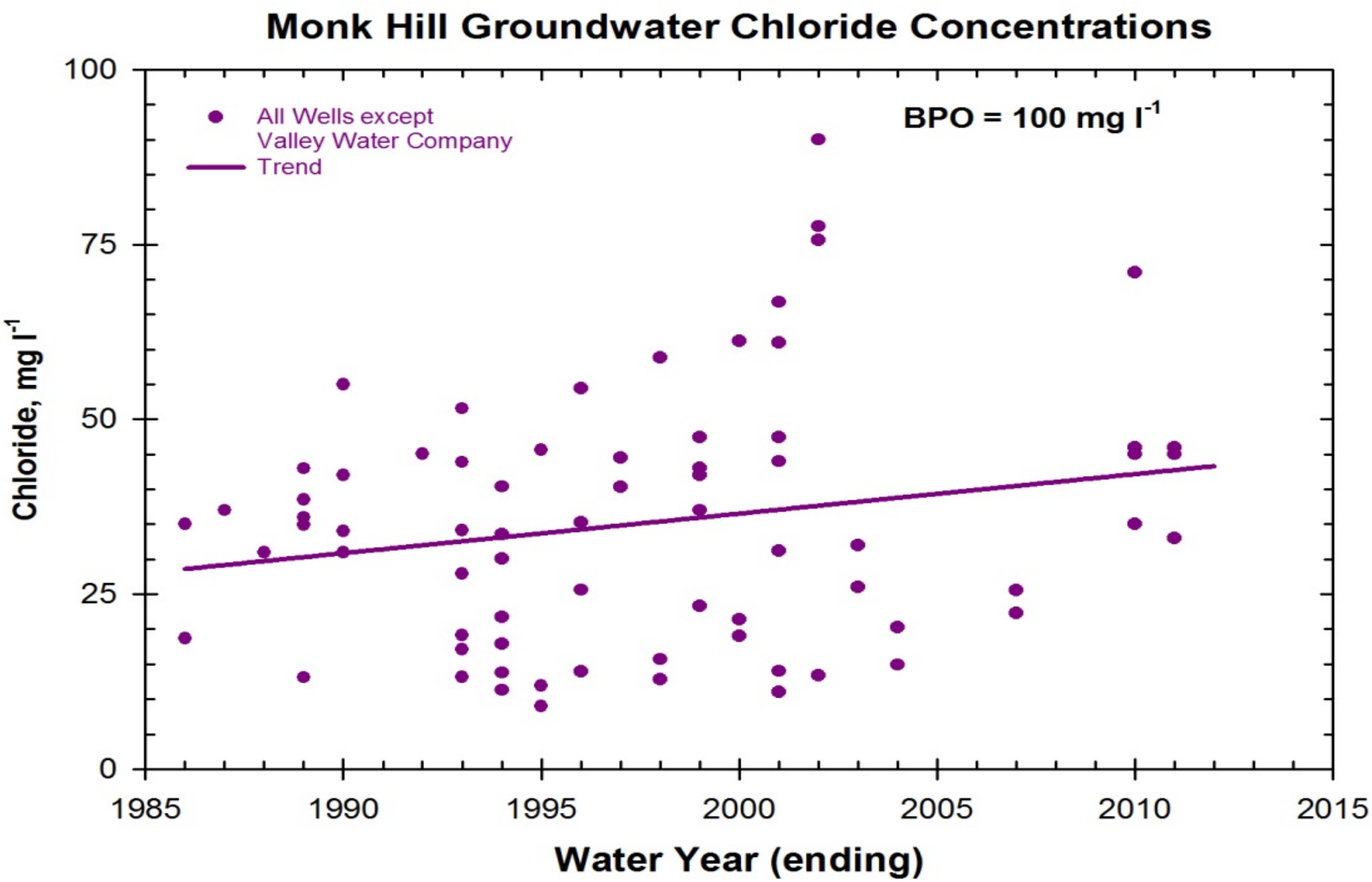
(compiled from Appendices J and K.) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL SUBAREA NITRATE GROUNDWATER QUALITY CHARACTERISTICS BY PURVEYOR

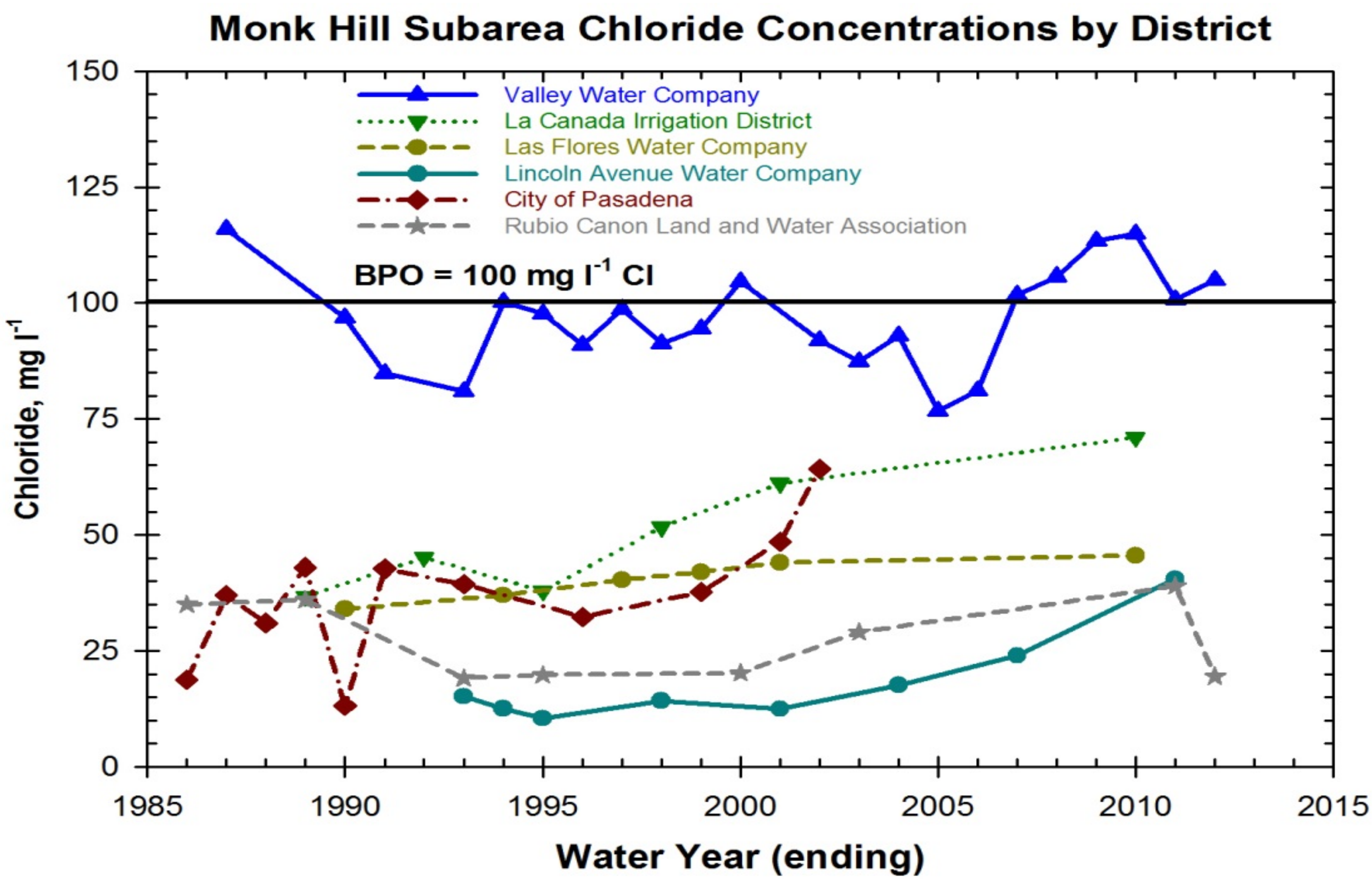
PLATE III.12b



(compiled from Table III.4 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona — WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD
	MONK HILL SUBAREA CHLORIDE GROUNDWATER QUALITY CHARACTERISTICS

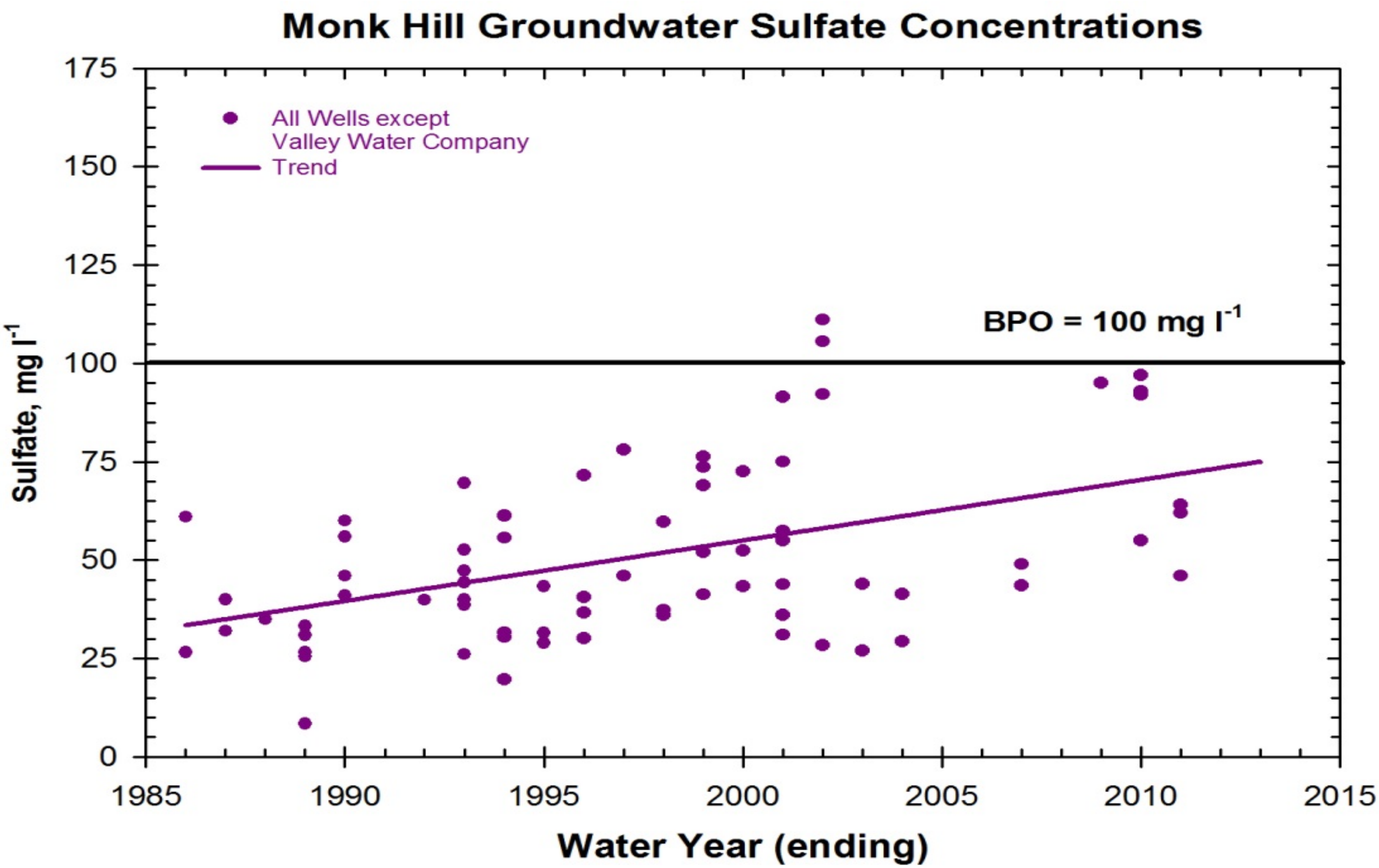
PLATE III.13a



(compiled from Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	**RAYMOND BASIN MANAGEMENT BOARD**
	MONK HILL SUBAREA CHLORIDE GROUNDWATER QUALITY CHARACTERISTICS BY PURVEYOR

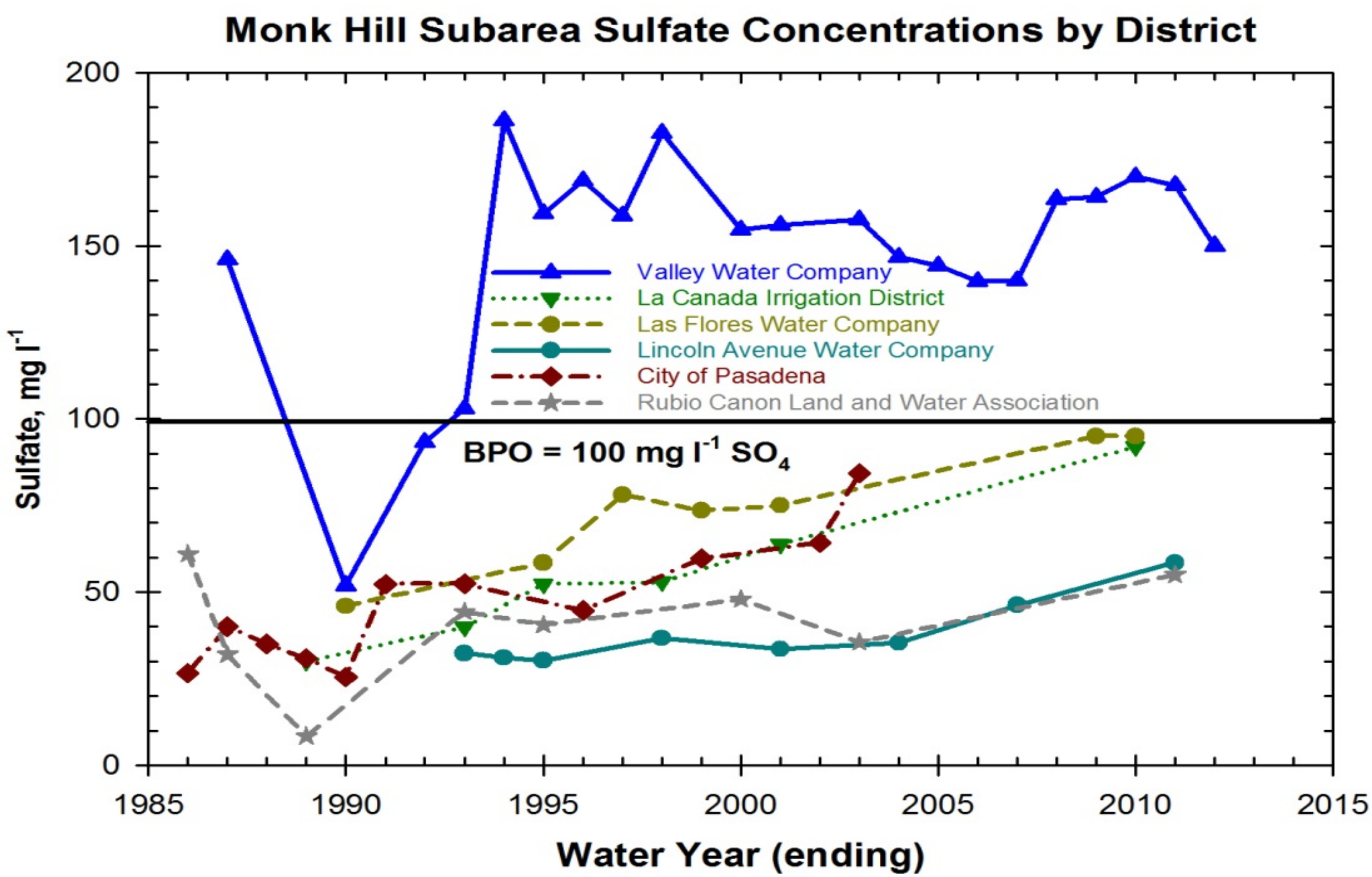
PLATE III.13b



(compiled from Table III.4 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	**RAYMOND BASIN MANAGEMENT BOARD** MONK HILL SUBAREA SULFATE GROUNDWATER QUALITY CHARACTERISTICS

PLATE III.14a



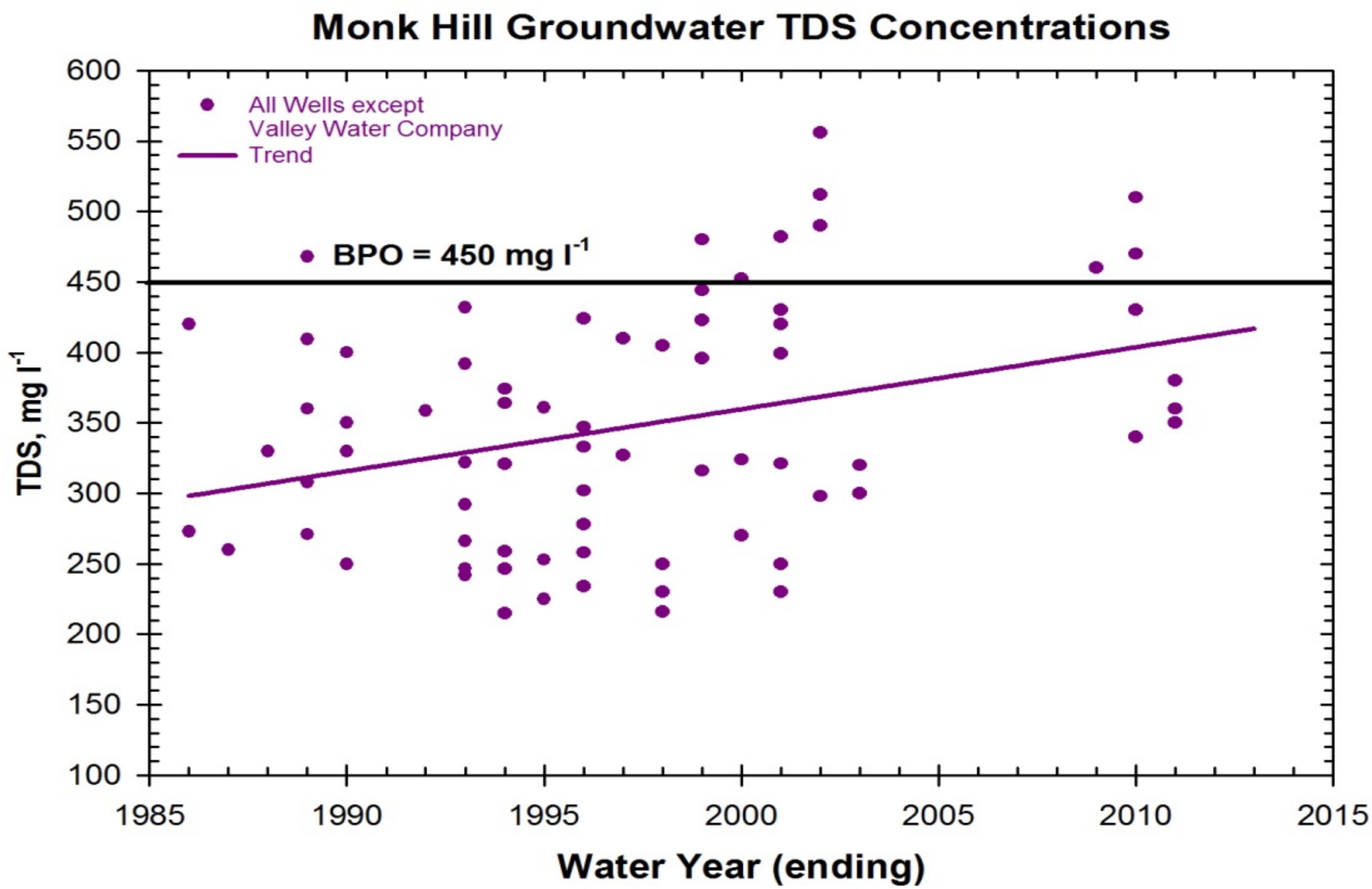
(compiled from Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL SUBAREA SULFATE GROUNDWATER QUALITY CHARACTERISTICS BY PURVEYOR

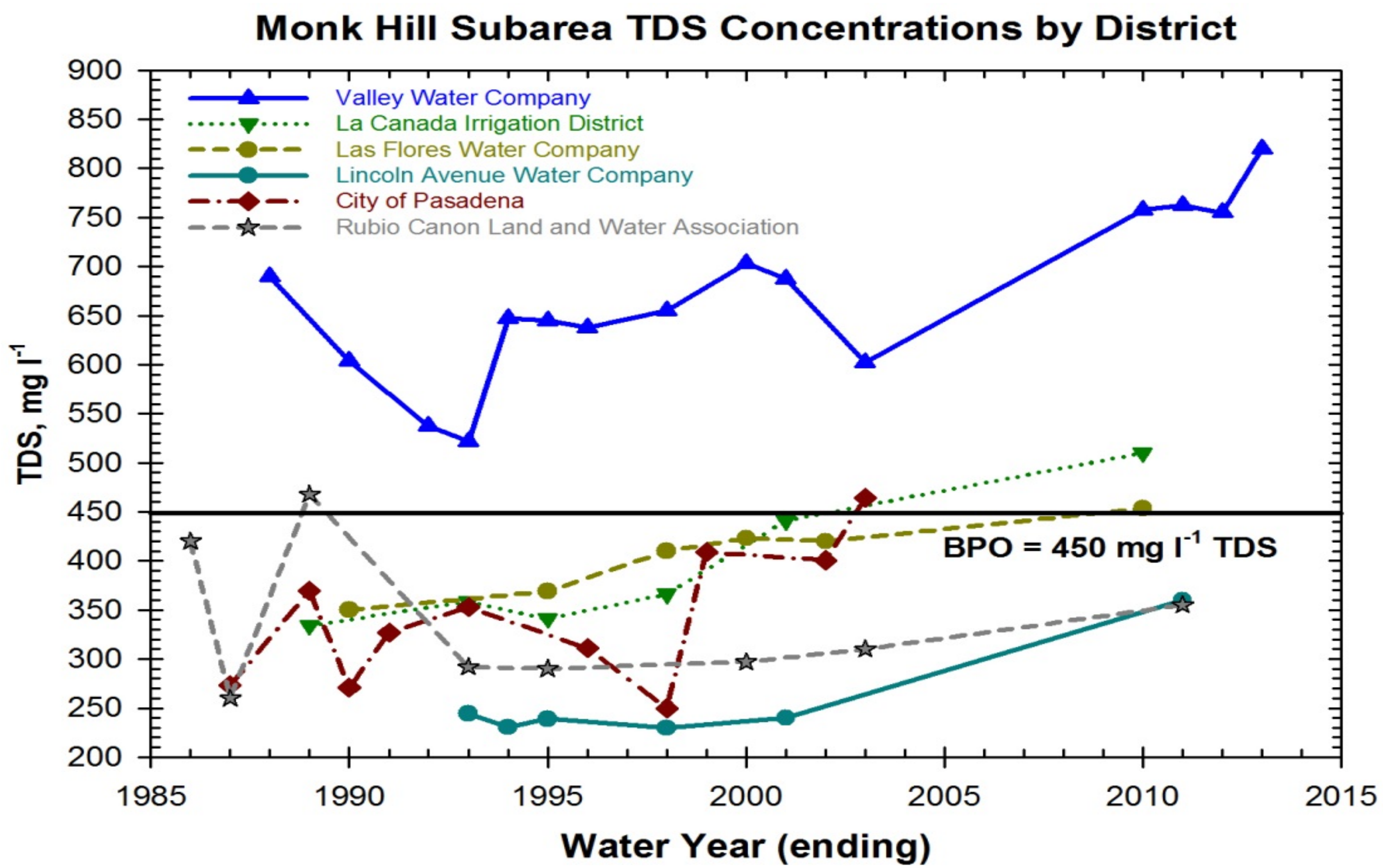
PLATE III.14b



(compiled from Table III.4 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD MONK HILL SUBAREA TOTAL DISSOLVED SOLIDS (TDS) GROUNDWATER QUALITY CHARACTERISTICS

PLATE III.15a



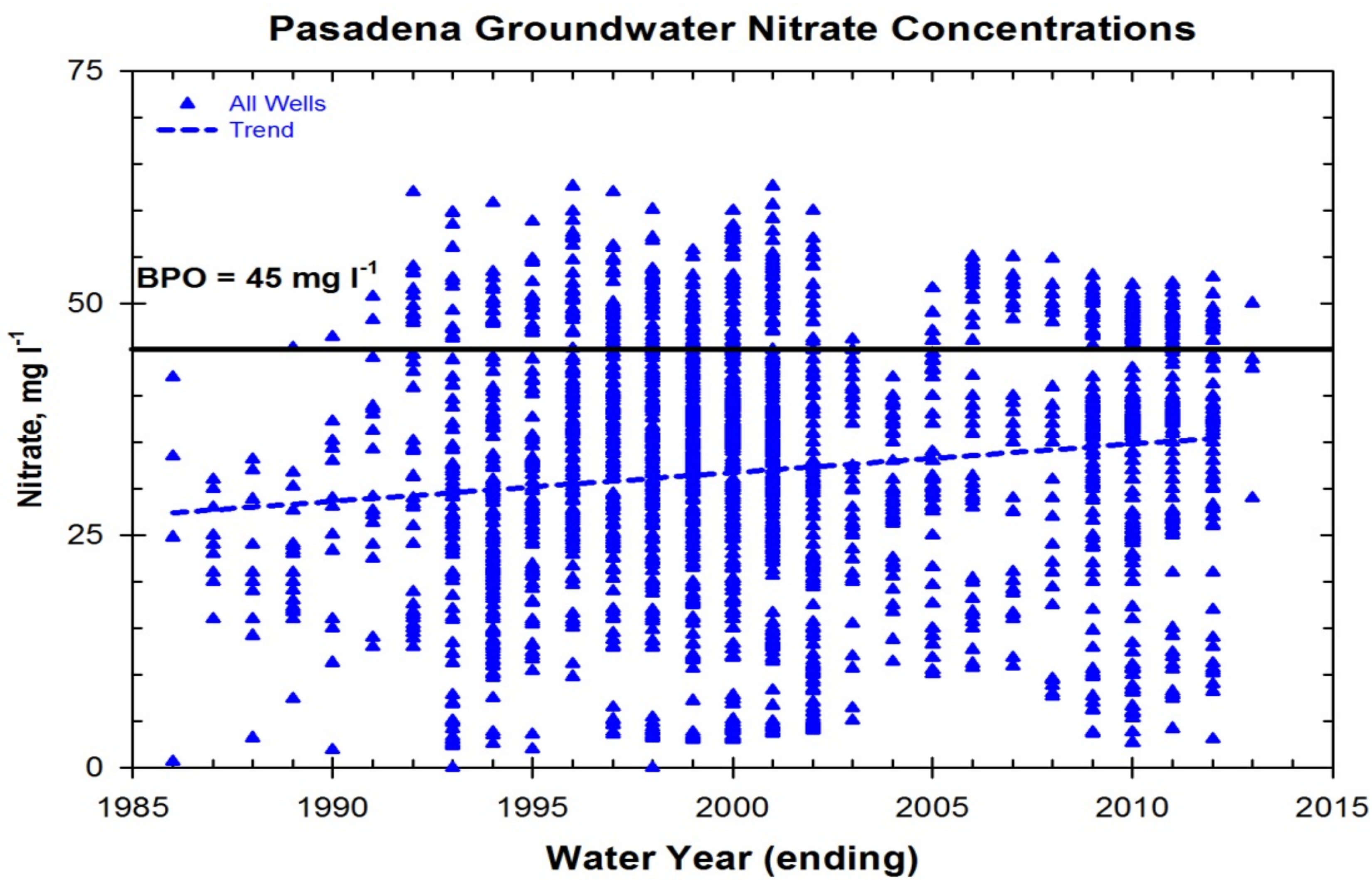
(compiled from Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL SUBAREA TOTAL DISSOLVED SOLIDS (TDS) GROUNDWATER QUALITY CHARACTERISTICS BY PURVEYOR

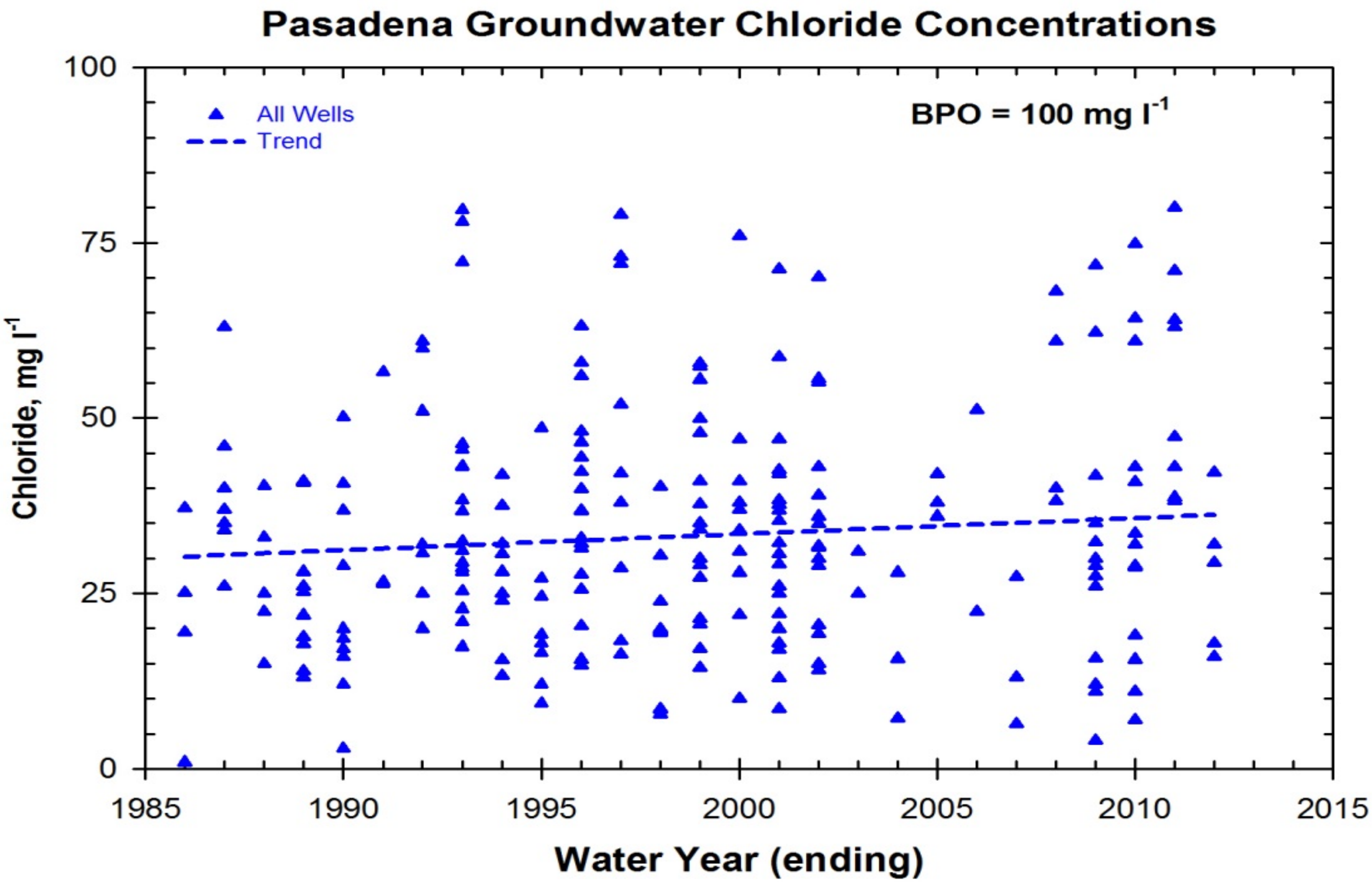
PLATE III.15b



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD PASADENA SUBAREA NITRATE GROUNDWATER QUALITY CHARACTERISTICS

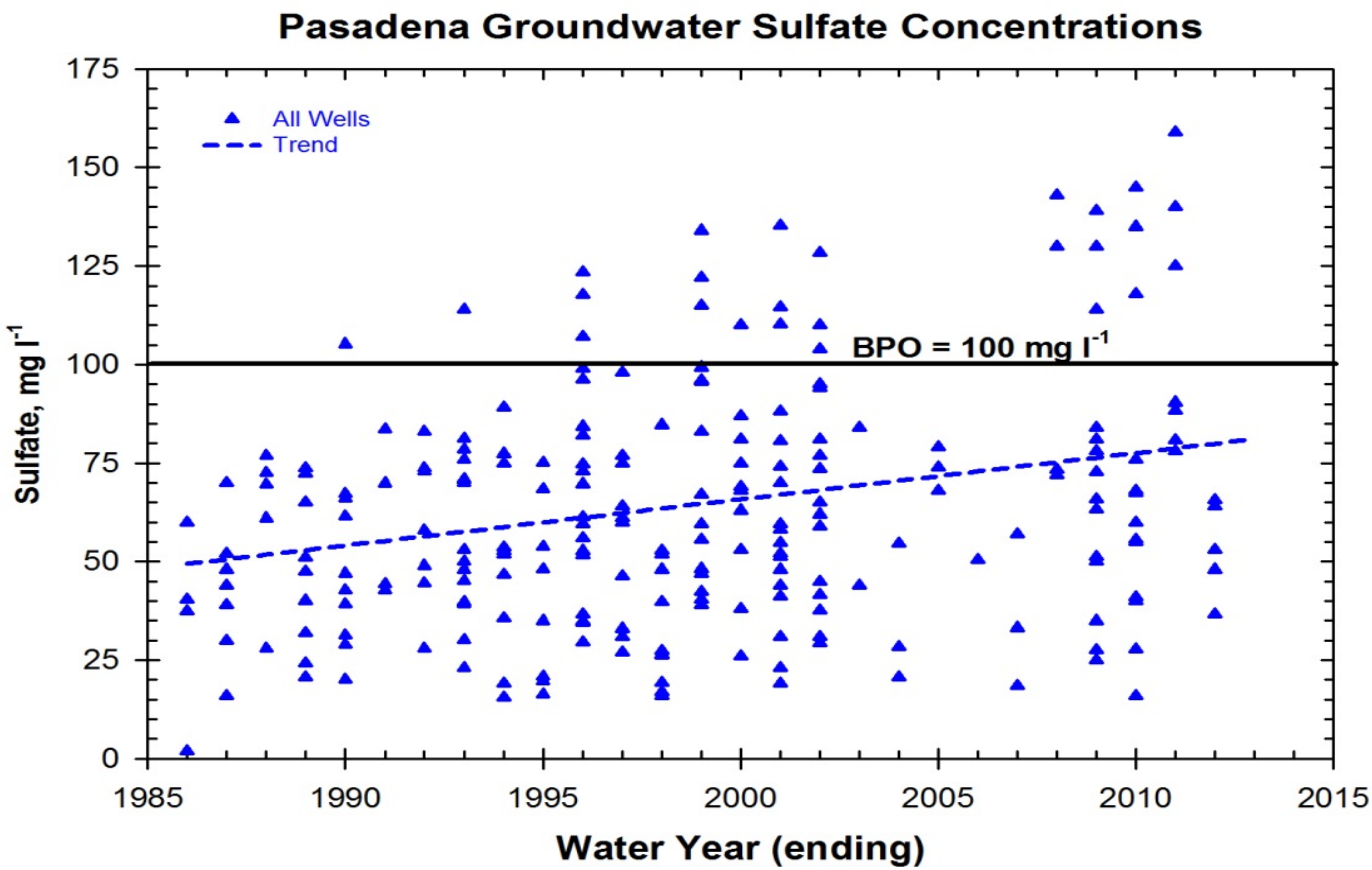
PLATE III.16a



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	**RAYMOND BASIN MANAGEMENT BOARD** PASADENA SUBAREA CHLORIDE GROUNDWATER QUALITY CHARACTERISTICS

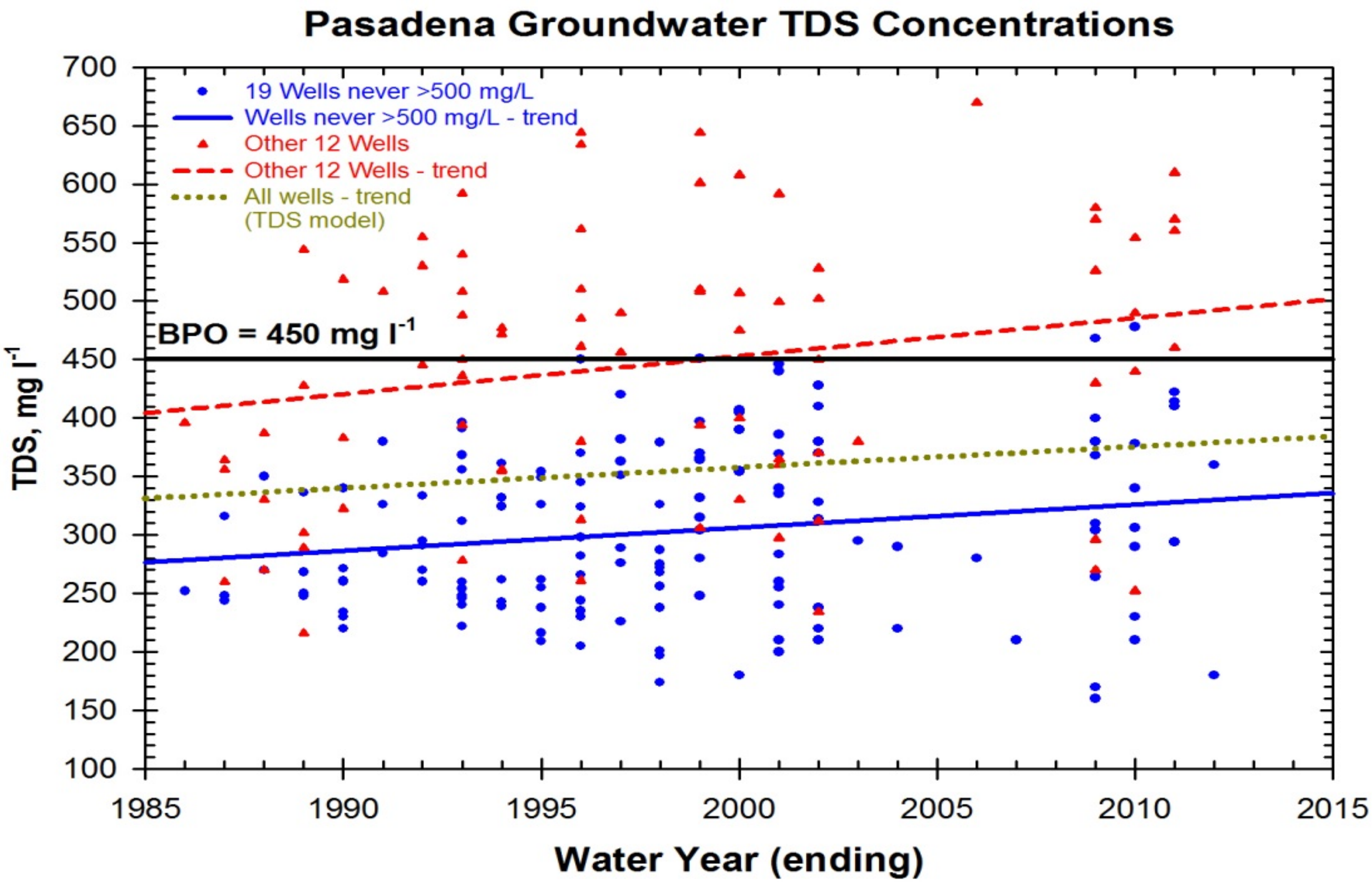
PLATE III.16b



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD PASADENA SUBAREA SULFATE GROUNDWATER QUALITY CHARACTERISTICS

PLATE III.16c



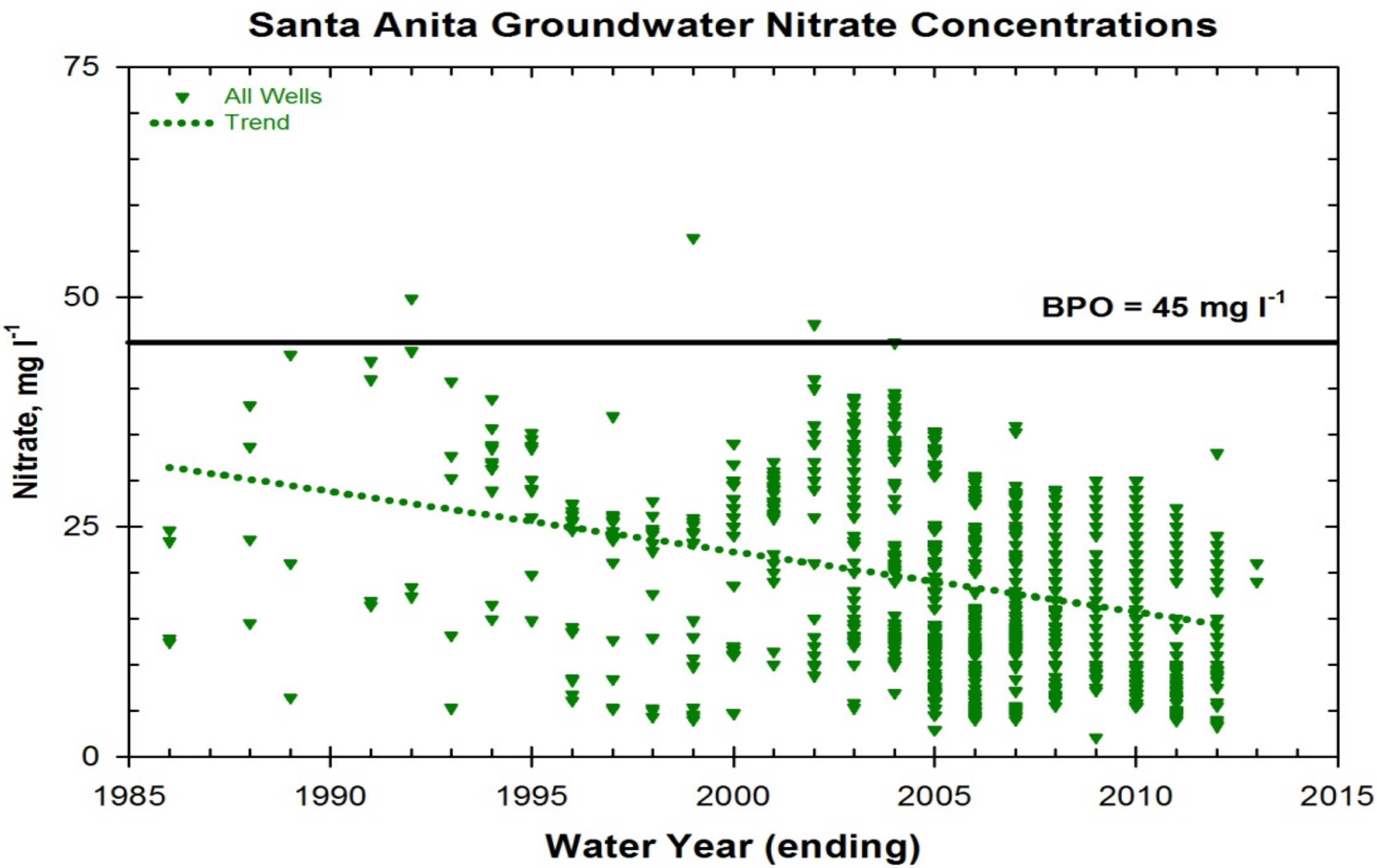
(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

PASADENA SUBAREA TOTAL DISSOLVED SOLIDS (TDS) GROUNDWATER QUALITY CHARACTERISTICS

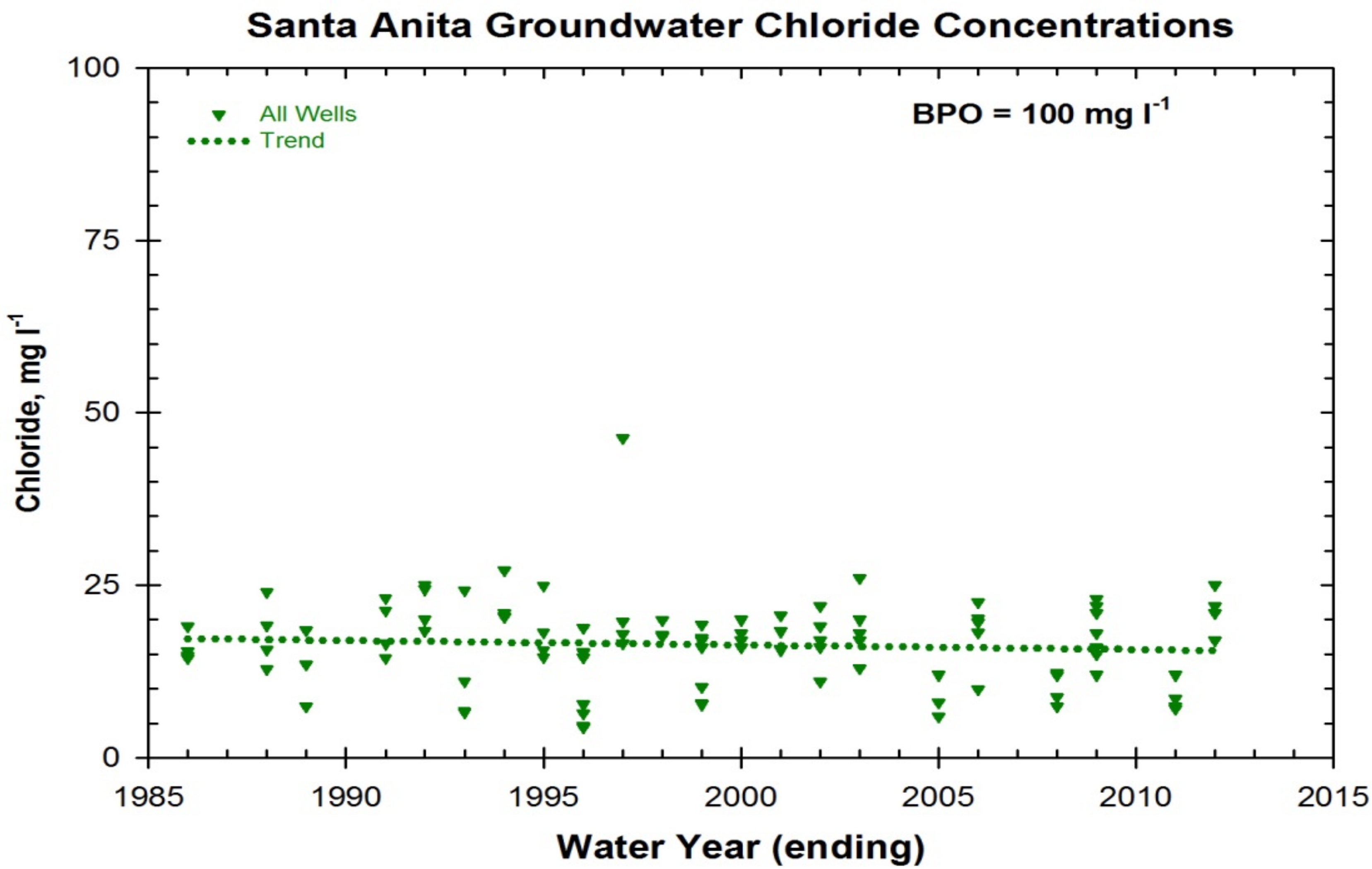
PLATE III.16d



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD SANTA ANITA SUBAREA NITRATE GROUNDWATER QUALITY CHARACTERISTICS

PLATE III.17a



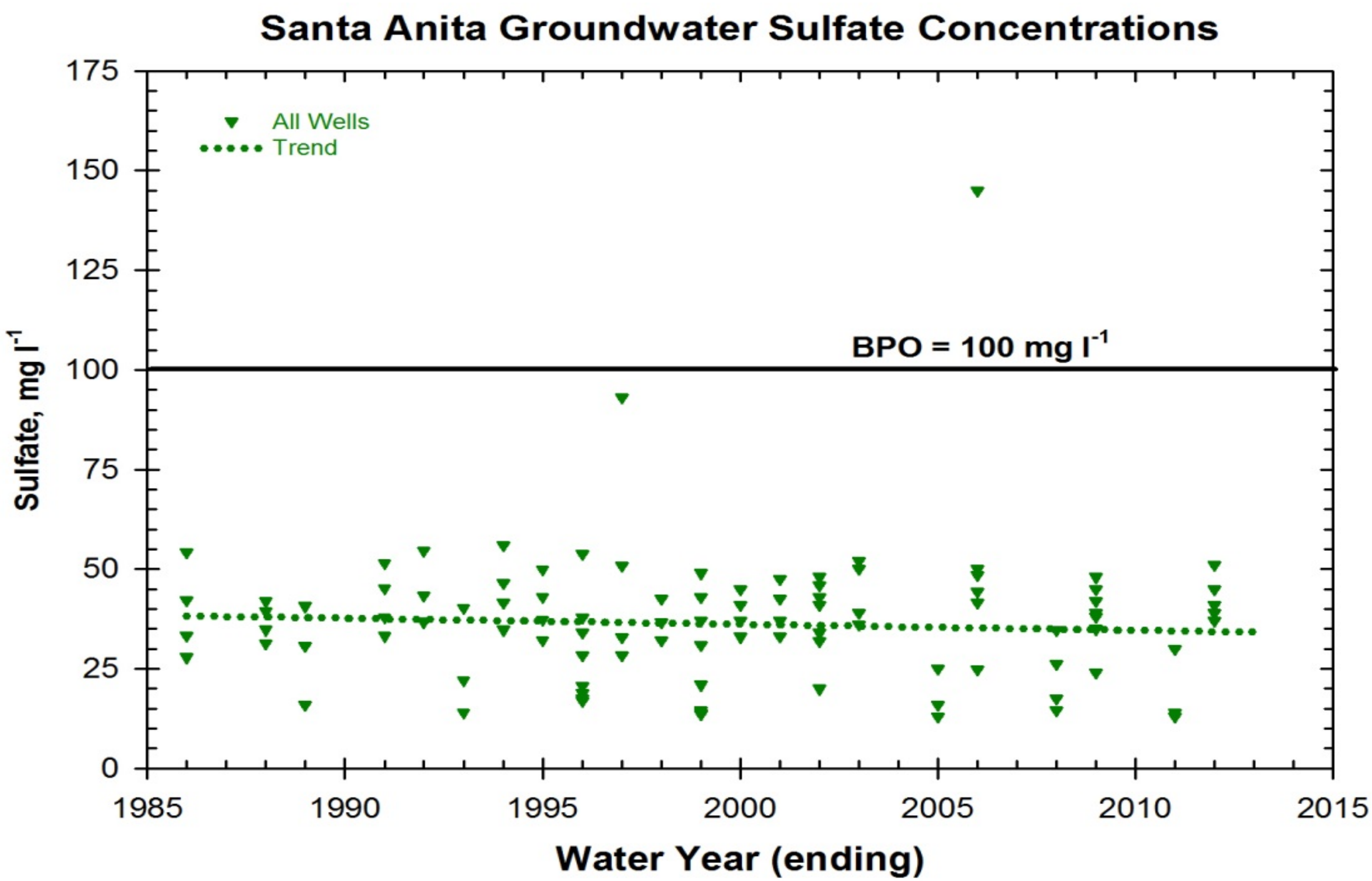
(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

SANTA ANITA SUBAREA CHLORIDE GROUNDWATER QUALITY CHARACTERISTICS

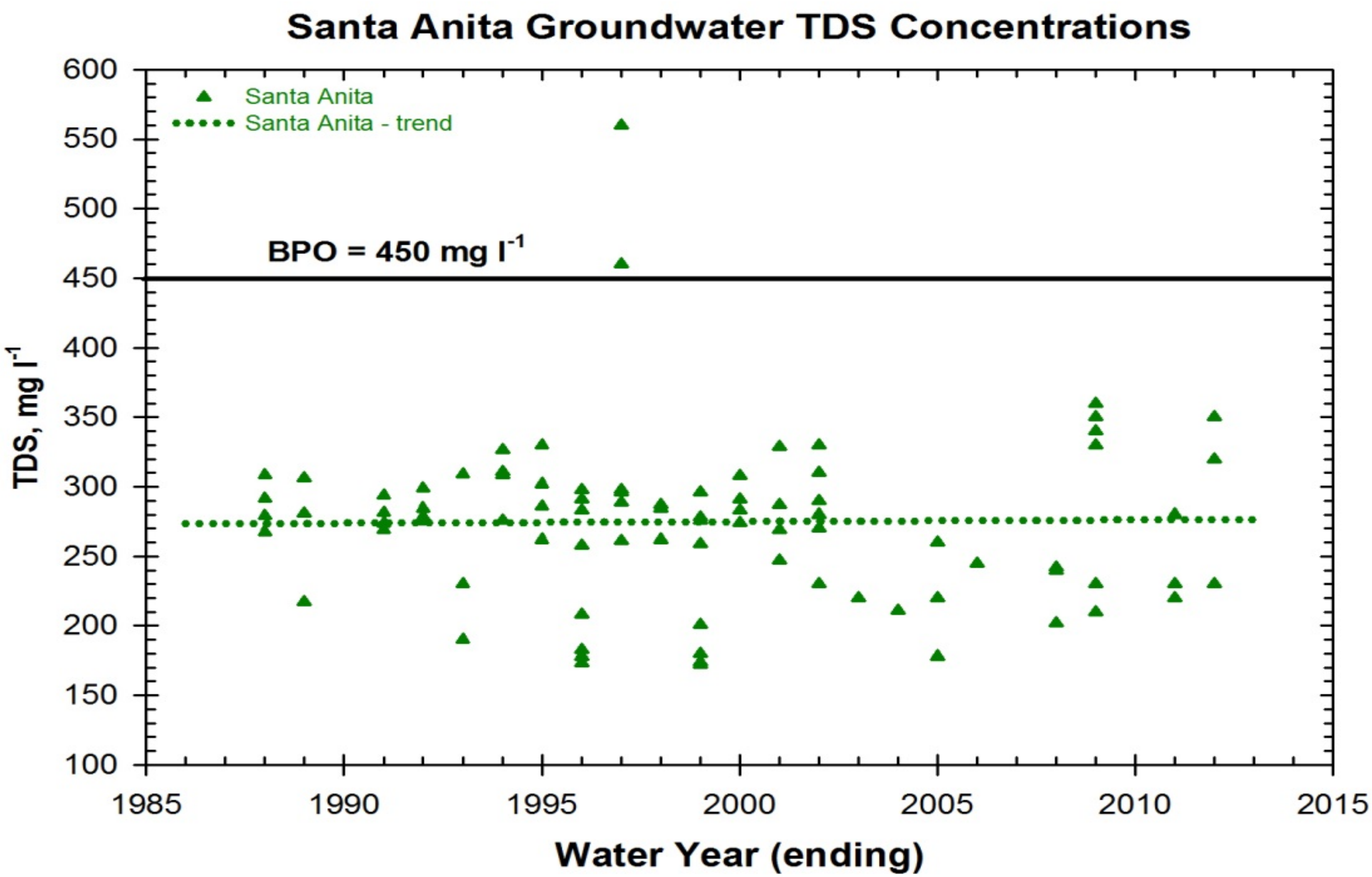
PLATE III.17b



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	**RAYMOND BASIN MANAGEMENT BOARD** SANTA ANITA SUBAREA SULFATE GROUNDWATER QUALITY CHARACTERISTICS

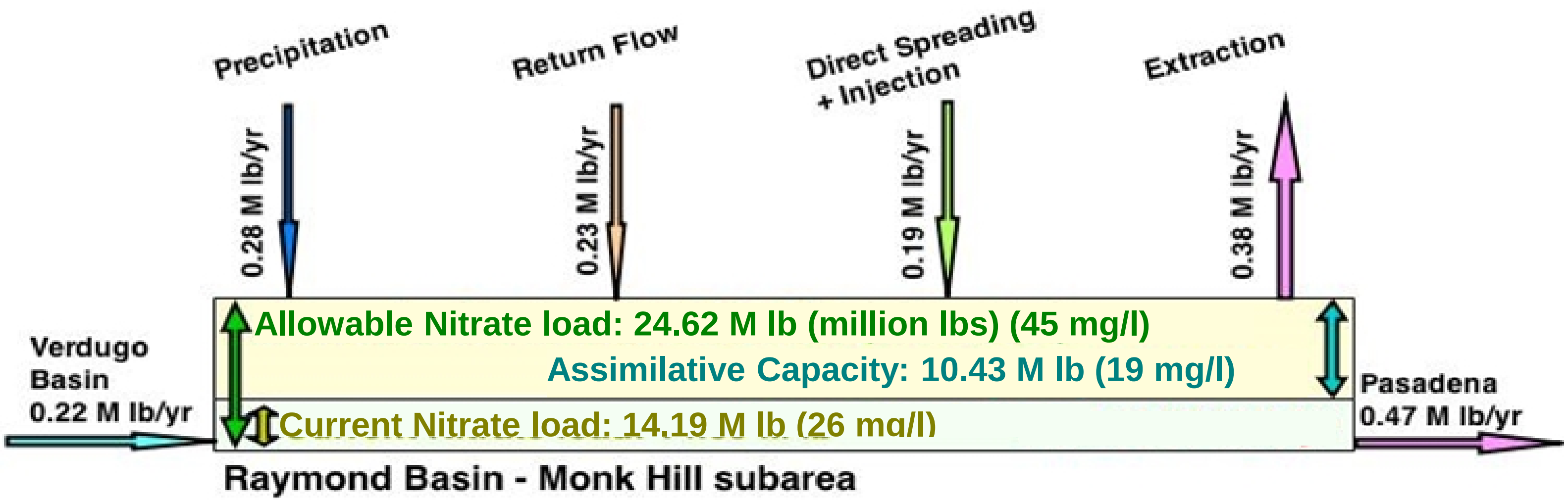
PLATE III.17c



(compiled from Table III.3 and Appendices J and K) BPO is the Basin Water Quality Plan Objective

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	**RAYMOND BASIN MANAGEMENT BOARD** SANTA ANITA SUBAREA TOTAL DISSOLVED SOLIDS (TDS) GROUNDWATER QUALITY CHARACTERISTICS

PLATE III.17d



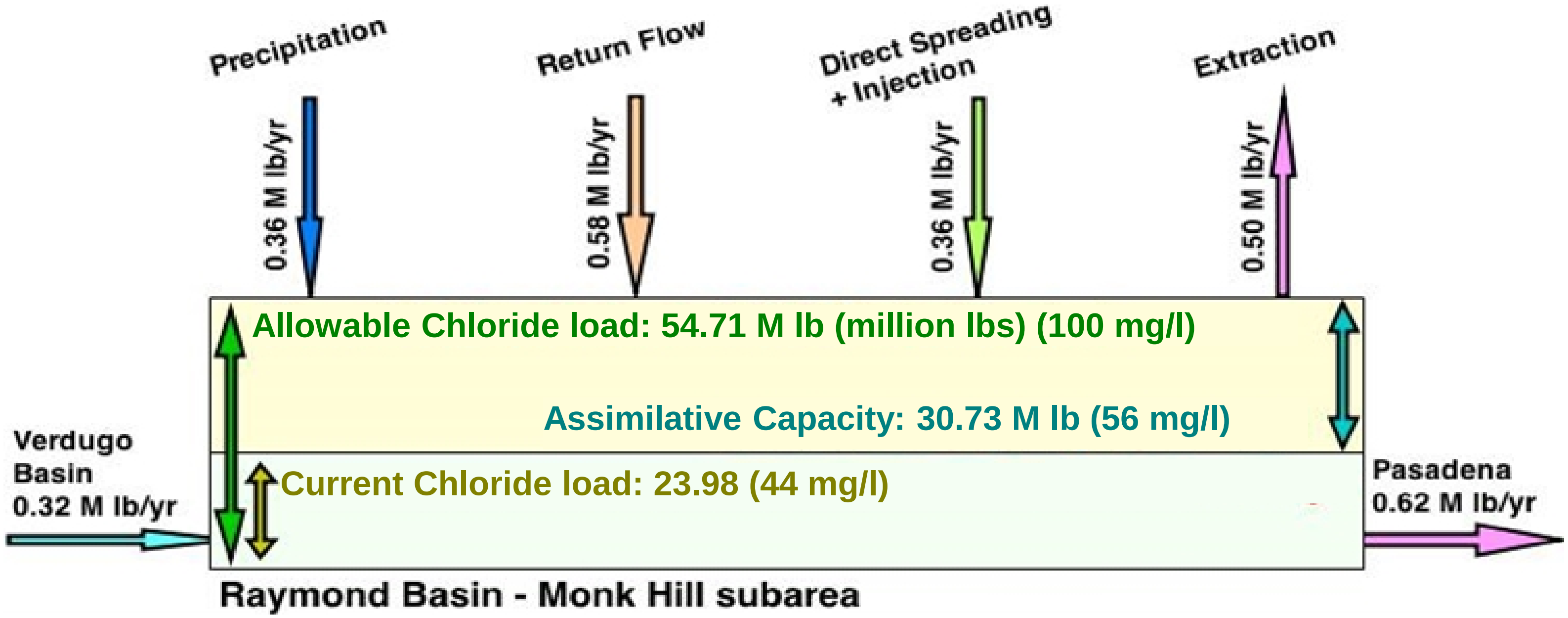
(compiled from Tables III.6 through III.9 and Appendix G)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL SUBAREA NITRATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.18a



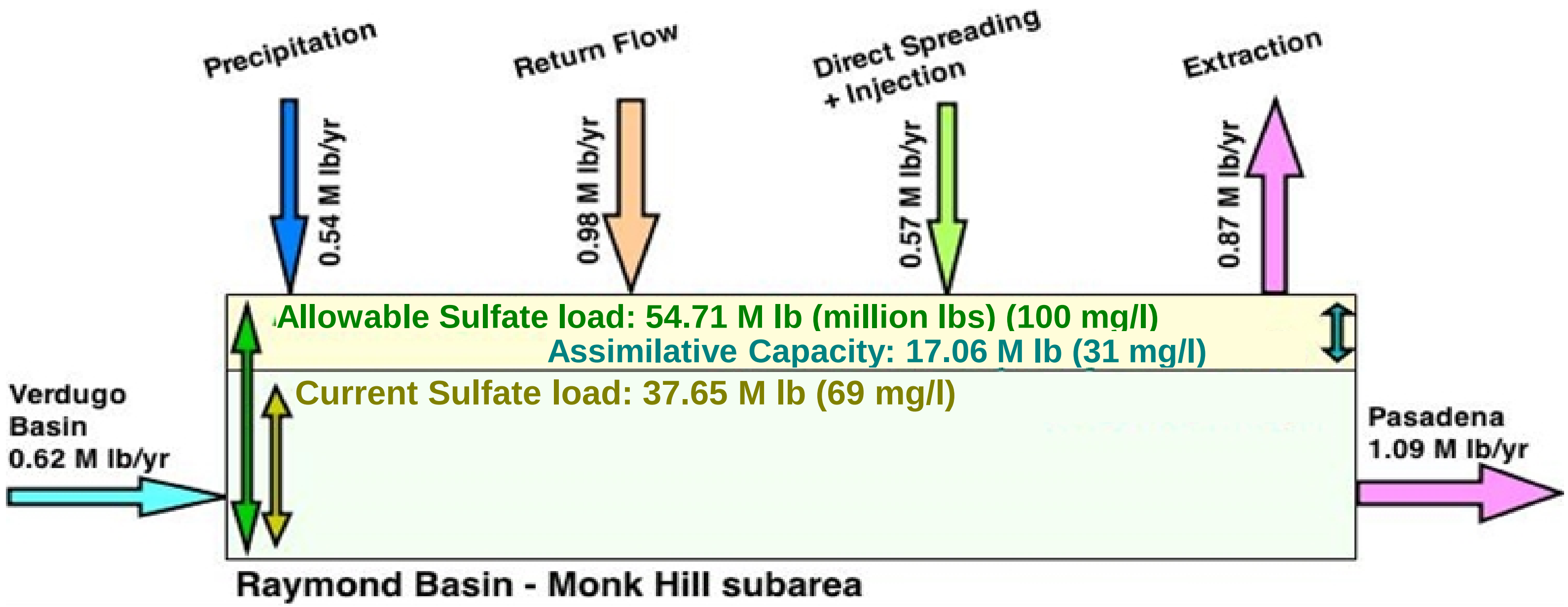
(compiled from Tables III.6 through III.9 and Appendix G)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL SUBAREA CHLORIDE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.18b



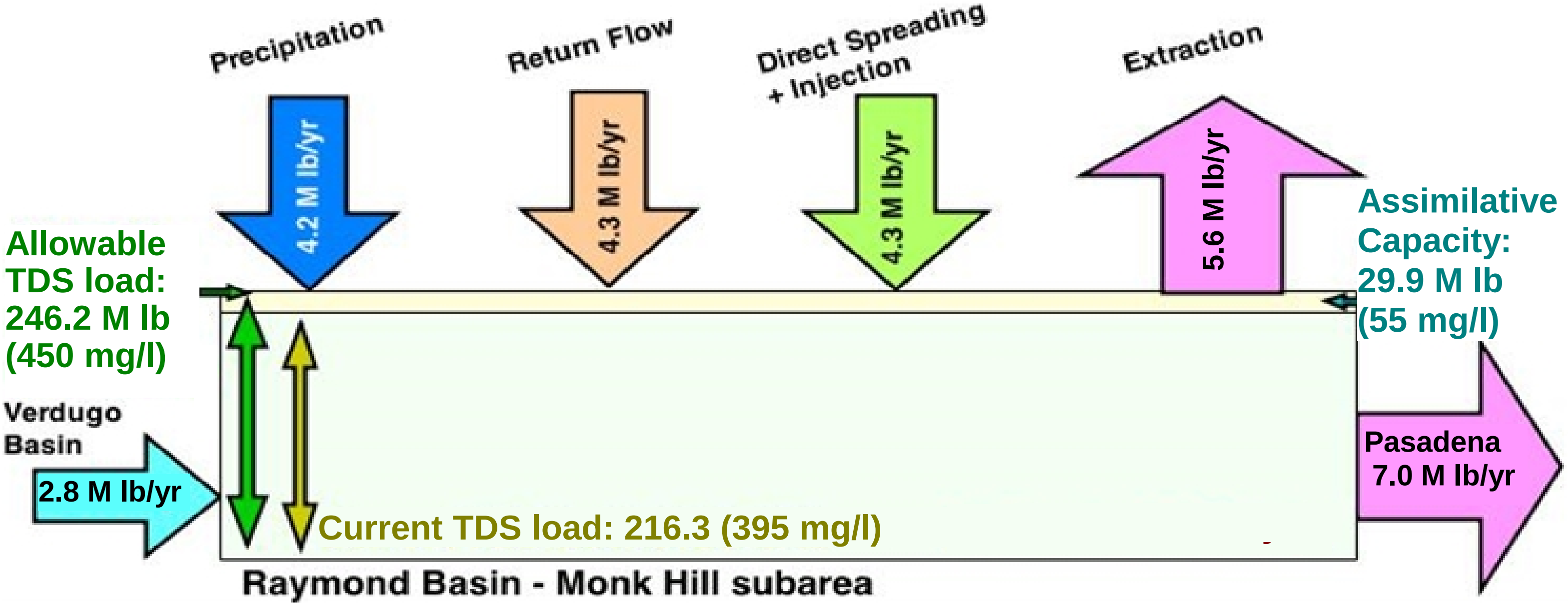
(compiled from Tables III.6 through III.9 and Appendix G)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL SUBAREA SULFATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

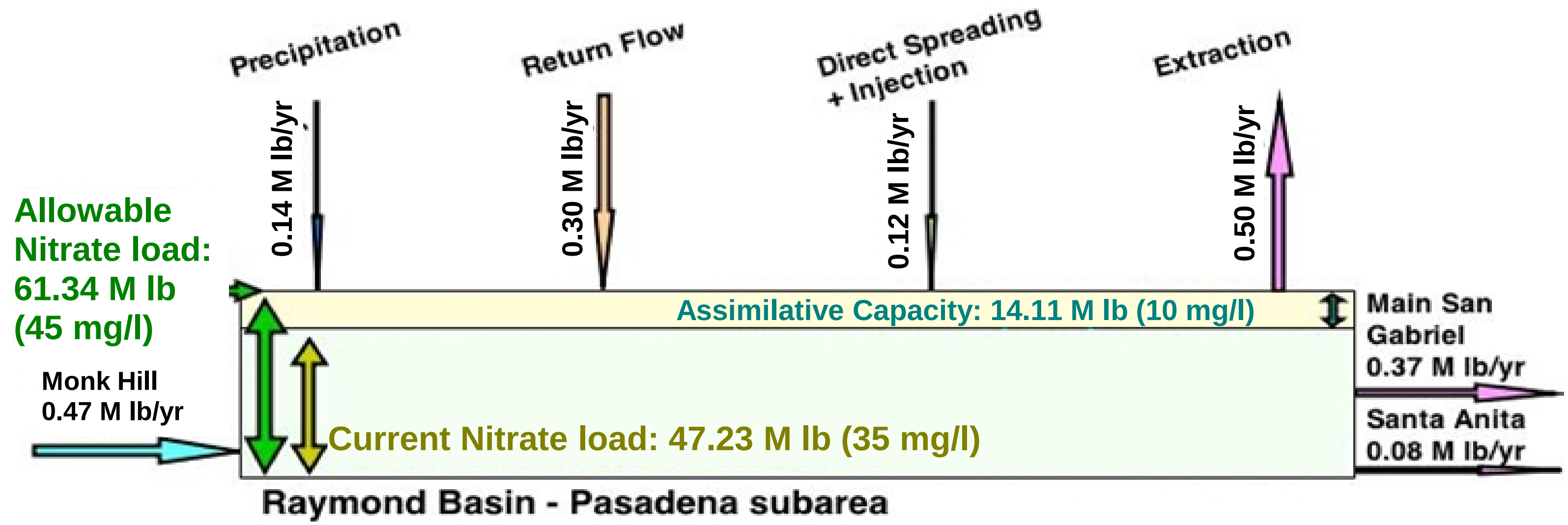
PLATE III.18c



(compiled from Tables III.6 through III.9 and Appendix G)

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD MONK HILL SUBAREA TOTAL DISSOLVED SOLIDS (TDS) LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.18d



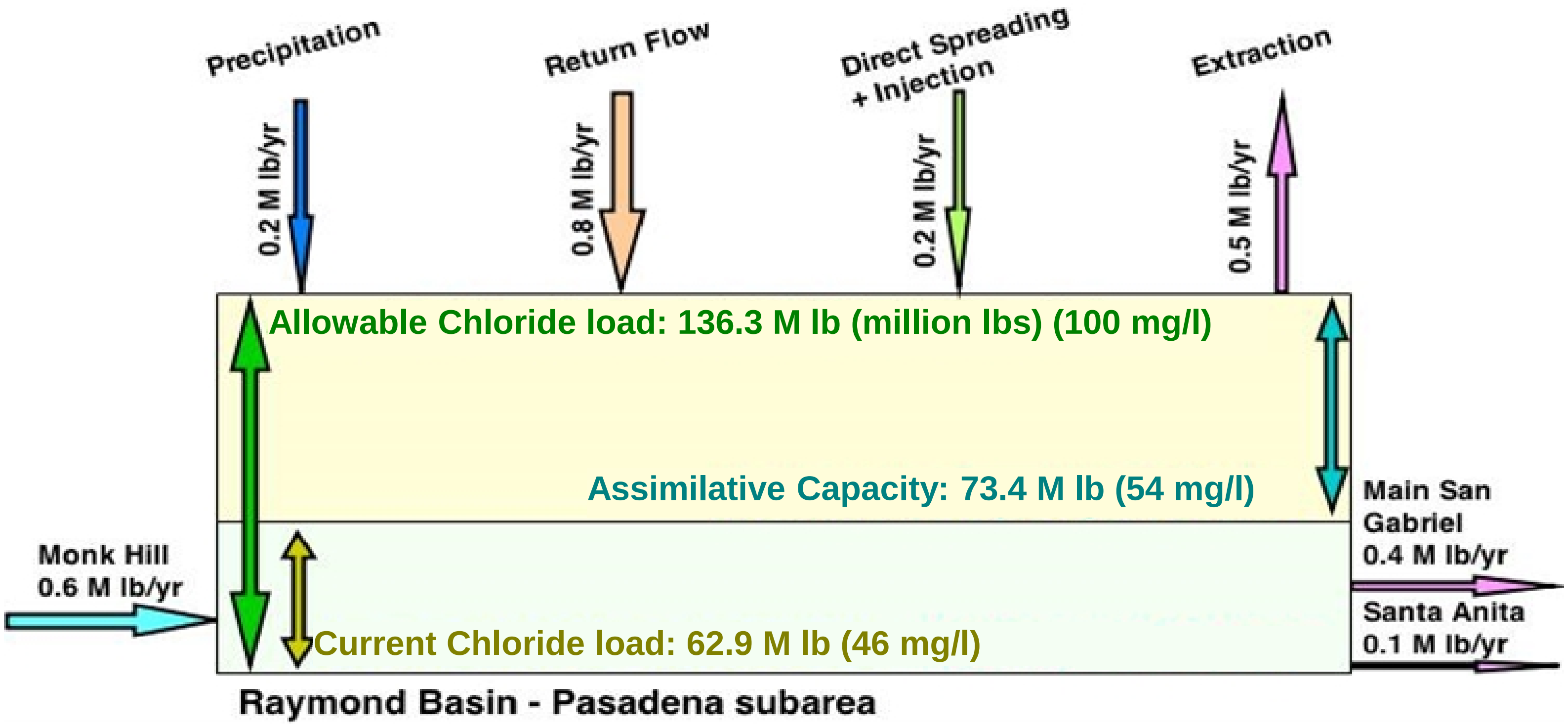
(compiled from Tables III.10 through III.13)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

PASADENA SUBAREA NITRATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.19a



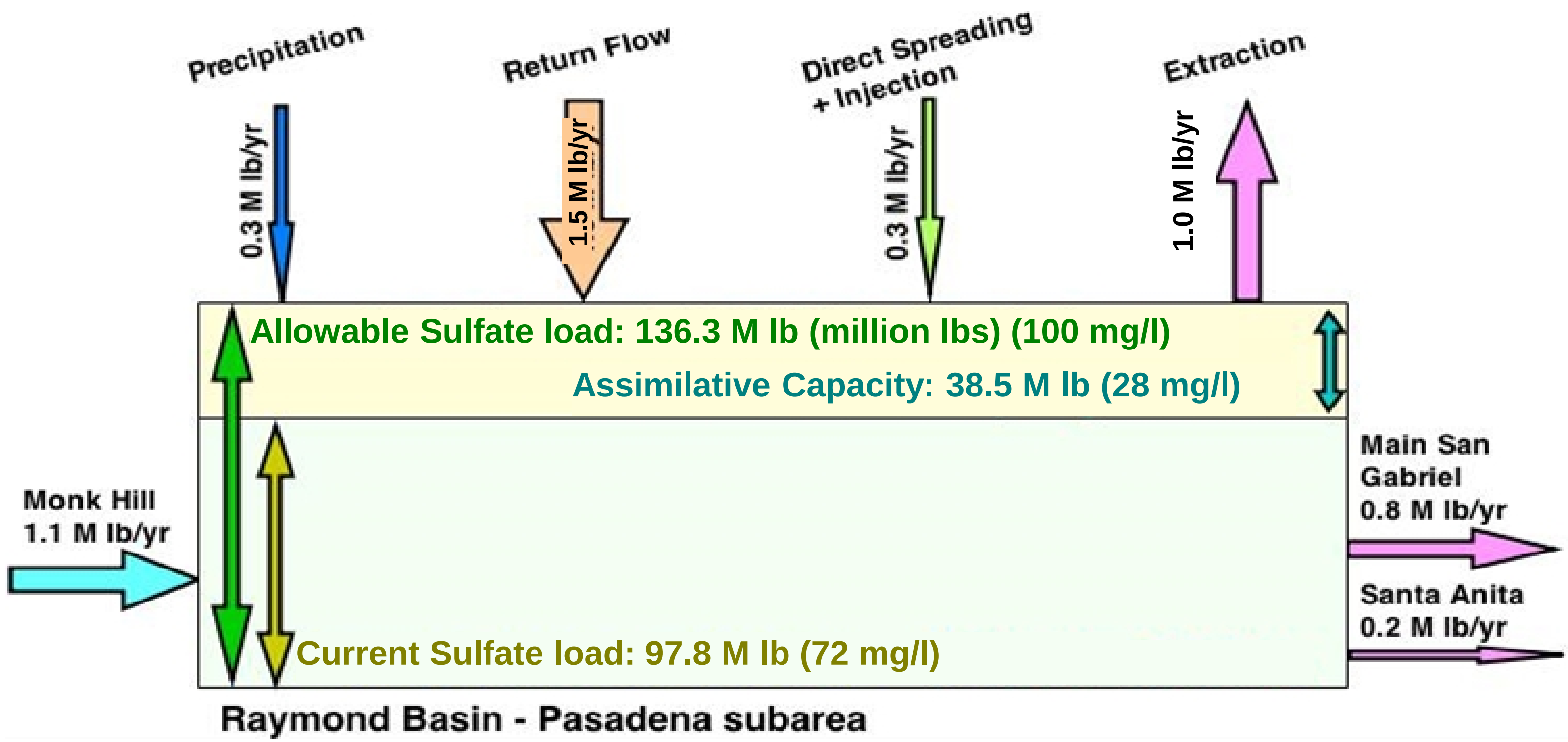
(compiled from Tables III.10 through III.13)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

PASADENA SUBAREA CHLORIDE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.19b



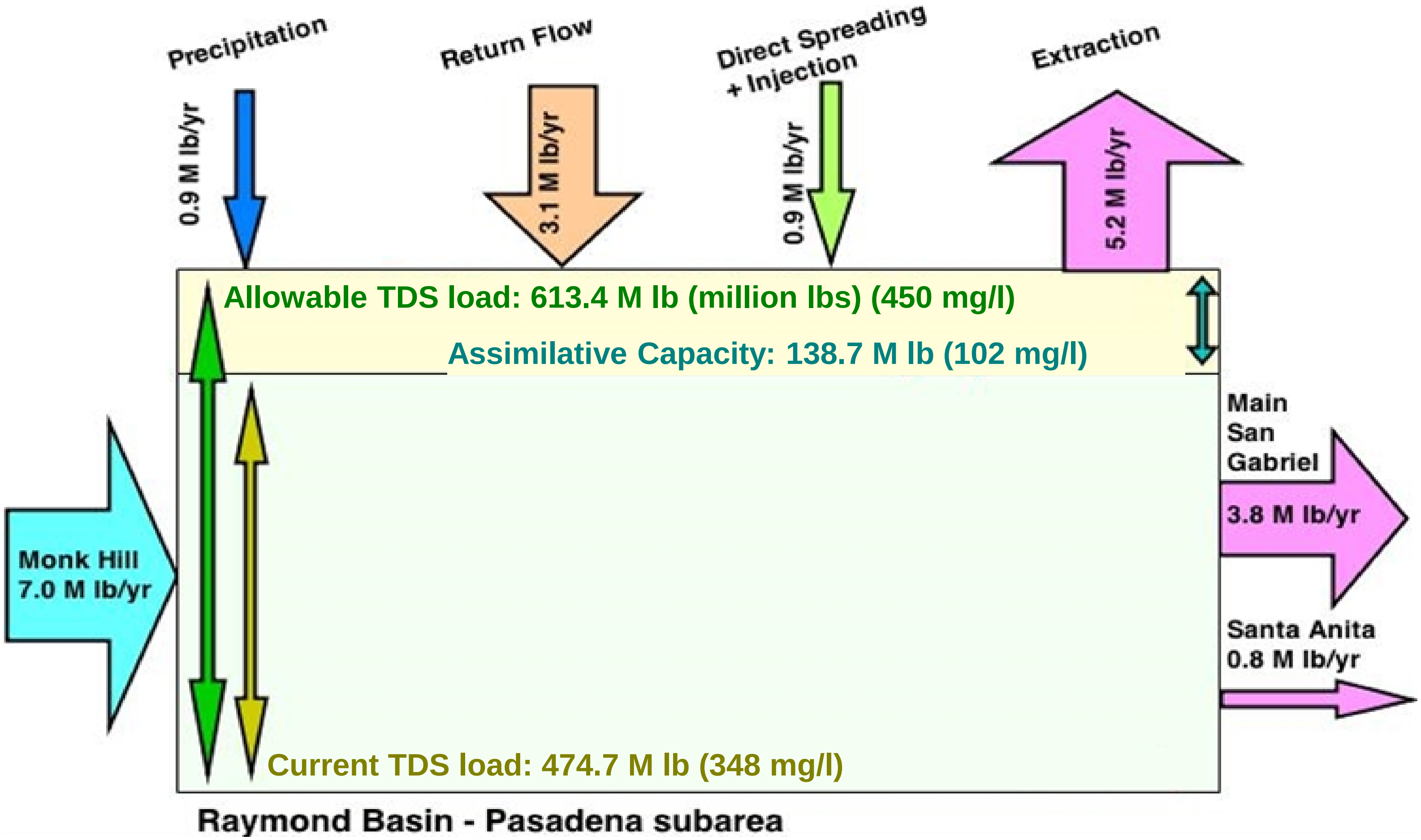
(compiled from Tables III.10 through III.13)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

PASADENA SUBAREA SULFATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

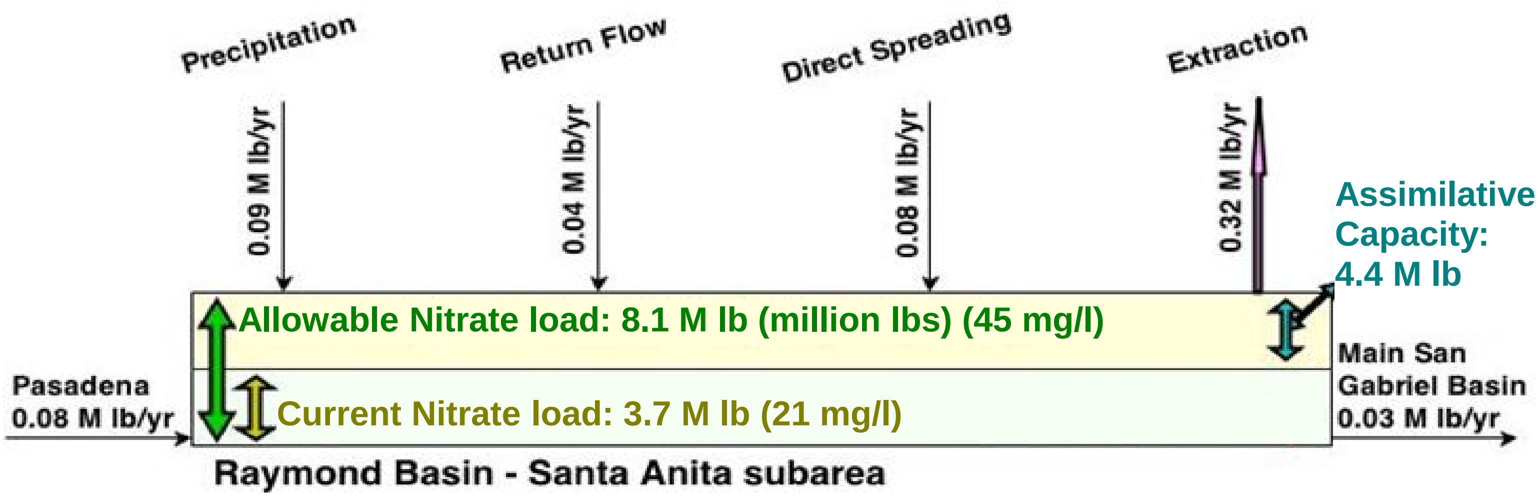
PLATE III.19c



(compiled from Tables III.10 through III.13)

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	**RAYMOND BASIN MANAGEMENT BOARD** PASADENA SUBAREA TOTAL DISSOLVED SOLIDS LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.19d



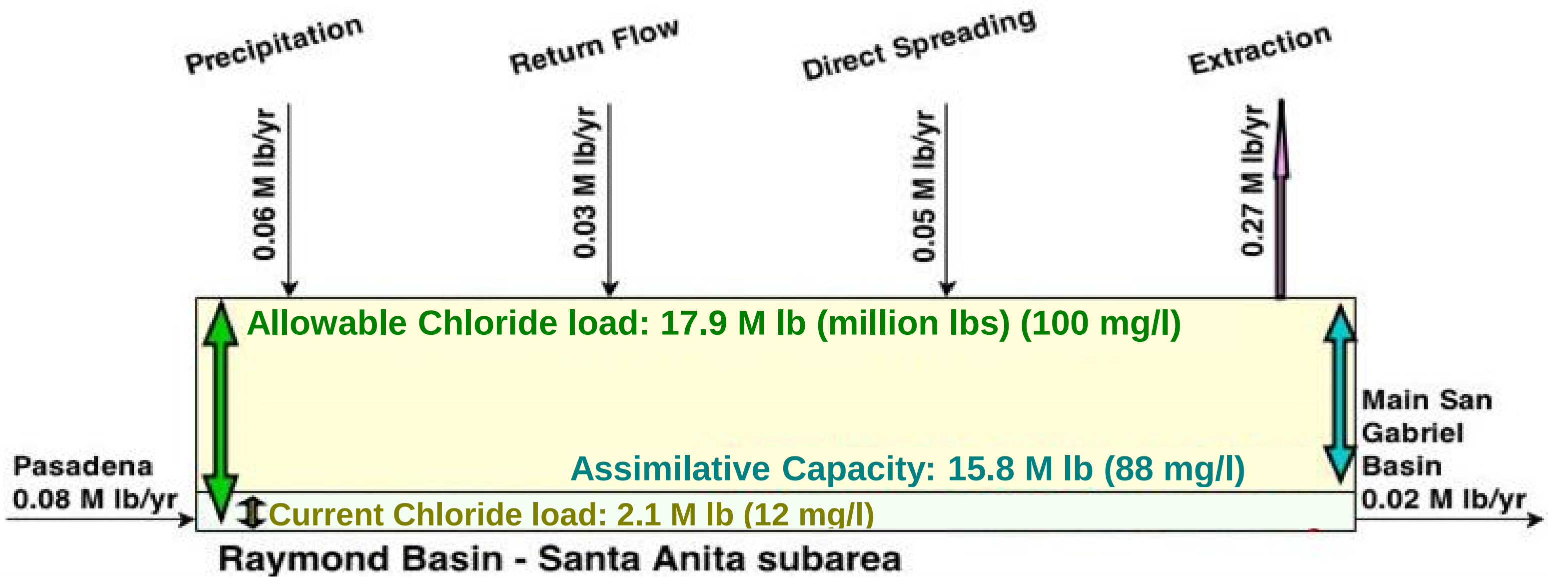
(compiled from Tables III.14 through III.17)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

SANTA ANITA SUBAREA NITRATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.20a



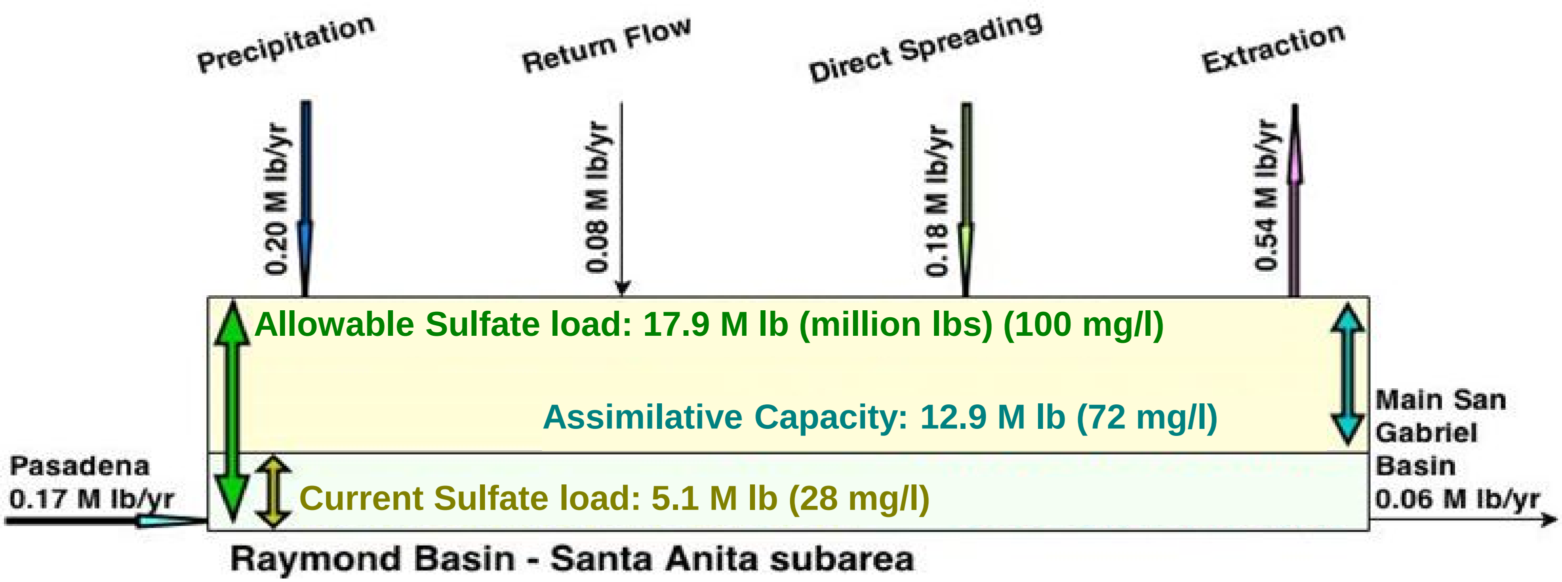
(compiled from Tables III.14 through III.17)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

SANTA ANITA SUBAREA CHLORIDE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.20b



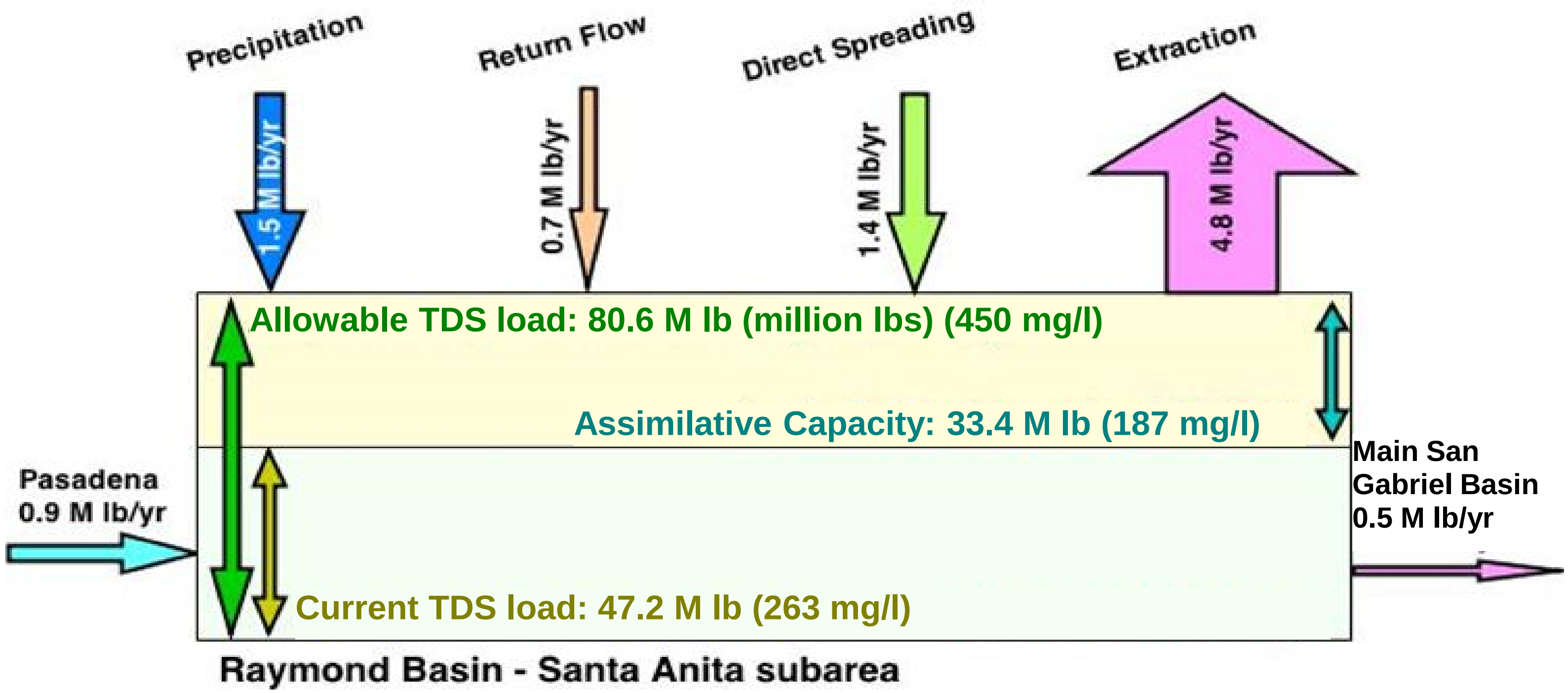
(compiled from Tables III.14 through III.17)

STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

SANTA ANITA SUBAREA SULFATE LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

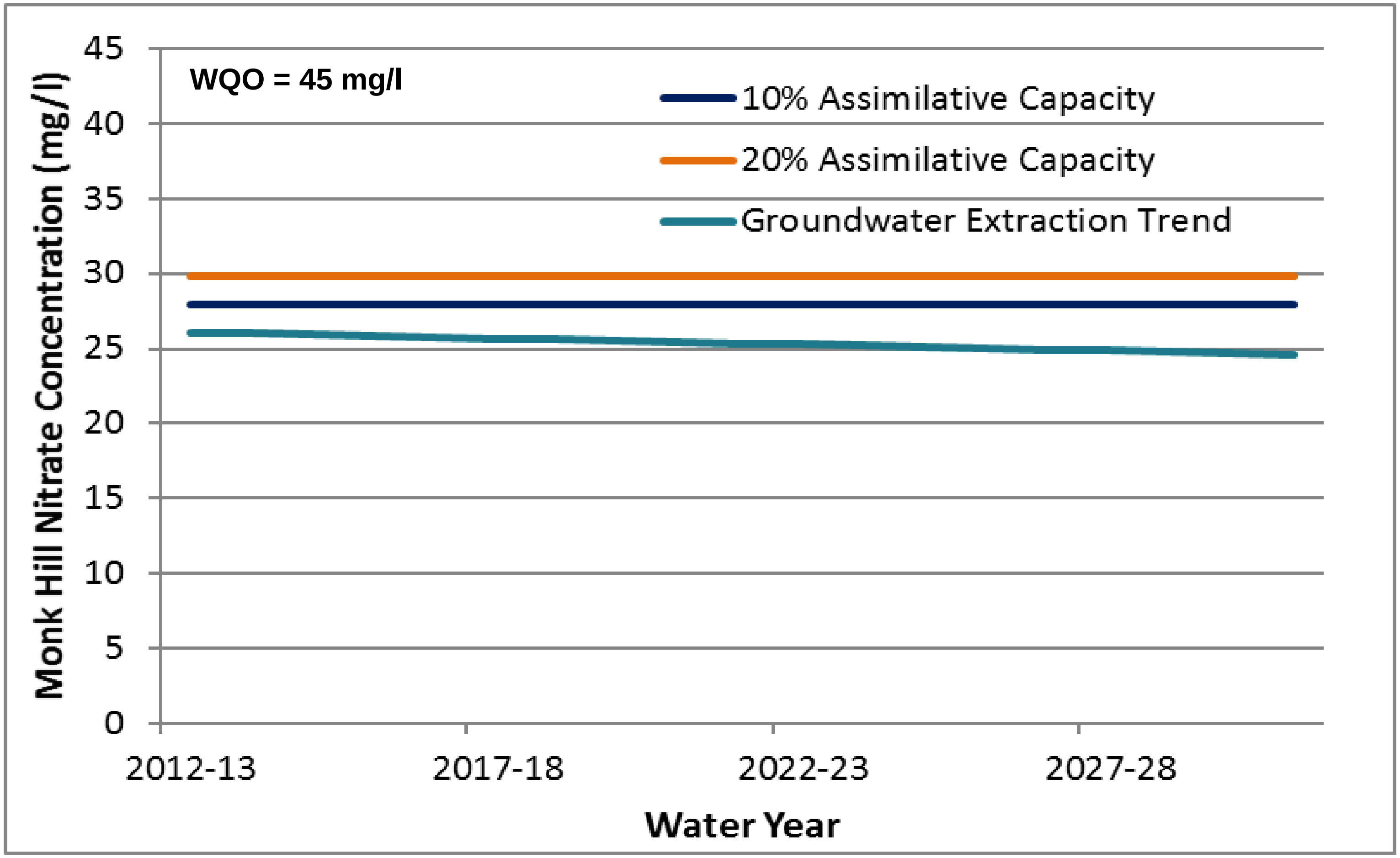
PLATE III.20c



(compiled from Tables III.14 through III.17)

STETSON ENGINEERS INC. West Covina San Rafael Mesa, Arizona WATER RESOURCE ENGINEERS	RAYMOND BASIN MANAGEMENT BOARD SANTA ANITA SUBAREA TOTAL DISSOLVED SOLIDS (TDS) LOADING / UNLOADING BALANCE, 2002-2003 THROUGH 2011-2012

PLATE III.20d

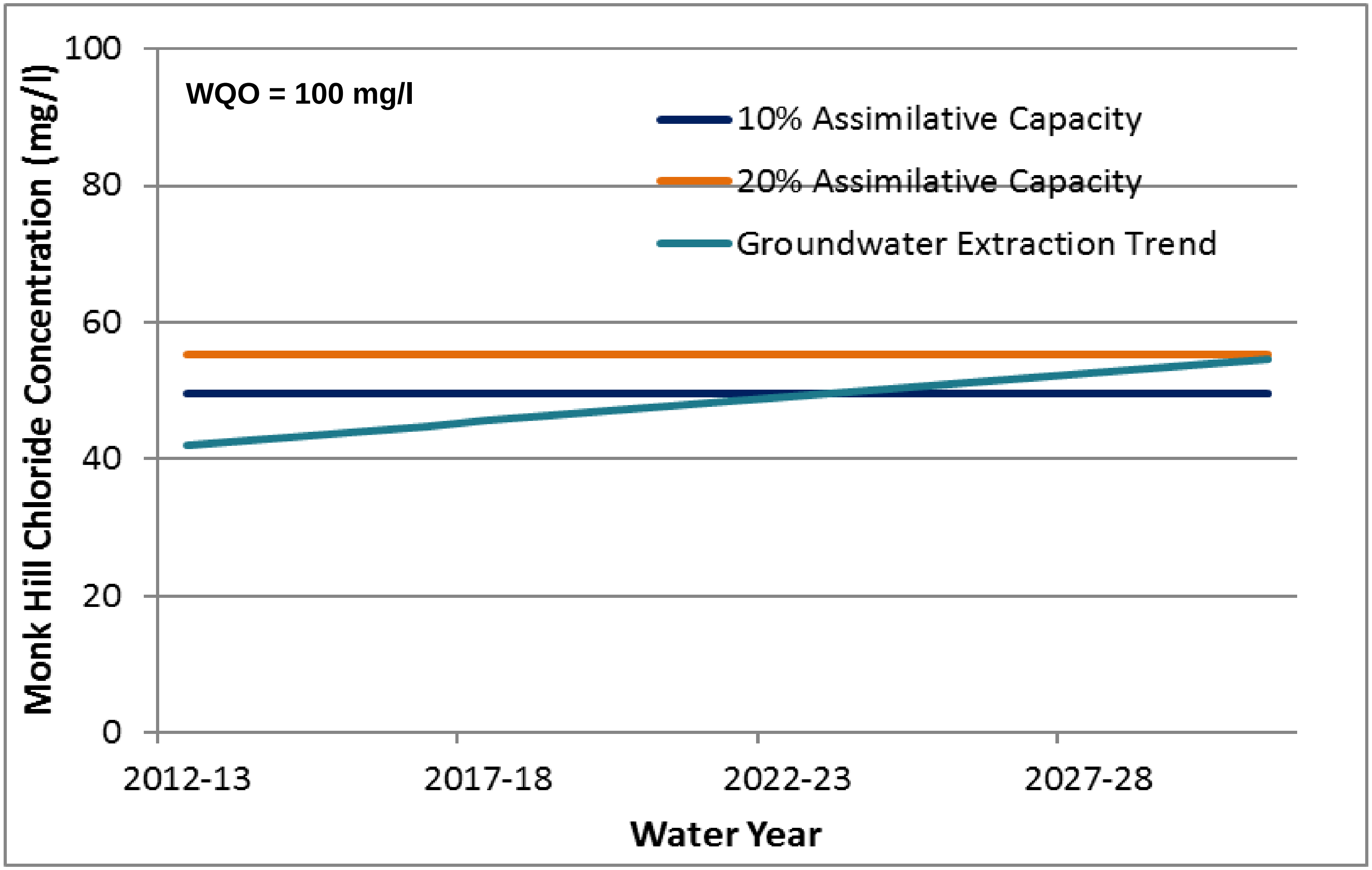


STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL NITRATE CONCENTRATION TREND

PLATE IV.1a

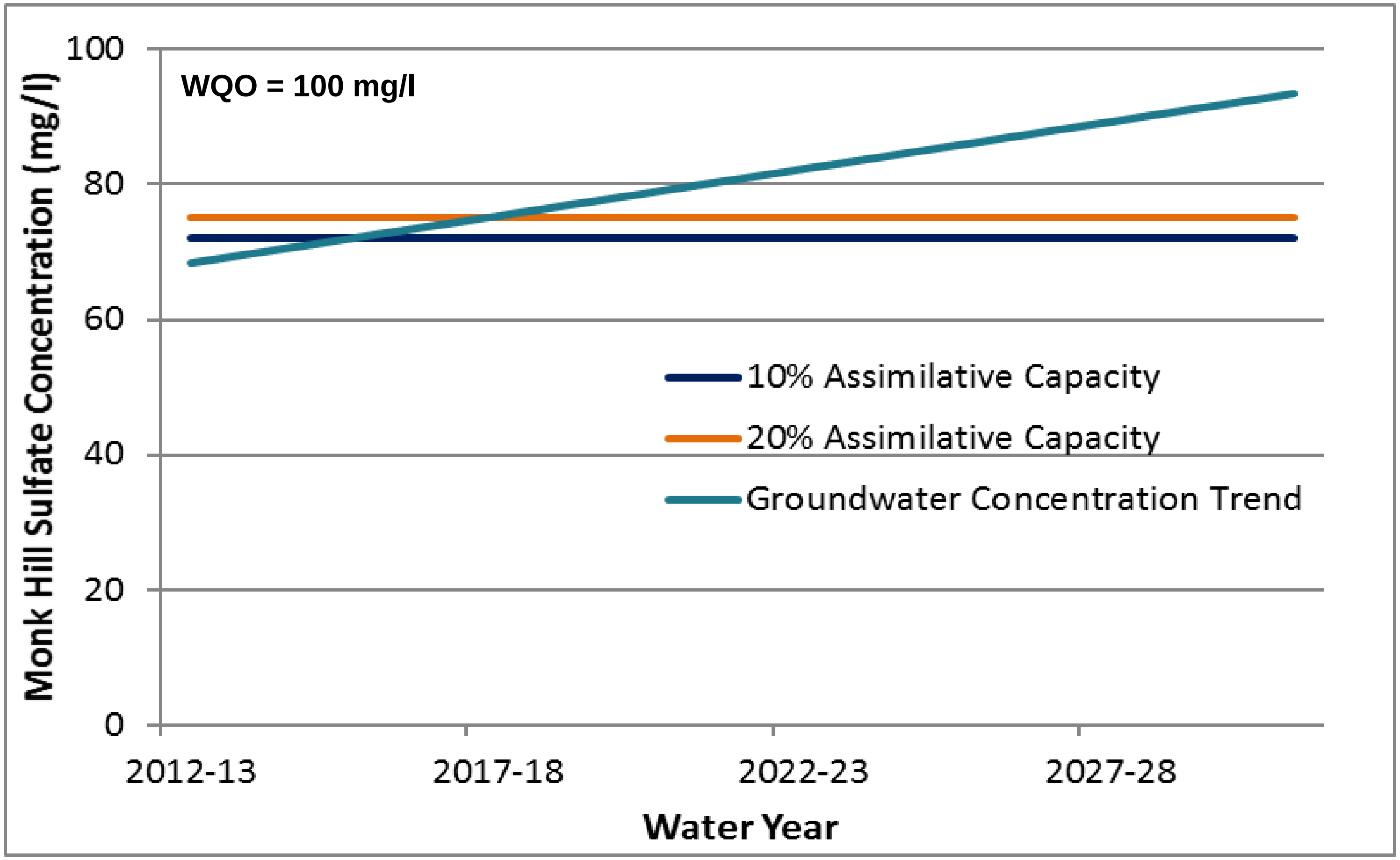


STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL CHLORIDE CONCENTRATION TREND

PLATE IV.1b

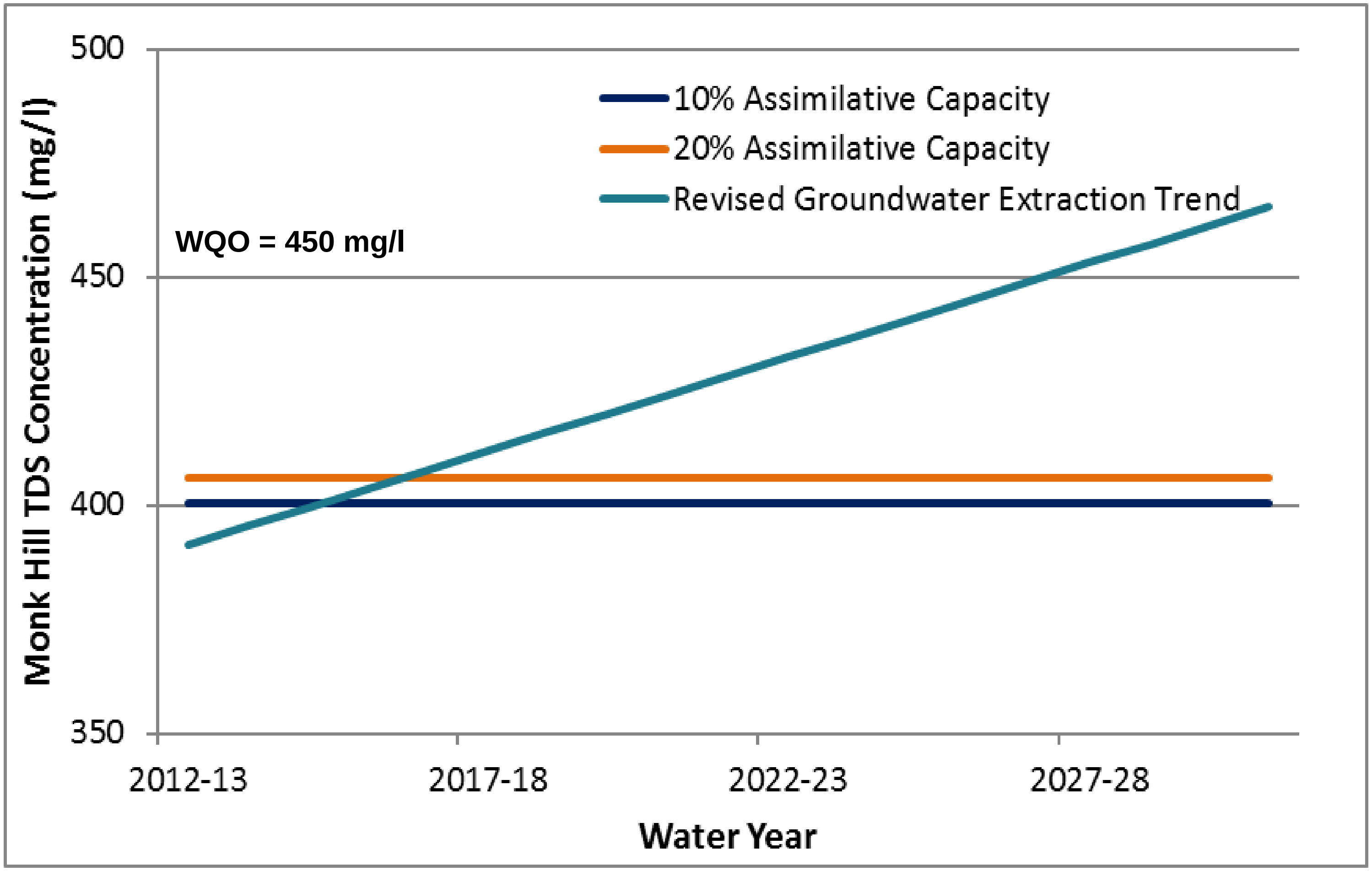


STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL SULFATE CONCENTRATION TREND

PLATE IV.1c

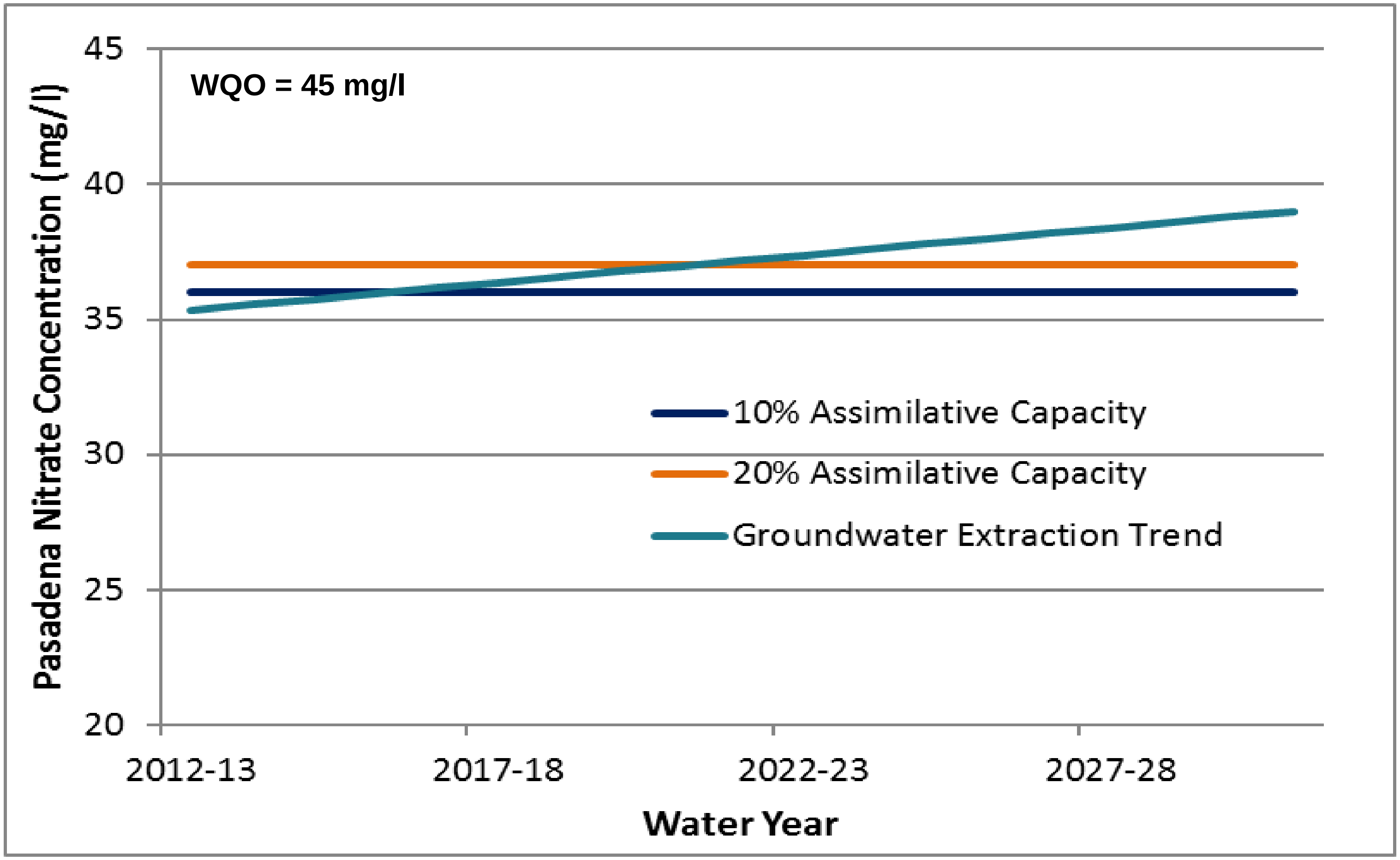


STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

MONK HILL TDS CONCENTRATION TREND

PLATE IV.1d

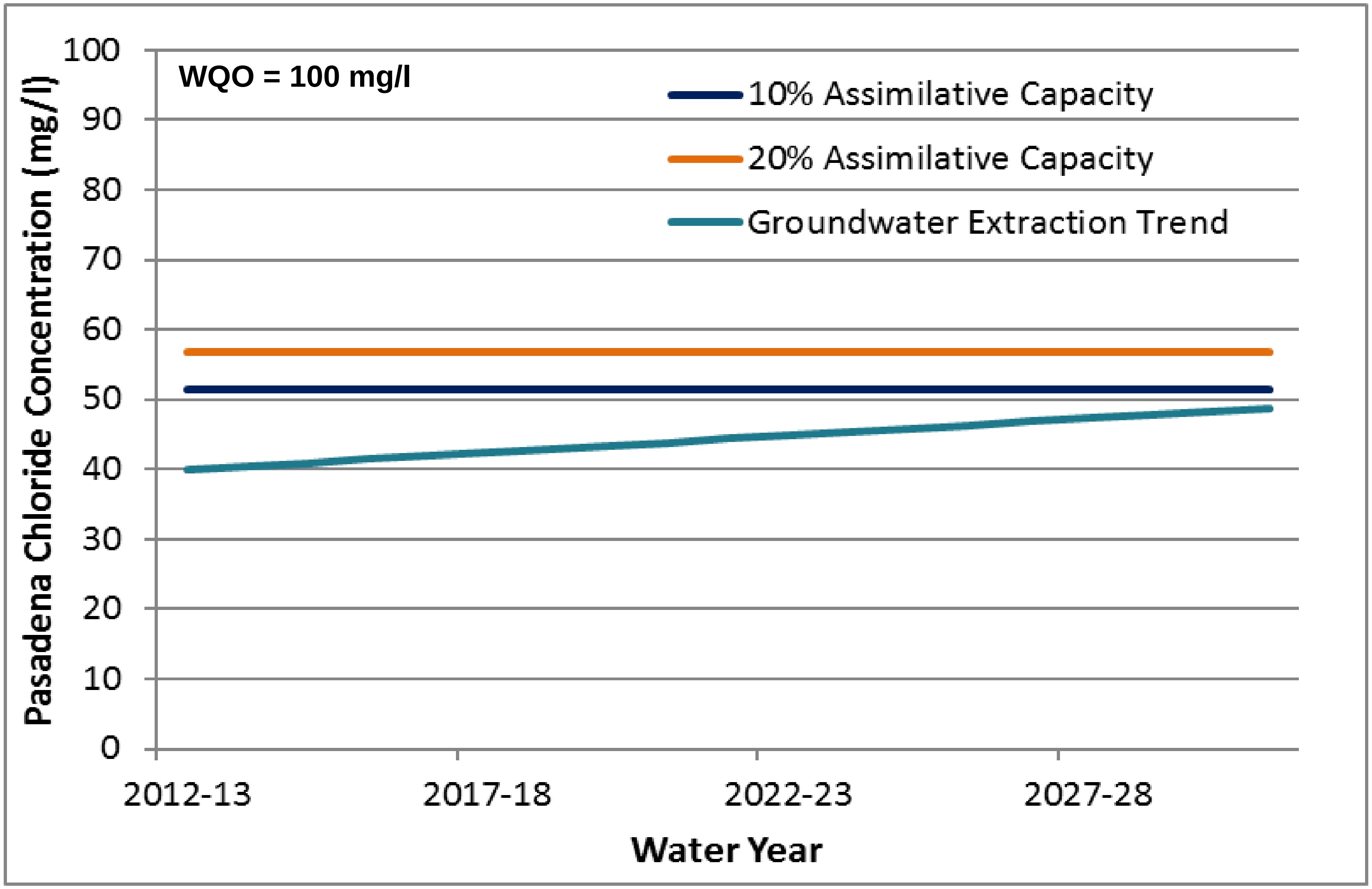


STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

PASADENA NITRATE CONCENTRATION TREND

PLATE IV.2a

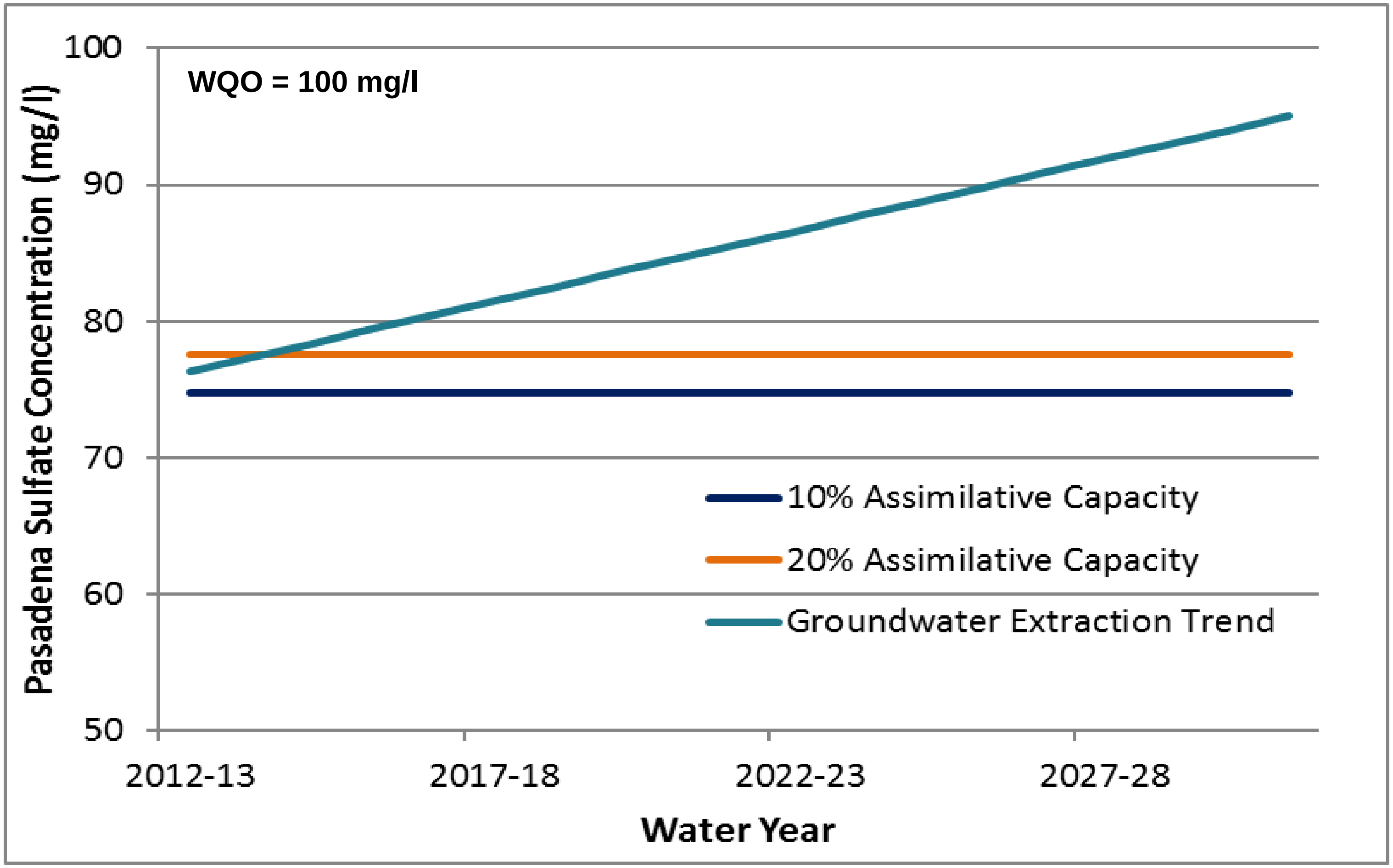


STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

PASADENA CHLORIDE CONCENTRATION TREND

PLATE IV.2b

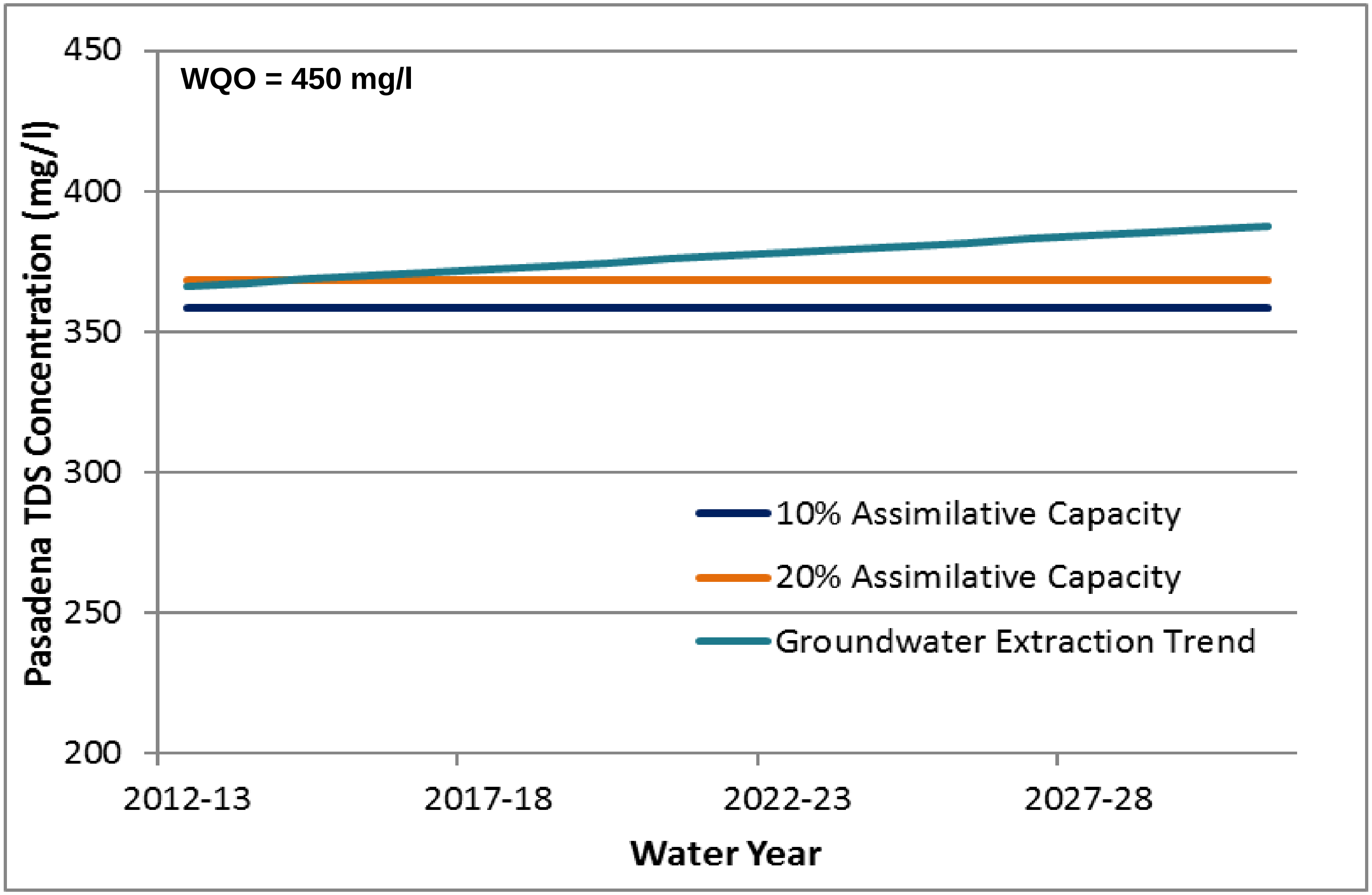


STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

PASADENA SULFATE CONCENTRATION TREND

PLATE IV.2c

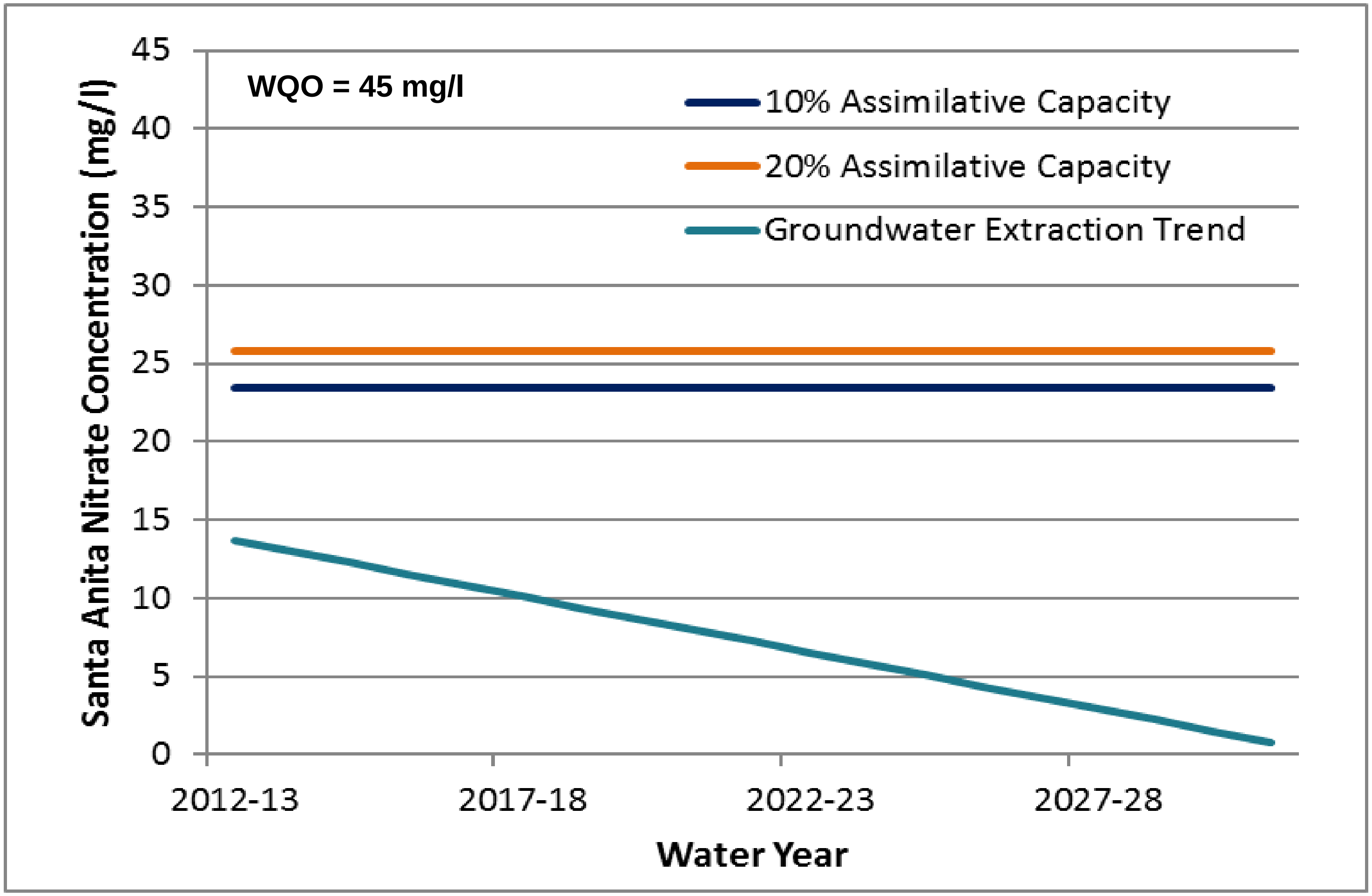


STETSON ENGINEERS INC.
West Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

PASADENA TDS CONCENTRATION TREND

PLATE IV.2d



STETSON ENGINEERS INC.
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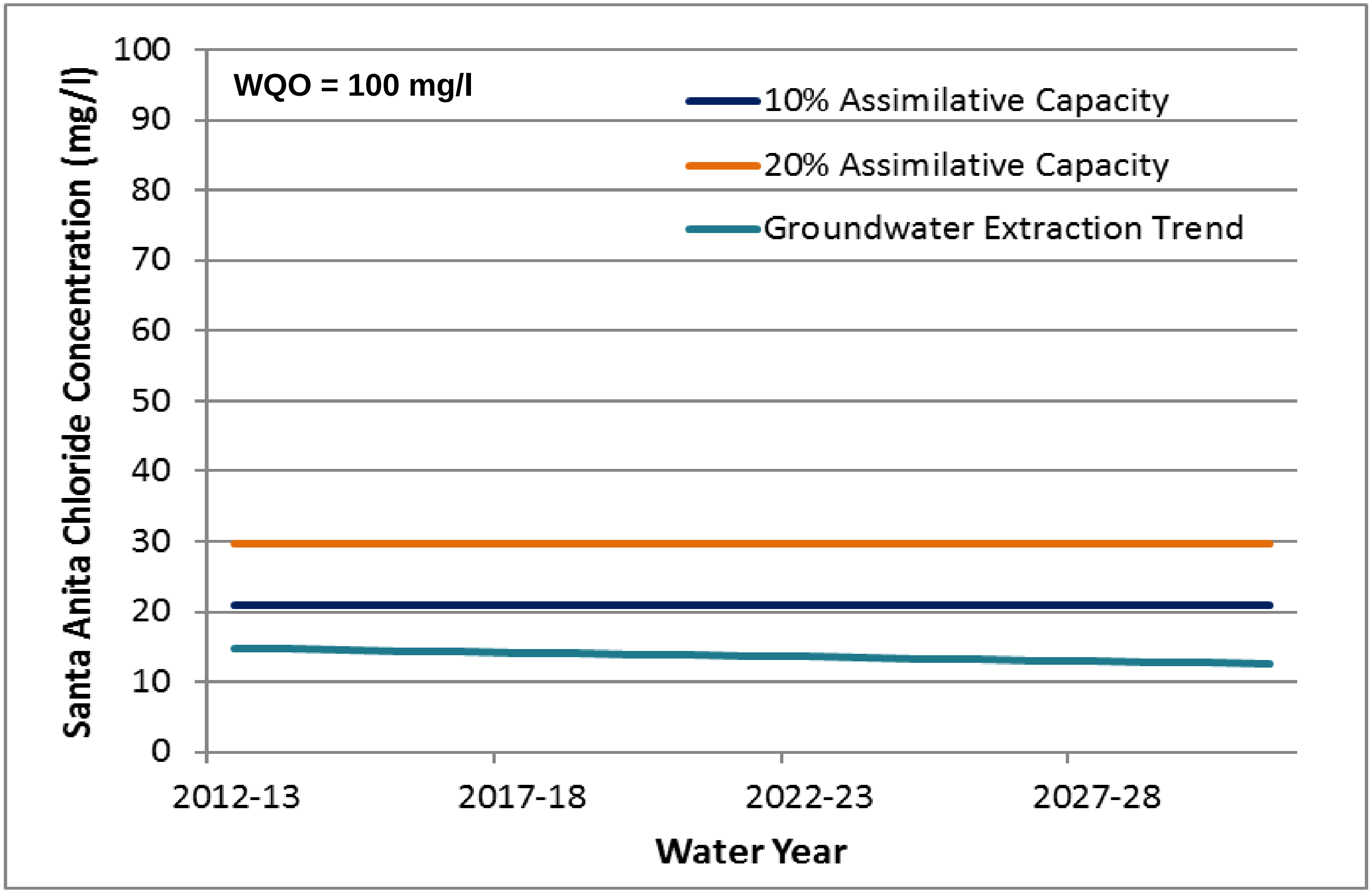
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

SANTA ANITA NITRATE CONCENTRATION TREND

PLATE IV.3a



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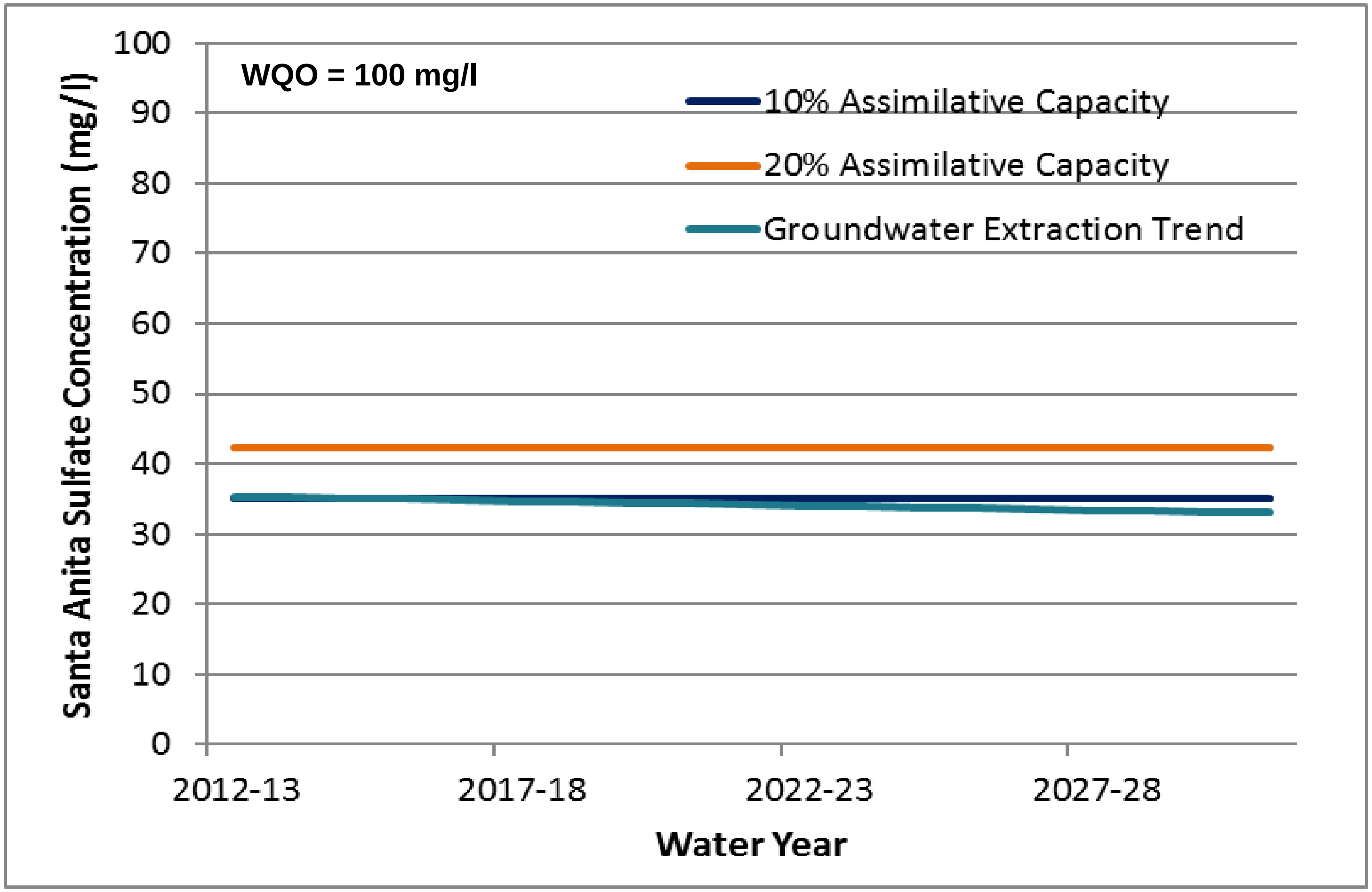
RAYMOND BASIN MANAGEMENT BOARD

SANTA ANITA CHLORIDE CONCENTRATION TREND

PLATE IV.3b



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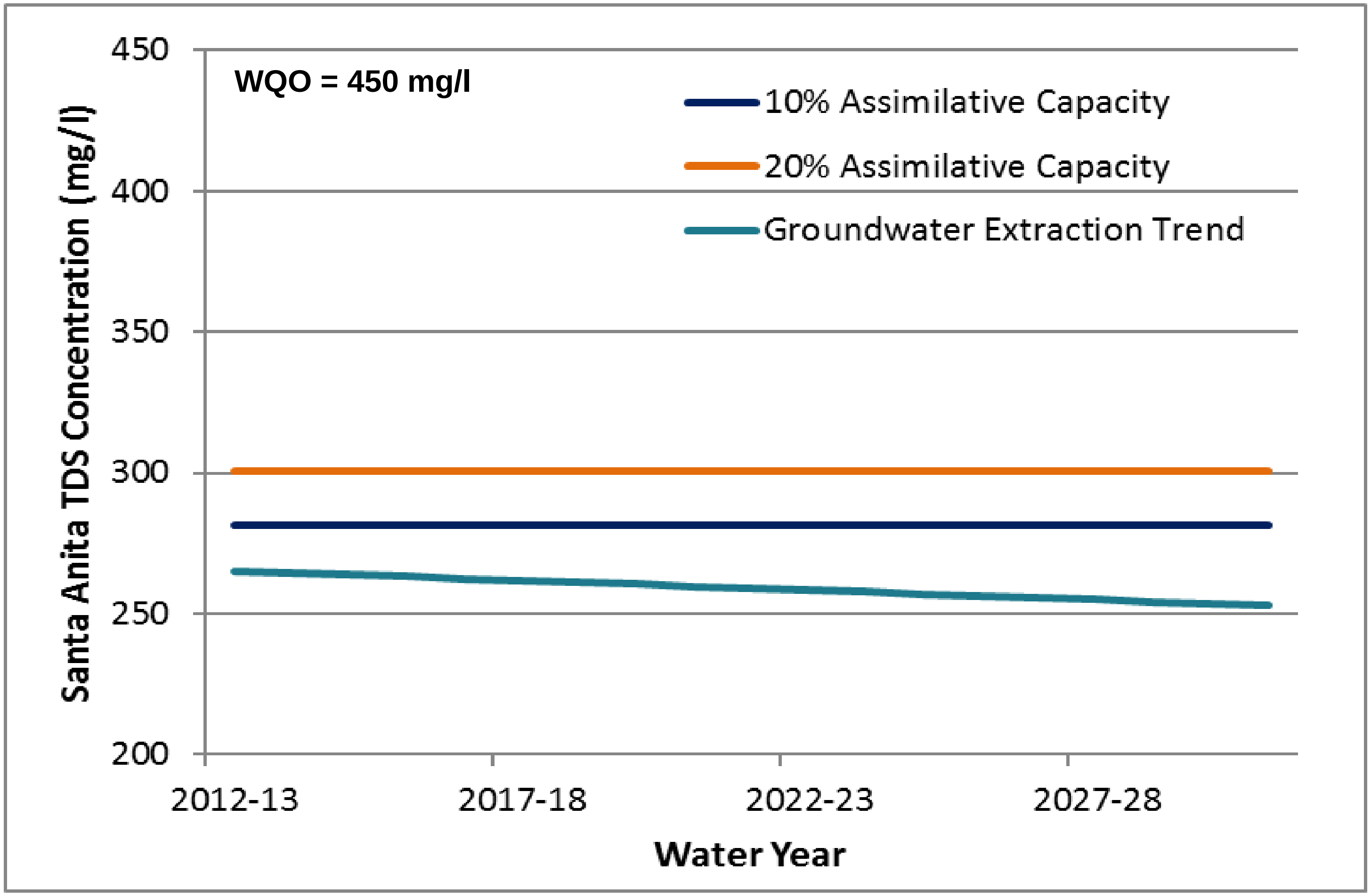
RAYMOND BASIN MANAGEMENT BOARD

SANTA ANITA SULFATE CONCENTRATION TREND

PLATE IV.3c



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WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

SANTA ANITA TDS CONCENTRATION TREND

PLATE IV.3d

RAYMOND BASIN SNMP TABLES

TABLE III.1
WATER QUALITY OBJECTIVES FOR THE RAYMOND BASIN

CONSTITUENT	BASIN PLAN OBJECTIVES

BACTERIA (Objective in coliforms per 100 mL)

COLIFORM	1.1

INORGANIC CHEMICALS (MCLs in mg/L) (TABLE 64431-A) [1]

ALUMINUM	1
ANTIMONY	0.006
ARSENIC	0.01
ASBESTOS [2] (in MFL)	7
BARIUM	1
BERYLLIUM	0.004
CADMIUM	0.005
CHROMIUM	0.05
CYANIDE	0.15
FLUORIDE	2
MERCURY	0.002
NICKEL	0.1
NITRATE (as NO_3)	45
NITRATE + NITRITE (as N)	10
NITRITE (as N)	1
PERCHLORATE	0.006
SELENIUM	0.05
THALLIUM	0.002

RADIOACTIVITY (MCLs in pCi/L) (TABLES 64442 AND 64443) [1]

RADIUM 226 + RADIUM 228	5
GROSS ALPHA	15
URANIUM	20
BETA/PHOTON EMITTERS (in millirem/year)	4
STRONTIUM 90	8
TRITIUM	20,000

ORGANIC CHEMICALS (MCLs in mg/L)

VOLATILE ORGANIC CHEMICALS (TABLE 64444-A) [1]

BENZENE	0.001
CARBON TETRACHLORIDE	0.0005
1,2-DICHLOROBENZENE	0.6
1,4-DICHLOROBENZENE	0.005
1,1-DICHLOROETHANE	0.005
1,2-DICHLOROETHANE	0.0005
1,1-DICHLOROETHYLENE	0.006
cis-1,2-DICHLOROETHYLENE	0.006
trans-1,2-DICHLOROETHYLENE	0.01

TABLE III.1
WATER QUALITY OBJECTIVES FOR THE RAYMOND BASIN

CONSTITUENT	BASIN PLAN OBJECTIVES
DICHLOROMETHANE	0.005
1,2-DICHLOROPROPANE	0.005
1,3-DICHLOROPROPENE	0.0005
ETHYLBENZENE	0.3
METHYL-TERT-BUTYL ETHER (MTBE)	0.013
MONOCHLOROBENZENE	0.07
STYRENE	0.1
1,1,2,2-TETRACHLOROETHANE	0.001
TETRACHLOROETHYLENE	0.005
TOLUENE	0.15
1,2,4-TRICHLOROBENZENE	0.005
1,1,1-TRICHLOROETHANE	0.2
1,1,2-TRICHLOROETHANE	0.005
TRICHLOROETHYLENE	0.005
TRICHLOROFLUOROMETHANE	0.15
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (FREON 113)	1.2
VINYL CHLORIDE	0.0005
XYLENES	1.75 [3]

NON-VOLATILE SYNTHETIC ORGANIC CHEMICALS (TABLE 64444-A) [1]

ALACHLOR	0.002
ATRAZINE	0.001
BENTAZON	0.018
BENZO (A) PYRENE	0.0002
CARBOFURAN	0.018
CHLORDANE	0.0001
2,4-D	0.07
DALAPON	0.2
DIBROMOCHLOROPROPANE	0.0002
DI (2-ETHYLHEXYL) ADIPATE	0.4
DI (2-ETHYLHEXYL) PHTHALATE	0.004
DINOSEB	0.007
DIQUAT	0.02
ENDOTHALL	0.1
ENDRIN	0.002
ETHYLENE DIBROMIDE (EDB)	0.00005
GLYPHOSATE	0.7
HEPTACHLOR	0.00001
HEPTACHLOR EPOXIDE	0.00001
HEXACHLOROBENZENE	0.001
HEXACHLOROCYCLOPENTADIENE	0.05
LINDANE	0.0002
METHOXYCHLOR	0.03
MOLINATE	0.02
OXAMYL	0.05
PENTACHLOROPHENOL	0.001

TABLE III.1
WATER QUALITY OBJECTIVES FOR THE RAYMOND BASIN

CONSTITUENT	BASIN PLAN OBJECTIVES
PICLORAM	0.5
POLYCHLORINATED BIPHENOLS (Total PCBs)	0.0005
SIMAZINE	0.004
THIOBENCARB	0.07
TOXAPHENE	0.003
2,3,7,8-TCDD (DIOXIN)	3×10^{-8}
2,4,5-TP (SILVEX)	0.05

MINERALS (Objectives in mg/L)

TOTAL DISSOLVED SOLIDS	450
SULFATE	100
CHLORIDE	100
BORON	0.5

NOTES :

[1] Title 22, Division 4, Chapter 15 - California Code of Regulations - Updated June 21, 2012

[2] For fibers exceeding 10 micrometers in length

[3] MCL for either a single isomer or the sum of isomers

MCL : Maximum contaminant level

mL : Milliliter

MFL : Million fibers per liter

pCi/L : Picocuries per liter

mg/L : Milligrams per liter

TABLE III.2
GROUNDWATER VOLUME ESTIMATES IN RAYMOND BASIN BY RELATIVE AREA OF SUBAREAS

	Area		Groundwater in Storage†
	- miles^2 -	--- % ---	-- ac-ft --
Raymond Basin	40.9	100.0%	800,000
Monk Hill	9.7	23.8%	190,400
Pasadena	27.4	67.1%	536,800
Santa Anita	3.7	9.1%	72,800

† Ch. 4 Groundwater Basin Reports: San Gabriel Valley Basins, Raymond Basin, September :

TABLE III.3.
RAYMOND BASIN SUBAREA GROUNDWATER QUALITY CHARACTERISTICS BY DECADE

Nitrate

NO_3	Monk Hill			Pasadena			Santa Anita			Valley Water Company		
mg/L	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011
0 to 25	34%	38%	24%	68%	23%	23%	67%	51%	74%	31%	16%	31%
26 to 35	38%	20%	8%	24%	21%	21%	7%	42%	20%	13%	12%	13%
36 to 45	21%	28%	48%	4%	39%	39%	27%	5%	6%	8%	20%	8%
46 to 75	7%	14%	19%	3%	16%	16%	0%	2%	0%	48%	51%	48%
> 75	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	1%	0%
no. wells	29	415	392	72	1222	1223	15	124	924	222	164	222
	------------ Nitrate, mg/L ------------			------------ Nitrate, mg/L ------------			------------ Nitrate, mg/L ------------			------------ Nitrate, mg/L ------------		
mean	29	31	36	24	32	33	25	23	18	56	43	38
25%	23	22	27	18	24	26	15	14	11	53	33	21
50%	30	32	39	23	33	36	23	25	16	54	48	44
75%	35	42	45	28	41	40	36	29	26	58	57	58

Chloride

Cl	Monk Hill			Pasadena			Santa Anita			Valley Water Company		
mg/L	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011
0 to 50	92%	87%	76%	95%	85%	81%	100%	100%	100%	0%	0%	0%
51 to 75	8%	13%	10%	5%	11%	19%	0%	0%	0%	0%	3%	9%
76 to 100	0%	0%	14%	0%	3%	0%	0%	0%	0%	33%	69%	57%
101 to 125	0%	0%	0%	0%	1%	0%	0%	0%	0%	67%	29%	29%
>125	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%
no. wells	13	38	21	41	123	80	15	47	40	3	35	35
	------------ Chloride, mg/L ------------			------------ Chloride, mg/L ------------			------------ Chloride, mg/L ------------			------------ Chloride, mg/L ------------		
mean	35	31	43	26	34	34	17	17	15	103	95	96
25%	31	16	26	17	21	22	14	15	12	97	89	91
50%	35	29	44	25	31	31	16	17	16	114	94	95
75%	39	44	47	37	42	42	19	20	19	115	104	108

Sulfate

SO_4	Monk Hill			Pasadena			Santa Anita			Valley Water Company		
mg/L	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011
0 to 50	79%	58%	41%	60%	39%	29%	87%	89%	91%	33%	0%	0%
51 to 100	21%	42%	50%	38%	53%	48%	13%	11%	7%	33%	10%	3%
101 to 150	0%	0%	9%	3%	7%	23%	0%	0%	2%	33%	29%	43%
151 to 200	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	58%	55%
>200	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	3%	0%
no. wells	14	38	22	40	123	73	15	47	44	3	31	40
	------------ Sulfate, mg/L ------------			------------ Sulfate, mg/L ------------			------------ Sulfate, mg/L ------------			------------ Sulfate, mg/L ------------		
mean	37	48	66	47	62	73	37	36	35	83	159	155
25%	28	36	44	30	40	44	32	28	19	52	138	146
50%	34	44	60	44	58	68	38	37	36	90	160	152
75%	45	61	92	65	77	93	42	43	45	118	184	166

Total Dissolved Solids

TDS	Monk Hill			Pasadena			Santa Anita			Valley Water Company		
mg/L	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011	to 1991	1992 to 2001	2002 to 2011
0 to 250	0%	27%	0%	17%	18%	20%	9%	24%	48%	0%	0%	0%
251 to 350	60%	38%	33%	54%	32%	31%	91%	71%	48%	0%	0%	0%
351 to 450	30%	31%	28%	22%	29%	26%	0%	0%	3%	0%	0%	0%
451 to 550	10%	4%	33%	5%	14%	11%	0%	2%	0%	33%	13%	5%
551 to 650	0%	0%	6%	2%	7%	10%	0%	2%	0%	0%	55%	20%
651 to 750	0%	0%	0%	0%	0%	2%	0%	0%	0%	67%	26%	40%
>750	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%	35%
no. wells	10	45	18	41	123	61	11	49	29	3	31	20
	------------ TDS, mg/L ------------			------------ TDS, mg/L ------------			------------ TDS, mg/L ------------			------------ TDS, mg/L ------------		
mean	345	322	411	319	359	363	279	275	268	633	643	731
25%	282	250	343	260	264	273	271	258	220	604	600	683
50%	340	321	410	289	351	352	281	283	260	661	630	740
75%	397	392	479	356	438	438	293	298	330	676	700	788

*(Data compiled from Appendices J, K.) Data are reported as the percentage of wells with test values in the given range in the specified period.(Valley Water Company is in the Monk Hill subarea, but not included in the analysis.)

TABLE III.4a
NITRATE CONCENTRATION IN WATER SOURCES FOR RAYMOND BASIN SUBAREAS

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Surface Water				Groundwater Production						Return Flow, weighted mean		
Water Year	Monk Hill	Pasadena	Santa Anita	Runoff	Verdugo Basin	Monk Hill†	Pasadena	Santa Anita	Imported Ground Water	MWD Weymouth WRP	Monk Hill	Pasadena	Santa Anita
			mg/L										
1986-87				4		29	13	18	30				
1987-88				6		28	28	23	29				
1988-89				3		27	20	28	30				
1989-90			11	3		27	24	24	30				
1990-91				10		22	24	27	29				
1991-92	1	7		4		35	30	29	26				
1992-93		7	12	3		35	33	32	32				
1993-94	2	7	11	2		19	33	16	37		6	6	12
1994-95	2	10	11	5		14	23	29	22	3	12	8	11
1995-96	3	12	10	2	50	29	30	37	22	2	11	10	11
1996-97	3	12	11	2	41	27	36	25	24	2	6	12	11
1997-98	3	12	11	2		26	35	19	26	2	12	9	12
1998-99	3	14	11	2	56	28	34	21	24	3	12	11	12
1999-00	3	14	11	2	44	27	32	17	20	3	11	10	12
2000-01	3	14	11	2	45	28	32	22	22	3	10	8	11
2001-02	3	12	11	2	48	28	31	24	28	3	11	8	11
2002-03	2	12	11	5	65	30	32	24	21	3	12	7	11
2003-04	3	10	11	3	47	31	28	26	19	4	11	7	10
2004-05	3	8	12	3	47	29	33	26	21	2	9	5	12
2005-06	2	9	11	4	43	21	30	19	14	3	8	6	12
2006-07	3	9	12	2	43	16	36	15	16	4	13	6	12
2007-08	3	9	12	3	43	29	37	14	27	2	10	5	12
2008-09	3	8	11	4	44	25	37	17	27	3	12	5	10
2009-10	4	8	11	2	43	27	35	17	24	3	10	5	11
2010-11	3	8	9	3	39	27	34	17	43	3	10	6	10
2011-12	4	7	9	2	39	29	36	15	38	3	10	5	9
1986-2012													
Minimum	1	7	9	2	39	14	13	14	14	2	6	5	9
Maximum	4	14	12	10	65	35	37	37	43	4	13	12	12
Mean	3	10	11	3	46	27	30	22	26	3	10	7	11
2002-2012 Mean	3	9	11	3	45	26	34	19	25	3	11	6	11
2007-2012 Mean	3	8	10	3	42	27	36	16	32	3	10	5	10

†Valley Water Company production wells are excluded from these means.

*(Compiled from Appendices J, L, M, N, O.)

TABLE III.4b
CHLORIDE CONCENTRATION IN WATER SOURCES FOR RAYMOND BASIN SUBAREAS

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Surface Water				Groundwater Production						Return Flow, weighted mean		
Water Year	Monk Hill	Pasadena	Santa Anita	Runoff	Verdugo Basin	Monk Hill†	Pasadena	Santa Anita	Imported Ground Water	MWD Weymouth WRP	Monk Hill	Pasadena	Santa Anita
				mg/L									
1986-87				27		37	39	17	23				
1987-88				18		31	23	18	23				
1988-89				16		39	23	13	37				
1989-90	24		9	46		24	25	16	26				
1990-91			14	28		43	27	19	25				
1991-92			12	16		45	40	22	27				
1992-93	8	10	11	17		25	38	12	32				
1993-94	7	10	10	10		25	37	22	14		61	27	11
1994-95	5	10	10	19		23	21	18	25		57	36	10
1995-96	6	10	9	11	55	32	35	16	19		61	33	9
1996-97	6	10	8	2	92	40	57	11	17		69	13	8
1997-98	6	10	8	5		33	21	25	21		58	34	9
1998-99	5	10	8	10	76	40	33	13	32		60	34	8
1999-00	6	10	8	19	85	20	37	18	14		62	41	8
2000-01	7	10	8	10	80	42	28	18	17		76	53	8
2001-02	7	10	9	9	74	64	35	17	42	85	79	48	9
2002-03	8	10	10	6	94	29	36	19	15	79	60	50	10
2003-04	8	10	10	10	62	18	20	13	18	86	65	51	19
2004-05	7	10	9	8	64	23	40	8	39	75	53	44	11
2005-06	7	10	9	27	99	20	51	18	11	61	44	37	10
2006-07	7	10	9	22	64	24	18	14	14	86	61	53	9
2007-08	7	9	7	4	81	41	52	10	40	96	77	61	8
2008-09	6	9	7	14	81	41	35	20	28	98	75	60	18
2009-10	6	10	7	7	36	58	26	17	15	88	78	55	10
2010-11	7	10	7	12	36	40	45	9	45	70	60	43	7
2011-12	7	10	7	14	35	46	45	21	33	90	77	54	8
1986-2012													
Minimum	5	9	7	2	35	18	18	8	11	61	44	13	7
Maximum	24	10	14	46	99	64	57	25	45	98	79	61	19
Mean	7	10	9	15	70	35	34	16	25	83	65	44	10
2002-2012 Mean	7	10	8	12	65	34	37	15	26	83	65	51	11
2007-2012 Mean	7	9	7	10	54	45	41	15	32	88	73	55	10

†Valley Water Company production wells are excluded from these means.

*(Compiled from Appendices K, L, M, N, O.)

TABLE III.4c
SULFATE CONCENTRATION IN WATER SOURCES FOR RAYMOND BASIN SUBAREAS

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Surface Water				Groundwater Production						Return Flow, weighted mean		
Water Year	Monk Hill	Pasadena	Santa Anita	Runoff	Verdugo Basin	Monk Hill†	Pasadena	Santa Anita	Imported Ground Water	MWD Weymouth WRP	Monk Hill	Pasadena	Santa Anita
				------------------	------------------	------------------	------------------	------------------	mg/L	------------------	------------------	------------------	------------------
1986-87				33		36			36				
1987-88				32		35	43	38	35				
1988-89				47		23	46	34	23				
1989-90	59		23	50		36	49	34	36				
1990-91				42		52	50	36	52				
1991-92				38		40	55	42					
1992-93	47	31	23	38		42	80	36	42				
1993-94	57	31	23	22		43	74	37	31		126	65	23
1994-95	51	30	23	39		45	65	36	45		90	63	23
1995-96	51	28	23	21	89	45	57	41	45		102	65	24
1996-97	51	28	23	22	211	44	58	33	78		180	36	24
1997-98	52	26	24	13		45	61	36	45		159	103	24
1998-99	47	27	24	21	142	49	61	32	67		130	85	24
1999-00	34	26	24	29	135	50	62	36	48		97	66	24
2000-01	34	26	24	23	123	52	64	34	57		113	86	24
2001-02	31	26	25	29	120	56	64	39	64	171	138	98	25
2002-03	25	26	25	38	170	61	67	41	60	111	91	76	26
2003-04	25	25	27	25	100	58	68	41	35	145	118	90	41
2004-05	24	25	24	16	110	59	67	33		164	119	97	29
2005-06	20	26	24	25	151	62	67	42		116	93	74	26
2006-07	20	26	21	24	110	57	50	42	46	140	107	91	22
2007-08	19	26	21	26	120	41	73	45		209	151	136	22
2008-09	20	27	21	24	125	46	79	32	95	240	164	149	47
2009-10	20	26	22	24	125	78	76	35	94	194	157	123	28
2010-11	20	26	20	16	130	70	78	29	57	122	105	79	21
2011-12	21	25	20	17	130	70	78	30	47	140	118	88	20
1986-2012													
Minimum	19	25	20	13	89	23	43	29	23	111	90	36	20
Maximum	59	31	27	50	211	78	80	45	95	240	180	149	47
Mean	35	27	23	28	131	50	64	37	52	159	124	88	26
2002-2012 Mean	21	26	22	24	127	60	70	37	62	158	122	100	28
2007-2012 Mean	20	26	21	21	126	61	77	34	73	181	139	115	28

†Valley Water Company production wells are excluded from these means.

*(Compiled from Appendices K, L, M, N, O.)

TABLE III.4d
TOTAL DISSOLVED SOLIDS CONCENTRATION IN WATER SOURCES FOR RAYMOND BASIN SUBAREAS

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Surface Water				Groundwater Production						Return Flow, weighted mean		
Water Year	Monk Hill	Pasadena	Santa Anita	Runoff	Verdugo Basin	Monk Hill†	Pasadena	Santa Anita	Imported Ground Water	MWD Weymouth WRP	Monk Hill	Pasadena	Santa Anita
				mg/L									
1986-87				236		267	305		298				
1987-88				270		347	303	287	314				
1988-89				256		391	337	268	331				
1989-90	338		236	304		310	302		295				
1990-91				330		327	305	279	290				
1991-92				204		295	400	284	258				
1992-93				226		312	368	230	292				
1993-94	278	200	221	199		231	382	305	247		383	265	224
1994-95	237	211	205	284		320	335	279	237		333	262	205
1995-96	237	216	205	198	437	318	343	279	231		388	290	210
1996-97	237	216	198	180	655	318	351	268	243		520	233	202
1997-98	232	223	191	160		308	345	282	267		487	366	196
1998-99	224	224	192	204	552	319	356	273	386		434	333	198
1999-00	199	225	192	255	576	320	361	274	245		357	290	196
2000-01	204	224	192	250	557	322	356	274	263		422	354	195
2001-02	213	226	197	240	553	331	355	279	295	500	451	363	199
2002-03	218	228	197	270	513	348	352	275	273	387	369	321	199
2003-04	224	228	200	240	540	350	358	273	286	445	415	346	230
2004-05	223	228	208	200	510	369	356	267	315	452	412	345	220
2005-06	222	230	208	240	604	369	356	274	326	344	348	292	213
2006-07	216	223	215	210	480	386	363	257	322	437	415	346	216
2007-08	210	223	209	200	600	381	360	262	310	565	499	429	211
2008-09	216	215	209	210	583	390	356	268	327	620	527	447	258
2009-10	224	215	203	210	620	426	351	273	330	532	497	399	216
2010-11	236	215	212	200	595	413	363	263	360	380	388	307	215
2011-12	240	215	212	200	600	413	376	273	358	470	452	355	214
1986-2012													
Minimum	199	200	191	160	437	231	302	230	231	344	333	233	195
Maximum	338	230	236	330	655	426	400	305	386	620	527	447	258
Mean	231	220	205	230	561	342	350	273	296	467	426	334	212
2002-2012 Mean	223	222	207	218	565	384	359	269	321	463	432	359	219
2007-2012 Mean	225	217	209	204	600	405	361	268	337	513	473	387	223

†Valley Water Company production wells are excluded from these means.

*(Compiled from Appendices K, L, M, N, O.)

TABLE III.5a
FACTORS AND COEFFICIENTS USED IN CALIBRATING LOADING-UNLOADING CONSTITUENT MODELS: RAYMOND BASIN, MONK HILL SUBAREA

Subsurface inflow: Verdugo Basin	Use annual water quality.			
Artificial recharge: Injection	Use annual injection water quality.			
	Nitrate	Chloride	Sulfate	TDS
Mean groundwater concentration (GW), mg/L (1994-95 to 2011-12)	27	35	55	356
Volume of annual recharge from precipitation to mean or annual surface spreading to mean	Coefficient (multiplier)			
Greater than mean	0.8	0.8	0.7	1
75% to mean	0.9	0.9	0.8	1
Less than 75% of mean	1	1	1	1
	Multiply appropriate coefficient for each year by GW (c*GW).			
Precipitation	c*GW	c*GW	c*GW	c*GW
Artificial recharge: Surface Spreading	c*GW	c*GW	c*GW	c*GW
Return flow, weighted				
Ratio of water quality of annual return flow (WQ) to mean groundwater concentration (GW)	Use appropriate factor for each year.			
Less than mean groundwater	0.8 GW	1.0 GW	1.0 GW	1.0 WQ
1 to 1.25 mean groundwater	0.9 GW	1.0 WQ	1.0 WQ	1.0 WQ
Greater than 1.25 mean groundwater	1.0 GW	0.9 WQ	0.8 WQ	1.0 WQ

TABLE III.5b
FACTORS AND COEFFICIENTS USED IN CALIBRATING LOADING-UNLOADING CONSTITUENT MODELS: RAYMOND BASIN, PASADENA SUBAREA

Subsurface inflow: Monk Hill subarea	Use annual water quality.			
Artificial recharge: Injection	Use annual injection water quality.			
	Nitrate	Chloride	Sulfate	TDS
Mean groundwater concentration (GW), mg/L	33	35	66	355
Volume of annual recharge from precipitation to mean or annual surface spreading to mean	Coefficient (multiplier)			
Greater than mean	0.4	0.6	0.5	0.4
75% to mean	0.6	0.8	0.7	0.5
Less than 75% of mean	0.8	0.9	0.9	0.8
	Multiply appropriate coefficient for each year by GW (c*GW).			
Precipitation	c*GW	c*GW	c*GW	1.0 WQ
Artificial recharge: Surface Spreading	c*GW	c*GW	c*GW	1.0 WQ
Return flow, weighted				
Ratio of water quality of annual return flow (WQ) to mean groundwater concentration (GW)	Use appropriate factor for each year.			
Less than mean groundwater	0.4 GW	1.0 GW	1.0 GW	0.4 WQ
1 to 1.25 mean groundwater	0.6 GW	1.0 WQ	1.0 WQ	0.5 WQ
Greater than 1.25 mean groundwater	0.8 GW	0.7 WQ	0.7 WQ	0.8 WQ

TABLE III.5c
FACTORS AND COEFFICIENTS USED IN CALIBRATING LOADING-UNLOADING CONSTITUENT MODELS: RAYMOND BASIN, SANTA ANITA SUBAREA

Subsurface inflow: Pasadena subarea	Use annual water quality.			
Artificial recharge: Injection	Use annual injection water quality.			
	Nitrate	Chloride	Sulfate	TDS
Mean groundwater concentration (GW), mg/L	21	16	37	272
Volume of annual recharge from precipitation to mean or annual surface spreading to mean	Coefficient (multiplier)			
Greater than mean	0.60	1.05	0.85	1.25
75% to mean	0.75	1.10	0.88	1.10
Less than 75% of mean	1.00	1.10	1.00	1.05
	Multiply appropriate coefficient for each year by GW (c*GW).			
Precipitation	c*GW		c*GW	
Artificial recharge: Surface Spreading	c*GW		c*GW	
	Use lesser of GW or product of coefficient and water quality for each year			
Precipitation		GW or c*WQ		GW or c*WQ
Artificial recharge: Surface Spreading		GW or c*WQ		GW or c*WQ
Return flow, weighted				
Ratio of water quality of annual return flow (WQ) to mean groundwater concentration (GW)	Use appropriate factor for each year.			
Less than mean groundwater	0.6 GW	1.1 WQ	1 WQ	Lesser of GW or 1.4 WQ
1 to 1.25 mean groundwater	0.75 GW	1.1 WQ	1 WQ	Lesser of GW or 1.3 WQ
Greater than 1.25 mean groundwater	1.0 GW	1.1 WQ	1 WQ	Lesser of GW or 1.2 WQ

TABLE III.6
RAYMOND BASIN MONK HILL SUBAREA NITRATE (NO3) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	NO_3 loading					NO_3 unloading				NO_3 in Groundwater in Storage			Allowable Loading	Assimilative Capacity
Water Year	Precipitation	Verdugo Basin Subsurface Inflow	Returned flow Total	Injection & Spreading	Total	Groundwater extraction unloading	Subsurface outflow unloading	Total	NO_3 balance	Groundwater volume	NO_3 Conc.	Total	45 mg/l	
	lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	lbs	ac-ft	mg/l	lbs	lbs	lbs
1994-95	479,000	236,000	217,000	452,000	1,384,000	796,000	485,000	1,281,000	103,000	195,123	27	14,160,000	23,865,000	9,705,000
1995-96	224,000	297,000	223,000	249,000	993,000	936,000	435,000	1,371,000	-378,000	189,699	27	13,783,000	23,202,000	9,419,000
1996-97	215,000	212,000	237,000	271,000	935,000	656,000	439,000	1,095,000	-160,000	188,265	27	13,622,000	23,027,000	9,405,000
1997-98	500,000	382,000	234,000	584,000	1,700,000	702,000	483,000	1,185,000	515,000	197,825	26	14,137,000	24,196,000	10,059,000
1998-99	144,000	604,000	228,000	258,000	1,234,000	702,000	519,000	1,221,000	13,000	195,541	27	14,151,000	23,917,000	9,766,000
1999-00	223,000	107,000	224,000	231,000	785,000	811,000	489,000	1,300,000	-515,000	190,698	26	13,636,000	23,324,000	9,688,000
2000-01	243,000	322,000	229,000	227,000	1,021,000	589,000	473,000	1,062,000	-41,000	190,561	26	13,595,000	23,308,000	9,713,000
2001-02	97,000	433,000	227,000	98,000	855,000	599,000	500,000	1,099,000	-244,000	187,776	26	13,351,000	22,967,000	9,616,000
2002-03	236,000	368,000	232,000	207,000	1,043,000	339,000	516,000	855,000	188,000	190,537	26	13,539,000	23,305,000	9,766,000
2003-04	208,000	254,000	237,000	94,000	793,000	381,000	497,000	878,000	-85,000	190,189	26	13,455,000	23,262,000	9,807,000
2004-05	747,000	118,000	238,000	493,000	1,596,000	300,000	376,000	676,000	920,000	205,062	26	14,375,000	25,081,000	10,706,000
2005-06	224,000	278,000	225,000	301,000	1,028,000	224,000	323,000	547,000	481,000	208,598	26	14,856,000	25,514,000	10,658,000
2006-07	57,000	155,000	232,000	116,000	560,000	486,000	547,000	1,033,000	-473,000	204,000	26	14,382,000	24,951,000	10,569,000
2007-08	262,000	191,000	236,000	200,000	889,000	436,000	454,000	890,000	-1,000	203,824	26	14,381,000	24,930,000	10,549,000
2008-09	203,000	244,000	227,000	140,000	814,000	423,000	500,000	923,000	-109,000	201,982	26	14,273,000	24,704,000	10,431,000
2009-10	318,000	209,000	218,000	33,000	778,000	286,000	509,000	795,000	-17,000	202,437	26	14,256,000	24,760,000	10,504,000
2010-11	351,000	209,000	221,000	185,000	966,000	334,000	549,000	883,000	83,000	205,262	26	14,339,000	25,106,000	10,767,000
2011-12	168,000	159,000	192,000	187,000	706,000	564,000	436,000	1,000,000	-294,000	201,017	26	14,045,000	24,586,000	10,541,000
mean	272,000	265,000	227,000	240,000	1,004,000	531,000	474,000	1,005,000	-1,000	197,000	26	14,019,000	24,111,000	10,093,000
median, 50%	224,000	240,000	228,000	217,000	951,000	525,000	487,000	1,017,000	-29,000	197,000	26	14,144,000	24,057,000	9,933,000
2002-03 to 2011-12	277,000	219,000	226,000	196,000	917,000	377,000	471,000	848,000	69,000	201,000	26	14,190,000	24,620,000	10,430,000
2007-08 to 2011-12	260,000	202,000	219,000	149,000	831,000	409,000	490,000	898,000	-68,000	203,000	26	14,259,000	24,817,000	10,558,000

* (Condensed from App. P).

TABLE III.7
RAYMOND BASIN MONK HILL SUBAREA CHLORIDE (Cl) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	Cl loading					Cl unloading				Cl in Groundwater in Storage			Allowable	Assimilative
Water Year	Precipitation LBS/YR	Verdugo Basin Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	Cl balance LBS/YR	Groundwater volume ac-ft	Cl Conc. mg/l	Total lbs	Loading 100 mg/l lbs	Capacity lbs
1994-95	610,000	465,000	467,000	596,000	2,138,000	632,000	385,000	1,017,000	1,121,000	195,123	33	17,566,000	53,034,000	35,468,000
1995-96	299,000	324,000	513,000	403,000	1,539,000	1,139,000	530,000	1,669,000	-130,000	189,699	34	17,436,000	51,560,000	34,124,000
1996-97	285,000	477,000	611,000	463,000	1,836,000	1,004,000	672,000	1,675,000	161,000	188,265	34	17,597,000	51,170,000	33,573,000
1997-98	636,000	617,000	504,000	869,000	2,626,000	831,000	572,000	1,403,000	1,223,000	197,825	35	18,820,000	53,769,000	34,949,000
1998-99	186,000	829,000	516,000	428,000	1,959,000	1,026,000	758,000	1,784,000	175,000	195,541	36	18,995,000	53,148,000	34,153,000
1999-00	296,000	205,000	572,000	404,000	1,477,000	586,000	354,000	940,000	537,000	190,698	38	19,532,000	51,832,000	32,300,000
2000-01	322,000	564,000	710,000	422,000	2,018,000	885,000	711,000	1,595,000	423,000	190,561	39	19,955,000	51,794,000	31,839,000
2001-02	126,000	675,000	731,000	316,000	1,848,000	1,268,000	1,059,000	2,327,000	-479,000	187,776	38	19,476,000	51,038,000	31,562,000
2002-03	314,000	535,000	568,000	417,000	1,834,000	321,000	489,000	810,000	1,024,000	190,537	40	20,500,000	51,788,000	31,288,000
2003-04	270,000	335,000	631,000	265,000	1,501,000	228,000	297,000	525,000	976,000	190,189	42	21,476,000	51,693,000	30,217,000
2004-05	951,000	161,000	516,000	910,000	2,538,000	340,000	424,000	764,000	1,774,000	205,062	42	23,250,000	55,736,000	32,486,000
2005-06	298,000	639,000	407,000	614,000	1,958,000	280,000	404,000	684,000	1,274,000	208,598	43	24,524,000	56,697,000	32,173,000
2006-07	74,000	230,000	583,000	351,000	1,238,000	396,000	446,000	842,000	396,000	204,000	45	24,920,000	55,447,000	30,527,000
2007-08	336,000	359,000	740,000	267,000	1,702,000	720,000	749,000	1,469,000	233,000	203,824	45	25,153,000	55,399,000	30,246,000
2008-09	270,000	448,000	697,000	203,000	1,618,000	651,000	770,000	1,421,000	197,000	201,982	46	25,350,000	54,899,000	29,549,000
2009-10	405,000	172,000	700,000	47,000	1,324,000	613,000	1,092,000	1,705,000	-381,000	202,437	45	24,969,000	55,022,000	30,053,000
2010-11	447,000	196,000	497,000	266,000	1,406,000	465,000	763,000	1,228,000	178,000	205,262	45	25,147,000	55,790,000	30,643,000
2011-12	217,000	140,000	490,000	243,000	1,090,000	991,000	766,000	1,758,000	-668,000	201,017	45	24,479,000	54,636,000	30,157,000
mean	352,000	410,000	581,000	416,000	1,758,000	688,000	625,000	1,312,000	446,000	197,000	40	21,619,000	53,581,000	31,962,000
median, 50%	299,000	404,000	570,000	404,000	1,768,000	642,000	622,000	1,412,000	315,000	197,000	41	20,988,000	53,459,000	31,701,000
2002-03 to 2011-12	358,000	322,000	583,000	358,000	1,621,000	501,000	620,000	1,121,000	500,000	201,000	44	23,977,000	54,711,000	30,734,000
2007-08 to 2011-12	335,000	263,000	625,000	205,000	1,428,000	688,000	828,000	1,516,000	-88,000	203,000	45	25,020,000	55,149,000	30,130,000

*(Condensed from App. Q).

TABLE III.8
RAYMOND BASIN MONK HILL SUBAREA SULFATE (SO4) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	SO_4 loading					SO_4 unloading				SO_4 in Groundwater in Storage			Allowable	Assimilative
Water Year	Precipitation LBS/YR	Verdugo Basin Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	SO_4 balance LBS/YR	Groundwater volume ac-ft	SO_4 Conc. mg/l	Total lbs	Loading 100 mg/l lbs	Capacity lbs
1994-95	935,000	872,000	652,000	832,000	3,291,000	1,266,000	771,000	2,037,000	1,254,000	195,123	46	24,368,000	53,034,000	28,666,000
1995-96	514,000	526,000	763,000	591,000	2,394,000	1,578,000	734,000	2,312,000	82,000	189,699	47	24,450,000	51,560,000	27,110,000
1996-97	484,000	1,095,000	1,419,000	812,000	3,810,000	1,090,000	729,000	1,819,000	1,991,000	188,265	52	26,441,000	51,170,000	24,729,000
1997-98	968,000	1,157,000	1,241,000	1,435,000	4,801,000	1,143,000	786,000	1,930,000	2,871,000	197,825	55	29,312,000	53,769,000	24,457,000
1998-99	293,000	1,542,000	989,000	706,000	3,530,000	1,272,000	940,000	2,212,000	1,318,000	195,541	58	30,630,000	53,148,000	22,518,000
1999-00	415,000	328,000	788,000	567,000	2,098,000	1,460,000	882,000	2,342,000	-244,000	190,698	59	30,386,000	51,832,000	21,446,000
2000-01	454,000	872,000	938,000	598,000	2,862,000	1,107,000	889,000	1,995,000	867,000	190,561	60	31,253,000	51,794,000	20,541,000
2001-02	198,000	1,085,000	1,139,000	585,000	3,007,000	1,114,000	930,000	2,044,000	963,000	187,776	63	32,216,000	51,038,000	18,822,000
2002-03	437,000	965,000	772,000	629,000	2,803,000	673,000	1,027,000	1,700,000	1,103,000	190,537	64	33,319,000	51,788,000	18,469,000
2003-04	424,000	541,000	1,021,000	433,000	2,419,000	757,000	988,000	1,745,000	674,000	190,189	66	33,993,000	51,693,000	17,700,000
2004-05	1,369,000	277,000	1,030,000	1,501,000	4,177,000	857,000	1,072,000	1,929,000	2,248,000	205,062	65	36,241,000	55,736,000	19,495,000
2005-06	417,000	976,000	758,000	979,000	3,130,000	852,000	1,230,000	2,082,000	1,048,000	208,598	66	37,289,000	56,697,000	19,408,000
2006-07	116,000	395,000	902,000	564,000	1,977,000	946,000	1,064,000	2,010,000	-33,000	204,000	67	37,256,000	55,447,000	18,191,000
2007-08	536,000	532,000	1,294,000	367,000	2,729,000	715,000	744,000	1,458,000	1,271,000	203,824	70	38,527,000	55,399,000	16,872,000
2008-09	459,000	689,000	1,349,000	339,000	2,836,000	733,000	866,000	1,599,000	1,237,000	201,982	72	39,764,000	54,899,000	15,135,000
2009-10	615,000	607,000	1,249,000	76,000	2,547,000	824,000	1,467,000	2,291,000	256,000	202,437	73	40,020,000	55,022,000	15,002,000
2010-11	674,000	706,000	772,000	373,000	2,525,000	814,000	1,337,000	2,151,000	374,000	205,262	72	40,394,000	55,790,000	15,396,000
2011-12	341,000	529,000	675,000	381,000	1,926,000	1,496,000	1,156,000	2,653,000	-727,000	201,017	73	39,667,000	54,636,000	14,969,000
mean	536,000	761,000	986,000	654,000	2,937,000	1,039,000	978,000	2,017,000	920,000	197,000	63	33,640,000	53,581,000	19,940,000
median, 50%	457,000	698,000	964,000	588,000	2,820,000	1,018,000	935,000	2,024,000	1,006,000	197,000	65	33,656,000	53,459,000	19,115,000
2002-03 to 2011-12	539,000	622,000	982,000	564,000	2,707,000	867,000	1,095,000	1,962,000	745,000	201,000	69	37,647,000	54,711,000	17,064,000
2007-08 to 2011-12	525,000	613,000	1,068,000	307,000	2,513,000	916,000	1,114,000	2,030,000	482,000	203,000	72	39,674,000	55,149,000	15,475,000

*(Condensed from App. R).

TABLE III.9
RAYMOND BASIN MONK HILL SUBAREA TOTAL DISSOLVED SOLIDS (TDS) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	TDS loading					TDS unloading				TDS in Groundwater in Storage			Allowable Loading	Assimilative Capacity
Water Year	Precipitation LBS/YR	Verdugo Basin Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	TDS balance LBS/YR	Groundwater volume ac-ft	TDS Conc. mg/l	Total lbs	450 mg/l lbs	lbs
1994-95	7,752,000	3,630,000	3,007,000	7,403,000	21,792,000	8,912,000	5,429,000	14,341,000	7,451,000	195,123	325	172,474,000	238,655,000	66,181,000
1995-96	3,326,000	3,552,000	3,612,000	4,473,000	14,963,000	11,217,000	5,214,000	16,431,000	-1,468,000	189,699	332	171,006,000	232,021,000	61,015,000
1996-97	3,133,000	3,113,000	5,140,000	5,252,000	16,638,000	7,930,000	5,305,000	13,235,000	3,403,000	188,265	341	174,409,000	230,267,000	55,858,000
1997-98	8,091,000	4,812,000	4,743,000	10,441,000	28,087,000	7,782,000	5,351,000	13,133,000	14,954,000	197,825	352	189,363,000	241,960,000	52,597,000
1998-99	1,897,000	6,513,000	4,116,000	4,818,000	17,344,000	8,210,000	6,069,000	14,279,000	3,065,000	195,541	362	192,428,000	239,166,000	46,738,000
1999-00	3,252,000	1,456,000	3,626,000	4,184,000	12,518,000	9,289,000	5,607,000	14,896,000	-2,378,000	190,698	367	190,050,000	233,243,000	43,193,000
2000-01	3,534,000	4,253,000	4,396,000	3,938,000	16,121,000	6,860,000	5,510,000	12,370,000	3,751,000	190,561	374	193,801,000	233,075,000	39,274,000
2001-02	1,279,000	5,447,000	4,656,000	2,365,000	13,747,000	6,549,000	5,468,000	12,017,000	1,730,000	187,776	383	195,531,000	229,669,000	34,138,000
2002-03	3,470,000	3,415,000	3,899,000	3,420,000	14,204,000	3,846,000	5,865,000	9,711,000	4,493,000	190,537	386	200,024,000	233,046,000	33,022,000
2003-04	2,742,000	3,244,000	4,479,000	1,937,000	12,402,000	4,532,000	5,919,000	10,450,000	1,952,000	190,189	391	201,976,000	232,620,000	30,644,000
2004-05	12,094,000	1,512,000	4,451,000	9,602,000	27,659,000	5,371,000	6,714,000	12,085,000	15,574,000	205,062	390	217,550,000	250,811,000	33,261,000
2005-06	3,272,000	3,889,000	3,551,000	6,070,000	16,782,000	5,049,000	7,283,000	12,331,000	4,451,000	208,598	392	222,001,000	255,136,000	33,135,000
2006-07	750,000	2,156,000	4,373,000	2,488,000	9,767,000	6,392,000	7,193,000	13,585,000	-3,818,000	204,000	393	218,183,000	249,512,000	31,329,000
2007-08	4,185,000	2,660,000	5,356,000	2,972,000	15,173,000	6,674,000	6,945,000	13,619,000	1,554,000	203,824	397	219,737,000	249,297,000	29,560,000
2008-09	2,970,000	3,306,000	5,435,000	1,982,000	13,693,000	6,178,000	7,305,000	13,483,000	210,000	201,982	401	219,947,000	247,044,000	27,097,000
2009-10	5,149,000	2,913,000	4,938,000	459,000	13,459,000	4,486,000	7,992,000	12,479,000	980,000	202,437	402	220,927,000	247,601,000	26,674,000
2010-11	5,681,000	3,258,000	3,570,000	2,844,000	15,353,000	4,830,000	7,927,000	12,757,000	2,596,000	205,262	401	223,523,000	251,056,000	27,533,000
2011-12	2,210,000	2,443,000	3,215,000	2,468,000	10,336,000	8,491,000	6,562,000	15,054,000	-4,718,000	201,017	400	218,805,000	245,864,000	27,059,000
mean	4,155,000	3,421,000	4,254,000	4,284,000	16,113,000	6,811,000	6,314,000	13,125,000	2,988,000	197,000	377	202,319,000	241,114,000	38,795,000
median, 50%	3,299,000	3,282,000	4,385,000	3,679,000	15,068,000	6,612,000	5,994,000	13,184,000	2,274,000	197,000	388	201,000,000	240,563,000	33,198,000
2002-03 to 2011-12	4,252,000	2,880,000	4,327,000	3,424,000	14,883,000	5,585,000	6,971,000	12,555,000	2,327,000	201,000	395	216,267,000	246,199,000	29,931,000
2007-08 to 2011-12	4,039,000	2,916,000	4,503,000	2,145,000	13,603,000	6,132,000	7,346,000	13,478,000	124,000	203,000	400	220,588,000	248,172,000	27,585,000

*(Condensed from App. S)

TABLE III.10
RAYMOND BASIN PASADENA SUBAREA NITRATE (NO3) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
Water Year	NO_3 loading					NO_3 unloading				NO_3 in Groundwater in Storage			Allowable Loading 45 mg/l	Assimilative Capacity
	Precipitation	Monk Hill Subsurface Inflow	Returned flow Total	Injection & Spreading	Total	Groundwater extraction unloading	Subsurface outflow unloading	Total	NO3 balance	Groundwater volume	NO_3 Conc.	Total		
	LBS/YR	LBS/YR	LBS/YR	LBS/YR	LBS/YR	LBS/YR	LBS/YR	LBS/YR	LBS/YR	ac-ft	mg/l	lbs	lbs	lbs
1994-95	239,000	485,000	360,000	272,000	1,356,000	1,428,000	474,000	1,902,000	-546,000	540,874	33	48,345,000	66,154,000	17,809,000
1995-96	137,000	435,000	362,000	226,000	1,160,000	1,264,000	472,000	1,735,000	-575,000	536,585	33	47,770,000	65,630,000	17,860,000
1996-97	126,000	439,000	254,000	187,000	1,006,000	861,000	470,000	1,330,000	-324,000	535,321	33	47,446,000	65,475,000	18,029,000
1997-98	233,000	483,000	379,000	309,000	1,404,000	852,000	501,000	1,353,000	51,000	541,963	32	47,497,000	66,287,000	18,790,000
1998-99	61,000	519,000	378,000	199,000	1,157,000	835,000	466,000	1,302,000	-145,000	537,667	32	47,352,000	65,762,000	18,410,000
1999-00	121,000	490,000	276,000	88,000	975,000	927,000	513,000	1,440,000	-465,000	528,362	33	46,887,000	64,624,000	17,737,000
2000-01	153,000	473,000	274,000	81,000	981,000	661,000	463,000	1,124,000	-143,000	526,467	33	46,744,000	64,392,000	17,648,000
2001-02	46,000	500,000	261,000	62,000	869,000	626,000	470,000	1,096,000	-227,000	517,725	33	46,517,000	63,323,000	16,806,000
2002-03	98,000	516,000	270,000	85,000	969,000	306,000	399,000	704,000	265,000	511,918	34	46,782,000	62,613,000	15,831,000
2003-04	155,000	497,000	273,000	60,000	985,000	423,000	467,000	890,000	95,000	502,541	34	46,877,000	61,466,000	14,589,000
2004-05	384,000	376,000	272,000	306,000	1,338,000	439,000	331,000	770,000	568,000	512,393	34	47,445,000	62,671,000	15,226,000
2005-06	121,000	323,000	260,000	149,000	853,000	489,000	382,000	872,000	-19,000	509,322	34	47,426,000	62,295,000	14,869,000
2006-07	17,000	547,000	271,000	80,000	915,000	610,000	485,000	1,095,000	-180,000	500,530	35	47,246,000	61,220,000	13,974,000
2007-08	122,000	454,000	275,000	106,000	957,000	639,000	495,000	1,134,000	-177,000	498,182	35	47,069,000	60,933,000	13,864,000
2008-09	114,000	500,000	258,000	81,000	953,000	560,000	483,000	1,044,000	-91,000	493,015	35	46,978,000	60,301,000	13,323,000
2009-10	146,000	510,000	367,000	96,000	1,119,000	358,000	447,000	805,000	314,000	493,661	35	47,292,000	60,380,000	13,088,000
2010-11	154,000	549,000	340,000	205,000	1,248,000	418,000	437,000	854,000	394,000	497,871	35	47,686,000	60,895,000	13,209,000
2011-12	59,000	428,000	362,000	74,000	923,000	720,000	387,000	1,107,000	-184,000	495,437	35	47,502,000	60,597,000	13,095,000
mean	138,000	474,000	305,000	148,000	1,065,000	690,000	452,000	1,142,000	-77,000	516,000	34	47,270,000	63,057,000	15,787,000
median, 50%	124,000	488,000	275,000	101,000	983,000	633,000	469,000	1,102,000	-144,000	512,000	34	47,322,000	62,642,000	15,529,000
2002-03 to 2011-12	137,000	470,000	295,000	124,000	1,026,000	496,000	431,000	928,000	99,000	501,000	35	47,230,000	61,337,000	14,107,000
2007-08 to 2011-12	119,000	488,000	320,000	112,000	1,040,000	539,000	450,000	989,000	51,000	496,000	35	47,305,000	60,621,000	13,316,000

*(Condensed from App. T).

TABLE III.11
RAYMOND BASIN PASADENA SUBAREA CHLORIDE (Cl) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	Cl loading					Cl unloading				Cl in Groundwater in Storage			Allowable Loading	Assimilative Capacity
Water Year	Precipitation LBS/YR	Monk Hill Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	Cl balance LBS/YR	Groundwater volume ac-ft	Cl Conc. mg/l	Total lbs	100 mg/l lbs	lbs
1994-95	430,000	385,000	645,000	439,000	1,899,000	982,000	326,000	1,308,000	591,000	540,874	38	55,597,000	147,009,000	91,412,000
1995-96	219,000	530,000	640,000	368,000	1,757,000	1,236,000	461,000	1,697,000	60,000	536,585	38	55,657,000	145,844,000	90,187,000
1996-97	165,000	672,000	691,000	303,000	1,831,000	1,428,000	779,000	2,207,000	-376,000	535,321	38	55,281,000	145,500,000	90,219,000
1997-98	424,000	572,000	670,000	499,000	2,165,000	520,000	306,000	826,000	1,339,000	541,963	38	56,620,000	147,305,000	90,685,000
1998-99	72,000	758,000	668,000	322,000	1,820,000	854,000	477,000	1,331,000	489,000	537,667	39	57,109,000	146,138,000	89,029,000
1999-00	160,000	354,000	873,000	141,000	1,528,000	1,061,000	586,000	1,647,000	-119,000	528,362	40	56,990,000	143,609,000	86,619,000
2000-01	198,000	711,000	782,000	199,000	1,890,000	607,000	425,000	1,032,000	858,000	526,467	40	57,848,000	143,094,000	85,246,000
2001-02	54,000	1,059,000	670,000	73,000	1,856,000	695,000	522,000	1,217,000	639,000	517,725	42	58,487,000	140,718,000	82,231,000
2002-03	135,000	489,000	732,000	101,000	1,457,000	403,000	525,000	928,000	529,000	511,918	42	59,016,000	139,139,000	80,123,000
2003-04	183,000	297,000	750,000	71,000	1,301,000	261,000	288,000	549,000	752,000	502,541	44	59,768,000	136,591,000	76,823,000
2004-05	688,000	424,000	916,000	494,000	2,522,000	576,000	434,000	1,009,000	1,513,000	512,393	44	61,281,000	139,268,000	77,987,000
2005-06	160,000	404,000	748,000	241,000	1,553,000	701,000	548,000	1,249,000	304,000	509,322	44	61,585,000	138,434,000	76,849,000
2006-07	20,000	446,000	775,000	95,000	1,336,000	303,000	241,000	544,000	792,000	500,530	46	62,377,000	136,044,000	73,667,000
2007-08	223,000	749,000	912,000	228,000	2,112,000	908,000	702,000	1,610,000	502,000	498,182	46	62,879,000	135,406,000	72,527,000
2008-09	150,000	770,000	834,000	95,000	1,849,000	562,000	484,000	1,046,000	803,000	493,015	48	63,682,000	134,002,000	70,320,000
2009-10	326,000	1,093,000	704,000	236,000	2,359,000	279,000	348,000	627,000	1,732,000	493,661	49	65,414,000	134,177,000	68,763,000
2010-11	344,000	763,000	728,000	332,000	2,167,000	529,000	553,000	1,081,000	1,086,000	497,871	49	66,500,000	135,321,000	68,821,000
2011-12	69,000	725,000	504,000	88,000	1,386,000	902,000	486,000	1,388,000	-2,000	495,437	49	66,498,000	134,660,000	68,162,000
mean	223,000	622,000	736,000	240,000	1,822,000	712,000	472,000	1,183,000	638,000	516,000	43	60,144,000	140,126,000	79,982,000
median, 50%	174,000	622,000	730,000	232,000	1,840,000	651,000	481,000	1,149,000	615,000	512,000	43	59,392,000	139,204,000	79,055,000
2002-03 to 2011-12	230,000	616,000	760,000	198,000	1,804,000	542,000	461,000	1,003,000	801,000	501,000	46	62,900,000	136,304,000	73,404,000
2007-08 to 2011-12	222,000	820,000	736,000	196,000	1,975,000	636,000	515,000	1,150,000	824,000	496,000	48	64,995,000	134,713,000	69,719,000

*(Condensed from App. U).

TABLE III.12
RAYMOND BASIN PASADENA SUBAREA SULFATE (SO4) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	SO_4 loading					SO_4 unloading				SO_4 in Groundwater in Storage			Allowable	Assimilative
Water Year	Precipitation LBS/YR	Monk Hill Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	SO_4 balance LBS/YR	Groundwater volume ac-ft	SO_4 Conc. mg/l	Total lbs	Loading 100 mg/l lbs	Capacity lbs
1994-95	606,000	771,000	1,197,000	689,000	3,263,000	3,083,000	1,024,000	4,107,000	-844,000	540,874	59	86,906,000	147,009,000	60,103,000
1995-96	321,000	734,000	1,204,000	579,000	2,838,000	2,012,000	751,000	2,763,000	75,000	536,585	60	86,981,000	145,844,000	58,863,000
1996-97	285,000	729,000	1,299,000	476,000	2,789,000	1,453,000	793,000	2,245,000	544,000	535,321	60	87,525,000	145,500,000	57,975,000
1997-98	592,000	786,000	1,367,000	784,000	3,529,000	1,542,000	908,000	2,449,000	1,080,000	541,963	60	88,605,000	147,305,000	58,700,000
1998-99	135,000	940,000	1,129,000	506,000	2,710,000	1,578,000	881,000	2,458,000	252,000	537,667	61	88,857,000	146,138,000	57,281,000
1999-00	275,000	882,000	1,411,000	264,000	2,832,000	1,797,000	994,000	2,791,000	41,000	528,362	62	88,898,000	143,609,000	54,711,000
2000-01	344,000	889,000	1,269,000	372,000	2,874,000	1,370,000	958,000	2,328,000	546,000	526,467	63	89,444,000	143,094,000	53,650,000
2001-02	102,000	930,000	1,383,000	137,000	2,552,000	1,269,000	953,000	2,223,000	329,000	517,725	64	89,773,000	140,718,000	50,945,000
2002-03	224,000	1,027,000	1,566,000	189,000	3,006,000	743,000	970,000	1,713,000	1,293,000	511,918	65	91,066,000	139,139,000	48,073,000
2003-04	343,000	988,000	1,321,000	134,000	2,786,000	874,000	964,000	1,838,000	948,000	502,541	67	92,014,000	136,591,000	44,577,000
2004-05	976,000	1,072,000	1,422,000	777,000	4,247,000	977,000	736,000	1,713,000	2,534,000	512,393	68	94,548,000	139,268,000	44,720,000
2005-06	274,000	1,230,000	1,474,000	379,000	3,357,000	919,000	718,000	1,636,000	1,721,000	509,322	70	96,269,000	138,434,000	42,165,000
2006-07	37,000	1,064,000	1,329,000	178,000	2,608,000	830,000	659,000	1,488,000	1,120,000	500,530	72	97,389,000	136,044,000	38,655,000
2007-08	293,000	744,000	2,016,000	382,000	3,435,000	1,274,000	986,000	2,259,000	1,176,000	498,182	73	98,565,000	135,406,000	36,841,000
2008-09	258,000	866,000	2,068,000	179,000	3,371,000	1,244,000	1,073,000	2,317,000	1,054,000	493,015	74	99,619,000	134,002,000	34,383,000
2009-10	371,000	1,468,000	1,580,000	443,000	3,862,000	804,000	1,004,000	1,808,000	2,054,000	493,661	76	101,673,000	134,177,000	32,504,000
2010-11	390,000	1,337,000	1,337,000	521,000	3,585,000	909,000	950,000	1,858,000	1,727,000	497,871	76	103,400,000	135,321,000	31,921,000
2011-12	130,000	1,089,000	826,000	165,000	2,210,000	1,586,000	853,000	2,439,000	-229,000	495,437	77	103,171,000	134,660,000	31,489,000
mean	331,000	975,000	1,400,000	397,000	3,103,000	1,348,000	899,000	2,246,000	857,000	516,000	67	93,595,000	140,126,000	46,531,000
median, 50%	289,000	935,000	1,352,000	381,000	2,940,000	1,272,000	952,000	2,252,000	1,001,000	512,000	66	91,540,000	139,204,000	46,397,000
2002-03 to 2011-12	330,000	1,089,000	1,494,000	335,000	3,247,000	1,016,000	891,000	1,907,000	1,340,000	501,000	72	97,771,000	136,304,000	38,533,000
2007-08 to 2011-12	288,000	1,101,000	1,565,000	338,000	3,293,000	1,163,000	973,000	2,136,000	1,156,000	496,000	75	101,286,000	134,713,000	33,428,000

*(Condensed from App. V).

TABLE III.13
RAYMOND BASIN PASADENA SUBAREA TOTAL DISSOLVED SOLIDS (TDS) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	TDS loading					TDS unloading				TDS in Groundwater in Storage			Allowable	Assimilative
Water Year	Precipitation LBS/YR	Monk Hill Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	TDS balance LBS/YR	Groundwater volume ac-ft	TDS Conc. mg/l	Total lbs	Loading 450 mg/l lbs	Capacity lbs
1994-95	1,543,000	5,428,000	2,360,000	1,755,000	11,086,000	15,907,000	5,282,000	21,189,000	-10,103,000	540,874	334	490,545,000	661,543,000	170,998,000
1995-96	738,000	5,215,000	2,627,000	1,529,000	10,109,000	12,096,000	4,516,000	16,612,000	-6,503,000	536,585	332	484,042,000	656,297,000	172,255,000
1996-97	773,000	5,305,000	2,287,000	1,254,000	9,619,000	8,736,000	4,766,000	13,502,000	-3,883,000	535,321	330	480,159,000	654,751,000	174,592,000
1997-98	1,597,000	5,352,000	3,467,000	2,115,000	12,531,000	8,707,000	5,127,000	13,834,000	-1,303,000	541,963	325	478,856,000	662,875,000	184,019,000
1998-99	403,000	6,069,000	3,154,000	1,380,000	11,006,000	9,153,000	5,109,000	14,262,000	-3,256,000	537,667	325	475,600,000	657,620,000	182,020,000
1999-00	769,000	5,609,000	2,464,000	792,000	9,634,000	10,476,000	5,793,000	16,269,000	-6,635,000	528,362	327	468,965,000	646,240,000	177,275,000
2000-01	970,000	5,510,000	2,997,000	1,111,000	10,588,000	7,578,000	5,301,000	12,879,000	-2,291,000	526,467	326	466,674,000	643,921,000	177,247,000
2001-02	307,000	5,469,000	2,915,000	413,000	9,104,000	7,021,000	5,274,000	12,295,000	-3,191,000	517,725	329	463,483,000	633,229,000	169,746,000
2002-03	618,000	5,866,000	2,655,000	574,000	9,713,000	3,892,000	5,078,000	8,971,000	742,000	511,918	334	464,225,000	626,127,000	161,902,000
2003-04	1,048,000	5,918,000	2,896,000	408,000	10,270,000	4,636,000	5,114,000	9,750,000	520,000	502,541	340	464,745,000	614,658,000	149,913,000
2004-05	2,690,000	6,713,000	2,886,000	2,142,000	14,431,000	5,195,000	3,913,000	9,107,000	5,324,000	512,393	338	470,069,000	626,707,000	156,638,000
2005-06	784,000	7,283,000	2,336,000	1,056,000	11,459,000	4,874,000	3,809,000	8,682,000	2,777,000	509,322	342	472,846,000	622,952,000	150,106,000
2006-07	110,000	7,192,000	2,878,000	529,000	10,709,000	6,000,000	4,764,000	10,764,000	-55,000	500,530	348	472,791,000	612,198,000	139,407,000
2007-08	1,021,000	6,945,000	3,623,000	903,000	12,492,000	6,299,000	4,874,000	11,173,000	1,319,000	498,182	350	474,110,000	609,326,000	135,216,000
2008-09	806,000	7,304,000	3,557,000	513,000	12,180,000	5,633,000	4,857,000	10,490,000	1,690,000	493,015	355	475,800,000	603,007,000	127,207,000
2009-10	967,000	7,996,000	3,650,000	1,271,000	13,884,000	3,690,000	4,607,000	8,297,000	5,587,000	493,661	359	481,387,000	603,797,000	122,410,000
2010-11	1,017,000	7,928,000	2,598,000	1,358,000	12,901,000	4,241,000	4,432,000	8,673,000	4,228,000	497,871	359	485,615,000	608,946,000	123,331,000
2011-12	373,000	6,449,000	3,808,000	474,000	11,104,000	7,599,000	4,089,000	11,688,000	-584,000	495,437	360	485,031,000	605,969,000	120,938,000
mean	919,000	6,308,000	2,953,000	1,088,000	11,268,000	7,319,000	4,817,000	12,135,000	-868,000	516,000	340	475,275,000	630,565,000	155,290,000
median, 50%	795,000	5,994,000	2,891,000	1,084,000	11,046,000	6,660,000	4,866,000	11,431,000	-320,000	512,000	336	474,855,000	626,417,000	159,270,000
2002-03 to 2011-12	943,000	6,959,000	3,089,000	923,000	11,914,000	5,206,000	4,554,000	9,760,000	2,155,000	501,000	348	474,662,000	613,369,000	138,707,000
2007-08 to 2011-12	837,000	7,324,000	3,447,000	904,000	12,512,000	5,492,000	4,572,000	10,064,000	2,448,000	496,000	357	480,389,000	606,209,000	125,820,000

* (Condensed from App. W).

TABLE III.14
RAYMOND BASIN SANTA ANITA SUBAREA NITRATE (NO3) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	NO_3 loading					NO_3 unloading				NO_3 in Groundwater in Storage			Allowable Loading 45 mg/l	Assimilative Capacity
Water Year	Precipitation LBS/YR	Pasadena Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	NO3 balance LBS/YR	Groundwater volume ac-ft	NO_3 Conc. mg/l	Total lbs	lbs	lbs
1994-95	119,000	147,000	38,000	88,000	392,000	724,000	58,000	782,000	-390,000	74,864	24	4,907,000	9,157,000	4,250,000
1995-96	89,000	88,000	35,000	104,000	316,000	394,000	42,000	436,000	-120,000	75,302	23	4,787,000	9,210,000	4,423,000
1996-97	65,000	96,000	35,000	80,000	276,000	334,000	34,000	368,000	-92,000	74,397	23	4,695,000	9,099,000	4,404,000
1997-98	126,000	130,000	36,000	99,000	391,000	373,000	34,000	407,000	-16,000	77,256	22	4,679,000	9,449,000	4,770,000
1998-99	67,000	102,000	35,000	93,000	297,000	326,000	30,000	356,000	-59,000	75,445	23	4,620,000	9,228,000	4,608,000
1999-00	68,000	160,000	37,000	60,000	325,000	381,000	40,000	421,000	-96,000	74,109	22	4,524,000	9,064,000	4,540,000
2000-01	76,000	120,000	35,000	64,000	295,000	387,000	44,000	431,000	-136,000	73,627	22	4,388,000	9,005,000	4,617,000
2001-02	48,000	115,000	34,000	12,000	209,000	352,000	47,000	400,000	-191,000	70,789	22	4,197,000	8,658,000	4,461,000
2002-03	121,000	93,000	40,000	79,000	333,000	379,000	52,000	431,000	-98,000	70,276	21	4,099,000	8,595,000	4,496,000
2003-04	81,000	111,000	41,000	31,000	264,000	432,000	49,000	481,000	-217,000	67,639	21	3,882,000	8,273,000	4,391,000
2004-05	165,000	35,000	36,000	148,000	384,000	312,000	58,000	370,000	14,000	73,138	20	3,896,000	8,946,000	5,050,000
2005-06	77,000	11,000	37,000	106,000	231,000	339,000	31,000	370,000	-139,000	70,230	20	3,757,000	8,590,000	4,833,000
2006-07	34,000	101,000	40,000	36,000	211,000	332,000	16,000	348,000	-137,000	64,590	21	3,620,000	7,900,000	4,280,000
2007-08	83,000	118,000	36,000	75,000	312,000	308,000	19,000	327,000	-15,000	63,856	21	3,605,000	7,810,000	4,205,000
2008-09	77,000	119,000	41,000	66,000	303,000	320,000	25,000	345,000	-42,000	61,633	21	3,563,000	7,538,000	3,975,000
2009-10	76,000	78,000	39,000	91,000	284,000	255,000	30,000	284,000	0	62,986	21	3,563,000	7,704,000	4,141,000
2010-11	83,000	58,000	36,000	99,000	276,000	267,000	23,000	290,000	-14,000	63,450	21	3,549,000	7,761,000	4,212,000
2011-12	68,000	78,000	41,000	61,000	248,000	220,000	14,000	234,000	14,000	61,413	21	3,563,000	7,511,000	3,948,000
mean	85,000	98,000	37,000	77,000	297,000	358,000	36,000	393,000	-96,000	70,000	22	4,105,000	8,528,000	4,422,000
median, 50%	77,000	102,000	37,000	80,000	296,000	337,000	34,000	370,000	-94,000	71,000	21	3,998,000	8,627,000	4,414,000
2002-03 to 2011-12	87,000	80,000	39,000	79,000	285,000	316,000	32,000	348,000	-63,000	66,000	21	3,710,000	8,063,000	4,353,000
2007-08 to 2011-12	77,000	90,000	39,000	78,000	285,000	274,000	22,000	296,000	-11,000	63,000	21	3,569,000	7,665,000	4,096,000

*(Condensed from App. X).

TABLE III.15
RAYMOND BASIN SANTA ANITA SUBAREA CHLORIDE (Cl) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	Cl loading					Cl unloading				Cl in Groundwater in Storage			Allowable	Assimilative
Water Year	Precipitation LBS/YR	Pasadena Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	Cl balance LBS/YR	Groundwater volume ac-ft	Cl Conc. mg/l	Total lbs	Loading 100 mg/l lbs	Capacity lbs
1994-95	125,000	101,000	36,000	81,000	343,000	358,000	29,000	387,000	-44,000	74,864	14	2,940,000	20,348,000	17,408,000
1995-96	49,000	86,000	30,000	78,000	243,000	256,000	28,000	284,000	-41,000	75,302	14	2,899,000	20,467,000	17,568,000
1996-97	37,000	160,000	25,000	53,000	275,000	195,000	20,000	215,000	60,000	74,397	15	2,959,000	20,221,000	17,262,000
1997-98	95,000	79,000	28,000	66,000	268,000	447,000	40,000	487,000	-219,000	77,256	13	2,740,000	20,998,000	18,258,000
1998-99	26,000	105,000	27,000	62,000	220,000	255,000	24,000	278,000	-58,000	75,445	13	2,682,000	20,506,000	17,824,000
1999-00	44,000	183,000	29,000	26,000	282,000	314,000	33,000	346,000	-64,000	74,109	13	2,618,000	20,143,000	17,525,000
2000-01	47,000	110,000	27,000	38,000	222,000	278,000	32,000	310,000	-88,000	73,627	13	2,530,000	20,012,000	17,482,000
2001-02	19,000	127,000	28,000	6,000	180,000	256,000	34,000	290,000	-110,000	70,789	13	2,420,000	19,241,000	16,821,000
2002-03	57,000	123,000	30,000	41,000	251,000	272,000	37,000	309,000	-58,000	70,276	12	2,362,000	19,101,000	16,739,000
2003-04	45,000	68,000	57,000	16,000	186,000	226,000	26,000	252,000	-66,000	67,639	12	2,296,000	18,384,000	16,088,000
2004-05	159,000	46,000	36,000	111,000	352,000	130,000	24,000	154,000	198,000	73,138	13	2,494,000	19,879,000	17,385,000
2005-06	49,000	16,000	34,000	79,000	178,000	414,000	38,000	452,000	-274,000	70,230	12	2,220,000	19,088,000	16,868,000
2006-07	11,000	50,000	33,000	17,000	111,000	330,000	16,000	346,000	-235,000	64,590	11	1,985,000	17,556,000	15,571,000
2007-08	50,000	167,000	25,000	40,000	282,000	192,000	12,000	204,000	78,000	63,856	12	2,063,000	17,356,000	15,293,000
2008-09	35,000	119,000	55,000	25,000	234,000	362,000	28,000	389,000	-155,000	61,633	11	1,908,000	16,752,000	14,844,000
2009-10	61,000	61,000	29,000	61,000	212,000	253,000	29,000	282,000	-70,000	62,986	11	1,838,000	17,120,000	15,282,000
2010-11	67,000	74,000	20,000	66,000	227,000	157,000	14,000	171,000	56,000	63,450	11	1,894,000	17,246,000	15,352,000
2011-12	27,000	97,000	17,000	23,000	164,000	318,000	20,000	338,000	-174,000	61,413	10	1,720,000	16,692,000	14,972,000
mean	56,000	98,000	31,000	49,000	235,000	279,000	27,000	305,000	-70,000	70,000	12	2,365,000	18,951,000	16,586,000
median, 50%	48,000	99,000	29,000	47,000	231,000	264,000	28,000	300,000	-65,000	71,000	13	2,391,000	19,171,000	16,845,000
2002-03 to 2011-12	56,000	82,000	34,000	48,000	220,000	265,000	24,000	290,000	-70,000	66,000	12	2,078,000	17,917,000	15,839,000
2007-08 to 2011-12	48,000	104,000	29,000	43,000	224,000	256,000	21,000	277,000	-53,000	63,000	11	1,885,000	17,033,000	15,149,000

* (Condensed from App. Y).

TABLE III.16
RAYMOND BASIN SANTA ANITA SUBAREA SULFATE (SO4) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	SO_4 loading					SO_4 unloading				SO_4 in Groundwater in Storage			Allowable Loading	Assimilative Capacity
Water Year	Precipitation LBS/YR	Pasadena Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	SO_4 balance LBS/YR	Groundwater volume ac-ft	SO_4 Conc. mg/l	Total lbs	100 mg/l lbs	lbs
1994-95	353,000	317,000	72,000	229,000	971,000	705,000	56,000	762,000	209,000	74,864	37	7,508,000	20,348,000	12,840,000
1995-96	157,000	140,000	69,000	270,000	636,000	1,454,000	71,000	1,525,000	-889,000	75,302	32	6,619,000	20,467,000	13,848,000
1996-97	152,000	163,000	68,000	206,000	589,000	834,000	60,000	894,000	-305,000	74,397	31	6,314,000	20,221,000	13,907,000
1997-98	369,000	235,000	72,000	255,000	931,000	916,000	58,000	974,000	-43,000	77,256	30	6,271,000	20,998,000	14,727,000
1998-99	106,000	193,000	70,000	240,000	609,000	831,000	59,000	890,000	-281,000	75,445	29	5,990,000	20,506,000	14,516,000
1999-00	158,000	310,000	75,000	107,000	650,000	1,058,000	67,000	1,125,000	-475,000	74,109	27	5,515,000	20,143,000	14,628,000
2000-01	172,000	249,000	71,000	136,000	628,000	718,000	61,000	780,000	-152,000	73,627	27	5,363,000	20,012,000	14,649,000
2001-02	71,000	232,000	73,000	22,000	398,000	774,000	78,000	851,000	-453,000	70,789	26	4,910,000	19,241,000	14,331,000
2002-03	169,000	227,000	68,000	139,000	603,000	455,000	81,000	536,000	67,000	70,276	26	4,977,000	19,101,000	14,124,000
2003-04	150,000	228,000	112,000	55,000	545,000	537,000	80,000	616,000	-71,000	67,639	27	4,906,000	18,384,000	13,478,000
2004-05	549,000	78,000	87,000	383,000	1,097,000	479,000	99,000	579,000	518,000	73,138	27	5,424,000	19,879,000	14,455,000
2005-06	159,000	20,000	79,000	273,000	531,000	577,000	88,000	665,000	-134,000	70,230	28	5,290,000	19,088,000	13,798,000
2006-07	42,000	137,000	72,000	63,000	314,000	697,000	46,000	743,000	-429,000	64,590	28	4,861,000	17,556,000	12,695,000
2007-08	194,000	235,000	68,000	160,000	657,000	783,000	52,000	835,000	-178,000	63,856	27	4,683,000	17,356,000	12,673,000
2008-09	144,000	263,000	130,000	116,000	653,000	507,000	45,000	552,000	101,000	61,633	29	4,784,000	16,752,000	11,968,000
2009-10	235,000	176,000	72,000	235,000	718,000	365,000	59,000	424,000	294,000	62,986	30	5,078,000	17,120,000	12,042,000
2010-11	260,000	127,000	50,000	257,000	694,000	344,000	45,000	389,000	305,000	63,450	31	5,383,000	17,246,000	11,863,000
2011-12	124,000	171,000	40,000	108,000	443,000	617,000	29,000	646,000	-203,000	61,413	31	5,180,000	16,692,000	11,512,000
mean	198,000	195,000	75,000	181,000	648,000	703,000	63,000	766,000	-118,000	70,000	29	5,503,000	18,951,000	13,447,000
median, 50%	159,000	210,000	72,000	183,000	632,000	701,000	60,000	753,000	-143,000	71,000	28	5,327,000	19,171,000	13,823,000
2002-03 to 2011-12	203,000	166,000	78,000	179,000	626,000	536,000	62,000	599,000	27,000	66,000	28	5,057,000	17,917,000	12,861,000
2007-08 to 2011-12	191,000	194,000	72,000	175,000	633,000	523,000	46,000	569,000	64,000	63,000	29	5,022,000	17,033,000	12,012,000

* (Condensed from App. Z).

TABLE III.17
RAYMOND BASIN SANTA ANITA SUBAREA TOTAL DISSOLVED SOLIDS (TDS) BALANCE

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					=c2+c3+c4+c5			=c7+c8	=c6-c9					=c14-c13
	TDS loading					TDS unloading				TDS in Groundwater in Storage			Allowable Loading	Assimilative Capacity
Water Year	Precipitation LBS/YR	Pasadena Subsurface Inflow LBS/YR	Returned flow Total LBS/YR	Injection & Spreading LBS/YR	Total LBS/YR	Groundwater extraction unloading LBS/YR	Subsurface outflow unloading LBS/YR	Total LBS/YR	TDS balance LBS/YR	Groundwater volume ac-ft	TDS Conc. mg/l	Total lbs	450 mg/l lbs	lbs
1994-95	2,912,000	1,636,000	869,000	1,887,000	7,304,000	5,474,000	438,000	5,912,000	1,392,000	74,864	274	55,843,000	91,566,000	35,723,000
1995-96	1,110,000	844,000	791,000	2,228,000	4,973,000	4,485,000	482,000	4,968,000	5,000	75,302	273	55,848,000	92,102,000	36,254,000
1996-97	1,014,000	977,000	784,000	1,651,000	4,426,000	4,731,000	478,000	5,209,000	-783,000	74,397	272	55,065,000	90,995,000	35,930,000
1997-98	2,847,000	1,325,000	807,000	1,970,000	6,949,000	4,968,000	449,000	5,416,000	1,533,000	77,256	270	56,598,000	94,492,000	37,894,000
1998-99	577,000	1,121,000	789,000	1,856,000	4,343,000	5,384,000	501,000	5,885,000	-1,542,000	75,445	268	55,056,000	92,277,000	37,221,000
1999-00	1,022,000	1,808,000	849,000	581,000	4,260,000	4,838,000	502,000	5,340,000	-1,080,000	74,109	268	53,976,000	90,643,000	36,667,000
2000-01	1,104,000	1,379,000	805,000	898,000	4,186,000	4,335,000	498,000	4,833,000	-647,000	73,627	266	53,329,000	90,053,000	36,724,000
2001-02	398,000	1,286,000	778,000	121,000	2,583,000	4,104,000	553,000	4,657,000	-2,074,000	70,789	266	51,255,000	86,582,000	35,327,000
2002-03	1,125,000	1,190,000	689,000	779,000	3,783,000	3,979,000	541,000	4,520,000	-737,000	70,276	264	50,518,000	85,955,000	35,437,000
2003-04	850,000	1,211,000	741,000	313,000	3,115,000	4,615,000	525,000	5,140,000	-2,025,000	67,639	264	48,493,000	82,729,000	34,236,000
2004-05	4,588,000	414,000	817,000	3,197,000	9,016,000	4,339,000	805,000	5,145,000	3,871,000	73,138	263	52,364,000	89,455,000	37,091,000
2005-06	1,111,000	108,000	841,000	2,284,000	4,344,000	6,285,000	574,000	6,859,000	-2,515,000	70,230	261	49,849,000	85,898,000	36,049,000
2006-07	257,000	993,000	899,000	386,000	2,535,000	5,940,000	281,000	6,221,000	-3,686,000	64,590	263	46,163,000	79,000,000	32,837,000
2007-08	1,605,000	1,160,000	817,000	1,149,000	4,731,000	4,802,000	304,000	5,106,000	-375,000	63,856	264	45,788,000	78,102,000	32,314,000
2008-09	1,015,000	1,193,000	752,000	684,000	3,644,000	4,907,000	379,000	5,285,000	-1,641,000	61,633	264	44,147,000	75,383,000	31,236,000
2009-10	1,927,000	809,000	711,000	1,924,000	5,371,000	4,016,000	466,000	4,482,000	889,000	62,986	263	45,036,000	77,038,000	32,002,000
2010-11	2,215,000	593,000	653,000	2,189,000	5,650,000	4,712,000	407,000	5,119,000	531,000	63,450	264	45,567,000	77,605,000	32,038,000
2011-12	743,000	819,000	507,000	650,000	2,719,000	4,101,000	263,000	4,364,000	-1,645,000	61,413	263	43,922,000	75,114,000	31,192,000
mean	1,468,000	1,048,000	772,000	1,375,000	4,663,000	4,779,000	469,000	5,248,000	-585,000	70,000	266	50,490,000	85,277,000	34,787,000
median, 50%	1,107,000	1,141,000	790,000	1,400,000	4,344,000	4,722,000	480,000	5,143,000	-760,000	71,000	264	50,887,000	86,269,000	35,580,000
2002-03 to 2011-12	1,544,000	849,000	743,000	1,356,000	4,491,000	4,770,000	455,000	5,224,000	-733,000	66,000	263	47,185,000	80,628,000	33,443,000
2007-08 to 2011-12	1,501,000	915,000	688,000	1,319,000	4,423,000	4,508,000	364,000	4,871,000	-448,000	63,000	264	44,892,000	76,648,000	31,756,000

*(Condensed from App. AA).

TABLE III.18

ASSIMILATIVE CAPACITY FOR GROUNDWATER RECHARGE THROUGH INJECTION AND SPREADING OF RECYCLED WATER, RAYMOND BASIN: MONK HILL SUBAREA

Water Quantity Assumptions, 2002-03 to 2011-12				
	ac-ft			
Mixing model, 100% of groundwater in storage	190,400	190,400	190,400	190,400
	ac-ft/yr			
Groundwater recharge/Removal	13,300	13,300	13,300	13,300
Recycled Water Replenishment	225	225	225	225
Balance of Recharge	13,075	13,075	13,075	13,075
Water Quality Characteristics, 2002-03 to 2011-12				
	Nitrate	Chloride	Sulfate	TDS†
	mg/L			
Groundwater	26	44	69	395
Basin Water Quality Objectives	45	100	100	450
Recycled Water	26	163	210	720
Loading Characteristics, 2002-03 to 2011-12				
	lbs			
Allowable loading	24,619,900	54,710,700	54,710,700	246,198,700
Current load	14,144,000	23,976,800	37,647,000	216,267,300
Assimilative Capacity (AC)	10,475,900	30,733,900	17,063,700	29,931,400
10% AC	1,047,590	3,073,390	1,706,370	2,993,140
	lbs			
Recycled Water Project loading	16,000	100,000	128,000	440,000
Balance of Recharge loading	924,000	1,563,000	2,452,000	14,035,000
Total loading	940,000	1,663,000	2,580,000	14,475,000
Groundwater removal unloading	940,000	1,590,000	2,494,000	14,277,000
Net load	0	73,000	86,000	198,000
	percent			
Percent AC used with 225 AFY after 1 year	0.0	0.2	0.5	0.7
Percent AC used with 225 AFY after 5 years	0.0	1.1	2.3	3.0
Percent AC used with 225 AFY after 10 years	0.0	2.0	4.0	5.2
Percent AC used with 225 AFY after 20 years	0.0	2.8	5.9	7.6
Percent AC used with 225 AFY after Equilibrium Reache	0.0	3.6	7.7	10.0

† If ratio of TDS/SO4 in recharge water < 3.0, sulfate will be limiting, otherwise TDS.

TABLE III.19

ASSIMILATIVE CAPACITY FOR GROUNDWATER RECHARGE THROUGH INJECTION AND SPREADING OF RECYCLED WATER, RAYMOND BASIN: PASADENA SUBAREA

Water Quantity Assumptions, 2002-03 to 2011-12				
	ac-ft			
Mixing model, 100% of groundwater in storage	536,800	536,800	536,800	536,800
	ac-ft/yr			
Groundwater recharge/Removal	19,700	19,700	19,700	19,700
Recycled Water Replenishment	405	405	405	405
Balance of Recharge	19,295	19,295	19,295	19,295
Water Quality Characteristics, 2002-03 to 2011-12				
	Nitrate	Chloride	Sulfate	TDS†
	mg/L			
Groundwater	35	46	72	348
Basin Water Quality Objectives	45	100	100	450
Recycled Water	26	163	210	720
Loading Characteristics, 2002-03 to 2011-12				
	lbs			
Allowable loading	61,337,100	136,304,200	136,304,200	613,368,700
Current load	47,230,300	62,900	97,771,400	474,661,900
Assimilative Capacity (AC)	14,106,800	136,241,300	38,532,800	138,706,800
10% AC	1,410,680	13,624,130	3,853,280	13,870,680
	lbs			
Recycled Water Project loading	29,000	179,000	231,000	792,000
Balance of Recharge loading	1,835,000	2,412,000	3,775,000	18,248,000
Total loading	1,864,000	2,591,000	4,006,000	19,040,000
Groundwater removal unloading	1,874,000	2,463,000	3,855,000	18,631,000
Net load	-10,000	128,000	151,000	409,000
	percent			
Percent AC used with 405 AFY after 1 year	-0.1	0.1	0.392	0.295
Percent AC used with 405 AFY after 5 years	-0.3	0.8	1.7	1.3
Percent AC used with 405 AFY after 10 years	-0.6	1.4	3.2	2.3
Percent AC used with 405 AFY after 20 years	-1.0	2.8	5.3	3.9
Percent AC used with 405 AFY after Equilibrium Reache	-1.8	4.5	10.0	7.5

† If ratio of TDS/SO4 in recharge water >4.0 sulfate will be limiting, otherwise TDS.

TABLE III.20

ASSIMILATIVE CAPACITY FOR GROUNDWATER RECHARGE THROUGH INJECTION AND SPREADING OF RECYCLED WATER, RAYMOND BASIN: SANTA ANITA SUBAREA

Water Quantity Assumptions, 2002-03 to 2011-12				
	ac-ft			
Mixing model, 100% of groundwater in storage	72,800	72,800	72,800	72,800
	ac-ft/yr			
Groundwater recharge/Removal	6,200	6,200	6,200	6,200
Recycled Water Replenishment	245	245	245	245
Balance of Recharge	5,955	5,955	5,955	5,955
Water Quality Characteristics, 2002-03 to 2011-12				
	Nitrate	Chloride	Sulfate	TDS†
	mg/L			
Groundwater	21	12	28	263
Basin Water Quality Objectives	45	100	100	450
Recycled Water	26	163	210	720
Loading Characteristics, 2002-03 to 2011-12				
	lbs			
Allowable loading	8,062,800	17,917,400	17,917,400	80,627,900
Current load	3,709,700	2,078,000	5,056,600	47,184,700
Assimilative Capacity (AC)	4,353,100	15,839,400	12,860,800	33,443,200
10% AC	435,310	1,583,940	1,286,080	3,344,320
	lbs			
Recycled Water Project loading	17,000	109,000	140,000	479,000
Balance of Recharge loading	340,000	194,000	453,000	4,256,000
Total loading	357,000	303,000	593,000	4,735,000
Groundwater removal unloading	354,000	202,000	472,000	4,431,000
Net load	3,000	101,000	121,000	304,000
	percent			
Percent AC used with 245 AFY after 1 year	0.1	0.6	0.9	0.9
Percent AC used with 245 AFY after 5 years	0.3	2.4	3.6	3.5
Percent AC used with 245 AFY after 10 years	0.5	4.0	5.9	5.7
Percent AC used with 245 AFY after 20 years	0.7	5.6	8.3	8.0
Percent AC used with 245 AFY after Equilibrium Reache	0.8	6.8	10.0	9.7

† If ratio of TDS/SO4 in recharge water > 3.5 sulfate will be limiting, otherwise TDS.

Table III.21

Existing and Potential Implementation Measures

Activity	Timeframe	Type of Implementation Measure	Loading Impact	Concentration Impact
Groundwater Replenishment	Existing	• Spreading Grounds • Replenishment Coordinating Group	Increase	Decrease
	Potential	• New replenishment facilities	Increase	Decrease
Reduce Stormwater Runoff	Potential	• Stormwater BMPs to reduce runoff	Increase	No Change
Institutional/Regulatory	Existing	• Basin Adjunction • Title 22 Water Quality Monitoring	None	None
		• SNMP Monitoring Program	None	None
Imported Water Regional Salinity Control	Existing	• MWD Salinity Source Control	No Change	Decrease

Existing – Implementation measures or projects/programs that are currently in place

Potential – Implementation measures that are anticipated to be in operation before 2025 notwithstanding exigencies that are outside in the control of the project sponsors

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RAYMOND BASIN SNMP APPENDICES

APPENDIX A

POLICY FOR WATER QUALITY CONTROL FOR RECYCLED WATER

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2009-0011

ADOPTION OF A POLICY FOR
WATER QUALITY CONTROL FOR RECYCLED WATER

WHEREAS:

1. The Strategic Plan Update 2008-2012 for the Water Boards includes a priority to increase sustainable local water supplies available for meeting existing and future beneficial uses by 1,725,000 acre-feet per year, in excess of 2002 levels, by 2015, and ensure adequate water flows for fish and wildlife habitat. This Recycled Water Policy (Policy) is intended to support the Strategic Plan priority to Promote Sustainable Local Water Supplies. Increasing the acceptance and promoting the use of recycled water is a means towards achieving sustainable local water supplies and can result in reduction in greenhouse gases, a significant driver of climate change. The Policy is also intended to encourage beneficial use of, rather than solely disposal of, recycled water.

2. California Water Code section 13140 authorizes the State Water Resources Control Board (State Water Board) to adopt state policy for water quality control.

3. On March 20, 2007, the State Water Board conducted a public workshop on recycled water.

4. On September 28, 2007, staff circulated a draft Recycled Water Policy and a draft staff report/certified regulatory program environmental analysis/California Environmental Quality Act (CEQA) checklist for public comment.

5. On October 2, 2007, the State Water Board conducted a public workshop on the draft Recycled Water Policy.

6. On February 15, 2008, the State Water Board circulated an updated version of the draft Policy and the draft staff report/certified regulatory program environmental analysis/CEQA checklist.

7. On November 21, 2008, the State Water Board circulated another updated version of the draft Policy and the draft staff report/certified regulatory program environmental analysis/ CEQA checklist.

8. Staff has responded to significant verbal and written comments received from the public and made revisions to the draft Policy in response to the comments.

9. On January 6, 2009, the State Water Board conducted a public hearing on the draft Policy. In response, staff has revised the draft Policy, which is available at http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/draft_recycled_water_policy_011609.pdf. Staff has also revised the draft staff report, which is available at http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/docs/020309_draftstaffreport_checklist_01162009.pdf.

10. The Policy includes findings, including findings related to compliance with State Water Board Resolution No. 68-16, that are hereby incorporated by reference.

11. The State Water Board received a letter from statewide water and wastewater entities dated December 19, 2008, strongly urging their member agencies to commit funding and in-kind resources to facilitate development of salt/nutrient management plans within the five-year timeframe established by the State Water Board in the Policy.

12. The Resources Agency has approved the State Water Board's and the Regional Water Quality Control Boards' water quality control planning process as a "certified regulatory program" that adequately satisfies the CEQA requirements for preparing environmental documents. State Water Board staff has prepared a "substitute environmental document" for this project that contains the required environmental documentation under the State Water Board's CEQA regulations. (California Code of Regulations, title 23, section 3777.) The substitute environmental documents include the "Draft Staff Report and Certified Regulatory Program Environmental Analysis Recycled Water Policy," which includes an environmental checklist, the comments and responses to comments, the Policy itself, and this resolution. The project is the adoption of a Recycled Water Policy.

13. In preparing the substitute environmental documents, the State Water Board has considered the requirements of Public Resources Code section 21159 and California Code of Regulations, title 14, section 15187, and intends these documents to serve as a Tier 1 environmental review. The State Water Board has considered the reasonably foreseeable consequences of adoption of the draft Policy; however, potential site-specific recycled water project impacts may need to be considered in any subsequent environmental analysis performed by lead agencies, pursuant to Public Resources Code section 21159.1.

14. Consistent with CEQA, the substitute environmental documents do not engage in speculation or conjecture but, rather, analyze the reasonably foreseeable environmental impacts related to methods of compliance with the draft Policy, reasonably foreseeable mitigation measures to reduce those impacts, and reasonably feasible alternative means of compliance that would avoid or reduce the identified impacts.

15. The draft Policy incorporates mitigation that reduces to a level that is insignificant any adverse effects on the environment. From a program-level perspective, incorporation of the mitigation measures described in the substitute environmental document will foreseeably reduce impacts to less than significant levels.

16. A policy for water quality control does not become effective until adopted by the State Water Board and until the regulatory provisions are approved by the Office of Administrative Law (OAL).

17. If, during the OAL approval process, OAL determines that minor, non-substantive modifications to the language of the Policy are needed for clarity or consistency, the Executive Director or designee may make such changes consistent with the State Water Board's intent in adopting this Policy, and shall inform the State Water Board of any such changes.

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves and adopts the CEQA substitute environmental documentation, which includes the staff report/certified regulatory program environmental analysis/CEQA checklist, and the response to comments, which was prepared in accordance with the requirements of the State Water Board's certified regulatory CEQA process (as set forth in California Code of Regulations, title 23, section 3775, et seq.), Public Resources Code section 21159, and California Code of Regulations, title 14, section 15187, and directs the Executive Director or designee to sign the environmental checklist.

2. After considering the entire record, including oral testimony at the public hearing, adopts the Recycled Water Policy.

3. Authorizes the Executive Director or designee to submit the Recycled Water Policy to OAL for review and approval.

4. If, during the OAL approval process, OAL determines that minor, non-substantive modifications to the language of the Policy are needed for clarity or consistency, directs the Executive Director or designee to make such changes and inform the State Water Board of any such changes.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on February 3, 2009.

AYE:	Chair Tam M. Doduc Charles R. Hoppin Frances Spivy-Weber
NAY:	None
ABSENT:	Arthur G. Baggett, Jr.
ABSTAIN:	None

Jeanine Townsend

Jeanine Townsend
Clerk to the Board

STATE WATER RESOURCES CONTROL BOARD

RESOLUTION NO. 68-16

STATEMENT OF POLICY WITH RESPECT TO
MAINTAINING HIGH QUALITY OF WATERS IN CALIFORNIA

WHEREAS the California Legislature has declared that it is the policy of the State that the granting of permits and licenses for unappropriated water and the disposal of wastes into the waters of the State shall be so regulated as to achieve highest water quality consistent with maximum benefit to the people of the State and shall be controlled so as to promote the peace, health, safety and welfare of the people of the State; and

WHEREAS water quality control policies have been and are being adopted for waters of the State; and

WHEREAS the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature;

NOW, THEREFORE, BE IT RESOLVED:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

3. In implementing this policy, the Secretary of the Interior will be kept advised and will be provided with such information as he will need to discharge his responsibilities under the Federal Water Pollution Control Act.

BE IT FURTHER RESOLVED that a copy of this resolution be forwarded to the Secretary of the Interior as part of California's water quality control policy submission.

CERTIFICATION

The undersigned, Executive Officer of the State Water Resources Control Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on October 24, 1968.

Dated: October 28, 1968

Kerry W. Mulligan
Kerry W. Mulligan
Executive Officer
State Water Resources
Control Board

Recycled Water Policy

1. *Preamble*

California is facing an unprecedented water crisis.

The collapse of the Bay-Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River and failing levees in the Delta to create a new reality that challenges California's ability to provide the clean water needed for a healthy environment, a healthy population and a healthy economy, both now and in the future.

These challenges also present an unparalleled opportunity for California to move aggressively towards a sustainable water future. The State Water Resources Control Board (State Water Board) declares that we will achieve our mission to "preserve, enhance and restore the quality of California's water resources to the benefit of present and future generations." To achieve that mission, we support and encourage every region in California to develop a salt/nutrient management plan by 2014 that is sustainable on a long-term basis and that provides California with clean, abundant water. These plans shall be consistent with the Department of Water Resources' Bulletin 160, as appropriate, and shall be locally developed, locally controlled and recognize the variability of California's water supplies and the diversity of its waterways. We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling, water conservation, and maintenance of supply infrastructure and the use of stormwater (including dry-weather urban runoff) in these plans; these sources of supply are drought-proof, reliable, and minimize our carbon footprint and can be sustained over the long-term.

We declare our independence from relying on the vagaries of annual precipitation and move towards sustainable management of surface waters and groundwater, together with enhanced water conservation, water reuse and the use of stormwater. To this end, we adopt the following goals for California:

- Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.
- Increase the use of stormwater over use in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.
- Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020.
- Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.

The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in Water Code section 13050(n), in a manner that implements state and federal water quality laws. The State Water Board expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

When used in compliance with this Policy, Title 22 and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses.

2. *Purpose of the Policy*

   a. The purpose of this Policy is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards), proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects.

   b. It is the intent of the State Water Board that all elements of this Policy are to be interpreted in a manner that fully implements state and federal water quality laws and regulations in order to enhance the environment and put the waters of the state to the fullest use of which they are capable.

   c. This Policy describes permitting criteria that are intended to streamline the permitting of the vast majority of recycled water projects. The intent of this streamlined permit process is to expedite the implementation of recycled water projects in a manner that implements state and federal water quality laws while allowing the Regional Water Boards to focus their limited resources on projects that require substantial regulatory review due to unique site-specific conditions.

   d. By prescribing permitting criteria that apply to the vast majority of recycled water projects, it is the State Water Board's intent to maximize consistency in the permitting of recycled water projects in California while also reserving to the Regional Water Boards sufficient authority and flexibility to address site-specific conditions.

   e. The State Water Board will establish additional policies that are intended to assist the State of California in meeting the goals established in the preamble to this Policy for water conservation and the use of stormwater.

   f. For purposes of this Policy, the term "permit" means an order adopted by a Regional Water Board or the State Water Board prescribing requirements for a recycled water project, including but not limited to water recycling requirements, master reclamation permits, and waste discharge requirements.

3. *Benefits of Recycled Water*

The State Water Board finds that the use of recycled water in accordance with this Policy, that is, which supports the sustainable use of groundwater and/or surface water, which is sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water, is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the California Environmental Quality Act (CEQA).

4. *Mandate for the Use of Recycled Water*

a. The State Water Board and Regional Water Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws.

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through the cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

(2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

(3) The State Water Board hereby declares that, pursuant to Water Code sections 13550 *et seq*., it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject to the conditions established in sections 13550 *et seq*. The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible to enforce the mandates of this subparagraph.

b. These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.

c. The water industry and the environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.

d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC), and the California Department of Water Resources (CDWR) to use their respective authorities to the fullest extent practicable to assist the State Water Board and the Regional Water Boards in increasing the use of recycled water in California.

5. *Roles of the State Water Board, Regional Water Boards, CDPH and CDWR*

The State Water Board recognizes that it shares jurisdiction over the use of recycled water with the Regional Water Boards and with CDPH. In addition, the State Water Board recognizes that CDWR and the CPUC have important roles to play in encouraging the use of recycled water. The State Water Board believes that it is important to clarify the respective roles of each of these agencies in connection with recycled water projects, as follows:

a. The State Water Board establishes general policies governing the permitting of recycled water projects consistent with its role of protecting water quality and sustaining water supplies. The State Water Board exercises general oversight over recycled water projects, including review of Regional Water Board permitting practices, and shall lead the effort to meet the recycled water use goals set forth in the Preamble to this Policy. The State Water Board is also charged by statute with developing a general permit for irrigation uses of recycled water.

b. The CDPH is charged with protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. Regional Water Boards shall appropriately rely on the expertise of CDPH for the establishment of permit conditions needed to protect human health.

c. The Regional Water Boards are charged with protection of surface and groundwater resources and with the issuance of permits that implement CDPH recommendations, this Policy, and applicable law and will, pursuant to paragraph 4 of this Policy, use their authority to the fullest extent possible to encourage the use of recycled water.

d. CDWR is charged with reviewing and, every five years, updating the California Water Plan, including evaluating the quantity of recycled water presently being used and planning for the potential for future uses of recycled water. In undertaking these tasks, CDWR may appropriately rely on urban water management plans and may share the data from those plans with the State Water Board and the Regional Water Boards. CDWR also shares with the State Water Board the authority to allocate and distribute bond funding, which can provide incentives for the use of recycled water.

e. The CPUC is charged with approving rates and terms of service for the use of recycled water by investor-owned utilities.

6. *Salt/Nutrient Management Plans*

a. *Introduction.*

(1) Some groundwater basins in the state contain salts and nutrients that exceed or threaten to exceed water quality objectives established in the applicable Water Quality Control Plans (Basin Plans), and not all Basin Plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salt or nutrients. These conditions can be caused by natural soils/conditions, discharges of waste, irrigation using surface water, groundwater or recycled water and water supply augmentation using surface or recycled water. Regulation of recycled water alone will not address these conditions.

(2) It is the intent of this Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address salt and nutrient issues is through the development of regional or subregional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects.

b. *Adoption of Salt/ Nutrient Management Plans.*

(1) The State Water Board recognizes that, pursuant to the letter dated December 19, 2008 and attached to the Resolution adopting this Policy, the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Regional Water Board staff.

(a) It is the intent of this Policy for every groundwater basin/sub-basin in California to have a consistent salt/nutrient management plan. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality. It is also the intent of the State Water Board that because stormwater is typically lower in nutrients and salts and can augment local water supplies, inclusion of a significant stormwater use and recharge component within the salt/nutrient management plans is critical to the long-term sustainable use of water in California. Inclusion of stormwater recharge is consistent with State Water Board Resolution No. 2005-06, which establishes sustainability as a core value for State Water Board programs and also assists in implementing Resolution No. 2008-30, which requires sustainable water resources management and is consistent with Objective 3.2 of the State Water Board Strategic Plan Update dated September 2, 2008.

(b) Salt and nutrient plans shall be tailored to address the water quality concerns in each basin/sub-basin and may include constituents other than salt and nutrients that impact water quality in the basin/sub-basin. Such plans shall address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects.

(c) Such plans may be developed or funded pursuant to the provisions of Water Code sections 10750 *et seq.* or other appropriate authority.

(d) Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.

(e) The requirements of this paragraph shall not apply to areas that have already completed a Regional Water Board approved salt and nutrient plan for a basin, sub-basin, or other regional planning area that is functionally equivalent to paragraph 6(b)3.

(f) The plans may, depending upon the local situation, address constituents other than salt and nutrients that adversely affect groundwater quality.

(2) Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.

(3) Each salt and nutrient management plan shall include the following components:

(a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

(i) The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

(ii) The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.

(iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.

(b) A provision for annual monitoring of Emerging Constituents/ Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.

(c) Water recycling and stormwater recharge/use goals and objectives.

(d) Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.

(e) Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.

(f) An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.

(4) Nothing in this Policy shall prevent stakeholders from developing a plan that is more protective of water quality than applicable standards in the Basin Plan. No Regional Water Board, however, shall seek to modify Basin Plan objectives without full compliance with the process for such modification as established by existing law.

7. *Landscape Irrigation Projects*

a. *Control of incidental runoff.* Incidental runoff is defined as unintended small amounts (volume) of runoff from recycled water use areas, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence. Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a National Pollutant Discharge Elimination System (NPDES) permit, including municipal separate storm water system permits, but regardless of the regulatory instrument, the project shall include, but is not limited to, the following practices:

(1) Implementation of an operations and management plan that may apply to multiple sites and provides for detection of leaks, (for example, from broken sprinkler heads), and correction either within 72 hours of learning of the runoff, or prior to the release of 1,000 gallons, whichever occurs first,

(2) Proper design and aim of sprinkler heads,

(3) Refraining from application during precipitation events, and

(4) Management of any ponds containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and there is notification of the appropriate Regional Water Board Executive Officer of the discharge.

b. *Streamlined Permitting*

(1) The Regional Water Boards shall, absent unusual circumstances (i.e., unique, site-specific conditions such as where recycled water is proposed to be used for irrigation over high transmissivity soils over a shallow (5' or less) high quality groundwater aquifer), permit recycled water projects that meet the criteria set forth in this Policy, consistent with the provisions of this paragraph.

(2) If the Regional Water Board determines that unusual circumstances apply, the Regional Water Board shall make a finding of unusual circumstances based on substantial evidence in the record, after public notice and hearing.

(3) Projects meeting the criteria set forth below and eligible for enrollment under requirements established in a general order shall be enrolled by the State or Regional Water Board within 60 days from the date on which an application is deemed complete by the State or Regional Water Board. For projects that are not enrolled in a general order, the Regional Water Board shall consider permit adoption within 120 days from the date on which the application is deemed complete by the Regional Water Board.

(4) Landscape irrigation projects that qualify for streamlined permitting shall not be required to include a project specific receiving water and groundwater monitoring component unless such project specific monitoring is required under the adopted salt/nutrient management plan. During the interim while the salt management plan is under development, a landscape irrigation project proponent can either perform project specific monitoring, or actively participate in the development and implementation of a salt/nutrient management plan, including basin/sub-basin monitoring. Permits or requirements for landscape irrigation projects shall include, in addition to any other appropriate recycled water monitoring requirements, recycled water monitoring for CECs on an annual basis and priority pollutants on a twice annual basis. Except as requested by CDPH, State and Regional Water Board monitoring requirements for CECs shall not take effect until 18 months after the effective date of this Policy. In addition, any permits shall include a permit reopener to allow incorporation of appropriate monitoring requirements for CECs after State Water Board action under paragraph 10(b)(2).

(5) It is the intent of the State Water Board that the general permit for landscape irrigation projects be consistent with the terms of this Policy.

c. *Criteria for streamlined permitting*. Irrigation projects using recycled water that meet the following criteria are eligible for streamlined permitting, and, if otherwise in compliance with applicable laws, shall be approved absent unusual circumstances:

(1) Compliance with the requirements for recycled water established in Title 22 of the California Code of Regulations, including the requirements for treatment and use area restrictions, together with any other recommendations by CDPH pursuant to Water Code section 13523.

(2) Application in amounts and at rates as needed for the landscape (i.e., at agronomic rates and not when the soil is saturated). Each irrigation project shall be subject to an operations and management plan, that may apply to multiple sites, provided to the Regional Water Board that specifies the agronomic rate(s) and describes a set of reasonably practicable measures to ensure compliance with this requirement, which may include the development of water budgets for use areas, site

supervisor training, periodic inspections, tiered rate structures, the use of smart controllers, or other appropriate measures.

(3) Compliance with any applicable salt and nutrient management plan.

(4) Appropriate use of fertilizers that takes into account the nutrient levels in the recycled water. Recycled water producers shall monitor and communicate to the users the nutrient levels in their recycled water.

8. *Recycled Water Groundwater Recharge Projects*

a. The State Water Board acknowledges that all recycled water groundwater recharge projects must be reviewed and permitted on a site-specific basis, and so such projects will require project-by-project review.

b. Approved groundwater recharge projects will meet the following criteria:

(1) Compliance with regulations adopted by CDPH for groundwater recharge projects or, in the interim until such regulations are approved, CDPH's recommendations pursuant to Water Code section 13523 for the project (e.g., level of treatment, retention time, setback distance, source control, monitoring program, etc.).

(2) Implementation of a monitoring program for constituents of concern and a monitoring program for CECs that is consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy and that takes into account site-specific conditions. Groundwater recharge projects shall include monitoring of recycled water for CECs on an annual basis and priority pollutants on a twice annual basis.

c. Nothing in this paragraph shall be construed to limit the authority of a Regional Water Board to protect designated beneficial uses, *provided* that any proposed limitations for the protection of public health may only be imposed following regular consultation by the Regional Water Board with CDPH, consistent with State Water Board Orders WQ 2005-0007 and 2006-0001.

d. Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing the dissolution of constituents, such as arsenic, from the geologic formation into groundwater.

e. Projects that utilize surface spreading to recharge groundwater with recycled water treated by reverse osmosis shall be permitted by a Regional Water Board within one year of receipt of recommendations from CDPH. Furthermore, the Regional Water Board shall give a high priority to review and approval of such projects.

9. *Antidegradation*

a. The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the Legislature’s intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state.

b. Activities involving the disposal of waste that could impact high quality waters are required to implement best practicable treatment or control of the discharge necessary to ensure that pollution or nuisance will not occur, and the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

c. Groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law is to the benefit of the people of the state of California. Nonetheless, the State Water Board finds that groundwater recharge projects using recycled water have the potential to lower water quality within a basin. The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:

(1) A project that utilizes less than 10 percent of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20 percent of the available assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board, until such time as the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the Regional Water Board shall calculate the impacts of the project or projects over at least a ten year time frame.

(2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1), then a Regional Water Board-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the Regional Water Board to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

d. Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.

(1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

(2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a groundwater basin).

10. *Emerging Constituents/Chemicals of Emerging Concern*

a. *General Provisions*

(1) Regulatory requirements for recycled water shall be based on the best available peer-reviewed science. In addition, all uses of recycled water must meet conditions set by CDPH.

(2) Knowledge of risks will change over time and recycled water projects must meet legally applicable criteria. However, when standards change, projects should be allowed time to comply through a compliance schedule.

(3) The state of knowledge regarding CECs is incomplete. There needs to be additional research and development of analytical methods and surrogates to determine potential environmental and public health impacts. Agencies should minimize the likelihood of CECs impacting human health and the environment by means of source control and/or pollution prevention programs.

(4) Regulating most CECs will require significant work to develop test methods and more specific determinations as to how and at what level CECs impact public health or our environment.

b. *Research Program.* The State Water Board, in consultation with CDPH and within 90 days of the adoption of this Policy, shall convene a "blue-ribbon" advisory panel to guide future actions relating to constituents of emerging concern.

(1) The panel shall be actively managed by the State Water Board and shall be composed of at least the following: one human health toxicologist, one environmental toxicologist, one epidemiologist, one biochemist, one civil engineer familiar with the design and construction of recycled water treatment facilities, and one chemist familiar with the design and operation of advanced laboratory methods for the detection of emerging constituents. Each of these panelists shall have extensive experience as a principal investigator in their respective areas of expertise.

(2) The panel shall review the scientific literature and, within one year from its appointment, shall submit a report to the State Water Board and CDPH describing the current state of scientific knowledge regarding the risks of emerging constituents to public health and the environment. Within six months of receipt of the panel's report the State Water Board, in coordination with CDPH, shall hold a public hearing to consider recommendations from staff and shall endorse the recommendations, as appropriate, after making any necessary modifications. The panel or a similarly constituted panel shall update this report every five years.

(3) Each report shall recommend actions that the State of California should take to improve our understanding of emerging constituents and, as may be appropriate, to protect public health and the environment.

(4) The panel report shall answer the following questions: What are the appropriate constituents to be monitored in recycled water, including analytical methods and method detection limits? What is the known toxicological information for the above constituents? Would the above lists change based on level of treatment and use? If so, how? What are possible indicators that represent a suite of CECs? What levels of CECs should trigger enhanced monitoring of CECs in recycled water, groundwater and/or surface waters?

c. *Permit Provisions.* Permits for recycled water projects shall be consistent both with any CDPH recommendations to protect public health and with any actions by the State Water Board taken pursuant to paragraph 10(b)(2).

11. *Incentives for the Use of Recycled Water*

a. *Funding*

The State Water Board will request CDWR to provide funding ($20M) for the development of salt and nutrient management plans during the next three years (i.e., before FY 2010/2011). The State Water Board will also request CDWR to provide priority funding for projects that have major recycling components; particularly those that decrease demand on potable water supplies. The State Water Board will also request priority funding for stormwater recharge projects that augment local water supplies. The State Water Board shall promote the use of the State Revolving Fund (SRF) for water purveyor, stormwater agencies, and water recyclers to use for water reuse and stormwater use and recharge projects.

b. *Stormwater*

The State Water Board strongly encourages all water purveyors to provide financial incentives for water recycling and stormwater recharge and reuse projects. The State Water Board also encourages the Regional Water Boards to require less stringent monitoring and regulatory requirements for stormwater treatment and use projects than for projects involving untreated stormwater discharges.

c. TMDLs

Water recycling reduces mass loadings from municipal wastewater sources to impaired waters. As such, waste load allocations shall be assigned as appropriate by the Regional Water Boards in a manner that provides an incentive for greater water recycling.

Recycled Water Policy

1. *Preamble*

California is facing an unprecedented water crisis.

The collapse of the Bay-Delta ecosystem, climate change, and continuing population growth have combined with a severe drought on the Colorado River and failing levees in the Delta to create a new reality that challenges California's ability to provide the clean water needed for a healthy environment, a healthy population and a healthy economy, both now and in the future.

These challenges also present an unparalleled opportunity for California to move aggressively towards a sustainable water future. The State Water Resources Control Board (State Water Board) declares that we will achieve our mission to "preserve, enhance and restore the quality of California's water resources to the benefit of present and future generations." To achieve that mission, we support and encourage every region in California to develop a salt/nutrient management plan by 2014 that is sustainable on a long-term basis and that provides California with clean, abundant water. These plans shall be consistent with the Department of Water Resources' Bulletin 160, as appropriate, and shall be locally developed, locally controlled and recognize the variability of California's water supplies and the diversity of its waterways. We strongly encourage local and regional water agencies to move toward clean, abundant, local water for California by emphasizing appropriate water recycling, water conservation, and maintenance of supply infrastructure and the use of stormwater (including dry-weather urban runoff) in these plans; these sources of supply are drought-proof, reliable, and minimize our carbon footprint and can be sustained over the long-term.

We declare our independence from relying on the vagaries of annual precipitation and move towards sustainable management of surface waters and groundwater, together with enhanced water conservation, water reuse and the use of stormwater. To this end, we adopt the following goals for California:

- Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.
- Increase the use of stormwater over use in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.
- Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020.
- Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.

The purpose of this Policy is to increase the use of recycled water from municipal wastewater sources that meets the definition in Water Code section 13050(n), in a manner that implements state and federal water quality laws. The State Water Board expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

When used in compliance with this Policy, Title 22 and all applicable state and federal water quality laws, the State Water Board finds that recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses.

2. *Purpose of the Policy*

a. The purpose of this Policy is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards), proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects.

b. It is the intent of the State Water Board that all elements of this Policy are to be interpreted in a manner that fully implements state and federal water quality laws and regulations in order to enhance the environment and put the waters of the state to the fullest use of which they are capable.

c. This Policy describes permitting criteria that are intended to streamline the permitting of the vast majority of recycled water projects. The intent of this streamlined permit process is to expedite the implementation of recycled water projects in a manner that implements state and federal water quality laws while allowing the Regional Water Boards to focus their limited resources on projects that require substantial regulatory review due to unique site-specific conditions.

d. By prescribing permitting criteria that apply to the vast majority of recycled water projects, it is the State Water Board's intent to maximize consistency in the permitting of recycled water projects in California while also reserving to the Regional Water Boards sufficient authority and flexibility to address site-specific conditions.

e. The State Water Board will establish additional policies that are intended to assist the State of California in meeting the goals established in the preamble to this Policy for water conservation and the use of stormwater.

f. For purposes of this Policy, the term "permit" means an order adopted by a Regional Water Board or the State Water Board prescribing requirements for a recycled water project, including but not limited to water recycling requirements, master reclamation permits, and waste discharge requirements.

3. *Benefits of Recycled Water*

The State Water Board finds that the use of recycled water in accordance with this Policy, that is, which supports the sustainable use of groundwater and/or surface water, which is sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water, is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the California Environmental Quality Act (CEQA).

4. *Mandate for the Use of Recycled Water*

a. The State Water Board and Regional Water Boards will exercise the authority granted to them by the Legislature to the fullest extent possible to encourage the use of recycled water, consistent with state and federal water quality laws.

(1) The State Water Board hereby establishes a mandate to increase the use of recycled water in California by 200,000 afy by 2020 and by an additional 300,000 afy by 2030. These mandates shall be achieved through the cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The State Water Board will evaluate progress toward these mandates biennially and review and revise as necessary the implementation provisions of this Policy in 2012 and 2016.

(2) Agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities.

(3) The State Water Board hereby declares that, pursuant to Water Code sections 13550 *et seq*., it is a waste and unreasonable use of water for water agencies not to use recycled water when recycled water of adequate quality is available and is not being put to beneficial use, subject to the conditions established in sections 13550 *et seq*. The State Water Board shall exercise its authority pursuant to Water Code section 275 to the fullest extent possible to enforce the mandates of this subparagraph.

b. These mandates are contingent on the availability of sufficient capital funding for the construction of recycled water projects from private, local, state, and federal sources and assume that the Regional Water Boards will effectively implement regulatory streamlining in accordance with this Policy.

c. The water industry and the environmental community have agreed jointly to advocate for $1 billion in state and federal funds over the next five years to fund projects needed to meet the goals and mandates for the use of recycled water established in this Policy.

d. The State Water Board requests the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC), and the California Department of Water Resources (CDWR) to use their respective authorities to the fullest extent practicable to assist the State Water Board and the Regional Water Boards in increasing the use of recycled water in California.

5. *Roles of the State Water Board, Regional Water Boards, CDPH and CDWR*

The State Water Board recognizes that it shares jurisdiction over the use of recycled water with the Regional Water Boards and with CDPH. In addition, the State Water Board recognizes that CDWR and the CPUC have important roles to play in encouraging the use of recycled water. The State Water Board believes that it is important to clarify the respective roles of each of these agencies in connection with recycled water projects, as follows:

a. The State Water Board establishes general policies governing the permitting of recycled water projects consistent with its role of protecting water quality and sustaining water supplies. The State Water Board exercises general oversight over recycled water projects, including review of Regional Water Board permitting practices, and shall lead the effort to meet the recycled water use goals set forth in the Preamble to this Policy. The State Water Board is also charged by statute with developing a general permit for irrigation uses of recycled water.

b. The CDPH is charged with protection of public health and drinking water supplies and with the development of uniform water recycling criteria appropriate to particular uses of water. Regional Water Boards shall appropriately rely on the expertise of CDPH for the establishment of permit conditions needed to protect human health.

c. The Regional Water Boards are charged with protection of surface and groundwater resources and with the issuance of permits that implement CDPH recommendations, this Policy, and applicable law and will, pursuant to paragraph 4 of this Policy, use their authority to the fullest extent possible to encourage the use of recycled water.

d. CDWR is charged with reviewing and, every five years, updating the California Water Plan, including evaluating the quantity of recycled water presently being used and planning for the potential for future uses of recycled water. In undertaking these tasks, CDWR may appropriately rely on urban water management plans and may share the data from those plans with the State Water Board and the Regional Water Boards. CDWR also shares with the State Water Board the authority to allocate and distribute bond funding, which can provide incentives for the use of recycled water.

e. The CPUC is charged with approving rates and terms of service for the use of recycled water by investor-owned utilities.

6. *Salt/Nutrient Management Plans*

a. Introduction.

(1) Some groundwater basins in the state contain salts and nutrients that exceed or threaten to exceed water quality objectives established in the applicable Water Quality Control Plans (Basin Plans), and not all Basin Plans include adequate implementation procedures for achieving or ensuring compliance with the water quality objectives for salt or nutrients. These conditions can be caused by natural soils/conditions, discharges of waste, irrigation using surface water, groundwater or recycled water and water supply augmentation using surface or recycled water. Regulation of recycled water alone will not address these conditions.

(2) It is the intent of this Policy that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses. The State Water Board finds that the appropriate way to address salt and nutrient issues is through the development of regional or subregional salt and nutrient management plans rather than through imposing requirements solely on individual recycled water projects.

b. Adoption of Salt/ Nutrient Management Plans.

(1) The State Water Board recognizes that, pursuant to the letter dated December 19, 2008 and attached to the Resolution adopting this Policy, the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Regional Water Board staff.

(a) It is the intent of this Policy for every groundwater basin/sub-basin in California to have a consistent salt/nutrient management plan. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality. It is also the intent of the State Water Board that because stormwater is typically lower in nutrients and salts and can augment local water supplies, inclusion of a significant stormwater use and recharge component within the salt/nutrient management plans is critical to the long-term sustainable use of water in California. Inclusion of stormwater recharge is consistent with State Water Board Resolution No. 2005-06, which establishes sustainability as a core value for State Water Board programs and also assists in implementing Resolution No. 2008-30, which requires sustainable water resources management and is consistent with Objective 3.2 of the State Water Board Strategic Plan Update dated September 2, 2008.

(b) Salt and nutrient plans shall be tailored to address the water quality concerns in each basin/sub-basin and may include constituents other than salt and nutrients that impact water quality in the basin/sub-basin. Such plans shall address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects.

(c) Such plans may be developed or funded pursuant to the provisions of Water Code sections 10750 *et seq.* or other appropriate authority.

(d) Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.

(e) The requirements of this paragraph shall not apply to areas that have already completed a Regional Water Board approved salt and nutrient plan for a basin, sub-basin, or other regional planning area that is functionally equivalent to paragraph 6(b)3.

(f) The plans may, depending upon the local situation, address constituents other than salt and nutrients that adversely affect groundwater quality.

(2) Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.

(3) Each salt and nutrient management plan shall include the following components:

(a) A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).

(i) The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

(ii) The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.

(iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.

(b) A provision for annual monitoring of Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.

(c) Water recycling and stormwater recharge/use goals and objectives.

(d) Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.

(e) Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.

(f) An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.

(4) Nothing in this Policy shall prevent stakeholders from developing a plan that is more protective of water quality than applicable standards in the Basin Plan. No Regional Water Board, however, shall seek to modify Basin Plan objectives without full compliance with the process for such modification as established by existing law.

7. *Landscape Irrigation Projects*[1]

a. *Control of incidental runoff.* Incidental runoff is defined as unintended small amounts (volume) of runoff from recycled water use areas, such as unintended, minimal over-spray from sprinklers that escapes the recycled water use area. Water leaving a recycled water use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence. Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a National Pollutant Discharge Elimination System (NPDES) permit, including municipal separate storm water system permits, but regardless of the regulatory instrument, the project shall include, but is not limited to, the following practices:

(1) Implementation of an operations and management plan that may apply to multiple sites and provides for detection of leaks, (for example, from broken sprinkler heads), and correction either within 72 hours of learning of the runoff, or prior to the release of 1,000 gallons, whichever occurs first,

(2) Proper design and aim of sprinkler heads,

(3) Refraining from application during precipitation events, and

(4) Management of any ponds containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and there is notification of the appropriate Regional Water Board Executive Officer of the discharge.

[1] Specified uses of recycled water considered "landscape irrigation" projects include any of the following:
i. Parks, greenbelts, and playgrounds;
ii. School yards;
iii. Athletic fields;
iv. Golf courses;
v. Cemeteries;
vi. Residential landscaping, common areas;
vii. Commercial landscaping, except eating areas;
viii. Industrial landscaping, except eating areas; and
ix. Freeway, highway, and street landscaping.

b. Streamlined Permitting

(1) The Regional Water Boards shall, absent unusual circumstances (i.e., unique, site-specific conditions such as where recycled water is proposed to be used for irrigation over high transmissivity soils over a shallow (5' or less) high quality groundwater aquifer), permit recycled water projects that meet the criteria set forth in this Policy, consistent with the provisions of this paragraph.

(2) If the Regional Water Board determines that unusual circumstances apply, the Regional Water Board shall make a finding of unusual circumstances based on substantial evidence in the record, after public notice and hearing.

(3) Projects meeting the criteria set forth below and eligible for enrollment under requirements established in a general order shall be enrolled by the State or Regional Water Board within 60 days from the date on which an application is deemed complete by the State or Regional Water Board. For projects that are not enrolled in a general order, the Regional Water Board shall consider permit adoption within 120 days from the date on which the application is deemed complete by the Regional Water Board.

(4) Landscape irrigation projects that qualify for streamlined permitting shall not be required to include a project specific receiving water and groundwater monitoring component unless such project specific monitoring is required under the adopted salt/nutrient management plan. During the interim while the salt management plan is under development, a landscape irrigation project proponent can either perform project specific monitoring, or actively participate in the development and implementation of a salt/nutrient management plan, including basin/sub-basin monitoring. Permits or requirements for landscape irrigation projects shall include, in addition to any other appropriate recycled water monitoring requirements, recycled water monitoring for surrogates as specified in Attachment A of this Policy. For landscape irrigation projects, priority pollutants shall be monitored once per year, except for landscape irrigation projects with design production flows of one million gallons per day or less, which shall be monitored for priority pollutants once every five years.

(5) It is the intent of the State Water Board that the general permit for landscape irrigation projects be consistent with the terms of this Policy.

c. *Criteria for streamlined permitting*. Irrigation projects using recycled water that meet the following criteria are eligible for streamlined permitting, and, if otherwise in compliance with applicable laws, shall be approved absent unusual circumstances:

(1) Compliance with the requirements for recycled water established in Title 22 of the California Code of Regulations, including the requirements for treatment and use area restrictions, together with any other recommendations by CDPH pursuant to Water Code section 13523.

(2) Application in amounts and at rates as needed for the landscape (i.e., at agronomic rates and not when the soil is saturated). Each irrigation project shall be subject to an operations and management plan, that may apply to multiple sites, provided to the Regional Water Board that specifies the agronomic rate(s) and describes a set of reasonably practicable measures to ensure compliance with this requirement, which may include the development of water budgets for use areas, site supervisor training, periodic inspections, tiered rate structures, the use of smart controllers, or other appropriate measures.

(3) Compliance with any applicable salt and nutrient management plan.

(4) Appropriate use of fertilizers that takes into account the nutrient levels in the recycled water. Recycled water producers shall monitor and communicate to the users the nutrient levels in their recycled water.

8. *Recycled Water Groundwater Recharge Projects*

a. The State Water Board acknowledges that all recycled water groundwater recharge projects must be reviewed and permitted on a site-specific basis, and so such projects will require project-by-project review.

b. Approved groundwater recharge projects will meet the following criteria:

(1) Compliance with regulations adopted by CDPH for groundwater recharge projects or, in the interim until such regulations are approved, CDPH's recommendations pursuant to Water Code section 13523 for the project (e.g., level of treatment, retention time, setback distance, source control, monitoring program, etc.).

(2) Implementation of a monitoring program for CECs that is consistent with Attachment A and any recommendations from CDPH. Groundwater recharge projects shall include monitoring of recycled water for priority pollutants twice per year.

c. Nothing in this paragraph shall be construed to limit the authority of a Regional Water Board to protect designated beneficial uses, *provided* that any proposed limitations for the protection of public health may only be imposed following regular consultation by the Regional Water Board with CDPH, consistent with State Water Board Orders WQ 2005-0007 and 2006-0001.

d. Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing the dissolution of constituents, such as arsenic, from the geologic formation into groundwater.

e. Projects that utilize surface spreading to recharge groundwater with recycled water treated by reverse osmosis shall be permitted by a Regional Water Board within one year of receipt of recommendations from CDPH. Furthermore, the Regional Water Board shall give a high priority to review and approval of such projects.

9. *Antidegradation*

a. The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the Legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state.

b. Activities involving the disposal of waste that could impact high quality waters are required to implement best practicable treatment or control of the discharge necessary to ensure that pollution or nuisance will not occur, and the highest water quality consistent with the maximum benefit to the people of the state will be maintained.

c. Groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law is to the benefit of the people of the state of California. Nonetheless, the State Water Board finds that groundwater recharge projects using recycled water have the potential to lower water quality within a basin. The proponent of a groundwater recharge project must demonstrate compliance with Resolution No. 68-16. Until such time as a salt/nutrient management plan is in effect, such compliance may be demonstrated as follows:

(1) A project that utilizes less than 10 percent of the available assimilative capacity in a basin/sub-basin (or multiple projects utilizing less than 20 percent of the available assimilative capacity in a basin/sub-basin) need only conduct an antidegradation analysis verifying the use of the assimilative capacity. For those basins/sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board, until such time as the salt/nutrient plan is approved by the Regional Water Board and is in effect. For compliance with this subparagraph, the available assimilative capacity shall be calculated by comparing the mineral water quality objective with the average concentration of the basin/sub-basin, either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. In determining whether the available assimilative capacity will be exceeded by the project or projects, the Regional Water Board shall

calculate the impacts of the project or projects over at least a ten year time frame.

(2) In the event a project or multiple projects utilize more than the fraction of the assimilative capacity designated in subparagraph (1), then a Regional Water Board-deemed acceptable antidegradation analysis shall be performed to comply with Resolution No. 68-16. The project proponent shall provide sufficient information for the Regional Water Board to make this determination. An example of an approved method is the method used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. An integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16 is encouraged.

d. Landscape irrigation with recycled water in accordance with this Policy is to the benefit of the people of the State of California. Nonetheless, the State Water Board finds that the use of water for irrigation may, regardless of its source, collectively affect groundwater quality over time. The State Water Board intends to address these impacts in part through the development of salt/nutrient management plans described in paragraph 6.

(1) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is in place may be approved without further antidegradation analysis, provided that the project is consistent with that plan.

(2) A project that meets the criteria for a streamlined irrigation permit and is within a basin where a salt/nutrient management plan satisfying the provisions of paragraph 6(b) is being prepared may be approved by the Regional Water Board by demonstrating through a salt/nutrient mass balance or similar analysis that the project uses less than 10 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin (or multiple projects using less than 20 percent of the available assimilative capacity as estimated by the project proponent in a basin/sub-basin).

10. *Constituents of Emerging Concern*

a. General Provisions

(1) Regulatory requirements for recycled water shall be based on the best available peer-reviewed science. In addition, all uses of recycled water must meet conditions set by CDPH.

(2) Knowledge of risks will change over time and recycled water projects must meet legally applicable criteria. However, when standards change, projects should be allowed time to comply through a compliance schedule.

(3) The state of knowledge regarding CECs is incomplete. There needs to be additional research and development of analytical methods and surrogates to determine potential environmental and public health impacts. Agencies should minimize the likelihood of CECs impacting human health and the environment by means of source control and/or pollution prevention programs.

(4) Regulating most CECs will require significant work to develop test methods and more specific determinations as to how and at what level CECs impact public health or our environment.

b. Research Program

(1) The State Water Board, in consultation with CDPH, convened a "blue-ribbon" advisory panel to guide future actions relating to CECs.

(a) The panel was actively managed by the State Water Board and was composed of the following: one human health toxicologist, one environmental toxicologist, one epidemiologist, one biochemist, one civil engineer familiar with the design and construction of recycled water treatment facilities, and one chemist familiar with the design and operation of advanced laboratory methods for the detection of emerging constituents. Each of these panelists had extensive experience as a principal investigator in their respective areas of expertise.

(b) The panel reviewed the scientific literature and submitted a report to the State Water Board and CDPH that described the current state of scientific knowledge regarding the risks of CECs to public health and the environment. In December 2010, the State Water Board, in coordination with CDPH, held a public hearing to hear a presentation on the report and to receive comments from stakeholders.

(c) The State Water Board considered the panel report and the comments received and adopted an amendment to the Policy establishing monitoring requirements for CECs in recycled water. These monitoring requirements are prescribed in Attachment A.

(2) The panel or a similarly constituted panel shall update the report every five years The next update is due in June 2015.

(a) Each updated report shall recommend actions that the State of California should take to improve our understanding of CECs and, as may be appropriate, to protect public health and the environment.

(b) The updated reports shall answer the following questions: What are the appropriate constituents to be monitored in recycled water, including analytical methods and method detection limits? What is the known toxicological information for the above constituents? Would the above lists change based on level of treatment and use? If so, how? What are possible indicators that represent a suite of CECs? What levels of CEC's should trigger enhanced monitoring of CEC's in recycled water, groundwater and/surface waters?

(c) Within six months from receipt of an updated report, the State Water Board shall hold a hearing to consider recommendations from staff and shall endorse the recommendations, as appropriate, after making any necessary modifications.

c. Permit Provisions

Permits for recycled water projects shall be consistent with any CDPH recommendations to protect public health and the monitoring requirements prescribed in Attachment A.

11. *Incentives for the Use of Recycled Water*

a. Funding

The State Water Board will request CDWR to provide priority funding for projects that have major recycling components; particularly those that decrease demand on potable water supplies. The State Water Board will also request priority funding for stormwater recharge projects that augment local water supplies. The State Water Board shall promote the use of the State Revolving Fund (SRF) for water purveyor, stormwater agencies, and water recyclers to use for water reuse and stormwater use and recharge projects.

b. Stormwater

The State Water Board strongly encourages all water purveyors to provide financial incentives for water recycling and stormwater recharge and reuse projects. The State Water Board also encourages the Regional Water Boards to require less stringent monitoring and regulatory requirements for stormwater treatment and use projects than for projects involving untreated stormwater discharges.

c. TMDLs

Water recycling reduces mass loadings from municipal wastewater sources to impaired waters. As such, waste load allocations shall be assigned as appropriate by the Regional Water Boards in a manner that provides an incentive for greater water recycling.

ATTACHMENT A

REQUIREMENTS FOR MONITORING CONSTITUENTS OF EMERGING CONCERN FOR RECYCLED WATER

The purpose of this attachment to the Recycled Water Policy (Policy) is to provide direction to the Regional Water Quality Control Boards (Regional Water Boards) on monitoring requirements for constituents of emerging concern[1] (CECs) in recycled municipal wastewater, herein referred to as “recycled water”. The monitoring requirements and criteria for evaluating monitoring results in the Policy are based on recommendations from a Science Advisory Panel[2]. The monitoring requirements pertain to the production and use of recycled water for groundwater recharge reuse[3] by surface and subsurface application methods, and for landscape irrigation. The monitoring requirements apply to recycled water producers, including entities that further treat or enhance the quality of recycled water supplied by municipal wastewater treatment facilities, and groundwater recharge reuse facilities.

Groundwater recharge by surface application is the controlled application of water to a spreading area for infiltration resulting in the recharge of a groundwater basin. Subsurface application is the controlled application of water to a groundwater basin or aquifer by a means other than surface application, such as direct injection through a well.

The California Department of Public Health (CDPH) shall be consulted for any additional monitoring requirements for recycled water use found necessary by CDPH to protect human health.

[1] For this Policy, CECs are defined to be chemicals in personal care products, pharmaceuticals including antibiotics, antimicrobials; industrial, agricultural, and household chemicals; hormones; food additives; transformation products, inorganic constituents; and nanomaterials.

[2] The Science Advisory Panel was convened in accordance with provision 10.b. of the Policy. The panel’s recommendations were presented in the report; *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

[3] As used in this attachment, use of recycled water for groundwater recharge reuse has the same meaning as indirect potable reuse for groundwater recharge as defined in section 116275 of the Health and Safety Code (Water Code section 13561(c)), where it is defined as the planned use of recycled water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system.

1. CECS AND SURROGATES

Within this Policy, CECs of toxicological relevance to human health are referred to as "health-based CECs."[4] CECs determined not to have human health relevance, but useful for monitoring treatment process efficacy, are referred to as "performance indicator CECs." An indicator CEC is an individual CEC used for evaluating a family of CECs with similar physicochemical or biodegradable characteristics. The removal of an indicator CEC through a treatment process provides an indication of removal of CECs with similar properties. The health-based CECs also serve as indicator CECs.

A surrogate is a measurable physical or chemical property, such as chlorine residual or electrical conductivity, that can be used to measure the efficiency of trace organic compounds removal by treatment process and/or provide an indication of a treatment process failure. In regards to surrogates, a reverse osmosis (RO) treatment process, for example, is expected to substantially reduce the electrical conductivity of the recycled water being treated; this reduction in the level of the surrogate also provides an indication that inorganic and organic compounds, including CECs, are being removed.

Recycled water monitoring programs used for groundwater recharge reuse shall include monitoring for: (1) human health-based CECs; (2) performance indicator CECs; and (3) surrogates. The purpose of monitoring performance indicator CECs and surrogates is to assess the removal efficiency of unit processes to remove CECs. Treatment processes designed to provide a barrier to CECs include, but are not limited to, advanced oxidation processes (AOPs), biologically active carbon, nanofiltration, and RO. In addition, soil aquifer treatment[5] is a natural treatment process that provides a level of removal of CECs. AOPs are treatment processes involving the use of hydrogen peroxide and ozone, commonly combined with ultraviolet light irradiation.

This Policy provides CEC monitoring requirements for recycled water which undergoes additional treatment by soil aquifer treatment or RO/AOPs. CEC monitoring requirements for groundwater recharge reuse projects implementing treatment processes that provide control of CECs by processes other than soil aquifer treatment or RO/AOPs shall be established on a case-by-case basis by the Regional Water Boards in consultation with CDPH.

Monitoring of health-based CECs or performance indicator CECs is not required for recycled water used for landscape irrigation due to the low risk for ingestion of the

[4] Determined through a screening process conducted by the CEC Science Advisory Panel; *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

[5] For evaluating removal of CECs, the treatment zone for soil aquifer treatment is from the surface of the application area through the unsaturated zone to groundwater, including groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

water.[6] Monitoring programs for recycled water used for landscape irrigation, however, shall include monitoring for applicable surrogates, as presented in section 1.2, to evaluate the efficacy of filtration and disinfection systems.

1.1. CECs for Monitoring Programs

This Policy provides requirements for monitoring CECs in recycled water used for groundwater recharge reuse. The Regional Water Boards shall not issue requirements for monitoring of additional CECs, beyond the requirements provided in this Policy except when:

- recommended by CDPH;
- requested by the project proponent; or
- required by an adopted regional salt and nutrient management plan.

Table 1 provides the health-based CECs and performance indicator CECs to be monitored for recycled water uses along with their respective reporting limits. All CECs listed for a recycled water application shall be monitored during an initial assessment monitoring phase, as described in Section 3.1. Based on monitoring results and findings, the list of performance indicator CECs required for monitoring may be refined for subsequent monitoring phases. The health-based CECs listed in Table 1 shall be monitored during the entirety of the initial assessment and baseline monitoring phases (Sections 3.1 and 3.2). Based on the results of the baseline monitoring phase and/or subsequent monitoring, the list of health-based CECs required for monitoring may be revised. The method for evaluation of monitoring results for health-based CECs is provided in Section 4.2.

Quality Assurance and Quality Control measures shall be used for both collection of samples and laboratory analysis work. The project proponent shall develop a quality assurance project plan that includes the appropriate number of field blanks, laboratory blanks, replicate samples, and matrix spikes.

[6] "For monitoring programs to assess CEC threats for urban irrigation reuse, none of the chemicals for which measurement methods and exposure data are available exceeded the threshold for monitoring priority. This is largely attributable to higher Monitoring Trigger Levels (MTLs), because of reduced water ingestion in a landscape irrigation setting compared to drinking water." MTLs are health-based screening level values for CECs for a particular water reuse scenario. MTLs were established in, *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

Table 1 – CECs to be Monitored

Constituent	Constituent Group	Relevance/Indicator Type	Reporting Limit (µg/L)
GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION			
17β-estradiol	Steroid hormones	Health	0.001
Caffeine	Stimulant	Health & Performance	0.05
N-Nitrosodimethylamine (NDMA)	Disinfection byproduct	Health	0.002
Triclosan	Antimicrobial	Health	0.05
Gemfibrozil	Pharmaceutical	Performance	0.01
Iopromide	Pharmaceutical	Performance	0.05
N,N-Diethyl-meta-toluamide (DEET)	Personal care product	Performance	0.05
Sucralose	Food additive	Performance	0.1
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION			
17β-estradiol	Steroid hormones	Health	0.001
Caffeine	Stimulant	Health & Performance	0.05
NDMA	Disinfection byproduct	Health & Performance	0.002
Triclosan	Antimicrobial	Health	0.05
DEET	Personal care product	Performance	0.01
Sucralose	Food additive	Performance	0.1
LANDSCAPE IRRIGATION			
None	--	--	--

µg/L – Micrograms per liter

Analytical methods for laboratory analysis of CECs shall be selected to achieve the reporting limits presented in Table 1 and shall be peer reviewed and published.

1.2. Surrogates for Monitoring Programs

Selection of appropriate surrogates shall be based on the types of treatment processes used, the recycled water use, and the measurable occurrence of surrogates in the treatment process. Table 2 presents a list of surrogates to be considered for monitoring treatment of recycled water used for groundwater recharge reuse and landscape irrigation.

Table 2: Surrogates

GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION
Ammonia
Total Organic Carbon (TOC)
Nitrate
Ultraviolet (UV) Light Absorption
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION
Electrical Conductivity
TOC
LANDSCAPE IRRIGATION
Chlorine Residual
Total Coliform
Turbidity

The project proponent shall propose surrogates to monitor on a case-by-case basis appropriate for the treatment process or processes. For example, chlorine residual is not an appropriate surrogate for projects that do not use chlorine-based compounds for disinfection. The Regional Water Board shall review and approve the selected surrogates in consultation with CDPH.

Where applicable, surrogates may be measured using on-line or hand-held instruments provided that instrument calibration procedures are implemented in accordance with the manufacturer's specifications and that calibration is documented.

2. MONITORING LOCATIONS

Monitoring locations for CECs and surrogates will depend on the unit treatment processes utilized and the recycled water use. Monitoring for CECs and surrogates shall be conducted before and after an individual treatment process or a combination of processes that provide removal of CECs; unit processes are presented in Section 1. Additionally, surface application recharge reuse projects relying on the process of soil aquifer treatment shall monitor for CECs in groundwater at a location prior to the point of extraction for drinking water supply. Monitoring locations for health-based and performance indicator CECs and surrogates are detailed below.

2.1. Health-Based CEC Monitoring Locations

2.1.1. Groundwater Recharge Reuse - Surface Application

For groundwater recharge reuse projects implementing surface application of recycled water, health-based CECs shall be monitored at these locations:

(1) Following tertiary treatment[7] prior to application to the surface spreading area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels from the application site in thirty days.

Monitoring locations for health-based CECs for the phases of monitoring are presented in Tables 3 through 5.

2.1.2. Groundwater Recharge Reuse - Subsurface Application

For groundwater recharge reuse projects implementing subsurface application of recycled water, monitoring of health-based CECs shall be conducted at a location following RO/AOPs treatment prior to discharge into an aquifer.

2.1.3. Landscape Irrigation

Monitoring of health-based CECs is not required for municipal recycled water used for landscape irrigation.

2.2. Performance Indicator CEC and Surrogate Monitoring Locations

To allow evaluation of individual unit processes or a combination of unit processes that provide removal of CECs, performance indicator CECs and surrogates shall be monitored at the locations described below and presented in Tables 3 through 5.

2.2.1. Groundwater Recharge Reuse - Surface Application

For surface application practices, performance indicator CECs shall be monitored in recycled water and groundwater at these locations:

(1) Following tertiary treatment prior to application to the surface spreading area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels from application site in thirty days.

Surrogates shall be monitored in recycled water and groundwater at these locations:

[7] Standards for disinfected tertiary recycled water presented in California Code of Regulations Title 22, section 60301.230 and 60301.320.

(1) Following tertiary treatment prior to application to the surface application area; and

(2) At monitoring well locations designated in consultation with CDPH within the distance groundwater travels from application site in thirty days.

Monitoring locations for performance indicator CECs and surrogates for the phases of monitoring are presented in Tables 3 through 5.

2.2.2. Groundwater Recharge Reuse - Subsurface Application

For subsurface application, performance indicator CECs and surrogates shall be monitored in recycled water at these locations:

(1) Prior to treatment by RO/AOPs; and

(2) Following treatment by RO/AOPs prior to release to the aquifer.

2.2.3. Landscape Irrigation

For landscape irrigation, surrogates shall be monitored in municipal recycled water following treatment prior to distribution.

3. PHASED MONITORING REQUIREMENTS

The Regional Water Board shall phase the monitoring requirements for CECs and surrogates for groundwater recharge reuse projects. The purpose of phased monitoring is to allow monitoring requirements for health-based CECs, performance indicator CECs and surrogates to be refined based on the monitoring results and findings of the previous phase. An initial assessment monitoring phase, followed by a baseline monitoring phase, shall be conducted to determine the project-specific monitoring requirements for standard operations. The initial assessment and baseline monitoring phases shall be conducted after CDPH approval for groundwater recharge reuse project operation.

3.1. Initial Assessment Monitoring Phase

The purposes of the initial assessment phase are to: (1) identify the occurrence of health-based CECs, performance indicator CECs, and surrogates in recycled water and groundwater; (2) determine the treatment effectiveness of unit processes[9]; (3) define the project-specific performance indicator CECs and surrogates to monitor during the baseline phase; and (4) specify the expected removal percentages for indicator CECs and surrogates. The monitoring requirements for the initial assessment monitoring phase shall apply to the start-up of new facilities, piloting of new unit processes at existing facilities, and existing facilities where CECs and surrogates have not been

[9] Unit processes that remove CECs.

assessed equivalent[10] to the requirements of this Policy. The initial assessment monitoring phase shall be conducted for a period of one year.

During the initial assessment monitoring phase for the applicable recycled water application method, each of the health-based CECs and performance indicator CECs listed in Table 1, and the appropriate surrogates listed in Table 2, shall be monitored. Surrogates shall be selected to monitor individual unit processes or combinations of unit processes that remove CECs. Performance indicator CEC and surrogate monitoring results that demonstrate measurable removal for a given unit process shall be candidates for use in the monitoring programs for the baseline and standard operation phases. Monitoring requirements for the initial assessment phase are summarized in Table 3.

For existing groundwater recharge reuse projects, historic monitoring data may be used to assess the occurrence and removal of CECs and surrogates. Existing projects demonstrating prior assessment of CECs and surrogates equivalent to the initial assessment phase requirements of this Policy may skip the initial monitoring phase and initiate the baseline monitoring phase requirements in Section 3.2.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern (i.e., the effectiveness of the treatment processes to achieve the expected degree of removal of CECs or the increased occurrence and/or concentrations of CECs) more frequent monitoring shall be required to further evaluate the effectiveness of the treatment process. Additional actions also may be warranted, which may include but not be limited to resampling to confirm a result, additional monitoring, implementation of a source identification program, toxicological studies, engineering removal studies, and/or modification of facility operations. If additional monitoring is required, the Regional Water Board shall consult with CDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.

Following completion of the initial assessment monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the baseline monitoring phase shall be determined on a project specific basis.

3.2. Baseline Monitoring Phase

Based on the findings of the initial assessment monitoring phase, project-specific performance indicator CECs and surrogates shall be selected for monitoring during the baseline monitoring phase. The purpose of the baseline monitoring phase is to assess and refine which health-based CECs, performance indicator CECs and surrogates are

[10] To be considered equivalent, data from prior assessment need not replicate the exact frequency and duration of the initial assessment phase requirements specified in Table 3, if the overall robustness and size of the data are sufficient to adequately characterize the surrogates and treatment performance under consideration.

appropriate to monitor removal of CECs and treatment system operational performance for the standard operation of a facility. Performance indicator CECs detected during the initial assessment phase shall be selected for monitoring during the baseline monitoring phase. Surrogates that exhibited reduction through a unit process and/or provide an indication of operational performance shall be selected for monitoring during the baseline monitoring phase. Those surrogates not reduced through a unit process are not good indicators of the unit's intended performance. For example, a filtration unit will not effectively lower electrical conductivity. Therefore, electrical conductivity is not a good surrogate for a filtration unit. The baseline monitoring phase shall be conducted for a period of three years following the initial assessment monitoring phase. Monitoring requirements for the baseline phase are summarized in Table 4.

For existing groundwater recharge reuse projects, historic monitoring data may be used to assess removal of health-based CECs, performance indicator CECs and surrogates. Existing projects that can demonstrate prior assessment of CECs and surrogates equivalent to the initial assessment phase and baseline phase requirements of this Policy may be eligible for standard operation monitoring requirements (Section 3.3).

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. If evaluation of monitoring results indicates a concern (i.e., the effectiveness of the treatment processes to achieve the expected degree of removal of CECs or the increased occurrence and/or concentrations of CECs) more frequent monitoring shall be required to further evaluate the effectiveness of the treatment process. Additional actions may also be warranted, which may include, but not be limited to, resampling to confirm a result; additional monitoring; implementation of a source identification program; toxicological studies; engineering removal studies; and/or modification of facility operation. If additional monitoring is required, the Regional Water Board shall consult with CDPH and revise the Monitoring and Reporting Program as appropriate. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.

Following the baseline operation monitoring phase, monitoring requirements shall be re-evaluated and subsequent requirements for the standard operation of a project shall be determined on a project-specific basis.

Table 3: Initial Assessment Phase Monitoring Requirements

Recycled Water Use	Constituent	Frequency	Monitoring Point
	Health-Based CECs and Performance Indicator CECs: All listed in Table 1	Quarterly	- Following tertiary treatment prior to application to surface spreading area. - At monitoring well locations designated in consultation with CDPH.[1]
		1st 3 months: To be determined on a project-specific basis.[2]	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[1]
		3-12 months: To be determined on a project-specific basis.[2]	- Following tertiary treatment prior to application to the surface spreading area. - At monitoring well locations designated in consultation with CDPH.[1]
	Health-Based CECs: All listed in Table 1	Quarterly	Following treatment by RO/AOPs prior to release to aquifer.
	Performance Indicator CECs: All listed in Table 1	Quarterly	- Prior to RO treatment. - Following RO/AOPs prior to release to aquifer.
	Surrogates: To be selected on a project-specific basis.	To be determined on a project-specific basis.	- Prior to RO treatment. - Following RO/AOPs prior to release to aquifer.
Landscape Irrigation	Health-Based CECs and Performance Indicator CECs: Not applicable	Not applicable	Not applicable
	Surrogates: To be selected on a project-specific basis.	To be determined on a project-specific basis.	Following tertiary treatment prior to distribution.

1 - Groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.
2 – The monitoring frequency shall be determined by the Regional Water Boards in consultation with CDPH. The intent is to have increased monitoring frequency during the first three months and then decrease the frequency after three months.

Table 4: Baseline Phase Monitoring Requirements

Recycled Water Use	Constituent	Frequency	Monitoring Point
	Health-Based CECs: All listed in Table 1. Performance Indicator CECs: Selected based on the findings of the initial assessment phase.	Semi-Annually	- Following tertiary treatment prior to application to the surface spreading area; and - At monitoring well locations designated in consultation with CDPH.[1]
	Surrogates: Selected based on the findings of the initial assessment phase.	Based on findings of the initial assessment phase. .	- Following tertiary treatment prior to application to the surface spreading area; and - At monitoring well locations designated in consultation with CDPH.[1]
Groundwater Recharge Reuse – Subsurface Application	Health-Based CECs: All listed in Table 1.	Semi-Annually	Following treatment by RO/AOPs prior to release to the aquifer.
	Performance Indicator CECs: Selected based on the findings of the initial assessment phase.	Semi-Annually	- Prior to RO treatment. - Following treatment by RO/AOPs prior to release to the aquifer.
	Surrogates: Selected based on the findings of the initial assessment phase.	Based on findings of the initial assessment phase.	- Prior to RO treatment. - Following treatment by RO/AOPs prior to release to the aquifer.
Landscape Irrigation	Health-Based CECs and Performance Indicator CECs: Not applicable	Not applicable	Not applicable
	Surrogates: To be selected on a project-specific basis.	To be determined on a project-specific basis.	Following tertiary treatment prior to distribution.

1 - Groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

3.3. Standard Operation Monitoring

Based on the findings of the baseline monitoring phase, monitoring requirements for health-based CECs, performance indicator CECs and surrogates may be refined to establish project-specific requirements for monitoring the standard operating conditions of a groundwater recharge reuse project. Monitoring requirements for the standard operation phase are summarized in Table 5. The list of health-based CECs required for monitoring may be revised if monitoring results meet the conditions of the minimum threshold level presented in Table 7. Performance indicator CECs and surrogates detected during the baseline phase and that exhibited reduction by a unit process and/or provided an indication of operational performance shall be selected for monitoring of standard operations.

Monitoring locations for the standard operation phase shall be the same as the locations used for the baseline monitoring phase.

Monitoring for health-based CECs and performance indicator CECs shall be conducted on a semi-annual basis, unless the project demonstrates consistency in treatment efficacy in removal of CECs, treatment operational performance, and appropriate recycled water quality. These projects may be monitored for CECs on an annual basis. Monitoring frequencies for CECs and surrogates for standard operation monitoring are presented in Table 5.

Monitoring results shall be evaluated following each sampling event to allow timely implementation of any response actions. Evaluation of monitoring results and determination of appropriate response actions based on monitoring results are presented in Section 4.

Table 5: Standard Operation Monitoring Requirements

Recycled Water Use	Constituent	Frequency	Monitoring Point
Groundwater Recharge Reuse -Surface Application	Health-Based CECs and Performance Indicator CECs: Selected based on the findings of the baseline phase.	Semi-Annually or Annually	- Following tertiary treatment prior to application to the surface spreading area; and - At monitoring well locations designated in consultation with CDPH. [1]
	Surrogates: Selected based on the findings of the baseline phase.	Based on findings of the baseline assessment phase.	- Following tertiary treatment prior to application to the surface spreading area; and - At monitoring well locations designated in consultation with CDPH.[1]
Groundwater Recharge Reuse -Subsurface Application	Health-Based CECs: Selected based on the findings of the baseline phase	Semi-Annually or Annually	-Following RO/AOPs treatment prior to release to the aquifer.
	Performance Indicator CECs: Selected based on the findings of the baseline phase.	Semi-Annually or Annually	- Prior to RO treatment. - Following RO/AOPs prior to release to the aquifer.
	Surrogates: To be selected on a project–specific basis.	Based on findings of the baseline assessment phase.	- Prior to RO treatment. - Following RO/AOPs prior to release to the aquifer.
Landscape Irrigation	Health-Based CECs and Performance Indicator CECs: Not applicable	Not applicable	Not applicable
	Surrogates: To be selected on a project–specific basis.	Based on findings of the baseline assessment phase.	Following tertiary treatment prior to distribution.

1 - Groundwater within a 30-day travel time distance through the aquifer downgradient of the surface application area.

4. EVALUATION OF CEC AND SURROGATE MONITORING RESULTS

This section presents the approaches for evaluating treatment process performance and health-based CEC monitoring results. Monitoring results for performance indicator CECs and surrogates shall be used to evaluate the operational performance of a treatment process and the effectiveness of a treatment process in removing CECs. For evaluation of health-based CEC monitoring results, a multi-tiered approach of thresholds and corresponding response actions is presented in Section 4.2. The evaluation of monitoring results shall be included in monitoring reports submitted to the Regional Water Board and CDPH.

4.1 Evaluation of Performance Indicator CEC and Surrogate Results

The effectiveness of a treatment process to remove CECs shall be evaluated by determining the removal percentages for performance indicator CECs and surrogates. The removal percentage is the difference in the concentration of a compound in recycled water prior to and after a treatment process (e.g., soil aquifer treatment or RO/AOPS), divided by the concentration prior to the treatment process and multiplied by 100.

$$\text{Removal Percentage} = ([X_{in} – X_{out}]/X_{in})\ (100)$$

X_{in} - Concentration in recycled water prior to a treatment process
X_{out} - Concentration in recycled water after a treatment process

During the initial assessment, the recycled water project proponent shall monitor performance to determine removal percentages for performance indicator CECs and surrogates. The removal percentages shall be confirmed during the baseline monitoring phase. One example of removal percentages from Drews et. al. (2008) for each application scenario and their associated processes (i.e. soil aquifer treatment or RO/AOPs) is presented in Table 6. The established removal percentages for each project shall be used to evaluate treatment efficacy and operational performance.

4.1.1. Groundwater Recharge Reuse – Surface Application

For groundwater recharge reuse by surface application, the removal percentage shall be determined by comparing the quality of the recycled water applied to a surface spreading area to the quality of groundwater at monitoring wells. The distance between the application site and the monitoring wells shall be no more than the distance the groundwater travels in thirty days from the application site. The location of the monitoring wells shall be designated in consultation with CDPH. The removal percentage shall account for any effects from the presence of dilution water, such as potable water applied to the application site, storm water applied to the application site, or native groundwater.

4.1.2. Groundwater Recharge Reuse – Subsurface Application

For groundwater recharge reuse using subsurface application, the removal percentage shall be determined by comparing recycled water quality before treatment by RO/AOPs and after treatment prior to application to the aquifer.

4.1.3. Landscape Irrigation

For landscape irrigation projects, determination of removal percentages is not required for surrogates.

Table 6: Monitoring Trigger Levels and Removal Percentages

Constituent/ Parameter	Relevance/Indicator Type/Surrogate	Monitoring Trigger Level (micrograms/liter)[1]	Removal Percentages (%)[2]
GROUNDWATER RECHARGE REUSE - SURFACE APPLICATION[3]			
17β-estradiol	Health	0.0009	--[4]
Caffeine	Health & Performance	0.35	>90
NDMA	Health	0.01	--
Triclosan	Health	0.35	--
Gemfibrozil	Performance	--	>90
Iopromide	Performance	--	>90
DEET	Performance	--	>90
Sucralose	Performance	--	<25[5]
Ammonia	Surrogate	--	>90
TOC	Surrogate	--	>30
Nitrate	Surrogate	--	>30
UV Absorption	Surrogate	--	>30
GROUNDWATER RECHARGE REUSE - SUBSURFACE APPLICATION[6]			
17β-estradiol	Health	0.0009	--
Caffeine	Health & Performance	0.35	>90
NDMA	Health & Performance	0.01	25-50, >80[7]
Triclosan	Health	0.35	--
DEET	Performance	--	>90
Sucralose	Performance	--	>90
Electrical Conductivity	Surrogate	--	>90
TOC	Surrogate	--	>90
LANDSCAPE IRRIGATION			
Chlorine Residual	Surrogate	--	--
Total Coliform	Surrogate	--	--
Turbidity	Surrogate	--	--

1 - Monitoring trigger levels for groundwater recharge reuse and landscape irrigation applications were established in *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.
2 –The removal percentages presented in this table are from work by Drewes et.al. (2008) and provide an example of performance for that specific research. Project specific removal percentages will be developed for each groundwater recharge reuse project during the initial and baseline monitoring phases.
3 - Treatment process: Soil aquifer treatment. The stated removal percentages are examples and need to be finalized during the initial and baseline monitoring phases for a given site.
4 – Not applicable
5 - Sucralose degrades poorly during soil aquifer treatment. It is included here mainly as a tracer.
6 - Treatment process: Reverse osmosis and advanced oxidation process.
7- For treatment using reverse osmosis, removal percentage is between 25 and 50 percent. For treatment using reverse osmosis and advanced oxidation processes, removal percentage is greater than 80 percent.

`4.2. Evaluation of Health-Based CEC Results

The project proponent shall evaluate health-relevant CEC monitoring results. To determine the appropriate response actions, the project proponent shall compare measured environmental concentrations (MECs) to their respective monitoring trigger levels[12] (MTLs) listed in Table 6 to determine MEC/MTL ratios. The project proponent shall compare the calculated MEC/MTL ratios to the thresholds presented in Table 7 and shall implement the response actions corresponding to the threshold.

For surface application, the results shall be evaluated for groundwater collected from the monitoring wells. For subsurface application projects, results shall be evaluated for the recycled water released to the aquifer.

Table 7: MEC/MTL Thresholds and Response Actions

MC/MTL Threshold	Response Action
If greater than 75 percent of the MEC/MTL ratio results for a CEC are less than or equal to 0.1 during the baseline monitoring phase and/or subsequent monitoring -	A) Consider requesting removal of the CEC from the monitoring program.
If MEC/MTL ratio is greater than 0.1 and less than or equal to 1 -	B) Continue to monitor.
If MEC/MTL ratio is greater than 1 and less than or equal to 10 -	C) Check the data. Continue to monitor.
If MEC/MLT ratio is greater than 10 and less than or equal to 100 -	D) Resample immediately and analyze to confirm CEC result. Continue to monitor.
If MEC/MLT ratio is greater than 100 -	E) Resample immediately and analyze to confirm result. Continue to monitor. Contact the Regional Water Board and CDPH to discuss additional actions. (Additional actions may include, but are not limited to, additional monitoring, toxicological studies, engineering removal studies, modification of facility operation, implementation of a source identification program, and monitoring at additional locations.)

[12] Monitoring Trigger Level (MTL): Health-based screening level value for a CEC for a particular water reuse scenario. MTLs were established in, *Monitoring Strategies for Chemicals of Emerging Concern (CECs) in Recycled Water – Recommendations of a Science Advisory Panel*, dated June 25, 2010.

APPENDIX B

REGIONAL BOARD ASSISTANCE IN GUIDING SALT AND NUTRIENT MANAGEMENT PLAN DEVELOPMENT IN THE LOS ANGELES REGION

Regional Water Board Assistance in Guiding Salt and Nutrient Management Plan Development in the Los Angeles Region

Further clarification and information to assist development of Salt and Nutrient Management Plans set forth in the State Water Board's Recycled Water Policy

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

JUNE 28, 2012

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1. INTRODUCTION

The State Water Resources Control Board (State Water Board) adopted the Recycled Water Policy (State Water Board Resolution No. 2009-0011) on February 3, 2009. The purpose of the Recycled Water Policy (hereinafter, Policy) is to protect groundwater resources and increase the beneficial use of recycled water from municipal wastewater sources in a manner consistent with state and federal water quality laws and regulations. The Policy provides direction to the Regional Water Quality Control Boards (Regional Water Boards), proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the State Water Board and the Regional Water Boards in issuing permits for recycled water projects.

The Policy recognizes the potential for increased salt and nutrient loading to groundwater basins as a result of increased recycled water use, and therefore, requires the development of regional or sub-regional salt and nutrient management plans.
In requiring such plans, the Policy acknowledges that recycled water may not be the sole cause of high concentrations of salts and nutrients in groundwater basins, and therefore regulation of recycled water alone will not address such conditions. The intent of this requirement is for salts and nutrients from all sources to be managed on a basin-wide or watershed-wide basis in a manner that ensures the attainment of water quality objectives and protection of beneficial use.

The Recycled Water Policy states:

a) Every basin/sub-basin shall have a consistent salt and nutrient management plan (hereinafter, SNMP);
b) SNMPs shall be tailored to address the water quality concerns in each basin;
c) Shall be developed or funded pursuant to the provisions of Water Code sections 10750 *et seq.* or other appropriate authority;
d) SNMPs shall be completed and proposed to the Regional Water Board within five years from the adoption date of the Policy;
e) SNMPs are not required in areas where a Regional Water Board has approved a functionally equivalent salt and nutrient plan; and
f) SNMPs may address constituents other than salt and nutrients that adversely affect groundwater quality.

Within one year of the receipt of a proposed SNMP, the Regional Water Board is expected to consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans are to be based on the salt and nutrient plans required by the Policy.

The Policy spells out the required elements of an SNMP. In addition, State Water Board staff provided additional detail on the contents of a SNMP by developing “Suggested Elements” as a means of indicating the nature and extent of information to be provided in the plans. State Water Board staff also provided templates for Regional Water Board adoption of the implementation aspects of the SNMPs into each region’s Water Quality Control Plan (hereinafter, Basin Plan).

The Policy is clear that the SNMP process should be stakeholder-led and conducted in a collaborative manner among interested parties. The Regional Water Board’s role is that of an overseer and facilitator of the SNMP development process – providing regulatory guidance as necessary and technical and regulatory oversight of the process to ensure that the final product is compliant with the specific requirements of the Policy and state and federal water quality laws. Board staff has been attending stakeholder meetings for various groundwater basin/sub-basin groups to provide support and information as necessary.

The purpose of this document is to provide information and guidance to assist on certain aspects of the SNMP development identified by stakeholder groups. Recognizing that each basin has its own unique set of conditions and constraints, this document does not seek to dictate the methods by which stakeholders should manage salt and nutrient loads to their basins. It does, however, provide clarification of the regulatory requirements of SNMPs along with other considerations. By providing such information, the Regional Water Board will promote adherence with SNMP requirements for groundwater basins in the Los Angeles Region. This document is not a policy or regulation of the Regional Water Board and has no regulatory affect; it is intended to assist in the development of SNMPs.

2. GROUNDWATER BASINS IN THE LOS ANGELES REGION

The Los Angeles subregion overlies 24 groundwater basins and encompasses most of Ventura and Los Angeles counties (Figure 2-1). Within this subregion, the Ventura River Valley, Santa Clara River Valley, and Coastal Plain of Los Angeles basins are divided into sub-basins. The basins in the Los Angeles subregion underlie 1.01 million acres (1,580 square miles) or about 40 percent of the total surface area of the subregion (DWR, 2003). Groundwater is found in unconfined alluvial aquifers in most of the inland basins of the Los Angeles subregions. In some larger basins, such as those underlying the coastal plain, groundwater occurs in multiple aquifers separated by aquitards that create confined groundwater conditions (DWR, 2003). Coastal basins in this hydrologic region are prone to intrusion of seawater. Seawater intrusion barriers are maintained along the coastal plain. In Los Angeles County, imported and recycled water is injected to maintain a seawater intrusion barrier (DWR, 2003).

FIGURE 2-1: GROUNDWATER BASINS IN THE LOS ANGELES REGION

For purposes of regulation by the Regional Water Board pursuant to its authority under the California Water Code, the groundwater basins in the Los Angeles Region are identified in the Basin Plan. Basin descriptions in the Basin Plan were updated in 2011 based on the Department of Water Resources (DWR) 2003 revision of Bulletin 118 (Figure 2-1). The basins include the Central and West Coast Basins, which underlie the Los Angeles Coastal Plain; the San Fernando and San Gabriel Basins, which lie between the Santa Monica Mountains and the San Gabriel and Santa Susanna Range; and the Santa Clara and Ventura Basins, which lie between Oak Ridge and the Transverse Ranges.
General characteristics of the major basins/sub-basins are summarized in Table 2-1.

TABLE 2-1: GENERAL CHARACTERISTICS OF THE LOS ANGELES REGION GROUNDWATER BASINS

MAJOR GROUNDWATER BASIN(S) AND SUB-BASINS	STORAGE CAPACITY (AC-FT)	BASIN RECHARGE[1]
COASTAL PLAINS OF LOS ANGELES		
Santa Monica	~1,100,000	Natural/Recycled
Hollywood	200,000	Natural
West Coast Basin	~6,500,000	Natural/Recycled/Imported
Central	13,800,000	Natural/Recycled/Imported
SAN GABRIEL	10,740,000	Natural
RAYMOND	450,000	Natural
SAN FERNANDO	3,670,000	Natural/ Recycled
SANTA CLARA RIVER VALLEY		
Oxnard	7,140,000	Natural/ Recycled/ Septics
Mound	n.a	
Santa Paula	800,000	Recycled/Septics
Fillmore	1,100,000	Recycled/Septics
Piru	1,979,000	Recycled/Septics
Santa Clara River Valley East	n.a.	Natural/Recycled/Septics
PLEASANT VALLEY	1,886,000	Natural/Recycled/Septics
LAS POSAS VALLEY	345,000	Natural/Irrigation
ARROYO SANTA ROSA	103,600	Natural/Irrigation/Septics
UPPER/LOWER OJAI	~84,000	Natural/Septics
VENTURA RIVER VALLEY	10,000	
SIMI VALLEY	180,000	Natural/IRecycled/Septics
TIERRA REJADA	80,000	
THOUSAND OAKS	130,000	
CONEJO VALLEY	7,106	
RUSSELL VALLEY	10,570	
HIDDEN VALLEY	n.a.	
MALIBU VALLEY	n.a.	Natural/Irrigation/Septics

n.a: not available

The Central and West Coast Basins, San Gabriel and Raymond Basins, and the Piru, Fillmore, Mound and Oxnard Forebay sub-basins beneath the Santa Clara River Valley have large storage capacities with significant existing or proposed municipal groundwater use in both urbanized and agricultural areas. The water levels are stable or declining and imported and/or recycled water is used to replenish and help manage

[1] Managed and natural stormwater recharge takes place in most of these basins.

groundwater supplies. The hydrogeology and groundwater of the basins have been extensively studied and documented, and groundwater quality and transport have been studied using computer models. Potential groundwater management alternatives for these basins have also been extensively studied. The San Gabriel Basin has no confining layers, but the Regional Water Board and USEPA's management of twelve plumes of Volatile Organic Compounds (VOCs) and five plumes of nitrates, where groundwater exceeds the Maximum Contaminant Level (MCL), has limited the impact to adjudicated drinking water resources. Basin water quality has also benefited from management practices and implementation of groundwater remediation conducted by the Watermaster in conjunction with local water purveyors.
The San Fernando Basin and Santa Clara River also have large storage capacities, but have declining water levels, significantly less municipal groundwater use, and no existing conjunctive use. The groundwater quality is variable, but remains locally usable as a source of irrigation or municipal supply. Wastewater and recycling agencies within these basins experience periodic noncompliance with groundwater quality objectives. In general, the basins have been studied less extensively than the Central and West Coast, San Gabriel and Raymond and Lower Santa Clara River Valley basins, although the potential yields from these basins are equally large. In the San Fernando Basin, impacts from a VOC plume and four nitrate plumes along with the irregular presence of confining layers have impacted the use of the basin for drinking water uses. In the upgradient portion of Santa Clara River Valley, contamination of the groundwater and its exfiltrates by salts, nutrients and bacteria as a result of increasing urbanization has impacted the use of groundwater as a source of domestic supply.

Nine groundwater basins in rural areas[2] are the sole source of local drinking water supply. They have smaller storage capacities (less than 10,000 acre-feet) in unconsolidated sediment. Wastewater, recycling agencies and facilities with onsite wastewater treatment systems (hereinafter, OWTS) may experience periodic noncompliance with Basin Plan groundwater quality objectives in these basins. Fewer studies and resources exist to characterize basin hydrogeology, groundwater quality, and groundwater transport. The California Department of Public Health, the State Water Board's Division of Water Rights, and USEPA's drinking water protection programs identify problems with water quality upon delivery, and efforts to isolate pollutants from the underlying potable supply are implemented through waste discharge requirements from the Regional Water Board.

The Oxnard Plain, Ventura River, Sylmar, Pomona, and Thousand Oaks/Pleasant Valley/Fox Canyon basins are moderately sized agricultural and urbanized groundwater basins with higher salinity levels. Wastewater and recycled water can usually comply with Basin Plan groundwater quality objectives, but the quality is improved by potable water conjunctive use. The coastal areas of the Region are underlain by porous sediments or fractured bedrock, both of which may have been intruded by saltwater during historic municipal, agricultural and industrial use of the aquifers. Fresh or recycled water injection is used to limit seawater intrusion in the Central, West Coast and Oxnard Plain basins. The tidally influenced and impacted areas may be heavily studied or un-evaluated, but wastewater and recycled water permits generally require compliance with Basin Plan objectives for salt. Public water supplies are not currently developed within these areas.

[2] Ojai Valley, Acton, Sierra Pelona Valley, Lake Elizabeth, Santa Rosa Valley, Hidden Valley, Santa Susana Knolls, Lockwood Valley, and Hungry Valley.

Beneficial uses of the groundwater basins in the region include Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Industrial Services Supply (IND), Industrial Process Supply (PROC), and Aquaculture (AQUA). The designated beneficial uses for these basins are shown in Table 2-2.

TABLE 2-2: BENEFICIAL USES OF GROUND WATERS IN THE LOS ANGELES REGION.[1]

DWR[2] Basin No.	BASIN	MUN	IND	PROC	AGR	AQUA
	PITAS POINT AREA[3]	E	E	P	E	
4-1	**UPPER OJAI VALLEY**	E	E	E	E	
4-2	**OJAI VALLEY**	E	E	E	E	
4-3	**VENTURA RIVER VALLEY**					
4-3.01	Upper Ventura	E	E	E	E	
4-3.02	Lower Ventura	P	E	P	E	
4-4	**SANTA CLARA RIVER VALLEY[4]**					
4-4.02	Oxnard					
4-4.02	Oxnard Forebay	E	E	E	E	
4-4.02	Confined aquifers	E	E	E	E	
4-4.02	Unconfined and perched aquifers	E	P		E	
4-4.03	Mound					
4-4.03	Confined aquifers	E	E	E	E	
4-4.03	Unconfined and perched aquifers	E	P		E	
4-4.04	Santa Paula					
4-4.04	East of Peck Road	E	E	E	E	
4-4.04	West of Peck Road	E	E	E	E	
4-4.05	Fillmore					
4-4.05	Pole Creek Fan area	E	E	E	E	
4-4.05	South side of Santa Clara River	E	E	E	E	
4-4.05	Remaining Fillmore area	E	E	E	E	E
4-4.05	Topa Tapa (upper Sespe) area	P	E	P	E	
4-4.06	Piru					
4-4.06	Upper area (upper Lake Piru)	P	E	E	E	
4-4.06	Lower area east of Piru Creek	E	E	E	E	
4-4.06	Lower area west of Piru Creek	E	E	E	E	
4-4.07	Santa Clara River Valley East					
4-4.07	Mint Canyon	E	E	E	E	
4-4.07	South Fork	E	E	E	E	
4-4.07	Placerita Canyon	E	E	E	E	
4-4.07	Bouquet and San Francisquito Canyons	E	E	E	E	
4-4.07	Castaic Valley	E	E	E	E	
4-4.07	Saugus Aquifer	E				
4-5	**ACTON VALLEY[4]**					
4-5	Acton Valley	E	E	E	E	
4-5	Sierra Pelona Valley (Agua Dulce)	E	E		E	
4-5	Upper Mint Canyon	E	E	E	E	
4-5	Upper Bouquet Canyon	E	P	P	E	

DWR[2] Basin No.	BASIN	MUN	IND	PROC	AGR	AQUA
4-5	Green Valley	E	P	P	E	
4-5	Lake Elizabeth- Lake Hughes area	E	P	P	E	
4-6	**PLEASANT VALLEY[5]**					
4-6	Confined Aquifers	E	E	E	E	
4-6	Unconfined and perched aquifers	P	E	E	E	
4-7	**ARROYO SANTA ROSA VALLEY[5]**	E	E	E	E	
4-8	**LAS POSAS VALLEY[5]**	E	E	E	E	
4-9	**SIMI VALLEY**					
	Simi Valley Basin					
	Confined aquifers	E	E	E	E	
	Unconfined aquifers	E	E	E	E	
	Gillibrand Basin	E	E	P	E	
4-10	**CONEJO**	E	E	E	E	
4-11	**COASTAL PLAIN OF LOS ANGELES**					
4-11.01	Santa Monica	E	E	E	E	
4-11.02	Hollywood	E	E	E	E	
4-11.03	West Coast					
	Underlying Ports of Los Angeles & Long Beach		E	E	E	
4-11.03	Underlying El Segundo, Seaward of Barrier		E	E	E	
4-11.03	Remainder of Basin	E	E	E	E	
4-11.04	Central	E	E	E	E	
4-12	**SAN FERNANDO VALLEY**	E[6]	E	E	E	
4-13	**SAN GABRIEL VALLEY[7]**	E	E	E	E	
4-15	**TIERRA REJADA**	E	P	P	E	
4-16	**HIDDEN VALLEY**	E	P		E	
4-17	**LOCKWOOD VALLEY**	E	E		E	
4-18	**HUNGRY VALLEY**	E	P	E	E	
4-19	**THOUSAND OAKS AREA[8]**	E	E	E	E	
4-19	Triunfo Canyon area	P	P		E	
4-19	Lindero Canyon area	P	P		E	
4-19	Las Virgenes Canyon area	P	P		E	
4-20	**RUSSELL VALLEY**	E	P		E	
4-21	**CONEJO-TIERRA REJADA VOLCANIC[9]**	E			E	
4-22	**MALIBU VALLEY[10]**					
4-22	Camarillo area	E	P		E	
4-22	Point Dume area	E	P		E	
4-22	Malibu Valley	P	P		E	
4-22	Topanga Canyon area	P	P		E	
4-23	**RAYMOND**	E	E	E	E	
	SAN PEDRO CHANNEL ISLANDS[11]					
	Anacapa Island	P	P			
	San Nicolas Island	E	P			

DWR[2] Basin No.	BASIN	MUN	IND	PROC	AGR	AQUA
	Santa Catalina Island	E	P		E	
	San Clemente Island	P	P			
	Santa Barbara Island	P	P			

E: Existing beneficial use
P: Potential beneficial use
1: Beneficial uses for ground waters outside of the major basins listed on this table have not been specifically listed. However, ground waters outside of the major basins are, in many cases, significant sources of water. Furthermore, ground waters outside of the major basins are either potential or existing source of water for downgradient basins, and as such, beneficial uses in the downgradient basins shall apply to these areas.
2: Basins are numbered according to DWR Bulletin No. 118-Update 2003 (DWR, 2003).
3: Ground waters in the Pitas Point area (between the lower Ventura River and Rincon Point) are not considered to comprise a major basin and, accordingly, have not been designated a basin number by the DWR or outlined on Fig. 2-1.
4: Santa Clara River Valley Basin was formerly Ventura Central Basin and Acton Valley Basin was formerly Upper Santa Clara Basin (DWR, 1980).
5: Pleasant Valley, Arroyo Santa Rosa Valley, and Las Posas Valley Basins were formerly sub-basins of Ventura Central (DWR, 1980).
6: Nitrite pollution in the groundwater of the Sunland-Tujunga area currently precludes direct MUN use. Since the groundwater in this area can be treated or blended (or both), it retains the MUN designation.
7: Raymond Basin was formerly a sub-basin of San Gabriel Valley and Monk Hill sub-basin is now part of San Fernando Valley Basin (DWR, 2003). The Main San Gabriel Basin was formerly separated into Eastern and Western areas. Since these areas had the same beneficial uses as Puente Basin all three areas have been combined into San Gabriel Valley. Any groundwater upgradient of these areas is subject to downgradient beneficial uses and objectives, as explained in Footnote 1.
8: These areas were formerly part of the Russell Valley Basin (DWR, 1980).
9: Groundwater in the Conejo-Tierra Rejada Volcanic Area occurs primarily in fractured volcanic rocks in the western Santa Monica Mountains and Conejo Mountain areas. These areas have not been delineated on Fig. 2-1.
10: With the exception of groundwater in Malibu Valley (DWR Basin No. 4-22) ground waters along the southern slopes of the Santa Monica Mountains are not considered to comprise a major basin and accordingly have not been designated a basin number by DWR.
11: DWR has not designated basins for ground waters on the San Pedro Channel Islands.

3. REGIONAL GROUNDWATER QUALITY OBJECTIVES

As set forth in the Policy, *SNMPs shall be tailored to address water quality concerns in each basin and may include constituents other than salt and nutrients that adversely impact basin/sub-basin water quality.*

GROUND WATER QUALITY OBJECTIVES

Water quality objectives for ground waters in the Los Angeles Region are contained in the Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan). The same water quality objectives for Nitrogen, Chemical Constituents and Radioactivity, Bacteria, and Taste and Odor, apply to all ground waters in the region (Table 3-1).

TABLE 3-1: WATER QUALITY OBJECTIVES FOR GROUNDWATER BASINS IN THE LOS ANGELES REGION

PARAMETER	**WATER QUALITY OBJECTIVE**
Nitrogen NO3-N + NO2-N NO3 NO3-N NO2-N	 10 mg/L 45 mg/L 10 mg/L 1 mg/L
Chemical Constituents and Radioactivity	For ground waters designated for use as domestic or municipal supply, Maximum Contaminant Levels (MCLs) contained in Title 22 of the California Code of Regulations apply. In addition, ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect any designated beneficial use.
Bacteria	In ground waters used for domestic or municipal supply (MUN), the concentration of coliform organisms over any seven day period shall be less than 1.1/100 mL.
Taste and Odor	Ground waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses.

The Basin Plan also contains site-specific objectives for mineral water quality for individual basins/sub-basins (Table 3-2).

TABLE 3-2: WATER QUALITY OBJECTIVES FOR SELECTED CONSTITUENTS IN REGIONAL GROUND WATERS

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
Upper Ojai Valley	**4-1**	**Ojai Valley**	**4-1**				
Upper Ojai Valley	4-1	Upper Ojai Valley	4-1				
Upper Ojai Valley	4-1	West of Sulfur Mountain Road	4-1	1000	300	200	1.0
Upper Ojai Valley	4-1	Central Area	4-1	700	50	100	1.0
Upper Ojai Valley	4-1	Sisar Area	4-1	700	250	100	0.5
Ojai Valley	**4-2**	**Lower Ojai Valley**	**4-2**				**0.5**
Ojai Valley	4-2	West of San Antonio-Senior Canyon	4-2	1000	300	200	0.5
Ojai Valley	4-2	East of San Antonio-Senior Canyon	4-2	700	200	50	
Ventura River Valley	**4-3**	**Ventura River Valley**	**4-3**				
Upper Ventura River	4-3.01	Upper Ventura	4-3	800	300	100	0.5
Upper Ventura River	4-3.01	San Antonio Creek Area	4-3	1000	300	100	1.0
Lower Ventura River	4-3.02	Lower Ventura	4-3	1500	500	30	1.5
Santa Clara River Valley	**4-4**	**Ventura Central**	**4-4**				
Piru	4-4.06	Santa Clara-Piru Creek Area	4-4				
Piru	4-4.06	Upper Area (above Lake Piru)	4-4	1100	400	200	2.0
Piru	4-4.06	Lower Area East of Piru Creek	4-4	2500	1200	200	1.5
Piru	4-4.06	Lower Area West of Piru Creek	4-4	1200	600	100	1.5
Fillmore	4-4.05	Santa Clara-Sespe Creek Area	4-4				
Fillmore	4-4.05	Topa Topa (upper Sespe) Area	4-4	900	350	30	2.0
Fillmore	4-4.05	Fillmore Area	4-4				
Fillmore	4-4.05	Pole Creek Fan Area	4-4	2000	800	100	1.0
Fillmore	4-4.05	South Side of Santa Clara River	4-4	1500	800	100	1.1
Fillmore	4-4.05	Remaining Fillmore Area	4-4	1000	400	50	0.7
Santa Paula	4-4.04	Santa Clara-Santa Paula Area	4-4				
Santa Paula	4-4.04	East of Peck Road	4-4	1200	600	100	1.0
Santa Paula	4-4.04	West of Peck Road	4-4	2000	800	110	1.0

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
Oxnard	4-4.02	Oxnard Plain	4-4				
Mound	4-4.03	Oxnard Plain	4-4				
Oxnard	4-4.02	Oxnard Forebay	4-4	1200	600	150	1.0
Oxnard	4-4.02	Confined Aquifers	4-4	1200	600	150	1.0
Oxnard	4-4.02	Unconfined & Perched Aquifers	4-4	3000	1000	500	
Pleasant Valley	**4-6**	**Pleasant Valley**	**4-6**				
Pleasant Valley	4-6	Confined Aquifers	4-6	700	300	150	1.0
Pleasant Valley	4-6	Unconfined & Perched Aquifers	4-6				
Arroyo Santa Rosa Valley	**4-7**	**Arroyo Santa Rosa**	**4-7**	900	300	150	1.0
Las Posas Valley	**4-8**	**Las Posas Valley**	**4-8**				
Las Posas Valley	4-8	South Las Posas Area	4-8				
Las Posas Valley	4-8	NW of Grimes Cyn Rd. & LA Ave. & Somis Rd.	4-8	700	300	100	0.5
Las Posas Valley	4-8	E of Grimes Cyn Rd & Hitch Blvd.	4-8	2500	1200	400	3.0
Las Posas Valley	4-8	S of LA Ave Between Somis Rd & Hitch Blvd.	4-8	1500	700	250	1.0
Las Posas Valley	4-8	Grimes Canyon Rd. & Broadway Area	4-8	250	30	30	0.2
Las Posas Valley	4-8	North Las Posas Area	4-8	500	250	150	1.0
Acton Valley	**4-5**	**Upper Santa Clara**	**4-5**				
Acton Valley	4-5	Acton Valley	4-5	550	150	100	1.0
Acton Valley	4-5	Sierra Pelona Valley (Agua Dulce)	4-5	600	100	100	0.5
Acton Valley	4-5	Upper Mint Canyon	4-5	700	150	100	0.5
Acton Valley	4-5	Upper Bouquet Canyon	4-5	400	50	30	0.5
Acton Valley	4-5	Green Valley	4-5	400	50	25	
Acton Valley	4-5	Lake Elizabeth-Lake Hughes Area	4-5	500	100	50	0.5
Santa Clara River Valley East	**4-4.07**	**Eastern Santa Clara**	**4-4.07**				
Santa Clara River Valley	4-4.07	Santa Clara-Mint Canyon	4-4.07	800	150	150	1.0

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
East							
Santa Clara River Valley East	4-4.07	South Fork	4-4.07	700	200	100	0.5
Santa Clara River Valley East	4-4.07	Placentia Canyon	4-4.07	700	150	100	0.5
Santa Clara River Valley East	4-4.07	Santa Clara-Bouquet & San Fransisquito Canyons	4-4.07	700	250	100	1.0
Santa Clara River Valley East	4-4.07	Castaic Valley	4-4.07	1000	350	150	1.0
Santa Clara River Valley East	4-4.07	Saugus Aquifer	4-4.07				
Simi Valley	**4-9**	**Simi Valley**	**4-9**				
Simi Valley	4-9	Simi Valley Basin	4-9				
Simi Valley	4-10	Confined Aquifers	4-9	1200	600	150	1.0
Simi Valley	4-11	Unconfined & Perched Aquifers	4-9				
Simi Valley	4-12	Gillibrand Basin	4-9	900	350	50	1.0
Conejo Valley	**4-10**	**Conejo Valley**	**4-10**	**800**	**250**	**150**	**1.0**
Coastal Plain of Los Angeles	**4-11**	**Los Angeles Coastal Plain**	**4-11**				
Central	4-11.04	Central Basin	4-11	700	250	150	1.0
West Coast	4-11.03	West Coast Basin	4-11	800	250	250	1.5
Hollywood	4-11.02	Hollywood Basin	4-11	750	100	100	1.0
Santa Monica	4-11.01	Santa Monica Basin	4-11	1000	250	200	0.5
San Fernando Valley	**4-12**	**San Fernando Valley**	**4-12**				
San Fernando Valley	4-12	Sylmar Basin	4-12	600	150	100	0.5
San Fernando Valley	4-12	Verdugo Basin	4-12	600	150	100	0.5
San Fernando Valley	4-12	San Fernando Basin	4-12				
San Fernando Valley	4-12	West of Highway 405	4-12	800	300	100	1.5
San Fernando Valley	4-12	East of Highway 405 (overall)	4-12	700	300	100	1.5
San Fernando Valley	4-12	Sunland-Tujunga Area	4-12	400	50	50	0.5
San Fernando Valley	4-12	Foothill Area	4-12	400	100	50	1.0
San Fernando Valley	4-12	Area Encompassing RT-Tujunga -Erwin-N. Hollywood-Whithall-LA/Verdugo-Crystal	4-12	600	250	100	1.5

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
		Springs-Headworks-Glendale/Burbank Well Fields					
San Fernando Valley	4-12	Narrows Area (below confluence of Verdugo Wash with the LA River	4-12	900	300	150	1.5
San Fernando Valley	4-12	Eagle Rock Basin	4-12	800	150	100	0.5
San Gabriel Valley/Raymond/San Fernando Valley	**4-13**	**San Gabriel Valley**	**4-13**				
Raymond	4-23	Raymond Basin	4-13				
San Fernando Valley	4-12	Monk Hill Sub-Basin	4-13	450	100	100	0.5
Raymond	4-23	Santa Anita Area	4-13	450	100	100	0.5
Raymond	4-23	Pasadena Area	4-13	450	100	100	0.5
San Gabriel Valley	4-13	Main San Gabriel Basin	4-13				
San Gabriel Valley	4-13	Western Area	4-13	450	100	100	0.5
San Gabriel Valley	4-13	Eastern Area	4-13	600	100	100	0.5
San Gabriel Valley	4-13	Puente Basin	4-13	1000	300	150	1.0
Upper Santa Ana Valley/San Gabriel Valley	**8-2.01**	**Upper Santa Ana Valley**	**4-14**				
San Gabriel Valley	4-13	Live Oak Area	8-2	450	150	100	0.5
San Gabriel Valley	4-13	Claremont Heights Area	8-2	450	100	50	
San Gabriel Valley	4-13	Pomona Area	8-2	300	100	50	0.5
Upper Santa Ana Valley/ San Gabriel Valley	8-2.01/4-13	Chino Area	8-2	450	20	15	
San Gabriel Valley	4-13	Spadra Area	8-2	550	200	120	1.0
Tierra Rejada	**4-15**	**Tierra Rejada**	**4-15**	**700**	**250**	**100**	**0.5**
Hidden Valley	**4-16**	**Hidden Valley**	**4-16**	**1000**	**250**	**250**	**1.0**
Lockwood Valley	**4-17**	**Lockwood Valley**	**4-17**	**1000**	**300**	**20**	**2.0**
Hungry Valley	**4-18**	**Hungry Valley & Peace Valley**	**4-18**	**500**	**150**	**50**	**1.0**
Conejo Valley	**4-10**	**Thousand Oaks Area**	**4-19**	**1400**	**700**	**150**	**1.0**
Russell Valley	**4-20**	**Russell Valley**	**4-20**				
Russell Valley	4-20	Russell Valley	4-20	1500	500	250	1.0
Thousand Oaks Area	4-19	Triunfo Canyon Area	4-20	2000	500	500	2.0

2011 Basin Plan Name	Bulletin 118-03 update number	1994 Basin Plan Name	Bulletin 118-80 number	TDS	Sulfate	Chloride	Boron
Thousand Oaks Area	4-20	Lindero Canyon Area	4-20	2000	500	500	2.0
Thousand Oaks Area	4-21	Las Virgenes Canyon Area	4-20	2000	500	500	2.0
Deleted	**Deleted**	**Conejo-Tierra Rejada Volcanic Area**	**4-21**				
Malibu Valley	**4-22**	**Santa Monica Mountains-Southern Slopes**	**4-22**				
Malibu Valley	4-22	Camarillo Area	4-22	1000	250	250	1.0
Malibu Valley	4-22	Point Dume Area	4-22	1000	250	250	1.0
Malibu Valley	4-22	Malibu Valley	4-22	2000	500	500	2.0
Malibu Valley	4-22	Topanga Canyon Area	4-22	2000	500	500	2.0
San Pedro Channel Islands		**San Pedro Channel Islands**					
Anacapa Island	No DWR#	Anacapa Island	No DWR#				
San Nicholas Island	No DWR#	San Nicholas Island	No DWR#	1100	150	350	
Santa Catalina Island	No DWR#	Santa Catalina Island	No DWR#	1000	100	250	1.0
San Clemente Island	No DWR#	San Clemente Island	No DWR#				
Santa Barbara	No DWR#	Santa Barbara Island	No DWR#				

<u>GROUNDWATER BASIN WATER QUALITY</u>

The following section presents information on general water quality conditions as provided by the Department of Water Resources in their Bulletin 118- 2003 update. This information is meant to provide a general overview of the conditions within the basins. It is anticipated that more current information will be provided in the Salt and Nutrient Management Plans developed for each basin.

According to DWR's Bulletin 118-2003, nitrate content is elevated in some parts of the subregion. Volatile organic compounds (VOCs) have caused groundwater impairments in some of the industrialized portions of the region. The San Gabriel Valley and San Fernando Valley groundwater basins both have multiple sites of contamination from VOCs. The main constituents in the contamination plumes are trichloroethylene (TCE) and tetrachloroethylene (PCE). Some of the locations have been declared federal Superfund sites. Contamination plumes containing high concentrations of TCE and PCE also occur in the Bunker Hill Sub-basin of the Upper Santa Ana Valley Groundwater Basin. Some of these plumes are also designated as Superfund sites. Also, perchlorate has been identified as a significant pollutant in some areas of the Los Angeles Region.

Basin-specific information on water quality in the region's major basins/sub-basins is provided in Table 3-3. This information is summarized from DWR's Bulletin 118-2003 and includes monitoring results from public supply wells sampled under the DHS Title 22 program from 1994 through 2000. Per this bulletin, the information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

TABLE 3-3: WATER QUALITY IN MAJOR BASINS/SUB-BASINS IN THE LOS ANGELES REGION

Basin/sub-basin	Status	TDS	Constituent Group[3]	Number of wells sampled[4]	Number of wells with a concentration above an MCL[5]
Central Basin		Range: 200-2500 mg/l Average: 453 mg/l (293 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	316 315 315 322 344 316	15 1 2 0 43 113
West Coast Basin	Injection wells create a groundwater ridge, which inhibits the inland flow of saltwater into the sub-basin to protect and maintain groundwater elevations.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	45 45 46 46 44 45	0 1 0 0 0 30
San Fernando Valley Basin	Groundwater contamination from VOCs and hexavalent chromium (CrVI) continues to be a serious problem for water supply in the eastern portion of the San Fernando Valley		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	129 122 129 134 134 129	6 13 44 3 90 17
San Gabriel[6]	Four areas of the San Gabriel Valley Basin are Superfund sites. Trichloroethylene, Perchloroethylene, and Carbon Tetrachloride contaminate the Whittier Narrows, Puente basin, Baldwin Park and El Monte areas.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	287 278 300 292 301 287	3 4 73 1 85 20

[3] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater–Bulletin 118* by DWR (2003).

[4] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

[5] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

[6] There are six operable units (O.U.) within the Main San Gabriel Basin: the Baldwin Park O.U., the Puente Valley O.U., the Whittier Narrows O.U., the South El Monte O.U., and the Area 3 (Alhambra) O.U.

Basin/sub-basin	Status	TDS	Constituent Group[3]	Number of wells sampled[4]	Number of wells with a concentration above an MCL[5]
Raymond	Fluoride content occasionally exceeds recommended levels of 1.6 mg/L, near the San Gabriel Mountain front. Volatile organic compounds are detected in wells near Arroyo Seco and radiation is occasionally detected near the San Gabriel Mountains.	Range: 38-780 mg/l Average: 346 mg/l (70 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	66 55 78 57 60 66	9 8 23 0 19 9
Santa Monica		Range: 729-1,156 mg/L Average: 916 mg/L (7 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	13 12 13 12 12 13	0 1 0 0 9 8
Hollywood	Public water supply from imported surface water, groundwater quality information scarce.	Single sample 526 mg/L (Truran, 2001).			
Oxnard	Nitrate concentrations can exceed the state Maximum Contaminant Level (MCL) of 45 mg/L. Intrusion of seawater has occurred near Pt. Mugu and Port Hueneme. Elevated levels of DDT and PCB are found near Pt. Mugu.	Range: 160-1,800 mg/L Average: 1,102 mg/L (69 public supply wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	73 69 80 63 68 73	6 8 14 1 2 49
Piru	Agricultural return flows may lead to high nitrate concentrations particularly during dry periods. Urban stormwater runoff within the Santa Clara River Watershed tends to concentrate salts and other contaminants. The most prominent natural contaminants in the sub-basin are boron and sulfate.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	3 3 3 3 3 3	0 0 0 0 0 1

Basin/sub-basin	Status	TDS	Constituent Group[3]	Number of wells sampled[4]	Number of wells with a concentration above an MCL[5]
Fillmore	Agricultural return flows may lead to high nitrate concentrations particularly during dry periods. Urban stormwater runoff within the Santa Clara River Watershed tends to concentrate salts and other contaminants. Other contaminants in the sub-basin are boron, sulfate, and nitrates.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	13 10 14 10 10 13	0 1 1 0 1 3
Santa Paula	Nitrate concentrations can fluctuate significantly.	Range: 470-1,800 mg/L Average: 1,198 mg/L (13 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	16 12 16 9 9 16	3 1 2 0 0 15
Mound		Range: 1,498-1,908 mg/L Average: 1,644 mg/L (4 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	2 2 2 2 2 2	1 0 0 0 0 2
Las Posas		Range: 338-1,700 mg/L Average: 742 mg/L (23 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	22 22 24 22 22 22	1 2 0 1 0 16
Santa Rosa			Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	1 1 1 1 1 1	0 0 0 0 0 1

Basin/sub-basin	Status	TDS	Constituent Group[3]	Number of wells sampled[4]	Number of wells with a concentration above an MCL[5]
Pleasant Valley		Range: 597-1,420 mg/L Average: 922 mg/L (10 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	10 10 10 10 10 10	0 1 0 0 0 10
Lower Santa Clara	Drinking water standards are met at public supply wells without the use of treatment methods. Areas with somewhat elevated mineral levels have been observed in the northern basin. Some wells with elevated nitrate concentration have been identified in the southern portion of the basin.		Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	257 234 268 253 252 257	9 1 10 3 4 29
Upper Santa Clara	Nitrate content has exceeded 45 mg/L in some parts of the sub-basin with a well in the central part of the sub-basin reaching 68 mg/L. Trichloroethylene and ammonium perchlorate have been detected in four wells in the eastern part of the sub-basin.	Range: 300-1,662 mg/L Average: 695 mg/L (59 public wells)	Inorganic – Primary Radiological Nitrates Pesticides VOCs and SVOCs Inorganics- Secondary	67 56 74 66 66 67	4 2 2 4 0 7

4. CLARIFICATION OF SNMP REQUIREMENTS

The Policy states that SNMPs are to be developed for every groundwater basin in California. This will allow water purveyors and basin management agencies to take advantage of a streamlined permit process for recycled water projects that is intended to expedite the implementation of recycled water projects. The required elements of a SNMP, as specified by the Policy include:

a) Development of a basin-wide monitoring plan;
b) Annual monitoring of Constituents of Emerging Concern;
c) Consideration of Water Recycling/Stormwater Recharge/Use;
d) Source identification/Source loading and assimilative capacity estimates;
e) Implementation measures; and
f) Anti-degradation analyses.

Development of SNMPs will lead to a more comprehensive approach to basin water quality management. SNMP proponents will have the opportunity to collectively determine the implementation strategies necessary to comply with water quality objectives established to restore and maintain the beneficial use of the ground waters.

SNMPs are required for each groundwater basin in the state. However, there is flexibility in the level of detail required in each plan depending on the size, complexity and level of activity within the basin. That notwithstanding, an initial assessment of water quality (past and present) and use (including future use) is necessary in order to determine the level of specificity warranted in each basin. The following sections discuss the required SNMP elements in greater detail, providing clarification where communications with stakeholders have indicated it to be necessary.

STAKEHOLDER COLLABORATION

As stated in the Policy*:*
"…local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Regional Water Board staff."

Stakeholder collaboration may be within or between basins. While the Policy requires that every basin/sub-basin in the state have a SNMP, this does not preclude stakeholders working across basin boundaries to accommodate existing and future stakeholder structures and basin management efforts. Also, some differences exist between DWR Bulletin-118 basin/sub-basin definitions and court-adjudicated basins, which may influence formation of stakeholder groups.

Key stakeholders include local agencies involved in groundwater management, owners and operators of recharge facilities, water purveyors, water districts, water masters, and salt and nutrient contributing dischargers. These agencies have access to basin-specific data and information that is essential to the development of successful SNMPs. Private well owners may also have essential water quality information. Nongovernmental entities may have information about ecosystems associated with groundwater exfiltration. Other parties from regulatory agencies, environmental groups, industry, and interested persons may also provide important support. No single entity is wholly responsible for SNMP development. While a lead agency is necessary to coordinate the development effort, the point of a collaborative process is to take advantage of the collective expertise, resources and information of the participating entities. Therefore, participation to varying degrees by all stakeholders is encouraged. Table 4-1 lists the agencies already engaged in, and others that should consider being involved in salt and nutrient management for each groundwater basin or sub-basin group. This is not an exhaustive list.

TABLE 4-1: PARTICIPATING AND POTENTIAL STAKEHOLDERS FOR EACH BASIN/SUB-BASIN GROUP AS OF FEBRUARY 2012

Basin/sub-basin	**Participating and Potential Stakeholders**
Central and West Coast Basins	Water Replenishment District (WRD) of Southern California City of Los Angeles Department of Water & Power County Sanitation Districts of Los Angeles County Metropolitan Water District of Southern California West Basin Municipal Water District Central Basin Municipal Water District Los Angeles County Department of Public Works California Department of Public Health
San Fernando Basin	Upper Los Angeles River Area Water Master Los Angeles Department of Water and Power City of Glendale City of Burbank City of San Fernando City of La Crescenta Metropolitan Water District US Environmental Protection Agency California Department of Public Health
San Gabriel/	San Gabriel Basin Water Master City of Alhambra* City of Arcadia* City of Pasadena* Crescenta Valley Water District* Metropolitan Water District County Sanitation Districts of Los Angeles County
Raymond Basin	Raymond Basin Management Board City of Alhambra* City of Pasadena* Metropolitan Water District County Sanitation Districts of Los Angeles County
Three Valleys (Six Basins)	Three Valleys Municipal Water District*
Lower Santa Clara Pleasant Valley, Las Posas, Oxnard	Fox Canyon United Water Conservation District Metropolitan Water District City of Oxnard
Lower Santa Clara	Ventura County Watershed Protection District City of Fillmore County of Ventura City of Santa Paula United Water Conservation District
Eastern Santa Clara	Castaic Lake Water Agency

Basin/sub-basin	Participating and Potential Stakeholders
Saugus Aquifer, Santa Clara Castaic Valley, South Fork, Placerita Canyon, Santa Clara-Bouquet and San Francisquito Canyons, Santa Clara-Mint Canyon, Acton/Sierra Pelona/Upper Mint Canyon Basins	Los Angeles County Sanitation Districts City of Santa Clara
Tierra Rejada/Gillibrand/Simi/Thousand Oaks/Conejo/Hidden Valley/Russell Valley Basins	Calleguas Municipal Water District Calleguas Creek Watershed Management Plan
Hollywood and Santa Monica Basins	*City of Beverly Hills* City of Santa Monica**
Pleasant Valley, Las Posas, Oxnard and Tierra Rejada/Gillibrand/Simi/Thousand Oaks/Conejo/Hidden Valley/Russell Valley Basins	Calleguas Creek Watershed Management Plan, Fox Canyon, City of Oxnard, United Water Conservation District.
Ventura/Ojai	County of Ventura
Malibu Valley	City of Malibu* La Paz Treatment Facility

**Potentia Stakeholders*

Ideally, participation in the SNMP development process should not be limited to those agencies directly involved with basin management or salt and nutrient contributors. Other parties from regulatory agencies, environmental groups, industry, and interested persons may be included and/or kept informed; and their input solicited for each major task. Groundwater basin adjudication may impact the roles of stakeholders not identified as parties in the applicable judgments.

The Regional Water Board's role in preparing SNMPs is to:

a) Facilitate interaction and information sharing within and among groundwater basin stakeholder groups,
b) Provide regulatory guidance on the SNMP requirements of the Policy,
c) Provide technical and regulatory oversight of the SNMP process to maintain consistency in scope and content of these plans and ensure compliance with the Policy's requirements, and
d) Adopt, as appropriate, the implementation measures included in SNMPs into the Water Quality Control Plan for the Los Angeles Region.

The Regional Water Board conducted its first stakeholder workshop in November 2010 to introduce the SNMP requirement to stakeholders and initiate the development process. Since then stakeholder groups have been formed for the major groundwater basins and Regional Water Board staff have been made available to each group to provide basin-specific technical guidance and oversight of individual plans. A second stakeholder workshop was held in November 2011 to provide further clarification on certain regulatory aspects of the SNMP development process that were identified as issues of concern by stakeholders.

SPECIFIC SNMP REQUIREMENTS
It is the intent of the Policy "… *that salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses*."

The Policy also specifies that each salt and nutrient management plan shall include:

a) *A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations to determine whether concentrations of salt, nutrients, and other constituents of concern are consistent with applicable water quality objectives.*
b) *A provision for annual monitoring of Emerging Constituents/Constituents of Emerging Concern*
c) *Water recycling and stormwater recharge/use goals and objectives.*
d) *Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.*
e) *Implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.*
f) *An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of the Antidegradation Policy (Resolution No. 68-16).*

SNMP "SUGGESTED ELEMENTS"

In 2010, at the direction of the Executive Director, State Water Board staff provided a draft list of suggested elements for SNMPs that would assure that the requirements of the Policy were met (Appendix I). These elements are not considered additions to the requirements; rather they are meant to provide specifics as to how the requirements can be met, and indicate the appropriate level of detail necessary in a SNMP. They are purely recommendations and stakeholders have the option of arriving at the Policy's SNMP requirements via alternative means. This is illustrated in Table 4-2 where the suggested elements provided by State Water Board staff are lined up with the SNMP requirements as enumerated in the Policy.

TABLE 4-2: SNMP SUGGESTED ELEMENTS AND CORRESPONDING REQUIREMENTS FROM THE RECYCLED WATER POLICY

RECYCLED WATER POLICY SECTION	**RECYCLED WATER POLICY REQUIREMENT**	**SNMP SUGGESTED ELEMENTS**
6b(1)	…local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA …	**CEQA ANALYSIS**
6b(1)(a)	It is the intent of this Policy for every groundwater basin/sub-	**GROUNDWATER BASIN CHARACTERISTICS** GROUNDWATER BASIN OVERVIEW

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RECYCLED WATER POLICY SECTION	RECYCLED WATER POLICY REQUIREMENT	SNMP SUGGESTED ELEMENTS

	basin in California to have a consistent salt/nutrient management plan. The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality.	▪ Physiographic Description
		▪ Groundwater Basin and/or Sub-Basin Boundaries
		▪ Watershed Boundaries
		▪ Geology
		▪ Hydrogeology/Hydrology
		▪ Aquifers
		▪ Recharge Areas
		▪ Hydrologic Areas Tributary to the Groundwater Basin
		▪ Climate
		▪ Land Cover and Land Use
		▪ Water Sources
		
		GROUNDWATER INVENTORY
		▪ Groundwater Levels
		▪ Historical, Existing, Regional Changes
		▪ Groundwater Storage
		▪ Historical, Existing, Changes
		▪ Groundwater Production
		▪ Historical, Existing, Spatial and Temporal Changes, Safe Yield
		▪ Groundwater Mixing and Movement
		▪ Subsurface Inflow/Outflow
		▪ Horizontal and Vertical Movement and Mixing
		
		BASIN EVALUATION
		WATER BALANCE
		▪ Conceptual Model
		▪ Basin Inflow/Outflow
		▪ Groundwater, Surface Water, Imported Water, Water Transfers, Recycled Water Irrigation, Waste Water Discharges, Agricultural Runoff, Stormwater Runoff (Urban, Agriculture, Open Space), Precipitation
		▪ Infiltration, Evaporation, Evapotranspiration, Recharge, Surface Water and Groundwater Connectivity
		
		PROJECTED WATER QUALITY
		
		BASIN WATER QUALITY
		▪ Groundwater Quality
		    ▪ Background, Historical, Existing
		    ▪ Water Quality Objectives
		▪ Surface Water Quality
		▪ Delivered Water Quality
		▪ Imported Water Quality
		▪ Recycled Water Quality

6b(3)(a)	A basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations.	**BASIN MANAGEMENT PLAN ELEMENTS** BASIN MONITORING PROGRAMS ▪ Identify Responsible Stakeholder(s) Implementing the Monitoring ▪ Monitoring Program Goals

RECYCLED WATER POLICY SECTION	RECYCLED WATER POLICY REQUIREMENT	SNMP SUGGESTED ELEMENTS

6b(3)(a)(i)	The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.	▪ Sampling Locations
		▪ Water Quality Parameters
		▪ Sampling Frequency
		▪ Quality Assurance/Quality Control
		▪ Database Management
		▪ Data Analysis and Reporting
		▪ Groundwater Level Monitoring
		▪ Basin Water Quality Monitoring
		▪ Groundwater Quality Monitoring
		    ▪ Areas of Surface Water and Groundwater Connectivity
		    ▪ Areas of Large Recycled Water Projects
		    ▪ Recycled Water Recharge Areas

6b(3)(a)(iii)	The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data.	▪ Surface Water Quality Monitoring
		▪ Stormwater Monitoring
		▪ Wastewater Discharge Monitoring
		▪ Recycled Water Quality Monitoring
		▪ Salt and Nutrient Source Loading Monitoring
		▪ Other Constituents of Concern
		▪ Water Balance Monitoring
		    ▪ Climatological Monitoring
		    ▪ Surface Water Flow Monitoring
		    ▪ Groundwater Production Monitoring

6b(3)(b)	A provision for annual monitoring of Emerging Constituents/ Constituents of Emerging Concern (e.g., endocrine disrupters, personal care products or pharmaceuticals) (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy.	**BASIN EVALUATION** CONSTITUENTS OF EMERGING CONCERNS (CECs) ▪ Constituents ▪ CEC Source Identification
6b(3)(c)	Water recycling and stormwater recharge/use goals and objectives.	**BASIN MANAGEMENT PLAN ELEMENTS** GROUNDWATER MANAGEMENT GOALS ▪ Recycled Water and Stormwater Use/Recharge Goals and Objectives
6b(3)(d)	Salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.	**BASIN EVALUATION** SALT AND NUTRIENT BALANCE ▪ Conceptual Model ▪ Salt and Nutrient Source Identification ▪ Salt and Nutrient Loading Estimates ▪ Historical, Existing, Projected ▪ Import/Export ▪ Basin/Sub-Basin Assimilative Capacity for Salt and Nutrients ▪ Fate and Transport of Salt and Nutrients
6b(3)(e)	Implementation measures to	**BASIN MANAGEMENT PLAN ELEMENTS**

RECYCLED WATER POLICY SECTION	**RECYCLED WATER POLICY REQUIREMENT**	**SNMP SUGGESTED ELEMENTS**

	manage salt and nutrient loading in the basin on a sustainable basis.	GROUNDWATER MANAGEMENT GOALS
		▪ Groundwater Management Goals
		
		SALT AND NUTRIENT LOAD ALLOCATIONS
		
		SALT AND NUTRIENT MANAGEMENT STRATEGIES
		▪ Load Reduction Goals
		▪ Future Land Development and Use
		▪ Salt/Nutrient Management Options
		▪ Salt/Nutrient Management Strategies and Modeling
		▪ Management Strategy Model Results
		▪ Feasibility
		▪ Cost
		
		PLAN IMPLEMENTATION
		SALT AND NUTRIENT MANAGEMENT PROGRAM
		▪ Organizational Structure
		▪ Stakeholder Responsibilities
		▪ Implementation Measures to Manage Salt and Nutrient Loading
		▪ Salt/Nutrient Management
		  ▪ Water Supply Quality
		  ▪ Regulations of Salt/Nutrients
		  ▪ Load Allocations
		  ▪ Salt and Nutrient Source Control
		  ▪ CEC Source Control
		  ▪ Site Specific Requirements
		▪ Groundwater Resource Protection
		▪ Additional Studies
		
		PERIODIC REVIEW OF SALT/NUTRIENT MANAGEMENT PLAN
		▪ Adaptive Management Plan
		▪ Performance Measures
		▪ Performance Evaluation
		
		COST ANALYSIS
		▪ CWC § 13141, "…prior to implementation of any agricultural water quality control program, an estimate of the total cost of such a program, together with an identification of potential sources of funding, shall be indicated in any regional water quality control plan."
		
		IMPLEMENTATION SCHEDULE

6b(3)(f)	An antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16.	**ANTIDEGRADATION ANALYSIS**
No specific reference	While the background information listed in State	**BACKGROUND** ▪ Purpose

RECYCLED WATER POLICY SECTION	RECYCLED WATER POLICY REQUIREMENT	SNMP SUGGESTED ELEMENTS
	Water Board's "Suggested Elements" is not specifically identified by the Recycled Water Policy, it would provide the necessary information in support of the conceptual basis for the plan.	▪ Protection of Beneficial Use ▪ Sustainability of Water Resources ▪ Problem Statement ▪ Salt/Nutrient Management Objectives ▪ Regulatory Framework ▪ Groundwater Beneficial Uses ▪ Stakeholder Roles and Responsibilities ▪ Process to Develop Salt/Nutrient Management Plan

The Policy recognizes that:
The degree of specificity within these plans and the length of these plans will be dependent on a variety of site-specific factors, including but not limited to size and complexity of a basin, source water quality, stormwater recharge, hydrogeology, and aquifer water quality.

In response to this, State Water Board staff has suggested three classes of basins in the context of SNMP development to assist in determining the extent of information required for each class: Major, Saline/Coastal, and No Threat basins. They are defined as follows:

a) Major: Large in size, complex land use, heavily used, water quality threatened;
b) Saline/Coastal: Basins with naturally saline groundwater not currently used as a source of water; and
c) Low threat: Basins with minimal or no known or current threat to water quality.

The State Water Board staff have also provided draft Basin Plan Amendment templates to indicate the amount of information necessary for each classification. The templates for each basin class are provided in Appendix I. Groundwater basins in the Los Angeles Region do not necessarily fit neatly into these classes; the scope of information for a SNMP will also be influenced by basin-specific attributes, conditions and water quality concerns. However, stakeholders are encouraged to use the templates as a guide.

Regardless of how a basin may be categorized, the Policy states that the SNMP must include "implementation measures to manage salt and nutrient loading in the basin on a sustainable basis."
Where applicable, implementation strategies may be developed to address issues such as pollution prevention, water quality restoration, basin recharge with storm water and recycled water and groundwater-surface water interaction.

A. BASIN/SUB-BASIN WIDE MONITORING PLAN

As set forth in the Policy Part 6(b)(3)(a), each SNMP shall include *"a basin/sub-basin wide monitoring plan that includes an appropriate network of monitoring locations. The scale of the basin/sub-basin monitoring plan is dependent upon the site-specific conditions and shall be adequate to provide a reasonable, cost-effective means of determining whether the concentrations of salt, nutrients, and other constituents of concern as identified in the salt and nutrient plans are consistent with applicable water* *quality objectives. Salts, nutrients, and the constituents identified in paragraph 6(b)(1)(f) shall be monitored. The frequency of monitoring shall be determined in the salt/nutrient management plan and approved by the Regional Water Board pursuant to paragraph 6(b)(2).*

(i) The monitoring plan must be designed to determine water quality in the basin. The plan must focus on basin water quality near water supply wells and areas proximate to large water recycling projects, particularly groundwater recharge projects. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.

(ii) The preferred approach to monitoring plan development is to collect samples from existing wells if feasible as long as the existing wells are located appropriately to determine water quality throughout the most critical areas of the basin.

(iii) The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. The data shall be reported to the Regional Water Board at least every three years.

The objective of this requirement is to develop a basin wide monitoring plan that would allow for a comprehensive assessment of basin water quality in relation to beneficial uses supported by the basin and applicable water quality objectives. Several localized and project-specific monitoring programs exist throughout the basins in the region. These include monitoring of ground and surface waters by various agencies to comply with regulatory requirements, as well as voluntary monitoring efforts by these agencies and environmental groups. In keeping with the Policy's preferred approach, it is recommended that all parties engaged in water quality monitoring and data collection within each groundwater basin be identified as a starting point in developing a basin-wide monitoring plan. Compilation and review of existing programs and groundwater quality reports will reduce the potential for redundancy, and also assist in identifying data gaps that need to be addressed.

Regulatory agencies are involved in statewide monitoring of groundwater quality for the purpose of assessing and protecting groundwater basins. These agencies include the State Water Board, the California Department of Public Health, Department of Water Resources, Department of Toxic Substances Control, Department of Pesticide Regulation, and the U.S. Geological Survey. State Water Board's online groundwater information system, GeoTracker GAMA provides access to groundwater quality monitoring data from these agencies as well as other Regional Boards and the Lawrence Livermore National Laboratory. This information is available on the Groundwater Ambient Monitoring and Assessment (GAMA) program website at: http://www.waterboards.ca.gov/water_issues/programs/gama/geotracker_gama.shtml. Results from these monitoring efforts may be used in conjunction with those generated by water purveyors, managers and private entities in determining the scope of the monitoring plan.

The monitoring plan should clearly define the areal extent of the basin or sub-basin to be monitored. The region's major basin boundaries were most recently updated by the Department of Water Resources in its 2003 update of Bulletin 118 (DWR, 2003). While this update omitted some of the sub-basins that were identified in the previous version, the Regional Water Board's Basin Plan still retains these basins/sub-basin as ground waters to be protected under the California Water Code.

In developing sampling locations within a given basin, stakeholders are encouraged to consider:

a) Location of existing monitoring locations;
b) Location of existing and potential contributing sources, including areas with significant groundwater-surface water interaction; and
c) Existing and proposed recycled water projects/facilities and groundwater recharge areas.

Stakeholders are also encouraged to use the 2003 U.S. Geological Survey report titled "Framework for a Ground Water Quality and Assessment Program for California" as a resource when developing the monitoring plan. This document is available at: http://www.waterboards.ca.gov/water_issues/programs/gama/docs/usgs_rpt_72903_wri034166.pdf

The parameters to be monitored should be reflective of the water quality conditions and applicable water quality objectives within a given basin or sub-basin. Per the Policy, salts, nutrients, and CECs will be monitored in all basins. It is recommended that a draft monitoring plan be submitted to the Regional Water Board for review prior to finalizing the SNMP of which it would be a component. As with other groundwater monitoring programs in the region, data generated from SNMP monitoring programs should be submitted to the State Water Board's online groundwater information system – GeoTracker.

The Policy also states that Salt and Nutrient Management Plans may include constituents other than salt and nutrients which may impact water quality in the basin/sub-basin. However, inclusion of additional parameters is at the discretion of stakeholders involved in the SNMP development process. Stakeholders are encouraged to consider existing groundwater quality information and their knowledge of localized conditions, in determining which other parameters of concern should be monitored. Table 4-3 lists some of the known parameters of concern in the major basins and sub-basins in the Los Angeles Region.

TABLE 4-3: PARAMETERS OF CONCERN IN THE LOS ANGELES REGION'S MAJOR BASINS

<table>
<tr><th colspan="2">Groundwater Basin</th><th>Primary Parameters of Concern*</th></tr>
<tr><td colspan="2">West Coast
Central</td><td>Seawater Intrusion</td></tr>
<tr><td colspan="2">San Gabriel
Raymond</td><td>VOCs, SVOCs</td></tr>
<tr><td colspan="2">San Fernando</td><td>VOCs, Cr^{VI}</td></tr>
<tr><td>Santa Clara Watershed</td><td>Oxnard
Mound
Santa Paula
Fillmore
Piru
East Santa Clara</td><td>Nitrate, Salts, TDS, DDT, PCBs</td></tr>
<tr><td colspan="2">Pleasant Valley</td><td>Nitrates, TDS, Salts</td></tr>
</table>

Groundwater Basin		Primary Parameters of Concern*
Ojai Ventura River		Nitrates
Calleguas Watershed	Conejo Valley Russell Valley Hidden Valley Simi Valley Tierra Rejada Thousand Oaks	Nitrates, TDS, Salts
Malibu Valley		Seawater Intrusion

*This is not a complete list of parameters of concern.

B. MONITORING OF CONSTITUENTS OF EMERGING CONCERN

Constituents of emerging concerns (CECs) include several types of chemicals that may be classified as (i) persistent organic pollutants (ii) pharmaceuticals and personal care products, (iii) veterinary medicines, (iv) endocrine disruptors, and others. Such constituents present water quality concerns due to their large number and variety, their prevalence in the environment, and their potential for harmful effects on aquatic life. Much less is known about their potential effects on humans. Increasing recycled water use has the potential to increase the occurrence of CECs in ground water basins through indirect potable reuse or groundwater recharge reuse (i.e., augmentation of drinking water aquifers using recycled water), as well as urban landscape irrigation. Staff are coordinating with EPA, the Southern California Coastal Water Research Project, and others in studying this issue.

Recycled Water Policy CEC Monitoring Requirements:
As stated in the Policy, *"[e]ach Salt and Nutrient Management Plan shall include a provision for annual monitoring of Emerging Constituents/Constituents of Emerging Concern (CECs) consistent with recommendations by CDPH and consistent with any actions by the State Water Board taken pursuant to paragraph 10(b) of this Policy."*

Paragraph 10(b) of the Policy directs the State Water Board, in consultation with the California Department of Public Health (CDPH), to convene a "blue-ribbon" advisory panel to guide future actions relating to constituents of emerging concern.

The advisory panel (Panel) completed its report (Panel Report) on CECs in June 2010. State Water Board staff developed a staff report (SWRCB, 2010) based on recommendations from the Panel and those provided by the CDPH. In December 2010, the State Water Board held a public hearing regarding proposed CEC monitoring requirements presented in the staff report.
The Panel Report employed a risk-based screening process to identify CECs of toxicological relevance to monitor for potable and non-potable recycled water use scenarios (i.e., groundwater recharge reuse and landscape irrigation). The screening approach focused the universe of CECs based on their potential for health effects and their occurrence in recycled water in California. The Panel Report recommends monitoring of selected performance indicator CECs to evaluate the performance of treatment processes to remove CECs; and recommends monitoring of surrogate parameters, such as turbidity, dissolved organic carbon, and conductivity, to verify that treatment units are working as designed.

Health-based CECs selected for monitoring include caffeine, 17-beta-estradiol (17β-estradiol), n-nitrosodimethylamine (NDMA), and triclosan.

The Panel also selected a set of performance-based indicator CECs. Each selected performance-based indicator CEC represents a group or a family of CECs. The removal of the performance-based indicator CEC through a treatment process provides an indication of the removal of the other CECs in the group, provide they have similar properties. The six compounds selected to serve as performance-based indicator CECs are caffeine, gemfibrozil, n,n-diethyl-meta-toluamide (DEET), iopromide, NDMA, and sucralose. Caffeine and NDMA serve as both health and performance-based indicator CECs.

Upon reviewing the oral and written comments received on the publicly noticed staff report, the State Water Board drafted an amendment to the Policy prescribing monitoring requirements for CECs in recycled water used for groundwater recharge reuse and landscape irrigation. The draft Policy amendment ("Requirements for Monitoring Emerging Constituents/Constituents of Emerging Concern for Recycled Water") was released for public comment on May 9, 2012. The proposed amendment and accompanying attachment can be found on the State Water Board's website at: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/draft_amendment_to_policy.shtml

Other Considerations

The California Department of Public Health has released a draft of their Groundwater Replenishment Reuse Regulations, which are used to regulate recycled water for replenishment projects. Upon adoption of the final regulation, where the CEC monitoring requirements differ from those specified by the State Water Board in the amendment to the Policy, monitoring for the additional constituents specified by California Department of Public Health regulations should be included where groundwater recharge using recycled water is a consideration.

Section 60320.120(c) of the draft regulations requires annual monitoring of indicator CECs specified by CDPH and the Regional Water Board by proponents of groundwater replenishment and reuse projects (GRRPs). Stakeholders may take this into consideration in developing CEC monitoring programs for each basin/sub-basin where such projects exist or are planned. .

Regional Board Considerations

The Los Angeles Regional Board has taken early actions to begin to address CECs. The Board currently includes CEC Special Study Requirements in NPDES permits for Publicly Owned Treatment Works (POTWs), during permit renewal.
In addition, the development of a CEC monitoring strategy for the region was identified as a priority project during the project-selection phase of the 2011-13 triennial review. The Regional Board has also directed resources toward establishing some baseline information on CEC occurrence, and fate and transport in inland surface waters throughout the region. The information gathered from on-going monitoring and other applicable studies will inform future monitoring strategies.

Where site specific CEC monitoring is required for existing or proposed projects within a groundwater basin or sub-basin, SNMP proponents are encouraged to consider including them as part of the CEC monitoring strategies developed for the basin or sub-basin

C. SALT AND NUTRIENT ANALYSIS

As stated in the Policy, *"[e]ach SNMPs shall include salt and nutrient source identification, basin/sub-basin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients…"* in order to *"… address and implement provisions, as appropriate, for all sources of salt and/or nutrients to groundwater basins, including recycled water irrigation projects and groundwater recharge reuse projects."*

Identification of existing and planned future sources of salts and nutrients is an essential part of a SNMP. This allows for a more accurate assessment of the pollutant loads to the basin and analysis of the final impact on basin water quality as determined through fate and transport analysis. A comprehensive consideration of sources will lead to a robust assessment and a more effective implementation strategy for basin management. Table 4-5 provides examples of source considerations in conducting this analysis.

TABLE 4-6: LIKELY SOURCES OF SALTS, NUTRIENTS, AND OTHER POLLUTANTS OF CONCERN IN GROUNDWATER BASINS

Source Considerations	Examples
Land uses	Agricultural and landscape irrigation
Groundwater recharge	Recycled water, Municipal water supply, Stormwater
Point source discharges to groundwater	Municipal and Industrial facilities, Other permitted facilities (e.g. landfills)
Non-point source discharges	Agricultural and nursery facilities, on-site wastewater treatment system discharges
Specific point sources	Injection wells*, percolation basins*
Surface water-groundwater interaction	Percolation from stream flow, stormwater runoff infiltration
Sub-surface inflow	Seawater intrusion, upstream inflow
Discrete discharges	Chemical spills, leaking tanks, improper disposal

*associated with oil production

In order to estimate pollutant loads to these basins, it will be necessary to quantify the mass loadings of all identifiable sources to each basin/sub-basin, and evaluate their fate and transport Stakeholders have the flexibility to apply any scientifically defensible methodology to make these determinations.

D. WATER RECYCLING AND STORMWATER RECHARGE/USE GOALS AND OBJECTIVES

Recycled Water Use

As stated in the Policy, *"[e]ach SNMP shall include water recycling and stormwater recharge goals and objectives."* With the intent of moving towards sustainable management of surface waters and groundwater, the Policy adopts the goals of increasing the use of recycled water in California over 2002 levels by at least one million acre-feet per year (afy) by 2020 and by at least two million afy by 2030.

There are a significant number of recycled water facilities in the Los Angeles Region. The State Water Board conducted a 2009 survey of recycled water use throughout the state to determine the amount of recycled water used and the beneficial uses to which recycled water was put. Only publicly-owned wastewater and water recycling agencies were included in the survey. Due to the low response rate from agencies solicited (18%), data from a similar 2001 survey were included in the overall results. Table 4-6 shows survey results for responding agencies in the Los Angeles Region. More details on the survey are available on the State Water Board's website at http://www.waterboards.ca.gov/water_issues/programs/grants_loans/water_recycling/munirec.shtml.

TABLE 4-7: SURVEY RESULTS OF RECYCLED WATER USE BY POTWS AND WATER RECYCLING AGENCIES IN THE LOS ANGELES REGION

Agency	Total Reuse (AFY)	Beneficial Use
Burbank Water and Power	2090	Golf Course and Landscape Irrigation, Industrial
City of Burbank	879	Landscape Irrigation, Geothermal/Energy Production
City of Los Angeles Bureau of Sanitation	40,787	Recreational Impoundment, Natural systems restoration, Wetlands, Wildlife Habitat
City of Los Angeles Department of Water and Power	32,113	Golf Course & Landscape Irrigation, Industrial, Seawater Intrusion Barrier, Recreational Impoundment, Natural systems restoration, Wetlands, Wildlife Habitat
City of Los Angeles Department of Public Works	3,683	Landscape Irrigation, Geothermal/Energy Production
Camarillo Sanitation District/City of Camarillo	1,293	Agriculture Irrigation
Camrosa Water District	779	Agriculture Irrigation
City of Fillmore	110	Landscape Irrigation
County Sanitation Districts of Los Angeles County	80,000	Unspecified (likely groundwater recharge)
Las Virgenes Municipal Water District	5,174	Landscape Irrigation
Los Angeles County Department of Public Works	148	Landscape Irrigation
Long Beach Water Department	6,380	Golf Course & Landscape Irrigation, Commercial, Seawater Barrier
Ventura County Waterworks District 1	428	Golf Course Irrigation
Ventura County Waterworks District 1	63	Commercial
West Basin Municipal Water District	26,032	Landscape Irrigation, Industrial, Seawater Intrusion Barrier

While the majority of facilities surveyed used their recycled water for irrigation, a significant portion of the recycled water is used for groundwater recharge. In the Central and West Coast Groundwater Basins, recycled water is used extensively by the Water Replenishment District of Southern California for groundwater recharge and to maintain seawater intrusion barriers. An innovative form of recycling is practiced by the City of Santa Monica using its Santa Monica Urban Runoff Recycling Facility, which collects and treats 90% of the City's urban runoff in the dry season for use in landscape irrigation.

Substituting potable water with recycled water is another means of increasing recycled water use and reducing dependence on imported water supplies. This may be achieved by developing an indirect potable use program similar to the one initiated by the Orange County Water District.

SNMPs should include goals and objectives for water recycling. As part of developing these goals, it may be helpful to examine master plans for water recycling that have been developed by recycled water producers, distributors, and municipalities, as well as Urban Water Management Plans.

Stormwater Use

Another goal of the Policy, with the intent of increasing sustainable local water supplies, is to increase the use of stormwater over the levels in 2007 by at least 500,000 afy by 2020 and by at least one million afy by 2030.The Policy recognizes that stormwater is typically lower in nutrients and salts and can augment local water supplies, and therefore deems the inclusion of a significant stormwater use and recharge component within the salt/nutrient management plans to be critical to the long-term sustainable use of water in California. In support of this, the State Water Board expects to develop additional policies to encourage the use of stormwater, encourage water conservation, encourage the conjunctive use of surface and groundwater, and improve the use of local water supplies.

The Regional Water Board also recognizes stormwater as a valuable resource and contains a requirement in its Municipal Separate Stormwater Systems (MS4) permits that new developments and significant redevelopments retain stormwater onsite using low impact development (LID) best management practices (BMPs), with an allowance for regional and other alternative compliance approaches. MS4 permits require that land development projects be designed to infiltrate, harvest and use, evapotranspire, or bio-treat a specified volume of stormwater onsite using LID BMPs, if technically feasible. The intent of this requirement is twofold – first, to achieve improvements in water quality by preventing pollutants conveyed by stormwater from being discharged to receiving waters and, second, to increase the use of stormwater for groundwater recharge.

Since new developments and redevelopments will not necessarily occur in areas where infiltration or recharge is feasible, it is important that stormwater use be considered on a regional scale to maximize the potential for stormwater infiltration and use. Basin stakeholders are encouraged to consider such an approach in developing their implementation strategies for increasing stormwater use.

E. IMPLEMENTATION MEASURES

As stated in the Policy, *"[e]ach SNMP shall include implementation measures to manage salt and nutrient loading in the basin on a sustainable basis."*

Implementation strategies should integrate water quantity and quality, groundwater and surface water, and recharge area protection in order to maintain a sustainable long-term supply for multiple beneficial uses. These strategies will be dictated to a large degree by basin-specific characteristics and conditions. Depending on conditions within each basin/sub-basin, strategies may generally be geared towards:

a) Pollution prevention to maintain and protect ground water quality at levels consistent with Basin Plan objectives and the State's anti-degradation policy;
b) Source load reductions to groundwater basins;
c) Treatment and management of areas of impaired water quality;
d) Increasing groundwater recharge by storm water; and
e) Increasing recycled water use.

Based on water quality conditions within a basin and the results of the source loading and fate and transport analysis, salts and nutrients from identifiable non-point and point sources should be managed in a manner that will support attainment of applicable water quality objectives. Measurable parameters should be identified for evaluation of the effectiveness of the strategies, and an implementation schedule and monitoring program should be developed to track progress toward basin management goals. Implementation measures may also include, as appropriate, strategies for local water supply development including increasing the use of recycled water, and plans for stormwater retention for use or recharge.

The consideration of implementation alternatives should take into account the interest of all parties currently involved in basin use and management in order to resolve any potential competing or conflicting interests prior to finalizing the basin management approach. To the greatest extent feasible, input from all stakeholders and interested parties should be solicited as part of the development process.

The Regional Water Board recognizes that a number of agencies have developed basin management plans for specific basins; while others have developed specific management measures for salt and/or nutrient impairments. Existing basin or sub-basin management plans and salt and nutrient management strategies should be assessed to determine their applicability towards the SNMP requirements of the Policy. For the purpose of SNMP development, these efforts may be supplemented as necessary to provide missing elements or address inconsistencies and demonstrate compliance with SNMP requirements. In instances where water quality from a sub-basin or basin may impact or be impacted by that of adjacent basins, all stakeholders concerned are encouraged to collaborate in developing salt and nutrient management strategies.

F. ANTI-DEGRADATION REQUIREMENTS

As stated in the Policy, *"[e]ach Salt and Nutrient Management Plan shall include an antidegradation analysis demonstrating that the projects included within the plan will, collectively, satisfy the requirements of Resolution No. 68-16."*

Resolution No. 68-16 is the State Water Board's "Statement of Policy with respect to Maintaining High Quality of Waters in California" also known as the State Anti-degradation Policy. It requires that:

> *Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*

Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

The intent of Resolution 68-16 is to preserve the State's high quality waters. Any activity that results in the discharge of waste must be subject to treatment or controls that assure that the discharge will not cause the receiving water to exceed water quality objectives set forth in the applicable Basin Plan or cause pollution or nuisance. In addition, the discharge should be controlled to achieve the highest water quality feasible. In other words, water quality should be the best it can be, but at least not exceed water quality objectives or impact beneficial uses. The water quality objectives are set forth in the Regional Water Board Basin Plans, the State Water Board's Sources of Drinking Water Policy, and the California Ocean Plan. The baseline water quality to maintain refers to the highest existing quality since Resolution No. 68-16 was adopted in 1968, although if a lowering of water quality was formally approved in the past, this could adjust the baseline.

In some instances, degradation of existing water quality may be allowed so long as such degradation is consistent with the maximum benefit to the people of the state. Modification of existing water quality through the development of site specific objectives should only be considered when all other salt and nutrient management alternatives have been exhausted; and even so should be part of a larger salt and nutrient load reduction strategy. Such changes to water quality objectives may only occur where the existing water quality is better than that required to support the most sensitive beneficial use(s) of the basin (i.e. where there is assimilative capacity). Basin-wide management strategies should always be developed in a manner that would be protective of the most sensitive beneficial uses within a basin.

Where project(s) within SNMPs have the potential to degrade the water quality within a basin, stakeholders are required to conduct an anti-degradation analysis. The rigor of the analysis required depends on the nature and extent of the potential degradation. The guidelines and requirements for such analysis are provided below and parallel, to a large extent, those provided in the Policy for basins where plans are yet to be completed. This analysis will be part of the supporting documentation for the Basin Plan amendment incorporating the implementation plan(s) consistent with implementation measures identified in the SNMP. Implementation projects must be demonstrated to be consistent with Resolution 68-16 as supported by the anti-degradation analysis conducted as part of SNMP development.

The Policy recognizes that groundwater recharge and landscape irrigation projects are to the benefit of the people of the state, despite having the potential to lower water quality within the basin. As such, the Policy provides a threshold below which less rigorous analysis will be conducted for the anti-degradation analysis – during the period before SNMPs have been developed.

The Regional Water Board will apply the same considerations, on a basin-wide scale, once SNMPs are in place.

(1) Generally, a basin-wide implementation strategy that utilizes less than 20 percent of the available assimilative capacity in a basin/sub-basin need only conduct an anti-degradation analysis verifying the use of the assimilative capacity. For those basins /sub-basins where the Regional Water Boards have not determined the baseline assimilative capacity, the baseline assimilative capacity shall be calculated by the initial project proponent, with review and approval by the Regional Water Board. The available assimilative capacity shall be calculated by comparing the water quality objectives with the average concentration of the basin/sub-basin[7], either over the most recent five years of data available or using a data set approved by the Regional Water Board Executive Officer. Though the Policy expresses assimilative capacity in units of concentration, the Regional Water Board recognizes that, depending on the complexity of the basin, it may be more appropriate to calculate and express assimilative capacity as a load. Historical groundwater quality data will be reviewed in order to inform decisions about assimilative capacity and conclusions drawn about anti-degradation requirements. In determining whether the available assimilative capacity will be exceeded by the basin-wide implementation strategy, the Regional Water Board will consider the impacts of the strategy over at least a ten-year time frame, based on an analysis of these impacts provided by the project proponent(s), and other relevant data and information.

(2) In the event a basin wide implementation strategy utilizes more than 20 percent of the available assimilative capacity in a basin/sub-basin), a more rigorous anti-degradation analysis shall be performed to comply with Resolution No. 68-16. Proponents of the strategy shall provide sufficient information for the Regional Water Board to make this determination.

In addition to verification of the assimilative capacity to be used, the analysis should show:

a) That the strategy is necessary to accommodate important economic or social development;
b) Any reduction in water quality will be consistent with maximum benefit to people of the State;
c) Reduction in water quality will not unreasonably affect actual or potential beneficial uses; and
d) Water quality will not fall below water quality objectives set to protect beneficial uses as prescribed in the Basin Plan.

The severity and extent of water quality reduction will be considered when evaluating the benefits required to compensate for the degradation. The magnitude of the proposed strategy and potential reduction in water quality will also determine the scope of impact assessment. The Regional Water Board will ensure that a systematic impact assessment is conducted.

Factors that should be considered when determining whether a strategy is necessary to accommodate social or economic development and is consistent with maximum benefit to the people of the State, include:

1. Past, present, and probable beneficial uses of the water.

[7] More than one average concentration may be necessary for a given basin/sub-basin to fully evaluate variability between sub-areas or sub-basins.

2. Economic and social costs, tangible and intangible, of the proposed strategy compared to benefits. The economic impacts to be considered may include the cost of alternative actions in lieu of the proposed strategy, as well as the cost of any mitigation necessary to address degradation resulting from the proposed strategy. The long-term and short-term socioeconomic impacts of maintaining existing water quality must be considered. Examples of social and economic parameters that could be affected are employment, housing, community services, income, tax revenues, and land value. To accurately assess the impact of the proposed strategy, the projected baseline socioeconomic profile of the affected community without the strategy should be compared to the projected profile with the strategy.

3. The environmental aspects of the proposed discharge must be evaluated. The proposed discharge, while actually causing a reduction in water quality in a given water body, may be simultaneously causing an increase in water quality in a more environmentally sensitive body of water from which the discharge in question is being diverted.

4. The implementation of feasible alternative control measures, which might reduce, eliminate, or compensate for negative impacts of the proposed action.

Participation from the public and appropriate government agencies should be solicited in the “maximum benefit” determination to ensure that the environmental, social, and economic impacts of the strategy are accurately assessed.

The Regional Water Board will ultimately make the decision as to whether or not it is to the maximum benefit of the people of the State to use more than 20% of the assimilative capacity of a basin or sub-basin as part of a SNMP’s implementation strategy. Consideration will be given to providing buffers for varying environmental conditions such as droughts, as well as the needs of future generations.

Where no assimilative capacity exists for salts and/or nutrients within a basin/sub-basin, stakeholders may explore and implement strategies for creating such assimilative capacity. As previously mentioned, modifying water quality objectives should only be considered where all other alternatives have been exhausted and then only as part of a larger comprehensive salt and nutrient reduction strategy. Any modifications to water quality objectives shall be done in a manner that protects the most sensitive beneficial uses in a basin/ sub-basin.

The Policy includes an example of an approved method for conducting an anti-degradation analysis based on a numeric groundwater model. It was used by the State Water Board in connection with Resolution No. 2004-0060 and the Regional Water Board in connection with Resolution No. R8-2004-0001. However, stakeholders have the flexibility to use other methods that have been deemed acceptable by the Regional Board. SNMP proponents should vet any such other methods with Regional Board staff prior to embarking on an analysis using the method. The Policy also encourages an integrated approach (using surface water, groundwater, recycled water, stormwater, pollution prevention, water conservation, etc.) to the implementation of Resolution No. 68-16.

An anti-degradation analysis will not be required where it has been demonstrated that implementation strategies are not expected to result in water quality degradation in a groundwater basin.

E. Discharges covered by the Recycled Water Policy

The Policy is specifically geared towards increasing the use of recycled water from municipal wastewater sources permitted through Wastewater Recycling Requirements (WRRs). Land discharges of wastewater are addressed through separate Waste Discharge Requirements (WDRs), however, this does not preclude them from the SNMP development process. Such discharges (existing and proposed) should be accounted for in determining source loading estimates, determination of assimilative capacity, and in basin management planning. In the same vein, recycled water projects already in progress should be considered during the same phases of SNMP development.

5. CEQA REQUIREMENTS

The Policy requires that salt and nutrient management plans developed for basin/sub-basins comply with the applicable California Environmental Quality Act (CEQA) requirements. The following outlines the CEQA requirements for the Regional Board adoption of SNMP implementation strategies into the Water Quality Control Plan for the Los Angeles Region (Basin Plan). SNMP proponents may be required to comply with other CEQA requirements related to specific implementation strategies for salt and nutrient management contained in their plans. SNMP proponents are to conduct the environmental analysis required for Regional Board adoption.

The CEQA requires state and local agencies determine the potential significant environmental impacts of proposed projects and identify measures to avoid or mitigate these impacts where feasible. The CEQA Guidelines, which provide the protocol by which state and local agencies comply with CEQA requirements, are detailed in California Code of Regulations, Title 14 § 15000 et seq.

The basic purposes of CEQA are to: 1) inform decision makers and public about the potential significant environmental effects of a proposed project, 2) identify ways that environmental damage may be mitigated, 3) prevent significant, avoidable damage to the environment by requiring changes in projects, through the selection of alternative projects or the use of mitigation measures when feasible, and 4) disclose to the public why an agency approved a project if significant effects are involved (Cal. Code Regs., tit. 14, § 15002(a)).

LEAD AND RESPONSIBLE AGENCIES UNDER CEQA

As set forth in the Policy, stakeholders will fund SNMP development including any necessary analysis and documentation to comply with CEQA. Stakeholders will develop implementation strategies, which may include projects requiring environmental analysis. Public agencies that carry out or implement projects associated with the SNMPs are considered the lead agencies under CEQA for these individual projects. However, in addition, the implementation measures identified in a SNMP may be adopted as amendments to the Basin Plan by the Regional Water Board, and CEQA analysis is a required part of the adoption process in accordance with the State Water Board's certified regulatory program. As such, for the purpose of Water Board adoption of a Basin Plan amendment, the Regional Water Board will be the lead agency for purposes of CEQA. Therefore, it will be necessary for stakeholders and Regional Water Board staff to work in collaboration.

REQUIRED ENVIRONMENTAL ANALYSIS

The California Secretary for Natural Resources has certified the State and Regional Water Boards' basin planning process as exempt from certain requirements of CEQA, including preparation of an initial study, negative declaration, and environmental impact report (California Code of Regulations, Title 14, Section 15251(g)).

The basin planning process is certified by the Secretary for Natural Resources as a regulatory program exempt from the requirements to prepare an Environmental Impact Report, Negative Declaration, and Initial Study (Title 14, California Code of Regulations (CCR), Section 15241(g)). However, a certified program is subject to other provisions in CEQA (Pub. Resources Code, Section 21000 et seq.), such as the requirement to avoid significant adverse effects to the environment where feasible. The Regional Board is required to comply with State Water Board regulations set forth in California Code of Regulations, Title 23, sections 3775 et. seq, and Public Resources Code section 21159.

Requirements of California Code of Regulations, Title 23, Section 3777(a)

The “certified regulatory program” of the Regional Water Board is also subject to the substantive requirements of California Code of Regulations, Title 23, Section 3777(a), which requires a written report that includes a description of the proposed activity, an analysis of reasonable alternatives, and an identification of mitigation measures to minimize any significant adverse environmental impacts. Section 3777(a) also requires the Regional Water Board to complete an environmental checklist as part of its substitute environmental documents.

Any water quality control plan, state policy for water quality control, and any other components of California's water quality management plan as defined in Code of Federal Regulations, title 40, sections 130.2(k) and 130.6, proposed for board approval or adoption must include or be accompanied by Substitute Environmental Documentation (SED) and supported by substantial evidence in the administrative record. The Draft SED may be comprised of a single document or a compilation of documents. The Draft SED must be circulated prior to board action approving or adopting a project, as specified in sections 3778 and 3779. The Draft SED shall consist of:

a) A written report prepared for the board, containing an environmental analysis of the project;
b) A completed Environmental Checklist (a sample of which is contained in Appendix II). The sample Environmental Checklist may be modified as appropriate to meet the particular circumstances of a project. The issues identified in the Environmental Checklist must be evaluated in the checklist or elsewhere in the SED; and
c) Other documentation as the board may include.

The Draft SED shall include, at a minimum, the following information:

a) A brief description of the proposed project;
b) An identification of any significant or potentially significant adverse environmental impacts of the proposed project;
c) An analysis of reasonable alternatives to the project and mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts; and
d) An environmental analysis of the reasonably foreseeable methods of compliance. The environmental analysis shall include, at a minimum, all of the following:
    i. An identification of the reasonably foreseeable methods of compliance with the project;

ii. An analysis of any reasonably foreseeable significant adverse environmental impacts associated with those methods of compliance;
iii. An analysis of reasonably foreseeable alternative methods of compliance that would have less significant adverse environmental impacts; and
iv. An analysis of reasonably foreseeable mitigation measures that would minimize any unavoidable significant adverse environmental impacts of the reasonably foreseeable methods of compliance.

In the preparation of the environmental analysis described in d) above, the board may utilize numerical ranges or averages where specific data are not available; however, the board shall not be required to engage in speculation or conjecture. The environmental analysis shall take into account a reasonable range of environmental, economic, and technical factors, population and geographic areas, and specific sites, but the board shall not be required to conduct a site-specific project level analysis of the methods of compliance, which CEQA may otherwise require of those agencies who are responsible for complying with the plan or policy when they determine the manner in which they will comply.

As to each environmental impact, the SED shall contain findings as described in State CEQA Guidelines section 15091, and if applicable, a statement described in section 15093.

If the board determines that no fair argument exists that the project could result in any reasonably foreseeable significant adverse environmental impacts, the SED shall include a finding to that effect in lieu of the analysis of project alternatives and mitigation measures.

If the board determines that no fair argument exists that the reasonably foreseeable methods of compliance with the project could result in any reasonably foreseeable significant adverse environmental impacts, the SED shall include a finding to that effect in lieu of the analysis of alternative methods of compliance and associated mitigation measures.

Requirements of Public Resources Code section 21159

Public Resources Code section 21159 has the same minimum requirements for the environmental analysis which the Regional Water Board is also required to fulfill along with the same considerations. Section 21159(c) requires that the environmental analysis take into account a reasonable range of:

a) Environmental, economic, and technical factors,
b) Population and geographic areas, and
c) Specific sites.

A “reasonable range” does not require an examination of every site, but a reasonably representative sample of them. The statute specifically states that the section shall not require the agency to conduct a “project-level analysis” (Public Resources Code § 21159(d)). Rather, a project-level analysis must be performed by the local agencies that will implement the strategies and projects identified in the SNMP (Public Resources Code §21159.2). Notably, the Regional Water Board is prohibited from specifying the manner of compliance with its regulations (Cal. Water Code §13360), and accordingly, the actual environmental impacts will necessarily depend upon the compliance strategy selected by the local agencies and other permittees.

State Water Board Finding
As set forth in the Policy, the State Water Board finds that the use of recycled water which supports the sustainable use of groundwater and/or surface water that is sufficiently treated so as not to adversely impact public health or the environment and which ideally substitutes for use of potable water is presumed to have a beneficial impact. Other public agencies are encouraged to use this presumption in evaluating the impacts of recycled water projects on the environment as required by the CEQA.

Public Participation Requirements for the CEQA Process

Pursuant to California Public Resources Code section 21083.9, a CEQA Scoping Meeting will be held to receive comments on the appropriate scope and content of substitute environmental documents supporting amendments to the Basin Plan to incorporate salt and nutrient management plans for groundwater basins in the Los Angeles Region. The purpose of this meeting is to scope the proposed projects and/or strategies for groundwater basin management and to determine, with input from interested agencies and persons, if those means would result in significant adverse impacts to the environment. Information garnered from this process will be considered during development of the draft SED and, where applicable, may be incorporated into the final document.

ROLES OF STAKEHOLDER GROUPS AND REGIONAL WATER BOARD STAFF IN THE CEQA PROCESS

Both Regional Water Board staff and stakeholder groups will be significantly involved in the environmental analysis for the SNMPs. Table 5-1 lists the different aspects of the CEQA process and identifies the roles of each party.

TABLE 5-1: ROLES OF STAKEHOLDERS AND REGIONAL WATER BOARD STAFF IN THE CEQA PROCESS FOR BASIN PLAN AMENDMENTS

TASK	REGIONAL WATER BOARD	STAKEHOLDERS
LEAD AGENCY	Lead	
CEQA SCOPING MEETING	Co-Lead	Co-Lead
ENVIRONMENTAL ANALYSIS	Oversight	Lead
SED DEVELOPMENT	Oversight	Lead
DOCUMENT REVIEW	Lead	
RESPONSE TO COMMENTS	Lead - Regulatory	Lead - Technical
REVISIONS	Oversight/Review	Lead
PUBLIC HEARING	Lead	
PROJECT LEVEL EIR		Lead

The CEQA scoping meeting will be held jointly by Regional Water Board staff and stakeholder groups, while the environmental analysis will be conducted primarily by the groundwater basin stakeholder groups with oversight and review by Regional Water Board staff. Following the release of the draft environmental document for public review, it is anticipated that there will be comments on its technical and regulatory aspects. The Regional Water Board will take the lead in responding to the regulatory comments, while stakeholders will be the lead for responding to technical comments. Any revisions necessary in response to public comments will be the purview of the stakeholder groups with oversight by Regional Water Board staff. Preparation of the environmental documentation for consideration and adoption by the Regional Water Board will be the responsibility of Regional Water Board and staff. Finally, once the SNMPs have been adopted and specific projects are to be implemented, basin stakeholders will be responsible for the development of project-specific environmental analysis and other related CEQA requirements.

TIMELINE FOR THE CEQA PROCESS IN RELATION TO SNMP DEVELOPMENT

The SED will be considered by the Regional Water Board as part of the adoption of the implementation provisions contained in the SNMPs. Approval of the SED is separate from approval of a specific project alternative or a component of an alternative. Approval of the SED refers to the process of: (1) addressing comments, (2) confirming that the Regional Water Board considered the information in the SED, and (3) affirming that the SED reflects independent judgment and analysis by the Regional Water Board - CEQA Guidelines Section 10590 and 15090 (Title 14 of CCR).

Stakeholders are encouraged to begin the CEQA process once potential basin management strategies have been identified during SNMP development. The CEQA scoping meeting should be held early enough in the process for consideration of public comments during the development of the substitute environmental document. Ideally the SED should be completed at the same time as the SNMP for timely consideration and adoption by the Regional Water Board.
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6. BOARD ADOPTION OF SNMPS

As stated in the Policy: *Salt and nutrient plans shall be completed and proposed to the Regional Water Board within five years from the date of this Policy unless a Regional Water Board finds that the stakeholders are making substantial progress towards completion of a plan. In no case shall the period for the completion of a plan exceed seven years.*

Stakeholders are encouraged to complete and submit SNMPs for each basin by May 2014 as specified in the Policy. However, the Policy allows for an extension where significant progress has been made but this deadline cannot be met. For this purpose, the Regional Water Board will consider “significant progress” as follows: (i) upon completion of a collaborative stakeholder developed basin wide monitoring plan that meets the requirements set forth in the Policy, (ii) completion of the salt/nutrient source identification, loading and linkage analysis, and (iii) commencement of the development of implementation strategies for basin management. Stakeholders will also be required to make a showing that completion by the May 2014 deadline is infeasible. SNMPs that have not achieved significant progress may warrant greater Regional Board involvement or Regional Board developed plans, and will be addressed on a case-by-case basis.

Within one year of the receipt of a proposed salt and nutrient management plan, the Regional Water Boards shall consider for adoption revised implementation plans, consistent with Water Code section 13242, for those groundwater basins within their regions where water quality objectives for salts or nutrients are being, or are threatening to be, exceeded. The implementation plans shall be based on the salt and nutrient plans required by this Policy.

The Regional Water Board expects to adopt the implementation provisions of each SNMP within one year of submission by basin/sub-basin stakeholders. State Water Board staff have provided templates for these Basin Plan amendments (see Appendix I) as a guide to the scope of information to be provided in the amendment language. Table 6-1 provides a tentative schedule of stakeholder tasks and submissions.

TABLE 6-1: TENTATIVE SCHEDULE OF STAKEHOLDER SUBMISSIONS

Tasks	Date
CEQA Scoping Meeting	June 2013
Initial Draft SNMP & CEQA submittal	November 2013
Final Draft SNMP & CEQA submittal	May 2014
Regional Water Board Consideration and Adoption	May 2015 and beyond

Regional and State Water Board Resources

Regional Water Board staff expects to continue working collaboratively with groundwater basin stakeholders during the SNMP development process, as well as through the Board adoption process. In addition to staff assigned for this purpose, the following resources are available to stakeholders to facilitate the process.

Regional Water Board SNMP website:

www.waterboards.ca.gov/losangeles/water_issues/programs/salt_and_nutrient_management/index.shtml

SNMP E-mail list subscription:
http://www.waterboards.ca.gov/resources/email_subscriptions/reg4_subscribe.shtml

Groundwater Ambient Monitoring and Assessment (GAMA) website:
www.waterboards.ca.gov/losangeles/water_issues/programs/sgama/geotracker_gama.html

State Water Board website:
http://www.swrcb.ca.gov/water_issues/programs/water_recycling_policy/index.shtml

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APPENDIX C

PRECIPITATION IN THE RAYMOND BASIN AND THE CONTRIBUTING WATERSHED

Appendix C. Precipitation in Raymond Basin and the contributing watershed

Water Year (Oct-Sep)	Mountain Watershed					Valley Floor				
	175-LaCanada	338-MtWilson	235-Henninger	63-SADebris	Average	176-Altedena	591-SAReserv.	167-Arcadia	610-Pasadena	Average
1924/25	14.45				14.45	12.57			12.85	12.71
1925/26	29.55				29.55	25.28			22.38	23.83
1926/27	31.08				31.08	25.65			25.17	25.41
1927/28	15.74			16.37	16.06	13.98			13.59	13.79
1928/29	18.09			23.47	20.78	17.79		16.41	15.88	16.69
1929/30	18.92		20.89	22.42	20.74	16.15		17.2	16.33	16.56
1930/31	20.61		22.18	18.83	20.54	17.84		17.76	17.35	17.65
1931/32	29.41		27.74	28.31	28.49	23.09		24.24	22.35	23.23
1932/33	20.33		21.01	17.20	19.51	16.42		15.2	16.44	16.02
1933/34		30.68	24.12	22.15	25.65	20.59		21.86	21.14	21.20
1934/35	30.55	45.73	33.04	28.47	34.45	27.23		26.52	26.98	26.91
1935/36	20.31	28.72	23.79	20.73	23.39	18.12		18	15.97	17.36
1936/37	32.90	53.21	41.78	36.32	41.05	32.89		32.53	28.81	31.41
1937/38		58.89	42.47	36.91	46.09	34.2		32.83	31.38	32.80
1938/39	26.12	39.60	30.44	19.37	28.88	25.09		16.62	17.84	19.85
1939/40	20.08	27.84	22.09	28.47	24.62	17.75		20.79	22.93	20.49
1940/41	51.97	74.13	55.42	47.41	57.23	46.47		41.65	46.32	44.81
1941/42	18.17	21.84	19.06	17.82	19.22	14.18		14.25	14.71	14.38
1942/43	40.78	64.85	48.99	49.24	50.97	37.45		34.2	33.33	34.99
1943/44	30.37	42.50	34.55	28.57	34.00	28.97		24.19	25.53	26.23
1944/45	24.42	32.61	23.86	15.69	24.15	19.14		16.63	16.4	17.39
1945/46	21.61	33.25	22.38	20.12	24.34	17.52		16.1	16.99	16.87
1946/47	27.67	40.99	30.02	24.04	30.68	23.34		20.11	20.69	21.38
1947/48	11.07	18.73	13.52	12.88	14.05	10.3		11.24	10.76	10.77
1948/49	15.57	21.40	17.58	15.35	17.48	12.67		12.29	12.25	12.40
1949/50	17.77	25.72	21.31	18.51	20.83	15.87		15.5	14.71	15.36
1950/51	12.19	14.19	12.69	14.29	13.34	10.94		11.65	11.8	11.46
1951/52	43.38	57.17	44.17	40.12	46.21	39.35		35.15	36.83	37.11
1952/53	14.51	20.98	15.37	16.15	16.75	13.53		13.63	13.98	13.71
1953/54	20.15	28.28	21.75	20.54	22.68	16.66		17.34	16.47	16.82
1954/55	18.06	25.95	19.78	17.52	20.33	16.83		14.79	16	15.87
1955/56	23.16	27.99	22.07	21.29	23.63	19.32		19.15	18.7	19.06
1956/57	22.59	25.40	20.13	19.10	21.81	15.73		15.73	15.64	15.70
1957/58	35.56	57.23	37.53	34.47	41.20	32.6		33.21	30.58	32.13
1958/59	12.48	17.01	12.32	12.36	13.54	12.06		11.8	10.26	11.37
1959/60	9.68	16.94	13.11	13.34	13.27	10.17		11.24	9.58	10.33
1960/61	10.71	12.50	9.63	8.54	10.35	7.96		7	7.18	7.38
1961/62	26.00	45.90	29.56	27.65	32.28	25.63		26.46	24.34	25.48
1962/63	16.72	22.71	17.41	13.70	17.64	14.32		11.61	10.18	12.04
1963/64	14.50	20.15	15.10	18.26	17.00	12.12		15.21	12.02	13.12
1964/65	22.66	34.34	25.29	21.63	25.98	18.24		16.62	14.92	16.59
1965/66	32.53	56.30	38.46	35.14	40.61	30.02		27.47	25.14	27.54

Appendix C. Precipitation in Raymond Basin and the contributing watershed

Water Year (Oct-Sep)	Mountain Watershed					Valley Floor				
	175-LaCanada	338-MtWilson	235-Henninger	63-SADebris	Average	176-Altedena	591-SAReserv.	167-Arcadia	610-Pasadena	Average
1966/67	34.47	55.95	36.23	37.93	41.15	27.76		31.43	26.2	28.46
1967/68	20.83	26.30	17.95	16.67	20.44	16.95		13.73	16.33	15.67
1968/69	48.98	81.54	55.82	62.09	62.11	43.23		40.75	32.76	38.91
1969/70	14.43	21.37	17.42	19.42	18.16	12.97		14.67	11.43	13.02
1970/71	21.94	27.70	23.18	23.75	24.14	18.37		16.79	15.78	16.98
1971/72	11.46	13.25	11.31	10.83	11.71	8.8		8.09	8.34	8.41
1972/73	30.83	38.95	34.06	35.83	34.92	27.09		28.14	26.19	27.14
1973/74	22.76	37.01	28.23	25.64	28.41	21.67		18.93	18.72	19.77
1974/75	22.10	28.24	23.26	21.13	23.68	17.92		15.85	15.49	16.42
1975/76	19.72	31.53	25.96	14.01	22.81	16.83	12.03	10.42	9.58	12.22
1976/77	18.39	22.33	21.21	22.37	21.08	15.42	13.67	19.1	17.57	16.44
1977/78	53.90	79.34	59.12	55.73	62.02	46.04	41.70	46.78	43.09	44.40
1978/79	26.97	47.79	29.97	29.07	33.45	24.82	21.58	24.11	25.38	23.97
1979/80	42.25	55.81	51.56	51.03	50.16	40.42	41.47	40.93	39.59	40.60
1980/81	14.96	26.89	15.48	14.81	18.04	12.39	18.18	11.74	11.71	13.51
1981/82	28.13	40.03	30.08	25.01	30.81	20.77	33.33	21.06	18.57	23.43
1982/83	59.99	95.32	65.46	57.90	69.67	50.75	53.73	45.88	46.62	49.25
1983/84	14.00	23.99	16.01	22.61	19.15	12.3	6.01	14.92	14.02	11.81
1984/85	17.31	34.47	18.64	23.10	23.38	18.44	12.01	17.65	16.93	16.26
1985/86	30.94	49.42	30.54	28.92	34.96	23.29	17.26	23.41	22.34	21.58
1986/87	10.88	0.00	12.24	16.18	9.83	9.7	11.28	13.12	11.72	11.46
1987/88	24.20	45.52	27.58	27.27	31.14	18.66	28.36	21.04	18.07	21.53
1988/89	17.97	30.89	18.63	20.21	21.93	14.27	12.67	13.59	11.78	13.08
1989/90	12.80	19.69	15.78	18.50	16.69	13.68	14.06	12.82	12.35	13.23
1990/91	21.46	35.79	25.50	24.24	26.75	21.08	17.55	19.89	18.48	19.25
1991/92	41.53	48.69	44.88	35.11	42.55	35.22	22.62	26.14	30.23	28.55
1992/93	49.68	64.78	66.55	55.03	59.01	41.89	50.59	44.51	39.5	44.12
1993/94	14.71	20.03	16.69	17.39	17.21	13.8	14.87	13.54	10.95	13.29
1994/95	47.27	61.80	45.44	50.86	51.34	35.39	39.90	36.58	36.49	37.09
1995/96	20.87	34.39	22.64	29.43	26.83	16.72	19.01	21.15	16.61	18.37
1996/97	23.68	33.28	22.73	29.14	27.21	18.42	19.54	20.78	16.82	18.89
1997/98	48.95	64.38	52.29	49.70	53.83	43.14	41.69	41.31	39.2	41.34
1998/99	13.02	18.19	14.93	14.61	15.19	12.34	12.76	10.58	11.56	11.81
1999/00	20.81	31.96	18.82	19.99	22.90	17.85	19.99	15.85	17.88	17.89
2000/01	23.82	32.37	20.29	23.48	24.99	19.28	19.69	18.23	18.64	18.96
2001/02	10.06	13.26	7.88	10.01	10.30	7.91	9.08	7.4	7.24	7.91
2002/03	25.48	39.42	24.48	28.90	29.57	22.36	24.41	22.51	19.98	22.32
2003/04	15.08	12.47	16.79	16.75	15.27	15.81	15.32	16.84	13.6	15.39
2004/05	64.05	63.76	71.92	63.00	65.68	56.66	62.87	57.5	56.1	58.28
2005/06	25.66	17.86	26.64	28.73	24.72	20.98	22.71	22.97	17.93	21.15
2006/07	9.35	5.80	9.43	9.34	8.48	7.5	7.52	5.92	4.58	6.38
2007/08	26.32	24.17	29.10	29.66	27.31	21.42	23.99	22.5	22.4	22.58

Appendix C. Precipitation in Raymond Basin and the contributing watershed

Water Year (Oct-Sep)	Mountain Watershed					Valley Floor				
	175-LaCanada	338-MtWilson	235-Henninger	63-SADebris	Average	176-Altedena	591-SAReserv.	167-Arcadia	610-Pasadena	Average
2008/09	16.78	11.71	18.94	17.76	16.30	16.42	13.40	11.5	16.12	14.36
2009/10	30.20	38.71	31.95	30.46	32.83	24.7	23.28	21.55	25.11	23.66
2010/11	36.91	28.38	44.44	38.48	37.05	29.53	32.16	29.54	28.23	29.87
2011/12	16.58	16.83	18.38	16.77	17.14	11.53	10.21	11.05	13.38	11.54

STATISTICAL ANALYSIS

Maximum	64.05	95.32	71.92	63.00	69.67	56.66	62.87	57.50	56.10	58.28
Minimum	9.35	0.00	7.88	8.54	8.48	7.50	6.01	5.92	4.58	6.38
Historic Average	24.94	35.38	27.55	26.14	28.15	21.69	23.26	21.15	20.28	21.10
Last 5 Years Average	25.36	23.96	28.56	26.63	26.13	20.72	20.61	19.23	21.05	20.40
Last 10 Years Average	26.64	25.91	29.21	27.99	27.44	22.69	23.59	22.19	21.74	22.55
Last 15 Years Average	25.54	27.95	27.09	26.51	26.77	21.83	22.61	21.02	20.80	21.56
Last 20 Years Average	26.96	31.68	29.02	28.97	29.16	22.68	24.15	22.59	21.62	22.76
3 yrs in 4					17.96					13.89
1 yr in 2					23.84					17.92
1 yr in 4					34.47					25.46

Source: Los Angeles County Department of Public Works

APPENDIX D

ARTIFICIAL RECHARGE:
SURFACE SPREADING AND INJECTION IN RAYMOND BASIN

Appendix D. Artificial recharge: Surface spreading and injection in Raymond Basin

WATER YEAR (OCT-SEP)	SURFACE SPREADING					IMPORTED WATER INJECTION			TOTAL Artificial RECHARGE
	MONK HILL	PASADENA	SANTA ANITA	PASADENA+SANTA	RAYMOND	MONK HILL	PASADENA	RAYMOND	
1951-1952	1110	1476	2330	3806	4916				4916
1952-1953	216	0	206	206	422				422
1953-1954	520	190	830	1020	1540				1540
1954-1955	197	0	486	486	683				683
1955-1956	301	182	526	708	1009				1009
1956-1957	397	0	399	399	796				796
1957-1958	2100	1030	4959	5989	8089				8089
1958-1959	252	130	1494	1624	1876				1876
1959-1960	0	0	579	579	579				579
1960-1961	0	0	457	457	457				457
1961-1962	1107	1065	1951	3016	4123				4123
1962-1963	236	7	1434	1441	1677				1677
1963-1964	317	24	1162	1186	1503				1503
1964-1965	844	324	1415	1739	2583				2583
1965-1966	966	2000	5795	7795	8761				8761
1966-1967	1816	1450	5764	7214	9030				9030
1967-1968	855	305	4067	4372	5227				5227
1968-1969	609	3249	3501	6750	7359				7359
1969-1970	195	483	2843	3326	3521				3521
1970-1971	644	583	1580	2163	2807				2807
1971-1972	173	0	1044	1044	1217				1217
1972-1973	1240	1902	3930	5832	7072				7072
1973-1974	2637	2851	3459	6310	8947				8947
1974-1975	1517	1322	2250	3572	5088				5088
1975-1976	757	1234	1050	2284	3041				3041
1976-1977	821	1110	1117	2227	3048				3048
1977-1978	4102	4950	4714	9664	13765				13765
1978-1979	4082	3196	5303	8499	12581				12581
1979-1980	2738	3793	4381	8173	10911				10911
1980-1981	1034	2459	2493	4952	5986				5986
1981-1982	2158	4540	2169	6708	8866				8866
1982-1983	8106	7748	2889	10638	18743				18743
1983-1984	1560	9418	782	10200	11760				11760
1984-1985	1796	2024	625	2650	4446				4446
1985-1986	4019	4237	1257	5495	9514				9514
1986-1987	1150	812	470	1282	2432				2432
1987-1988	2234	3766	751	4517	6751				6751

Appendix D. Artificial recharge: Surface spreading and injection in Raymond Basin

WATER YEAR (OCT-SEP)	SURFACE SPREADING					IMPORTED WATER INJECTION			TOTAL
	MONK HILL	PASADENA	SANTA ANITA	PASADENA+SANTA	RAYMOND	MONK HILL	PASADENA	RAYMOND	Artificial RECHARGE
1988-1989	1313	2281	339	2620	3933				3933
1989-1990	557	1186	14	1200	1757				1757
1990-1991	1474	3334	648	3982	5456				5456
1991-1992	4205	5339	1532	6870	11076				11076
1992-1993	8852	8402	3958	12360	21212				21212
1993-1994	4951	4385	1464	5849	10800	367	2072	2440	13239
1994-1995	11285	7727	3265	10992	22277	313	0	313	22590
1995-1996	5674	7552	1763	9315	14989	404	0	404	15393
1996-1997	6390	6150	1325	7475	13865	626	0	626	14490
1997-1998	3727	10695	2131	12826	16553	625	422	1047	17600
1998-1999	3273	6047	1050	7096	10369	486	0	486	10855
1999-2000	1024	2789	398	3186	4210	520	0	520	4730
2000-2001	1188	2907	675	3582	4770	503	0	503	5273
2001-2002	281	1273	213	1486	1767	862	0	862	2629
2002-2003	1508	1643	620	2263	3772	624	0	624	4396
2003-2004	435	1331	437	1768	2203	1167	0	1167	3369
2004-2005	5388	8505	3383	11888	17276	1457	0	1457	18733
2005-2006	4578	5023	1342	6366	10943	752	0	752	11695
2006-2007	561	1712	242	1954	2515	593	0	593	3108
2007-2008	2822	3329	737	4066	6888	0	0	0	6888
2008-2009	1296	1715	1758	3473	4769	93	0	93	4863
2009-2010	226	3001	3286	6288	6514	17	0	17	6531
2010-2011	2853	6149	3812	9961	12813	140	0	140	12954
2011-2012	2499	2088	1477	3564	6063	0	0	0	6063

STATISTICAL ANALYSIS

Maximum	11,285.00	10,694.80	5,795.00	12,825.50	22,276.80	1,457.30	2,072.45	2,439.69	22,590.20
Minimum	0.00	0.00	14.00	206.00	422.00	0.00	0.00	0.00	422.00
Historic Average	2,117.44	2,826.59	1,907.03	4,733.61	6,851.05	502.65	131.27	633.92	7,048.50
Last 5 Years Average	1,939.08	3,256.40	2,213.96	5,470.36	7,409.44	50.12	0.00	50.12	7,459.56
Last 10 Years Average	2,216.54	3,449.64	1,709.38	5,159.02	7,375.56	484.37	0.00	484.37	7,859.93
Last 15 Years Average	2,110.53	3,880.39	1,437.37	5,317.76	7,428.29	522.65	28.11	550.77	7,979.06
Last 20 Years Average	3,440.52	4,621.09	1,666.72	6,287.81	9,728.33	502.65	131.27	633.92	10,330.55

Source: Raymond Basin Magagement Board

APPENDIX E

WATER EXPORTED FROM RAYMOND BASIN IN PURVEYOR

Appendix E. Water exported from Raymond Basin by purveyor

FISCAL YEAR (JULY-JUNE)	GROUNDWATER EXPORTED (ACRE-FEET)													TOTAL
	ALH.	ARC.	CAWC	CMLWC	CWTC	EPWC	LCID	LFWC	MON.	PAS.	RCLW	SGCWD	SSWC	
1957-58	1064	0	0	0	0	0	0	0	991	2244	0	368	0	4667
1958-59	836	742	0	0	608	0	0	0	753	2780	0	1252	1449	8420
1959-60	977	0	0	0	0	0	0	0	554	2725	0	1176	1523	6955
1960-61	1091	0	0	7	296	0	0	0	1168	2935	0	1472	1423	8392
1961-62	1162	0	0	0	219	0	0	0	1362	4411	0	1069	1311	9534
1962-63	804	0	0	0	623	0	0	0	791	4804	0	1038	1538	9598
1963-64	1020	0	499	0	0	147	0	0	359	5753	0	1198	1618	10594
1964-65	1072	0	579	0	0	0	0	0	1186	3530	0	1241	1242	8850
1965-66	842	0	1070	0	0	0	0	0	1205	5794	0	1000	1686	11597
1966-67	1139	0	874	0	0	0	0	0	1044	3822	0	1121	1444	9444
1967-68	292	1794	381	0	0	195	0	0	953	6081	0	1113	1470	12279
1968-69	1033	0	136	0	0	0	0	0	990	5922	0	1063	1451	10594
1969-70	769	163	0	0	0	1	0	0	1050	5616	0	1106	1460	10166
1970-71	1140	1206	0	0	0	61	0	0	1177	5090	0	1105	1495	11273
1971-72	902	323	0	0	0	0	0	0	681	5653	0	1073	897	9528
1972-73	1032	1274	0	0	0	0	0	0	1021	4631	0	1096	1451	10504
1973-74	1075	388	212	0	0	148	0	0	0	4570	0	943	0	7337
1974-75	871	1555	0	0	0	185	396	0	905	5204	0	0	1174	10290
1975-76	0	621	570	0	0	199	310	0	0	6968	0	0	1782	10450
1976-77	0	354	416	0	0	0	198	0	0	3972	0	0	1214	6155
1977-78	0	927	1504	0	0	148	302	0	0	4968	0	0	1539	9388
1978-79	0	2010	283	0	0	0	72	0	0	4325	0	0	1178	7868
1979-80	0	1916	419	0	0	4	79	0	0	4281	0	0	1592	8291
1980-81	0	2473	6	0	0	86	115	77	0	8519	0	0	1396	12673
1981-82	0	76	345	0	0	0	0	60	0	5080	0	0	913	6474
1982-83	0	2217	366	0	0	21	0	89	0	5034	0	0	1354	9082
1983-84	0	3343	250	0	0	13	0	66	0	6146	0	0	1223	11041
1984-85	0	2100	459	0	0	0	0	96	0	11170	0	0	1607	15432
1985-86	0	2380	0	0	0	0	0	88	0	4182	0	0	1399	8048
1986-87	0	2029	348	0	0	112	0	89	0	5701	233	0	1442	9953
1987-88	0	497	376	0	0	133	0	70	0	7594	77	0	1385	10131
1988-89	0	1229	811	0	0	20	0	61	0	6885	91	0	1542	10640
1989-90	0	981	290	0	0	8	0	0	0	0	0	0	1266	2544
1990-91	0	0	0	0	0	92	0	0	0	2405	0	64	1514	4075
1991-92	0	0	0	0	0	0	0	0	0	1776	0	4	1294	3074
1992-93	0	0	0	0	0	0	0	0	0	505	0	0	1693	2198
1993-94	0	0	0	0	0	0	0	0	0	229	0	0	2101	2330
1994-95	0	0	0	0	0	0	0	0	0	1035	0	0	1351	2386
1995-96	0	0	0	0	0	0	0	0	0	1341	0	0	1553	2894
1996-97	0	0	0	0	0	0	0	0	0	1308	0	0	1497	2804
1997-98	0	0	0	0	0	0	0	0	0	1304	0	0	1440	2744
1998-99	0	0	0	0	0	0	0	0	0	0	0	0	1096	1096
1999-00	0	0	154	0	0	0	0	0	0	9	0	0	1831	1994
2000-01	0	0	219	0	0	0	0	0	0	5	0	0	1444	1667

Appendix E. Water exported from Raymond Basin by purveyor

FISCAL YEAR (JULY-JUNE)	GROUNDWATER EXPORTED (ACRE-FEET)													TOTAL
	ALH.	ARC.	CAWC	CMLWC	CWTC	EPWC	LCID	LFWC	MON.	PAS.	RCLW	SGCWD	SSWC	
2001-02	0	0	0	0	0	0	0	0	0	0	0	0	1026	1026
2002-03	0	0	0	0	0	49	0	0	0	0	0	0	470	519
2003-04	0	0	0	0	0	0	0	0	0	795	0	0	553	1347
2004-05	0	0	0	0	0	1	0	0	0	494	0	0	787	1283
2005-06	0	0	0	0	0	2	0	0	0	469	0	0	1464	1936
2006-07	0	0	0	0	0	26	0	0	0	698	0	0	1110	1834
2007-08	0	0	0	0	0	53	0	0	0	616	0	0	1065	1734
2008-09	0	0	0	0	0	65	0	0	0	650	0	0	1079	1794
2009-10	0	0	0	0	0	68	0	0	0	396	0	0	613	1077
2010-11	0	0	0	0	0	28	0	0	0	19	0	0	724	772
2011-12	0	0	0	0	0	27	0	0	0	19	0	0	345	390
AVERAGE	311	556	192	0	32	34	27	13	294	3281	7	336	1264	6348
MAXIMUM	1162	3343	1504	7	623	199	396	96	1362	11170	233	1472	2101	15432
MINIMUM	0	0	0	0	0	0	0	0	0	0	0	0	0	390

Source: Raymond Basin Management Board's Annual Reports

NOTES:

ALH.: City of Alhambra
ARC.: City of Arcadia
CAWC: California Anerican Water Company
CMLWC: California-Michigan Land and Water Company
CWTC: California Water and Telephone Company
EPWC: Esat Pasadena Water Company

LCID: La Canada Irrigation District
LFWC: Las Flores Water Company
MON.: City of Monrovia
PAS.: City of Pasadena
RCLW: Rubio Canon Land & Water
SGVCWD: San Gabriel County Water District
SSWC: Sunny Slope Water Company

APPENDIX F

IMPORTED AND DIVERTED WATER USAGE IN RAYMOND BASIN

Appendix F. Imported and diverted water usage in Raymond Basin (AFY)

Fiscal Year (Jul-Jun)	Water Usage in Raymond Basin (Acre-Feet)									
	Water Diversions and Imported Water									
	Surface Water Diversions				Imported MWD Water				Main Basin Water	Total
	Monk Hill	Pasadena	Santa Anita	Total	Monk Hill	Pasadena	Santa Anita	Total		
1950-51				1,302				15,066		16,368
1951-52				7,599				12,830		20,429
1952-53				3,823				19,781		23,604
1953-54				3,508				22,541		26,048
1954-55				2,504				21,178		23,682
1955-56				2,225				21,608		23,833
1956-57				1,726				20,655		22,381
1957-58				6,203				17,417		23,620
1958-59				3,228				23,885		27,113
1959-60				1,276				27,448		28,724
1960-61				895				29,948		30,843
1961-62				2,696				25,889		28,585
1962-63				2,027				26,362		28,388
1963-64				1,776				26,761		28,537
1964-65				2,274				26,815		29,089
1965-66				8,718				20,653		29,371
1966-67				12,160				18,346		30,506
1967-68				6,579				21,750		28,329
1968-69				8,300				20,292		28,592
1969-70				8,102				22,005		30,107
1970-71				5,140				26,471		31,612
1971-72				2,473				30,811		33,283
1972-73				4,673				22,831		27,504
1973-74				4,341				22,801		27,142
1974-75				3,281				23,944		27,225
1975-76				2,573				26,615		29,188
1976-77				2,157				22,193		24,349
1977-78				3,688				23,603		27,291
1978-79				5,016				22,965		27,981
1979-80				4,448				15,391		19,839
1980-81				4,565				25,558		30,124
1981-82				3,698				22,489		26,188
1982-83				4,961				20,062		25,023
1983-84				6,061				22,426		28,487
1984-85				3,025				30,271		33,296
1985-86				1,980				31,709		33,689
1986-87				2,177				30,261		32,438
1987-88				1,640				32,385		34,024
1988-89				1,379				31,582		32,961
1989-90				404				35,901		36,305
1990-91				3,258				33,642		36,900
1991-92				2,022				29,261		31,284
1992-93				3,263				32,493		35,755
1993-94				803				40,542		41,344
1994-95	317	388	0	706	7,833	14,567	0	22,400	395	46,606
1995-96	297	792	409	1,498	8,547	14,110	0	22,657	382	48,693
1996-97	211	597	368	1,176	25,213	1,170	0	26,383	339	55,458
1997-98	547	535	301	1,384	7,561	14,266	0	21,827	348	46,769
1998-99	704	647	479	1,831	7,960	15,704	0	23,665	364	51,354
1999-00	365	522	263	1,150	10,618	20,603	0	31,220	312	65,052
2000-01	331	440	236	1,007	10,372	22,536	0	32,908	186	68,016
2001-02	110	249	153	512	11,535	22,608	0	34,142	481	69,790
2002-03	301	216	163	680	8,160	26,916	0	35,076	577	72,088
2003-04	123	192	67	382	12,327	25,535	781	38,643	261	78,312

Appendix F. Imported and diverted water usage in Raymond Basin (AFY)

Fiscal Year (Jul-Jun)	Water Usage in Raymond Basin (Acre-Feet)									
	Water Diversions and Imported Water									
	Surface Water Diversions				Imported MWD Water				Main Basin Water	Total
	Monk Hill	Pasadena	Santa Anita	Total	Monk Hill	Pasadena	Santa Anita	Total		
2004-05	599	545	490	1,634	9,003	22,092	198	31,292	370	66,222
2005-06	620	816	533	1,968	9,141	24,459	43	33,643	3,318	74,542
2006-07	227	513	239	978	10,520	28,787	0	39,306	4,058	84,628
2007-08	219	479	256	954	10,105	28,106	0	38,212	3,634	81,965
2008-09	234	373	166	774	9,428	25,376	687	35,491	3,370	75,900
2009-10	93	395	180	668	9,131	22,480	143	31,754	3,627	68,472
2010-11	173	592	391	1,157	8,268	21,040	0	29,308	3,321	64,252
2011-12	172	490	226	889	5,251	22,861	0	28,112	3,860	61,862
STATISTICAL ANALYSIS										
Maximum	704	816	533	12,160	25,213	28,787	781	40,542	4,058	84,628
Minimum	93	192	0	382	5,251	1,170	0	12,830	186	16,368
Historic Average	314	488	273	2,956	10,054	20,734	103	26,669	1,622	39,377
Last 5 Years Average	178	466	244	888	8,437	23,973	166	32,576	3,563	70,490
Last 10Years Average	276	461	271	1,008	9,133	24,765	185	34,084	2,640	72,824
Last 15 Years Average	321	467	276	1,065	9,292	22,891	123	32,307	1,872	68,615
Last 20 Years Average	314	488	273	1,171	10,054	20,734	103	31,454	1,622	62,854

Source: Raymond Basin Management Board

APPENDIX G

GROUNDWATER BALANCE MODEL FOR RAYMOND BASIN (MONK HILL SUBAREA)

Appendix G. GROUNDWATER BALANCE MODEL FOR RAYMOND BASIN (MONK HILL SUBAREA)

WATER YEAR	RECHARGE FROM PRECIPITATION			ARTIFICIAL RECHARGE			TOTAL RECHARGE	RETURN FLOW	SUBSURFACE INFLOW	GROUNDWATER EXTRACTION	SUBSURFACE OUTFLOW	GROUNDWATER STORAGE			
	MOUNTAIN WATERSHED RECHARGE ACRE-FEET	VALLEY FLOOR RECHARGE ACRE-FEET	TOTAL ACRE-FEET	SURFACE SPREADING ACRE-FEET	INJECTION ACRE-FEET	TOTAL ACRE-FEET	ACRE-FEET	ACRE-FEET	Verdugo Basin ACRE-FEET	ACRE-FEET	ACRE-FEET	TOTAL INFLOW ACRE-FEET	TOTAL OUTFLOW ACRE-FEET	CHANGE IN STORAGE ACRE-FEET	
(1)	(2)	(3)	(4) = (2)+(3)	(5)	(6)	(7) = (5)+(6)	(8) = (4)+(7)	(9)	(10)	(11)	(12)	(13) = (8)+(9)+(10)	(14) = (11)+(12)	(15) = (13)-(14)	
															190400
1994-95	6,038	1,973	8,011	7,555	99	7,654	15,665	3,321	2,226	10,247	6,242	21,212	16,489	4,723	195,123
1995-96	2,748	689	3,437	4,128	403	4,531	7,968	3,422	2,178	12,965	6,027	13,568	18,992	-5,424	189,699
1996-97	2,783	455	3,238	4,487	593	5,080	8,318	3,634	1,909	9,164	6,131	13,861	15,295	-1,434	188,265
1997-98	6,488	1,874	8,362	9,706	623	10,329	18,691	3,581	2,951	9,281	6,382	25,223	15,663	9,560	197,825
1998-99	1,815	145	1,960	4,256	484	4,740	6,700	3,492	3,994	9,470	7,000	14,186	16,470	-2,284	195,541
1999-00	2,941	420	3,361	3,794	497	4,291	7,652	3,742	893	10,682	6,448	12,287	17,130	-4,843	190,698
2000-01	3,084	568	3,652	3,408	501	3,909	7,561	3,833	2,608	7,841	6,298	14,002	14,139	-137	190,561
2001-02	1,198	124	1,322	1,233	862	2,095	3,417	3,802	3,340	7,272	6,072	10,559	13,344	-2,785	187,776
2002-03	3,307	279	3,586	2,745	726	3,471	7,057	3,884	2,094	4,069	6,205	13,035	10,274	2,761	190,537
2003-04	2,252	582	2,834	1,193	647	1,840	4,674	3,970	1,989	4,762	6,219	10,633	10,981	-348	190,189
2004-05	9,284	3,215	12,499	8,093	1,442	9,535	22,034	3,976	927	5,362	6,702	26,937	12,064	14,873	205,062
2005-06	2,966	416	3,382	4,846	1,477	6,323	9,705	3,756	2,385	5,040	7,270	15,846	12,310	3,536	208,598
2006-07	758	17	775	1,454	910	2,364	3,139	3,878	1,322	6,087	6,850	8,339	12,937	-4,598	
2007-08	3,706	619	4,325	3,072	0	3,072	7,397	3,947	1,631	6,445	6,706	12,975	13,151	-176	
2008-09	2,668	401	3,069	1,904	83	1,987	5,056	3,794	2,027	5,828	6,891	10,877	12,719	-1,842	
2009-10	4,155	1,166	5,321	449	17	466	5,787	3,652	1,786	3,872	6,898	11,225	10,770	455	
2010-11	4,672	1,199	5,871	2,827	105	2,932	8,803	3,387	1,998	4,302	7,061	14,188	11,363	2,825	
2011-12	2,185	99	2,284	2,551	0	2,551	4,835	2,619	1,498	7,444	5,753	8,952	13,197	-4,245	
DESCRIPTIVE STATISTICS															
Minimum	758	17	775	449	0	466	3,139	2,619	893	3,872	5,753	8,339	10,274	-5,424	
Maximum	9,284	3,215	12,499	9,706	1,477	10,329	22,034	3,976	3,994	12,965	7,270	26,937	18,992	14,873	
Mean	3,503	791	4,294	3,761	526	4,287	8,581	3,649	2,098	7,230	6,509	14,328	13,738	590	
Median	2,954	512	3,410	3,240	499	3,690	7,479	3,749	2,013	6,859	6,415	13,302	13,174	-262	
Last 5 yrs mean	3,477	697	4,174	2,161	41	2,202	6,376	3,480	1,788	5,578	6,662	11,643	12,240	-597	

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APPENDIX H

GROUNDWATER BALANCE MODEL FOR RAYMOND BASIN (PASADENA AREA)

Appendix H. GROUNDWATER BALANCE MODEL FOR RAYMOND BASIN (PASADENA SUBAREA)

WATER YEAR	RECHARGE FROM PRECIPITATION			ARTIFICIAL RECHARGE			TOTAL RECHARGE	RETURN FLOW	SUBSURFACE INFLOW	GROUNDWATER EXTRACTION	SUBSURFACE OUTFLOW	GROUNDWATER STORAGE			
	MOUNTAIN WATERSHED	VALLEY FLOOR		SURFACE SPREADING	INJECTION	TOTAL						TOTAL INFLOW	TOTAL OUTFLOW	CHANGE IN STORAGE	
	RECHARGE ACRE-FEET	RECHARGE ACRE-FEET	TOTAL ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	
(1)	(2)	(3)	(4) = (2)+(3)	(5)	(6)	(7) = (5)+(6)	(8) = (4)+(7)	(9)	(10)	(11)	(12)	(13) = (8)+(9)+(10)	(14) = (11)+(12)	(15) = (13)-(14)	
															536800
1994-95	1,465	5,293	6,758	7,685	0	7,685	14,443	6,629	6,242	17,447	5,793	27,313	23,240	4,074	540,874
1995-96	666	1,848	2,514	6,383	16	6,400	8,914	6,666	6,028	21,057	4,840	21,608	25,897	-4,289	536,585
1996-97	675	1,222	1,897	5,305	0	5,305	7,202	7,193	6,130	16,789	5,000	20,525	21,789	-1,264	535,321
1997-98	1,574	5,030	6,604	8,744	0	8,744	15,348	6,971	6,383	16,596	5,465	28,702	22,060	6,642	541,963
1998-99	440	389	829	5,642	0	5,642	6,471	6,949	7,000	19,431	5,286	20,421	24,716	-4,296	537,667
1999-00	714	1,127	1,841	1,618	0	1,618	3,459	7,814	6,450	21,121	5,907	17,723	27,028	-9,305	528,362
2000-01	748	1,526	2,274	2,283	0	2,283	4,558	7,766	6,298	15,033	5,484	18,622	20,517	-1,896	526,467
2001-02	291	334	625	839	0	839	1,463	7,396	6,072	18,210	5,463	14,932	23,674	-8,742	517,725
2002-03	802	746	1,548	1,161	0	1,161	2,709	7,630	6,206	17,043	5,309	16,545	22,352	-5,806	511,918
2003-04	546	1,560	2,106	820	0	820	2,926	7,720	6,218	20,988	5,253	16,864	26,241	-9,377	502,541
2004-05	2,252	8,624	10,876	8,659	0	8,659	19,535	7,693	6,702	20,040	4,039	33,930	24,079	9,851	512,393
2005-06	720	1,118	1,838	4,224	0	4,224	6,062	7,346	7,270	19,810	3,939	20,678	23,748	-3,071	509,322
2006-07	184	43	227	1,093	0	1,093	1,320	7,672	6,849	19,800	4,833	15,841	24,633	-8,792	500,530
2007-08	899	1,661	2,560	2,994	0	2,994	5,554	7,796	6,706	17,417	4,987	20,056	22,404	-2,348	
2008-09	647	1,076	1,723	1,098	0	1,098	2,821	7,311	6,891	17,165	5,024	17,023	22,189	-5,167	
2009-10	1,008	3,127	4,135	2,718	0	2,718	6,853	6,748	6,901	15,021	4,835	20,502	19,856	646	
2010-11	1,133	3,219	4,352	5,810	0	5,810	10,162	6,247	7,062	14,766	4,496	23,471	19,262	4,210	
2011-12	530	267	797	1,014	0	1,014	1,811	4,934	5,752	10,926	4,005	12,497	14,931	-2,434	
DESCRIPTIVE STATISTICS															
Minimum	184	43	227	820	0	820	1,320	4,934	5,752	10,926	3,939	12,497	14,931	-9,377	
Maximum	2,252	8,624	10,876	8,744	16	8,744	19,535	7,814	7,270	21,121	5,907	33,930	27,028	9,851	
Mean	850	2,123	2,972	3,783	1	3,784	6,756	7,138	6,509	17,703	4,998	20,403	22,701	-2,298	
Median	717	1,374	2,001	2,856	0	2,856	5,808	7,328	6,416	17,432	5,012	20,238	22,822	-2,752	
Last 5 yrs mean	843	1,870	2,714	2,727	0	2,727	5,440	6,607	6,662	15,059	4,670	18,710	19,728	-1,019	

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APPENDIX I

GROUNDWATER BALANCE MODEL FOR RAYMOND BASIN (SANTA ANITA SUBAREA)

Appendix I. GROUNDWATER BALANCE MODEL FOR RAYMOND BASIN (SANTA ANITA SUBAREA)

WATER YEAR	**RECHARGE FROM PRECIPITATION**			**ARTIFICIAL RECHARGE**			TOTAL RECHARGE	**RETURN FLOW**	**SUBSURFACE INFLOW**	**GROUNDWATER EXTRACTION**	**SUBSURFACE OUTFLOW**	**GROUNDWATER STORAGE**		
	MOUNTAIN WATERSHED	VALLEY FLOOR		SURFACE SPREADING	INJECTION	TOTAL						TOTAL INFLOW	TOTAL OUTFLOW	CHANGE IN STORAGE
	RECHARGE ACRE-FEET	RECHARGE ACRE-FEET	TOTAL ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET	ACRE-FEET
(1)	(2)	(3)	(4) = (2)+(3)	(5)	(6)	(7) = (5)+(6)	(8) = (4)+(7)	(9)	(10)	(11)	(12)	(13) = (8)+(9)+(10)	(14) = (11)+(12)	(15) = (13)-(14)
1994-95	3,277	908	4,185	2,712	0	2,712	6,897	1,176	1,794	7,225	578	9867	7804	2063.9
1995-96	1,491	317	1,808	3,203	0	3,203	5,010	1,069	905	5,910	636	6984	6546	438.2
1996-97	1,511	210	1,720	2,449	0	2,449	4,169	1,061	1,025	6,503	657	6255	7161	-905.4
1997-98	3,520	863	4,383	3,032	0	3,032	7,415	1,092	1,412	6,475	585	9919	7059	2859.4
1998-99	984	67	1,051	2,845	0	2,845	3,896	1,067	1,160	7,259	675	6122	7934	-1811.4
1999-00	1,597	193	1,790	1,059	0	1,059	2,849	1,149	1,843	6,502	675	5841	7177	-1335.8
2000-01	1,674	262	1,936	1,566	0	1,566	3,501	1,088	1,427	5,829	670	6016	6499	-482.4
2001-02	650	57	707	215	0	215	923	1,053	1,332	5,415	730	3307	6144	-2837.4
2002-03	1,794	128	1,922	1,385	0	1,385	3,307	979	1,244	5,320	724	5531	6044	-513.0
2003-04	1,221	268	1,489	548	0	548	2,037	1,002	1,244	6,214	707	4284	6921	-2637.2
2004-05	5,037	1,480	6,517	4,542	0	4,542	11,059	1,105	427	5,982	1,110	12591	7092	5499.0
2005-06	1,610	192	1,802	3,244	0	3,244	5,046	1,137	111	8,433	770	6295	9203	-2908.3
2006-07	411	7	419	629	0	629	1,048	1,217	1,008	8,509	403	3272	8912	-5639.9
2007-08	2,011	285	2,296	1,838	0	1,838	4,134	1,106	1,187	6,735	426	6427	7161	-734.0
2008-09	1,448	185	1,632	1,149	0	1,149	2,781	1,018	1,234	6,736	520	5033	7256	-2223.0
2009-10	2,255	537	2,791	2,787	0	2,787	5,578	962	849	5,409	628	7390	6037	1353.0
2010-11	2,535	552	3,087	3,050	0	3,050	6,137	883	602	6,589	569	7622	7158	463.8
2011-12	1,185	46	1,231	1,077	0	1,077	2,308	726	802	5,519	354	3837	5873	-2036.5
DESCRIPTIVE STATISTICS														
Minimum	411	7	419	215	0	215	923	726	111	5,320	354	3,272	5,873	-5,640
Maximum	5,037	1,480	6,517	4,542	0	4,542	11,059	1,217	1,843	8,509	1,110	12,591	9,203	5,499
Mean	1,901	364	2,265	2,074	0	2,074	4,339	1,049	1,089	6,476	634	6,477	7,110	-633
Median	1,603	236	1,805	2,143	0	2,143	4,015	1,068	1,173	6,488	646	6,189	7,125	-820
Last 5 yrs mean	1,887	321	2,208	1,980	0	1,980	4,188	939	935	6,198	499	6,062	6,697	-635

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APPENDIX J

RAYMOND BASIN NITRATE CONCENTRATION FROM WELL TEST RESULTS

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	2/12/1985	10.1	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/1/1985	25	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/1/1985	28.2	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/7/1985	29.9	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/6/1986	34	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/7/1986	37	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/7/1986	20.7	RCL&WA
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	8/22/1986	25.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/6/1986	31.7	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/5/1987	30.8	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/6/1987	35.2	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/6/1987	57.2	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/6/1987	22.4	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/20/1987	44	RCL&WA
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	7/23/1987	27	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/5/1987	29.9	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/9/1987	22.9	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	11/2/1987	34.3	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	11/2/1987	24.2	RCL&WA
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	8/18/1988	21	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	6/20/1989	36.2	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	6/20/1989	35.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/20/1989	42.8	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-SHE	6/29/1989	10.1	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	9/28/1989	1.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/26/1990	33.88	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	9/28/1990	31	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	9/28/1990	14	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	9/28/1990	59	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	5/4/1992	21.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	5/4/1992	13.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	5/18/1992	26	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	5/18/1992	17.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	5/20/1992	34.8	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	5/20/1992	16.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	5/26/1992	22.2	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	5/27/1992	41	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/1/1992	23.6	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/8/1992	51.8	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/8/1992	22.6	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/15/1992	53.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/15/1992	22.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/18/1992	44.8	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/18/1992	22.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/22/1992	48.9	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/22/1992	21.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/29/1992	54.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	8/31/1992	38.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	3/8/1993	11.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	3/8/1993	7.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	3/15/1993	11	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	3/15/1993	9.1	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	4/16/1993	10.1	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	4/16/1993	12.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/7/1993	20.3	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	6/23/1993	27.64	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	6/23/1993	13.05	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	6/23/1993	57.71	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	6/23/1993	32.22	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/10/1994	26.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/10/1994	10.1	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	4/4/1994	5.9	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	4/4/1994	10.5	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/4/1994	39.8	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/4/1994	18.9	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/5/1994	42.6	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/5/1994	23.4	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/19/1994	43.9	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/3/1994	33.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/3/1994	21.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/19/1994	42.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	12/27/1994	27.9	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	12/27/1994	26.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	12/27/1994	10.2	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/3/1995	18.7	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/3/1995	10.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/19/1995	45.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/10/1995	24.7	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/10/1995	17.4	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	4/28/1995	34.5	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	6/12/1995	8.6	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	6/12/1995	15.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/13/1995	39.8	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/13/1995	22.6	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/5/1995	46.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/5/1995	23.3	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	7/31/1995	28.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	9/15/1995	25.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/2/1995	41.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/2/1995	26	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	10/24/1995	31.5	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	11/28/1995	33.1	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	12/6/1995	18.3	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	12/6/1995	9.6	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	12/6/1995	23.2	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/11/1995	40.2	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	1/2/1996	34.2	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/2/1996	41.7	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/2/1996	31.3	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	1/30/1996	35.4	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	2/26/1996	37.2	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/27/1996	34.6	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	4/16/1996	17.31	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	4/16/1996	6.54	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	4/16/1996	22.08	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	5/22/1996	42.42	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	5/30/1996	29.3	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	6/17/1996	6.3	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	6/17/1996	17.2	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	6/24/1996	38.2	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/1/1996	41.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/1/1996	26	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	7/8/1996	38.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	8/19/1996	27.8	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	9/30/1996	32	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/7/1996	36.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/7/1996	20.8	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	10/29/1996	32.2	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/9/1996	35.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	12/30/1996	36.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/6/1997	16.6	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/6/1997	25.6	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	1/31/1997	33.5	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	2/21/1997	30.15	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	2/21/1997	5.96	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	2/21/1997	23.89	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME		SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		3/27/1997	32.1	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		4/7/1997	24	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		4/7/1997	24.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		4/21/1997	30.6	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		4/21/1997	26.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		5/31/1997	34.3	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3		6/2/1997	6.16	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5		6/2/1997	19.3	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		6/23/1997	30	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		7/7/1997	37.6	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		7/7/1997	24.7	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		8/1/1997	27.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		9/12/1997	29.7	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		10/6/1997	34.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		10/6/1997	26.4	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		10/16/1997	34.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		11/3/1997	41.5	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		12/8/1997	39.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		12/15/1997	31.8	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		1/5/1998	21.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		1/5/1998	26.8	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		1/7/1998	41.7	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		1/8/1998	32.8	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		1/8/1998	20.8	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		3/13/1998	34	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		3/16/1998	43.9	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		4/6/1998	16.2	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		4/6/1998	13.3	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		4/13/1998	20.5	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		5/6/1998	36.79	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		5/6/1998	22.09	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/11/1998	46.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/13/1998	41	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3		6/1/1998	5.8	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5		6/1/1998	14.1	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		6/3/1998	17.3	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		6/3/1998	37.62	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		6/3/1998	23.33	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		6/8/1998	37.8	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		6/29/1998	32	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		7/1/1998	16.83	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		7/1/1998	38.67	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		7/1/1998	23.97	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		7/6/1998	36.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		7/6/1998	24.4	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		7/13/1998	43.6	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		8/5/1998	15.99	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		8/5/1998	36.39	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		8/5/1998	23.3	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		8/24/1998	32.5	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		8/24/1998	30.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		10/5/1998	38.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		10/5/1998	24.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		12/14/1998	39.8	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		12/19/1998	26.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		12/19/1998	31.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		1/4/1999	24.7	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		1/4/1999	22.5	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		1/6/1999	31.33	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		1/6/1999	22.63	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		1/25/1999	41.4	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		2/3/1999	22.71	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		2/3/1999	31.33	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME		SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		2/3/1999	21.65	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		3/4/1999	17.56	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		3/4/1999	38.18	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		3/4/1999	23.94	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/22/1999	42.4	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		3/28/1999	30.4	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		3/28/1999	34.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		4/5/1999	15.9	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		4/5/1999	19.7	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR		4/19/1999	47.185	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/10/1999	43.4	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		5/12/1999	28.25	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		5/12/1999	37.78	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		5/12/1999	28.06	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		5/24/1999	18.7	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		5/24/1999	34.7	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		5/24/1999	24.9	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3		6/1/1999	4	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5		6/1/1999	14.5	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		6/2/1999	16.87	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		6/2/1999	30.35	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		6/2/1999	22.35	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		6/10/1999	13.64	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		6/10/1999	30.95	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		6/10/1999	20.51	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		6/13/1999	39.6	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		6/13/1999	35.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		7/6/1999	36.7	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		7/6/1999	22.2	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		7/7/1999	14.15	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		7/7/1999	32.99	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		7/7/1999	20.85	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		7/12/1999	47.1	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		7/14/1999	14.53	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		7/14/1999	35.45	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		7/14/1999	22.4	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		7/15/1999	50.4	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		7/26/1999	45.2	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		8/2/1999	38.4	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		8/3/1999	49	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		8/4/1999	15.58	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		8/4/1999	36.36	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		8/4/1999	23.58	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		8/9/1999	45.9	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		8/9/1999	15.76	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		8/9/1999	36.42	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		8/9/1999	23.11	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		8/12/1999	13.58	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		8/12/1999	35.46	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		8/12/1999	21.19	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		8/16/1999	48	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		8/23/1999	47.6	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		8/30/1999	46.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		9/7/1999	41.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		9/13/1999	49.5	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		9/20/1999	49.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		9/27/1999	31.2	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		9/27/1999	42	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		9/27/1999	48.1	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		10/4/1999	48.1	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		10/4/1999	39.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		10/4/1999	24.1	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		10/11/1999	48.8	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME		SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		10/11/1999	6.45	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		10/11/1999	30.87	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		10/11/1999	19.1	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		10/18/1999	45.7	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		10/25/1999	42.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		11/1/1999	45.1	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		11/8/1999	38.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		11/15/1999	44.4	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		11/22/1999	40.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		11/29/1999	43.6	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		12/6/1999	43.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		12/13/1999	50.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		12/20/1999	43.4	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		12/28/1999	34.3	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		12/28/1999	34.7	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		1/3/2000	43.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		1/3/2000	18.9	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		1/3/2000	22.2	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		1/11/2000	38.5	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		1/17/2000	44.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		1/24/2000	44.2	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		1/31/2000	44.4	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		2/2/2000	19.88	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		2/2/2000	19.88	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		2/2/2000	19.88	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		2/7/2000	42.2	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		2/10/2000	15.3	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		2/10/2000	36.4	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		2/10/2000	23.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		2/14/2000	44.6	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		2/22/2000	45.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		2/28/2000	40	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		3/2/2000	16	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		3/2/2000	35	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		3/2/2000	23.5	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/6/2000	47	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/12/2000	44	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		3/17/2000	34	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		3/17/2000	33	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/20/2000	44	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/27/2000	44	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		3/29/2000	25	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/3/2000	43	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		4/3/2000	19	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		4/3/2000	19	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/10/2000	44	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/17/2000	44	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/24/2000	45	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		4/24/2000	16	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		4/24/2000	18	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/1/2000	44.6	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		5/1/2000	15.36	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		5/1/2000	34.57	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		5/1/2000	22.51	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3		5/8/2000	4.52	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5		5/8/2000	18.2	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/8/2000	47.6	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/15/2000	47.9	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/22/2000	46.1	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/30/2000	48.1	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		6/5/2000	44.5	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		6/8/2000	22.48	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		6/8/2000	31.72	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	6/8/2000	21.13	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/12/2000	48	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	6/19/2000	32.8	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	6/19/2000	34.5	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/19/2000	47.6	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/26/2000	43.5	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/3/2000	44.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/3/2000	22	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/3/2000	24.7	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/10/2000	44.2	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	7/12/2000	14.2	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	7/12/2000	33.12	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	7/12/2000	21.25	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	7/17/2000	34.1	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	7/24/2000	33	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	7/31/2000	29.8	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	8/2/2000	14	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	8/2/2000	36	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	8/2/2000	22	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	8/7/2000	35.4	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/16/2000	60.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/21/2000	53.7	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	8/28/2000	39	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/28/2000	58	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/5/2000	52	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/11/2000	50	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	9/12/2000	17	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	9/12/2000	40	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	9/12/2000	26	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/18/2000	49	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	9/25/2000	35	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	9/25/2000	37	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/25/2000	47	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/2/2000	47	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/2/2000	20.9	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/2/2000	23.5	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	10/4/2000	19.12	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	10/4/2000	28.22	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	10/4/2000	29.65	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/9/2000	45	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/16/2000	38	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/23/2000	44.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/30/2000	46	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/6/2000	40.3	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	11/8/2000	22.49	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/13/2000	45.9	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	11/15/2000	14.78	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	11/15/2000	33.59	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/27/2000	46.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/4/2000	40.6	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	12/4/2000	21.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	12/4/2000	21.9	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/11/2000	45.4	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	12/13/2000	16.31	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	12/13/2000	40.07	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	12/13/2000	23.89	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	12/18/2000	43.9	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	12/18/2000	44.1	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/18/2000	44.6	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/26/2000	39.8	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/2/2001	45	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/2/2001	20	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/2/2001	21	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/8/2001	39	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/15/2001	44	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	1/16/2001	36	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	1/16/2001	35	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/22/2001	45	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	1/23/2001	32.91	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	1/23/2001	55.19	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	1/23/2001	23.49	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/29/2001	45	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/29/2001	14	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/29/2001	21	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/5/2001	44	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/12/2001	39	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/20/2001	41	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/26/2001	44	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/5/2001	38	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/12/2001	42	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	3/14/2001	25.33	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	3/14/2001	25.73	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/19/2001	47	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	3/19/2001	37	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/19/2001	37	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	3/21/2001	20.33	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	3/21/2001	26.17	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/26/2001	46	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	3/29/2001	21.79	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	3/29/2001	28.83	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/2/2001	40	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/2/2001	16	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/2/2001	17	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	4/4/2001	14.53	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	4/4/2001	19.62	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	4/9/2001	27	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/9/2001	44	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	4/12/2001	21.17	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/16/2001	45	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	4/18/2001	23.96	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/23/2001	45	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	4/25/2001	19.92	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/30/2001	45	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	5/2/2001	21.79	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/7/2001	46	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	5/9/2001	24.44	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/14/2001	48	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	5/16/2001	24.35	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/21/2001	42	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	5/22/2001	23.1	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	5/22/2001	46.36	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	5/22/2001	26.64	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	5/23/2001	4.2	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	5/23/2001	12	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/29/2001	47	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	5/30/2001	16.37	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	5/30/2001	39.41	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	5/30/2001	23.51	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/4/2001	48	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	6/5/2001	17.77	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	6/5/2001	43.37	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	6/5/2001	26.76	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/11/2001	52	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/18/2001	47	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/18/2001	33	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/18/2001	23	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/25/2001	51	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	6/26/2001	49	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	6/26/2001	35	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	7/2/2001	28	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/2/2001	58	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/2/2001	36	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/2/2001	26	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	7/3/2001	18.24	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	7/3/2001	44.92	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	7/3/2001	28.29	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/9/2001	46	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/16/2001	46	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	7/18/2001	54.99	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	7/18/2001	54.99	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	7/23/2001	35	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/23/2001	48	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/30/2001	46	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/6/2001	47	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	8/13/2001	39	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/13/2001	49	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	8/15/2001	16.72	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	8/15/2001	46.93	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	8/15/2001	27.18	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/20/2001	50	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/27/2001	56	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/4/2001	58	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/10/2001	50	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/17/2001	50	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	9/19/2001	15.58	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	9/19/2001	37.51	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	9/19/2001	23.42	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/24/2001	50	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	9/30/2001	39	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	9/30/2001	26	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/1/2001	55	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	10/3/2001	18.14	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	10/3/2001	43.63	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	10/3/2001	26.66	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/8/2001	49	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/8/2001	22	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/8/2001	26	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	10/15/2001	38	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/15/2001	47	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/22/2001	47	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/29/2001	47	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/5/2001	48	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	11/7/2001	15.92	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	11/7/2001	38.77	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	11/7/2001	23.25	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/12/2001	47	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	11/19/2001	45	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/19/2001	47	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/26/2001	45	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/3/2001	46	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	12/5/2001	15.85	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	12/5/2001	36.55	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	12/5/2001	21.86	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/10/2001	46	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/17/2001	47	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/26/2001	48	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	12/31/2001	45	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	12/31/2001	42	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/2/2002	49	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/7/2002	47	RBMB DATABASE	
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/7/2002	27	RBMB DATABASE	
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/7/2002	24	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	1/9/2002	16	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	1/9/2002	35.58	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	1/9/2002	21.38	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/14/2002	46	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/21/2002	46	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/28/2002	47	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	1/29/2002	34	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/4/2002	47	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/11/2002	45	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/19/2002	45	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	2/25/2002	39	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/25/2002	46	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/4/2002	46	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/11/2002	46	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/18/2002	46	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/25/2002	42	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	3/25/2002	35	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/25/2002	45	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/1/2002	45	RBMB DATABASE	
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/2/2002	14	RBMB DATABASE	
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/2/2002	20	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/8/2002	41	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/15/2002	48	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/22/2002	48	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	4/24/2002	38.06	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	4/24/2002	56.8	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	4/24/2002	26.34	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	4/29/2002	35	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/29/2002	46	RBMB DATABASE	
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	5/5/2002	18	RBMB DATABASE	
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	5/5/2002	14	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/6/2002	44	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/13/2002	49	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	5/15/2002	38.36	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	5/15/2002	53.52	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	5/15/2002	25.36	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/20/2002	49	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	5/28/2002	42	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/28/2002	52	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/3/2002	50	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	6/5/2002	39.8	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	6/5/2002	51.7	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	6/5/2002	31.5	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/10/2002	43	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/17/2002	46	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	6/24/2002	40	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	6/24/2002	35	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/24/2002	50	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/1/2002	50	RBMB DATABASE	
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/1/2002	33	RBMB DATABASE	
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/1/2002	23	RBMB DATABASE	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	7/8/2002	33	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/8/2002	51	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/15/2002	41	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	7/17/2002	44.1	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	7/17/2002	54	RBMB DATABASE	
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	7/17/2002	48.9	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/22/2002	49	RBMB DATABASE	
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/29/2002	51	RBMB DATABASE	
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	8/5/2002	4.3	RBMB DATABASE	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME		SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5		8/5/2002	14	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		8/5/2002	32	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		8/5/2002	49	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		8/12/2002	48	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		8/14/2002	47	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		8/14/2002	56.5	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		8/14/2002	48.6	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		8/26/2002	50	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-58		8/27/2002	12.3	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		9/3/2002	49	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		9/9/2002	47	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-58		9/11/2002	12	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		9/16/2002	48	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		9/18/2002	50.8	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		9/18/2002	59.6	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		9/18/2002	55.6	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		9/23/2002	44	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		9/23/2002	36	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		9/23/2002	50	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-58		10/2/2002	12.1	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		10/7/2002	18	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		10/7/2002	13	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52		10/9/2002	51.7	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN		10/9/2002	61.7	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN		10/9/2002	50	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		10/28/2002	36	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-58		11/6/2002	11.6	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		11/25/2002	39	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-58		12/4/2002	11.3	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		12/30/2002	39	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		12/30/2002	3.1	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		1/7/2003	14	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		1/7/2003	13	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-58		1/8/2003	11.8	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		1/13/2003	14	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		1/13/2003	13	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-59		1/22/2003	14.7	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		1/27/2003	39	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/28/2003	46	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/9/2009	38	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		3/16/2009	42	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		3/16/2009	32	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/16/2009	37	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/23/2009	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		3/30/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/6/2009	38	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4		4/6/2009	11	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7		4/6/2009	17	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/13/2009	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/20/2009	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		4/27/2009	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/4/2009	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/11/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/18/2009	39	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3		5/20/2009	16	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5		5/20/2009	20	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		5/26/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		6/1/2009	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		6/8/2009	39	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6		6/15/2009	31	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		6/15/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2		6/22/2009	40	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1		6/29/2009	39	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/29/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/6/2009	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/13/2009	40	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/13/2009	19	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/13/2009	17	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/20/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/27/2009	39	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	8/3/2009	34	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/3/2009	39	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	8/6/2009	18	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	8/6/2009	20	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/10/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/17/2009	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/24/2009	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/31/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/8/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/14/2009	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/21/2009	39	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	9/28/2009	40	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	9/28/2009	30	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/28/2009	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/5/2009	40	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/5/2009	20	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/5/2009	18	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/12/2009	39	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/12/2009	18	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/12/2009	18	RCL&WA
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/19/2009	40	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/19/2009	18	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/19/2009	18	RCL&WA
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/26/2009	39	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/26/2009	17	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/26/2009	17	RCL&WA
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/2/2009	40	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	11/2/2009	19	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	11/2/2009	19	RCL&WA
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/9/2009	38	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	11/9/2009	6.8	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	11/9/2009	6.8	RCL&WA
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	11/16/2009	18	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/16/2009	38	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	11/16/2009	6.2	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	11/16/2009	6.2	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	11/23/2009	2.6	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	11/23/2009	2.6	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	11/30/2009	0	RCL&WA
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	11/30/2009	0	RCL&WA
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/4/2010	38	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/4/2010	12	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/4/2010	18	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/11/2010	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/18/2010	38	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	2/1/2010	18	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/1/2010	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/8/2010	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/16/2010	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/22/2010	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/1/2010	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/15/2010	37	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/22/2010	47	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/22/2010	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/29/2010	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/5/2010	39	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/5/2010	12	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/5/2010	18	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/12/2010	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/19/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/26/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/3/2010	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/10/2010	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/17/2010	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/24/2010	45	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/1/2010	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/7/2010	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/14/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/21/2010	43	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/28/2010	44	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/6/2010	41	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/6/2010	17	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/6/2010	17	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/12/2010	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/19/2010	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/26/2010	43	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/9/2010	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/16/2010	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/23/2010	39	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	8/26/2010	17	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/30/2010	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/7/2010	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/13/2010	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/20/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/27/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/4/2010	38	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/4/2010	16	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/4/2010	17	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/11/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/18/2010	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/25/2010	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/1/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/8/2010	40	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	11/11/2010	17	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/15/2010	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/23/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/29/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/6/2010	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/13/2010	43	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/20/2010	41	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	12/27/2010	41	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	12/27/2010	31	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/27/2010	41	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/3/2011	10	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/3/2011	19	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/4/2011	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/10/2011	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/17/2011	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/24/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/31/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/7/2011	49	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	2/7/2011	20	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	2/7/2011	30	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/14/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/22/2011	43	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/28/2011	44	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/7/2011	44	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/14/2011	43	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	3/21/2011	37	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	3/22/2011	15	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	3/23/2011	27	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	3/28/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/4/2011	41	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/4/2011	11	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/4/2011	22	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/11/2011	43	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/18/2011	44	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/25/2011	43	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/2/2011	44	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/9/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/16/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/23/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/31/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/6/2011	43	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	6/13/2011	34	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/13/2011	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/20/2011	42	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	6/27/2011	36	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	6/27/2011	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/5/2011	43	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	7/5/2011	19	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	7/5/2011	16	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/11/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/18/2011	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/25/2011	42	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/1/2011	42	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	8/4/2011	12	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	8/4/2011	21	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/8/2011	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/15/2011	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/22/2011	41	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	8/29/2011	39	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/6/2011	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/12/2011	39	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	9/19/2011	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/19/2011	39	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	9/26/2011	33	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/26/2011	40	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/3/2011	39	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	10/3/2011	18	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	10/3/2011	16	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/10/2011	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/17/2011	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/24/2011	37	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	10/31/2011	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/7/2011	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/14/2011	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/21/2011	37	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	11/22/2011	6	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	11/22/2011	22	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/28/2011	36	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	12/5/2011	37	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/5/2011	40	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	12/6/2011	9	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	12/6/2011	22	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/12/2011	37	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/19/2011	37	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/27/2011	37	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/3/2012	37	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/3/2012	15	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/9/2012	37	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/16/2012	36	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/23/2012	36	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	1/30/2012	36	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	2/6/2012	22	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/6/2012	37	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	2/7/2012	21	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/13/2012	34	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	2/14/2012	6.8	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/21/2012	38	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/27/2012	40	CDPH DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	3/23/2012	32	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/2/2012	36	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/2/2012	33	CDPH DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/2/2012	17	CDPH DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	4/3/2012	20	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/9/2012	35	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/16/2012	33	CDPH DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	4/23/2012	36	CDPH DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	4/29/1986	24.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/29/1986	0.64	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/22/1986	42	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/22/1986	33.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/26/1987	31	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	5/26/1987	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/26/1987	21	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/26/1987	28	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	5/26/1987	16	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/26/1987	30	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	5/4/1987	25	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/1/1987	24	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	7/23/1987	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/6/1987	23	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/8/1987	25	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/12/1987	24	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/2/1987	23	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/29/1988	16	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	2/1/1988	24	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	3/22/1988	14.2	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	3/22/1988	3.2	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	3/22/1988	3.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/7/1988	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	4/4/1988	21	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/17/1988	28.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/16/1988	33.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	5/2/1988	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/9/1988	20	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/21/1988	32	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/5/1988	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	8/1/1988	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/3/1988	19	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/7/1988	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/5/1988	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	1/3/1989	23	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	2/6/1989	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/6/1989	21	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	4/3/1989	17	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/15/1989	84	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	5/1/1989	21	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/21/1989	24.1	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	6/20/1989	17.3	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	6/20/1989	17.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/29/1989	19.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/5/1989	21	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/21/1989	18	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/5/1989	16	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/15/1989	27.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/28/1989	45.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	9/28/1989	23.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/5/1989	17	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	12/12/1989	16.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	12/21/1989	31.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	12/21/1989	23.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	12/21/1989	30.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/29/1989	7.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	3/22/1990	1.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/22/1990	34.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	3/22/1990	23.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	3/22/1990	46.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	3/22/1990	25.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/2/1990	29	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/8/1990	16	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/8/1990	28.1	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	4/9/1990	16	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/9/1990	15	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/25/1990	11.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/25/1990	35.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/25/1990	37.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/2/1990	33	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/14/1991	26.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/14/1991	29.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/1/1991	14	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/1/1991	13	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/1/1991	24	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	9/24/1991	38.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/24/1991	48.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/3/1991	50.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/3/1991	36.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/3/1991	27.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/7/1991	34.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/7/1991	38.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/7/1991	44.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/2/1991	38	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/2/1991	22.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/2/1991	27.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/18/1992	13	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	2/18/1992	54	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/18/1992	26	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/18/1992	15	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/18/1992	62	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	2/3/1992	48.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/3/1992	31.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/3/1992	24.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/2/1992	47.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/2/1992	18.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	4/6/1992	43.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/6/1992	14.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/13/1992	28.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/13/1992	31.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	5/4/1992	42.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/4/1992	16.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/4/1992	15.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/1/1992	50.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/1/1992	34.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/1/1992	35.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/6/1992	53.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/6/1992	34.4	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	8/4/1992	17.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	8/3/1992	53.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/3/1992	34.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/22/1992	28	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/22/1992	49.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/8/1992	48.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/8/1992	34.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/28/1992	29	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/28/1992	48.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/5/1992	51.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/5/1992	16.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/2/1992	44.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/2/1992	16.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/7/1992	40.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/7/1992	13.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/25/1993	23.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	1/4/1993	51.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/4/1993	13.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/18/1993	21	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	2/1/1993	49.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/1/1993	27.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/29/1993	25.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/29/1993	41.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/1/1993	47.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/1/1993	18.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/1/1993	23.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/27/1993	24.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/27/1993	34.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	4/5/1993	42	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/5/1993	29.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/18/1993	30.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/26/1993	30.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/26/1993	46.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	5/3/1993	47.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/3/1993	31.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/3/1993	27.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/29/1993	24.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/29/1993	52.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/23/1993	12.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/23/1993	38.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	6/23/1993	32.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/23/1993	7.81	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-JOU	6/23/1993	7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	6/23/1993	37	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/23/1993	56	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/30/1993	0	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	6/23/1993	22.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/7/1993	47.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/7/1993	30	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/7/1993	36.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/26/1993	30.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/26/1993	58.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/31/1993	5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	9/21/1993	17.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/7/1993	4.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/13/1993	16.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/21/1993	5.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/28/1993	11.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/7/1993	41.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/7/1993	34.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/7/1993	27.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/5/1993	2.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/11/1993	2.9	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/12/1993	34.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/19/1993	2.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/26/1993	3.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/25/1993	25	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/25/1993	43.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/4/1993	20.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/4/1993	32.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/4/1993	26.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	11/2/1993	2.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	11/10/1993	20.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	11/15/1993	15.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	11/22/1993	6.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	11/30/1993	2.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/29/1993	28.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/29/1993	52.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/1/1993	46.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/1/1993	31.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/1/1993	23.8	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	12/22/1993	39.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	12/7/1993	3.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	12/13/1993	4.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	12/21/1993	2.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	12/28/1993	4.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/13/1993	13.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	12/16/1993	59.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	12/13/1993	32.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/16/1993	29.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	12/13/1993	26.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/16/1993	59.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/27/1993	26.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/27/1993	49.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/20/1993	26.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/20/1993	29.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/20/1993	20.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	1/18/1994	16.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	1/25/1994	14.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/4/1994	3.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/11/1994	30.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/18/1994	3.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/25/1994	7.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	1/4/1994	39.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/4/1994	37.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/4/1994	28.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	2/15/1994	20.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	2/15/1994	2.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/1/1994	23.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/28/1994	26.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/1/1994	23	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/28/1994	48.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	2/7/1994	32.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/7/1994	10	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/7/1994	3.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	3/1/1994	18.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	3/7/1994	18.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	3/22/1994	22.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	3/29/1994	22.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	3/1/1994	2.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	3/7/1994	9.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	3/15/1994	12.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	3/22/1994	12.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	3/29/1994	11.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/16/1994	27	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/28/1994	48	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/16/1994	48.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/28/1994	21.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/7/1994	42.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/7/1994	33.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/7/1994	29.5	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	4/7/1994	35.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	4/5/1994	20	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	4/11/1994	23.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	4/19/1994	24.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/5/1994	10.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/11/1994	16	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/12/1994	28.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/19/1994	13.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/25/1994	29.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/25/1994	51.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	4/4/1994	36.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/4/1994	22.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/4/1994	23.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/9/1994	21.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/16/1994	25	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/24/1994	19.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/31/1994	20	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/9/1994	11	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/16/1994	11.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/24/1994	10.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/31/1994	10.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/31/1994	29.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/31/1994	51.8	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	6/7/1994	33.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/7/1994	23	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/13/1994	21	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/14/1994	25.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/21/1994	21.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/28/1994	21.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/7/1994	13	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/13/1994	11.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/14/1994	29.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/21/1994	11.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/28/1994	14.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/21/1994	27.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/21/1994	47.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/6/1994	43.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/6/1994	29	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/6/1994	22.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	7/5/1994	21.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	7/11/1994	22.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	7/19/1994	24.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	7/26/1994	21.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/5/1994	17.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/11/1994	16.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/12/1994	32.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/19/1994	14.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/26/1994	14.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/25/1994	27.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/25/1994	52.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/5/1994	36.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/5/1994	24.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/5/1994	20.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	8/2/1994	21.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	8/8/1994	19	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	8/16/1994	21.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	8/23/1994	19.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	8/30/1994	21.3	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/2/1994	16.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/8/1994	12.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/16/1994	16.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/23/1994	13.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/30/1994	14.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/24/1994	50.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	8/1/1994	49.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/1/1994	40.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/1/1994	27.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	9/6/1994	20.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	9/19/1994	20.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/6/1994	13.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/19/1994	13.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	9/15/1994	37.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/6/1994	44.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/6/1994	39.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/6/1994	38.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/11/1994	31	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/31/1994	49.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/3/1994	36.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/3/1994	37.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/3/1994	32.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	11/7/1994	40.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	11/7/1994	23.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	11/7/1994	60.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/28/1994	26.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/28/1994	50	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/7/1994	53.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/7/1994	24.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/7/1994	24.2	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	12/20/1994	37.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/27/1994	50	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	12/19/1994	18.4	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	12/19/1994	29.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/19/1994	38.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/19/1994	33.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/19/1994	30.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/10/1995	50.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/23/1995	15.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/30/1995	2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	1/24/1995	54.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	1/23/1995	26.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/26/1995	58.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/30/1995	50.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	1/9/1995	40.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/9/1995	29.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/9/1995	21.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/6/1995	15.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/13/1995	13.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/21/1995	12.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/27/1995	11.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/27/1995	34.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/21/1995	37.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	2/27/1995	28.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/27/1995	49.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/6/1995	28.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/6/1995	10.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/6/1995	12	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/13/1995	15.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/20/1995	41.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/27/1995	15.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	3/27/1995	46.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/27/1995	35.8	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/27/1995	24.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	3/27/1995	32.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/27/1995	34.6	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	3/21/1995	17.9	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	3/21/1995	32.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/6/1995	32.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/6/1995	15.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/11/1995	33.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/24/1995	49.5	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/26/1995	21.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/3/1995	30.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/3/1995	32.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	5/22/1995	49.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/22/1995	47.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/30/1995	47	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	5/31/1995	19.3	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	5/31/1995	32.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/1/1995	35.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/1/1995	26.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/26/1995	28.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/26/1995	28.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/26/1995	30.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/26/1995	52.3	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	6/27/1995	19.8	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	6/27/1995	21.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/5/1995	44	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/5/1995	32.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/11/1995	31.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/18/1995	27.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/31/1995	46.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/5/1995	54.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/3/1995	41.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/3/1995	34.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/30/1995	47.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	8/14/1995	50.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/7/1995	33	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/7/1995	28.1	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	9/26/1995	40.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/25/1995	25.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/25/1995	46.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/11/1995	25.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/11/1995	27.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/11/1995	33.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/31/1995	48.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/2/1995	24	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/2/1995	28	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/2/1995	40.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/27/1995	50.2	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	11/1/1995	25	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/6/1995	42.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/6/1995	17.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/6/1995	27	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/11/1995	25.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/11/1995	47.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	12/6/1995	13.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	12/6/1995	35.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	12/6/1995	3.6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	12/6/1995	27	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	12/6/1995	29.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	12/6/1995	20.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/4/1995	54.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/4/1995	21	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/4/1995	27.1	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/3/1996	38.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/8/1996	35.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/15/1996	40.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/16/1996	20.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/22/1996	15.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/29/1996	15.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	1/15/1996	62.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	1/16/1996	57.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/15/1996	48.95	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	1/15/1996	24.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/15/1996	54.65	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/29/1996	42.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	1/3/1996	48.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/3/1996	30.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/15/1996	36.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/3/1996	21.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	2/27/1996	31.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/27/1996	41.6	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	2/12/1996	35.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	2/5/1996	43.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/5/1996	19.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/5/1996	9.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	3/12/1996	27.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/4/1996	16.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/18/1996	15.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	3/18/1996	35.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/4/1996	44.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/11/1996	42.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/18/1996	39.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/18/1996	46.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/18/1996	49	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/25/1996	25.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/25/1996	50.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/4/1996	57.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/4/1996	37.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/4/1996	33.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/15/1996	38.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	4/15/1996	58.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	4/15/1996	40.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	4/15/1996	24.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/15/1996	53.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/29/1996	50.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	4/16/1996	11.14	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	4/16/1996	32.36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	4/16/1996	20.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/13/1996	38.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	5/13/1996	56.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/6/1996	36.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/13/1996	37.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/20/1996	38.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/13/1996	36.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	5/13/1996	24.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/13/1996	51.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/28/1996	48.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/22/1996	34.55	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	5/22/1996	27.81	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/22/1996	29.84	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-JOU	5/22/1996	47	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/22/1996	31.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	5/13/1996	48.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/13/1996	43	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/20/1996	30.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/18/1996	28.9	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/17/1996	41.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	6/17/1996	57.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	6/10/1996	36.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	6/17/1996	37.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	6/17/1996	40.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/17/1996	48.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/4/1996	26.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/17/1996	27.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/17/1996	49.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/3/1996	39.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/10/1996	29.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/3/1996	23.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/9/1996	27.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/29/1996	24.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/29/1996	49.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/1/1996	25.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/1/1996	27.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/1/1996	34.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/19/1996	39.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	8/19/1996	37.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/19/1996	38.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	8/19/1996	24	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/19/1996	51.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/26/1996	25.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/26/1996	50.5	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	8/6/1996	22.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	8/5/1996	29.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/5/1996	33.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/5/1996	45.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/24/1996	27	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/24/1996	52.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/13/1996	57.08	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/17/1996	59.86	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/3/1996	36.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/23/1996	32.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/3/1996	29.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/8/1996	28.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/15/1996	41.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/4/1996	24.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/15/1996	34.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/15/1996	36.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	10/15/1996	30.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/28/1996	26.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/28/1996	49	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/7/1996	32.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/7/1996	35.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/7/1996	42.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/25/1996	26.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/25/1996	51.4	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	11/11/1996	26	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/4/1996	33.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/4/1996	31.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/4/1996	57	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	12/17/1996	39	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/16/1996	23.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/16/1996	42.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/2/1996	40.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/2/1996	35.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/14/1997	29.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/21/1997	16.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/28/1997	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/6/1997	38.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/13/1997	34.9	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/21/1997	44.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	1/21/1997	32.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/21/1997	47.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/27/1997	23.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/27/1997	47.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	1/6/1997	39.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/6/1997	22.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/18/1997	16.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/18/1997	16.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/18/1997	34.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/10/1997	35.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/18/1997	36.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/24/1997	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	2/18/1997	21.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/18/1997	46.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/24/1997	28.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/24/1997	48.7	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	2/4/1997	31.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/10/1997	26.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/3/1997	41.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/24/1997	16	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/26/1997	19	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/24/1997	14.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/26/1997	13	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/24/1997	34.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/26/1997	34	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/3/1997	37.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/24/1997	37.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/26/1997	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	3/26/1997	24	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/24/1997	48.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/26/1997	62	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/3/1997	28.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/3/1997	43.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/14/1997	39.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/14/1997	13.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	4/14/1997	34.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	4/14/1997	38.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	4/14/1997	24.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/14/1997	43.35	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/28/1997	29.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/28/1997	48.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/7/1997	36.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/7/1997	43.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/19/1997	46.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/19/1997	3.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/19/1997	32.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/19/1997	36.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	5/19/1997	23.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/19/1997	47.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/27/1997	29.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/27/1997	49.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/5/1997	44.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/5/1997	37.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/16/1997	26.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/16/1997	40.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/16/1997	5.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	6/16/1997	34.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	6/16/1997	36.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	6/16/1997	21.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/16/1997	49	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/23/1997	25.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/23/1997	52.3	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	6/3/1997	28	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/9/1997	33.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/2/1997	42.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	7/8/1997	12.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/8/1997	27.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/14/1997	40.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/14/1997	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	7/14/1997	34.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	7/14/1997	40.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	7/14/1997	25.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/14/1997	44.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/28/1997	31.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/28/1997	48.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/7/1997	35.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/7/1997	47.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/18/1997	42.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/18/1997	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	8/18/1997	36.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/18/1997	38.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	8/18/1997	24.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/18/1997	49.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/26/1997	32.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/26/1997	49.5	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	8/13/1997	22.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	8/11/1997	41.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/11/1997	38.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/11/1997	41.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/14/1997	41.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/15/1997	41.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/15/1997	3.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	9/14/1997	36.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	9/15/1997	36.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/14/1997	38.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/15/1997	38.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/15/1997	48.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/29/1997	24.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/29/1997	48.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/2/1997	40.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/2/1997	45.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/2/1997	32.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/14/1997	26.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/13/1997	41.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/13/1997	3.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/13/1997	35.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/13/1997	38.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	10/13/1997	26.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/13/1997	49.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/27/1997	31.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/27/1997	46.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/6/1997	35.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/6/1997	28.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/6/1997	50.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	11/17/1997	54.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	11/17/1997	5.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	11/17/1997	36.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	11/17/1997	54.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	11/17/1997	32.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	11/17/1997	53.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/24/1997	48.1	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	11/11/1997	17.1	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	11/11/1997	13.8	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	11/11/1997	32.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/3/1997	27	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/3/1997	35.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/3/1997	48.7	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	12/9/1997	40	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/15/1997	42.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/15/1997	6.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	12/15/1997	20.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/15/1997	56.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/15/1997	56	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/4/1997	29.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/15/1997	45.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	12/24/1997	42.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/1/1997	33.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/1/1997	24.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/1/1997	53.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/13/1998	24.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/20/1998	22.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/20/1998	20.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/20/1998	60.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/20/1998	56.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/12/1998	30.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/26/1998	30.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/26/1998	50.7	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	1/26/1998	16	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/26/1998	36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	1/8/1998	52.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	1/5/1998	34.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/5/1998	15.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/5/1998	21.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/17/1998	21.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/17/1998	4.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/17/1998	39.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/17/1998	52.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/17/1998	50.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/24/1998	30	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/24/1998	53.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	2/2/1998	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/2/1998	36.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/2/1998	52.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/23/1998	20.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/23/1998	4.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/27/1998	42.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/23/1998	53	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	3/23/1998	28.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/23/1998	45	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-1	3/23/1998	44.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-1	3/26/1998	41.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-1	3/30/1998	41.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/23/1998	31	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/23/1998	48.7	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	3/23/1998	13.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/2/1998	30.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/2/1998	36.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/2/1998	47.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/20/1998	20.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/20/1998	3.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	4/20/1998	40.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	4/20/1998	53.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	4/20/1998	28.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/20/1998	42.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/28/1998	29.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/28/1998	50.9	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	4/22/1998	16.8	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/22/1998	35.4	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	4/15/1998	3.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	4/15/1998	30.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	4/15/1998	0	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-JOU	4/15/1998	0	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	4/15/1998	48.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	4/15/1998	33.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	4/6/1998	26.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/6/1998	32.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/6/1998	49.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/18/1998	37.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/18/1998	4.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/18/1998	44.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/18/1998	49.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	5/18/1998	36.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/18/1998	46	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/26/1998	28.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/26/1998	50.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/6/1998	22.43	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	5/6/1998	17.01	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/6/1998	31.86	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	5/19/1998	33.36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/6/1998	5.44	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	5/6/1998	27.05	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/6/1998	45.39	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/6/1998	34.67	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	5/6/1998	14.81	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	5/4/1998	46.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/4/1998	44.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/4/1998	30.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/16/1998	28.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/15/1998	43.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/15/1998	4.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	6/15/1998	41.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	6/15/1998	51.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	6/15/1998	23.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/15/1998	45.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/23/1998	28.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/23/1998	51.3	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	6/22/1998	13.6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/3/1998	32.59	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/3/1998	12.91	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/3/1998	33.13	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	6/3/1998	26.01	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/3/1998	26.01	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/10/1998	27.45	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	6/3/1998	31.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/3/1998	45.27	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/3/1998	35.02	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/10/1998	35.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	6/3/1998	19.62	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/1/1998	24.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/1/1998	30.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/1/1998	52.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/14/1998	26.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/20/1998	44.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/20/1998	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	7/20/1998	39.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	7/20/1998	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	7/20/1998	27.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/20/1998	41.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/27/1998	28.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/27/1998	45.6	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	7/14/1998	18.8	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	7/14/1998	22.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	7/1/1998	12.99	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/1/1998	34.82	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	7/1/1998	26.25	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	7/1/1998	29.39	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	7/1/1998	32.27	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/8/1998	26.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/1/1998	36.19	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/13/1998	29.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/27/1998	28.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/13/1998	47	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/17/1998	41.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/17/1998	3.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	8/17/1998	36.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/17/1998	40.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	8/17/1998	25.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/17/1998	41.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/25/1998	30.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/25/1998	49.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/5/1998	34.95	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/5/1998	29.18	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/5/1998	34.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	8/5/1998	26.78	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/5/1998	19.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/5/1998	35.74	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/5/1998	46.48	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/5/1998	25.13	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/5/1998	31.59	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	8/3/1998	23.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/3/1998	33.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/3/1998	57.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/14/1998	44.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/14/1998	3.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	9/14/1998	38.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/14/1998	41.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/14/1998	39.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/22/1998	30.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/22/1998	48.6	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	9/28/1998	17	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/8/1998	21.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/8/1998	32.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/14/1998	42.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/13/1998	30.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/12/1998	40.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/12/1998	3.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/12/1998	39.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/12/1998	40.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	10/12/1998	29	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/12/1998	38.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/28/1998	30.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/28/1998	49.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/5/1998	22.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/5/1998	42.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/5/1998	52.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	11/16/1998	38.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	11/16/1998	3.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	11/16/1998	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	11/16/1998	38.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	11/16/1998	29.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	11/16/1998	42.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/30/1998	33.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/30/1998	50.9	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	11/30/1998	37.7	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	12/3/1998	44.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/21/1998	42.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/29/1998	3.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	12/21/1998	36.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/21/1998	37.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/21/1998	35.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/14/1998	34.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/14/1998	52.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/14/1998	36	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/14/1998	16.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/14/1998	39.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/11/1999	26.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/4/1999	3.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/19/1999	3.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	1/19/1999	35.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/19/1999	39.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/19/1999	36.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/25/1999	32	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/25/1999	52	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/27/1999	36.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	1/6/1999	33.69	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	1/6/1999	32.24	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	1/6/1999	32.05	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	1/6/1999	25.16	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	1/6/1999	13.25	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	1/6/1999	29.94	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	1/6/1999	44.41	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	1/6/1999	18.47	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	1/4/1999	43.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/4/1999	35.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/4/1999	48.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	2/9/1999	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/22/1999	19.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/22/1999	3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/22/1999	35	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/22/1999	44.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	2/22/1999	27	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/22/1999	39.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/23/1999	34	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/23/1999	55	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	2/1/1999	23.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/1/1999	40.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/1/1999	48.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/22/1999	27.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/22/1999	3.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/22/1999	38.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/22/1999	41	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	3/22/1999	26.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/22/1999	35.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/22/1999	38	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/22/1999	53	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	3/11/1999	34.28	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/11/1999	32.99	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/1/1999	35.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/1/1999	43.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/1/1999	48.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/20/1999	55.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/12/1999	30.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/12/1999	3.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	4/12/1999	39.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	4/12/1999	44.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	4/12/1999	22.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/12/1999	39.7	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/26/1999	29	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/26/1999	44	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/26/1999	35.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	4/6/1999	22.91	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	4/6/1999	30.26	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	4/14/1999	26.32	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	4/21/1999	27.76	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	4/21/1999	26.56	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	4/6/1999	39.17	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	4/20/1999	32.42	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	4/6/1999	11.85	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	4/21/1999	15.55	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	4/19/1999	37.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/19/1999	49.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/19/1999	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/17/1999	41.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/17/1999	7.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/17/1999	38.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/17/1999	49.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	5/17/1999	24.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/17/1999	32.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/25/1999	27	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/25/1999	46	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/5/1999	31.77	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	5/5/1999	12.15	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	5/24/1999	16.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/5/1999	30.56	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/24/1999	32.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	5/5/1999	22.63	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	5/24/1999	25.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/5/1999	27.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/12/1999	31.14	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/19/1999	34.55	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/24/1999	33.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/26/1999	32.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-JOU	5/24/1999	47.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	5/5/1999	27.41	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	5/24/1999	25.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/5/1999	42.19	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/24/1999	43.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/5/1999	35.45	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/12/1999	45.84	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/17/1999	45.69	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/24/1999	43.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	5/5/1999	17.85	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	5/24/1999	21.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	5/3/1999	41.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/3/1999	47	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/3/1999	37	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/15/1999	34	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/3/1999	31.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/15/1999	27.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/14/1999	3.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	6/14/1999	35.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	6/14/1999	40.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	6/14/1999	25.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/14/1999	32.9	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/14/1999	30	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/14/1999	47	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/2/1999	31	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/10/1999	32.74	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/23/1999	19.69	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/2/1999	16	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/10/1999	11.65	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/2/1999	28.94	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/10/1999	41.41	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/23/1999	37.11	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	6/2/1999	20	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	6/10/1999	21.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/2/1999	30.64	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/9/1999	33.17	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/16/1999	33.65	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/23/1999	37.87	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	6/2/1999	25.07	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	6/10/1999	32.74	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/2/1999	39.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/10/1999	42.55	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/23/1999	48.39	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	6/2/1999	18.06	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	6/10/1999	17.67	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/1/1999	21.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/1/1999	29.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/1/1999	40.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/13/1999	29	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/19/1999	38.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/19/1999	3.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	7/19/1999	34	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	7/19/1999	38.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/19/1999	36.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/26/1999	32	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/26/1999	49	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	7/26/1999	19.4	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	7/26/1999	25.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/7/1999	33.17	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/14/1999	34.27	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	7/7/1999	12.02	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/7/1999	31.57	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/14/1999	33.46	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	7/7/1999	24.08	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	7/7/1999	29.84	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/7/1999	44.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/14/1999	46.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	7/6/1999	25.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/6/1999	39.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/6/1999	50.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/10/1999	26.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/16/1999	38.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/16/1999	3.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	8/16/1999	34.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/16/1999	36.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	8/16/1999	26.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/16/1999	33.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/30/1999	28	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/30/1999	44	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/4/1999	36.68	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/9/1999	35.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/12/1999	37.26	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/4/1999	13.34	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/9/1999	11.61	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/12/1999	10.66	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/4/1999	34.76	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/9/1999	34.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/12/1999	36.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	8/4/1999	25.23	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	8/9/1999	25.06	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	8/12/1999	24.6	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/4/1999	31.82	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/9/1999	31.46	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/12/1999	30.75	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/4/1999	51.04	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/4/1999	19.72	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/9/1999	18.68	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/12/1999	17.49	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	8/2/1999	22	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/2/1999	37.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/2/1999	52.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/14/1999	26.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/20/1999	42.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/20/1999	18.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	9/20/1999	36.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/20/1999	38.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	9/20/1999	29.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/20/1999	35.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/27/1999	29	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/27/1999	43	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	9/7/1999	37.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/7/1999	38.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/7/1999	42.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/12/1999	26.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/18/1999	46.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/18/1999	3.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/18/1999	34.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/18/1999	38.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	10/18/1999	30	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/18/1999	35.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/25/1999	31	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/25/1999	50	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	10/27/1999	24.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	10/11/1999	35.44	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	10/11/1999	14.315	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	10/11/1999	33.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	10/11/1999	23.79	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	10/11/1999	29.91	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	10/11/1999	17.96	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/4/1999	23.2	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/4/1999	39.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/4/1999	47.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	11/15/1999	42.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	11/15/1999	3.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	11/15/1999	38.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	11/17/1999	30.165	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	11/1/1999	38	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/1/1999	46	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/1/1999	42.4	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	12/8/1999	44.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	12/14/1999	26.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/13/1999	43.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/13/1999	3.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	12/13/1999	32.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/13/1999	36.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	12/13/1999	28.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/13/1999	34.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	12/6/1999	29	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/6/1999	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/6/1999	44.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/11/2000	28	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/3/2000	46.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/10/2000	52.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/24/2000	46.8	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/3/2000	3.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/10/2000	3.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/18/2000	3.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/24/2000	3.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/3/2000	35	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/10/2000	36.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/18/2000	35.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/24/2000	34.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/3/2000	33.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/10/2000	41.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/18/2000	37.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/24/2000	37.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/24/2000	31	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/24/2000	48	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	1/24/2000	20.4	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/24/2000	25.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/3/2000	46.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/3/2000	42.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	2/8/2000	26	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/28/2000	30	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/7/2000	38.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/7/2000	43.6	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	3/7/2000	44	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/6/2000	21.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/6/2000	7.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/6/2000	50.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/6/2000	32.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/21/2000	30	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/21/2000	47	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	3/8/2000	22	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	3/8/2000	20	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/2/2000	31	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/8/2000	22	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	3/8/2000	31	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	3/9/2000	25	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	3/8/2000	23	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	3/14/2000	46	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	3/15/2000	43	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	3/9/2000	19	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/6/2000	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/6/2000	46	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/11/2000	25.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/17/2000	7.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/17/2000	3.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	4/17/2000	36.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	4/17/2000	52.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	4/17/2000	29.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/17/2000	37.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/24/2000	29	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/24/2000	47	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/27/2000	37	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/3/2000	37	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/3/2000	53	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/8/2000	26.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/2/2000	6.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/8/2000	26	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/15/2000	35.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/30/2000	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/2/2000	5.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/8/2000	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/15/2000	3.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/30/2000	3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/30/2000	38	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/2/2000	57.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/8/2000	55.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/15/2000	57.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/30/2000	57	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	5/30/2000	29	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/8/2000	41.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/15/2000	35.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/30/2000	34	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/22/2000	27	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/22/2000	44	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/1/2000	36.26	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	5/1/2000	12.76	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/1/2000	34.31	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	5/1/2000	23.82	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	5/1/2000	29.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	5/1/2000	18.15	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/1/2000	48.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/1/2000	32.6	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	6/7/2000	43.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/19/2000	33	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/19/2000	26	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/5/2000	38.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/12/2000	42.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/19/2000	42.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/5/2000	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/12/2000	4.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/19/2000	4.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	6/5/2000	56.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	6/12/2000	58.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	6/19/2000	57.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	6/19/2000	30.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/5/2000	34.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/12/2000	38.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/19/2000	39.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/19/2000	27	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/19/2000	43	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/8/2000	32.43	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/8/2000	13.33	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/8/2000	30.19	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	6/8/2000	23.84	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/8/2000	34.69	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	6/8/2000	30.15	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/8/2000	45.87	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/8/2000	38	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	6/8/2000	19.4	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/12/2000	43.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/12/2000	44.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/11/2000	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/25/2000	40.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/19/2000	4.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/25/2000	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	7/19/2000	44.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	7/25/2000	42.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/19/2000	35.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/25/2000	36.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/24/2000	30	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/24/2000	49	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	7/27/2000	19.5	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	7/27/2000	24.6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	7/12/2000	11.85	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/12/2000	32.68	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	7/12/2000	22.25	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	7/12/2000	28.39	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	7/12/2000	27.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/12/2000	34.62	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	7/12/2000	17.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/3/2000	51	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/3/2000	36.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/21/2000	16	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/2/2000	44.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/9/2000	39.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/15/2000	39.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/22/2000	38.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/29/2000	39.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/2/2000	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/9/2000	4.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/15/2000	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/22/2000	4.49	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/29/2000	4.32	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	8/22/2000	34.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	8/29/2000	35.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/2/2000	44.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/9/2000	39.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/15/2000	40.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/22/2000	39.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	8/29/2000	40.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	8/22/2000	32.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/2/2000	38.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/9/2000	35.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/15/2000	36.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/22/2000	36.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/29/2000	36	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/28/2000	33	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/28/2000	55	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/2/2000	12	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/2/2000	32	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	8/2/2000	23	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/2/2000	30	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/2/2000	29	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/2/2000	45	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/2/2000	18	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/7/2000	38.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/7/2000	45.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/12/2000	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/5/2000	39.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/11/2000	38.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/18/2000	38.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/25/2000	39.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/5/2000	4.35	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/11/2000	4.16	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/18/2000	4.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/25/2000	4.28	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	9/18/2000	36.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	9/25/2000	39.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/11/2000	39.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/18/2000	37.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/20/2000	40.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/25/2000	38.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	9/5/2000	32.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	9/25/2000	33	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/5/2000	36.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/11/2000	36.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/18/2000	35.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/25/2000	36.4	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/25/2000	32	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/25/2000	51	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	9/20/2000	26.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	9/12/2000	15	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/20/2000	40.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	9/12/2000	28.75	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	9/12/2000	36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/20/2000	37.25	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	9/12/2000	23	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/4/2000	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/4/2000	42	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	10/10/2000	30.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/10/2000	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/3/2000	38.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/9/2000	38.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/16/2000	38.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/23/2000	39.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/30/2000	40.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/3/2000	4.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/9/2000	4.31	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/16/2000	4.29	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/23/2000	4.21	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/30/2000	4.87	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/3/2000	35.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/9/2000	36	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/16/2000	41.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/23/2000	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	10/30/2000	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/6/2000	37.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/9/2000	39.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/16/2000	40.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/23/2000	44.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	10/30/2000	52.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/3/2000	35.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/9/2000	35.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/16/2000	35.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/23/2000	36.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/30/2000	36.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/23/2000	32	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/23/2000	53	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/2/2000	35	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/2/2000	43	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	11/14/2000	30.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	11/14/2000	24.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/27/2000	35	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/27/2000	52	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/6/2000	36.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/6/2000	41.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	12/19/2000	30.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	12/19/2000	24.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/4/2000	21.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/11/2000	20.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/18/2000	16.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/26/2000	16.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/4/2000	4.38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/11/2000	4.49	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/18/2000	4.48	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/26/2000	4.49	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	12/4/2000	35.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	12/11/2000	35.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	12/18/2000	36.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	12/26/2000	36.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/4/2000	56	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/11/2000	51.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/18/2000	60	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/26/2000	57.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	12/18/2000	32.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/4/2000	35	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/11/2000	38.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/18/2000	35.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/26/2000	36.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/11/2000	34	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/11/2000	53	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	12/27/2000	26.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	12/1/2000	37.59	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	12/1/2000	36.97	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/4/2000	32.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/4/2000	49.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	1/9/2001	30.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/9/2001	24.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/2/2001	16.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/8/2001	14.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/16/2001	15	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/22/2001	14.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/29/2001	14.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/2/2001	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/8/2001	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/16/2001	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/22/2001	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/29/2001	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	1/2/2001	35.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	1/8/2001	38.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	1/16/2001	42.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	1/22/2001	43.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	1/29/2001	43.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/2/2001	57.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/8/2001	55.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/16/2001	56.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/22/2001	50.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	1/29/2001	49.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/2/2001	35.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/8/2001	35.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/16/2001	11.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/22/2001	35.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/29/2001	35.2	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/22/2001	37	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/22/2001	54	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	1/22/2001	15	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/22/2001	25	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/2/2001	48	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/2/2001	33	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	2/13/2001	31.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	2/13/2001	24.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/5/2001	14.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/12/2001	13.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/20/2001	13.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/26/2001	13.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/5/2001	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/12/2001	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/20/2001	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/26/2001	5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/5/2001	44.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/9/2001	43	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/12/2001	42.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/20/2001	41.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/23/2001	38.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/26/2001	37.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/27/2001	36.9	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/5/2001	53.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/12/2001	48	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/20/2001	48.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/26/2001	49.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	2/20/2001	28.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/5/2001	36	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/12/2001	52.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/20/2001	38.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/26/2001	43	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/20/2001	36	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/20/2001	54	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/5/2001	39	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/5/2001	24	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	3/13/2001	30.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	3/13/2001	24.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/5/2001	13.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/19/2001	13.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/26/2001	13.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/5/2001	4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/12/2001	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/19/2001	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/26/2001	4.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	3/20/2001	44	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/5/2001	50.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/19/2001	60.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	3/26/2001	59.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	3/19/2001	32	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/5/2001	36.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/19/2001	35.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/26/2001	34.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/19/2001	35	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/19/2001	53	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/5/2001	43	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/5/2001	26	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	4/10/2001	30.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/10/2001	24.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/2/2001	13.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/2/2001	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/2/2001	36.3	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/23/2001	36	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/23/2001	53	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/23/2001	29	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/2/2001	43	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/2/2001	29	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/8/2001	29.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/8/2001	24.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/7/2001	26	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/14/2001	26.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/21/2001	25.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/29/2001	28.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/7/2001	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/14/2001	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/21/2001	4.25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/29/2001	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/21/2001	62.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/7/2001	35.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/14/2001	35.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/21/2001	35.85	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/29/2001	35.5	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/21/2001	34	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/21/2001	54	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/2/2001	8.35	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/9/2001	24.55	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/16/2001	28.12	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/22/2001	23.54	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/30/2001	30.88	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	5/9/2001	14.12	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/2/2001	27.63	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/9/2001	29.84	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/16/2001	24.03	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/22/2001	23.54	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/30/2001	29.82	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	5/9/2001	26.39	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/2/2001	22.68	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/9/2001	28.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/16/2001	29.15	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/22/2001	40.02	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	5/9/2001	26.73	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/2/2001	38.15	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/9/2001	41.18	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/16/2001	43.38	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/30/2001	43.75	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/9/2001	30.48	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/22/2001	34.51	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/30/2001	32.75	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	5/9/2001	15.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/7/2001	43	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/7/2001	47	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/12/2001	31.1	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/18/2001	30.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/12/2001	24.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/18/2001	25.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/4/2001	30	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/11/2001	35.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/18/2001	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/4/2001	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/11/2001	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/18/2001	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/4/2001	34.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/11/2001	34.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/18/2001	34.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/18/2001	33	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/18/2001	54	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/5/2001	34.99	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/13/2001	30.82	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/20/2001	31.62	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/26/2001	31.26	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/5/2001	12.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/5/2001	34.49	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/13/2001	32.12	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/20/2001	30.16	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/26/2001	29.65	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	6/5/2001	25.29	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/5/2001	33.07	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/13/2001	27.45	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/20/2001	28.08	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/26/2001	27.23	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	6/5/2001	32.08	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/5/2001	49.72	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/13/2001	44.02	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/20/2001	44.26	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/26/2001	43.37	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/5/2001	36.81	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/13/2001	31.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/20/2001	32.01	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/26/2001	31.61	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	6/5/2001	21.24	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/4/2001	33	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/4/2001	53	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	7/10/2001	30.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/10/2001	25.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/2/2001	39.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/9/2001	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/16/2001	36.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/23/2001	38.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/2/2001	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/9/2001	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/16/2001	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/23/2001	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/2/2001	35.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/9/2001	34.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/16/2001	33.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/23/2001	34.9	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	7/23/2001	26	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/3/2001	37.32	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/11/2001	38.59	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/18/2001	40.34	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/25/2001	41.43	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	7/3/2001	12.43	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/3/2001	35.33	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/11/2001	36.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/18/2001	37.33	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/25/2001	38.93	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	7/3/2001	25.89	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	7/3/2001	32.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	7/11/2001	34.14	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	7/25/2001	35.63	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	7/3/2001	33.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/3/2001	52.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/11/2001	54.21	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/18/2001	54.99	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/3/2001	40.87	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/11/2001	40.77	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/18/2001	42.07	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/25/2001	42.65	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	7/3/2001	23.72	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/2/2001	50	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/2/2001	38	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	8/14/2001	25.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/13/2001	37.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/20/2001	37.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/13/2001	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/20/2001	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/13/2001	35.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/20/2001	34.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/1/2001	33.04	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/8/2001	35.43	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/15/2001	39.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/22/2001	37.94	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/29/2001	37.16	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/15/2001	12.45	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/1/2001	35.52	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/8/2001	33.16	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/15/2001	33.46	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/22/2001	35.27	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/29/2001	34.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	8/15/2001	23.32	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/1/2001	30.19	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/8/2001	30.31	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/15/2001	30.82	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/22/2001	31.55	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/29/2001	30.84	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/15/2001	33.98	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/1/2001	47.92	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/8/2001	47.84	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/15/2001	53.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/22/2001	50.94	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/29/2001	50.36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/1/2001	36.35	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/8/2001	36.86	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/15/2001	40.6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/22/2001	38.78	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/29/2001	38.38	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/6/2001	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/6/2001	45	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	9/25/2001	42	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/18/2001	25.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/17/2001	20.7	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/17/2001	32	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/17/2001	52	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	9/25/2001	13	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	9/5/2001	36.53	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	9/12/2001	35.51	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	9/19/2001	35.95	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	9/27/2001	35.27	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	9/19/2001	11.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/5/2001	33.47	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/12/2001	33.36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/19/2001	33.27	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/27/2001	33.18	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	9/19/2001	22.28	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	9/5/2001	29.58	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	9/12/2001	29.47	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	9/19/2001	29.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	9/27/2001	29.02	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	9/19/2001	30.38	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/5/2001	53.67	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/12/2001	48.11	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/19/2001	47.09	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/27/2001	46.95	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	9/5/2001	36.62	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	9/12/2001	36.57	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	9/19/2001	36.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	9/27/2001	36.45	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/4/2001	44	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/4/2001	51	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	10/9/2001	35	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/9/2001	26	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/1/2001	38.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/1/2001	35.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/22/2001	32	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/22/2001	55	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	10/25/2001	25	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	10/3/2001	40.79	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	10/10/2001	38.33	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	10/17/2001	39.67	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	10/3/2001	13.38	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	10/3/2001	38.47	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	10/10/2001	36.07	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	10/17/2001	37.41	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	10/3/2001	25.69	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	10/3/2001	33.23	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	10/10/2001	31.32	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	10/17/2001	32.91	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	10/3/2001	34.73	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	10/3/2001	54.58	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	10/10/2001	51.72	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	10/17/2001	52.95	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	10/3/2001	42.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	10/10/2001	40.06	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	10/17/2001	40.71	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/1/2001	36	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/1/2001	54	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	11/20/2001	34	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	11/20/2001	26	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	11/6/2001	23	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	11/13/2001	30	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	11/27/2001	6.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	11/6/2001	3.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	11/13/2001	3.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	11/6/2001	34	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	11/13/2001	35	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/19/2001	33	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/19/2001	51	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	11/7/2001	11.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	11/7/2001	22.58	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	11/7/2001	31.35	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/5/2001	43	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/5/2001	44	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	12/11/2001	33	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	12/11/2001	26	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/3/2001	31	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/11/2001	34	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/26/2001	40	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/3/2001	3.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/11/2001	4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/17/2001	3.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/26/2001	4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	12/17/2001	55	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/3/2001	40	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/11/2001	34	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/17/2001	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/26/2001	48	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/10/2001	33	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/10/2001	52	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	12/5/2001	11.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	12/5/2001	22.11	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	12/5/2001	30	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/3/2001	37	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/3/2001	53	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	1/8/2002	34	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/8/2002	27	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	1/28/2002	42	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/14/2002	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	1/28/2002	4.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/14/2002	35	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	1/28/2002	37	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/21/2002	52	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/28/2002	36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	1/9/2002	10.89	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	1/9/2002	21.42	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	1/9/2002	30.07	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	1/30/2002	21.64	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/7/2002	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/14/2002	37	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/7/2002	49	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/14/2002	51	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	2/12/2002	33	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	2/12/2002	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/5/2002	43	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/19/2002	43	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/5/2002	4.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	2/19/2002	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/5/2002	60	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/5/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/19/2002	37	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/19/2002	56	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	2/6/2002	11.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	2/6/2002	22.19	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	2/6/2002	30.12	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	2/6/2002	21.02	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/4/2002	39	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/4/2002	48	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	3/12/2002	33	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	3/12/2002	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/11/2002	42	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	3/25/2002	43	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/11/2002	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/25/2002	5.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/11/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/25/2002	36	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/4/2002	41	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/6/2002	41	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/25/2002	36	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/25/2002	54	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	3/6/2002	9.16	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	3/6/2002	19.43	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	3/6/2002	27.27	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/4/2002	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/4/2002	42	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	4/9/2002	32	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/9/2002	26	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/1/2002	43	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/9/2002	42	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/16/2002	43	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/29/2002	42	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/1/2002	4.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/9/2002	4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/16/2002	4.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/29/2002	4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/1/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/9/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/16/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/29/2002	36	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/22/2002	39	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/22/2002	55	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/24/2002	27	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	4/24/2002	10.01	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	4/3/2002	11.18	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	4/24/2002	30.67	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	4/3/2002	22.29	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	4/24/2002	5.95	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	4/3/2002	29.83	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	4/24/2002	41.12	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	4/24/2002	15.66	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	4/3/2002	20.43	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/1/2002	38	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/1/2002	48	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/15/2002	32	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/15/2002	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/7/2002	42	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/13/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/21/2002	42	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/7/2002	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/13/2002	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/21/2002	4.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/7/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/13/2002	36	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/21/2002	36	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/21/2002	35	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/15/2002	8.23	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	5/1/2002	12.17	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/15/2002	29.61	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	5/1/2002	22.82	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/15/2002	7.02	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	5/1/2002	31.23	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/15/2002	40.22	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/15/2002	14.45	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	5/1/2002	21.45	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/6/2002	39	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/6/2002	44	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/11/2002	32	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/17/2002	32	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/11/2002	25	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/17/2002	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/11/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/18/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	6/26/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/11/2002	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/18/2002	4.1	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/26/2002	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/11/2002	36	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/18/2002	36	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/26/2002	38	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/17/2002	35	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/17/2002	55	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/5/2002	8.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/12/2002	11.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/5/2002	28.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	6/12/2002	22.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/5/2002	7.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	6/12/2002	29.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/5/2002	41	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/5/2002	14.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	6/12/2002	20	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/10/2002	36	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/10/2002	40	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	7/16/2002	31	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	7/16/2002	24	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/9/2002	21	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/16/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/22/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	7/29/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/2/2002	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/9/2002	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/16/2002	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/22/2002	4.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/29/2002	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/2/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/9/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/16/2002	38	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/22/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/29/2002	38	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/22/2002	36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/17/2002	4.6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	7/10/2002	10.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/17/2002	29.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	7/10/2002	22.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	7/17/2002	5.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	7/10/2002	30.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/17/2002	42	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/17/2002	13.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	7/10/2002	20.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/1/2002	42	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/1/2002	42	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/5/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/13/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/19/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	8/26/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/5/2002	6.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/13/2002	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/19/2002	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/26/2002	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/5/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/13/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/19/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/26/2002	39	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/20/2002	36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/14/2002	11.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/7/2002	10.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/14/2002	31.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	8/7/2002	22.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/14/2002	9.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/7/2002	30.6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/14/2002	42.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/14/2002	17.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/7/2002	20.3	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/5/2002	39	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/5/2002	44	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	9/17/2002	35	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	9/17/2002	28	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/3/2002	36	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/9/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/17/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	9/25/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/3/2002	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/9/2002	4.5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/17/2002	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/25/2002	4.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/3/2002	37	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/9/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/17/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/25/2002	39	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/16/2002	36	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/16/2002	50	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	9/18/2002	8.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	9/11/2002	10.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/18/2002	32.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	9/11/2002	22.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	9/18/2002	5.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	9/11/2002	30.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/18/2002	45.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	9/18/2002	15.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	9/11/2002	19.7	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/2/2002	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/2/2002	43	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	10/8/2002	32	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	10/8/2002	25	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/2/2002	40	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/7/2002	40	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/14/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	10/22/2002	28	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/2/2002	4.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/7/2002	4.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/14/2002	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/22/2002	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	10/28/2002	4.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/2/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/7/2002	40	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/14/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/22/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	10/28/2002	39	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/21/2002	37	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	10/30/2002	23	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	10/9/2002	5.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	10/2/2002	10.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	10/9/2002	32.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	10/2/2002	22.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	10/9/2002	5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	10/2/2002	30.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	10/9/2002	46.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	10/9/2002	14.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	10/2/2002	19.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/14/2002	39	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/14/2002	44	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	11/19/2002	34	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	11/19/2002	28	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	11/4/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	11/12/2002	40	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	11/4/2002	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	11/12/2002	4.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	11/18/2002	4.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	11/4/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	11/12/2002	38	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	11/18/2002	39	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/18/2002	36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	11/20/2002	4.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	11/6/2002	10.36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	11/20/2002	32.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	11/6/2002	21.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	11/20/2002	4.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	11/6/2002	30.6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	11/20/2002	45.9	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	11/20/2002	15	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/4/2002	44	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/4/2002	40	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	12/10/2002	36	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	12/10/2002	28	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/3/2002	43	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/10/2002	44	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	12/17/2002	57	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/3/2002	5	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/10/2002	4.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	12/17/2002	4.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/3/2002	45	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/10/2002	39	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	12/17/2002	38	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/17/2002	36	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	12/18/2002	9.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	12/4/2002	10.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	12/18/2002	38.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	12/4/2002	21.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	12/18/2002	6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	12/4/2002	30.6	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	12/18/2002	55.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	12/18/2002	19.8	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/2/2002	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/2/2002	40	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	1/14/2003	28	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	1/15/2003	6.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	1/8/2003	10.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	1/15/2003	32.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	1/8/2003	22.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	1/15/2003	5.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	1/8/2003	32	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	1/15/2003	46.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	1/15/2003	15.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	1/8/2003	29.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/6/2003	40	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/6/2003	40	RBMB DATABASE
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	2/11/2003	26	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	2/3/2003	41	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	2/3/2003	41	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	3/11/2003	25	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	3/26/2003	26	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/3/2003	41	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/3/2003	44	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	4/8/2003	28	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	4/7/2003	40	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	4/7/2003	42	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	5/13/2003	30	45
Pasadena	KINNELOA IRRIGATION DIST.	DOLORES WELL	5/7/2003	12	45
Pasadena	KINNELOA IRRIGATION DIST.	KINNELOA WELL 03	5/7/2003	20	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	5/7/2003	31	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	5/5/2003	40	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	5/5/2003	43	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/10/2003	27	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/23/2003	27	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/2/2003	40	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/17/2003	41	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/2/2003	43	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/17/2003	45	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	7/8/2003	26	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	7/7/2003	41	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	7/7/2003	44	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	8/12/2003	25	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	8/19/2003	20.3	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	8/4/2003	39	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	8/4/2003	42	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	9/16/2003	27	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/2/2003	39	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/30/2003	43	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/2/2003	43	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/30/2003	39.8	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	10/14/2003	25.9	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	10/6/2003	40	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	10/20/2003	40.744	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	10/6/2003	42	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	11/25/2003	25.3	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	11/12/2003	20.9	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1		2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/12/2003	39	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/24/2003	38	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	11/12/2003	41	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	11/24/2003	40	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/16/2003	23.5	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	12/9/2003	26.3	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/1/2003	37	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/1/2003	42	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/10/2003	37	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	1/13/2004	26.3	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	1/5/2004	40	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	2/26/2004	22	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	2/10/2004	26.5	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	2/18/2004	22.6	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	2/2/2004	42	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	3/9/2004	26.7	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/1/2004	39	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/4/2004	37.3	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	4/13/2004	27.7	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	4/5/2004	33	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	4/5/2004	38	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	5/11/2004	27.2	45	
Pasadena	KINNELOA IRRIGATION DIST.	DOLORES WELL	5/12/2004	11.4	45	
Pasadena	KINNELOA IRRIGATION DIST.	KINNELOA WELL 03	5/12/2004	21.5	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	5/12/2004	21.6	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	5/3/2004	36	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	5/3/2004	36.96	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	5/3/2004	31	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/1/2004	16.8	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/8/2004	28.7	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/1/2004	39.2	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/7/2004	39	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/15/2004	39.4	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/7/2004	27	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/15/2004	27.7	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	7/13/2004	26.8	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	7/6/2004	39	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	7/6/2004	29	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	8/9/2004	36.1	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	8/11/2004	20.6	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	8/2/2004	37	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	8/2/2004	35	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/2/2004	13.8	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	9/14/2004	28	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/7/2004	40	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/7/2004	36	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/23/2004	37.9	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	10/12/2004	29	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	10/4/2004	39	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	11/9/2004	28.5	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	11/9/2004	19.2	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/1/2004	38	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/22/2004	29	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/29/2004	30	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	11/1/2004	33	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/1/2004	17.5	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	12/14/2004	29.5	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/6/2004	30	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/13/2004	29	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/21/2004	29.9	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/6/2004	30	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/21/2004	30	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	1/11/2005	27.6	45	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	1/3/2005	38	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	1/3/2005	31	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	2/8/2005	29.1	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	2/7/2005	28	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	2/7/2005	29	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	3/8/2005	28.2	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	3/15/2005	13.3	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/7/2005	43	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/16/2005	42	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/7/2005	28	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	4/12/2005	29.5	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	4/4/2005	40	45
Pasadena	KINNELOA IRRIGATION DIST.	DOLORES WELL	5/10/2005	14.2	45
Pasadena	KINNELOA IRRIGATION DIST.	KINNELOA WELL 03	5/10/2005	15	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	5/10/2005	11.8	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	5/2/2005	42	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	5/23/2005	25	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/2/2005	19.7	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/14/2005	29.6	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/6/2005	43	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/23/2005	43.8	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/6/2005	34	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/23/2005	31.2	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	7/12/2005	30.3	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	7/5/2005	44	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	7/5/2005	37	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	8/9/2005	30	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	8/22/2005	10.1	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	8/1/2005	44	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	8/1/2005	40	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/7/2005	21.6	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	9/13/2005	29.5	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/1/2005	44.6	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/6/2005	46	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/1/2005	31.4	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/6/2005	40	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	10/11/2005	30.1	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	10/3/2005	47	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	10/3/2005	31	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	11/16/2005	10.5	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/7/2005	47	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	11/7/2005	33	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/5/2005	17.7	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/5/2005	49	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/13/2005	51.6	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/5/2005	33	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/13/2005	42.8	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	1/3/2006	51	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	1/3/2006	40	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	2/21/2006	11.2	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	2/6/2006	51	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	2/6/2006	29	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	3/2/2006	16.4	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/6/2006	52	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/21/2006	50.4	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/6/2006	30	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/21/2006	28.7	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	4/3/2006	53	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	4/3/2006	28	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	5/2/2006	42.2	45
Pasadena	KINNELOA IRRIGATION DIST.	DOLORES WELL	5/22/2006	10.8	45
Pasadena	KINNELOA IRRIGATION DIST.	KINNELOA WELL 03	5/22/2006	19.9	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	5/22/2006	12.7	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1		2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	5/1/2006	52	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	5/1/2006	36	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/27/2006	20.4	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/13/2006	48.6	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/27/2006	47.6	45	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/27/2006	46	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/5/2006	54	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/21/2006	53.5	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/5/2006	30	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/21/2006	30.6	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	7/3/2006	54	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	7/3/2006	30	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	8/17/2006	15.7	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	8/7/2006	54	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	8/7/2006	37	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/18/2006	18.2	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/11/2006	55	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/12/2006	54.3	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/5/2006	39	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/12/2006	31.4	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	10/2/2006	54	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	10/2/2006	38	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	11/20/2006	15	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/6/2006	54	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	11/6/2006	40	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/5/2006	16.8	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/12/2006	52.5	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/12/2006	29.3	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	1/2/2007	53	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	1/2/2007	40	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	2/27/2007	16	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	3/20/2007	19.2	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/5/2007	52	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/14/2007	51.1	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/5/2007	36	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/14/2007	39.3	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	4/2/2007	52	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	4/2/2007	29	45	
Pasadena	KINNELOA IRRIGATION DIST.	DOLORES WELL	5/23/2007	10.9	45	
Pasadena	KINNELOA IRRIGATION DIST.	KINNELOA WELL 03	5/23/2007	20.1	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	5/23/2007	16.5	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	5/7/2007	55	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	5/7/2007	40	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/19/2007	18.8	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/4/2007	50	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/13/2007	52.3	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/4/2007	35	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/13/2007	27.6	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	7/2/2007	52	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	7/2/2007	36	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	8/23/2007	11.8	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	8/6/2007	52	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	8/6/2007	36	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/4/2007	21.1	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/4/2007	52	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/11/2007	49.5	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/4/2007	37	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/11/2007	27.5	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	10/1/2007	51	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	10/1/2007	36	45	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	11/15/2007	11.81	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/5/2007	52	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	11/5/2007	36	45	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/17/2007	16.7	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/3/2007	52	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/19/2007	48.3	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/3/2007	37	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/19/2007	38.3	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	1/7/2008	51	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	1/7/2008	38	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	2/20/2008	9.39	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	2/4/2008	50	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	2/4/2008	39	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	3/17/2008	17.5	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/3/2008	48	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/12/2008	54.8	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/3/2008	31	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/12/2008	41	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	4/7/2008	50	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	4/7/2008	35	45
Pasadena	KINNELOA IRRIGATION DIST.	DOLORES WELL	5/21/2008	9.6	45
Pasadena	KINNELOA IRRIGATION DIST.	KINNELOA WELL 03	5/21/2008	19.4	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	5/21/2008	8.8	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	5/5/2008	51	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	5/5/2008	37	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/2/2008	22.1	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/2/2008	51	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	6/24/2008	49.4	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/2/2008	37	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/24/2008	29	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	8/19/2008	8	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	8/4/2008	50	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	8/4/2008	36	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/24/2008	21	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/2/2008	52	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	9/9/2008	49	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/2/2008	36	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/9/2008	27	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	10/6/2008	52	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	10/6/2008	36	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	11/25/2008	7.7	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/3/2008	49	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	11/3/2008	35	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/10/2008	24	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/1/2008	51	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	12/11/2008	48	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/1/2008	37	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/11/2008	37	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	1/5/2009	51	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	1/5/2009	34	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	2/24/2009	6.2	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	2/2/2009	49	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	2/2/2009	34	45
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	3/9/2009	10.182	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	3/9/2009	48.697	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	3/16/2009	25	45
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/23/2009	42	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/23/2009	31	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	3/3/2009	35.8	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	3/10/2009	36.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	3/18/2009	35.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	3/25/2009	35.7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/3/2009	38.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/10/2009	39.4	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/18/2009	38.2	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/25/2009	38	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1		2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	3/3/2009	27.4	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	3/3/2009	46.6	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	3/3/2009	23.7	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/10/2009	52	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/10/2009	42	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/2/2009	49	45	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	3/2/2009	35	45	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/7/2009	10.182	CDPH DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/7/2009	47.812	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/20/2009	41	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/20/2009	30	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	4/1/2009	36	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	4/8/2009	36.3	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	4/15/2009	35.9	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	4/22/2009	36.6	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	4/29/2009	36.1	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	4/1/2009	38.8	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	4/8/2009	39.2	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	4/15/2009	39.2	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	4/22/2009	39.4	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	4/29/2009	39.2	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	4/1/2009	28.8	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	4/1/2009	46.9	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	4/15/2009	24	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/6/2009	50	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/6/2009	36	CDPH DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/4/2009	10.182	CDPH DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/4/2009	46.926	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/18/2009	40	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/18/2009	31	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	5/6/2009	20	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	5/6/2009	9.9	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	5/20/2009	7.7	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/6/2009	35.9	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	5/13/2009	36.1	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/6/2009	39.1	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/13/2009	38.9	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/19/2009	38.6	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/27/2009	38.9	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/6/2009	29.1	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/6/2009	46.8	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/19/2009	36	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/27/2009	36.8	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	5/6/2009	23.8	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/4/2009	49	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/4/2009	35	CDPH DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	6/3/2009	10.625	CDPH DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	6/3/2009	48.697	CDPH DATABASE	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/1/2009	20	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/1/2009	20	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/9/2009	22	45	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/22/2009	41	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/22/2009	31	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	6/3/2009	34.1	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/3/2009	38.6	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/10/2009	40.1	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/17/2009	37.6	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/24/2009	38.9	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/3/2009	33.6	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/3/2009	50.2	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/3/2009	35.8	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/10/2009	37.2	CDPH DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/17/2009	36.2	CDPH DATABASE	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/24/2009	36.7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	6/10/2009	24.7	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/1/2009	50	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/11/2009	51	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/1/2009	36	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/11/2009	40	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/7/2009	32.76	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	7/20/2009	10.182	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	7/7/2009	51.796	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	7/14/2009	17	45
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/20/2009	40	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/20/2009	30	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/1/2009	36.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/1/2009	38.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/8/2009	39.8	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/15/2009	39.1	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/22/2009	39.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/29/2009	38.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	7/1/2009	31.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/1/2009	48.4	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/1/2009	35.7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/8/2009	37.1	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/15/2009	36.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/22/2009	37.2	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/29/2009	36.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	7/7/2009	24	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/6/2009	50	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/6/2009	36	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	8/4/2009	10.625	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	8/4/2009	48.697	CDPH DATABASE
Pasadena	CITY OF ARCADIA	COLORADO WELL	8/5/2009	3.7	45
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/17/2009	41	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/17/2009	30	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	8/4/2009	6.3	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/5/2009	36.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/18/2009	38	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/18/2009	12.9	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/5/2009	39	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/12/2009	39.2	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/19/2009	39.1	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/26/2009	38.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/5/2009	30.4	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/18/2009	31	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/18/2009	45.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/5/2009	50.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/18/2009	51	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/5/2009	36.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/12/2009	36.7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/19/2009	37	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/26/2009	36.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/5/2009	23.8	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/18/2009	23.8	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/3/2009	49	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/3/2009	37	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	9/1/2009	9.739	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	9/1/2009	46.484	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/30/2009	25	45
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/14/2009	41	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/14/2009	31	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	9/2/2009	38.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/2/2009	39.4	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/9/2009	39	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	9/16/2009	39	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME		SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP		9/23/2009	38.9	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP		9/30/2009	39.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR		9/2/2009	32.1	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN		9/2/2009	51	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		9/2/2009	36.7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		9/9/2009	37	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		9/16/2009	36.8	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		9/23/2009	36.8	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		9/30/2009	37.4	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO		9/2/2009	23.7	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11		9/8/2009	50	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11		9/15/2009	53	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12		9/8/2009	36	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12		9/15/2009	31	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM		10/6/2009	10.182	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN		10/6/2009	47.812	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7		10/19/2009	41	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8		10/19/2009	30	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN		10/6/2009	26.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP		10/6/2009	39.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP		10/14/2009	39.1	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP		10/21/2009	39.4	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP		10/28/2009	40.2	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR		10/6/2009	31.3	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN		10/6/2009	51.3	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		10/6/2009	37.6	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		10/14/2009	37	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		10/21/2009	37.2	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		10/28/2009	37.7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO		10/6/2009	23.8	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11		10/5/2009	49	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12		10/5/2009	36	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM		11/3/2009	32.317	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM		11/10/2009	30.546	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN		11/3/2009	50.468	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7		11/16/2009	42	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8		11/16/2009	30	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL		11/18/2009	7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN		11/4/2009	14.8	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP		11/4/2009	39.2	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR		11/4/2009	30.7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN		11/4/2009	50.4	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		11/4/2009	36.9	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		11/11/2009	37	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		11/18/2009	35.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		11/24/2009	37.3	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO		11/3/2009	23.7	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11		11/2/2009	49	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12		11/2/2009	36	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM		12/1/2009	10.625	CDPH DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN		12/1/2009	46.926	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07		12/3/2009	21	45
Pasadena	CITY OF ARCADIA	COLORADO WELL		12/17/2009	3.8	45
Pasadena	CAL/AM WATER COMPANY	CA-LOM		1/12/2010	10.625	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN		1/12/2010	48.697	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN		1/12/2010	5.37	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN		1/20/2010	37	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP		1/12/2010	33.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR		1/12/2010	10.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN		1/12/2010	50.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-VIL		1/6/2010	23	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO		1/12/2010	24.4	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7		1/25/2010	43	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1		2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/25/2010	31	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/20/2010	6	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/4/2010	48	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	2/8/2010	10.625	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	2/8/2010	49.582	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	2/10/2010	8.31	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	2/10/2010	38.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-GAR	2/10/2010	12.4	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	2/10/2010	48.5	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	2/2/2010	24.8	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/16/2010	43	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/16/2010	32	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/1/2010	48	CDPH DATABASE	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	3/1/2010	26	45	
Pasadena	CITY OF PASADENA	P-BAN	3/18/2010	17.3	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	3/24/2010	35.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	3/31/2010	36.3	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	3/3/2010	35.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-GAR	3/3/2010	6.61	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	3/3/2010	49	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	3/2/2010	24.2	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/22/2010	42	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/22/2010	33	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/1/2010	47	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/31/2010	47	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/15/2010	32	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/31/2010	39	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	4/7/2010	11.068	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	4/7/2010	46.041	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	4/6/2010	38.1	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	4/14/2010	38	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	4/21/2010	37.9	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	4/28/2010	37.1	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	4/1/2010	38.4	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	4/6/2010	39.1	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-GAR	4/6/2010	22.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	4/6/2010	49.3	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	4/6/2010	25.5	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/26/2010	41	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/26/2010	32	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	4/20/2010	20	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	4/20/2010	8.8	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/20/2010	8.1	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/5/2010	47	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/5/2010	33	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	5/4/2010	29.661	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	5/4/2010	47.369	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	5/4/2010	37.2	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	5/12/2010	36.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	5/19/2010	36.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	5/26/2010	39.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	5/4/2010	50.5	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-GAR	5/4/2010	25.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	5/4/2010	47.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	5/4/2010	25.5	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/17/2010	41	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/17/2010	32	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/3/2010	48	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/3/2010	36	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	6/3/2010	10.625	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	6/3/2010	47.369	CDPH DATABASE	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/1/2010	23	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/8/2010	16	45	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CITY OF ARCADIA	COLORADO WELL	6/8/2010	2.7	45
Pasadena	CITY OF PASADENA	P-BAN	6/2/2010	35.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	6/9/2010	36.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	6/16/2010	37.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	6/23/2010	37.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	6/30/2010	36.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	6/9/2010	49.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	6/9/2010	26.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	6/9/2010	46.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	6/8/2010	25.2	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/21/2010	41	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/21/2010	31	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/1/2010	49	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/15/2010	51	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/1/2010	38	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/15/2010	31	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	7/13/2010	11.068	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	7/13/2010	47.369	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	7/7/2010	37.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	7/13/2010	37.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	7/21/2010	37	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	7/28/2010	36.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	7/7/2010	40.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	7/21/2010	48.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	7/28/2010	39.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	7/7/2010	27.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	7/7/2010	46.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	7/13/2010	25	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/19/2010	42	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/19/2010	32	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	7/20/2010	8.4	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/6/2010	50	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/6/2010	37	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	8/2/2010	10.625	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	8/10/2010	10	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	8/2/2010	46.484	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	8/10/2010	47	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/4/2010	37.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/11/2010	38.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/18/2010	37.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/25/2010	37.6	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	8/4/2010	39.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	8/10/2010	39.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	8/18/2010	39.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	8/4/2010	27.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	8/18/2010	27.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-MON	8/18/2010	46.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	8/4/2010	46.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	8/18/2010	47	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	8/10/2010	25.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	8/18/2010	24.7	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/16/2010	42	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/16/2010	32	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/2/2010	50	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/2/2010	37	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/13/2010	22	45
Pasadena	CITY OF PASADENA	P-BAN	9/1/2010	36.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	9/8/2010	37.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	9/14/2010	37.6	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	9/22/2010	38	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	9/29/2010	37.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	9/1/2010	48.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	9/8/2010	39.4	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CITY OF PASADENA	P-COP	9/14/2010	39.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	9/22/2010	39.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	9/29/2010	39.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	9/1/2010	26.6	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	9/1/2010	46.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	9/14/2010	24.9	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/20/2010	41	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/20/2010	31	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/7/2010	49	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/14/2010	52	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/7/2010	36	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/14/2010	29	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	10/5/2010	11.068	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	10/5/2010	48.254	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	10/5/2010	37.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	10/13/2010	38.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	10/20/2010	38.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	10/27/2010	37.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-CHA	10/5/2010	13.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	10/5/2010	39.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	10/13/2010	39.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	10/20/2010	39.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	10/27/2010	39.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	10/5/2010	47	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	10/5/2010	25	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/18/2010	41	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/18/2010	31	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	10/19/2010	5.8	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/4/2010	48	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/4/2010	35	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	11/1/2010	11.068	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	11/1/2010	46.926	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	11/2/2010	37.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	11/10/2010	37.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	11/17/2010	37.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	11/23/2010	37	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	11/2/2010	39.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	11/2/2010	47	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	11/2/2010	25.1	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/15/2010	46	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/15/2010	32	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/1/2010	50	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/1/2010	36	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	12/13/2010	10.625	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	12/13/2010	45.598	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/1/2010	21	45
Pasadena	CITY OF ARCADIA	COLORADO WELL	12/1/2010	3.8	45
Pasadena	CITY OF PASADENA	P-BAN	12/1/2010	36.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	12/7/2010	37	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	12/15/2010	36.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	12/22/2010	39	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	12/7/2010	50.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	12/22/2010	42	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	12/29/2010	41	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	12/7/2010	47	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	12/7/2010	25.2	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/13/2010	42	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/13/2010	31	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/6/2010	48	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/15/2010	48	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/6/2010	34	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/15/2010	35	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	1/12/2011	11.068	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1		2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	1/12/2011	45.155	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	1/5/2011	37	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	1/12/2011	37	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	1/19/2011	36	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	1/26/2011	36	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	1/5/2011	41	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	1/5/2011	49	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	1/5/2011	25	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/17/2011	41	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/17/2011	32	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/10/2011	7.8	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/3/2011	47	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/3/2011	34	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	2/7/2011	10.625	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	2/7/2011	45.155	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	2/2/2011	36	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	2/8/2011	36	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	2/16/2011	38	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	2/23/2011	38	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	2/8/2011	50	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	2/8/2011	46	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	2/8/2011	25	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/22/2011	41	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/22/2011	32	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/7/2011	48	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/7/2011	35	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	3/2/2011	10.625	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	3/2/2011	45.155	CDPH DATABASE	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	3/9/2011	29	45	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	3/15/2011	31	45	
Pasadena	CITY OF PASADENA	P-BAN	3/2/2011	36	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	3/8/2011	37	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	3/16/2011	37	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	3/30/2011	14.2	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-CHA	3/9/2011	27	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	3/8/2011	50	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	3/8/2011	47	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	3/8/2011	26	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/21/2011	40	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/21/2011	31	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/7/2011	49	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/9/2011	52	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/7/2011	36	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/9/2011	42	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	4/4/2011	10.625	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	4/4/2011	46.484	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	4/6/2011	37.2	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	4/12/2011	37.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	4/20/2011	37.8	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	4/27/2011	37.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-CHA	4/12/2011	26.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	4/12/2011	50.4	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	4/12/2011	47.5	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	4/12/2011	26.7	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	4/18/2011	41	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	4/18/2011	32	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	4/12/2011	21	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	4/12/2011	7.9	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/12/2011	8.2	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	4/4/2011	47	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/4/2011	36	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	5/9/2011	11.068	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	5/9/2011	44.713	CDPH DATABASE	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	CITY OF PASADENA	P-BAN	5/4/2011	39.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	5/10/2011	38.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	5/25/2011	37.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-CHA	5/10/2011	25.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	5/11/2011	51.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	5/11/2011	48.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	5/10/2011	26.8	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	5/16/2011	40	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/16/2011	31	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	5/2/2011	46	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	5/2/2011	38	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	6/1/2011	10.625	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	6/1/2011	45.598	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/16/2011	21	45
Pasadena	CITY OF PASADENA	P-BAN	6/1/2011	39.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	6/8/2011	38.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	6/15/2011	37.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	6/22/2011	37	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	6/29/2011	38	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	6/8/2011	51.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	6/8/2011	48.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	6/8/2011	26.9	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/20/2011	41	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	6/20/2011	32	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/6/2011	47	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	6/9/2011	48	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/6/2011	35	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/9/2011	40	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/13/2011	35	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	7/11/2011	11.068	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	7/11/2011	48.254	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	7/6/2011	38.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	7/13/2011	37.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	7/19/2011	37.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	7/27/2011	38.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	7/19/2011	48.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	7/19/2011	46.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	7/19/2011	26	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	7/26/2011	41	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	7/26/2011	30	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	7/19/2011	7.4	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	7/5/2011	47	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	7/5/2011	34	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	8/1/2011	10.625	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	8/1/2011	46.926	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/3/2011	39.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/10/2011	37	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/17/2011	38.6	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/24/2011	38	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/31/2011	38.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-CHA	8/17/2011	26.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	8/17/2011	49.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	8/17/2011	48	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	8/17/2011	27.5	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	8/22/2011	42	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	8/22/2011	31	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	8/1/2011	45	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	8/1/2011	35	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	9/14/2011	11.953	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	9/14/2011	52.239	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/1/2011	27	45
Pasadena	CITY OF PASADENA	P-BAN	9/7/2011	38.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	9/14/2011	36.4	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1		2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Pasadena	CITY OF PASADENA	P-BAN	9/21/2011	38.9	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	9/28/2011	37.5	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	9/14/2011	46.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	9/14/2011	45.4	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	9/14/2011	25.4	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/19/2011	41	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	9/19/2011	30	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/6/2011	46	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	9/8/2011	49	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/6/2011	34	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	9/8/2011	36	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	10/3/2011	11.068	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	10/3/2011	48.697	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	10/5/2011	39.3	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	10/12/2011	38.9	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	10/19/2011	39.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	10/26/2011	38.3	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	10/12/2011	48.4	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	10/12/2011	27.1	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	10/17/2011	45	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	10/17/2011	30	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	10/6/2011	7.4	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	10/3/2011	46	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	10/3/2011	34	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	11/7/2011	12.396	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	11/7/2011	45.155	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	11/2/2011	38	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	11/8/2011	37.9	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	11/16/2011	37.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	11/22/2011	37.9	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	11/30/2011	37.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	11/9/2011	48.2	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	11/9/2011	48.6	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	11/8/2011	26.2	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	11/21/2011	44	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	11/21/2011	33	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	11/7/2011	46	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	11/7/2011	35	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	12/13/2011	15.052	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	12/13/2011	43.385	CDPH DATABASE	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/19/2011	27	45	
Pasadena	CITY OF ARCADIA	COLORADO WELL	12/19/2011	4.2	45	
Pasadena	CITY OF PASADENA	P-BAN	12/7/2011	37.4	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	12/28/2011	40	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	12/7/2011	47.7	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	12/7/2011	47.8	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	12/6/2011	27.7	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	12/19/2011	45	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	12/19/2011	32	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/5/2011	48	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/14/2011	48	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/5/2011	35	CDPH DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	12/14/2011	36	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-LOM	1/4/2012	11.24	CDPH DATABASE	
Pasadena	CAL/AM WATER COMPANY	CA-WIN	1/4/2012	47.04	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	1/4/2012	37.3	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-BAN	1/10/2012	37.3	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-COP	1/11/2012	48.3	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-SUN	1/11/2012	47.4	CDPH DATABASE	
Pasadena	CITY OF PASADENA	P-WOO	1/10/2012	26.2	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	1/23/2012	46	CDPH DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	1/23/2012	33	CDPH DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/18/2012	8.2	CDPH DATABASE	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/3/2012	40	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	1/3/2012	30	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	2/14/2012	10.67	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	2/14/2012	44.41	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	2/7/2012	36.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	2/15/2012	35.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	2/22/2012	36.6	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	2/29/2012	39.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	2/7/2012	44.1	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	2/7/2012	47.6	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	2/21/2012	43	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	2/21/2012	31	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	2/6/2012	49	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/6/2012	35	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	3/6/2012	10.47	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	3/6/2012	44.14	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	3/12/2012	26	45
Pasadena	CITY OF PASADENA	P-BAN	3/6/2012	38.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	3/13/2012	37.7	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	3/20/2012	37.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	3/27/2012	38	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	3/6/2012	49.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	3/6/2012	47.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	3/6/2012	27	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/14/2012	37	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/5/2012	44	45
Pasadena	CAL/AM WATER COMPANY	CA-LOM	4/4/2012	10.14	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	4/23/2012	10.64	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	4/4/2012	41.28	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	4/23/2012	44.36	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	4/3/2012	37.6	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	4/10/2012	37.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	4/17/2012	39.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	4/24/2012	37.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	4/17/2012	52.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	4/3/2012	26	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	4/10/2012	27.9	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	4/17/2012	30.2	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	4/24/2012	28.3	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	4/17/2012	51	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	4/17/2012	31.3	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	4/17/2012	21	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	4/17/2012	9	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/17/2012	13	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	4/2/2012	33	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	5/7/2012	34	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	6/11/2012	28	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/25/2012	49	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/19/2012	40	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	7/18/2012	14	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	7/2/2012	35	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	8/6/2012	32	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	9/4/2012	28	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/4/2012	37	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	9/12/2012	40	45
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	10/16/2012	17	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	10/1/2012	34	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	11/29/2012	48	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	11/5/2012	35	45
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/3/2012	28	45
Pasadena	CITY OF ARCADIA	COLORADO WELL	12/3/2012	3.1	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/3/2012	35	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	12/11/2012	39	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	1/7/2013	44	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	1/7/2013	29	45
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	2/26/2013	50	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	2/4/2013	43	45
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	2/4/2013	29	45
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	4/29/1986	23.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	4/29/1986	12.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	4/29/1986	24.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	4/29/1986	12.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/17/1988	38.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	5/17/1988	14.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/17/1988	33.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/17/1988	23.6	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	6/21/1989	6.4	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	6/21/1989	43.7	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	6/21/1989	21	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	5/14/1991	16.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/14/1991	43	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/14/1991	16.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/25/1991	41	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/13/1992	44.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	5/13/1992	18.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/13/1992	49.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/13/1992	17.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/18/1993	40.8	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	6/22/1993	5.28	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	6/22/1993	5.28	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	6/22/1993	13.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/12/1993	30.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/12/1993	32.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	1/11/1994	38.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	4/12/1994	33.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/31/1994	32	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/14/1994	28.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/14/1994	16.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/14/1994	31.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/14/1994	14.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/12/1994	33.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/12/1994	35.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/11/1994	31.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/11/1994	33.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	1/10/1995	33.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/8/1995	35.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/8/1995	14.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/26/1995	30.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/13/1995	19.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/13/1995	126	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/26/1995	33.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/26/1995	14.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/11/1995	33.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/11/1995	34.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/10/1995	28.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/10/1995	29.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/14/1996	24.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/14/1996	13.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/18/1996	27.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/18/1996	14.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/18/1996	25.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/18/1996	13.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/9/1996	26.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/9/1996	25.5	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	7/1/1996	6.7	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1 2 3 4 5 6

Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	7/1/1996	8.5	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	7/1/1996	6.1	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	7/1/1996	8.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/8/1996	26.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/8/1996	27.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	4/15/1997	25.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	4/15/1997	24.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/16/1997	23.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/16/1997	23.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/16/1997	12.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/8/1997	26.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	7/8/1997	37	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/8/1997	26.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/14/1997	25.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/14/1997	26	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	12/29/1997	5.17	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	12/29/1997	8.4	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	12/29/1997	21.1	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	12/29/1997	5.28	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	1/6/1998	26.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	1/6/1998	27.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/16/1998	24.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/16/1998	12.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/16/1998	24.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/14/1998	23.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/14/1998	22.3	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	7/13/1998	4.3	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	7/13/1998	5	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	7/13/1998	17.7	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	7/13/1998	5.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/13/1998	24.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/13/1998	24.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	1/11/1999	24.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	1/11/1999	25.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	4/20/1999	5.35	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	4/20/1999	56.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/4/1999	14.8	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	5/17/1999	4	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	5/17/1999	4.3	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	5/17/1999	4.6	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	5/17/1999	9.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/15/1999	23.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/15/1999	13	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/15/1999	24.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/15/1999	10.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/13/1999	25.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/13/1999	25.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/12/1999	23.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/12/1999	24.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/19/2000	25	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/19/2000	12	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/19/2000	26	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/19/2000	11	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/11/2000	25	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/11/2000	25	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	7/10/2000	11.1	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	7/10/2000	4.71	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	7/10/2000	24	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	7/10/2000	11.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	9/12/2000	27	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	9/12/2000	30	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/10/2000	28	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/10/2000	34	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	11/20/2000	18.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	12/19/2000	29.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	12/19/2000	31.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	1/9/2001	29	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	1/9/2001	30.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	2/13/2001	27.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	2/13/2001	27.8	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	2/26/2001	19	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	3/13/2001	25.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	3/13/2001	29.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	4/10/2001	29.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/15/2001	27.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/8/2001	29.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/12/2001	26.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/18/2001	27.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/18/2001	11.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/12/2001	27.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/18/2001	29	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/18/2001	10	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/10/2001	28.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/10/2001	30.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	8/14/2001	26.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	8/14/2001	27.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	9/18/2001	26.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	9/18/2001	27.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/9/2001	27	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/9/2001	31	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	10/10/2001	21	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	10/10/2001	20	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	10/10/2001	32	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	10/10/2001	22	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	11/20/2001	31	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	11/20/2001	31	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	2/19/2002	34	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	3/5/2002	30	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	3/19/2002	30	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	3/5/2002	12	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	3/12/2002	12	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	3/5/2002	32	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	3/12/2002	31	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	3/5/2002	10	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	3/12/2002	10	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	4/9/2002	32	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	4/9/2002	12	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	4/9/2002	31	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	4/9/2002	11	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/15/2002	30	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	5/15/2002	13	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/15/2002	47	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/15/2002	11	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	5/6/2002	21	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	5/6/2002	8.8	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	5/6/2002	36	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	5/6/2002	26	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/11/2002	30	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/17/2002	30	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/11/2002	12	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/17/2002	12	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/11/2002	32	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/17/2002	32	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/11/2002	9.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/17/2002	10	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/16/2002	30	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	7/16/2002	13	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/16/2002	30	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	7/16/2002	11	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	8/12/2002	36	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	8/12/2002	29	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	9/17/2002	40	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	9/17/2002	13	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	9/17/2002	34	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	9/17/2002	12	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	10/8/2002	11	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/8/2002	32	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	10/8/2002	11	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	11/19/2002	15	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	11/19/2002	35	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	11/19/2002	13	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	11/18/2002	21	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	11/18/2002	8.8	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	11/18/2002	41	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	11/18/2002	31	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	1/14/2003	17	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/18/2003	37	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	2/18/2003	35	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	3/11/2003	35	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	3/11/2003	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	3/11/2003	35	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	3/11/2003	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	4/8/2003	34	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	4/8/2003	16	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	4/8/2003	36	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	4/8/2003	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	5/13/2003	34	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	5/13/2003	17	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	5/13/2003	37	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	5/13/2003	14	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	5/14/2003	5.8	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	5/14/2003	13	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/19/2003	26	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/19/2003	10	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/19/2003	32	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	5/19/2003	31	45
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/23/2003	5.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/10/2003	31	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/30/2003	39	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/10/2003	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/23/2003	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/10/2003	33	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/23/2003	35	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/10/2003	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/23/2003	13	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/2/2003	33	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/9/2003	36	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/16/2003	37	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/23/2003	36	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/30/2003	37	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/2/2003	26	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/9/2003	28	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/16/2003	28	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/23/2003	17	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/30/2003	16	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	7/29/2003	39	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	7/8/2003	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	7/8/2003	33	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	7/8/2003	12	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/11/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/14/2003	31	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/21/2003	24	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/28/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/11/2003	23	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/14/2003	18	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/21/2003	29	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/28/2003	28	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	8/12/2003	39	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	8/12/2003	12	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	8/12/2003	33	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	8/12/2003	12	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	8/5/2003	23.4	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/4/2003	36	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/5/2003	38.8	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/11/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/18/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/25/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/4/2003	27	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/5/2003	29.9	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/11/2003	28	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/18/2003	28	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/25/2003	28	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	9/16/2003	38	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	9/16/2003	13	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	9/16/2003	35	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	9/16/2003	13	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	9/2/2003	33	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	9/8/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	9/15/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	9/22/2003	38	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	9/29/2003	38	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	9/2/2003	27	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	9/8/2003	27	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	9/15/2003	28	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	9/22/2003	28	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	9/29/2003	28	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	10/14/2003	14.4	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	10/14/2003	35.1	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	10/14/2003	12.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	10/27/2003	21.1	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	10/6/2003	36	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	10/13/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	10/20/2003	37	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	10/27/2003	36.3	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	10/27/2003	38	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	10/6/2003	27	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	10/13/2003	29	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	10/20/2003	27	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	10/27/2003	27.2	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	10/27/2003	28	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	11/25/2003	13.2	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	11/25/2003	33	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	11/25/2003	12.4	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/3/2003	38	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/10/2003	38	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/17/2003	36	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/24/2003	35	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/3/2003	23	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/10/2003	24	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/17/2003	12	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/24/2003	20	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	12/9/2003	13.2	45	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	12/9/2003	33.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	12/9/2003	12.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	12/1/2003	36	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	12/1/2003	18	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	1/13/2004	13.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	1/13/2004	33.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	1/13/2004	12.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	2/10/2004	13.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	2/10/2004	33.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	2/10/2004	12.6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	2/17/2004	22	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	2/23/2004	21.8	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	2/17/2004	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/17/2004	36	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/23/2004	37.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	3/9/2004	14.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	3/9/2004	33.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	3/9/2004	12.8	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	3/8/2004	21	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	3/8/2004	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	3/8/2004	38	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	3/29/2004	28	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	4/13/2004	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	4/13/2004	33.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	4/13/2004	13.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	4/12/2004	19	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	4/12/2004	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	4/12/2004	33	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	4/12/2004	28	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	5/11/2004	15.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	5/11/2004	14.4	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	5/18/2004	11	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	5/18/2004	13	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/10/2004	19	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/27/2004	20.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/10/2004	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/27/2004	11.6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/10/2004	37	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/27/2004	38.8	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	5/10/2004	27	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	5/27/2004	29.8	45
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/1/2004	6.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/8/2004	14.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/8/2004	33.8	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/8/2004	13.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	6/14/2004	19	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	6/14/2004	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/14/2004	38	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/14/2004	28	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	7/13/2004	22.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	7/13/2004	12.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	7/13/2004	33.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	7/13/2004	10.9	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	7/12/2004	19	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	7/12/2004	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/12/2004	38	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/12/2004	27	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	8/9/2004	21.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	8/9/2004	12.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	8/9/2004	34.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	8/9/2004	10.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	8/9/2004	21	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	8/17/2004	20.9	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME		SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		8/9/2004	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		8/9/2004	39	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		8/17/2004	37.6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06		8/17/2004	29.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		9/14/2004	20.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		9/14/2004	12	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		9/14/2004	32.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		9/14/2004	10.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		9/28/2004	21	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		9/28/2004	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		9/28/2004	34	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		10/12/2004	20.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		10/12/2004	12.1	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		10/12/2004	35.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		10/12/2004	9.96	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		10/12/2004	23	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		10/12/2004	14	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		10/12/2004	45	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		11/9/2004	20.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		11/9/2004	12.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		11/9/2004	33.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		11/9/2004	10.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		11/7/2004	20	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		11/15/2004	20.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		11/7/2004	13	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		11/7/2004	38	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		11/15/2004	39.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		12/14/2004	20.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		12/14/2004	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		12/14/2004	33.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		12/14/2004	10.3	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		12/13/2004	20	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		12/13/2004	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		12/13/2004	38	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		1/11/2005	17.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		1/11/2005	11.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		1/11/2005	32.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		1/11/2005	10.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		2/8/2005	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		2/8/2005	13.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		2/8/2005	35.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		2/8/2005	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		2/23/2005	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		2/23/2005	8.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		2/23/2005	19	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		3/8/2005	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		3/8/2005	34.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		3/8/2005	11.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		3/23/2005	7.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		3/23/2005	7.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		3/23/2005	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		4/12/2005	21.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		4/12/2005	33.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		4/12/2005	12.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		4/4/2005	6.8	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		4/4/2005	7.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		4/4/2005	12	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		5/10/2005	22.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		5/10/2005	35.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		5/10/2005	13.7	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03	FORCE	5/3/2005	12.4	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05	FORCE	5/3/2005	2.9	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		5/2/2005	6.1	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/11/2005	6.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/2/2005	5.9	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/11/2005	9.9	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/2/2005	10	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/11/2005	18	45	
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/2/2005	8.3	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/14/2005	24.6	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/14/2005	34.4	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/14/2005	14.3	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	6/6/2005	9.1	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	6/6/2005	11	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/6/2005	21	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/15/2005	6.9	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	7/12/2005	25.2	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	7/12/2005	21.3	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	7/12/2005	35.4	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	7/12/2005	12.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	7/5/2005	11	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	7/5/2005	8.5	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/5/2005	23	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/5/2005	6.7	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	8/9/2005	24.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	8/9/2005	20.7	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	8/9/2005	33.3	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	8/9/2005	12.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	8/1/2005	10	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	8/30/2005	9.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/1/2005	17	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/30/2005	22.2	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/1/2005	7.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/30/2005	11.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	9/13/2005	23.1	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	9/13/2005	18.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	9/13/2005	31.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	9/13/2005	11.9	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	9/27/2005	12.2	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	9/27/2005	12.3	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	9/6/2005	9.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	9/6/2005	6.9	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	9/6/2005	18	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	9/6/2005	13	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	10/11/2005	22.6	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	10/11/2005	17.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	10/11/2005	31.3	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	10/11/2005	11.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	10/3/2005	6.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	10/3/2005	8.8	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	10/3/2005	23	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	10/3/2005	13	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	11/8/2005	22.7	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	11/8/2005	17.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	11/8/2005	31.4	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	11/8/2005	11.7	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	11/9/2005	12.1	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	11/9/2005	12.8	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	11/14/2005	4.5	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/14/2005	19.6	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/14/2005	11.7	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	12/13/2005	22.9	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	12/13/2005	16.1	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	12/13/2005	30.5	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	12/13/2005	11.4	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	12/5/2005	5.2	45	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1 2 3 4 5 6

Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	12/5/2005	6.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	12/5/2005	19	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	12/5/2005	12	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	1/10/2006	23.1	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	1/10/2006	15.8	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	1/10/2006	30.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	1/10/2006	11.3	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	1/3/2006	4.8	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	1/3/2006	8.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	1/3/2006	13	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	1/3/2006	6.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	2/14/2006	22.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	2/14/2006	15.8	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	2/14/2006	30	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	2/6/2006	4.9	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	2/22/2006	4.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	2/6/2006	7.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/6/2006	16	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/22/2006	13.7	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	2/6/2006	6.8	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	2/22/2006	5.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	3/14/2006	23.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	3/14/2006	15.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	3/14/2006	30	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	3/14/2006	11.5	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	3/27/2006	11.9	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	3/27/2006	12.7	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	3/13/2006	4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	3/13/2006	5.3	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	3/13/2006	5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	3/13/2006	4.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	4/11/2006	24.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	4/11/2006	11.8	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	4/11/2006	30.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	4/11/2006	15.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	4/3/2006	5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	4/3/2006	6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	4/3/2006	6.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	4/3/2006	5.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	5/9/2006	25	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	5/9/2006	16.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	5/9/2006	30.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	5/9/2006	12.4	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	5/8/2006	11.1	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	5/8/2006	11.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/8/2006	4.3	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/8/2006	4.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/8/2006	4.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	5/8/2006	5.6	45
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/27/2006	6.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/13/2006	24.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/27/2006	23.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/13/2006	15.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/27/2006	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/13/2006	29.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/27/2006	27.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/13/2006	12.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/27/2006	11.7	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	6/5/2006	5.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	6/5/2006	5.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/5/2006	6.6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/5/2006	5.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	7/11/2006	24.6	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1		2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	7/11/2006	15.7	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	7/11/2006	29	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	7/11/2006	12.2	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	7/3/2006	6.3	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	7/3/2006	8.9	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/3/2006	14	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/3/2006	8.6	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	8/8/2006	23.7	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	8/8/2006	15.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	8/8/2006	28.2	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	8/8/2006	12	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	8/17/2006	11.3	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	8/17/2006	13.6	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	8/7/2006	4.2	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	8/28/2006	4.1	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	8/7/2006	9	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/7/2006	5	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/28/2006	17.8	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/7/2006	9.3	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/28/2006	9.4	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	9/12/2006	23.3	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	9/12/2006	15	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	9/12/2006	27.5	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	9/12/2006	11.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	9/5/2006	7.4	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	9/5/2006	11	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	9/5/2006	20	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	9/5/2006	10	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	10/10/2006	23.3	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	10/10/2006	14.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	10/10/2006	27.9	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	10/10/2006	11.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	10/3/2006	4.6	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	10/3/2006	6.5	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	10/2/2006	21	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	10/2/2006	11	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	11/14/2006	23.4	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	11/14/2006	14.9	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	11/14/2006	28.1	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	11/14/2006	11.5	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	11/21/2006	11.4	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	11/21/2006	14.3	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	11/6/2006	10	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	11/13/2006	4.4	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	11/6/2006	6.5	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/6/2006	18	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/13/2006	20.4	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/6/2006	11	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/13/2006	10.9	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	12/12/2006	24.5	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	12/12/2006	14.7	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	12/12/2006	28.6	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	12/12/2006	11.5	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	12/4/2006	9.6	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	12/4/2006	6.6	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	12/4/2006	22	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	12/4/2006	11	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	1/9/2007	24.6	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	1/9/2007	14.5	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	1/9/2007	28.8	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	1/9/2007	11.4	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	1/2/2007	7.1	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	1/2/2007	21	45	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	1/2/2007	4.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	2/13/2007	24.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	2/13/2007	13.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	2/13/2007	28.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	2/13/2007	11.4	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	2/27/2007	11.8	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	2/27/2007	16.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	2/5/2007	8.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	2/26/2007	4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	2/5/2007	9.7	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/5/2007	4.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/26/2007	5.3	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	2/5/2007	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	2/26/2007	4.8	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	3/13/2007	24.8	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	3/13/2007	13.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	3/13/2007	28.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	3/13/2007	11.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	3/5/2007	5.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	3/5/2007	10	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	3/5/2007	4.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	3/5/2007	4.6	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	4/10/2007	24.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	4/10/2007	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	4/10/2007	28.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	4/10/2007	11.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	4/2/2007	5.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	4/2/2007	10	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	4/2/2007	20	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	4/2/2007	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	5/8/2007	24.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	5/8/2007	14.1	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	5/8/2007	28.3	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	5/8/2007	11.5	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	5/24/2007	12.3	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	5/24/2007	16.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/7/2007	5.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/7/2007	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/7/2007	22	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	5/7/2007	14	45
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/19/2007	7.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/12/2007	25.1	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/12/2007	13.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/12/2007	29.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/12/2007	11.6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	6/4/2007	5.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	6/4/2007	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/4/2007	7.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/4/2007	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	7/10/2007	24	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	7/10/2007	12.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	7/10/2007	28.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	7/10/2007	11.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	7/2/2007	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/2/2007	22	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/2/2007	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	8/14/2007	21.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	8/14/2007	12.8	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	8/14/2007	26.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	8/14/2007	11.7	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	8/27/2007	13.3	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	8/27/2007	15.9	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	8/6/2007	4.3	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	8/6/2007	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	8/6/2007	18	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	8/6/2007	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	9/11/2007	21.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	9/11/2007	12.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	9/11/2007	27.4	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	9/11/2007	11.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	9/4/2007	16	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	9/4/2007	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	9/4/2007	17	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	10/9/2007	21.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	10/9/2007	12.8	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	10/9/2007	27.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	10/9/2007	11.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	10/1/2007	18	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	10/1/2007	10	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	10/1/2007	18	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	11/20/2007	21.7	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	11/20/2007	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	11/20/2007	35.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	11/20/2007	12.4	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	11/19/2007	15.3	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	11/19/2007	17.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	11/5/2007	20	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	11/5/2007	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/5/2007	23	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/5/2007	19	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	12/11/2007	23	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	12/11/2007	13.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	12/11/2007	35.3	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	12/3/2007	19	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	12/3/2007	7.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	12/3/2007	26	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	12/3/2007	19	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	1/8/2008	21.1	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	1/8/2008	13.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	1/8/2008	27.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	1/7/2008	18	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	1/7/2008	7.3	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	1/7/2008	26	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	1/7/2008	20	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	2/12/2008	23.9	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	2/12/2008	14.2	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	2/12/2008	28.7	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	2/15/2008	15.6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	2/4/2008	8.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	2/4/2008	6.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/4/2008	15	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	2/4/2008	17	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	3/11/2008	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	3/11/2008	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	3/11/2008	27	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	3/10/2008	19.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	3/3/2008	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	3/3/2008	5.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	3/3/2008	23	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	3/3/2008	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	4/8/2008	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	4/8/2008	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	4/8/2008	27	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	4/7/2008	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	4/7/2008	5.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	4/7/2008	11	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME		SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06		4/7/2008	16	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		5/13/2008	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		5/13/2008	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		5/13/2008	26	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		5/30/2008	13	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE		5/8/2008	15.8	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE		5/8/2008	18.1	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		5/5/2008	13	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		5/29/2008	12.4	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		5/5/2008	6.6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		5/29/2008	6.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		5/5/2008	22	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		5/29/2008	9.8	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06		5/5/2008	17	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06		5/29/2008	15.7	45
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL		6/2/2008	6.76	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		6/10/2008	22	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		6/10/2008	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		6/10/2008	27	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		6/10/2008	12	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		6/2/2008	14	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		6/2/2008	6.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		6/2/2008	22	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06		6/2/2008	17	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		7/8/2008	23	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		7/8/2008	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		7/8/2008	28	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		7/8/2008	12	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		8/12/2008	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		8/12/2008	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		8/12/2008	26	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		8/12/2008	11	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE		8/18/2008	17	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE		8/18/2008	18	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		8/4/2008	13	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		8/4/2008	7.6	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		8/4/2008	25	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06		8/4/2008	17	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		9/16/2008	22	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		9/16/2008	16	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		9/16/2008	28	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		9/16/2008	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		9/8/2008	16	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		9/8/2008	10	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		9/8/2008	26	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06		9/8/2008	18	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		10/14/2008	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		10/14/2008	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		10/14/2008	27	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		10/14/2008	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		10/6/2008	18	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		10/6/2008	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		10/6/2008	15	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06		10/6/2008	19	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A		11/24/2008	23	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A		11/24/2008	16	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05		11/24/2008	29	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06		11/24/2008	12	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE		11/12/2008	18	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE		11/12/2008	18	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03		11/3/2008	16	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04		11/3/2008	8.7	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05		11/3/2008	27	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2		3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/3/2008	18	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	12/9/2008	21	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	12/9/2008	15	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	12/9/2008	27	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	12/9/2008	11	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	12/1/2008	15	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	12/1/2008	8.7	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	12/1/2008	27	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	12/1/2008	18	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	1/13/2009	21	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	1/13/2009	14	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	1/13/2009	2.1	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	1/5/2009	16	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	1/5/2009	8.3	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	1/5/2009	27	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	1/5/2009	18	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	2/10/2009	22	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	2/10/2009	15	45	
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	2/10/2009	27	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	2/19/2009	17	45	
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	2/24/2009	21	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	2/9/2009	16	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	2/9/2009	8.3	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	2/9/2009	26	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	2/9/2009	18	45	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	3/10/2009	21	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	3/10/2009	13	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	3/10/2009	26	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	3/2/2009	15	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	3/2/2009	7.5	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	3/2/2009	25	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	3/2/2009	18	45	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	4/14/2009	20	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	4/14/2009	13	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	4/14/2009	26	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	4/14/2009	12	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	4/6/2009	9	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	4/6/2009	9.6	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	4/6/2009	24	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	4/6/2009	12	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/12/2009	20	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	5/12/2009	14	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/12/2009	27	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/12/2009	11	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	5/4/2009	15	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	5/4/2009	9.9	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	5/4/2009	24	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	5/4/2009	17	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/1/2009	21	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/9/2009	21	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/1/2009	15	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/9/2009	14	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/1/2009	27	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/9/2009	28	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/1/2009	11	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/9/2009	11	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/1/2009	11	45	
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/9/2009	11	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	6/1/2009	17	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	6/1/2009	9.2	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	6/1/2009	26	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	6/1/2009	17	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/14/2009	22	CDPH DATABASE	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1		2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	7/14/2009	15	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	7/21/2009	29	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	7/14/2009	11	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	7/14/2009	8.5	45	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	7/27/2009	18	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	7/27/2009	11	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	7/27/2009	27	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	7/27/2009	18	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	8/11/2009	21	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	8/11/2009	14	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	8/11/2009	27	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	8/11/2009	11	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	8/3/2009	7.2	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	8/3/2009	11	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	8/3/2009	27	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	8/3/2009	18	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	9/15/2009	20	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	9/15/2009	14	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	9/15/2009	27	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	9/15/2009	11	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	9/8/2009	18	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	9/8/2009	9.2	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	9/8/2009	28	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	9/8/2009	18	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	10/13/2009	20	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	10/13/2009	14	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	10/13/2009	26	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	10/13/2009	10	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	10/5/2009	18	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	10/5/2009	10	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	10/5/2009	30	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	10/5/2009	18	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	11/10/2009	19	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	11/10/2009	14	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	11/10/2009	25	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	11/2/2009	17	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	11/2/2009	9	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	11/2/2009	29	CDPH DATABASE	
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	11/2/2009	17	CDPH DATABASE	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	12/8/2009	20	LAB REPORT	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	12/8/2009	14	LAB REPORT	
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	12/8/2009	26	LAB REPORT	
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	1/12/2010	20	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	1/26/2010	15	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA5	1/12/2010	28	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA6	1/12/2010	11	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-4	1/4/2010	11	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-5	1/4/2010	30	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-6	1/4/2010	19	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	2/9/2010	20	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	2/9/2010	14	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA5	2/9/2010	27	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-3	2/1/2010	18	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-4	2/1/2010	7.4	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-5	2/1/2010	30	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	3/9/2010	21	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	3/9/2010	14	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA5	3/9/2010	28	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-3	3/1/2010	16	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-4	3/1/2010	5.5	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-5	3/1/2010	26	CDPH DATABASE	
Santa Anita	CITY OF SIERRA MADRE	SM-6	3/1/2010	17	CDPH DATABASE	
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	4/13/2010	22	CDPH DATABASE	

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	4/13/2010	14	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	4/13/2010	29	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	4/5/2010	6.8	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	4/5/2010	8.9	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	4/5/2010	14	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	4/5/2010	7.8	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	5/11/2010	22	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	5/11/2010	14	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	5/11/2010	28	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	5/27/2010	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	5/3/2010	5.4	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	5/3/2010	6.9	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	5/3/2010	20	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	5/3/2010	9.6	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/1/2010	11	45
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/8/2010	13	45
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	6/8/2010	22	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	6/8/2010	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	6/8/2010	26	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	6/8/2010	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	6/1/2010	6.4	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	6/1/2010	10	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	6/1/2010	24	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	6/1/2010	10	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	7/13/2010	22	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	7/13/2010	16	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	7/13/2010	26	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	7/13/2010	13	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	7/6/2010	5.8	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	7/6/2010	9.5	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	7/6/2010	25	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	7/6/2010	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	8/10/2010	23	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	8/10/2010	13	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	8/10/2010	28	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	8/10/2010	17	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	8/2/2010	15	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	8/2/2010	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	8/2/2010	9.5	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	8/2/2010	16	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	9/14/2010	22	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	9/14/2010	16	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	9/14/2010	27	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	9/14/2010	13	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	9/13/2010	16	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	9/13/2010	8.5	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	9/13/2010	27	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	9/13/2010	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	10/12/2010	22	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	10/12/2010	16	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	10/12/2010	27	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	10/12/2010	13	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	10/4/2010	16	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	10/4/2010	8	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	10/4/2010	26	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	10/4/2010	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	11/9/2010	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	11/9/2010	16	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	11/9/2010	26	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	11/9/2010	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	11/1/2010	16	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	11/1/2010	10	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	11/1/2010	25	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	12/14/2010	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	12/14/2010	16	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	12/14/2010	27	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	12/14/2010	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	12/6/2010	6.4	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	12/6/2010	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	12/6/2010	25	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	12/6/2010	9.9	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	1/11/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	1/11/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	1/11/2011	27	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	1/11/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	1/3/2011	6.7	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	1/3/2011	8.2	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	1/3/2011	19	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	1/3/2011	10	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	2/9/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	2/9/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	2/9/2011	27	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	2/9/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	2/7/2011	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	2/7/2011	9.8	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	2/7/2011	23	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	2/7/2011	7.1	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	3/9/2011	20	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	3/9/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	3/9/2011	27	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	3/9/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	3/7/2011	3.9	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	3/7/2011	3.9	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	3/7/2011	7.9	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	3/7/2011	6.3	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	4/11/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	4/11/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	4/11/2011	27	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	4/11/2011	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	4/4/2011	4.3	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	4/4/2011	4.3	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	4/4/2011	4.5	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	4/4/2011	4.7	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	5/10/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	5/10/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	5/10/2011	26	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	5/10/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	5/2/2011	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	5/2/2011	9.2	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	5/2/2011	6.7	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	5/2/2011	6.2	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	5/2/2011	5.1	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	5/2/2011	4.5	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	5/2/2011	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	5/2/2011	5.1	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/16/2011	14	45
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	6/14/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	6/14/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	6/14/2011	24	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	6/14/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	6/6/2011	9.3	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	6/6/2011	5.8	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	6/6/2011	7.3	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	6/6/2011	7.7	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	7/12/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	7/12/2011	15	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	7/12/2011	25	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	7/12/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	7/5/2011	4.9	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	7/5/2011	4.9	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	7/5/2011	19	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	7/5/2011	9.9	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	8/16/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	8/16/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	8/16/2011	23	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	8/16/2011	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	8/1/2011	4.1	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	8/1/2011	4.6	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	8/1/2011	19	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	8/1/2011	9.6	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	9/13/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	9/13/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	9/13/2011	23	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	9/13/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	9/6/2011	10	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	9/6/2011	5	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	9/6/2011	22	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	9/6/2011	6.5	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	10/11/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	10/11/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	10/11/2011	23	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	10/11/2011	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	10/3/2011	8.6	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	10/3/2011	22	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	10/3/2011	10	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	11/8/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	11/8/2011	15	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	11/8/2011	24	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	11/8/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	11/7/2011	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	11/7/2011	5	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	11/7/2011	23	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	12/19/2011	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	12/19/2011	20	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	12/19/2011	23	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	12/19/2011	12	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	12/5/2011	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	12/5/2011	9.6	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	12/5/2011	23	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	1/10/2012	19	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	1/10/2012	14	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	1/10/2012	22	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	1/10/2012	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	1/3/2012	3.7	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	1/3/2012	8.8	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	1/3/2012	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	2/14/2012	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	2/14/2012	14	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	2/14/2012	23	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	2/14/2012	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	2/6/2012	4	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	2/6/2012	9.3	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	2/6/2012	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA1A	4/10/2012	18	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA2A	4/10/2012	12	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA5	4/10/2012	21	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ARC-ORA6	4/10/2012	11	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-3	4/2/2012	4	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	4/2/2012	9	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
Santa Anita	CITY OF SIERRA MADRE	SM-5	4/2/2012	20	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	5/8/2012	20	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	5/8/2012	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	5/8/2012	23	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	5/8/2012	11	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	5/2/2012	22	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/7/2012	7.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/7/2012	8.7	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/7/2012	21	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	5/7/2012	3.3	45
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/11/2012	10	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/11/2012	20	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/11/2012	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/11/2012	12	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/11/2012	15	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/11/2012	22	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/11/2012	24	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/11/2012	12	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/11/2012	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	6/4/2012	8.2	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	6/4/2012	9	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	6/4/2012	21	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/4/2012	3.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	7/10/2012	20	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	7/10/2012	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	7/10/2012	23	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	7/10/2012	11	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	7/2/2012	3.5	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	7/2/2012	8.9	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	7/2/2012	20	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	7/2/2012	5.5	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	8/14/2012	18	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	8/14/2012	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	8/14/2012	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	8/14/2012	10	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	8/6/2012	9.5	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	8/6/2012	21	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	9/11/2012	20	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	9/11/2012	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	9/11/2012	23	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	9/11/2012	11	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	10/9/2012	19	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	10/9/2012	14	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	10/9/2012	22	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	10/9/2012	11	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	11/14/2012	19	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	11/14/2012	23	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	11/14/2012	11	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	11/7/2012	9.3	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	11/7/2012	20	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	11/5/2012	15	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	11/5/2012	10	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	11/5/2012	5.9	45
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	11/5/2012	13	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	12/12/2012	22	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	12/12/2012	33	45
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	12/12/2012	12	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	1/2/2013	21	45
Santa Anita	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	2/12/2013	19	45
Monk Hill	VALLEY WATER CO.	VWC-2	12/30/1987	83.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/20/1989	32	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/20/1989	53	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
	VALLEY WATER CO.	VWC-1	3/6/1990	58.5	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	3/6/1990	52.5	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/17/1991	55.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	12/11/1991	60.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	12/11/1991	53.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/6/1992	53	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/16/1992	51.3	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	11/9/1992	36	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	2/2/1993	61.1	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	2/2/1993	54.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	4/12/1993	57	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/1/1993	57	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/1/1993	57	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/27/1993	57	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	12/9/1993	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	12/13/1993	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	5/16/1994	26	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/6/1994	24	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/17/1994	24.64	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/17/1994	4.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/5/1994	8.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/8/1994	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	8/1/1994	40.04	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	9/6/1994	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	10/18/1994	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	11/7/1994	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	11/15/1994	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	12/13/1994	42.24	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	12/13/1994	61.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	12/13/1994	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	3/9/1995	7.48	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	3/9/1995	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	3/9/1995	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	4/3/1995	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	4/20/1995	6.16	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	5/1/1995	16.72	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/14/1995	32.56	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/5/1995	36.52	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/13/1995	39.16	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/12/1995	61.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/14/1995	36.08	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/10/1995	32.56	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/5/1995	44	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/31/1995	61.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/10/1995	33.88	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	8/1/1995	33.44	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/1/1995	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	9/5/1995	44	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	9/5/1995	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	9/5/1995	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/5/1995	44	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	10/2/1995	44	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	10/2/1995	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	11/6/1995	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	12/5/1995	61.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	5/1/1996	7.48	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	5/6/1996	2.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	5/6/1996	39.16	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	5/6/1996	2.64	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/5/1996	27.28	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/3/1996	36.96	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/4/1996	36.96	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/5/1996	48.4	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
	VALLEY WATER CO.	VWC-4	6/3/1996	31.24	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/4/1996	30.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/9/1996	30.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/1/1996	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/9/1996	66	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/1/1996	37.84	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	8/6/1996	32.56	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/5/1996	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	8/6/1996	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	8/5/1996	42.24	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	9/3/1996	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	9/3/1996	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/16/1996	44	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	10/1/1996	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	10/1/1996	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	5/12/1997	33.44	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	5/5/1997	43.56	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	5/5/1997	3.52	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	5/12/1997	61.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/10/1997	29.92	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/10/1997	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/7/1997	34.76	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/1/1997	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/1/1997	41.36	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/7/1997	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	8/11/1997	40.04	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/4/1997	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	8/4/1997	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	9/2/1997	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	9/2/1997	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	1/12/1998	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	1/12/1998	9.68	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	5/4/1998	19.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	5/6/1998	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	5/6/1998	41.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	5/4/1998	10.12	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/1/1998	29.04	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/15/1998	26.84	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/1/1998	36.96	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/17/1998	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/1/1998	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/15/1998	40.48	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/1/1998	33.44	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/15/1998	40.92	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/6/1998	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/6/1998	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	8/3/1998	36.08	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/3/1998	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	8/3/1998	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	8/3/1998	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	9/1/1998	38.72	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	9/1/1998	74.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	9/1/1998	61.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/1/1998	52.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	10/5/1998	42.68	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	10/5/1998	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	5/3/1999	8.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	5/3/1999	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	5/3/1999	23.32	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	5/3/1999	2.772	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/1/1999	48.84	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/1/1999	69.08	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/1/1999	35.376	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
	VALLEY WATER CO.	VWC-1	7/7/1999	73.92	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/7/1999	69.96	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/7/1999	50.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	8/2/1999	41.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/2/1999	73.48	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	8/2/1999	69.08	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	8/2/1999	53.68	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	9/7/1999	47.96	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	9/7/1999	77.44	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	9/7/1999	69.08	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/7/1999	55.88	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	10/4/1999	51.48	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	10/6/1999	62.92	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	5/1/2000	19.008	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	5/1/2000	32.78	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	5/1/2000	45.32	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	5/1/2000	18.568	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/5/2000	31.196	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/5/2000	70.84	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/5/2000	47.96	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/5/2000	46.64	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/5/2000	40.216	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/5/2000	76.12	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/5/2000	71.72	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/5/2000	53.68	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	8/1/2000	43.296	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/1/2000	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	8/1/2000	69.08	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	8/1/2000	54.56	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	9/7/2000	65	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	10/2/2000	49	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	10/2/2000	56	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	5/1/2001	11.88	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	5/1/2001	2.64	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	5/1/2001	40.92	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	5/1/2001	11	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/4/2001	26.84	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/4/2001	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/4/2001	61.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/4/2001	44	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	8/6/2001	42.68	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/6/2001	79.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	8/6/2001	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	8/6/2001	61.6	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	9/4/2001	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/4/2001	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	10/1/2001	48.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	10/1/2001	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	10/1/2001	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	10/1/2001	57.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	4/23/2002	5.28	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	4/23/2002	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	4/23/2002	20.68	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	4/23/2002	3.652	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	5/1/2002	4.84	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	5/6/2002	2.024	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	5/6/2002	44	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	5/1/2002	3.784	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/3/2002	22.44	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/3/2002	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/3/2002	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/3/2002	21.12	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/1/2002	27.72	RBMB DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
	VALLEY WATER CO.	VWC-2	7/1/2002	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/1/2002	70.4	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/1/2002	23.76	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	8/5/2002	33.44	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/5/2002	0	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	8/5/2002	66	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	8/5/2002	25.52	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	9/3/2002	35.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/3/2002	25.08	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	10/2/2002	36.08	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	10/2/2002	25.96	RBMB DATABASE
	VALLEY WATER CO.	WELL 01	6/12/2003	32	45
	VALLEY WATER CO.	WELL 02	6/12/2003	72	45
	VALLEY WATER CO.	WELL 03	6/12/2003	46	45
	VALLEY WATER CO.	WELL 04	6/12/2003	53	45
	VALLEY WATER CO.	WELL 01	7/14/2003	37.7	45
	VALLEY WATER CO.	WELL 02	7/14/2003	3.1	45
	VALLEY WATER CO.	WELL 03	7/14/2003	68.2	45
	VALLEY WATER CO.	WELL 04	7/14/2003	32.2	45
	VALLEY WATER CO.	WELL 01	8/18/2003	45.1	45
	VALLEY WATER CO.	WELL 02	8/18/2003	46	45
	VALLEY WATER CO.	WELL 03	8/18/2003	56	45
	VALLEY WATER CO.	WELL 04	8/18/2003	44.8	45
	VALLEY WATER CO.	WELL 01	9/2/2003	40.92	45
	VALLEY WATER CO.	WELL 02	9/18/2003	0	45
	VALLEY WATER CO.	WELL 04	9/2/2003	28.16	45
	VALLEY WATER CO.	WELL 01	10/6/2003	42.68	45
	VALLEY WATER CO.	WELL 01	5/6/2004	9.5	45
	VALLEY WATER CO.	WELL 02	5/6/2004	2.2	45
	VALLEY WATER CO.	WELL 03	5/6/2004	22.8	45
	VALLEY WATER CO.	WELL 04	5/6/2004	7	45
	VALLEY WATER CO.	WELL 01	6/8/2004	24.5	45
	VALLEY WATER CO.	WELL 02	6/8/2004	0	45
	VALLEY WATER CO.	WELL 03	6/8/2004	55.5	45
	VALLEY WATER CO.	WELL 04	6/8/2004	21.6	45
	VALLEY WATER CO.	WELL 01	7/7/2004	28.6	45
	VALLEY WATER CO.	WELL 01	7/8/2004	29.4	45
	VALLEY WATER CO.	WELL 02	7/7/2004	2	45
	VALLEY WATER CO.	WELL 02	7/8/2004	2.1	45
	VALLEY WATER CO.	WELL 03	7/7/2004	60.2	45
	VALLEY WATER CO.	WELL 03	7/8/2004	58.2	45
	VALLEY WATER CO.	WELL 04	7/7/2004	24.4	45
	VALLEY WATER CO.	WELL 04	7/8/2004	25.1	45
	VALLEY WATER CO.	WELL 01	8/19/2004	32.7	45
	VALLEY WATER CO.	WELL 02	8/19/2004	0	45
	VALLEY WATER CO.	WELL 03	8/19/2004	64	45
	VALLEY WATER CO.	WELL 04	8/19/2004	24.6	45
	VALLEY WATER CO.	WELL 01	9/7/2004	34.8	45
	VALLEY WATER CO.	WELL 04	9/7/2004	38.7	45
	VALLEY WATER CO.	WELL 01	10/4/2004	38.3	45
	VALLEY WATER CO.	WELL 01	3/3/2005	6.6	45
	VALLEY WATER CO.	WELL 02	3/9/2005	4.2	45
	VALLEY WATER CO.	WELL 03	3/9/2005	4	45
	VALLEY WATER CO.	WELL 04	3/3/2005	5.3	45
	VALLEY WATER CO.	WELL 01	5/19/2005	16	45
	VALLEY WATER CO.	WELL 02	5/19/2005	2.3	45
	VALLEY WATER CO.	WELL 03	5/19/2005	2.2	45
	VALLEY WATER CO.	WELL 04	5/19/2005	10.3	45
	VALLEY WATER CO.	WELL 01	6/6/2005	22.6	45
	VALLEY WATER CO.	WELL 02	6/6/2005	2.2	45
	VALLEY WATER CO.	WELL 03	6/6/2005	2.3	45
	VALLEY WATER CO.	WELL 04	6/6/2005	15.5	45
	VALLEY WATER CO.	WELL 01	7/6/2005	25.1	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
	VALLEY WATER CO.	WELL 01	7/7/2005	24.4	45
	VALLEY WATER CO.	WELL 02	7/6/2005	2.4	45
	VALLEY WATER CO.	WELL 02	7/7/2005	2.3	45
	VALLEY WATER CO.	WELL 03	7/6/2005	2.5	45
	VALLEY WATER CO.	WELL 03	7/7/2005	2.3	45
	VALLEY WATER CO.	WELL 04	7/6/2005	19.9	45
	VALLEY WATER CO.	WELL 04	7/7/2005	19.5	45
	VALLEY WATER CO.	WELL 01	8/9/2005	25.1	45
	VALLEY WATER CO.	WELL 02	8/9/2005	0	45
	VALLEY WATER CO.	WELL 03	8/9/2005	0	45
	VALLEY WATER CO.	WELL 04	8/9/2005	19.4	45
	VALLEY WATER CO.	WELL 01	9/6/2005	25	45
	VALLEY WATER CO.	WELL 04	9/6/2005	19	45
	VALLEY WATER CO.	WELL 01	10/4/2005	25	45
	VALLEY WATER CO.	WELL 04	10/4/2005	19	45
	VALLEY WATER CO.	WELL 01	6/14/2006	20.7	45
	VALLEY WATER CO.	WELL 02	6/14/2006	0	45
	VALLEY WATER CO.	WELL 03	6/14/2006	50	45
	VALLEY WATER CO.	WELL 04	6/14/2006	25.3	45
	VALLEY WATER CO.	WELL 01	7/5/2006	25.4	45
	VALLEY WATER CO.	WELL 02	7/5/2006	0	45
	VALLEY WATER CO.	WELL 03	7/5/2006	56	45
	VALLEY WATER CO.	WELL 04	7/5/2006	27.1	45
	VALLEY WATER CO.	WELL 01	8/3/2006	29	45
	VALLEY WATER CO.	WELL 02	8/3/2006	0	45
	VALLEY WATER CO.	WELL 03	8/3/2006	2.1	45
	VALLEY WATER CO.	WELL 04	8/3/2006	45.1	45
	VALLEY WATER CO.	WELL 01	9/6/2006	32.1	45
	VALLEY WATER CO.	WELL 02	9/6/2006	64.9	45
	VALLEY WATER CO.	WELL 03	9/6/2006	65.8	45
	VALLEY WATER CO.	WELL 04	9/6/2006	48.2	45
	VALLEY WATER CO.	WELL 01	10/2/2006	36	45
	VALLEY WATER CO.	WELL 04	10/2/2006	30	45
	VALLEY WATER CO.	WELL 02	12/7/2006	2.7	45
	VALLEY WATER CO.	WELL 04	12/7/2006	6.4	45
	VALLEY WATER CO.	WELL 01	5/2/2007	18	45
	VALLEY WATER CO.	WELL 01	5/4/2007	17	45
	VALLEY WATER CO.	WELL 01	5/7/2007	19	45
	VALLEY WATER CO.	WELL 01	5/8/2007	20.4	45
	VALLEY WATER CO.	WELL 01	5/9/2007	21	45
	VALLEY WATER CO.	WELL 02	5/8/2007	42.4	45
	VALLEY WATER CO.	WELL 03	5/8/2007	42.4	45
	VALLEY WATER CO.	WELL 04	5/2/2007	11	45
	VALLEY WATER CO.	WELL 04	5/4/2007	19	45
	VALLEY WATER CO.	WELL 04	5/7/2007	26	45
	VALLEY WATER CO.	WELL 04	5/8/2007	27.7	45
	VALLEY WATER CO.	WELL 04	5/9/2007	30	45
	VALLEY WATER CO.	WELL 01	6/4/2007	26.7	45
	VALLEY WATER CO.	WELL 02	6/4/2007	59.7	45
	VALLEY WATER CO.	WELL 03	6/4/2007	46.3	45
	VALLEY WATER CO.	WELL 04	6/4/2007	43.3	45
	VALLEY WATER CO.	WELL 01	7/2/2007	31.2	45
	VALLEY WATER CO.	WELL 02	7/2/2007	63.6	45
	VALLEY WATER CO.	WELL 03	7/2/2007	53.7	45
	VALLEY WATER CO.	WELL 04	7/2/2007	49.2	45
	VALLEY WATER CO.	WELL 01	8/2/2007	34.7	45
	VALLEY WATER CO.	WELL 02	8/2/2007	63.3	45
	VALLEY WATER CO.	WELL 03	8/2/2007	53.5	45
	VALLEY WATER CO.	WELL 04	8/2/2007	52.4	45
	VALLEY WATER CO.	WELL 01	9/4/2007	38	45
	VALLEY WATER CO.	WELL 04	9/4/2007	54	45
	VALLEY WATER CO.	WELL 01	11/5/2007	46	45
	VALLEY WATER CO.	WELL 01	5/8/2008	53.1	45

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
	VALLEY WATER CO.	WELL 02	5/8/2008	62.3	45
	VALLEY WATER CO.	WELL 03	5/8/2008	55.4	45
	VALLEY WATER CO.	WELL 04	5/8/2008	56.9	45
	VALLEY WATER CO.	WELL 01	6/10/2008	55.2	45
	VALLEY WATER CO.	WELL 02	6/10/2008	68.7	45
	VALLEY WATER CO.	WELL 03	6/10/2008	60.1	45
	VALLEY WATER CO.	WELL 04	6/10/2008	61.6	45
	VALLEY WATER CO.	WELL 01	7/7/2008	50.7	45
	VALLEY WATER CO.	WELL 02	7/7/2008	63.3	45
	VALLEY WATER CO.	WELL 03	7/7/2008	59.8	45
	VALLEY WATER CO.	WELL 04	7/7/2008	55.5	45
	VALLEY WATER CO.	WELL 01	8/5/2008	51	45
	VALLEY WATER CO.	WELL 02	8/5/2008	67	45
	VALLEY WATER CO.	WELL 03	8/5/2008	61	45
	VALLEY WATER CO.	WELL 04	8/5/2008	58	45
	VALLEY WATER CO.	WELL 01	9/2/2008	51	45
	VALLEY WATER CO.	WELL 04	9/2/2008	58	45
	VALLEY WATER CO.	WELL 01	10/7/2008	50	45
	VALLEY WATER CO.	WELL 02	10/9/2008	66	45
	VALLEY WATER CO.	WELL 02	10/15/2008	72	45
	VALLEY WATER CO.	WELL 03	10/9/2008	62	45
	VALLEY WATER CO.	WELL 04	10/7/2008	58	45
	VALLEY WATER CO.	WELL 04	10/9/2008	54	45
	VALLEY WATER CO.	WELL 02	3/10/2009	2	45
	VALLEY WATER CO.	VWC-1	5/18/2009	51	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	5/18/2009	63	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	5/18/2009	60	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	5/18/2009	45	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	6/9/2009	50	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	6/9/2009	64	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	6/9/2009	60	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	6/9/2009	46	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	7/7/2009	52	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	7/7/2009	68	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	7/7/2009	60	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	7/7/2009	57	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	8/4/2009	51	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	8/4/2009	69	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	8/4/2009	61	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	8/4/2009	54	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	9/8/2009	49	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	9/8/2009	54	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	10/26/2009	52	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	10/26/2009	62	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	5/11/2010	64	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	5/11/2010	67	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	5/11/2010	59	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	5/11/2010	60	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	6/2/2010	61	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	6/2/2010	68	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	6/2/2010	61	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	6/2/2010	62	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	7/7/2010	56	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	7/7/2010	67	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	7/7/2010	63	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	7/7/2010	58	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	8/3/2010	55	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	8/3/2010	64	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	8/3/2010	59	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	9/9/2010	53	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	9/9/2010	62	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	12/6/2010	55	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	3/18/2011	2.4	CDPH DATABASE

Appendix J. Raymond Basin nitrate concentration from well test results

column 1	2	3	4	5	6
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	NO3, mg/L	SOURCE
	VALLEY WATER CO.	VWC-1	5/11/2011	52	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	5/11/2011	41	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	5/11/2011	61	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	5/11/2011	30	CDPH DATABASE
	VALLEY WATER CO.	WELL 03	5/11/2011	61	45
	VALLEY WATER CO.	VWC-1	6/3/2011	53	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	6/3/2011	50	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	6/3/2011	50	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	6/3/2011	47	CDPH DATABASE
	VALLEY WATER CO.	WELL 03	6/3/2011	50	45
	VALLEY WATER CO.	VWC-1	7/6/2011	56	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	7/6/2011	67	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	7/6/2011	56	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	7/6/2011	53	CDPH DATABASE
	VALLEY WATER CO.	WELL 03	7/6/2011	56	45
	VALLEY WATER CO.	VWC-1	8/3/2011	53	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	8/3/2011	68	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	8/3/2011	52	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	8/3/2011	57	CDPH DATABASE
	VALLEY WATER CO.	WELL 03	8/3/2011	52	45
	VALLEY WATER CO.	VWC-2	10/3/2011	58	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	11/1/2011	59	CDPH DATABASE
	VALLEY WATER CO.	WELL 01	5/23/2012	64	45
	VALLEY WATER CO.	WELL 02	5/23/2012	70	45
	VALLEY WATER CO.	WELL 03	5/23/2012	67	45
	VALLEY WATER CO.	WELL 04	5/23/2012	62	45
	VALLEY WATER CO.	WELL 01	6/7/2012	57	45
	VALLEY WATER CO.	WELL 02	6/7/2012	65	45
	VALLEY WATER CO.	WELL 03	6/7/2012	62	45
	VALLEY WATER CO.	WELL 04	6/7/2012	57	45
	VALLEY WATER CO.	WELL 01	7/5/2012	58	45
	VALLEY WATER CO.	WELL 02	7/5/2012	66	45
	VALLEY WATER CO.	WELL 03	7/5/2012	62	45
	VALLEY WATER CO.	WELL 04	7/5/2012	57	45
	VALLEY WATER CO.	WELL 01	8/2/2012	58	45
	VALLEY WATER CO.	WELL 02	8/2/2012	68	45
	VALLEY WATER CO.	WELL 03	8/2/2012	61	45
	VALLEY WATER CO.	WELL 04	8/2/2012	58	45
	VALLEY WATER CO.	WELL 01	9/5/2012	57	45
	VALLEY WATER CO.	WELL 02	9/5/2012	67	45
	VALLEY WATER CO.	WELL 03	9/5/2012	63	45
	VALLEY WATER CO.	WELL 04	9/5/2012	58	45
	VALLEY WATER CO.	WELL 01	10/2/2012	55	45
	VALLEY WATER CO.	WELL 04	10/2/2012	56	45
	VALLEY WATER CO.	WELL 01	11/8/2012	56	45
	VALLEY WATER CO.	WELL 01	1/4/2013	54	45
	VALLEY WATER CO.	WELL 04	1/4/2013	53	45
	VALLEY WATER CO.	WELL 02	2/13/2013	2	45

APPENDIX K

RAYMOND BASIN TDS, CHLORIDE, AND SULFATE CONCENTRATIONS FROM WELL TEST RESULTS

Appendix K. Raymond Basin TDS, chloride, and sulfate concentrations from well test results

column 1 2 3 4 5 6 7 8

Subarea	SYSTEM	WELL,NAME	SAMP,DATE	TDS	Cl	SO_4	Source
				--------------	mg/L	--------------	
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	6/20/1989	360	38.5	33.3	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	6/20/1989	307.8	34.9	26.6	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	8/31/1992	358.6	45.1	39.9	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	12/27/1994	321	30.1	61.4	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/19/1995	361	45.6	43.3	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	10/16/1997	327	44.5	46	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/16/1998	405	58.8	59.7	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-6	12/18/2000	452	61.2	72.5	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/19/2001	430	61	55	RBMB DATABASE
Monk Hill	LA CANADA IRRIGATION DIST.	LCID-1	3/22/2010	510	71	92	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/26/1990	350	34	46	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	9/19/1994	364	40.4	55.7	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/19/1994	374	33.6	61.2	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/8/1997	410	40.3	78.1	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	12/13/1999	423	42	73.6	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	11/19/2001	420	44	75	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	7/6/2009	460		95	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	2/8/2010	430		93	RBMB DATABASE
Monk Hill	LAS FLORES WATER CO.	LFWC-2	5/10/2010	470		97	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	4/16/1993	246.7	17.1	38.6	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	4/16/1993	242	13.2	26.1	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	4/4/1994	214.8	11.3	30.4	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	4/4/1994	246.6	13.8	31.6	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	6/12/1995	225	9	29	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	6/12/1995	253	11.9	31.5	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	6/1/1998	216	12.8	36	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	6/1/1998	230	15.7	37.3	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	5/23/2001	230	11	31	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	5/23/2001	250	14	36	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	5/18/2004		20.3		RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	5/18/2004		14.9		RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	WELL 03 FORCE	5/24/2007		25.6		RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	WELL 05 FORCE	5/24/2007		22.3		RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-3	9/14/2010	340	35	55	RBMB DATABASE
Monk Hill	LINCOLN AVENUE WATER CO.	LAWC-5	3/23/2011	380	46	62	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	8/22/1986	273	18.7	26.6	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	7/23/1987	400	37	40	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	8/18/1988	392	31	35	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-SHE	6/29/1989	420	43	30.9	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	9/28/1989	270.9	13.1	25.5	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	9/28/1990	330	42	41	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	9/28/1990	250	31	60	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	9/28/1990	432	55	56	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	6/23/1993	322	34.11	47.37	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	6/23/1993	266	27.96	39.97	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	6/23/1993	424	51.54	69.59	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	6/23/1993	347	43.86	52.65	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	4/16/1996	302	25.63	36.57	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	4/16/1996	278			RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	4/16/1996	258	13.96	30.11	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	4/16/1996	234			RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	4/16/1996	333	35.29	40.62	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	4/16/1996	396			RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	5/22/1996	444	54.45	71.58	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	1/1/1998	250			JPL
Monk Hill	PASADENA-CITY, WATER DEPT.	P-ARR	4/19/1999	480	43.035	76.295	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	5/24/1999	316	23.3	41.3	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	5/24/1999	481.9	47.4	69	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	5/24/1999	399.1	37	52	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	7/11/2001	321.1	31.19	43.86	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	7/11/2001	512	66.78	91.47	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	7/11/2001	556	47.4	57.44	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-52	8/14/2002	490	77.6	92.2	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-VEN	8/14/2002	316	75.6	105.6	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-WIN	8/14/2002	252	90	111.1	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-58	8/27/2002		13.4	28.4	RBMB DATABASE
Monk Hill	PASADENA-CITY, WATER DEPT.	P-58	9/18/2002	298			RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/13/1986	468	35	61	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/5/1987	291.9		32	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	6/20/1989	321	36	8.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	6/7/1993	259		44.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	12/27/1994	324	21.7	61.4	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	12/27/1994	270	17.9	19.7	RBMB DATABASE

Appendix K. Raymond Basin TDS, chloride, and sulfate concentrations from well test results

column 1		2	3 4	5	6	7	8
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	TDS	Cl	SO_4	Source
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	4/24/2000	320	21.4	52.5	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	4/24/2000	300	19	43.3	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	1/13/2003	350	26	44	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	1/13/2003	360	32	27	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-4	2/7/2011	260	33	64	RBMB DATABASE
Monk Hill	RUBIO CANON LAND & WATER ASSOCIATION	RCLWA-7	2/7/2011	217	45	46	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	1/1/1981	552			JPL
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	1/1/1982	330			JPL
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	1/1/1983	396			JPL
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	4/29/1986		25.1	37.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	4/29/1986		0.93	1.91	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/22/1986	427.8	37.2	60	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/22/1986	248	19.5	40.4	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/26/1987	244	34	16	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	5/26/1987	260	40	52	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/26/1987	364	63	70	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/26/1987	316	46	48	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	5/26/1987	248	37	30	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/26/1987	356	35	39	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	7/23/1987	271.4	26	44	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/29/1988	216	22.4	61	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	3/22/1988	270	15	28	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	3/22/1988	270	15	28	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	3/22/1988	270	15	28	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	5/16/1988	387	40.3	69.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/17/1988	350.2	25	72.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/21/1988	427.8	33	77	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	1/1/1989	450			JPL
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/15/1989	544	41	65	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	6/20/1989	250.1	13.1	20.6	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	6/20/1989	250.1	13.1	20.6	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	6/21/1989	289.1	21.9	40.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	6/21/1989	340	14	24.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/29/1989	336.3	28.1	73.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7	9/15/1989	302	25.2	51	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	9/28/1989	382.8	40.8	72.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	9/28/1989	234	17.8	31.9	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	10/2/1989		26		RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	12/29/1989	278.3	18.8	47.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/2/1990	391	29	66	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/8/1990	245.5	20	47	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	3/22/1990	261	17.1	39.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	3/22/1990	518.5	50.2	105.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	3/22/1990	312	2.9	42.8	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	3/22/1990	394	40.7	67.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	3/22/1990	222	18.6	31.4	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	4/9/1990	230	16	29	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/9/1990	220	12	20	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/25/1990	592	36.8	61.6	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/14/1991	284.6	26.7	44.3	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/14/1991	326	26.6	69.9	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	9/24/1991	508	56.6	83.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	9/24/1991	380	26.4	42.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	2/18/1992	260	20	28	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1	2/18/1992	555	61	83	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	2/18/1992	445	60	58	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/18/1992	295	25	58	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	2/18/1992	530	51	73	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	5/13/1992	291	32	44.5	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/13/1992	333.6	30.8	73.7	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	8/4/1992	270	20	49	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/18/1993	380	28.6	70.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1	3/1/1993	450	38.3	78.5	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	3/1/1993	205	21	39.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	5/18/1993	368.2	31.1	81.2	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	6/23/1993	248	22.81	39.29	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	6/23/1993	540	46.34	113.91	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	6/23/1993	324	32.44	53.09	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	6/23/1993	261	79.71	287.04	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-JOU	6/23/1993	644	77.95	273.24	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	6/23/1993	298	31.06	45.15	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	6/23/1993	510	43.13	81.25	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	6/23/1993	485			RBMB DATABASE

Appendix K. Raymond Basin TDS, chloride, and sulfate concentrations from well test results

column 1		2	3	4	5	6	7	8
Subarea	SYSTEM	WELL,NAME		SAMP,DATE	TDS	Cl	SO_4	Source
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO		6/23/1993	235	25.37	39.7	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM		12/13/1993	240	17.4	23	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK		12/13/1993	436	72.2	70	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT		12/13/1993	396	45.5	71	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1		12/16/1993	508	43	50	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW		12/16/1993	356	29.4	48	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN		12/16/1993	488	36.7	76	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2		12/22/1993	259.7	28.1	30.1	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-7		3/16/1994	355	25	51.8	RBMB DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8		3/16/1994	477	41.9	89.2	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6		6/14/1994	324.4	32.1	53.7	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1		6/14/1994	361.2	30.6	77.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN		9/15/1994	262	24	19	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1		11/7/1994	356	24	46.8	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT		11/7/1994	332	28.1	52.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN		11/7/1994	472	37.5	74.9	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3		12/19/1994	239	15.5	35.7	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL		12/19/1994	243	13.3	15.5	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3		3/21/1995	262	19.1	48.1	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL		3/21/1995	255	17.9	20.8	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL		5/31/1995	209	9.3	16.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6		6/26/1995	326	27.2	53.8	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1		6/26/1995	354	24.6	75.2	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3		6/27/1995	238	16.6	35	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL		6/27/1995	216	12	19.7	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2		9/26/1995	349	48.6	68.5	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		1/1/1996	313			JPL
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW		1/15/1996		44.4	73	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT		1/15/1996		32.9	56	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN		1/15/1996		39.9	69.7	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11		1/15/1996	394	36.7	96.2	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM		1/16/1996		15.6	29.6	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM1		1/16/1996		46.6	82.1	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1		2/5/1996	304	48.1	99	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12		2/5/1996	366	14.8	34.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA		4/16/1996	266	15.59	34.82	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA		4/16/1996	244			RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON		4/16/1996	282	31.46	51.63	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON		4/16/1996	332			RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO		4/16/1996	230	20.4	36.7	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO		4/16/1996	248			RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP		5/22/1996	561.5	57.92	117.75	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA		5/22/1996	364	32.08	59.59	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR		5/22/1996	306	27.67	52.74	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-JOU		5/22/1996	634	55.95	123.4	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-JOU		5/22/1996	644			RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL		5/22/1996	508	36.85	74.77	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1		6/18/1996	370	25.6	84.3	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN		9/17/1996	461	63.1	107.1	RBMB DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN		9/17/1996	510			RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2		12/17/1996	345	42.4	61.3	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM		1/28/1997		16.3	27	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM		3/26/1997	276	52	31	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM		3/26/1997	226	38	33	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK		3/26/1997	490	109	98	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW		3/26/1997	420	72	64	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT		3/26/1997	382	73	60	RBMB DATABASE
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN		3/26/1997	456	79	75	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1		6/16/1997	363	28.6	76.9	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6		7/8/1997	289	18.2	46.3	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2		12/9/1997	351	42.1	61.1	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3		1/26/1998	272	19.5	52.8	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL		1/26/1998	275	19.9	26.5	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL		3/23/1998	174	7.8	16.9	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3		4/22/1998	268	19.7	51.9	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL		4/22/1998	287	19.4	27.4	RBMB DATABASE
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1		6/16/1998	379	30.4	84.7	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL		6/22/1998	197	8.4	16	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-3		7/14/1998	256	23.9	39.8	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL		7/14/1998	238	19.4	26.2	RBMB DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL		9/28/1998	201	8.6	19.3	RBMB DATABASE
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2		12/3/1998	326	40.2	48	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11		1/4/1999	450	35	95.6	RBMB DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-1		2/1/1999	270	21.4	42.4	RBMB DATABASE

Appendix K. Raymond Basin TDS, chloride, and sulfate concentrations from well test results

column 1		2	3	4	5	6	7	8
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	TDS	Cl	SO_4	Source	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/1/1999	380	34.1	55.5	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	2/9/1999	451	47.9	96	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	5/24/1999	280	14.4	39	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	5/24/1999	601	57.8	115	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	5/24/1999		27.3	67	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	5/24/1999	297.5	29.1	59.6	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-JOU	5/24/1999	254	55.5	134	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	5/24/1999	335	20.6	47	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	5/24/1999	499.1	49.9	99.3	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	5/24/1999	364.7	57.4	122	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	5/24/1999	255	17.1	40.5	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/15/1999	397	41	83	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/15/1999	370	30	83	RBMB DATABASE	
Pasadena	ALHAMBRA-CITY, WATER DEPT.	ALH-2	12/8/1999	315	37.8	48.2	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	1/1/2000	608			JPL	
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/21/2000	400	34	68	RBMB DATABASE	
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/21/2000	507	47	110	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/30/2000	354	28	53	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/30/2000	180	10	26	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OAK	5/30/2000	475	76	87	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/30/2000	405	38	69	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	5/30/2000	355	37	63	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/30/2000	330	22	38	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/19/2000	407	41	75	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/19/2000	390	31	81	RBMB DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	1/22/2001	260	20	48	RBMB DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	1/22/2001	240	17	23	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	2/20/2001		35.4	59.6	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-PAT	2/20/2001		38.3	58.1	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	5/21/2001	340	25	52	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	5/21/2001	200	13	31	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-OSW	5/21/2001	440	42	70	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	5/21/2001	360	26	44	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/18/2001	446	37.6	74.2	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/18/2001	386	30.6	80.6	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	7/11/2001	369.5	32.25	51.22	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	7/11/2001	283.5	17.94	41.24	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	7/11/2001	591.5	71.26	135.27	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	7/11/2001	328	47.03	110.16	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	7/11/2001	312	29.2	54.81	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	7/11/2001	314	36.83	69.97	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	7/11/2001	502	58.67	114.5	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	7/11/2001	234	42.61	88.19	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	7/11/2001	220	22.12	43.97	RBMB DATABASE	
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	9/25/2001	210	8.6	19	RBMB DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/7/2002	560	43	95	RBMB DATABASE	
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	2/4/2002	410	36	59	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LAM	4/1/2002	410	39	65	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-LOM	4/1/2002	210	15	31	RBMB DATABASE	
Pasadena	CAL/AM WATER COOMPANY - SAN MARINO	CA-WIN	4/1/2002	370	30	45	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-CHAP6	6/17/2002	410	39	77	RBMB DATABASE	
Pasadena	ARCADIA-CITY, WATER DIVISION	ARC-HUG1	6/17/2002	370	29	81	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/7/2002	238	14.1	29.3	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-CRA	8/7/2002	322.4	31.6	73.5	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/7/2002	468	31.8	62	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/7/2002	304	19.3	37.7	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/14/2002	428	70.1	128.3	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/14/2002	528	55.1	104	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/14/2002	270	34.9	94	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/14/2002	526	55.6	110.1	RBMB DATABASE	
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/14/2002	296	20.5	41.5	RBMB DATABASE	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/23/2003	380	31	84	1000, 500, 600	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/16/2003	295	25	44	1000, 500, 600	
Pasadena	KINNELOA IRRIGATION DIST.	DOLORES WELL	5/12/2004	220	7.2		1000, 500	
Pasadena	KINNELOA IRRIGATION DIST.	KINNELOA WELL 03	5/12/2004		28		500	
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	5/12/2004		15.7		500	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	11/9/2004	290			1000	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	1/3/2005		36	68	500, 600	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	1/3/2005		38	74	500, 600	
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/16/2005		42	74	500, 600	
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/23/2005		42	79	500, 600	
Pasadena	CITY OF ARCADIA	HUGO REID WELL 01 - INACTIVE	6/27/2006	670	51.2	145	1000, 500, 600	
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/5/2006	280	22.4	50.5	1000, 500, 600	
Pasadena	KINNELOA IRRIGATION DIST.	DOLORES WELL	5/23/2007	210	6.4		1000, 500	

Appendix K. Raymond Basin TDS, chloride, and sulfate concentrations from well test results

column 1 2 3 4 5 6 7 8

Subarea	SYSTEM	WELL,NAME	SAMP,DATE	TDS	Cl	SO_4	Source
Pasadena	KINNELOA IRRIGATION DIST.	KINNELOA WELL 03	5/23/2007		27.4		500
Pasadena	KINNELOA IRRIGATION DIST.	WILCOX	5/23/2007		13.1		500
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	1/7/2008		61	130	500, 600
Pasadena	SUNNY SLOPE WATER CO.	WELL 11-INACTIVE	3/12/2008		68.1	143	500, 600
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/2/2008		40	72	500, 600
Pasadena	SUNNY SLOPE WATER CO.	WELL 12	6/24/2008		38.2	73.3	500, 600
Pasadena	EAST PASADENA WATER CO.	EPWC-7	3/23/2009	580		130	CDPH DATABASE
Pasadena	EAST PASADENA WATER CO.	EPWC-8	3/23/2009	430		78	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	7/14/2009	380	30	81	1000, 500, 600
Pasadena	CITY OF ARCADIA	COLORADO WELL	8/5/2009	160	11	25	1000, 500, 600
Pasadena	PASADENA-CITY, WATER DEPT.	P-BAN	8/18/2009	368	41.8	63.2	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-CHA	8/18/2009	264	15.8	27.5	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-GAR	8/18/2009	252	27.5	51.3	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-MON	8/18/2009	478	62.2	139	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-SUN	8/18/2009	490	4	114	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-WOO	8/18/2009	306	32.3	72.7	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-COP	8/19/2009	570	71.8	130	CDPH DATABASE
Pasadena	PASADENA-CITY, WATER DEPT.	P-VIL	8/19/2009	330	35	65.8	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/3/2009	310	26	50	1000, 500, 600
Pasadena	CITY OF ARCADIA	COLORADO WELL	12/17/2009	170	12	35	1000, 500, 600
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/22/2009	400	29	84	1000, 500, 600
Pasadena	KINNELOA IRRIGATION DIST.	KID-3	4/20/2010	340	32	60	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-DEL	4/20/2010	210	7	16	CDPH DATABASE
Pasadena	KINNELOA IRRIGATION DIST.	KID-WIL	4/20/2010	230	11	40	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	8/10/2010	230	19	41	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	8/10/2010	440	43	68	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/18/2010	378	40.9	67.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	8/18/2010	554	74.8	135	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-GAR	8/18/2010	592	28.7	55.5	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-MON	8/18/2010	409.2	64.2	145	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	8/18/2010	460	61	118	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	8/18/2010	294	33.6	76	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LON	9/21/2010		29	55	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-CHA	10/5/2010	290	15.6	27.7	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	1/3/2011	570	71	140	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-11	3/9/2011	260	64	140	CDPH DATABASE
Pasadena	SUNNY SLOPE WATER CO.	SSWC-12	6/13/2011	220	43	78	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-BAN	8/17/2011	422	47.3	80.8	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-CHA	8/17/2011	414	38.7	90.4	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-COP	8/17/2011	610	80	159	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-SUN	8/17/2011		63	125	CDPH DATABASE
Pasadena	CITY OF PASADENA	P-WOO	8/17/2011	420	38.2	88.3	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LOM	4/23/2012		17.9	36.7	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-LON	4/23/2012		29.4	53	CDPH DATABASE
Pasadena	CAL/AM WATER COMPANY	CA-WIN	4/23/2012		42.3	65.6	CDPH DATABASE
Pasadena	CITY OF ARCADIA	CHAPMAN WELL 07	12/3/2012	360	32	64	1000, 500, 600
Pasadena	CITY OF ARCADIA	COLORADO WELL	12/3/2012	180	16	48	1000, 500, 600
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	4/29/1986		19	33.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	4/29/1986		14.4	42.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	4/29/1986		14.7	27.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	4/29/1986		15.4	54.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/17/1988	291.3	19.1	34.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	5/17/1988	279.1	12.8	39.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/17/1988	267.6	15.7	31.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/17/1988	308.2	24	41.9	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	6/21/1989	190	7.4	16	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	6/21/1989	230	18.5	40.7	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	6/21/1989	183	13.5	30.7	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	5/14/1991	268.9	14.4	45.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/14/1991	281.5	21.3	33.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/14/1991	273.8	16.5	51.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/25/1991	293.7	23.1	37.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	5/13/1992	298.8	24.4	36.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	5/13/1992	275.2	18.4	43.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/13/1992	284.5	25	36.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	5/13/1992	278.5	20	54.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	5/18/1993	309.2	24.2	40.2	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	6/22/1993	173	6.5	14	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	6/22/1993	208	6.7	14	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	6/22/1993	178	11	22	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/14/1994	326.7	27.2	41.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/14/1994	308.4	20.9	46.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/14/1994	275.6	20.5	34.8	RBMB DATABASE

Appendix K. Raymond Basin TDS, chloride, and sulfate concentrations from well test results

column 1		2	3 4	5	6	7	8
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	TDS	Cl	SO_4	Source
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/14/1994	310.9	20.4	56	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/13/1995	330	24.9	42.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/26/1995	302	18.1	37.2	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/26/1995	262	15.5	32.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/26/1995	286	14.5	49.8	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/18/1996	291	18.8	34.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/18/1996	283	15.3	37.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/18/1996	258	14.5	28.4	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/18/1996	298	15.2	53.8	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	7/1/1996	172	4.6	17.5	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	7/1/1996	174	7.7	20.6	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	7/1/1996	180	4.4	17	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	7/1/1996	201	6.4	18.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/16/1997	289	19.7	32.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/16/1997	261	16.6	28.3	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/16/1997	298	17.9	50.9	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	7/8/1997	460	46.3	93.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	8/5/1997	296			RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	10/28/1997	560			RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/16/1998	287	19.9	36.6	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/16/1998	284	17.8	42.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/16/1998	262	17.6	32.1	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	5/17/1999	280	7.7	13.6	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	5/17/1999	230	7.8	13.9	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	5/17/1999	310	7.9	14.5	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	5/17/1999	270	10.2	21	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/15/1999	296	19.3	37	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/15/1999	276	17.3	43	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/15/1999	259	17	31	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/15/1999	278	16	49	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/19/2000	308	20	37	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/19/2000	283	17	41	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/19/2000	274	18	33	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/19/2000	291	16	45	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/18/2001	329	20.6	37.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/18/2001	247	15.8	42.5	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/18/2001	287	18.3	33.1	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/18/2001	269	15.6	47.5	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-3	5/6/2002	280	17	46	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-4	5/6/2002	230	11	20	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-5	5/6/2002	220	22	46	RBMB DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	SM-6	5/6/2002	220	16	32	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/17/2002	330	22	41	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/17/2002		16	43	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/17/2002	290	19	34	RBMB DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/17/2002	280	16	48	RBMB DATABASE
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/23/2003	220	13	36	1000, 500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/23/2003		18	52	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/23/2003		20	39	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/23/2003		17	52	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/30/2003		26	50	500, 600
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	11/9/2004	211			1000
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/11/2005	240	6		1000, 500
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/11/2005		8	16	500, 600
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/11/2005	202	12	25	1000, 500, 600
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	6/15/2005	242	6	13	1000, 500, 600
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/27/2006	245	9.9	24.8	1000, 500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/27/2006		22.5	44.3	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/27/2006		20.2	50.1	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/27/2006		19.6	41.6	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/27/2006		18.1	48.4	500, 600
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 03	5/29/2008	260	11.9	34.7	1000, 500, 600
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/29/2008		7.4	14.5	500, 600
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/29/2008	178	8.8	17.6	1000, 500, 600
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	5/29/2008		12.3	26.2	500, 600
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/1/2009	210	12	24	1000, 500, 600
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	6/1/2009	340			CDPH DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	6/1/2009	330			CDPH DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA5	6/1/2009	330			CDPH DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	6/1/2009	350			CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	6/1/2009		22	39	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/1/2009		18	48	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/1/2009		23	39	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/1/2009		16	45	500, 600

Appendix K. Raymond Basin TDS, chloride, and sulfate concentrations from well test results

column 1		2	3 4	5	6	7	8
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	TDS	Cl	SO_4	Source
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	7/14/2009	230	15	35	1000, 500, 600
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA1A	7/14/2009	340			CDPH DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA2A	7/14/2009	360			CDPH DATABASE
Santa Anita	ARCADIA-CITY, WATER DIVISION	ARC-ORA6	7/14/2009	330	16		CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 01-A	7/14/2009		21	38	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	7/14/2009		18	48	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	7/14/2009		16	42	500, 600
Santa Anita	CITY OF SIERRA MADRE	SM-3	5/5/2011	190	12	30	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-4	5/5/2011	306	8.6	14	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-5	5/5/2011	280.6	7.4	14	CDPH DATABASE
Santa Anita	CITY OF SIERRA MADRE	SM-6	5/5/2011	268.4	7.1	13	CDPH DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 04	5/5/2011			14	CDPH DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 05	5/5/2011			14	CDPH DATABASE
Santa Anita	SIERRA MADRE-CITY, WATER DEPT.	WELL 06	5/5/2011			13	CDPH DATABASE
Santa Anita	CITY OF ARCADIA	ANOAKIA WELL	6/11/2012	230	17	39	1000, 500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/11/2012	350	25	41	1000, 500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 02-A	6/11/2012		22	51	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 05	6/11/2012		21	37	500, 600
Santa Anita	CITY OF ARCADIA	ORANGE GROVE WELL 06	6/11/2012		21	45	500, 600
	VALLEY WATER CO.	VWC-2	12/30/1987	690	116	146	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	3/6/1990	661.2	114.3	14	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	3/6/1990	546.4	79.4	89.8	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/17/1991	537.6	84.9	93.3	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	9/16/1992	473.9	71.8	83.9	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	2/2/1993	575.6	89.9	126.2	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	2/2/1993	514.7	81.3	98.9	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	12/9/1993	760	115	185	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	12/13/1993	590	96	120	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/17/1994	600	92	190	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/17/1994	640	98	250	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	8/8/1994	700	105	180	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	12/13/1994	670	100	160	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	12/13/1994	690	110	180	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	12/13/1994	550	87	105	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/12/1995	640	92	130	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/13/1995	640	89	170	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/14/1995	650	105	190	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/14/1995	620	93	160	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/4/1996	630	87	170	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/4/1996	600	82	150	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/5/1996	700	105	200	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/5/1996	620	90	155	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/1/1997	620	98	165	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/1/1997	600	82	150	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/7/1997	700	110	185	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/7/1997	750	105	135	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	6/1/1998	620	94	190	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	6/1/1998	650	91	190	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	6/1/1998	700	96	190	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	6/1/1998	600	84	160	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/7/1999	780	92	177	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/7/1999	720	102	147	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/7/1999	610	89.4	140	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/5/2000	630	97.4	156	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/5/2000	780	121	183	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/5/2000	710	105	152	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/5/2000	630	95.2	133	RBMB DATABASE
	VALLEY WATER CO.	VWC-1	7/1/2002	610	92	160	RBMB DATABASE
	VALLEY WATER CO.	VWC-2	7/1/2002	510	89	170	RBMB DATABASE
	VALLEY WATER CO.	VWC-3	7/1/2002	730	100	150	RBMB DATABASE
	VALLEY WATER CO.	VWC-4	7/1/2002	560	87	150	RBMB DATABASE
	VALLEY WATER CO.	WELL 01	7/14/2003		94	150	500, 600
	VALLEY WATER CO.	WELL 02	7/14/2003		76	147	500, 600
	VALLEY WATER CO.	WELL 03	7/14/2003		92	146	500, 600
	VALLEY WATER CO.	WELL 04	7/14/2003			144	500, 600
	VALLEY WATER CO.	WELL 01	7/8/2004		95	138	500, 600
	VALLEY WATER CO.	WELL 02	7/8/2004		91	157	500, 600
	VALLEY WATER CO.	WELL 03	7/8/2004		93	137	500, 600
	VALLEY WATER CO.	WELL 04	7/8/2004		93	145	500, 600
	VALLEY WATER CO.	WELL 01	7/7/2005		91	152	500, 600
	VALLEY WATER CO.	WELL 02	7/7/2005		67	134	500, 600
	VALLEY WATER CO.	WELL 03	7/7/2005		67	127	500, 600
	VALLEY WATER CO.	WELL 04	7/7/2005		82	146	500, 600

Appendix K. Raymond Basin TDS, chloride, and sulfate concentrations from well test results

column 1	2	3	4	5	6	7	8
Subarea	SYSTEM	WELL,NAME	SAMP,DATE	TDS	Cl	SO_4	Source
	VALLEY WATER CO.	WELL 01	7/5/2006		94.5	164	500, 600
	VALLEY WATER CO.	WELL 02	7/5/2006		51.6	91.6	500, 600
	VALLEY WATER CO.	WELL 03	7/5/2006		101	175	500, 600
	VALLEY WATER CO.	WELL 04	7/5/2006		77.3	129	500, 600
	VALLEY WATER CO.	WELL 01	7/2/2007		95	152	500, 600
	VALLEY WATER CO.	WELL 02	7/2/2007		114	192	500, 600
	VALLEY WATER CO.	WELL 03	7/2/2007		99.5	161	500, 600
	VALLEY WATER CO.	WELL 04	7/2/2007		98.4	149	500, 600
	VALLEY WATER CO.	WELL 01	7/7/2008		102	156	500, 600
	VALLEY WATER CO.	WELL 02	7/7/2008		120	192	500, 600
	VALLEY WATER CO.	WELL 03	7/7/2008		95.9	153	500, 600
	VALLEY WATER CO.	WELL 04	7/7/2008		105	155	500, 600
	VALLEY WATER CO.	VWC-1	7/7/2009	750		170	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	7/7/2009	830		190	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	7/7/2009	660		140	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	7/7/2009	790		180	CDPH DATABASE
	VALLEY WATER CO.	WELL 01	7/7/2009		110		500
	VALLEY WATER CO.	WELL 02	7/7/2009		130		500
	VALLEY WATER CO.	WELL 03	7/7/2009		94		500
	VALLEY WATER CO.	WELL 04	7/7/2009		120		500
	VALLEY WATER CO.	VWC-1	7/7/2010	740	110	160	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	7/7/2010	830	130	190	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	7/7/2010	760	110	170	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	7/7/2010	720	110	150	CDPH DATABASE
	VALLEY WATER CO.	VWC-1	7/6/2011	780	110	160	CDPH DATABASE
	VALLEY WATER CO.	VWC-2	7/6/2011	850	110	170	CDPH DATABASE
	VALLEY WATER CO.	VWC-3	7/6/2011	670	87	130	CDPH DATABASE
	VALLEY WATER CO.	VWC-4	7/6/2011	720	96	140	CDPH DATABASE
	VALLEY WATER CO.	WELL 01	10/2/2012		110		500
	VALLEY WATER CO.	WELL 04	10/2/2012		100		500
	VALLEY WATER CO.	WELL 01	1/4/2013	900	140		1000, 500
	VALLEY WATER CO.	WELL 04	1/4/2013	740	100		1000, 500

APPENDIX L

SAN GABRIEL RIVER WATER QUALITY, RUNOFF

Appendix L. San Gabriel River Water quality, Runoff

column 1	2	3	4	5	6 7
FISCAL YEAR	CONCENTRATION (MILLIGRAMS PER LITER)				SOURCE(S)
	TOTAL DISSOLVED SOLIDS	NITRATE	SULFATE	CHLORIDE	
1966-67	204.3	6.05	26.75	3.75	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1967-68	207.3	2.09	22.38	4.11	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1968-69	182.9	1.34	22.33	5.50	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1969-70	195.0	2.38	23.50	4.75	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1970-71	195.4	1.18	24.67	4.42	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1971-72	195.3	1.25	28.17	4.83	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1972-73	202.4	2.56	27.17	4.67	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1973-74	177.6	1.60	24.25	3.33	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1974-75	196.8	1.07	27.25	4.50	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1975-76	201.4	1.39	28.08	2.75	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1976-77	196.9	1.96	26.83	2.92	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1977-78	173.1	2.70	20.75	2.50	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1978-79	189.5	1.86	20.27	2.82	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1979-80	182.3	1.51	22.14	2.86	USGS 11082800 - SAN GABRIEL AT AZUSA PH
1980-81	225.0	2.00	23.00	9.00	AZUSA - NO. 01 (NORTH) (02/17/0981)
1981-82	216.0	1.30	33.00	8.00	GLENDORA - NO. 8E (08/20/1981)
1982-83	226.0	6.00	19.00	15.00	GLENDORA - NO. 8E (08/09/1983)
1983-84	201.0	1.10	15.00	12.00	AZUSA - NO. 01 (NORTH) (02/14/1984)
1984-85	184.0	3.50	27.00	8.00	GLENDORA - NO. 8E (08/17/1984)
1985-86	186.0	5.20	21.50	7.40	AZUSA - NO. 05 (04/22/1986)
1986-87	236.0	3.60	33.00	27.00	CAWC - BACON (06/03/1987)
1987-88	270.0	6.20	32.00	18.00	CAWC - LAS L (09/15/1987)
1988-89	256.0	3.10	47.00	15.80	GLENDORA - NO. 8E (10/13/1988)
1989-90	304.0	3.10	49.80	45.70	GLENDORA - NO. 8E (08/31/1989)
1990-91	330.4	9.60	42.20	28.40	AZUSA - NO. 04 (10/04/1990)
1991-92	203.7	4.20	38.20	15.80	AZUSA - NO. 02 (SOUTH) (06/23/1992)
1992-93	225.7	2.50	38.00	16.70	GLENDORA - NO. 12G (07/21/1992)
1993-94	199.1	1.60	21.50	10.00	AZUSA - NO. 07 (08/26/1993)
1994-95	284.0	5.03	38.50	18.80	CIC - AZUSA DIVERSION (11/7/1994)
1995-96	198.0	2.40	20.50	11.00	GLENDORA - NO. 8E (7/13/1995)
1996-97	180.0	2.00	22.20	2.12	CIC - AZUSA DIVERSION (9/3/1997)
1997-98	160.0	2.00	13.00	4.90	CIC - AZUSA DIVERSION (6/1/1998)
1998-99	204.0	2.00	20.50	9.60	CIC - AZUSA DIVERSION (3/8/1999)
1999-00	255.0	2.00	29.30	19.20	CAWC - FISH CANYON (6/19/2000)
2000-01	250.0	2.40	23.00	9.90	CIC - AZUSA DIVERSION (6/11/2001)
2001-02	240.0	2.00	29.00	9.00	CIC - AZUSA DIVERSION (6/6/2002)
2002-03	270.0	4.90	38.00	6.00	CIC - AZUSA DIVERSION (3/12/2003)
2003-04	240.0	3.20	25.00	10.00	CIC - AZUSA DIVERSION (6/3/2004)
2004-05	200.0	3.30	16.00	7.70	AZUSA - NO. 11 (6/14/2005)
2005-06	240.0	3.60	25.00	27.00	AZUSA - NO. 4 (5/11/2006)
2006-07	210.0	2.20	24.00	22.00	AZUSA - NO. 15 (4/17/2007)
2007-08	200.0	2.70	26.00	4.30	CIC - AZUSA DIVERSION (4/18/2008)
2008-09	210.0	3.50	24.00	14.00	AZUSA - NO. 11 (10/15/2008)
2009-10	210.0	2.00	24.00	6.70	CIC - AZUSA DIVERSION (9/2/2009)
2010-11	200.0	2.60	16.00	12.00	GLENDORA - NO. 9E (6/14/2011)
2011-12	200.0	2.40	17.00	14.00	GLENDORA - NO. 8E (9/11/2011)

AZUSA: Azusa Light and Water
CAWC: California American Water Company
USGS: United States Geological Survey
CIC: Covina Irrigating
GLENDORA: City of Glendora

APPENDIX M

WATERSHED RUNOFF QUALITY DATA FOR RAYMOND BASIN SALT AND NUTRIENT MANAGEMENT PLAN

Appendix M. WATERSHED RUNOFF QUALITY DATA FOR RAYMOND BASIN SALT AND NUTRIENT MANAGEMENT PLAN

column 1 2 3 4 5 6 7 8 9 10

FISCAL YEAR	TOTAL DISSOLVED SOLIDS		NITRATE		CHLORIDE		SULFATE		
	AVERAGE CONCENTRATION	NO. OF VALUES	AVERAGE CONCENTRATION	NO. OF VALUES	AVERAGE CONCENTRATION	NO. OF VALUES	AVERAGE CONCENTRATION	NO. OF VALUES	SOURCE
SURFACE WATER									
1989-90	287.13	4	8.62	5	8.48	4	41.00	4	RBMB DATABASE
1990-91									
1991-92									
1992-93	214.55	4	7.14	4	8.85	4	30.83	4	RBMB DATABASE
1993-94	247.50	2		0	6.70	2	63.55	2	RBMB DATABASE
1994-95	220.83	6	9.29	8	8.52	6	31.10	6	RBMB DATABASE
1995-96	227.33	3	11.74	5	8.87	3	23.57	3	RBMB DATABASE
1996-97	191.00	2	8.05	4	6.60	2	23.50	2	RBMB DATABASE
1997-98	220.43	7	11.72	12	9.28	7	30.21	7	RBMB DATABASE
1998-99	214.80	5	10.65	8	10.28	5	25.66	5	RBMB DATABASE
1999-00	165.00	1	3.33	3	8.00	1	18.00	1	RBMB DATABASE
2000-01	220.00	4	6.19	10	8.08	4	29.00	4	RBMB DATABASE, 1000, 45, 500, 600
2001-02	217.50	4	5.67	10	10.05	4	25.50	4	RBMB DATABASE, 1000, 45, 500, 600
2002-03	250.00	1	8.80	9	9.50	1	24.00	1	1000, 45, 500, 600
2003-04	240.00	4	8.90	8	8.95	4	25.65	4	1000, 45, 500, 600
2004-05	196.67	3	11.37	6	6.67	3	18.67	3	1000, 45, 500, 600
2005-06	210.00	1	8.13	6	5.20	1	16.00	1	1000, 45, 500, 600
2006-07	212.50	4	9.23	6	8.68	4	25.93	4	1000, 45, 500, 600
2007-08	208.67	3	7.10	6	6.75	3	20.33	3	1000, 45, 500, 600
2008-09	280.00	1	6.07	8	8.20	1	27.00	1	1000, 45, 500, 600
2009-10	215.00	3	7.52	6	9.03	4	22.50	4	1000, 45, 500, 600
2010-11	236.67	3	5.92	6	7.50	3	17.67	3	1000, 45, 500, 600
2011-12	230.00	1	6.65	6	7.40	1	26.00	1	1000, 45, 500, 600
2012-13	250.00	1	2.00	1	8.10	1	31.00	1	1000, 45, 500, 600
MAXIMUM	287.13	7	11.74	12	10.28	7	63.55	7	
MINIMUM	165.00	0	2.00	0	5.20	0	16.00	0	
AVERAGE	225.25	3	7.81	6	8.17	3	27.12	3	

Notes: 1. Average concentration in milligrams per liter
2. Average diversion and tunnel waters except Kinneloa Irrigation District's Eucalyptus Tunnel

APPENDIX N

IMPORTED GROUNDWATER QUALITY

Appendix N. IMPORTED GROUNDWATER QUALITY

column 1	2	3	4	5
FISCAL YEAR (JUL-JUN)	AVERAGE CONCENTRATION (mg/L) *			
	TOTAL DISSOLVED SOLIDS	NITRATE AS NO3	CHLORIDE	SULFATE
1973-74	262.48	23.54	28.10	25.20
1974-75	341.00	35.00	33.50	36.50
1975-76	268.58	34.96	30.83	21.02
1976-77	282.83	27.17	26.32	30.92
1977-78	258.50	11.98	20.75	22.00
1978-79	249.33	20.50	19.60	22.08
1979-80	277.33	22.79	29.08	26.11
1980-81	300.33	25.29	31.33	37.00
1981-82	289.60	22.73	32.50	28.50
1982-83	263.88	21.93	33.38	28.13
1983-84	302.33	26.38	30.67	33.33
1984-85	325.60	34.34	27.20	30.00
1985-86	281.00	23.81	25.29	28.00
1986-87	298.47	29.86	23.30	29.07
1987-88	313.90	29.45	23.23	34.20
1988-89	330.74	30.34	36.77	41.76
1989-90	295.47	29.72	26.43	32.50
1990-91	289.57	29.01	24.64	32.43
1991-92	257.50	25.65	27.15	23.43
1992-93	292.38	31.86	31.62	31.00
1993-94	247.48	36.83	14.50	22.96
1994-95	236.67	22.07	25.20	21.07
1995-96	231.00	22.07	19.20	24.05
1996-97	242.80	24.40	17.22	21.78
1997-98	267.25	26.33	20.56	26.98
1998-99	386.00	23.89	31.50	38.00
1999-00	244.60	20.40	14.30	20.98
2000-01	263.33	21.50	17.23	20.20
2001-02	295.00	27.79	41.50	32.50
2002-03	272.50	21.21	15.47	23.67
2003-04	286.00	18.72	18.40	25.00
2004-05	315.45	21.47	39.33	40.33
2005-06	325.56	14.12	10.55	19.50
2006-07	322.30	15.72	14.00	21.75
2007-08	309.85	27.17	39.67	40.00
2008-09	326.62	27.30	27.85	40.10
2009-10	330.00	24.33	15.00	26.00
2010-11	360.00	43.40	44.67	38.33
2011-12	357.50	37.71	32.75	47.00

STATISTICAL ANALYSIS

Maximum	386.00	43.40	44.67	47.00
Minimum	231.00	11.98	10.55	19.50
Historic Av	292.33	25.97	26.17	29.32
Last 5 Year	336.79	31.98	31.99	38.29
Last 10 Yea	320.58	25.12	25.77	32.17
Last 15 Yea	310.80	24.74	25.52	30.69
Last 20 Yea	295.61	25.42	24.52	29.06

Source: Main San Gabriel Basin Watermaster Database
* City of Alhambra and East Pasadena Water Company Wells

APPENDIX O

ANNUAL MEAN IMPORTED WATER QUALITY CHARACTERISTICS FROM THE MWD WEYMOUTH TREATMENT PLANT

Appendix O. Annual mean imported water quality characte

Year	TDS	Nitrate	Chloride	Sulfate
	-------------------- mg/L --------------------			
2002	500		85	171
2003	387	2	79	111
2004	445	2	86	145
2005	452	2.4	75	164
2006	344	20	61	116
2007	437	2.2	86	140
2008	565	2.2	96	209
2009	620	1.76	98	240
2010	532	1.4	88	194
2011	380	1.6	70	122
2012	470	ND	90	140
Mean	467	4	83	159
Last 5 years	513	2	88	181

APPENDIX P

MONK HILL SUBAREA NITRATE (NO3) BALANCE WORKSHEET

Appendix P. Monk Hill subarea nitrate (NO3) balance worksheet. (Developed from Table III.4a and App. G).
Water quality data from Valley Water Company wells were omitted from this analysis.

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)
Water Year	Nitrate loading															
	From Precipitation					Artificial recharge					Return flow			Verdugo Basin		
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total	weighted			Subsurface inflow		
	Recharge ac-ft	NO$_3$ mg/L	Recharge ac-ft	NO$_3$ mg/L	lbs†	ac-ft	NO$_3$ mg/L	ac-ft	NO$_3$ mg/L	lbs	ac-ft	NO$_3$ mg/l	lbs	ac-ft	NO$_3$ mg/L	lbs
1994-95	6,038	22	1,973	22	479,000	7,555	22	99	3	452,000	3,321	24	217,000	2,226	39	236,000
1995-96	2,748	24	689	24	224,000	4,128	22	403	2	249,000	3,422	24	223,000	2,178	50	297,000
1996-97	2,783	24	455	27	215,000	4,487	22	593	2	271,000	3,634	24	237,000	1,909	41	212,000
1997-98	6,488	22	1,874	22	500,000	9,706	22	623	2	584,000	3,581	24	234,000	2,951	48	382,000
1998-99	1,815	27	145	27	144,000	4,256	22	484	3	258,000	3,492	24	228,000	3,994	56	604,000
1999-00	2,941	24	420	27	223,000	3,794	22	497	3	231,000	3,742	22	224,000	893	44	107,000
2000-01	3,084	24	568	27	243,000	3,408	24	501	3	227,000	3,833	22	229,000	2,608	45	322,000
2001-02	1,198	27	124	27	97,000	1,233	27	862	3	98,000	3,802	22	227,000	3,340	48	433,000
2002-03	3,307	24	279	27	236,000	2,745	27	726	3	207,000	3,884	22	232,000	2,094	65	368,000
2003-04	2,252	27	582	27	208,000	1,193	27	647	4	94,000	3,970	22	237,000	1,989	47	254,000
2004-05	9,284	22	3,215	22	747,000	8,093	22	1,442	2	493,000	3,976	22	238,000	927	47	118,000
2005-06	2,966	24	416	27	224,000	4,846	22	1,477	3	301,000	3,756	22	225,000	2,385	43	278,000
2006-07	758	27	17	27	57,000	1,454	27	910	4	116,000	3,878	22	232,000	1,322	43	155,000
2007-08	3,706	22	619	24	262,000	3,072	24	0	2	200,000	3,947	22	236,000	1,631	43	191,000
2008-09	2,668	24	401	27	203,000	1,904	27	83	3	140,000	3,794	22	227,000	2,027	44	244,000
2009-10	4,155	22	1,166	22	318,000	449	27	17	3	33,000	3,652	22	218,000	1,786	43	209,000
2010-11	4,672	22	1,199	22	351,000	2,827	24	105	3	185,000	3,387	24	221,000	1,998	39	209,000
2011-12	2,185	27	99	27	168,000	2,551	27	0	3	187,000	2,619	27	192,000	1,498	39	159,000
Mean, 1994-2012	3,503	24	791	25	272,167	3,761	24	526	3	240,333	3,649	23	226,500	2,098	46	265,444
Median	2,954	24	512	27	224,000	3,240	24	499	3	217,000	3,749	22	227,500	2,013	44	240,000
Standard deviation	2,061	2	827	2	163,458	2,512	2	451	0	143,661	327	1	10,772	782	6	123,133
Mean, 2007-2012	3,477	23	697	24	260,400	2,161	26	41	3	149,000	3,480	23	218,800	1,788	42	202,400
Mean, 2002-2012	3,595	24	799	25	277,400	2,913	25	541	3	195,600	3,686	23	225,800	1,766	45	218,500
Data Source																
Table or Appendix	G	III.3a	G	III.3a		G	III.3a	G	III.3a		G	III.3a		G	III.3a	
Column	2	2‡	3	2‡		5	2‡	6	11		9	12‡		10	6	

column 1	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	= c6 + c11 + c14 + c17			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 45	= c30 - c27	= 45-c28
Water Year		Nitrate Unloading							Net Nitrate Loading	Assimilative Capacity					
	Total	Groundwater extraction			Subsurface outflow			Total		Storage				Total	
	lbs	ac-ft	NO$_3$ mg/L	lbs	ac-ft	NO$_3$ mg/L	lbs	lbs	lbs	NO$_3$ lbs	mg/l	Ground Water ac-ft	Allowable Loading lbs	lbs	mg/l
										14,057,000					
1994-95	1,384,000	10,247	29	796,000	6,242	29	485,000	1,281,000	103,000	14,160,000	27	195,123	23,865,000	9,705,000	18
1995-96	993,000	12,965	27	936,000	6,027	27	435,000	1,370,000	-377,000	13,783,000	27	189,699	23,202,000	9,419,000	18
1996-97	935,000	9,164	26	656,000	6,131	26	439,000	1,096,000	-161,000	13,622,000	27	188,265	23,027,000	9,405,000	18
1997-98	1,700,000	9,281	28	702,000	6,382	28	483,000	1,185,000	515,000	14,137,000	26	197,825	24,196,000	10,059,000	19
1998-99	1,234,000	9,470	27	702,000	7,000	27	519,000	1,220,000	14,000	14,151,000	27	195,541	23,917,000	9,766,000	18
1999-00	785,000	10,682	28	811,000	6,448	28	489,000	1,300,000	-515,000	13,636,000	26	190,698	23,324,000	9,688,000	19
2000-01	1,021,000	7,841	28	589,000	6,298	28	473,000	1,062,000	-41,000	13,595,000	26	190,561	23,308,000	9,713,000	19
2001-02	855,000	7,272	30	599,000	6,072	30	500,000	1,099,000	-244,000	13,351,000	26	187,776	22,967,000	9,616,000	19
2002-03	1,043,000	4,069	31	339,000	6,205	31	516,000	855,000	188,000	13,539,000	26	190,537	23,305,000	9,766,000	19
2003-04	793,000	4,762	29	381,000	6,219	29	497,000	877,000	-84,000	13,455,000	26	190,189	23,262,000	9,807,000	19
2004-05	1,596,000	5,362	21	300,000	6,702	21	376,000	676,000	920,000	14,375,000	26	205,062	25,081,000	10,706,000	19
2005-06	1,028,000	5,040	16	224,000	7,270	16	323,000	547,000	481,000	14,856,000	26	208,598	25,514,000	10,658,000	19
2006-07	560,000	6,087	29	486,000	6,850	29	547,000	1,034,000	-474,000	14,382,000	26	204,000	24,951,000	10,569,000	19
2007-08	889,000	6,445	25	436,000	6,706	25	454,000	890,000	-1,000	14,381,000	26	203,824	24,930,000	10,549,000	19
2008-09	814,000	5,828	27	423,000	6,891	27	500,000	922,000	-108,000	14,273,000	26	201,982	24,704,000	10,431,000	19
2009-10	778,000	3,872	27	286,000	6,898	27	509,000	795,000	-17,000	14,256,000	26	202,437	24,760,000	10,504,000	19
2010-11	966,000	4,302	29	334,000	7,061	29	549,000	883,000	83,000	14,339,000	26	205,262	25,106,000	10,767,000	19
2011-12	706,000	7,444	28	564,000	5,753	28	436,000	1,000,000	-294,000	14,045,000	26	201,017	24,586,000	10,541,000	19
Mean, 1994-2012	1,004,444	7,230	27	531,333	6,509	27	473,889	1,005,111	-667	14,018,667	26	197,133	24,111,389	10,092,722	19
Median	950,500	6,859	28	525,000	6,415	28	487,000	1,017,000	-29,000	14,144,000	26	196,683	24,056,500	9,933,000	19
Standard deviation	301,166	2,605	3	206,420	425	3	57,020	221,262	361,421	412,995	0	6,962	851,443	483,771	0
Mean, 2007-2012	830,600	5,578	27	408,600	6,662	27	489,600	898,000	-67,400	14,258,800	26	202,904	24,817,200	10,558,400	19
Mean, 2002-2012	917,300	5,321	26	377,300	6,656	26	470,700	847,900	69,400	14,190,100	26	201,291	24,619,900	10,429,800	19
Data Source															
Table or Appendix		G	III.3a		G	III.3a									
Column		11	7		12	7									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5a)

APPENDIX Q

MONK HILL SUBAREA CHLORIDE (CI) BALANCE WORKSHEET

Appendix Q. Monk Hill subarea chloride (Cl) balance worksheet. (Developed from Table III.4b and App. G).
Water quality data from Valley Water Company wells were omitted from this analysis.

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 100	= c30 - c27	= 100-c28	
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
Water Year	Chloride loading																	Chloride Unloading							Net Chloride Loading	Assimilative Capacity						
	From Precipitation					Artificial recharge					Return flow			Verdugo Basin				Groundwater extraction			Subsurface outflow					Storage						
	Mountain Watershed Recharge	Cl	Valley Floor Recharge	Cl	Total	Surface Spreading	Cl	Injection	Cl	Total		weighted Cl		Subsurface inflow	Cl		Total		Cl			Cl		Total		CL		Ground Water	Allowable Loading	Total		
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l	
																										16,445,000						
1994-95	6,038	28	1,973	28	610,000	7,555	28	99	78	596,000	3,321	52	467,000	2,226	77	465,000	2,138,000	10,247	23	632,000	6,242	23	385,000	1,017,000	1,121,000	17,566,000	33	195,123	53,034,000	35,468,000	67	574,859
1995-96	2,748	32	689	32	299,000	4,128	28	403	81	403,000	3,422	55	513,000	2,178	55	324,000	1,539,000	12,965	32	1,139,000	6,027	32	530,000	1,669,000	-130,000	17,436,000	34	189,699	51,560,000	34,124,000	66	
1996-97	2,783	32	455	35	285,000	4,487	28	593	75	463,000	3,634	62	611,000	1,909	92	477,000	1,836,000	9,164	40	1,004,000	6,131	40	672,000	1,675,000	161,000	17,597,000	34	188,265	51,170,000	33,573,000	66	
1997-98	6,488	28	1,874	28	636,000	9,706	28	623	77	869,000	3,581	52	504,000	2,951	77	617,000	2,626,000	9,281	33	831,000	6,382	33	572,000	1,403,000	1,223,000	18,820,000	35	197,825	53,769,000	34,949,000	65	
1998-99	1,815	35	145	35	186,000	4,256	28	484	80	428,000	3,492	54	516,000	3,994	76	829,000	1,959,000	9,470	40	1,026,000	7,000	40	758,000	1,784,000	175,000	18,995,000	36	195,541	53,148,000	34,153,000	64	
1999-00	2,941	32	420	35	296,000	3,794	28	497	85	404,000	3,742	56	572,000	893	85	205,000	1,477,000	10,682	20	586,000	6,448	20	354,000	940,000	537,000	19,532,000	38	190,698	51,832,000	32,300,000	62	
2000-01	3,084	32	568	35	322,000	3,408	32	501	92	422,000	3,833	68	710,000	2,608	80	564,000	2,018,000	7,841	42	885,000	6,298	42	711,000	1,595,000	423,000	19,955,000	39	190,561	51,794,000	31,839,000	61	
2001-02	1,198	35	124	35	126,000	1,233	35	862	85	316,000	3,802	71	731,000	3,340	74	675,000	1,848,000	7,272	64	1,268,000	6,072	64	1,059,000	2,327,000	-479,000	19,476,000	38	187,776	51,038,000	31,562,000	62	
2002-03	3,307	32	279	35	314,000	2,745	35	726	79	417,000	3,884	54	568,000	2,094	94	535,000	1,834,000	4,069	29	321,000	6,205	29	489,000	810,000	1,024,000	20,500,000	40	190,537	51,788,000	31,288,000	60	
2003-04	2,252	35	582	35	270,000	1,193	35	647	86	265,000	3,970	59	631,000	1,989	62	335,000	1,501,000	4,762	18	228,000	6,219	18	297,000	525,000	976,000	21,476,000	42	190,189	51,693,000	30,217,000	58	
2004-05	9,284	28	3,215	28	951,000	8,093	28	1,442	75	910,000	3,976	48	516,000	927	64	161,000	2,538,000	5,362	23	340,000	6,702	23	424,000	764,000	1,774,000	23,250,000	42	205,062	55,736,000	32,486,000	58	
2005-06	2,966	32	416	35	298,000	4,846	28	1,477	61	614,000	3,756	40	407,000	2,385	99	639,000	1,958,000	5,040	20	280,000	7,270	20	404,000	684,000	1,274,000	24,524,000	43	208,598	56,697,000	32,173,000	57	
2006-07	758	35	17	35	74,000	1,454	35	910	86	351,000	3,878	55	583,000	1,322	64	230,000	1,238,000	6,087	24	396,000	6,850	24	446,000	842,000	396,000	24,920,000	45	204,000	55,447,000	30,527,000	55	
2007-08	3,706	28	619	32	336,000	3,072	32	0	96	267,000	3,947	69	740,000	1,631	81	359,000	1,702,000	6,445	41	720,000	6,706	41	749,000	1,469,000	233,000	25,153,000	45	203,824	55,399,000	30,246,000	55	
2008-09	2,668	32	401	35	270,000	1,904	35	83	98	203,000	3,794	68	697,000	2,027	81	448,000	1,618,000	5,828	41	651,000	6,891	41	770,000	1,421,000	197,000	25,350,000	46	201,982	54,899,000	29,549,000	54	
2009-10	4,155	28	1,166	28	405,000	449	35	17	88	47,000	3,652	70	700,000	1,786	36	172,000	1,324,000	3,872	58	613,000	6,898	58	1,092,000	1,705,000	-381,000	24,969,000	45	202,437	55,022,000	30,053,000	55	
2010-11	4,672	28	1,199	28	447,000	2,827	32	105	70	266,000	3,387	54	497,000	1,998	36	196,000	1,406,000	4,302	40	465,000	7,061	40	763,000	1,228,000	178,000	25,147,000	45	205,262	55,790,000	30,643,000	55	
2011-12	2,185	35	99	35	217,000	2,551	35	0	90	243,000	2,619	69	490,000	1,498	35	140,000	1,090,000	7,444	46	991,000	5,753	49	766,000	1,758,000	-668,000	24,479,000	45	201,017	54,636,000	30,157,000	55	
Mean, 1994-2012	3,503	32	791	33	352,333	3,761	31	526	82	415,778	3,649	59	580,722	2,098	70	409,500	1,758,333	7,230	35	687,556	6,509	35	624,500	1,312,000	446,333	21,619,167	40	197,133	53,580,667	31,961,500	60	
Median	2,954	32	512	35	298,500	3,240	32	499	83	403,500	3,749	56	570,000	2,013	77	403,500	1,768,000	6,859	36	641,500	6,415	36	622,000	1,412,000	314,500	20,988,000	41	196,683	53,458,500	31,700,500	59	
Standard deviation	2,061	3	827	3	205,997	2,512	3	451	9	219,188	327	9	100,967	782	20	205,335	414,358	2,605	13	315,797	425	13	230,000	485,672	667,788	3,049,246	5	6,962	1,892,165	1,828,862	5	
Mean, 2007-2012	3,477	30	697	32	335,000	2,161	34	41	88	205,200	3,480	66	624,800	1,788	54	263,000	1,428,000	5,578	45	688,000	6,662	46	828,000	1,516,200	-88,200	25,019,600	45	202,904	55,149,200	30,129,600	55	
Mean, 2002-2012	3,595	31	799	33	358,200	2,913	33	541	83	358,300	3,686	59	582,900	1,766	65	321,500	1,620,900	5,321	34	500,500	6,656	34	620,000	1,120,600	500,300	23,976,800	44	201,291	54,710,700	30,733,900	56	
Data Source																																
Table or Appendix	G	III.3b	G	III.3b		G	III.3b	G	III.3b		G	III.3b		G	III.3b			G	III.3b		G	III.3b										
Column	2	2‡	3	2‡		5	2‡	6	11		9	12‡		10	6			11	7		12	7										

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5a)

APPENDIX R

MONK HILL SUBAREA SULFATE (SO4) BALANCE WORKSHEET

Appendix R. Monk Hill subarea sulfate (SO4) balance worksheet. (Developed from Table III.4c and App. G).
Water quality data from Valley Water Company wells were omitted from this analysis.

Water Year	From Precipitation					Artificial recharge					Return flow			Verdugo Basin			Total
					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Sulfate loading																
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total		weighted		Subsurface inflow			Total
	Recharge	SO$_4$	Recharge	SO4			SO$_4$		SO$_4$			SO$_4$			SO$_4$		
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs
1994-95	6,038	39	1,973	55	935,000	7,555	39	99	116	832,000	3,321	72	652,000	2,226	144	872,000	3,291,000
1995-96	2,748	55	689	55	514,000	4,128	39	403	140	591,000	3,422	82	763,000	2,178	89	526,000	2,394,000
1996-97	2,783	55	455	55	484,000	4,487	39	593	209	812,000	3,634	144	1,419,000	1,909	211	1,095,000	3,810,000
1997-98	6,488	39	1,874	55	968,000	9,706	39	623	240	1,435,000	3,581	128	1,241,000	2,951	144	1,157,000	4,801,000
1998-99	1,815	55	145	55	293,000	4,256	39	484	194	706,000	3,492	104	989,000	3,994	142	1,542,000	3,530,000
1999-00	2,941	44	420	55	415,000	3,794	39	497	122	567,000	3,742	78	788,000	893	135	328,000	2,098,000
2000-01	3,084	44	568	55	454,000	3,408	44	501	140	598,000	3,833	90	938,000	2,608	123	872,000	2,862,000
2001-02	1,198	55	124	55	198,000	1,233	55	862	171	585,000	3,802	110	1,139,000	3,340	120	1,085,000	3,007,000
2002-03	3,307	44	279	55	437,000	2,745	55	726	111	629,000	3,884	73	772,000	2,094	170	965,000	2,803,000
2003-04	2,252	55	582	55	424,000	1,193	55	647	145	433,000	3,970	95	1,021,000	1,989	100	541,000	2,419,000
2004-05	9,284	39	3,215	44	1,369,000	8,093	39	1,442	164	1,501,000	3,976	95	1,030,000	927	110	277,000	4,177,000
2005-06	2,966	44	416	55	417,000	4,846	39	1,477	116	979,000	3,756	74	758,000	2,385	151	976,000	3,130,000
2006-07	758	55	17	55	116,000	1,454	55	910	140	564,000	3,878	86	902,000	1,322	110	395,000	1,977,000
2007-08	3,706	44	619	55	536,000	3,072	44	0	209	367,000	3,947	121	1,294,000	1,631	120	532,000	2,729,000
2008-09	2,668	55	401	55	459,000	1,904	55	83	240	339,000	3,794	131	1,349,000	2,027	125	689,000	2,836,000
2009-10	4,155	39	1,166	55	615,000	449	55	17	194	76,000	3,652	126	1,249,000	1,786	125	607,000	2,547,000
2010-11	4,672	39	1,199	55	674,000	2,827	44	105	122	373,000	3,387	84	772,000	1,998	130	706,000	2,525,000
2011-12	2,185	55	99	55	341,000	2,551	55	0	140	381,000	2,619	95	675,000	1,498	130	529,000	1,926,000
Mean, 1994-2012	3,503	48	791	54	536,056	3,761	46	526	162	653,778	3,649	99	986,167	2,098	132	760,778	2,936,778
Median	2,954	44	512	55	456,500	3,240	44	499	143	588,000	3,749	95	963,500	2,013	128	697,500	2,819,500
Standard deviation	2,061	7	827	3	298,989	2,512	8	451	43	362,874	327	22	245,553	782	27	333,723	763,238
Mean, 2007-2012	3,477	46	697	55	525,000	2,161	51	41	181	307,200	3,480	111	1,067,800	1,788	126	612,600	2,512,600
Mean, 2002-2012	3,595	47	799	54	538,800	2,913	50	541	158	564,200	3,686	98	982,200	1,766	127	621,700	2,706,900
Data Source																	
Table or Appendix	G	III.3c	G	III.3c		G	III.3c	G	III.3c		G	III.3c		G	III.3c		
Column	2	2‡	3	2‡		5	2‡	6	11		9	12‡		10	6		

Water Year	Sulfate Unloading						Total	Net Sulfate Loading	Assimilative Capacity					
			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26$			= 2.718 * c29 * 100	= c30 - c27	= 100-c28
column 1	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	Groundwater extraction			Subsurface outflow					Storage				Total	
		SO$_4$			SO$_4$				SO4		Ground Water	Allowable Loading		
	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l
									23,114,000					
1994-95	10,247	45	1,266,000	6,242	45	771,000	2,037,000	1,254,000	24,368,000	46	195,123	53,034,000	28,666,000	54
1995-96	12,965	45	1,578,000	6,027	45	734,000	2,312,000	82,000	24,450,000	47	189,699	51,560,000	27,110,000	53
1996-97	9,164	44	1,090,000	6,131	44	729,000	1,819,000	1,991,000	26,441,000	52	188,265	51,170,000	24,729,000	48
1997-98	9,281	45	1,143,000	6,382	45	786,000	1,930,000	2,871,000	29,312,000	55	197,825	53,769,000	24,457,000	45
1998-99	9,470	49	1,272,000	7,000	49	940,000	2,212,000	1,318,000	30,630,000	58	195,541	53,148,000	22,518,000	42
1999-00	10,682	50	1,460,000	6,448	50	882,000	2,342,000	-244,000	30,386,000	59	190,698	51,832,000	21,446,000	41
2000-01	7,841	52	1,107,000	6,298	52	889,000	1,995,000	867,000	31,253,000	60	190,561	51,794,000	20,541,000	40
2001-02	7,272	56	1,114,000	6,072	56	930,000	2,044,000	963,000	32,216,000	63	187,776	51,038,000	18,822,000	37
2002-03	4,069	61	673,000	6,205	61	1,027,000	1,700,000	1,103,000	33,319,000	64	190,537	51,788,000	18,469,000	36
2003-04	4,762	58	757,000	6,219	58	988,000	1,745,000	674,000	33,993,000	66	190,189	51,693,000	17,700,000	34
2004-05	5,362	59	857,000	6,702	59	1,072,000	1,929,000	2,248,000	36,241,000	65	205,062	55,736,000	19,495,000	35
2005-06	5,040	62	852,000	7,270	62	1,230,000	2,082,000	1,048,000	37,289,000	66	208,598	56,697,000	19,408,000	34
2006-07	6,087	57	946,000	6,850	57	1,064,000	2,010,000	-33,000	37,256,000	67	204,000	55,447,000	18,191,000	33
2007-08	6,445	41	715,000	6,706	41	744,000	1,458,000	1,271,000	38,527,000	70	203,824	55,399,000	16,872,000	30
2008-09	5,828	46	733,000	6,891	46	866,000	1,599,000	1,237,000	39,764,000	72	201,982	54,899,000	15,135,000	28
2009-10	3,872	78	824,000	6,898	78	1,467,000	2,291,000	256,000	40,020,000	73	202,437	55,022,000	15,002,000	27
2010-11	4,302	70	814,000	7,061	70	1,337,000	2,151,000	374,000	40,394,000	72	205,262	55,790,000	15,396,000	28
2011-12	7,444	74	1,496,000	5,753	74	1,156,000	2,653,000	-727,000	39,667,000	73	201,017	54,636,000	14,969,000	27
Mean, 1994-2012	7,230	55	1,038,722	6,509	55	978,444	2,017,167	919,611	33,640,333	63	197,133	53,580,667	19,940,333	37
Median	6,859	54	1,018,000	6,415	54	935,000	2,023,500	1,005,500	33,656,000	65	196,683	53,458,500	19,115,000	35
Standard deviation	2,605	11	286,128	425	11	213,011	292,080	899,107	5,345,546	9	6,962	1,892,165	4,161,305	9
Mean, 2007-2012	5,578	62	916,400	6,662	62	1,114,000	2,030,400	482,200	39,674,400	72	202,904	55,149,200	15,474,800	28
Mean, 2002-2012	5,321	61	866,700	6,656	61	1,095,100	1,961,800	745,100	37,647,000	69	201,291	54,710,700	17,063,700	31
Data Source														
Table or Appendix	G	III.3c		G	III.3c									
Column	11	7		12	7									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5a)

APPENDIX S

MONK HILL SUBAREA TOTAL DISOLVED SOLIDS (TDS) BALANCE WORKSHEET

Appendix S. Monk Hill subarea Total Dissolved Solids (TDS) balance worksheet. (Developed from Table III.4d and App. G).
Water quality data from Valley Water Company wells were omitted from this analysis.

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 450	= c30 - c27	= 450-c28
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Water Year	Total Dissolved Solids loading																	Total Dissolved Solids Unloading							Net	Assimilative Capacity					
	From Precipitation					Artificial recharge					Return flow			Verdugo Basin			Total	Groundwater extraction			Subsurface outflow			Total	TDS	Storage				Total	
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total		weighted		Subsurface inflow											Loading			Ground	Allowable		
	Recharge	TDS	Recharge	TDS			TDS		TDS			TDS			TDS				TDS			TDS				TDS		Water	Loading		
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l
																										165,023,000					
1994-95	6,038	356	1,973	356	7,752,000	7,555	356	99	344	7,403,000	3,321	333	3,007,000	2,226	600	3,630,000	21,792,000	10,247	320	8,912,000	6,242	320	5,429,000	14,341,000	7,451,000	172,474,000	325	195,123	238,655,000	66,181,000	125
1995-96	2,748	356	689	356	3,326,000	4,128	356	403	437	4,473,000	3,422	388	3,612,000	2,178	600	3,552,000	14,963,000	12,965	318	11,217,000	6,027	318	5,214,000	16,431,000	-1,468,000	171,006,000	332	189,699	232,021,000	61,015,000	118
1996-97	2,783	356	455	356	3,133,000	4,487	356	593	565	5,252,000	3,634	520	5,140,000	1,909	600	3,113,000	16,638,000	9,164	318	7,930,000	6,131	318	5,305,000	13,235,000	3,403,000	174,409,000	341	188,265	230,267,000	55,858,000	109
1997-98	6,488	356	1,874	356	8,091,000	9,706	356	623	620	10,441,000	3,581	487	4,743,000	2,951	600	4,812,000	28,087,000	9,281	308	7,782,000	6,382	308	5,351,000	13,133,000	14,954,000	189,363,000	352	197,825	241,960,000	52,597,000	98
1998-99	1,815	356	145	356	1,897,000	4,256	356	484	532	4,818,000	3,492	434	4,116,000	3,994	600	6,513,000	17,344,000	9,470	319	8,210,000	7,000	319	6,069,000	14,279,000	3,065,000	192,428,000	362	195,541	239,166,000	46,738,000	88
1999-00	2,941	356	420	356	3,252,000	3,794	356	497	380	4,184,000	3,742	357	3,626,000	893	600	1,456,000	12,518,000	10,682	320	9,289,000	6,448	320	5,607,000	14,896,000	-2,378,000	190,050,000	367	190,698	233,243,000	43,193,000	83
2000-01	3,084	356	568	356	3,534,000	3,408	356	501	470	3,938,000	3,833	422	4,396,000	2,608	600	4,253,000	16,121,000	7,841	322	6,860,000	6,298	322	5,510,000	12,370,000	3,751,000	193,801,000	374	190,561	233,075,000	39,274,000	76
2001-02	1,198	356	124	356	1,279,000	1,233	356	862	500	2,365,000	3,802	451	4,656,000	3,340	600	5,447,000	13,747,000	7,272	331	6,549,000	6,072	331	5,468,000	12,017,000	1,730,000	195,531,000	383	187,776	229,669,000	34,138,000	67
2002-03	3,307	356	279	356	3,470,000	2,745	356	726	387	3,420,000	3,884	369	3,899,000	2,094	600	3,415,000	14,204,000	4,069	348	3,846,000	6,205	348	5,865,000	9,711,000	4,493,000	200,024,000	386	190,537	233,046,000	33,022,000	64
2003-04	2,252	356	582	356	2,742,000	1,193	356	647	445	1,937,000	3,970	415	4,479,000	1,989	600	3,244,000	12,402,000	4,762	350	4,532,000	6,219	350	5,919,000	10,450,000	1,952,000	201,976,000	391	190,189	232,620,000	30,644,000	59
2004-05	9,284	356	3,215	356	12,094,000	8,093	356	1,442	452	9,602,000	3,976	412	4,451,000	927	600	1,512,000	27,659,000	5,362	369	5,371,000	6,702	369	6,714,000	12,085,000	15,574,000	217,550,000	390	205,062	250,811,000	33,261,000	60
2005-06	2,966	356	416	356	3,272,000	4,846	356	1,477	344	6,070,000	3,756	348	3,551,000	2,385	600	3,889,000	16,782,000	5,040	369	5,049,000	7,270	369	7,283,000	12,331,000	4,451,000	222,001,000	392	208,598	255,136,000	33,135,000	58
2006-07	758	356	17	356	750,000	1,454	356	910	437	2,488,000	3,878	415	4,373,000	1,322	600	2,156,000	9,767,000	6,087	386	6,392,000	6,850	386	7,193,000	13,585,000	-3,818,000	218,183,000	393	204,000	249,512,000	31,329,000	57
2007-08	3,706	356	619	356	4,185,000	3,072	356	0	565	2,972,000	3,947	499	5,356,000	1,631	600	2,660,000	15,173,000	6,445	381	6,674,000	6,706	381	6,945,000	13,619,000	1,554,000	219,737,000	397	203,824	249,297,000	29,560,000	53
2008-09	2,668	356	401	356	2,970,000	1,904	356	83	620	1,982,000	3,794	527	5,435,000	2,027	600	3,306,000	13,693,000	5,828	390	6,178,000	6,891	390	7,305,000	13,483,000	210,000	219,947,000	401	201,982	247,044,000	27,097,000	49
2009-10	4,155	356	1,166	356	5,149,000	449	356	17	532	459,000	3,652	497	4,938,000	1,786	600	2,913,000	13,459,000	3,872	426	4,486,000	6,898	426	7,992,000	12,479,000	980,000	220,927,000	402	202,437	247,601,000	26,674,000	48
2010-11	4,672	356	1,199	356	5,681,000	2,827	356	105	380	2,844,000	3,387	388	3,570,000	1,998	600	3,258,000	15,353,000	4,302	413	4,830,000	7,061	413	7,927,000	12,757,000	2,596,000	223,523,000	401	205,262	251,056,000	27,533,000	49
2011-12	2,185	356	99	356	2,210,000	2,551	356	0	470	2,468,000	2,619	452	3,215,000	1,498	600	2,443,000	10,336,000	7,444	420	8,491,000	5,753	420	6,562,000	15,054,000	-4,718,000	218,805,000	400	201,017	245,864,000	27,059,000	50
Mean, 1994-2012	3,503	356	791	356	4,154,833	3,761	356	526	471	4,284,222	3,649	429	4,253,500	2,098	600	3,420,667	16,113,222	7,230	356	6,811,000	6,509	356	6,314,333	13,125,333	2,987,889	202,318,611	377	197,133	241,113,500	38,794,889	73
Median	2,954	356	512	356	3,299,000	3,240	356	499	461	3,679,000	3,749	419	4,384,500	2,013	600	3,282,000	15,068,000	6,859	349	6,611,500	6,415	349	5,994,000	13,184,000	2,274,000	201,000,000	388	196,683	240,563,000	33,198,000	62
Standard deviation	2,061	0	827	0	2,777,063	2,512	0	451	87	2,664,373	327	60	724,963	782	0	1,275,044	5,066,868	2,605	39	1,971,883	425	39	937,742	1,610,023	5,410,479	18,380,379	25	6,962	8,514,666	12,559,259	25
Mean, 2007-2012	3,477	356	697	356	4,039,000	2,161	356	41	513	2,145,000	3,480	473	4,502,800	1,788	600	2,916,000	13,602,800	5,578	406	6,131,800	6,662	406	7,346,200	13,478,400	124,400	220,587,800	400	202,904	248,172,400	27,584,600	50
Mean, 2002-2012	3,595	356	799	356	4,252,300	2,913	356	541	463	3,424,200	3,686	432	4,326,700	1,766	600	2,879,600	14,882,800	5,321	385	5,584,900	6,656	385	6,970,500	12,555,400	2,327,400	216,267,300	395	201,291	246,198,700	29,931,400	55
Data Source																															
Table or Appendix	G	III.3d	G	III.3d		G	III.3d	G	III.3d		G	III.3d		G	III.3d			G	III.3d		G	III.3d									
Column	2	2‡	3	2‡		5	2‡	6	11		9	12‡		10	6			11	7		12	7									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5a)

APPENDIX T

PASADENA SUBAREA NITRATE (NO3) BALANCE WORKSHEET

Appendix T. Pasadena subarea nitrate (NO3) balance worksheet. (Developed from Table III.4a and App. H).

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Water Year	Nitrate loading																
	From Precipitation					Artificial recharge					Return flow			Monk Hill			
	Mountain Watershed Recharge	NO_3	Valley Floor Recharge	NO_3	Total	Surface Spreading	NO_3	Injection	NO_3	Total		weighted NO_3		Subsurface inflow	NO_3		Total
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs
1994-95	1,465	13	5,293	13	239,000	7,685	13	0	3	272,000	6,629	20	360,000	6,242	29	485,000	1,356,000
1995-96	666	20	1,848	20	137,000	6,383	13	16	2	226,000	6,666	20	362,000	6,028	27	435,000	1,160,000
1996-97	675	20	1,222	27	126,000	5,305	13	0	2	187,000	7,193	13	254,000	6,130	26	439,000	1,006,000
1997-98	1,574	13	5,030	13	233,000	8,744	13	0	2	309,000	6,971	20	379,000	6,383	28	483,000	1,404,000
1998-99	440	27	389	27	61,000	5,642	13	0	3	199,000	6,949	20	378,000	7,000	27	519,000	1,157,000
1999-00	714	20	1,127	27	121,000	1,618	20	0	3	88,000	7,814	13	276,000	6,450	28	490,000	975,000
2000-01	748	20	1,526	27	153,000	2,283	13	0	3	81,000	7,766	13	274,000	6,298	28	473,000	981,000
2001-02	291	27	334	27	46,000	839	27	0	3	62,000	7,396	13	261,000	6,072	30	500,000	869,000
2002-03	802	20	746	27	98,000	1,161	27	0	3	85,000	7,630	13	270,000	6,206	31	516,000	969,000
2003-04	546	27	1,560	27	155,000	820	27	0	4	60,000	7,720	13	273,000	6,218	29	497,000	985,000
2004-05	2,252	13	8,624	13	384,000	8,659	13	0	2	306,000	7,693	13	272,000	6,702	21	376,000	1,338,000
2005-06	720	20	1,118	27	121,000	4,224	13	0	3	149,000	7,346	13	260,000	7,270	16	323,000	853,000
2006-07	184	27	43	27	17,000	1,093	27	0	4	80,000	7,672	13	271,000	6,849	29	547,000	915,000
2007-08	899	13	1,661	20	122,000	2,994	13	0	2	106,000	7,796	13	275,000	6,706	25	454,000	957,000
2008-09	647	20	1,076	27	114,000	1,098	27	0	3	81,000	7,311	13	258,000	6,891	27	500,000	953,000
2009-10	1,008	13	3,127	13	146,000	2,718	13	0	3	96,000	6,748	20	367,000	6,901	27	510,000	1,119,000
2010-11	1,133	13	3,219	13	154,000	5,810	13	0	3	205,000	6,247	20	340,000	7,062	29	549,000	1,248,000
2011-12	530	27	267	27	59,000	1,014	27	0	3	74,000	4,934	27	362,000	5,752	27	428,000	923,000
Mean, 1994-2012	850	20	2,123	22	138,111	3,783	18	1	3	148,111	7,138	16	305,111	6,509	27	473,556	1,064,889
Median	717	20	1,374	27	124,000	2,856	13	0	3	101,000	7,328	13	274,500	6,416	27	487,500	983,000
Standard deviation	500	6	2,219	6	83,668	2,824	7	4	0	86,082	726	4	49,327	425	3	57,416	173,631
Mean, 2007-2012	843	17	1,870	20	119,000	2,727	19	0	3	112,400	6,607	19	320,400	6,662	27	488,200	1,040,000
Mean, 2002-2012	872	19	2,144	22	137,000	2,959	20	0	3	124,200	7,110	16	294,800	6,656	26	470,000	1,026,000
Data Source																	
Table or Appendix	H	III.3a	H	III.3a		H	III.3a	H	III.3a		H	III.3a		H	III.3a		
Column	2	3‡	3	3‡		5	3‡	6	11		9	13‡		10	7		

			= 2.718 * (c19 * c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26$			= 2.718 * c29 * 45	= c30 - c27	= 45-c28
column 1	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Water Year	Nitrate Unloading							Net Nitrate Loading	Assimilative Capacity					
	Groundwater extraction			Subsurface outflow			Total		Storage				Total	
		NO_3			NO_3				NO_3		Ground Water	Allowable Loading		
	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l
									48,891,000					
1994-95	17,447	30	1,428,000	5,793	30	474,000	1,902,000	-546,000	48,345,000	33	540,874	66,154,000	17,809,000	12
1995-96	12,965	36	1,264,000	4,840	36	472,000	1,735,000	-575,000	47,770,000	33	536,585	65,630,000	17,860,000	12
1996-97	9,164	35	861,000	5,000	35	470,000	1,330,000	-324,000	47,446,000	33	535,321	65,475,000	18,029,000	12
1997-98	9,281	34	852,000	5,465	34	501,000	1,353,000	51,000	47,497,000	32	541,963	66,287,000	18,790,000	13
1998-99	9,470	32	835,000	5,286	32	466,000	1,302,000	-145,000	47,352,000	32	537,667	65,762,000	18,410,000	13
1999-00	10,682	32	927,000	5,907	32	513,000	1,440,000	-465,000	46,887,000	33	528,362	64,624,000	17,737,000	12
2000-01	7,841	31	661,000	5,484	31	463,000	1,124,000	-143,000	46,744,000	33	526,467	64,392,000	17,648,000	12
2001-02	7,272	32	626,000	5,463	32	470,000	1,096,000	-227,000	46,517,000	33	517,725	63,323,000	16,806,000	12
2002-03	4,069	28	306,000	5,309	28	399,000	704,000	265,000	46,782,000	34	511,918	62,613,000	15,831,000	11
2003-04	4,762	33	423,000	5,253	33	467,000	890,000	95,000	46,877,000	34	502,541	61,466,000	14,589,000	11
2004-05	5,362	30	439,000	4,039	30	331,000	770,000	568,000	47,445,000	34	512,393	62,671,000	15,226,000	11
2005-06	5,040	36	489,000	3,939	36	382,000	872,000	-19,000	47,426,000	34	509,322	62,295,000	14,869,000	11
2006-07	6,087	37	610,000	4,833	37	485,000	1,095,000	-180,000	47,246,000	35	500,530	61,220,000	13,974,000	10
2007-08	6,445	37	639,000	4,987	37	495,000	1,134,000	-177,000	47,069,000	35	498,182	60,933,000	13,864,000	10
2008-09	5,828	35	560,000	5,024	35	483,000	1,044,000	-91,000	46,978,000	35	493,015	60,301,000	13,323,000	10
2009-10	3,872	34	358,000	4,835	34	447,000	805,000	314,000	47,292,000	35	493,661	60,380,000	13,088,000	10
2010-11	4,302	36	418,000	4,496	36	437,000	854,000	394,000	47,686,000	35	497,871	60,895,000	13,209,000	10
2011-12	7,444	36	720,000	4,005	36	387,000	1,107,000	-184,000	47,502,000	35	495,437	60,597,000	13,095,000	10
Mean, 1994-2012	7,630	33	689,778	4,998	33	452,333	1,142,056	-77,167	47,270,056	34	515,546	63,056,556	15,786,500	11
Median	6,859	34	632,500	5,012	34	468,500	1,101,500	-144,000	47,322,000	34	512,155	62,642,000	15,528,500	11
Standard deviation	3,496	3	301,456	581	3	47,847	325,595	316,255	439,678	1	17,842	2,182,127	2,092,606	1
Mean, 2007-2012	5,578	35	539,000	4,670	35	449,800	988,800	51,200	47,305,400	35	495,633	60,621,200	13,315,800	10
Mean, 2002-2012	5,321	34	496,200	4,672	34	431,300	927,500	98,500	47,230,300	35	501,487	61,337,100	14,106,800	10
Data Source														
Table or Appendix	H	III.3a		H	III.3a									
Column	11	8		12	8									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5b)

APPENDIX U

PASADENA SUBAREA CHLORIDE (CI) BALANCE WORKSHEET

Appendix U. Pasadena subarea chloride (Cl) balance worksheet. (Developed from Table III.4b and App. H).

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 100	= c30 - c27	= 100-c28
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Water Year	Chloride loading																	Chloride Unloading							Net Chloride Loading	Assimilative Capacity					
	From Precipitation					Artificial recharge					Return flow			Monk Hill			Total	Groundwater extraction			Subsurface outflow			Total		Storage				Total	
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total		weighted		Subsurface inflow														Ground	Allowable		
	Recharge	Cl	Recharge	Cl			Cl		Cl			Cl			Cl				Cl			Cl				CL		Water	Loading		
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l
																										55,006,000					
1994-95	1,465	32	5,293	21	430,000	7,685	21	0	78	439,000	6,629	36	645,000	6,242	23	385,000	1,899,000	17,447	21	982,000	5,793	21	326,000	1,308,000	591,000	55,597,000	38	540,874	147,009,000	91,412,000	62
1995-96	666	32	1,848	32	219,000	6,383	21	16	81	368,000	6,666	35	640,000	6,028	32	530,000	1,757,000	12,965	35	1,236,000	4,840	35	461,000	1,697,000	60,000	55,657,000	38	536,585	145,844,000	90,187,000	62
1996-97	675	32	1,222	32	165,000	5,305	21	0	75	303,000	7,193	35	691,000	6,130	40	672,000	1,831,000	9,164	57	1,428,000	5,000	57	779,000	2,207,000	-376,000	55,281,000	38	535,321	145,500,000	90,219,000	62
1997-98	1,574	32	5,030	21	424,000	8,744	21	0	77	499,000	6,971	35	670,000	6,383	33	572,000	2,165,000	9,281	21	520,000	5,465	21	306,000	826,000	1,339,000	56,620,000	38	541,963	147,305,000	90,685,000	62
1998-99	440	32	389	32	72,000	5,642	21	0	80	322,000	6,949	35	668,000	7,000	40	758,000	1,820,000	9,470	33	854,000	5,286	33	477,000	1,331,000	489,000	57,109,000	39	537,667	146,138,000	89,029,000	61
1999-00	714	32	1,127	32	160,000	1,618	32	0	85	141,000	7,814	41	873,000	6,450	20	354,000	1,528,000	10,682	37	1,061,000	5,907	37	586,000	1,647,000	-119,000	56,990,000	40	528,362	143,609,000	86,619,000	60
2000-01	748	32	1,526	32	198,000	2,283	32	0	92	199,000	7,766	37	782,000	6,298	42	711,000	1,890,000	7,841	28	607,000	5,484	28	425,000	1,032,000	858,000	57,848,000	40	526,467	143,094,000	85,246,000	60
2001-02	291	32	334	32	54,000	839	32	0	85	73,000	7,396	33	670,000	6,072	64	1,059,000	1,856,000	7,272	35	695,000	5,463	35	522,000	1,217,000	639,000	58,487,000	42	517,725	140,718,000	82,231,000	58
2002-03	802	32	746	32	135,000	1,161	32	0	79	101,000	7,630	35	732,000	6,206	29	489,000	1,457,000	4,069	36	403,000	5,309	36	525,000	928,000	529,000	59,016,000	42	511,918	139,139,000	80,123,000	58
2003-04	546	32	1,560	32	183,000	820	32	0	86	71,000	7,720	36	750,000	6,218	18	297,000	1,301,000	4,762	20	261,000	5,253	20	288,000	549,000	752,000	59,768,000	44	502,541	136,591,000	76,823,000	56
2004-05	2,252	32	8,624	21	688,000	8,659	21	0	75	494,000	7,693	44	916,000	6,702	23	424,000	2,522,000	5,362	40	576,000	4,039	40	434,000	1,009,000	1,513,000	61,281,000	44	512,393	139,268,000	77,987,000	56
2005-06	720	32	1,118	32	160,000	4,224	21	0	61	241,000	7,346	37	748,000	7,270	20	404,000	1,553,000	5,040	51	701,000	3,939	51	548,000	1,249,000	304,000	61,585,000	44	509,322	138,434,000	76,849,000	56
2006-07	184	32	43	32	20,000	1,093	32	0	86	95,000	7,672	37	775,000	6,849	24	446,000	1,336,000	6,087	18	303,000	4,833	18	241,000	544,000	792,000	62,377,000	46	500,530	136,044,000	73,667,000	54
2007-08	899	32	1,661	32	223,000	2,994	28	0	96	228,000	7,796	43	912,000	6,706	41	749,000	2,112,000	6,445	52	908,000	4,987	52	702,000	1,610,000	502,000	62,879,000	46	498,182	135,406,000	72,527,000	54
2008-09	647	32	1,076	32	150,000	1,098	32	0	98	95,000	7,311	42	834,000	6,891	41	770,000	1,849,000	5,828	35	562,000	5,024	35	484,000	1,046,000	803,000	63,682,000	48	493,015	134,002,000	70,320,000	52
2009-10	1,008	32	3,127	28	326,000	2,718	32	0	88	236,000	6,748	38	704,000	6,901	58	1,093,000	2,359,000	3,872	26	279,000	4,835	26	348,000	627,000	1,732,000	65,414,000	49	493,661	134,177,000	68,763,000	51
2010-11	1,133	32	3,219	28	344,000	5,810	21	0	70	332,000	6,247	43	728,000	7,062	40	763,000	2,167,000	4,302	45	529,000	4,496	45	553,000	1,081,000	1,086,000	66,500,000	49	497,871	135,321,000	68,821,000	51
2011-12	530	32	267	32	69,000	1,014	32	0	90	88,000	4,934	38	504,000	5,752	46	725,000	1,386,000	7,444	45	902,000	4,005	45	486,000	1,388,000	-2,000	66,498,000	49	495,437	134,660,000	68,162,000	51
Mean, 1994-2012	850	32	2,123	30	223,333	3,783	27	1	82	240,278	7,138	38	735,667	6,509	35	622,278	1,821,556	7,630	35	711,500	4,998	35	471,722	1,183,111	638,444	60,143,833	43	515,546	140,125,500	79,981,667	57
Median	717	32	1,374	32	174,000	2,856	30	0	83	232,000	7,328	37	730,000	6,416	36	622,000	1,840,000	6,859	35	651,000	5,012	35	480,500	1,149,000	615,000	59,392,000	43	512,155	139,203,500	79,055,000	57
Standard deviation	500	0	2,219	4	165,854	2,824	5	4	9	145,381	726	3	103,898	425	13	228,836	351,939	3,496	12	330,155	581	12	140,041	433,155	557,208	3,775,804	4	17,842	4,849,462	8,455,957	4
Mean, 2007-2012	843	32	1,870	30	222,400	2,727	29	0	88	195,800	6,607	41	736,400	6,662	45	820,000	1,974,600	5,578	41	636,000	4,670	41	514,600	1,150,400	824,200	64,994,600	48	495,633	134,713,200	69,718,600	52
Mean, 2002-2012	872	32	2,144	30	229,800	2,959	28	0	83	198,100	7,110	39	760,300	6,656	34	616,000	1,804,200	5,321	37	542,400	4,672	37	460,900	1,003,100	801,100	62,900,000	46	501,487	136,304,200	73,404,200	54
Data Source																															
Table or Appendix	H	III.3b	H	III.3b		H	III.3b	H	III.3b		H	III.3b		H	III.3b			H	III.3b		H	III.3b									
Column	2	3‡	3	3‡		5	3‡	6	11		9	13‡		10	7			11	8		12	8									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5b)

APPENDIX V

PASADENA SUBAREA SULFATE (SO4) BALANCE WORKSHEET

Appendix V. Pasadena subarea sulfate (SO4) balance worksheet. (Developed from Table III.4c and App. H).

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Water Year	Sulfate loading																
	From Precipitation					Artificial recharge					Return flow			Monk Hill			Total
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total		weighted		Subsurface inflow			
	Recharge	SO_4	Recharge	SO4			SO_4		SO_4			SO_4			SO_4		
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs
1994-95	1,465	33	5,293	33	606,000	7,685	33	0	116	689,000	6,629	66	1,197,000	6,242	45	771,000	3,263,000
1995-96	666	47	1,848	47	321,000	6,383	33	16	140	579,000	6,666	66	1,204,000	6,028	45	734,000	2,838,000
1996-97	675	47	1,222	60	285,000	5,305	33	0	209	476,000	7,193	66	1,299,000	6,130	44	729,000	2,789,000
1997-98	1,574	33	5,030	33	592,000	8,744	33	0	240	784,000	6,971	72	1,367,000	6,383	45	786,000	3,529,000
1998-99	440	60	389	60	135,000	5,642	33	0	194	506,000	6,949	60	1,129,000	7,000	49	940,000	2,710,000
1999-00	714	47	1,127	60	275,000	1,618	60	0	122	264,000	7,814	66	1,411,000	6,450	50	882,000	2,832,000
2000-01	748	47	1,526	60	344,000	2,283	60	0	140	372,000	7,766	60	1,269,000	6,298	52	889,000	2,874,000
2001-02	291	60	334	60	102,000	839	60	0	171	137,000	7,396	69	1,383,000	6,072	56	930,000	2,552,000
2002-03	802	47	746	60	224,000	1,161	60	0	111	189,000	7,630	76	1,566,000	6,206	61	1,027,000	3,006,000
2003-04	546	60	1,560	60	343,000	820	60	0	145	134,000	7,720	63	1,321,000	6,218	58	988,000	2,786,000
2004-05	2,252	33	8,624	33	976,000	8,659	33	0	164	777,000	7,693	68	1,422,000	6,702	59	1,072,000	4,247,000
2005-06	720	47	1,118	60	274,000	4,224	33	0	116	379,000	7,346	74	1,474,000	7,270	62	1,230,000	3,357,000
2006-07	184	60	43	60	37,000	1,093	60	0	140	178,000	7,672	64	1,329,000	6,849	57	1,064,000	2,608,000
2007-08	899	33	1,661	47	293,000	2,994	47	0	209	382,000	7,796	95	2,016,000	6,706	41	744,000	3,435,000
2008-09	647	47	1,076	60	258,000	1,098	60	0	240	179,000	7,311	104	2,068,000	6,891	46	866,000	3,371,000
2009-10	1,008	33	3,127	33	371,000	2,718	60	0	194	443,000	6,748	86	1,580,000	6,901	78	1,468,000	3,862,000
2010-11	1,133	33	3,219	33	390,000	5,810	33	0	122	521,000	6,247	79	1,337,000	7,062	70	1,337,000	3,585,000
2011-12	530	60	267	60	130,000	1,014	60	0	140	165,000	4,934	62	826,000	5,752	70	1,089,000	2,210,000
Mean, 1994-2012	850	46	2,123	51	330,889	3,783	47	1	162	397,444	7,138	72	1,399,889	6,509	55	974,778	3,103,000
Median	717	47	1,374	60	289,000	2,856	54	0	143	380,500	7,328	67	1,352,000	6,416	54	935,000	2,940,000
Standard deviation	500	11	2,219	12	218,239	2,824	13	4	43	216,438	726	12	288,836	425	10	210,432	513,117
Mean, 2007-2012	843	41	1,870	47	288,400	2,727	52	0	181	338,000	6,607	85	1,565,400	6,662	61	1,100,800	3,292,600
Mean, 2002-2012	872	45	2,144	51	329,600	2,959	51	0	158	334,700	7,110	77	1,493,900	6,656	60	1,088,500	3,246,700
Data Source																	
Table or Appendix	H	III.3c	H	III.3c		H	III.3c	H	III.3c		H	III.3c		H	III.3c		
Column	2	3‡	3	3‡		5	3‡	6	11		9	13‡		10	7		

			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 100	= c30 - c27	= 100-c28
column 1	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Water Year	Sulfate Unloading							Net Sulfate Loading	Assimilative Capacity					
	Groundwater extraction			Subsurface outflow			Total		Storage				Total	
		SO_4			SO_4				SO4		Ground Water	Allowable Loading		
	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l
									87,750,000					
1994-95	17,447	65	3,083,000	5,793	65	1,024,000	4,107,000	-844,000	86,906,000	59	540,874	147,009,000	60,103,000	41
1995-96	12,965	57	2,012,000	4,840	57	751,000	2,763,000	75,000	86,981,000	60	536,585	145,844,000	58,863,000	40
1996-97	9,164	58	1,453,000	5,000	58	793,000	2,245,000	544,000	87,525,000	60	535,321	145,500,000	57,975,000	40
1997-98	9,281	61	1,542,000	5,465	61	908,000	2,449,000	1,080,000	88,605,000	60	541,963	147,305,000	58,700,000	40
1998-99	9,470	61	1,578,000	5,286	61	881,000	2,458,000	252,000	88,857,000	61	537,667	146,138,000	57,281,000	39
1999-00	10,682	62	1,797,000	5,907	62	994,000	2,791,000	41,000	88,898,000	62	528,362	143,609,000	54,711,000	38
2000-01	7,841	64	1,370,000	5,484	64	958,000	2,328,000	546,000	89,444,000	63	526,467	143,094,000	53,650,000	37
2001-02	7,272	64	1,269,000	5,463	64	953,000	2,223,000	329,000	89,773,000	64	517,725	140,718,000	50,945,000	36
2002-03	4,069	67	743,000	5,309	67	970,000	1,713,000	1,293,000	91,066,000	65	511,918	139,139,000	48,073,000	35
2003-04	4,762	68	874,000	5,253	68	964,000	1,838,000	948,000	92,014,000	67	502,541	136,591,000	44,577,000	33
2004-05	5,362	67	977,000	4,039	67	736,000	1,713,000	2,534,000	94,548,000	68	512,393	139,268,000	44,720,000	32
2005-06	5,040	67	919,000	3,939	67	718,000	1,636,000	1,721,000	96,269,000	70	509,322	138,434,000	42,165,000	30
2006-07	6,087	50	830,000	4,833	50	659,000	1,488,000	1,120,000	97,389,000	72	500,530	136,044,000	38,655,000	28
2007-08	6,445	73	1,274,000	4,987	73	986,000	2,259,000	1,176,000	98,565,000	73	498,182	135,406,000	36,841,000	27
2008-09	5,828	79	1,244,000	5,024	79	1,073,000	2,317,000	1,054,000	99,619,000	74	493,015	134,002,000	34,383,000	26
2009-10	3,872	76	804,000	4,835	76	1,004,000	1,808,000	2,054,000	101,673,000	76	493,661	134,177,000	32,504,000	24
2010-11	4,302	78	909,000	4,496	78	950,000	1,858,000	1,727,000	103,400,000	76	497,871	135,321,000	31,921,000	24
2011-12	7,444	78	1,586,000	4,005	78	853,000	2,439,000	-229,000	103,171,000	77	495,437	134,660,000	31,489,000	23
Mean, 1994-2012	7,630	66	1,348,000	4,998	66	898,611	2,246,278	856,722	93,594,611	67	515,546	140,125,500	46,530,889	33
Median	6,859	66	1,271,500	5,012	66	951,500	2,252,000	1,001,000	91,540,000	66	512,155	139,203,500	46,396,500	34
Standard deviation	3,496	8	568,967	581	8	119,895	603,285	853,920	5,800,666	6	17,842	4,849,462	10,393,649	6
Mean, 2007-2012	5,578	77	1,163,400	4,670	77	973,200	2,136,200	1,156,400	101,285,600	75	495,633	134,713,200	33,427,600	25
Mean, 2002-2012	5,321	70	1,016,000	4,672	70	891,300	1,906,900	1,339,800	97,771,400	72	501,487	136,304,200	38,532,800	28
Data Source														
Table or Appendix	H	III.3c		H	III.3c									
Column	11	8		12	8									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5b)

APPENDIX W

PASADENA TOTAL DISSOLVED SOLIDS (TDS) BALANCE WORKSHEET

Appendix W. Pasadena subarea Total Dissolved Solids (TDS) balance worksheet. (Developed from Table III.4d and App. H).

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Water Year	Total Dissolved Solids loading																
	From Precipitation					Artificial recharge					Return flow			Monk Hill			
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total		weighted		Subsurface inflow			Total
	Recharge	TDS	Recharge	TDS			TDS		TDS			TDS			TDS		
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs
1994-95	1,465	84	5,293	84	1,543,000	7,685	84	0	344	1,755,000	6,629	131	2,360,000	6,242	320	5,428,000	11,086,000
1995-96	666	108	1,848	108	738,000	6,383	87	16	437	1,529,000	6,666	145	2,627,000	6,028	318	5,215,000	10,109,000
1996-97	675	108	1,222	173	773,000	5,305	87	0	565	1,254,000	7,193	117	2,287,000	6,130	318	5,305,000	9,619,000
1997-98	1,574	89	5,030	89	1,597,000	8,744	89	0	620	2,115,000	6,971	183	3,467,000	6,383	308	5,352,000	12,531,000
1998-99	440	179	389	179	403,000	5,642	90	0	532	1,380,000	6,949	167	3,154,000	7,000	319	6,069,000	11,006,000
1999-00	714	112	1,127	180	769,000	1,618	180	0	380	792,000	7,814	116	2,464,000	6,450	320	5,609,000	9,634,000
2000-01	748	112	1,526	179	970,000	2,283	179	0	470	1,111,000	7,766	142	2,997,000	6,298	322	5,510,000	10,588,000
2001-02	291	181	334	181	307,000	839	181	0	500	413,000	7,396	145	2,915,000	6,072	331	5,469,000	9,104,000
2002-03	802	114	746	182	618,000	1,161	182	0	387	574,000	7,630	128	2,655,000	6,206	348	5,866,000	9,713,000
2003-04	546	183	1,560	183	1,048,000	820	183	0	445	408,000	7,720	138	2,896,000	6,218	350	5,918,000	10,270,000
2004-05	2,252	91	8,624	91	2,690,000	8,659	91	0	452	2,142,000	7,693	138	2,886,000	6,702	369	6,713,000	14,431,000
2005-06	720	115	1,118	184	784,000	4,224	92	0	344	1,056,000	7,346	117	2,336,000	7,270	369	7,283,000	11,459,000
2006-07	184	178	43	178	110,000	1,093	178	0	437	529,000	7,672	138	2,878,000	6,849	386	7,192,000	10,709,000
2007-08	899	89	1,661	178	1,021,000	2,994	111	0	565	903,000	7,796	171	3,623,000	6,706	381	6,945,000	12,492,000
2008-09	647	172	1,076	172	806,000	1,098	172	0	620	513,000	7,311	179	3,557,000	6,891	390	7,304,000	12,180,000
2009-10	1,008	86	3,127	86	967,000	2,718	172	0	532	1,271,000	6,748	199	3,650,000	6,901	426	7,996,000	13,884,000
2010-11	1,133	86	3,219	86	1,017,000	5,810	86	0	380	1,358,000	6,247	153	2,598,000	7,062	413	7,928,000	12,901,000
2011-12	530	172	267	172	373,000	1,014	172	0	470	474,000	4,934	284	3,808,000	5,752	413	6,449,000	11,104,000
Mean, 1994-2012	850	126	2,123	149	918,556	3,783	134	1	471	1,087,611	7,138	155	2,953,222	6,509	356	6,308,389	11,267,778
Median	717	112	1,374	176	795,000	2,856	142	0	461	1,083,500	7,328	144	2,891,000	6,416	349	5,993,500	11,046,000
Standard deviation	500	39	2,219	43	585,040	2,824	45	4	87	560,983	726	40	490,379	425	39	936,527	1,518,691
Mean, 2007-2012	843	121	1,870	139	836,800	2,727	143	0	513	903,800	6,607	197	3,447,200	6,662	405	7,324,400	12,512,200
Mean, 2002-2012	872	129	2,144	151	943,400	2,959	144	0	463	922,800	7,110	165	3,088,700	6,656	384	6,959,400	11,914,300
Data Source																	
Table or Appendix	H	III.3d	H	III.3d		H	III.3d	H	III.3d		H	III.3d		H	III.3d		
Column	2	3‡	3	3‡		5	3‡	6	11		9	13‡		10	7		

			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 450	= c30 - c27	= 450-c28
column 1	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Water Year	Total Dissolved Solids Unloading							Net TDS Loading	Assimilative Capacity					
	Groundwater extraction			Subsurface outflow			Total		Storage				Total	
											Ground Water	Allowable Loading		
		TDS			TDS				TDS					
	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l
									500,648,000					
1994-95	17,447	335	15,907,000	5,793	335	5,282,000	21,189,000	-10,103,000	490,545,000	334	540,874	661,543,000	170,998,000	116
1995-96	12,965	343	12,096,000	4,840	343	4,516,000	16,612,000	-6,503,000	484,042,000	332	536,585	656,297,000	172,255,000	118
1996-97	9,164	351	8,736,000	5,000	351	4,766,000	13,502,000	-3,883,000	480,159,000	330	535,321	654,751,000	174,592,000	120
1997-98	9,281	345	8,707,000	5,465	345	5,127,000	13,834,000	-1,303,000	478,856,000	325	541,963	662,875,000	184,019,000	125
1998-99	9,470	356	9,153,000	5,286	356	5,109,000	14,262,000	-3,256,000	475,600,000	325	537,667	657,620,000	182,020,000	125
1999-00	10,682	361	10,476,000	5,907	361	5,793,000	16,269,000	-6,635,000	468,965,000	327	528,362	646,240,000	177,275,000	123
2000-01	7,841	356	7,578,000	5,484	356	5,301,000	12,879,000	-2,291,000	466,674,000	326	526,467	643,921,000	177,247,000	124
2001-02	7,272	355	7,021,000	5,463	355	5,274,000	12,295,000	-3,191,000	463,483,000	329	517,725	633,229,000	169,746,000	121
2002-03	4,069	352	3,892,000	5,309	352	5,078,000	8,971,000	742,000	464,225,000	334	511,918	626,127,000	161,902,000	116
2003-04	4,762	358	4,636,000	5,253	358	5,114,000	9,750,000	520,000	464,745,000	340	502,541	614,658,000	149,913,000	110
2004-05	5,362	356	5,195,000	4,039	356	3,913,000	9,107,000	5,324,000	470,069,000	338	512,393	626,707,000	156,638,000	112
2005-06	5,040	356	4,874,000	3,939	356	3,809,000	8,682,000	2,777,000	472,846,000	342	509,322	622,952,000	150,106,000	108
2006-07	6,087	363	6,000,000	4,833	363	4,764,000	10,764,000	-55,000	472,791,000	348	500,530	612,198,000	139,407,000	102
2007-08	6,445	360	6,299,000	4,987	360	4,874,000	11,173,000	1,319,000	474,110,000	350	498,182	609,326,000	135,216,000	100
2008-09	5,828	356	5,633,000	5,024	356	4,857,000	10,490,000	1,690,000	475,800,000	355	493,015	603,007,000	127,207,000	95
2009-10	3,872	351	3,690,000	4,835	351	4,607,000	8,297,000	5,587,000	481,387,000	359	493,661	603,797,000	122,410,000	91
2010-11	4,302	363	4,241,000	4,496	363	4,432,000	8,673,000	4,228,000	485,615,000	359	497,871	608,946,000	123,331,000	91
2011-12	7,444	376	7,599,000	4,005	376	4,089,000	11,688,000	-584,000	485,031,000	360	495,437	605,969,000	120,938,000	90
								346						
Mean, 1994-2012	7,630	355	7,318,500	4,998	355	4,816,944	12,135,389	-867,611	475,274,611	340	515,546	630,564,611	155,290,000	110
Median	6,859	356	6,660,000	5,012	356	4,865,500	11,430,500	-319,500	474,855,000	336	512,155	626,417,000	159,270,000	114
Standard deviation	3,496	9	3,178,708	581	9	520,523	3,414,370	4,260,280	8,091,030	13	17,842	21,823,025	22,293,678	13
Mean, 2007-2012	5,578	361	5,492,400	4,670	361	4,571,800	10,064,200	2,448,000	480,388,600	357	495,633	606,209,000	125,820,400	93
Mean, 2002-2012	5,321	359	5,205,900	4,672	359	4,553,700	9,759,500	2,154,800	474,661,900	348	501,487	613,368,700	138,706,800	102
Data Source														
Table or Appendix	H	III.3d		H	III.3d									
Column	11	8		12	8									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5b)

APPENDIX X

SANTA ANITA SUBAREA NITRATE (NO3) BALANCE WORKSHEET

Appendix X. Santa Anita subarea nitrate (NO3) balance worksheet. (Developed from Table III.4a and App. I).

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 45	= c30 - c27	= 45-c28
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Water Year	Nitrate loading																	Nitrate Unloading							Net Nitrate Loading	Assimilative Capacity					
	From Precipitation					Artificial recharge					Return flow			Pasadena				Groundwater extraction			Subsurface outflow					Storage					
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total	weighted			Subsurface inflow			Total							Total	Loading			Ground Water	Allowable Loading	Total	
	Recharge ac-ft	NO_3 mg/L	Recharge ac-ft	NO_3 mg/L	lbs†	ac-ft	NO_3 mg/L	ac-ft	NO_3 mg/L	lbs	ac-ft	NO_3 mg/l	lbs	ac-ft	NO_3 mg/L	lbs	lbs	ac-ft	NO_3 mg/L	lbs	ac-ft	NO_3 mg/L	lbs	lbs	lbs	NO_3 lbs	mg/l	ac-ft	lbs	lbs	mg/l
																										5,297,000					
1994-95	3,277	12	210	21	119,000	2,712	12	0	3	88,000	1,176	12	38,000	1,794	30	147,000	392,000	7,225	37	724,000	578	37	58,000	782,000	-390,000	4,907,000	24	74,864	9,157,000	4,250,000	21
1995-96	1,491	15	863	12	89,000	3,203	12	0	2	104,000	1,069	12	35,000	905	36	88,000	316,000	5,910	25	394,000	636	25	42,000	436,000	-120,000	4,787,000	23	75,302	9,210,000	4,423,000	22
1996-97	1,511	15	67	21	65,000	2,449	12	0	2	80,000	1,061	12	35,000	1,025	35	96,000	276,000	6,503	19	334,000	657	19	34,000	368,000	-92,000	4,695,000	23	74,397	9,099,000	4,404,000	22
1997-98	3,520	12	193	21	126,000	3,032	12	0	2	99,000	1,092	12	36,000	1,412	34	130,000	391,000	6,475	21	373,000	585	21	34,000	407,000	-16,000	4,679,000	22	77,256	9,449,000	4,770,000	23
1998-99	984	21	262	15	67,000	2,845	12	0	3	93,000	1,067	12	35,000	1,160	32	102,000	297,000	7,259	17	326,000	675	17	30,000	356,000	-59,000	4,620,000	23	75,445	9,228,000	4,608,000	22
1999-00	1,597	15	57	21	68,000	1,059	21	0	3	60,000	1,149	12	37,000	1,843	32	160,000	325,000	6,502	22	381,000	675	22	40,000	421,000	-96,000	4,524,000	22	74,109	9,064,000	4,540,000	23
2000-01	1,674	15	128	21	76,000	1,566	15	0	3	64,000	1,088	12	35,000	1,427	31	120,000	295,000	5,829	24	387,000	670	24	44,000	431,000	-136,000	4,388,000	22	73,627	9,005,000	4,617,000	23
2001-02	650	21	268	15	48,000	215	21	0	3	12,000	1,053	12	34,000	1,332	32	115,000	209,000	5,415	24	352,000	730	24	47,000	400,000	-191,000	4,197,000	22	70,789	8,658,000	4,461,000	23
2002-03	1,794	15	1,480	12	121,000	1,385	21	0	3	79,000	979	15	40,000	1,244	28	93,000	333,000	5,320	26	379,000	724	26	52,000	431,000	-98,000	4,099,000	21	70,276	8,595,000	4,496,000	24
2003-04	1,221	21	192	21	81,000	548	21	0	4	31,000	1,002	15	41,000	1,244	33	111,000	264,000	6,214	26	432,000	707	26	49,000	481,000	-217,000	3,882,000	21	67,639	8,273,000	4,391,000	24
2004-05	5,037	12	7	21	165,000	4,542	12	0	2	148,000	1,105	12	36,000	427	30	35,000	384,000	5,982	19	312,000	1,110	19	58,000	370,000	14,000	3,896,000	20	73,138	8,946,000	5,050,000	25
2005-06	1,610	15	285	15	77,000	3,244	12	0	3	106,000	1,137	12	37,000	111	36	11,000	231,000	8,433	15	339,000	770	15	31,000	370,000	-139,000	3,757,000	20	70,230	8,590,000	4,833,000	25
2006-07	411	21	185	21	34,000	629	21	0	4	36,000	1,217	12	40,000	1,008	37	101,000	211,000	8,509	14	332,000	403	14	16,000	348,000	-137,000	3,620,000	21	64,590	7,900,000	4,280,000	24
2007-08	2,011	12	537	12	83,000	1,838	15	0	2	75,000	1,106	12	36,000	1,187	37	118,000	312,000	6,735	17	308,000	426	17	19,000	327,000	-15,000	3,605,000	21	63,856	7,810,000	4,205,000	24
2008-09	1,448	15	552	12	77,000	1,149	21	0	3	66,000	1,018	15	41,000	1,234	35	119,000	303,000	6,736	17	320,000	520	17	25,000	345,000	-42,000	3,563,000	21	61,633	7,538,000	3,975,000	24
2009-10	2,255	12	46	21	76,000	2,787	12	0	3	91,000	962	15	39,000	849	34	78,000	284,000	5,409	17	255,000	628	17	30,000	284,000	0	3,563,000	21	62,986	7,704,000	4,141,000	24
2010-11	2,535	12	0	21	83,000	3,050	12	0	3	99,000	883	15	36,000	602	36	58,000	276,000	6,589	15	267,000	569	15	23,000	290,000	-14,000	3,549,000	21	63,450	7,761,000	4,212,000	24
2011-12	1,185	21	0	21	68,000	1,077	21	0	3	61,000	726	21	41,000	802	36	78,000	248,000	5,519	15	220,000	354	15	14,000	234,000	14,000	3,563,000	21	61,413	7,511,000	3,948,000	24
Mean, 1994-2012	1,901	16	296	18	84,611	2,074	16	0	3	77,333	1,049	13	37,333	1,089	33	97,778	297,056	6,476	21	357,500	634	21	35,889	393,389	-96,333	4,105,222	22	69,722	8,527,667	4,422,444	23
Median	1,603	15	193	21	77,000	2,143	14	0	3	79,500	1,068	12	36,500	1,173	34	101,500	296,000	6,488	19	336,500	646	19	34,000	370,000	-94,000	3,997,500	21	70,533	8,626,500	4,413,500	24
Standard deviation	1,118	4	372	4	30,805	1,183	4	0	0	31,645	114	2	2,401	437	3	36,897	55,399	935	6	105,559	166	6	13,715	114,875	100,940	497,372	1	5,429	664,052	289,382	1
Mean, 2007-2012	1,887	14	227	17	77,400	1,980	16	0	3	78,400	939	16	38,600	935	35	90,200	284,600	6,198	16	274,000	499	16	22,200	296,000	-11,400	3,568,600	21	62,668	7,664,800	4,096,200	24
Mean, 2002-2012	1,951	16	328	18	86,500	2,025	17	0	3	79,200	1,014	14	38,700	871	34	80,200	284,600	6,545	18	316,400	621	18	31,700	348,000	-63,400	3,709,700	21	65,921	8,062,800	4,353,100	24
Data Source																															
Table or Appendix	I	III.3a	I	III.3a		I	III.3a	I	III.3a		I	III.3a		I	III.3a			I	III.3a		I	III.3a									
Column	2	4‡	3	4‡		5	4‡	6	11		9	14‡		10	8			11	9		12	9									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5c)

APPENDIX Y

SANTA ANITA SUBAREA CHLORIDE (CI) BALANCE WORKSHEET

Appendix Y. Santa Anita subarea chloride (Cl) balance worksheet. (Developed from Table III.4b and App. I).

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Water	Chloride loading																
Year	From Precipitation					Artificial recharge					Return flow			Pasadena			
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total	weighted			Subsurface inflow			Total
	Recharge	Cl	Recharge	Cl			Cl		Cl			Cl			Cl		
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs
1994-95	3,277	11	908	11	125,000	2,712	11	0	78	81,000	1,176	11	36,000	1,794	21	101,000	343,000
1995-96	1,491	10	317	10	49,000	3,203	9	0	81	78,000	1,069	10	30,000	905	35	86,000	243,000
1996-97	1,511	8	210	8	37,000	2,449	8	0	75	53,000	1,061	9	25,000	1,025	57	160,000	275,000
1997-98	3,520	8	863	8	95,000	3,032	8	0	77	66,000	1,092	10	28,000	1,412	21	79,000	268,000
1998-99	984	9	67	9	26,000	2,845	8	0	80	62,000	1,067	9	27,000	1,160	33	105,000	220,000
1999-00	1,597	9	193	9	44,000	1,059	9	0	85	26,000	1,149	9	29,000	1,843	37	183,000	282,000
2000-01	1,674	9	262	9	47,000	1,566	9	0	92	38,000	1,088	9	27,000	1,427	28	110,000	222,000
2001-02	650	10	57	10	19,000	215	10	0	85	6,000	1,053	10	28,000	1,332	35	127,000	180,000
2002-03	1,794	11	128	11	57,000	1,385	11	0	79	41,000	979	11	30,000	1,244	36	123,000	251,000
2003-04	1,221	11	268	11	45,000	548	11	0	86	16,000	1,002	21	57,000	1,244	20	68,000	186,000
2004-05	5,037	9	1,480	9	159,000	4,542	9	0	75	111,000	1,105	12	36,000	427	40	46,000	352,000
2005-06	1,610	10	192	10	49,000	3,244	9	0	61	79,000	1,137	11	34,000	111	51	16,000	178,000
2006-07	411	10	7	10	11,000	629	10	0	86	17,000	1,217	10	33,000	1,008	18	50,000	111,000
2007-08	2,011	8	285	8	50,000	1,838	8	0	96	40,000	1,106	8	25,000	1,187	52	167,000	282,000
2008-09	1,448	8	185	8	35,000	1,149	8	0	98	25,000	1,018	20	55,000	1,234	35	119,000	234,000
2009-10	2,255	8	537	8	61,000	2,787	8	0	88	61,000	962	11	29,000	849	26	61,000	212,000
2010-11	2,535	8	552	8	67,000	3,050	8	0	70	66,000	883	8	20,000	602	45	74,000	227,000
2011-12	1,185	8	46	8	27,000	1,077	8	0	90	23,000	726	9	17,000	802	45	97,000	164,000
Mean, 1994-2012	1,901	9	364	9	55,722	2,074	9	0	82	49,389	1,049	11	31,444	1,089	35	98,444	235,000
Median	1,603	9	236	9	48,000	2,143	9	0	83	47,000	1,068	10	29,000	1,173	35	99,000	230,500
Standard deviation	1,118	1	381	1	37,143	1,183	1	0	9	28,203	114	4	10,176	437	12	44,071	60,808
Mean, 2007-2012	1,887	8	321	8	48,000	1,980	8	0	88	43,000	939	11	29,200	935	41	103,600	223,800
Mean, 2002-2012	1,951	9	368	9	56,100	2,025	9	0	83	47,900	1,014	12	33,600	871	37	82,100	219,700
Data Source																	
Table or Appendix	I	III.3b	I	III.3b		I	III.3b	I	III.3b		I	III.3b		I	III.3b		
Column	2	4‡	3	4‡		5	4‡	6	11		9	14‡		10	8		

			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 100	= c30 - c27	= 100-c28
column 1	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Water	Chloride Unloading							Net	Assimilative Capacity					
Year	Groundwater extraction			Subsurface outflow				Chloride	Storage					
							Total	Loading			Ground	Allowable	Total	
		Cl			Cl				Cl		Water	Loading		
	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l
									2,984,000					
1994-95	7,225	18	358,000	578	18	29,000	387,000	-44,000	2,940,000	14	74,864	20,348,000	17,408,000	86
1995-96	5,910	16	256,000	636	16	28,000	284,000	-41,000	2,899,000	14	75,302	20,467,000	17,568,000	86
1996-97	6,503	11	195,000	657	11	20,000	215,000	60,000	2,959,000	15	74,397	20,221,000	17,262,000	85
1997-98	6,475	25	447,000	585	25	40,000	487,000	-219,000	2,740,000	13	77,256	20,998,000	18,258,000	87
1998-99	7,259	13	255,000	675	13	24,000	278,000	-58,000	2,682,000	13	75,445	20,506,000	17,824,000	87
1999-00	6,502	18	314,000	675	18	33,000	346,000	-64,000	2,618,000	13	74,109	20,143,000	17,525,000	87
2000-01	5,829	18	278,000	670	18	32,000	310,000	-88,000	2,530,000	13	73,627	20,012,000	17,482,000	87
2001-02	5,415	17	256,000	730	17	34,000	290,000	-110,000	2,420,000	13	70,789	19,241,000	16,821,000	87
2002-03	5,320	19	272,000	724	19	37,000	309,000	-58,000	2,362,000	12	70,276	19,101,000	16,739,000	88
2003-04	6,214	13	226,000	707	13	26,000	252,000	-66,000	2,296,000	12	67,639	18,384,000	16,088,000	88
2004-05	5,982	8	130,000	1,110	8	24,000	154,000	198,000	2,494,000	13	73,138	19,879,000	17,385,000	87
2005-06	8,433	18	414,000	770	18	38,000	452,000	-274,000	2,220,000	12	70,230	19,088,000	16,868,000	88
2006-07	8,509	14	330,000	403	14	16,000	346,000	-235,000	1,985,000	11	64,590	17,556,000	15,571,000	89
2007-08	6,735	10	192,000	426	10	12,000	204,000	78,000	2,063,000	12	63,856	17,356,000	15,293,000	88
2008-09	6,736	20	362,000	520	20	28,000	389,000	-155,000	1,908,000	11	61,633	16,752,000	14,844,000	89
2009-10	5,409	17	253,000	628	17	29,000	282,000	-70,000	1,838,000	11	62,986	17,120,000	15,282,000	89
2010-11	6,589	9	157,000	569	9	14,000	171,000	56,000	1,894,000	11	63,450	17,246,000	15,352,000	89
2011-12	5,519	21	318,000	354	21	20,000	338,000	-174,000	1,720,000	10	61,413	16,692,000	14,972,000	90
Mean, 1994-2012	6,476	16	278,500	634	16	26,889	305,222	-70,222	2,364,889	12	69,722	18,950,556	16,585,667	88
Median	6,488	17	264,000	646	17	28,000	299,500	-65,000	2,391,000	13	70,533	19,171,000	16,844,500	87
Standard deviation	935	5	84,645	166	5	8,195	89,704	118,661	399,004	1	5,429	1,475,565	1,103,980	1
Mean, 2007-2012	6,198	15	256,400	499	15	20,600	276,800	-53,000	1,884,600	11	62,668	17,033,200	15,148,600	89
Mean, 2002-2012	6,545	15	265,400	621	15	24,400	289,700	-70,000	2,078,000	12	65,921	17,917,400	15,839,400	88
Data Source														
Table or Appendix	I	III.3b		I	III.3b									
Column	11	9		12	9									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5c)

APPENDIX Z

SANTA ANITA SUBAREA SULFATE (SO4) BALANCE WORKSHEET

Appendix Z. Santa Anita subarea sulfate (SO4) balance worksheet. (Developed from Table III.4c and App. I).

column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17			= 2.718 * (c19 + c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 100	= c30 - c27	= 100-c28
Water Year	Sulfate loading																	Sulfate Unloading							Net Sulfate Loading	Assimilative Capacity					
	From Precipitation				Total	Artificial recharge					Return flow			Pasadena			Total	Groundwater extraction			Subsurface outflow			Total		Storage				Total	
	Mountain Watershed		Valley Floor			Surface Spreading		Injection		Total		weighted		Subsurface inflow																	
	Recharge ac-ft	SO_4 mg/L	Recharge ac-ft	SO4 mg/L	lbs†	ac-ft	SO_4 mg/L	ac-ft	SO_4 mg/L	lbs	ac-ft	SO_4 mg/l	lbs	ac-ft	SO_4 mg/L	lbs	lbs	ac-ft	SO_4 mg/L	lbs	ac-ft	SO_4 mg/L	lbs	lbs	lbs	SO4 lbs	mg/l	Ground Water ac-ft	Allowable Loading lbs	lbs	mg/l
																										7,299,000					
1994-95	3,277	31	908	31	353,000	2,712	31	0	116	229,000	1,176	23	72,000	1,794	65	317,000	971,000	7,225	36	705,000	578	36	56,000	762,000	209,000	7,508,000	37	74,864	20,348,000	12,840,000	63
1995-96	1,491	32	317	32	157,000	3,203	31	0	140	270,000	1,069	24	69,000	905	57	140,000	636,000	12,965	41	1,454,000	636	41	71,000	1,525,000	-889,000	6,619,000	32	75,302	20,467,000	13,848,000	68
1996-97	1,511	32	210	37	152,000	2,449	31	0	209	206,000	1,061	24	68,000	1,025	58	163,000	589,000	9,164	33	834,000	657	33	60,000	894,000	-305,000	6,314,000	31	74,397	20,221,000	13,907,000	69
1997-98	3,520	31	863	31	369,000	3,032	31	0	240	255,000	1,092	24	72,000	1,412	61	235,000	931,000	9,281	36	916,000	585	36	58,000	974,000	-43,000	6,271,000	30	77,256	20,998,000	14,727,000	70
1998-99	984	37	67	37	106,000	2,845	31	0	194	240,000	1,067	24	70,000	1,160	61	193,000	609,000	9,470	32	831,000	675	32	59,000	890,000	-281,000	5,990,000	29	75,445	20,506,000	14,516,000	71
1999-00	1,597	32	193	37	158,000	1,059	37	0	122	107,000	1,149	24	75,000	1,843	62	310,000	650,000	10,682	36	1,058,000	675	36	67,000	1,125,000	-475,000	5,515,000	27	74,109	20,143,000	14,628,000	73
2000-01	1,674	32	262	37	172,000	1,566	32	0	140	136,000	1,088	24	71,000	1,427	64	249,000	628,000	7,841	34	718,000	670	34	61,000	780,000	-152,000	5,363,000	27	73,627	20,012,000	14,649,000	73
2001-02	650	37	57	37	71,000	215	37	0	171	22,000	1,053	25	73,000	1,332	64	232,000	398,000	7,272	39	774,000	730	39	78,000	851,000	-453,000	4,910,000	26	70,789	19,241,000	14,331,000	74
2002-03	1,794	32	128	37	169,000	1,385	37	0	111	139,000	979	26	68,000	1,244	67	227,000	603,000	4,069	41	455,000	724	41	81,000	536,000	67,000	4,977,000	26	70,276	19,101,000	14,124,000	74
2003-04	1,221	37	268	37	150,000	548	37	0	145	55,000	1,002	41	112,000	1,244	68	228,000	545,000	4,762	41	537,000	707	41	80,000	616,000	-71,000	4,906,000	27	67,639	18,384,000	13,478,000	73
2004-05	5,037	31	1,480	31	549,000	4,542	31	0	164	383,000	1,105	29	87,000	427	67	78,000	1,097,000	5,362	33	479,000	1,110	33	99,000	579,000	518,000	5,424,000	27	73,138	19,879,000	14,455,000	73
2005-06	1,610	32	192	37	159,000	3,244	31	0	116	273,000	1,137	26	79,000	111	67	20,000	531,000	5,040	42	577,000	770	42	88,000	665,000	-134,000	5,290,000	28	70,230	19,088,000	13,798,000	72
2006-07	411	37	7	37	42,000	629	37	0	140	63,000	1,217	22	72,000	1,008	50	137,000	314,000	6,087	42	697,000	403	42	46,000	743,000	-429,000	4,861,000	28	64,590	17,556,000	12,695,000	72
2007-08	2,011	31	285	32	194,000	1,838	32	0	209	160,000	1,106	22	68,000	1,187	73	235,000	657,000	6,445	45	783,000	426	45	52,000	835,000	-178,000	4,683,000	27	63,856	17,356,000	12,673,000	73
2008-09	1,448	32	185	37	144,000	1,149	37	0	240	116,000	1,018	47	130,000	1,234	79	263,000	653,000	5,828	32	507,000	520	32	45,000	552,000	101,000	4,784,000	29	61,633	16,752,000	11,968,000	71
2009-10	2,255	31	537	31	235,000	2,787	31	0	194	235,000	962	28	72,000	849	76	176,000	718,000	3,872	35	365,000	628	35	59,000	424,000	294,000	5,078,000	30	62,986	17,120,000	12,042,000	70
2010-11	2,535	31	552	31	260,000	3,050	31	0	122	257,000	883	21	50,000	602	78	127,000	694,000	4,302	29	344,000	569	29	45,000	389,000	305,000	5,383,000	31	63,450	17,246,000	11,863,000	69
2011-12	1,185	37	46	37	124,000	1,077	37	0	140	108,000	726	20	40,000	802	78	171,000	443,000	7,444	30	617,000	354	30	29,000	646,000	-203,000	5,180,000	31	61,413	16,692,000	11,512,000	69
																									36						
Mean, 1994-2012	1,901	33	364	35	198,000	2,074	33	0	162	180,778	1,049	26	74,889	1,089	66	194,500	648,167	7,062	37	702,833	634	37	63,000	765,889	-117,722	5,503,111	29	69,722	18,950,556	13,447,444	71
Median	1,603	32	236	37	158,500	2,143	32	0	143	183,000	1,068	24	72,000	1,173	66	210,000	632,000	6,835	36	701,000	646	36	59,500	752,500	-143,000	5,326,500	28	70,533	19,171,000	13,823,000	72
Standard deviation	1,118	3	381	3	121,209	1,183	3	0	43	94,591	114	7	19,805	437	8	76,550	194,194	2,495	5	268,404	166	5	17,442	269,266	339,093	755,652	3	5,429	1,475,565	1,093,320	3
Mean, 2007-2012	1,887	32	321	34	191,400	1,980	34	0	181	175,200	939	28	72,000	935	77	194,400	633,000	5,578	34	523,200	499	34	46,000	569,200	63,800	5,021,600	29	62,668	17,033,200	12,011,600	71
Mean, 2002-2012	1,951	33	368	35	202,600	2,025	34	0	158	178,900	1,014	28	77,800	871	70	166,200	625,500	5,321	37	536,100	621	37	62,400	598,500	27,000	5,056,600	28	65,921	17,917,400	12,860,800	72
Data Source																															
Table or Appendix	I	III.3c	I	III.3c		I	III.3c	I	III.3c		I	III.3c		I	III.3c			I	III.3c		I	III.3c									
Column	2	4‡	3	4‡		5	4‡	6	11		9	14‡		10	8			11	9		12	9									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5c)

APPENDIX AA

SANTA ANITA SUBAREA TOTAL DISSOLVED SOLIDS (TDS) BALANCE WORKSHEET

Appendix AA. Santa Anita subarea Total Dissolved Solids (TDS) balance worksheet. (Developed from Table III.4d and App. I).

					= 2.718 * (c2 * c3 + c4 * c5)					= 2.718 * (c7 * c8 + c9 * c10)			= 2.718 * (c12 * c13)			= 2.718 * (c15* c16)	= c6 + c11 + c14 + c17
column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Water Year	Total Dissolved Solids loading																
	From Precipitation					Artificial recharge					Return flow			Pasadena			Total
	Mountain Watershed		Valley Floor		Total	Surface Spreading		Injection		Total		weighted		Subsurface inflow			
	Recharge	TDS	Recharge	TDS			TDS		TDS			TDS			TDS		
	ac-ft	mg/L	ac-ft	mg/L	lbs†	ac-ft	mg/L	ac-ft	mg/L	lbs	ac-ft	mg/l	lbs	ac-ft	mg/L	lbs	lbs
1994-95	3,277	256	908	256	2,912,000	2,712	256	0	344	1,887,000	1,176	272	869,000	1,794	335	1,636,000	7,304,000
1995-96	1,491	226	317	226	1,110,000	3,203	256	0	437	2,228,000	1,069	272	791,000	905	343	844,000	4,973,000
1996-97	1,511	218	210	208	1,014,000	2,449	248	0	565	1,651,000	1,061	272	784,000	1,025	351	977,000	4,426,000
1997-98	3,520	239	863	239	2,847,000	3,032	239	0	620	1,970,000	1,092	272	807,000	1,412	345	1,325,000	6,949,000
1998-99	984	202	67	202	577,000	2,845	240	0	532	1,856,000	1,067	272	789,000	1,160	356	1,121,000	4,343,000
1999-00	1,597	211	193	202	1,022,000	1,059	202	0	380	581,000	1,149	272	849,000	1,843	361	1,808,000	4,260,000
2000-01	1,674	211	262	202	1,104,000	1,566	211	0	470	898,000	1,088	272	805,000	1,427	356	1,379,000	4,186,000
2001-02	650	207	57	207	398,000	215	207	0	500	121,000	1,053	272	778,000	1,332	355	1,286,000	2,583,000
2002-03	1,794	216	128	207	1,125,000	1,385	207	0	387	779,000	979	259	689,000	1,244	352	1,190,000	3,783,000
2003-04	1,221	210	268	210	850,000	548	210	0	445	313,000	1,002	272	741,000	1,244	358	1,211,000	3,115,000
2004-05	5,037	259	1,480	259	4,588,000	4,542	259	0	452	3,197,000	1,105	272	817,000	427	356	414,000	9,016,000
2005-06	1,610	228	192	218	1,111,000	3,244	259	0	344	2,284,000	1,137	272	841,000	111	356	108,000	4,344,000
2006-07	411	226	7	226	257,000	629	226	0	437	386,000	1,217	272	899,000	1,008	363	993,000	2,535,000
2007-08	2,011	261	285	230	1,605,000	1,838	230	0	565	1,149,000	1,106	272	817,000	1,187	360	1,160,000	4,731,000
2008-09	1,448	230	185	219	1,015,000	1,149	219	0	620	684,000	1,018	272	752,000	1,234	356	1,193,000	3,644,000
2009-10	2,255	254	537	254	1,927,000	2,787	254	0	532	1,924,000	962	272	711,000	849	351	809,000	5,371,000
2010-11	2,535	264	552	264	2,215,000	3,050	264	0	380	2,189,000	883	272	653,000	602	363	593,000	5,650,000
2011-12	1,185	222	46	222	743,000	1,077	222	0	470	650,000	726	257	507,000	802	376	819,000	2,719,000
Mean, 1994-2012	1,901	230	364	225	1,467,778	2,074	234	0	471	1,374,833	1,049	270	772,167	1,089	355	1,048,111	4,662,889
Median	1,603	226	236	221	1,107,000	2,143	235	0	461	1,400,000	1,068	272	790,000	1,173	356	1,140,500	4,343,500
Standard deviation	1,118	21	381	21	1,082,956	1,183	21	0	87	864,568	114	5	90,677	437	9	413,289	1,718,732
Mean, 2007-2012	1,887	246	321	238	1,501,000	1,980	238	0	513	1,319,200	939	269	688,000	935	361	914,800	4,423,000
Mean, 2002-2012	1,951	237	368	231	1,543,600	2,025	235	0	463	1,355,500	1,014	269	742,700	871	359	849,000	4,490,800
Data Source																	
Table or Appendix	I	III.3d	I	III.3d		I	III.3d	I	III.3d		I	III.3d		I	III.3d		
Column	2	4‡	3	4‡		5	4‡	6	11		9	14‡		10	8		

			= 2.718 * (c19 * c20)			= 2.718 * (c22* c23)	= c21 + c24	= c18 - c25	$c27_i = c27_{i-1} + c26_i$			= 2.718 * c29 * 100	= c30 - c27	= 450-c28
column 1	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Water Year	Total Dissolved Solids Unloading							Net TDS Loading	Assimilative Capacity					
	Groundwater extraction			Subsurface outflow			Total		Storage				Total	
											Ground	Allowable		
		TDS			TDS				TDS		Water	Loading		
	ac-ft	mg/L	lbs	ac-ft	mg/L	lbs	lbs	lbs	lbs	mg/l	ac-ft	lbs	lbs	mg/l
									54,451,000					
1994-95	7,225	279	5,474,000	578	279	438,000	5,912,000	1,392,000	55,843,000	274	74,864	91,566,000	35,723,000	176
1995-96	5,910	279	4,485,000	636	279	482,000	4,968,000	5,000	55,848,000	273	75,302	92,102,000	36,254,000	177
1996-97	6,503	268	4,731,000	657	268	478,000	5,209,000	-783,000	55,065,000	272	74,397	90,995,000	35,930,000	178
1997-98	6,475	282	4,968,000	585	282	449,000	5,416,000	1,533,000	56,598,000	270	77,256	94,492,000	37,894,000	180
1998-99	7,259	273	5,384,000	675	273	501,000	5,885,000	-1,542,000	55,056,000	268	75,445	92,277,000	37,221,000	182
1999-00	6,502	274	4,838,000	675	274	502,000	5,340,000	-1,080,000	53,976,000	268	74,109	90,643,000	36,667,000	182
2000-01	5,829	274	4,335,000	670	274	498,000	4,833,000	-647,000	53,329,000	266	73,627	90,053,000	36,724,000	184
2001-02	5,415	279	4,104,000	730	279	553,000	4,657,000	-2,074,000	51,255,000	266	70,789	86,582,000	35,327,000	184
2002-03	5,320	275	3,979,000	724	275	541,000	4,520,000	-737,000	50,518,000	264	70,276	85,955,000	35,437,000	186
2003-04	6,214	273	4,615,000	707	273	525,000	5,140,000	-2,025,000	48,493,000	264	67,639	82,729,000	34,236,000	186
2004-05	5,982	267	4,339,000	1,110	267	805,000	5,145,000	3,871,000	52,364,000	263	73,138	89,455,000	37,091,000	187
2005-06	8,433	274	6,285,000	770	274	574,000	6,859,000	-2,515,000	49,849,000	261	70,230	85,898,000	36,049,000	189
2006-07	8,509	257	5,940,000	403	257	281,000	6,221,000	-3,686,000	46,163,000	263	64,590	79,000,000	32,837,000	187
2007-08	6,735	262	4,802,000	426	262	304,000	5,106,000	-375,000	45,788,000	264	63,856	78,102,000	32,314,000	186
2008-09	6,736	268	4,907,000	520	268	379,000	5,285,000	-1,641,000	44,147,000	264	61,633	75,383,000	31,236,000	186
2009-10	5,409	273	4,016,000	628	273	466,000	4,482,000	889,000	45,036,000	263	62,986	77,038,000	32,002,000	187
2010-11	6,589	263	4,712,000	569	263	407,000	5,119,000	531,000	45,567,000	264	63,450	77,605,000	32,038,000	186
2011-12	5,519	273	4,101,000	354	273	263,000	4,364,000	-1,645,000	43,922,000	263	61,413	75,114,000	31,192,000	187
Mean, 1994-2012	6,476	272	4,778,611	634	272	469,222	5,247,833	-584,944	50,489,833	266	69,722	85,277,167	34,787,333	184
Median	6,488	273	4,721,500	646	273	480,000	5,142,500	-760,000	50,886,500	264	70,533	86,268,500	35,580,000	186
Standard deviation	935	7	649,410	166	7	123,864	641,023	1,768,321	4,494,077	4	5,429	6,640,536	2,247,648	4
Mean, 2007-2012	6,198	268	4,507,600	499	268	363,800	4,871,200	-448,200	44,892,000	264	62,668	76,648,400	31,756,400	186
Mean, 2002-2012	6,545	269	4,769,600	621	269	454,500	5,224,100	-733,300	47,184,700	263	65,921	80,627,900	33,443,200	187
Data Source														
Table or Appendix	I	III.3d		I	III.3d									
Column	11	9		12	9									

† Volume to lbs conversion, mg/l = ppm: 2.718 lb/ac-ft = 43560 ft^2/ac * 62.4 lb/ft^3 * 1/1000000

‡ Adjusted from raw data through calibration. (See Table III.5c)

APPENDIX BB

CRITERIA FOR DELIVERY OF SUPPLEMENTAL WATER

RAYMOND BASIN

MANAGEMENT BOARD

DRAFT

CRITERIA FOR DELIVERY OF SUPPLEMENTAL WATER

March 2006

PREPARED BY
STETSON ENGINEERS INC.

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RAYMOND BASIN MANAGEMENT BOARD

CRITERIA FOR DELIVERY OF SUPPLEMENTAL WATER

INTRODUCTION

At the Raymond Basin Water Quality Management Committee meeting on January 31, 2006, Stetson Engineers Inc. (Stetson) was requested to develop draft criteria for the delivery of Supplemental Water to the Raymond Basin (Basin), based upon Basin management requirements for water quality and water supply. These draft criteria for delivery of Supplemental Water are organized as follows:

Section I.	Background
Section II.	Review of Regulatory Standards for Supplemental Water Quality
Section III.	Availability of Water Supply
Section IV.	Review of Supplemental Water Quality
Section V.	Economic Analysis
Section VI.	Development of Supplemental Water Quality Criteria

The term "Supplemental Water," as used herein, is intended to be synonymous with "imported, non-tributary water," which is defined in the Raymond Basin Judgment. The review of criteria for delivery of Supplemental Water based upon water quality is primarily intended to formalize and document procedures to be considered by the Raymond Basin Management Board (RBMB) when evaluating future proposals to deliver Supplemental Water to Raymond Basin.

SECTION I - BACKGROUND

I.1 <u>RAYMOND BASIN JUDGMENT AND PROVISIONS</u>

In 1937, the City of Pasadena filed suit to adjudicate water rights of the Raymond Basin[1]. The State of California Division of Water Resources [now Department of Water Resources (DWR)] was retained to prepare a Report of Referee, which described the geology and hydrogeology of the Raymond Basin and identified the Safe Yield of the Raymond Basin as 21,900 acre-feet. The City of Pasadena requested the safe yield of Raymond Basin be redetermined during 1950. Subsequently, the Court issued a Modification of Judgment on April 29, 1955 increasing the Safe Yield of Raymond Basin to 30,622 acre-feet. This is referred to as the "Decreed Right of 1955." The water rights of the parties are fixed each year and do not vary. Parties to the Judgment are allowed to exceed their annual water right by no more than 10 percent. (An exceedance is deducted from the party's following year's water right.) Water demands in excess of a party's groundwater produced under a water right must be met by purchasing Supplemental Water. The Metropolitan Water District of Southern California (MWD) is the regional urban water supplier for the area and provides water to its member agencies in the Raymond Basin which consist of Foothill Municipal Water District (FMWD), the City of Pasadena and the City of San Marino.

The Basin consists of three areas: the Monk Hill Basin, the Pasadena Sub-area and the Santa Anita Sub-area, as shown on Plate 1. These three sub-areas have generally experienced decreasing water levels over the past 30 years, as shown on the hydrographs in Appendix A. The need to increase the Basin management activities for water supply and water quality are evident and interrelated.

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[1] City of Pasadena vs. City of Alhambra, et al, Los Angeles County Case No. Pasadena C-1323, Judgment entered December 23, 1944, modified April 29, 1955.

The Raymond Basin relies on recharge from local storm runoff for all of its Basin replenishment. Currently, there are no provisions in the Raymond Basin Judgment addressing delivery of Supplemental Water for groundwater recharge. However, in 1992 and 1993, the RBMB adopted long-term storage policies that allowed parties to the Judgment to store unused water rights in the Basin. In addition, some parties historically have stored water (through reduced pumping) using in-lieu programs and in limited cases, some parties have stored water through direct injection. While there is some limited capacity for replenishment using spreading grounds, it has not occurred for various reasons.

I.2 WATER SUPPLY REVIEW/BASIN CONDITION

In general, water levels throughout the Basin are declining due to insufficient recharge of storm runoff to meet the Decreed Rights of 1955, as shown on hydrographs in Appendix A. As noted earlier, historically Supplemental Water has not been delivered to spreading grounds for groundwater recharge. In an effort to resolve the declining water levels, the RBMB could modify the Judgment to allow it to levy an assessment to purchase and recharge Supplemental Water, in which there could be significant impacts to both water levels and water quality. Alternatively, the RBMB could modify the Judgment to reduce the quantity of Decreed Rights that could be produced, and as a result manage water levels.

The RBMB has taken measures to study the Basin water resource needs (Baseline Study and Conjunctive Use Plan) and to augment Basin storage. These include on-going injection programs by FMWD and Valley Water Company, and spreading grounds studies. In addition, Pasadena has worked with MWD to develop in-lieu storage of Supplemental Water. (Pasadena received treated, imported water in-lieu of pumping its water rights, which were stored in the Basin for future use.)

The Foothill Area Groundwater Storage Project involves FMWD and the Monk Hill sub-basin retail water agencies. This project will allow MWD, in cooperation with FMWD, to store up to 9,000 acre-feet of water in the Monk Hill sub-basin during wet periods and withdraw 3,000 acre-feet per year during dry years, droughts and emergencies. Similarly, the Jet Propulsion Laboratory (JPL), as part of Basin remediation, has been producing, treating, and reinjecting groundwater. MWD and Pasadena are developing a Conjunctive Use program that calls for up to 66,000 acre-feet of imported water to be stored in the Basin for subsequent production.

The in-lieu programs enable water producers to "store" water in the Basin by purchasing treated imported water in-lieu of pumping groundwater. This does not involve recharge/injection of Supplemental Water (other than potential impacts of return flow from applied water), should not have an impact on water quality, and is not intended to be covered by these criteria.

The purpose of this report is to establish criteria to evaluate proposals for Supplement Water recharge through which RBMB can manage both water supply and water quality, and advise regulatory agencies of those actions. In the absence of such criteria, RBMB may be exposed to regulatory agencies unilaterally developing and imposing water quality management standards.

SECTION II - REVIEW OF REGULATORY STANDARDS FOR SUPPLEMENTAL WATER QUALITY

II.1 BACKGROUND

There are three agencies primarily responsible for setting guidelines and regulations associated with replenishing the ground water of the Basin. They are the RBMB, the Regional Water Quality Control Board (RWQCB) and the State Department of Health Services (CDHS). A review of these agencies and their authority to regulate groundwater replenishment is discussed below.

II.2 RAYMOND BASIN AMENDED JUDGMENT

The Basin historically has been managed by limiting the amount of groundwater that is pumped each year. As a result, producers have obtained treated imported water from MWD, for demands in excess of water rights. Historically, very little Supplemental Water has been recharged in the Basin through percolation in spreading grounds, although some water has been credited to Basin storage account through in-lieu replenishment and injection programs.

The Raymond Basin Judgment Section XII (3) states in part, "The Board may approve, condition or disapprove proposed water storage programs and imported, non-tributary water shall not be stored in the basin without the Board's approval." In addition, that same section notes, "Approved programs shall include provisions...for such other conditions as may be necessary to prevent operational problems for other parties, including degradation of water quality." (Emphasis added.) Section XII (4) further notes the Board has the power "...to control the direct recharge into the basin of imported, non-tributary water."

The Raymond Basin Judgment does not specifically address the use of recycled water as Supplemental Water. However, recycled water may be considered for recharge as imported, non-tributary water.

With regard to establishing an assessment to purchase Supplemental Water for groundwater basin recharge, Section XII(6) of the Judgment states RBMB may "...conduct studies or undertake other activities for the common benefit of the parties in the operation of the Raymond Basin Area; to obtain engineering, legal and other professional services in such connection; and, in addition to the Watermaster budget procedures, to assess the parties in an equitable manner and as may be necessary to pay the costs of the Board's operations, which assessments shall be paid by the parties." (Emphasis added.)

The RBMB will need to actively manage the Basin to maintain/enhance water levels. This could be accomplished by reducing the quantity that may be produced each year or providing groundwater recharge. In the case of delivery of Supplemental Water, impacts to water quality will need to be evaluated.

II.3 REGIONAL WATER QUALITY CONTROL BOARD - WATER QUALITY CONTROL PLAN

The Regional Water Pollution Control Board, predecessor to the Regional Water Quality Control Board (RWQCB), was created in 1949 by the Dickey Act. By 1952, the Regional Water Pollution Control Board began adopting water quality objectives. With the adoption of the Porter-Cologne Act in 1969, the name was changed to the Regional Water Quality Control Board (RWQCB) and a Water Quality Control Plan was thereafter adopted. The most recent amendments to that Plan were adopted by the RWQCB in June 1994.

The Water Quality Control Plan is "...designed to preserve and enhance water quality and protect the beneficial uses of all regional waters." The Water Quality Control Plan is used by the RWQCB to maintain water quality in the region and regulate discharges to receiving water and ground water. The general policy of the RWQCB is to ensure that water quality degradation does not occur.

The RWQCB, in the interest of protecting the water supply of the Raymond Basin, has developed water quality objectives for groundwater and surface water. The Water Code defines water quality objectives as, "The allowable limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses...." The RWQCB has developed the water quality objectives to govern any discharge so that the quality of surface and groundwater will not be degraded. Currently, the RWQCB does not actively regulate the use of imported water for groundwater replenishment because it is not considered a waste product (e.g. recycled water). However, the RBMB should consider coordinating with the RWQCB for any proposed recharge project with constituent concentrations in excess of the Water Quality Control Plan objectives. The RWQCB water quality objectives for groundwater are shown in Table 1. (A more inclusive review of water quality objectives is shown in Appendix B.)

In addition to establishing water quality objectives for groundwater and surface water, RWQCB entered into a Memorandum of Agreement (MOA) with CDHS to regulate the use of recycled water for groundwater recharge. This MOA is discussed herein.

II.4 CALIFORNIA DEPARTMENT OF HEALTH SERVICES

The California Department of Health Services (CDHS) is charged with ensuring the drinking water standards are met by water systems to protect the health of consumers. Drinking water standards are contained in the Domestic Water Quality and Monitoring Regulations, Chapter 15, Title 22, California Code of Regulations. Many of these standards are shown in Appendix B. CDHS is also involved with permitting recycled water projects, as discussed below.

II.5 RWQCB/CDHS REGULATIONS FOR USE OF RECYCLED WATER

The State Water Resources Control Board, along with the nine Regional Water Quality Control Boards, entered into a Memorandum of Agreement with CDHS in December 1988 to regulate the use of recycled water. The MOA sets forth principles and procedures that are to be followed when evaluating an application to use recycled water for groundwater recharge.

For a recycled water groundwater recharge project the applicant must submit an application to the RWQCB for issuance of Water Reclamation Requirements (WRR). The RWQCB provides a copy of the application to CDHS for review and comments. All CDHS comments are then included in the RWQCB WRRs that may be issued. The WRRs are issued on a case-by-case basis to ensure recycled water is of such quality that it fully protects public health at all times. An Engineering Report is required to be submitted with the application. The Engineering Report must include relevant aspects of the project including, but not limited to:

1. A plan of the reclamation plant and project facilities;
2. a hydrogeological study of the project area;
3. a description of how the project will be operated;
4. a description of methods to determine maximum recycled water contribution; and
5. a water quality monitoring plan.

Furthermore, an applicant must comply with additional requirements, which consist of (1) site requirements (distance from a potable water well, depth to ground water, percolation rates and retention time); (2) water quality monitoring requirements; and (3) treatment performance standards (limitations on Total Organic Carbon, Coliform, turbidity and biochemical oxygen demand). The RWQCB requires an assessment to evaluate potential impacts of the project on the objectives and beneficial uses from the RWQCB's Basin Plan.

SECTION III - AVAILABILITY OF SUPPLEMENTAL WATER SUPPLY

III.1 BACKGROUND

Although the Judgment does not require delivery of Supplemental Water to the Basin for groundwater recharge, such water could be approved for delivery, if needed. Potential sources of supply could include treated imported water from MWD's Upper Feeder, untreated State Water Project (SWP) water through an extension of San Gabriel Valley Municipal Water District's (San Gabriel District) pipeline, and recycled water. A brief review of these potential sources of supply is provided below.

III.2 METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

MWD's Upper Feeder could be used to deliver treated imported water from the Weymouth Treatment Plant into spreading grounds located within the Basin, as shown in Plate 2. Service connections could be constructed adjacent to spreading grounds. RBMB would coordinate with interested local agencies and MWD to install service connections, identify the availability of treated imported water, and coordinate deliveries. Table 2 provides a summary of the source of supply from MWD.

III.3 SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

San Gabriel District constructed the Devil Canyon-Azusa Pipeline from the State Water Project at Devil Canyon to the San Gabriel Canyon Spreading Grounds, as shown in Plate 2. There are on-going discussions between impacted agencies, included San Gabriel District and MWD to potentially extend this pipeline into Raymond Basin. If SWP water from San Gabriel District/MWD is needed, agencies would have to construct a pipeline from San Gabriel District's existing pipeline to each of the spreading grounds within the Raymond Basin, as shown in Plate 2. RBMB would have to coordinate with San Gabriel District/MWD on the availability of SWP water and when water could be delivered. Table 2 provides a summary of the source of supply from San Gabriel District.

III.4 RECYCLED WATER

There are three water reclamation plants (WRPs) which are potential sources of recycled water to the Basin. They are the Whittier Narrows WRP, San Jose Creek WRP, and Glendale WRP. All water from the Whittier Narrows WRP has been fully contracted. San Jose Creek WRP has been constructed in stages with Stage I and II located adjacent to the San Jose Creek, just east of the I-605 Freeway. The total capacity of these two stages is 62.5 million gallons per day (MGD). The San Jose Creek WRP Stage III is located adjacent to the San Jose Creek and westerly of the I-605 Freeway. Stage III has a capacity of 37.5 MGD. The San Jose Creek WRP has a total capacity of 100 MGD. During Water Year 2003-04, a total of about 50,000 acre-feet of recycled water was unused and flowed to the ocean.

The City of Los Angeles Bureau of Sanitation operates the Los Angeles - Glendale WRP. The design capacity of the Glendale WRP is 20 MGD. However, within the next several years, modifications to the Glendale WRP will reduce the design capacity to 15 MGD with recycled water production expected to be around 13 MGD. Currently, the Cities of Los Angeles and Glendale equally split the available recycled water produced at the Glendale WRP, about 10 MGD each. There is an agreement between Glendale and Pasadena for use of a portion of this recycled water. Table 2 provides a summary of the source of supply from recycled water.

III.5 OTHER SOURCES

Currently, there are no other sources of Supplemental Water supply. There may be the opportunity in the future to obtain Supplemental Water from these sources. Therefore, the Supplemental Water criteria adopted by RBMB should be broad enough to consider a wide range of sources of supply.

SECTION IV - REVIEW OF SUPPLEMENTAL WATER QUALITY

IV.1 BACKGROUND

The development of Supplemental Water quality criteria must consider the existing (background) water quality in the Basin and regulatory requirements. Where proposed Supplemental Water for Basin replenishment is of inferior quality to the background water quality, and/or regulatory requirements an investigation of potential impacts must be performed. This may include solute transport modeling.

Background groundwater quality at various wells located in Basin hydrogeologic subunits is shown on Table 3. The locations of the hydrologic subunits and various wells are shown on Plate 1. The background groundwater quality in these hydrogeologic subunits of the Basin may be impacted by Supplemental Water that is recharged in nearby spreading grounds.

IV.2 SOURCES OF SUPPLY

As noted earlier there are three possible sources of Supplemental Water supply (treated imported water, SWP water, and recycled water). A summary of the water quality is shown on Table 4.

IV.2.1 Treated Imported Water from MWD Weymouth Treatment Plant

The quality of treated imported water from MWD's Weymouth Treatment Plant is shown on Table 4. Water quality does not meet the specified RWCQB basin objectives for Total Dissolved Solids (TDS) and Sulfate.

IV.2.2 <u>State Water Project Water</u>

State Water Project water quality is shown on Table 4. State water quality currently complies with the specified RWQCB basin objectives and CDHS water quality requirements. State water appears to be the "best quality of water available" for Basin replenishment purposes.

IV.2.3 <u>Recycled Water from the Glendale WRP and the San Jose Creek WRP</u>

Recycled water from the Glendale WRP and the San Jose Creek WRP does not meet all of the water quality parameters established in the RWQCB's Basin Plan for Basin replenishment. In addition, recycled water use must be permitted by the RWQCB and approved by CDHS.

IV.3 <u>COMPATIBILITY WITH REGULATORY STANDARDS</u>

The Regional Water Quality Control Board has established water quality objectives for the Raymond Basin. Those water quality objectives are listed on Table 1. Supplemental Water for groundwater recharge should be consistent with RWQCB's groundwater objectives.

Based upon the water quality of possible sources of Supplemental Water, the water quality parameters of concern are TDS, chloride, sulfates, nitrate and boron. These water quality parameters were selected primarily to conform to RWQCB's water quality objectives for groundwater and because compliance with these objectives will help maintain beneficial uses of groundwater in the Basin. Furthermore, municipal use of potable water tends to add about 300 parts per million of TDS to waste waters.

Maintaining high quality water in the groundwater basin contributes to maintaining high quality of recycled water produced at water reclamation facilities.

Under a variety of circumstances, the quality of available Supplemental Water may exceed one or more of the selected water quality criteria. Under those circumstances, the impact of the quality and quantity of the available Supplemental Water for Basin replenishment should be reviewed on a case-by-case basis.

SECTION V - ECONOMIC ANALYSIS

RBMB currently does not deliver Supplemental Water for groundwater recharge. However, it is possible RBMB could order Supplemental Water from Upper San Gabriel Valley Municipal Water District (Upper District), FMWD, Pasadena, San Marino and/or San Gabriel District. Upper District, FMWD, Pasadena, and San Marino receive water supply from MWD, which has established water rates for treated replenishment water. As a result, the rate Upper District, FMWD, Pasadena, or San Marino may charge RBMB for Supplemental Water will likely be similar. San Gabriel District has a contract for SWP water and develops its own rates. In the future, Supplemental Water may also be available as recycled water or new sources from other watersheds. The Judgment does not obligate water systems to charge the same rate for different sources of Supplemental Water. However, one of the most important criteria for selecting alternative Supplemental Water supplies is the quality of the Supplemental Water.

The Raymond Basin Judgment does not identify economic evaluation criteria for delivery of Supplemental Water. In the interest of managing the Basin, RBMB may choose to defer purchase of Supplemental Water for various reasons, including quality, price, availability, etc.

SECTION VI - DEVELOPMENT OF SUPPLEMENTAL WATER QUALITY CRITERIA

VI.1 BACKGROUND

Supplemental Water quality criteria must be consistent with the RBMB Judgment. Furthermore, delivery of such water should comply with regulatory standards established by the RWQCB and CDHS, particularly in the case of recycled water. The Judgment is silent on delivery of Supplemental Water except to the extent the RBMB may impose conditions to prevent degradation of water quality.

VI.2 SUPPLEMENTAL WATER CRITERIA – PRODUCER/NON-PARTIES

When evaluating a proposal to deliver Supplemental Water, RBMB may, in an attempt to receive the "best quality of water available", request deliveries (production) of Supplemental Water already in storage. In the event such water is not available, then RBMB may approve delivery of Supplemental Water if the water is the best quality available and complies with all other regulatory agencies' requirements. The applicant will be responsible for the costs of RBMB evaluation of the delivery request.

Figure 1 provides a detailed flow-chart of the decision-making process that will be followed when evaluating a request to deliver Supplemental Water. Figure 1 is divided into discrete sections 1 through 4, as described below.

1. Supplemental Water delivery requests may be submitted to RBMB by producers/non-parties. RBMB's criteria for Supplemental Water includes the "best quality of water available", must meet basin plan objectives and must meet specific selected minimum water quality criteria. Surface

deliveries must be coordinated through RBMB. The requesting entity should submit the quantity, spreading/injection location, source, quality, and schedule to RBMB for approval prior to delivery. The cost of the evaluation shall be borne by the applicant. (Note: It is generally expected that if a basin replenishment/recycled water project is developed, most, if not all, surface deliveries will be made into storage.)

2. RBMB staff will review the water delivery request. Any proposed delivery will be confirmed with Los Angeles County, Department of Public Works (DPW) in writing on a standardized form.

3. RBMB will consider <u>all</u> water quality parameters to determine the best quality of water available; however, the primary indicators are Title 22 standards and the Regional Board Basin Plan objectives. If the proposed delivery is not the best quality of water available, RBMB staff will determine if the requesting entity would like to request and fund a written waiver from RBMB. Without a written waiver request, the staff will recommend rejection of the delivery. A written waiver request will require further staff review and RMBM approval. RBMB may require Court approval to accept Supplemental Water that is not the "best quality of water available."

4. If the proposed Supplemental Water does not meet the RWQCB Basin Plan Objectives, RBMB staff will perform an impact analysis and submit a staff report and recommendation to RBMB. The impact analysis will include <u>at least</u>:

   <u>Mass Balance</u> - If the proposed delivery is <u>not</u> the best quality of water available, a mass balance will be performed comparing the proposed

Supplemental Water to either the best quality of water available or the Basin Plan objectives -- whichever results of the better water quality (comparing each key constituent). The mass balance may suggest a prorated reduction in the requested delivery. An example of a mass balance determination is shown on Plate 3.

Radial Degradation Model - A maximum radial degradation (area of impact) allowance will be standardized for each spreading facility. Each key constituent will be modeled according to the applicant's delivery plan.

If the modeling demonstrates that the spreading plan will not cause degradation to occur (at levels exceeding the Basin Plan) beyond the standardized degradation allowance, it will pass the radial degradation model test. An example of a radial degradation model is shown on Plates 4, 5 and 6.

Economic Impact - In the event that alternative water supplies are available, an economic analysis may also be used as a guide to recommend the Supplemental Water supply to RBMB.

If RBMB approves the delivery of any Supplemental Water, RBMB staff will coordinate spreading with the County of Los Angeles Department of Public Works (DPW) and other agencies that own their own recharge facilities.

VI.3 SUPPLEMENTAL WATER CRITERIA – RBMB ACTIVITY

When proposing to deliver Supplemental Water, RBMB will make every attempt to receive the "best quality of water available". Such deliveries should be consistent with Raymond Basin management and can be accomplished by the DPW. The costs of the study/Supplemental Water would be borne by the producers from the sub-area in which the Supplemental Water is proposed to be recharged.

Figure 2 provides a detailed flow-chart of the decision-making process that will be followed when evaluating a RBMB plan to deliver Supplemental Water. Figure 2 is divided into discrete sections 1 through 3, as described below.

1. RBMB's criteria for Supplemental Water includes the "best quality of water available", must meet basin plan objectives and must meet minimum water quality criteria. RBMB will consider the quantity, spreading location, source, quality, and schedule prior to delivery. (Note: It is generally expected that if a basin replenishment/recycled water project is developed, most, if not all, surface deliveries will be made into storage.)

2. RBMB will consider <u>all</u> water quality parameters to determine the best quality of water available; however, the primary indicators are Title 22 standards and the Regional Board Basin Plan objectives. If the proposed delivery is not the best quality of water available, RBMB staff will determine if the need for water supply may be the basis of a waiver of water quality provisions. A waiver will require further staff review and RMBM approval. RBMB may require Court approval to accept Supplemental Water that is not the "best quality of water available."

3. If the proposed Supplemental Water does not meet the RWQCB Basin Plan Objectives, RBMB staff will perform an impact analysis and submit a staff report and recommendation to RBMB.

Mass Balance - If the proposed delivery is not the best quality of water available, a mass balance will be performed comparing the proposed Supplemental Water to either the best quality of water available or the Basin Plan objectives -- whichever results of the better water quality (comparing each key constituent). The mass balance may suggest a prorated reduction in the requested delivery. An example of a mass balance determination is shown on Plate 3.

Radial Degradation Model - A maximum radial degradation (area of impact) allowance will be standardized for each spreading facility. Each key constituent will be modeled according to the applicant's delivery plan.

If the modeling demonstrates that the spreading plan will not cause degradation to occur (at levels exceeding the Basin Plan) beyond the standardized degradation allowance, it will pass the radial degradation model test. An example of a radial degradation model is shown on Plates 4, 5 and 6.

Economic Impact - In the event that alternative water supplies are available, an economic analysis may also be used as a guide to recommend the Supplemental Water supply to RBMB.

If RBMB approves the delivery of any Supplemental Water, RBMB staff will coordinate spreading with DPW.

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TABLE 1

WATER QUALITY OBJECTIVES FOR SELECTED CONSTITUENTS

GROUNDWATER BASIN	WATER QUALITY OBJECTIVES (mg/L)			
	TDS	SULFATE	CHLORIDE	BORON
Monk Hill Basin	450	100	100	0.5
Santa Anita sub-area	450	100	100	0.5
Pasadena sub-area	450	100	100	0.5

Source: Table 3-10, Water Quality Control Plan, Los Angeles Region 1994

TABLE 2

SOURCES OF SUPPLEMENTAL WATER

DELIVERING AGENCY 1/	SERVICE CONNECTION	SOURCE OF WATER 2/	DELIVERY RATE (CFS)	DELIVERY LOCATION
Metropolitan Water District of Southern California	-- 3/	Weymouth Treatment Plant	varies	Spreading Grounds
San Gabriel Valley Municipal Water District	--	SWP	50	Spreading Grounds
In-Lieu	--	Raymond Basin	varies	varies
Injection	--	Weymouth Treatment Plant	varies	varies
Recycled Water	--	Glendale/San Jose Creek WRPs	varies	Spreading Grounds

1/ Proposed sources of water supply
2/ SWP = State Water Project
WRP = Water Reclamation Plant
3/ Discharge release from Upper Feeder into spreading grounds

TABLE 3

RAYMOND BASIN
BACKGROUND WATER QUALITY

PRODUCER	WELL	HYDROLOGIC SUBUNIT OF MAIN SAN GABRIEL BASIN	BACKGROUND WATER QUALITY (MG/L)			
			TDS 1/	CHLORIDE	SULFATE	NITRATE
City of Arcadia	Chapman Well 7	Pasadena Sub-area	295	25	44	23
Kinneloa Irrigation District	Well 3	Pasadena Sub-area	310	28	55	22
La Canada Irrigation District	Well 1	Monk Hill Basin	530	66	81	49
Las Flores Water Company	Well 2	Monk Hill Basin	410	43	79	44
City of Pasadena	Copelin	Pasadena Sub-area	540	55	107	36
City of Sierra Madre	Well 4	Santa Anita Sub-area	220	8	16	10

1/ TDS = Total Dissolved Solids

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TABLE 4

SUPPLEMENTAL IMPORTED WATER QUALITY

Water Quality Parameter (Unit)	CDHS Title 22	RWQCB Basin Objectives Groundwater	Sources of Supply			
			State Water Project (Silverwood) 1/	MWD (Weymouth)	San Jose Creek Water Reclam. Plant	Glendale Water Reclamation Plant
Total Dissolved Solids (ppm)	1000	450	225	452	610	695
Chloride (ppm)	500	100	55	75	141	160
Sulfate (ppm)	500	100	34	164	143	147
Nitrate (ppm)	45	45	3.6	2.4	NA	1.18
Total Hardness as CaCO3 (ppm)	NR	NR	95	186	256	NA
Total Alkalinity as CaCO3 (ppm)	NR	NR	72	87	NA	NA
Turbidity (NTU)	5	NR	3.8	0.06	NA	NA
Calcium (ppm)	NR	NR	20	42	63.6	NA
Magnesium (ppm)	NR	NR	11	19.5	19.1	NA
Sodium (ppm)	NR	NR	42	80	126	NA
Potassium (ppm)	NR	NR	2.8	3.7	13.3	NA
pH	6.5 - 8.5	6.5 - 8.5	7.99	8.23	7.2	7.1
Iron (ppm)	0.3	NR	119	ND	NA	NA
Manganese (ppm)	0.05	NR	17	ND	NA	NA
Boron (ppm)	NR	0.5	0.16	0.15	0.55	0.6
PCE (ppb)	5	5	NA	NA	0.4	NA
TCE (ppb)	5	5	NA	NA	ND	NA
CTC (ppb)	0.5	0.5	NA	NA	ND	NA
Total Organic Carbon (ppm)	NR	NR	4.32	2.38	NA	NA
Other VOCs	2/	2/	NA	NA	NA	NA
Gross Alpha (pCi/l)	20,000	20,000	NA	NA	NA	NA
Gross Beta (pCi/l)	50	50	NA	NA	NA	NA
Langlier Index	NR	NR	NA	0.3	NA	NA
Arsenic (ppm)	0.01	0.05	2.1	0.8	ND	NA
Cadmium (ppm)	0.005	0.005	0.4	ND	ND	NA
Chromium (ppm)	0.05	0.05	ND	ND	0.0004	NA
Copper (ppm)	1	NR	ND	ND	NA	NA
Lead (ppm)	2	1.4 - 2.4	ND	ND	0.0003	NA
Mercury (ppm)	0.015	0.0052	ND	ND	ND	NA
Nickel (ppm)	0.1	0.1	3	ND	NA	NA
Silver (ppm)	0.1	NR	ND	ND	ND	NA
Zinc (ppm)	5	NR	ND	ND	NA	NA
Perchlorate (ppb)	6	4	NA	NA	NA	NA
1,4-Dioxane (ppb)	3	3	NA	NA	NA	NA
NDMA (ppb)	0.01	5	NA	NA	NA	NA

Footnotes:
1/ Two-year average (calendar year 1992 and 1993). Source, annual water quality report to MWD member agencies.
2/ Refer to Appendix B of this report
MWD = Metropolitan Water District of Southern California
NTU = NephelometricTurbidity Units
CFU = Colony - Forming Units
pCi/l = pico Curies per liter
ND = Non-Detected
NA = Not Available
ppm = parts per million
ppb = parts per billion

FIGURE 1

RBMB STAFF FLOWCHART FOR SUPPLEMENTAL WATER DELIVERIES PRODUCER/NON-PARTY REQUESTS

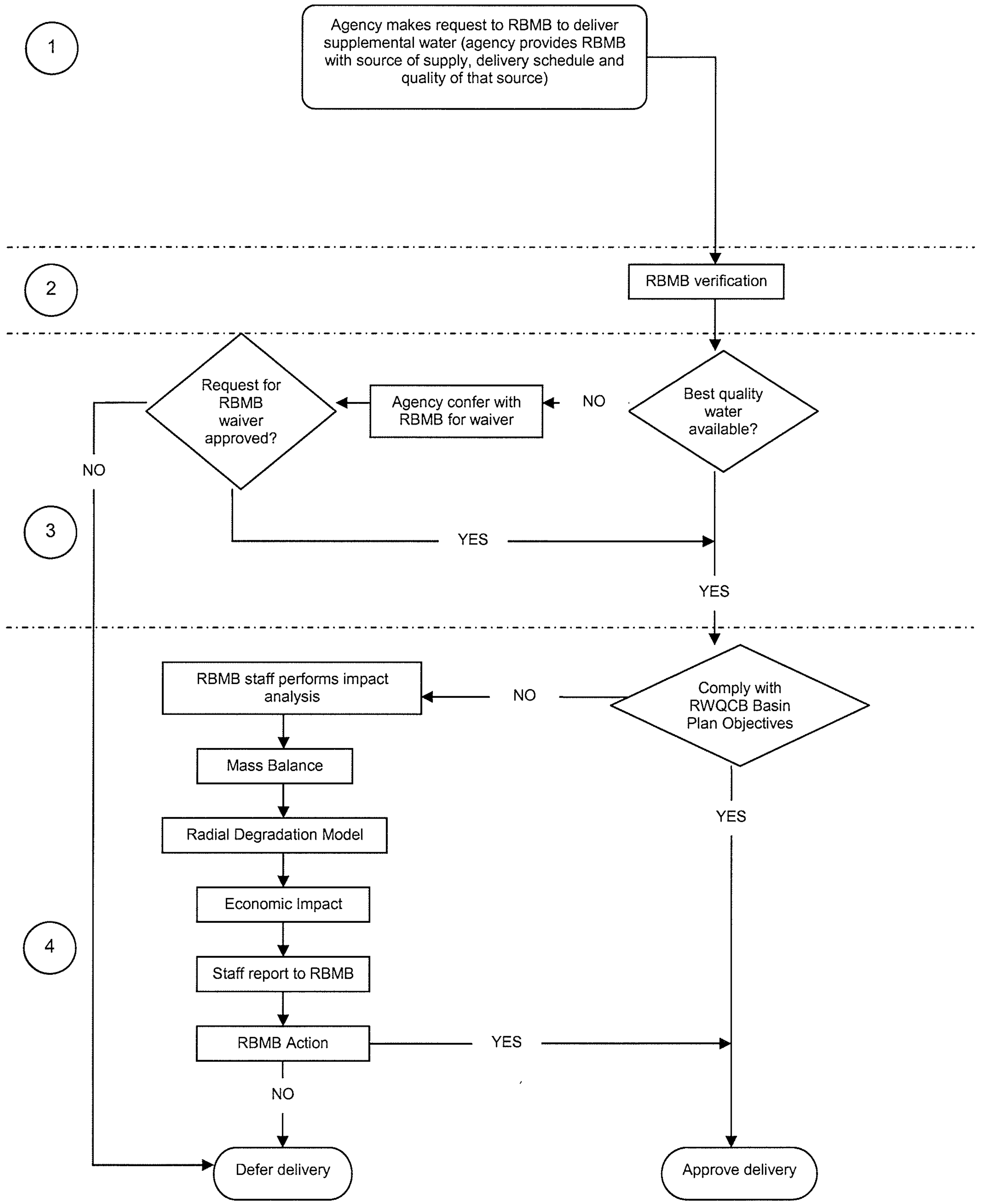


FIGURE 2

RBMB STAFF FLOWCHART FOR SUPPLEMENTAL WATER DELIVERIES
RBMB ACTIVITY

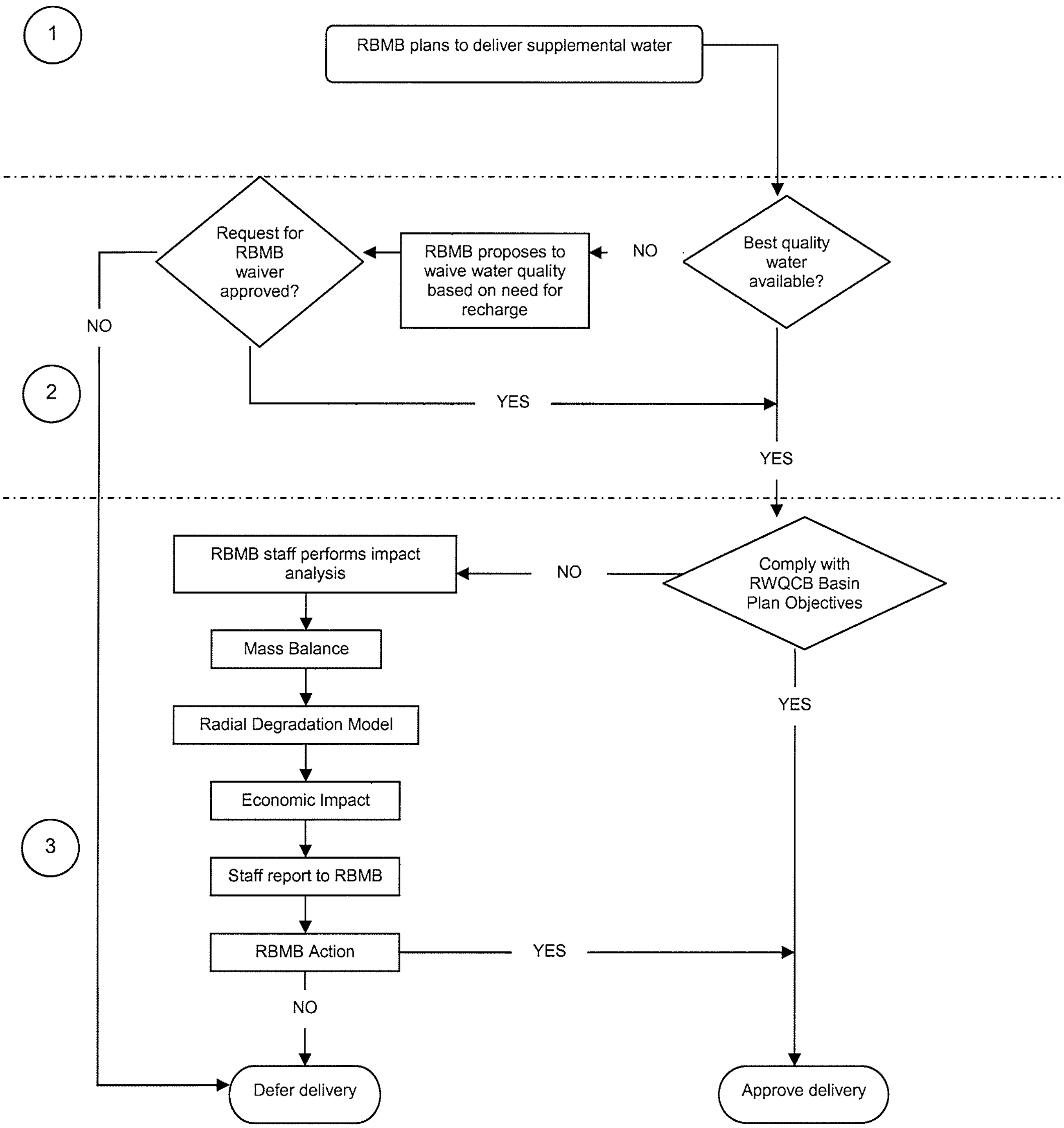
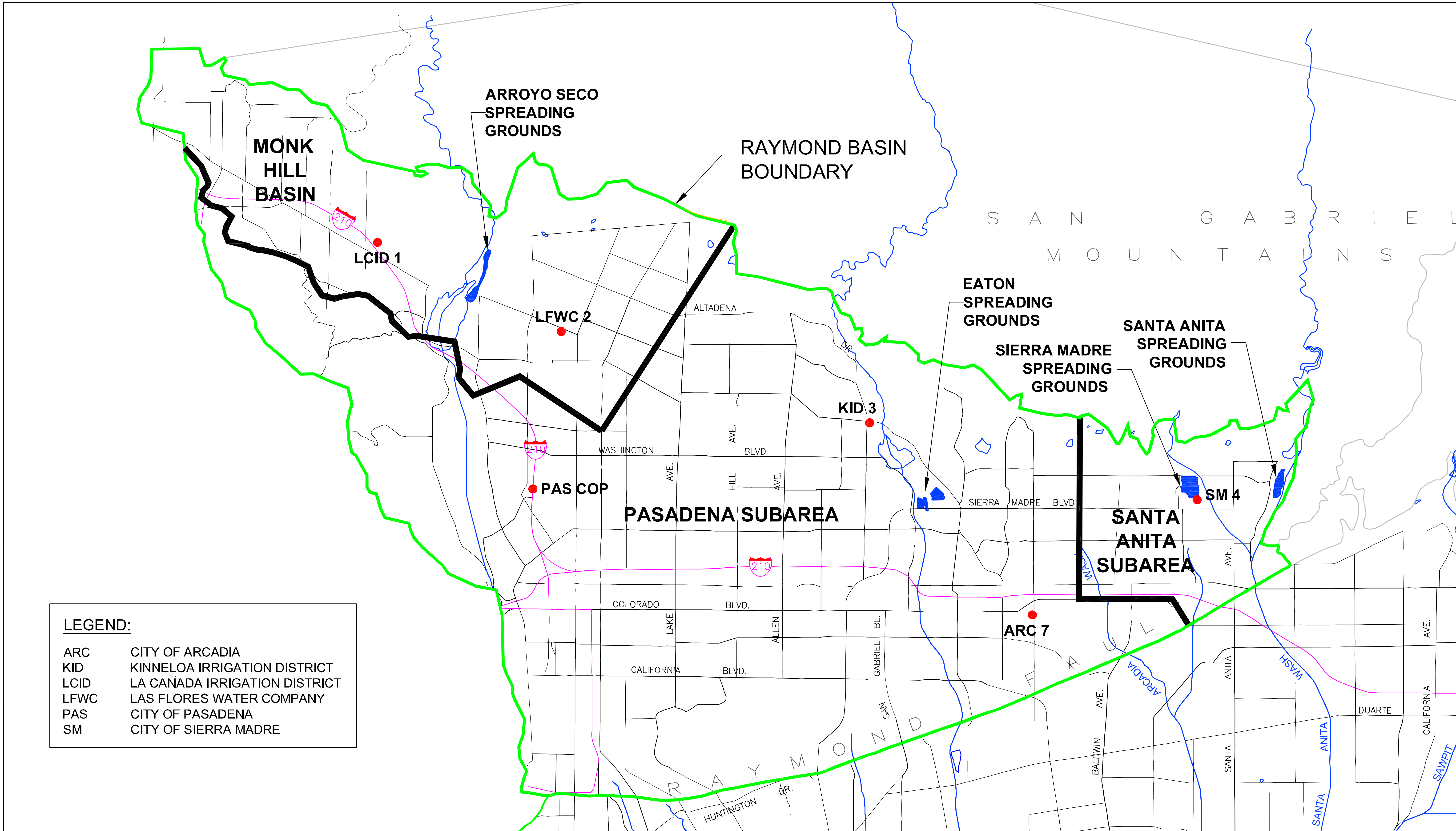


PLATE 1



STETSON ENGINEERS INC.
861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065
2171 E Francisco Blvd., Suite K
San Rafael California 94901
2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

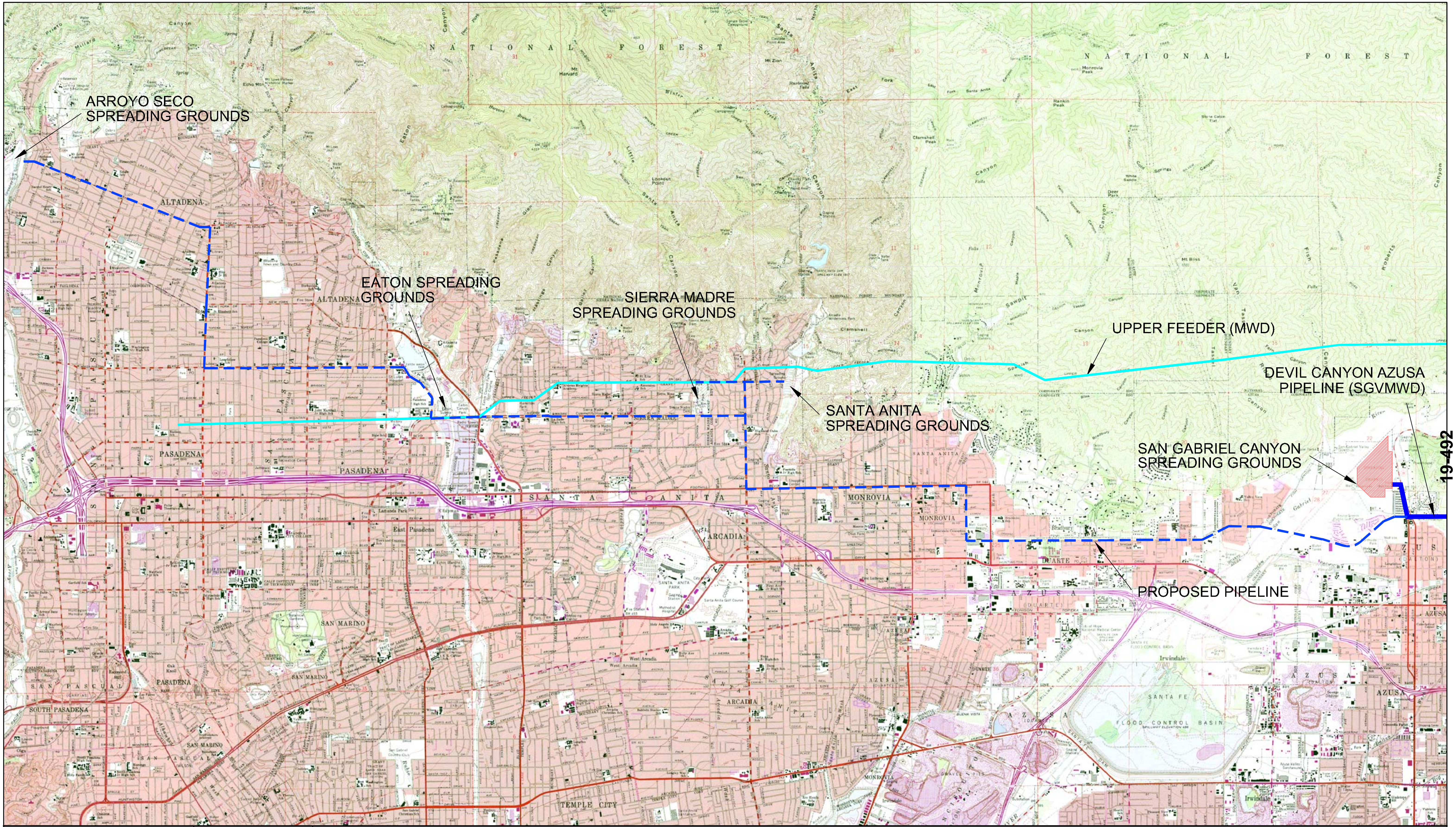
N
APPROXIMATE SCALE
1" = 5,000'

RAYMOND BASIN MANAGEMENT BOARD

RAYMOND BASIN HYDROLOGIC SUBUNITS

F:\JOBS\2111\2005 UWMP\PLATE 2.DWG

PLATE 2



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STETSON ENGINEERS INC.
861 VILLAGE OAKS DRIVE, SUITE 100
COVINA, CALIFORNIA 91724
TEL: (626) 967-6202
FAX: (626) 331-7065
2171 E Francisco Blvd., Suite K
San Rafael California 94901
2651 W Guadalupe Rd., Suite A209
Mesa Arizona 85202

N

APPROXIMATE SCALE
2,500' 0 2,500'

RAYMOND BASIN MANAGEMENT BOARD

FACILITY LOCATIONS

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MASS BALANCE ANALYSES

REQUEST FOR DELIVERY

DELIVERY AMOUNT	45000	ACRE-FEET
TDS CONCENTRATION	617	MILLIGRAMS PER LITER

MASS BALANCED DELIVERY USING BEST WATER QUALITY AVAILABLE (STATE WATER)

DELIVERY AMOUNT	22536	ACRE-FEET
TDS CONCENTRATION	309	MILLIGRAMS PER LITER

MASS BALANCED DELIVERY USING RWQCB BASIN OBJECTIVES

DELIVERY AMOUNT	32820	ACRE-FEET
TDS CONCENTRATION	450	MILLIGRAMS PER LITER

STETSON ENGINEERS INC.
Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

EXAMPLE OF MASS BALANCE ANALYSES FOR ALTERNATIVE SOURCES

***** CONCENTRATION AT ELEMENTS *****

	TIME/DISTANCE (Days/Feet)	0.	500.	1000.	1500.	2000.	2500.	3000.	3500.	4000.
DELIVERY PERIOD	30.	617.00	477.08	368.77	313.59	285.49	271.17	263.87	260.16	258.27
	60.	617.00	562.39	478.35	403.10	348.24	311.88	289.07	275.26	267.11
	90.	617.00	595.58	546.48	483.70	422.77	372.03	333.63	306.39	287.94
	120.	256.30	387.79	470.50	483.25	459.69	421.78	382.40	347.85	320.32
	150.	256.30	307.58	379.07	428.82	446.28	438.04	414.69	385.36	356.22
	180.	256.30	276.40	319.59	368.13	404.66	421.82	420.64	406.26	384.63
	210.	256.30	264.21	287.08	321.97	358.85	387.99	404.09	406.57	397.96
	240.	256.30	259.42	270.74	292.40	321.30	351.08	375.44	390.44	394.97

DELIVERY: AT SFSG, 15,000 AF/MO FOR THREE CONSECUTIVE MONTHS, TDS OF REPLACEMENT WATER = 617 MG/L

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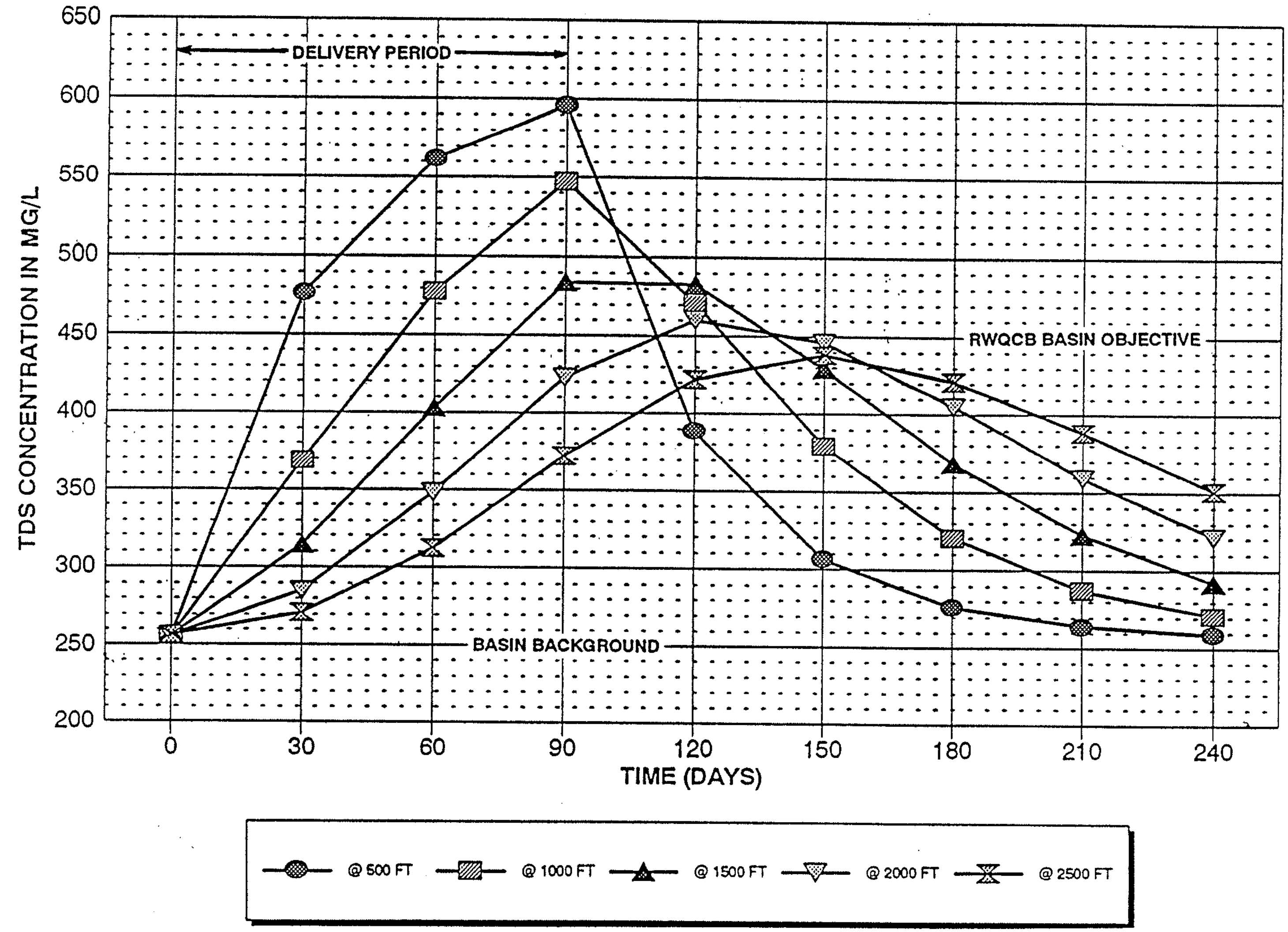
WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

EXAMPLE OF RADIAL DEGRADATION MODEL
TDS MIGRATION (AT OR NEAR WATER TABLE)

PLATE 4



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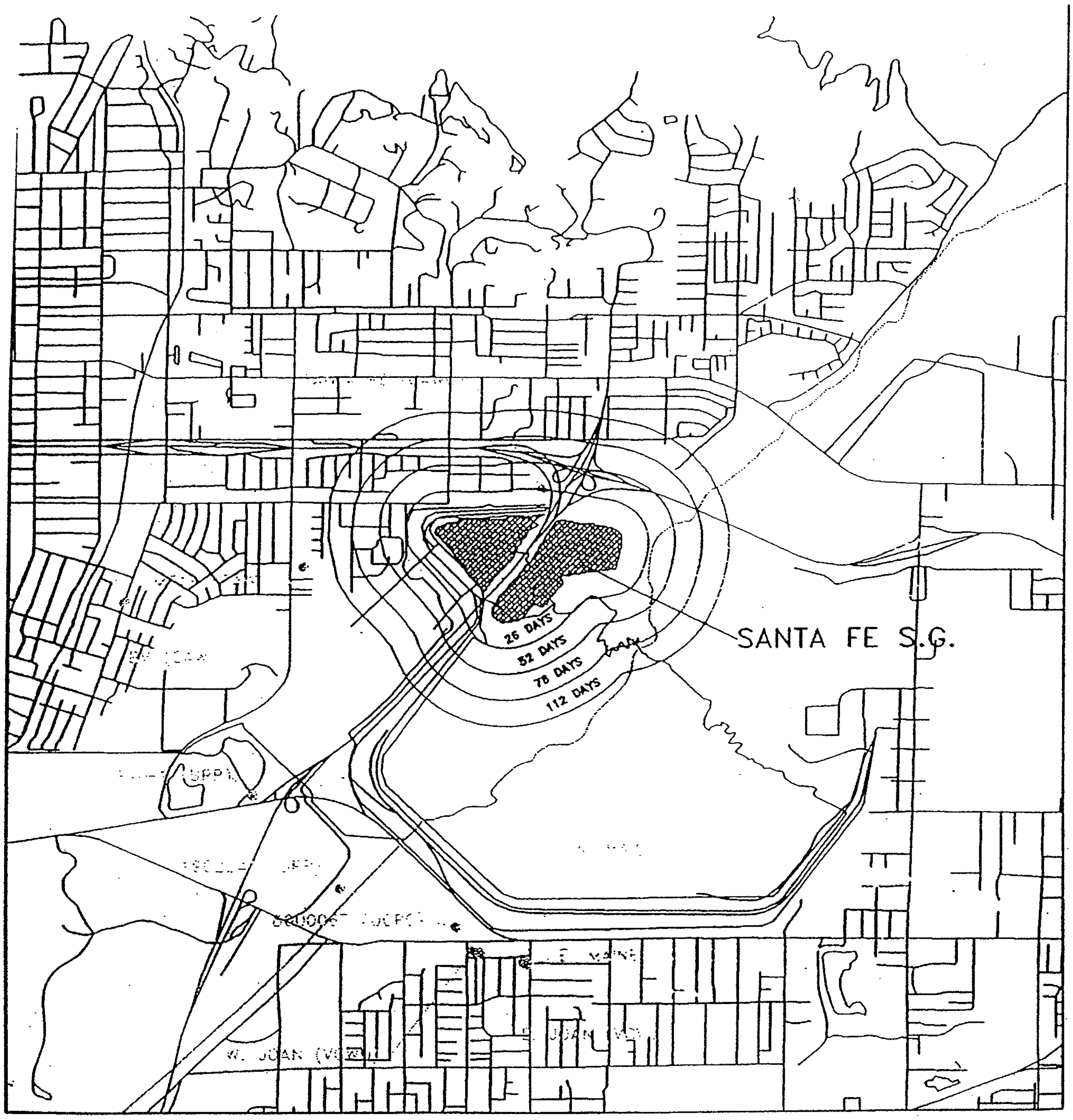
EXAMPLE OF RADIAL DEGRADATION MODEL OUTPUT FROM THE 1D-SOLUTE TRANSPORT PROGRAM

PLATE 5



CAWC	CALIFORNIA AMERICAN WATER COMPANY
LACDWP	LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS
ORP	OWL ROCK PRODUCTS
UCPC	UNITED CONCRETE PIPE COMPANY
URP	UNITED ROCK PRODUCTS
VCWD	VALLEY COUNTY WATER DISTRICT

DELIVERY:
- AT SANTA FE SPREADING GROUNDS
- 15,000 AF/MO FOR 3 CONSECUTIVE MONTHS
- TDS OF REPLACEMENT WATER = 617 MG/L

STETSON ENGINEERS INC.

Covina San Rafael Mesa, Arizona

WATER RESOURCE ENGINEERS

RAYMOND BASIN MANAGEMENT BOARD

EXAMPLE OF RADIAL DEGRADATION MODEL
MIGRATION OF THE 450 MG/L TDS CONTOUR

APPENDIX A

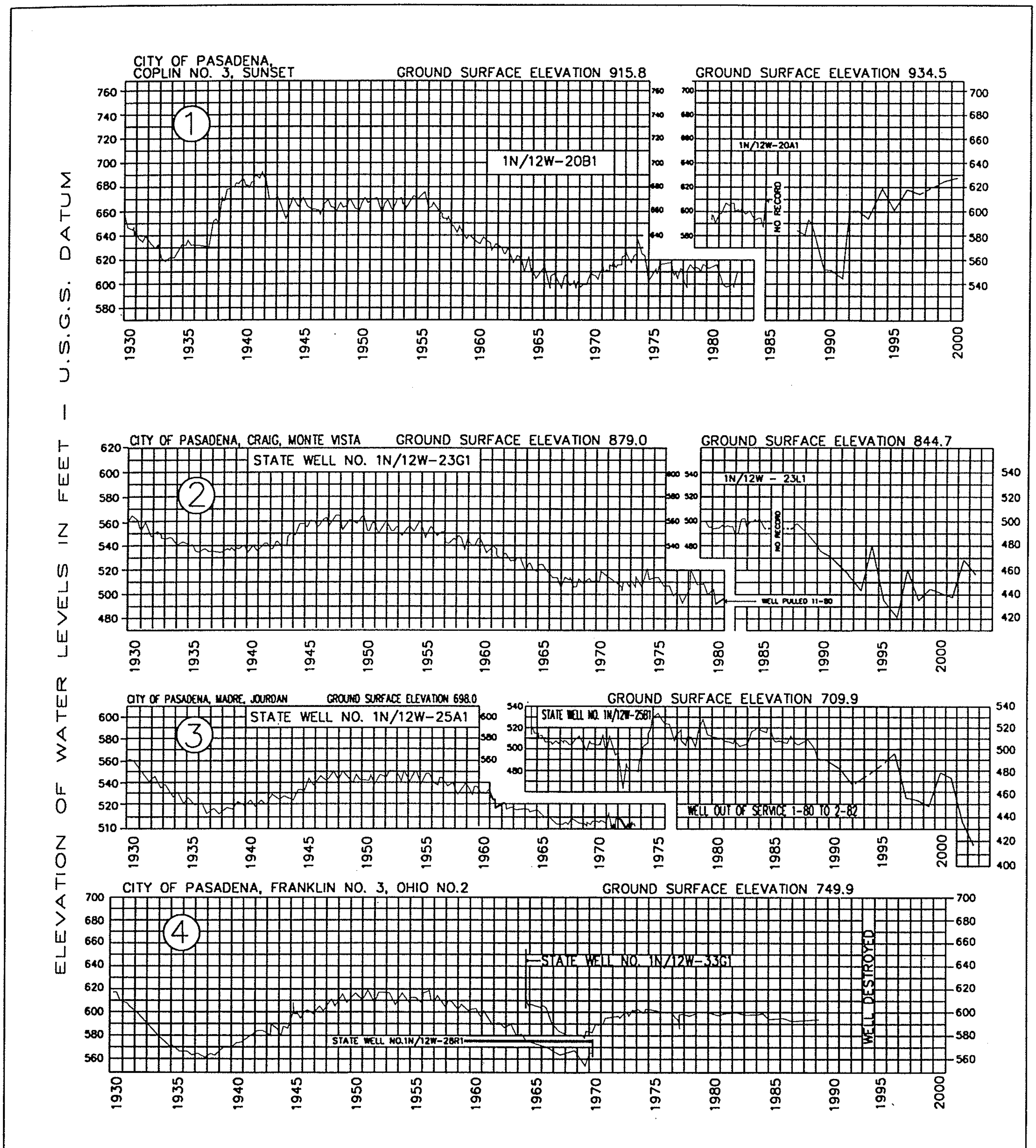


FIGURE 10a – FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA

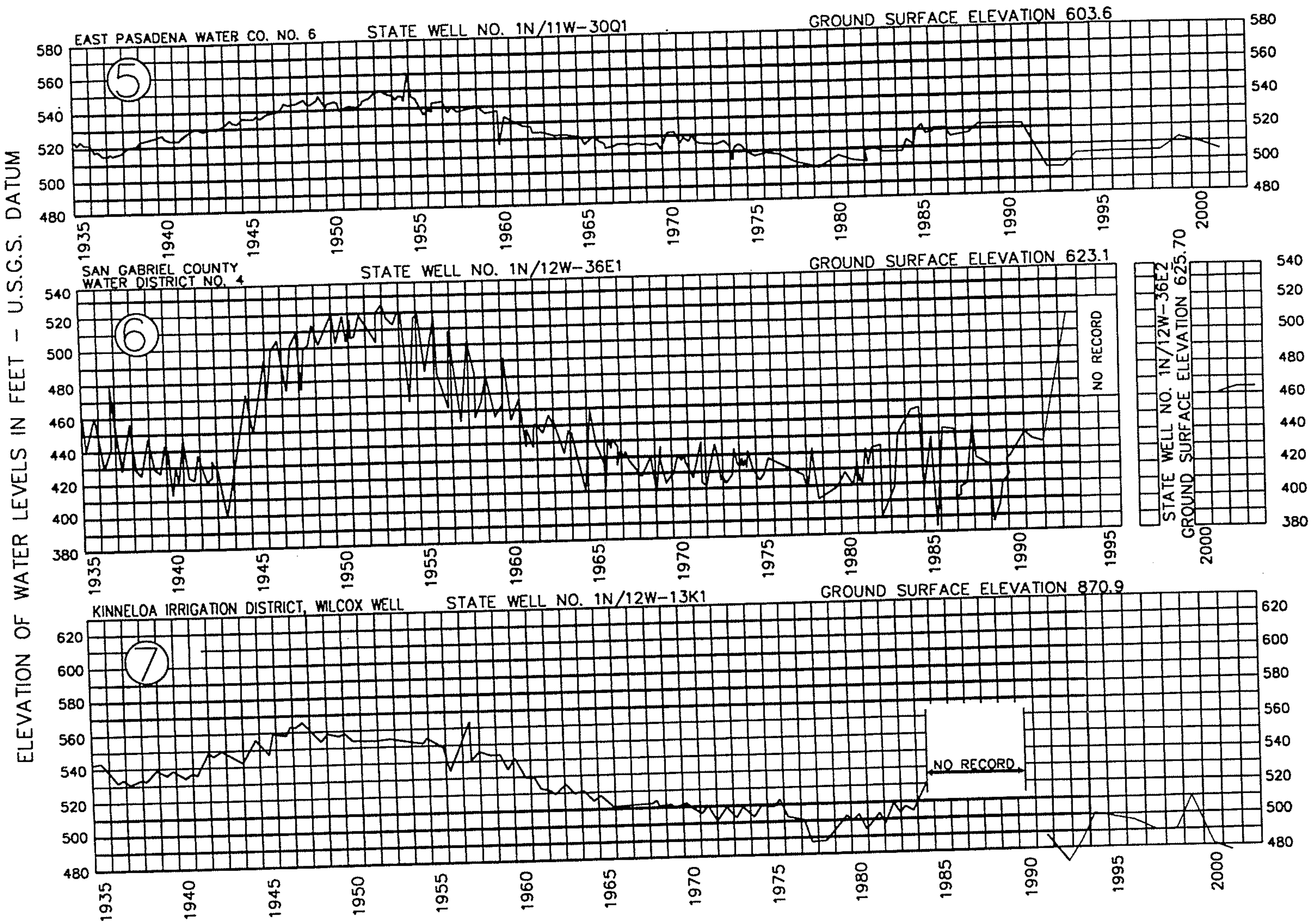


FIGURE 10b – FLUCTUATION OF WATER LEVELS AT WELLS IN THE PASADENA SUBAREA

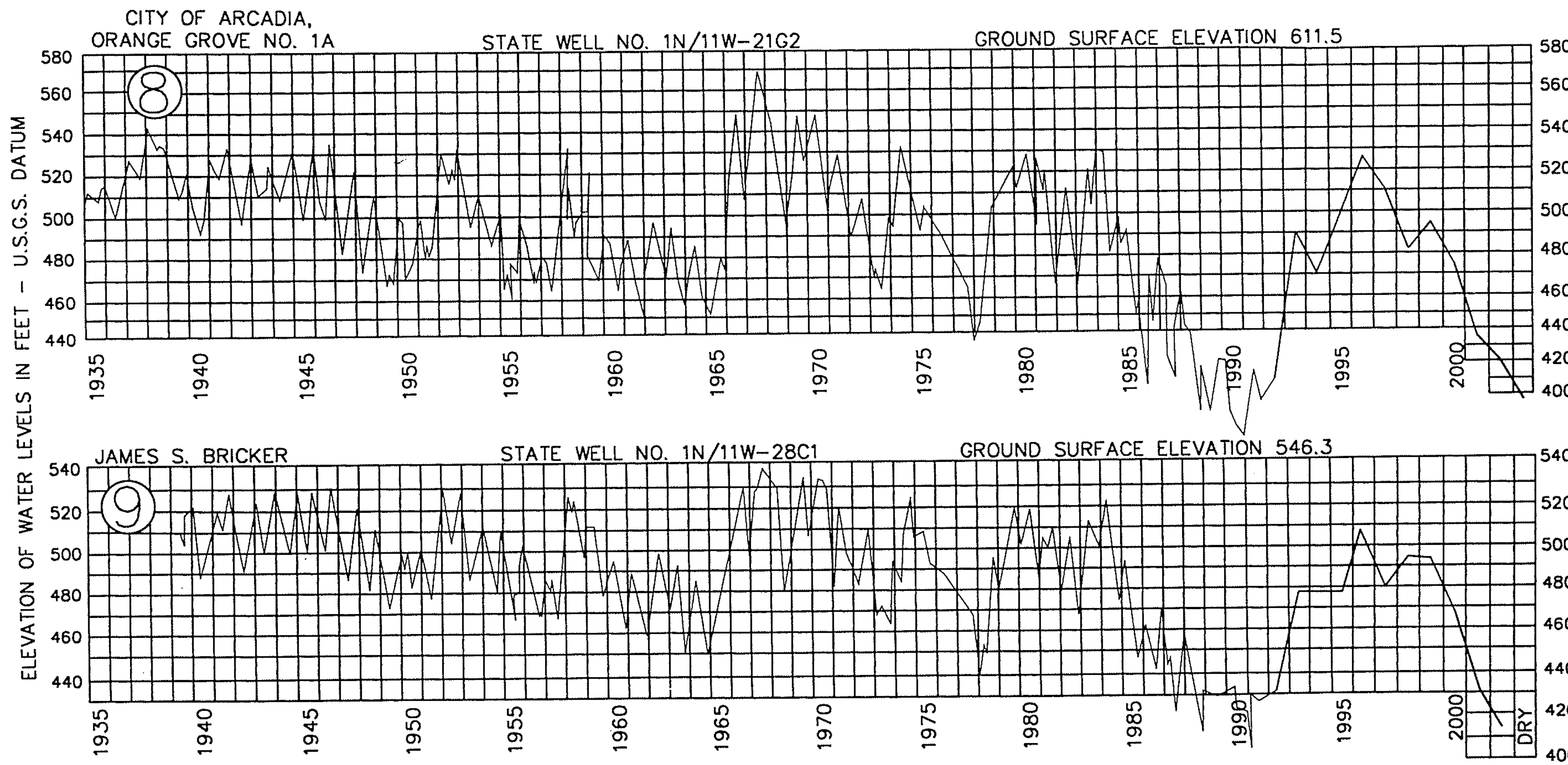


FIGURE 11 – FLUCTUATION OF WATER LEVELS AT WELLS IN THE SANTA ANITA SUBAREA

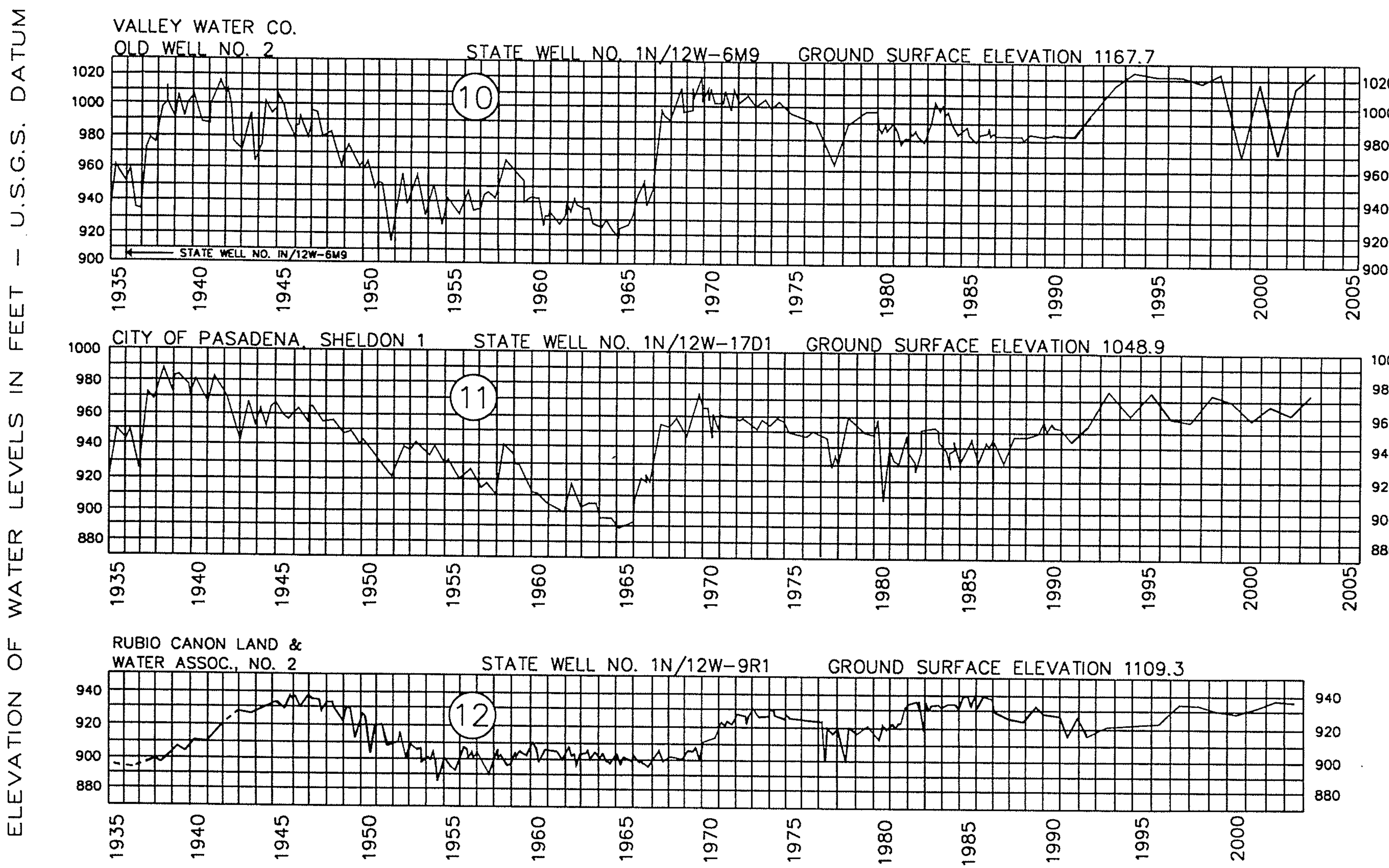


FIGURE 12 – FLUCTUATION OF WATER LEVELS AT WELLS IN THE MONK HILL BASIN

APPENDIX B

CDHS TITLE 22,
CDHS RECLAIMED WATER STANDARDS AND
RWQCB BASIN PLAN OBJECTIVES

CONSTITUENT	CDHS Title 22	CDHS RECL. WATER STANDARDS	RWQCB OBJECTIVES GROUND WATER	RWQCB OBJECTIVES SURFACE WATER
BACTERIA (MCL in coliforms per 100 ml)				
COLIFORM	5% OF SAMPLES 1/	2.2	1.1	200
INORGANICS CHEMICALS (MCLS in mg/l)				
ALUMINUM	1.000	1.000	1.000	1.000
AMMONIA, UN-IONIZED (as NITROGEN)	NR	NR	NR	0.21
AMMONIA, TOTAL (as NITROGEN)	NR	NR	NR	5.60
ANTIMONY	0.006	0.006	0.006	0.006
ARSENIC	0.05	0.05	0.05	0.05
ASBESTOS (In Million Fibers per Liter (MFL))	7.000	7.000	7.0	NR
BARIUM	1.0	1.000	1.000	1.000
BERYLLIUM	0.004	0.004	0.004	0.004
CADMIUM	0.005	0.005	0.005	0.005
CHROMIUM	0.05	0.050	0.05	0.05
CYANIDE	0.15	0.150	0.150	0.15
FLUORIDE	2.0	2.000	1.400-2.400	1.400-2.400
LEAD	0.015	NR	0.0052	0.0052
MERCURY	0.002	0.002	0.002	0.002
NICKEL	0.1	0.100	0.100	0.100
NITRATE (as NITRATE)	45	45.000	45.000	45.000
NITRITE (as NITROGEN)	1.000	1.000	1.000	1.000
NITRATE + NITRITE (as NITROGEN)	10.0	10.000	10.000	10.000
TOTAL NITROGEN (as NITROGEN)	NR	10.000	8.000	8.000
SELENIUM	0.05	0.050	0.050	0.05
SILVER	0.1	0.1	NR	NR
THALLIUM	0.002	0.002	0.002	0.002
RADIOACTIVITY (MCLS in pCi/L)				
RADIUM-226 + RADIUM-228	5	5	5	5
GROSS ALPHA PARTICLE ACTIVITY	15	15	15	15
TRITIUM	20,000	20,000	20,000	20,000
STRONTIUM-90	8	8	8	8
GROSS BETA PARTICLE ACTIVITY	50	50	50	50
URANIUM	20	20	20	20
VOLATILE ORGANIC CHEMICALS (MCLS in mg/l)				
BENZENE	0.001	0.0010	0.0010	0.001
CARBON TETRACHLORIDE	0.0005	0.0005	0.00050	0.00025
1,2-DICHLOROBENZENE	0.6	0.6000	0.6	0.6
1,4-DICHLOROBENZENE	0.005	0.0050	0.005	0.005
1,1-DICHLOROETHANE	0.005	0.0050	0.005	0.005
1,2-DICHLOROETHANE	0.0005	0.0005	0.0005	0.0005
1,1-DICHLOROETHYLENE	0.006	0.0060	0.006	0.006
cis-1,2-DICHLOROERTHYLENE	0.006	0.0060	0.006	0.006
trans-1,2-DICHLOROETHYLENE	0.01	0.0100	0.01	0.01
DICHLOROMETHANE	0.005	0.0050	0.005	0.005

CDHS TITLE 22,
CDHS RECLAIMED WATER STANDARDS AND
RWQCB BASIN PLAN OBJECTIVES

CONSTITUENT	CDHS Title 22	CDHS RECL. WATER STANDARDS	RWQCB OBJECTIVES GROUND WATER	RWQCB OBJECTIVES SURFACE WATER
1,2-DICHLOROPROPANE	0.005	0.0050	0.005	0.005
1,3-DICHLOROPROPENE	0.0005	0.0005	0.0005	0.0005
ETHYLBENZENE	0.3	0.3	0.7	0.7
ETHYLENE DIBROMIDE	0.00005	0.00005	0.00005	0.00005
MONOCHLOROBENZENE	0.07	0.0700	0.07	0.07
STYRENE	0.1	0.1000	0.1	0.1
1,1,2,2-TETRACHLOROETHANE	0.001	0.0010	0.001	0.001
TETRACHLOROETHYLENE	0.005	0.0050	0.005	0.005
TOLUENE	0.15	0.1500	0.15	0.15
1,2,4-TRICHLOROBENZENE	0.005	0.0050	0.0700	0.07
VOLATILE ORGANIC CHEMICALS (MCLS in mg/l)				
1,1,1-TRICHLOROETHANE	0.2	0.2000	0.2000	0.200
1,1,2-TRICHLOROETHANE	0.005	0.0050	0.005	0.005
TRICHLOROETHYLENE	0.005	0.0050	0.005	0.005
TRICHLOROFLUOROMETHANE (FREON 11)	0.15	0.1500	0.15	0.15
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (FREON 113)	1.2	1.2000	1.2000	1.2
VINYL CHLORIDE	0.0005	0.0005	0.0005	0.0005
XYLENES	1.750*	1.7500	1.7500	1.750
NON-VOLATILE SYNTHETIC ORGANIC CHEMICALS (MCLS in mg/l)				
ALACHLOR	0.002	0.0020	0.002	0.002
ATRAZINE	0.001	0.0010	0.003	0.003
BENTAZON	0.018	0.0180	0.018	0.018
BENZO(A)PYRENE	0.0002	0.0002	0.0002	0.0002
CARBOFURAN	0.018	0.0180	0.018	0.018
CHLORDANE	0.0001	0.0001	0.0001	0.0001
2,4-D	0.07	0.0700	0.07	0.07
DALAPON	0.2	0.2000	0.2	0.2
1,2-DIBROMO-3-CHLOROPROPANE	0.0002	0.0002	0.0002	0.0002
DI (2-ETHYLHEXYL) ADIPATE	0.4	0.4000	0.4	0.4
DI (2-ETHYLHEXYL) PHTHALATE	0.004	0.0040	0.004	0.004
DINOSEB	0.007	0.0070	0.007	0.007
DIQUAT	0.02	0.0200	0.02	0.02
ENDOTHALL	0.1	0.1000	0.1	0.1
ENDRIN	0.002	0.0020	0.002	0.002
ETHYLENE DIBROMIDE	0.00005	0.00005	0.00005	0.00005
GLYPHOSATE	0.7	0.7000	0.7000	0.7
HEPTACHLOR	0.00001	0.00001	0.00001	0.00001
NON-VOLATILE SYNTHETIC ORGANIC CHEMICALS (MCLS in mg/l)				
HEPTACHLOR EPOXIDE	0.00001	0.00001	0.00001	0.00001
HEXACHLOROBENZENE	0.001	0.0010	0.001	0.001
HEXACHLOROCYCLOPENTADIENE	0.05	0.0500	0.05	0.05
LINDANE	0.0002	0.0002	0.0002	0.0002
METHOXYCHLOR	0.03	0.0300	0.04	0.04
MOLINATE	0.02	0.0200	0.02	0.02

CDHS TITLE 22,
CDHS RECLAIMED WATER STANDARDS AND
RWQCB BASIN PLAN OBJECTIVES

CONSTITUENT	CDHS Title 22	CDHS RECL. WATER STANDARDS	RWQCB OBJECTIVES GROUND WATER	RWQCB OBJECTIVES SURFACE WATER
OXAMYL	0.05	0.0500	0.2	0.2
PENTACHLOROPHENOL	0.001	0.0010	0.001	0.001
PICLORAM	0.5	0.5000	0.5	0.5
POLYCHLORNATED BIPHENOLS	0.0005	0.0005	0.0005	0.0005
POLYCHLORINATED BIPHENYLS (PCBs) (in ng/l)	NR	NR	NR	14.0-30.0
SIMAZINE	0.004	0.0040	0.004	0.004
THIOBENCARB	0.07	0.0700	0.07	0.07
TOXAPHENE	0.003	0.0030	0.003	0.003
2,3,7,8-TCDD (DIOXIN)	0.00000003	0.00000003	0.00000003	0.00000003
2,4,5-TP (SILVEX)	0.05	0.0500	0.05	0.05
ACTION LEVELS (ug/l)				
	6	6	4.00	4.00
PERCHLORATE	3	3	3.00	3.00
1,4-DIOXANE	0.01	0.01	5.00	5.00
N-NITROSODIMETHYLAMINE				
SECONDARY STANDARDS (MCLS in mg/l)				
ALUMINUM	0.2	0.2000	1.0000	1.0000
BORON	NR	NR	0.5	0.5
CHLORIDE	500	250-500	100	150
COLOR (Units)	15	15	NR	NR
COPPER	1	1.0000	NR	NR
CORROSIVITY	Non-corrosive	Non-corrosive	NR	NR
FOAMING AGENTS (MBAS)	0.5	0.5000	NR	NR
IRON	0.3	0.3000	NR	NR
MANGANESE	0.05	0.0500	NR	NR
SECONDARY STANDARDS (MCLS in mg/l)				
ODOR-THRESHOLD (Units)	3	3	NR	NR
pH (Units)	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
SULFATE	500	250-500	100	300 2/
				300 3/
THIOBENCARB	0.001	0.0010	NR	NR
TOTAL DISSOLVED SOLIDS (TDS)	1000	500-1,000	450	950 2/
				750 3/
TOTAL ORGANIC CARBON (TOC)	NR	20.0	NR	NR
SUSPENDED SOLIDS (SS)	NR	30.0	NR	150
BIOCHEMICAL OXYGEN DEMAND (BOD)	NR	30.0	NR	30
TURBIDITY (Units)	5	5	NR	150
ZINC	5	5.0000	NR	NR
DISSOLVED OXYGEN (DO)	NR	NR	5.0	5.0
TEMPERATURE (F)	NR	NR	5-80	5-80

NOTES

CDHS : STATE DEPARTMENT OF HEALTH SERVICES
RWQCB : CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD/LOS ANGELES REGION
MCL : MAXIMUM CONTAMINANT LEVEL
mg/l : MILLIGRAMS PER LITER

CDHS TITLE 22,
CDHS RECLAIMED WATER STANDARDS AND
RWQCB BASIN PLAN OBJECTIVES

CONSTITUENT	CDHS Title 22	CDHS RECL. WATER STANDARDS	RWQCB OBJECTIVES GROUND WATER	RWQCB OBJECTIVES SURFACE WATER

ng/l : NANOGRAMS PER LITER
pCi/L : PICOCURIES PER LITER
NR : NOT REQUIRED
TOTAL NITROGEN = AMMONIA NITROGEN + ORGANIC NITROGEN + NITRATE (AS NITROGEN) + NITRITE (AS NITROGEN)
*MCL IS FOR EITHER A SINGLE ISOMER OR THE SUM OF THE ISOMERS.
1/ IF AT LEAST 40 OR MORE SAMPLES COLLECTED PER MONTH, OTHERWISE NO MORE THAN ONE SAMMPLE PER MONTH SHALL BE POSITIVE, SEE PAGE 11 CDHS TITLE 22.
2/ TAKEN FROM WATER QUALITY CONTROL PLAN, LOS ANGELES REGION, WATER QUALITY OBJECTIVES, TABLE 3-8, ABOVE FIGUEROA STREET
3/ TAKEN FROM WATER QUALITY CONTROL PLAN, LOS ANGELES REGION, WATER QUALITY OBJECTIVES, TABLE 3-8, RIO HONDO ABOVE SANTA ANA FI