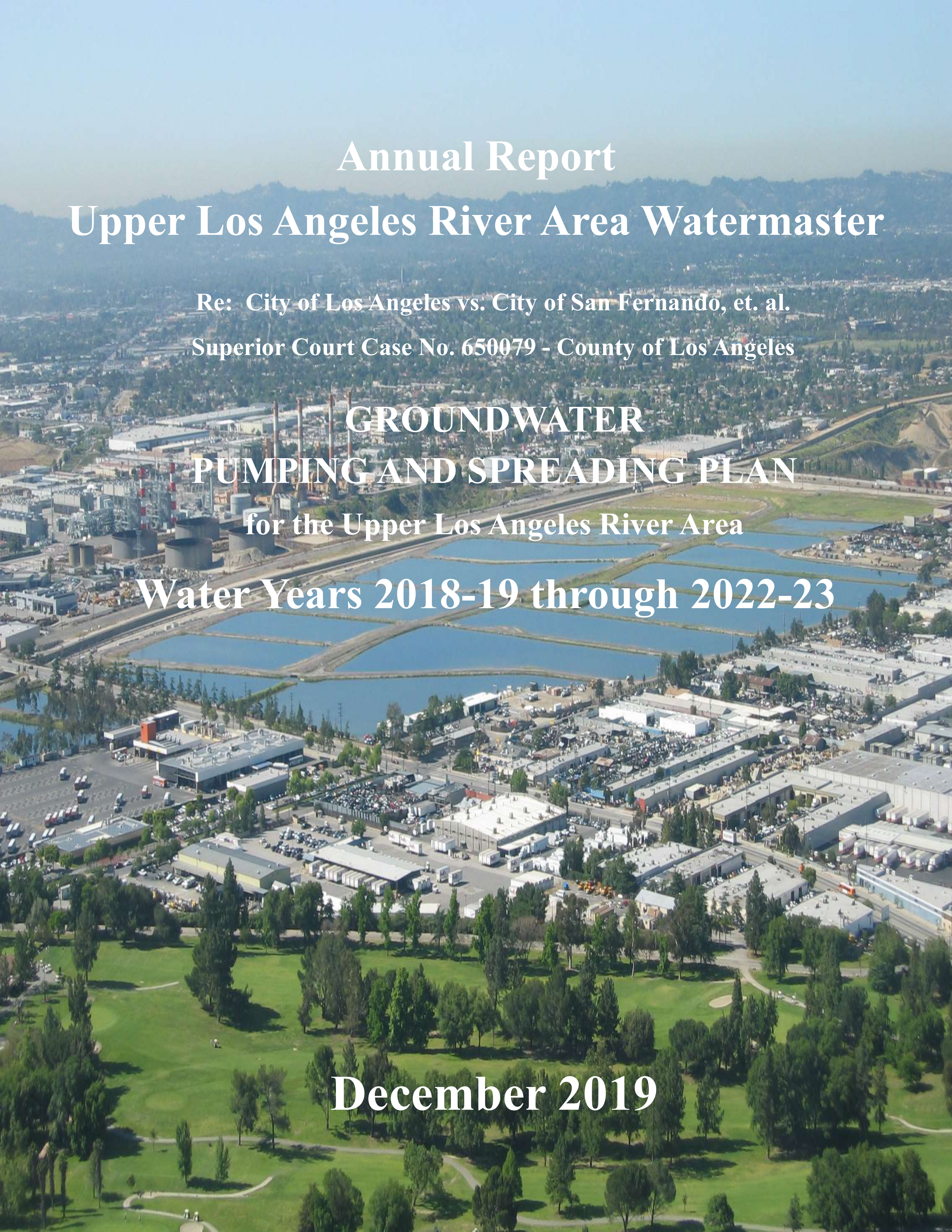

Annual Report
Upper Los Angeles River Area Watermaster

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

Superior Court Case No. 650079 - County of Los Angeles

GROUNDWATER
PUMPING AND SPREADING PLAN

for the Upper Los Angeles River Area

Water Years 2018-19 through 2022-23

December 2019

ANNUAL REPORT

UPPER LOS ANGELES RIVER AREA WATERMASTER

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

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

Water Years 2018-19 through 2022-23
(October 2018 – September 2023)

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Copies of this report may be downloaded from the
ULARA Watermaster Website (http://ULARAwatermaster.com).

December 2019

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I. EXECUTIVE SUMMARY

As Watermaster for the Court-adjudicated Upper Los Angeles River Area (ULARA), I am pleased to submit this Annual Report for the Groundwater Pumping and Spreading Plan for Water Years 2018-19 through 2022-23 (i.e., for the period of October 1, 2018 through September 30, 2023). Note that this Groundwater Pumping and Spreading Plan is being submitted to the Court later than its anticipated July 2019 filing date. Due to the delayed receipt of data necessary for analysis, reporting, and timely finalization of the report, this current report is being provided to the Court in November 2022. To avoid confusion with the submittal to the Court of the previous Annual Pumping and Spreading Plan for Water Years 2017-18 through 2021-22, this current report has been purposely dated December 2019.

Preparation of this Annual Report is in compliance with Section 5.4 of the Policies and Procedures document (as developed by the original ULARA Watermaster), which established the Watermaster's responsibility for management of the four groundwater basins in ULARA (the San Fernando, Verdugo, Sylmar and Eagle Rock basins). Also provided in this Groundwater Pumping and Spreading Plan, as appendices, are the individual pumping and spreading plans submitted by each of the five major pumping Parties in ULARA (the cities of Burbank, Glendale, Los Angeles and San Fernando, and the Crescenta Valley Water District) for their proposed operations during Water Years 2018-19 through 2022-23. Further, this report discusses the possible changes in recharge, spreading, pumping rates and pumping patterns, especially in relation to the available plans for cleanup of the contaminated groundwater in the eastern portion of the San Fernando Groundwater Basin (SFB).

Spreading operations in ULARA during Water Year 2018-19 were projected to be nearly three times the volume of the recent 5-year average and nearly 30 percent higher than the long-term average volume of spreading (1968-2018). Municipal pumping in three of the four ULARA groundwater basins (there is no municipal pumping from Eagle Rock Basin) is expected to be less than the recent 5-year and long-term averages during the 2018-19 water year. Consistent with past practices and pumped as part of groundwater cleanup operations within their respective USEPA Operable Units (OUs), the cities of Burbank and Glendale are on track to pump more than their adjudicated water rights from SFB in Water Year 2018-19. The City of Los Angeles continues to experience considerable challenges with groundwater contamination in the eastern portion of the SFB and continues to implement changes to their system (such as wellhead treatment facilities) where possible. In addition, work by the City of Los Angeles to construct new and/or replacement water wells in the Sylmar Basin has been ongoing to further increase the supply of local groundwater. The City of Los Angeles projects that sizeable municipal-supply extractions from the Sylmar Basin will resume in Water Year 2019-20; no extractions are projected to occur from this basin in the current Water Year by this City. The City of San Fernando also continued to experience pumping difficulties in the Sylmar Basin as a result of groundwater contamination and expects to pump less than its annual entitlements from this basin. In the Verdugo Basin, the Crescenta Valley Water District (CVWD) pumped less than its adjudicated water rights in the prior Water Year 2017-18 because some of its wells were out of service for rehabilitation, recurring bacteriological problems and declining water levels. CVWD expects to produce less than its adjudicated water rights in Water Year 2018-19 as well. Glendale similarly produced less than its adjudicated water rights in the Verdugo Basin in Water Year 2017-18 due to its limited local pumping capacity and expects to produce less than its adjudicated water rights from this basin during this current Water Year as well. There are no municipal-supply wells in the Eagle Rock Basin, the smallest of the four separate groundwater basins in ULARA.

There are currently five major groundwater cleanup facilities in operation in ULARA; each facility has its own extraction wells and treatment plant. These include: the North Hollywood Operable Unit (NHOU) and the Pollock Wells Treatment Plant, both of which are located in the City of Los Angeles; the Burbank Operable Unit (BOU) in Burbank; the Glendale Operable Unit (GOU), which includes the Glendale North Extraction Wells in Glendale and the Glendale South Extraction Wells in the City of Los Angeles; and the CVWD Glenwood Nitrate Water Treatment Plant in La Crescenta. In addition, the City of Los Angeles continues to operate wellhead treatment facilities on a few of its 12 wells at its Tujunga Wellfield in the SFB. CVWD recently brought a new nitrate treatment plant online at its Well No. 2 site. In November 2018, the City of San Fernando was able to bring its new nitrate treatment plant online in the Sylmar Basin.

The City of Los Angeles has had to reduce pumping in some of its wellfields in the SFB in response to ongoing water quality concerns regarding the existence of certain contaminants in the groundwater at concentrations that exceed their respective regulatory limits for public supply. As a result, the Los Angeles Department of Water and Power (LADWP) has begun evaluating potential response actions to restore the beneficial use of groundwater in the vicinity of its various wellfields in the eastern portion of the SFB. These efforts include the study of appropriate response actions as well as other analyses and activities to help evaluate appropriate response actions. While additional work is required to evaluate the appropriate interim and final response actions for each area, one potential set of alternatives would consist of a series of local and centralized treatment facilities that produce water for potable use. In addition, wellhead treatment in the Tujunga Wellfield has allowed for increased groundwater extraction from the SFB.

The groundwater model for the SFB is updated annually by the Watermaster Support Services group at the LADWP and continues to be used to simulate the combined effects of the projected pumping and spreading operations on groundwater elevations in the SFB for the five-year period ending September 30, 2023. Groundwater elevations simulated by this model are projected to decrease in most areas of the SFB, despite the projected future spreading of stormwater and imported water exceeding groundwater extractions in this basin over the model simulation period. In that model, some "pumping troughs," or areas of declining water levels, were identified as a result of ongoing pumping operations in the areas exhibiting these troughs in the eastern portion of the SFB.

Also noteworthy are the simulated groundwater elevation contours in the areas near the BOU wells, which appear to show some possible effects of plume containment by those wells. The estimated cumulative amounts of spreading were projected to exceed the cumulative amounts of spreading by 17,508 acre-feet (AF) over the next five years, as simulated by the LADWP model using projections of future pumping and spreading operations provided by the ULARA Parties for the LADWP modeling effort.

In closing, I thank each Party for taking the time and making the effort to provide its individual Spreading and Pumping Plan for the next five water years, and express my appreciation to each of these Parties for providing information and data that were essential to the preparation of this Annual Pumping and Spreading Plan document for Water Years 2018-19 through 2022-23. Also, much appreciated has been the continued assistance of the Watermaster Support Services group at LADWP (including Mr. Hadi Jonny, Ms. Fatema Akhter, Mr. Rafael Villegas, Mr. Manuel Aguilar) in helping with data analyses, modeling and preparation of the figures for this report.

Respectfully Submitted,

RICHARD C. SLADE
ULARA Watermaster

II. INTRODUCTION

As a result of the groundwater contamination that was detected in certain municipal-supply water wells in the eastern portion of the San Fernando Basin in the late-1970s, the original ULARA Watermaster and Administrative Committee, together with the Los Angeles Regional Water Quality Control Board (RWQCB-LA), revised the ULARA Watermaster's Policies and Procedures document in late-1993 to consider measures or actions oriented to help prevent further degradation of groundwater quality and to help limit the spread of contamination in the ULARA groundwater basins. The Policies and Procedures document was revised again by that Watermaster in February 1998 to organize the material into a more comprehensive document.

Section 5.4 of the Policies and Procedures requires each of the five municipal-supply purveyors (Parties) in ULARA to prepare its own annual Groundwater Pumping and Spreading Plan for each successive five-year period. These five Parties include the cities of Burbank, Glendale, Los Angeles and San Fernando as well as CVWD. Each of these municipal-supply pumpers is tasked to annually submit (on or before May 1 of each water year) its own Groundwater Pumping and Spreading Plan to the ULARA Watermaster in fulfillment of this requirement. Each plan is to include the projected groundwater pumping and spreading volumes, recent water quality data for each active water well, and possible modifications planned for key facilities owned and/or operated by that Party (e.g., constructing or destroying wells, constructing or modifying treatment plants, etc.) for the next five-year period.

The ULARA Watermaster is required to: evaluate the five individual plans with regard to the potential impacts of the combined pumping and spreading activities by all Parties related to the implementation of the San Fernando Judgment of January 26, 1979; and provide, if needed, recommendations for improving groundwater management and/or for helping to protect groundwater quality in the ULARA groundwater basins. The Watermaster's evaluation and recommendations are to be included in each annual Groundwater Pumping and Spreading Plan, and the Administrative Committee is to review and approve the plan so that it may be provided to the Court in July of each water year.

This Annual Report represents the Groundwater Pumping and Spreading Plan for the five-water year period of 2018-19 through 2022-23 for ULARA, and it has been prepared pursuant to Section 5.4 of the Policies and Procedures document. This Groundwater Pumping and Spreading Plan provides basic information to the Administrative Committee for use in possibly improving basin management, providing protection of the water rights of each Party and protecting water quality within ULARA.

III. PLANS FOR THE 2018-19 THROUGH 2022-23 WATER YEARS

A. Projected Groundwater Pumping for 2018-19 Water Year

The estimated pumping capacities of the municipal-supply water wells owned by each of the five Parties within the San Fernando, Sylmar and Verdugo basins are listed on Table 3-1. There are no municipal-supply wells in the Eagle Rock Basin, so this small basin is not listed on Table 3-1 and is not discussed further herein. Also shown on Table 3-1 are the numbers of currently active and inactive municipal-supply wells owned by each Party in each basin and the estimated pumping capacity of each wellfield (as reported by each Party). The SFB has the most Parties (3) and the total largest number of currently active municipal-supply water wells (64); Sylmar Basin has the fewest active wells (5). The number of active wells in each basin is subject to change each year because of various problems including water level declines, mechanical problems with a well or pump, and impacts from groundwater contamination.

Any differences that may exist between the water volumes listed in this report, and the water volumes reported in other ULARA Watermaster publications are likely due to numeric rounding differences and/or differences in usage of significant figures, unless specifically described herein.

Table 3-1A shows the actual volumes of groundwater pumped by the five Parties for Water Year 2018-19 in the San Fernando, Sylmar and Verdugo groundwater basins. Projected values shown on Table 3-1A are the groundwater extractions estimated (or projected) by each Party for the remainder of Water Year 2018-19 (i.e., from April, May, June and July 2018 through September 2019) for each of the three ULARA groundwater basins. As shown on Table 3-1A, the five Parties expect to extract 69,093 acre-feet (AF) of groundwater during Water Year 2018-19 from these three ULARA groundwater basins. Total groundwater extractions for Water Year 2018-19 by the five Parties are projected to be: 63,670 AF from SFB; 2,731 AF from Sylmar Basin; and 2,692 AF from Verdugo Basin.

The total volume of groundwater expected to be extracted by all Parties during the subject Water Year (69,093 AF) is 34,530 AF less than the 103,623 acre-feet per year (AFY) long-term historical average extractions from these three ULARA groundwater basins for the period of Water Years 1979-80 to 2017-18, and 14,789 AF less than the five-year average of 83,882 AFY from these basins. The estimated volume of pumping by all Parties for the next water year (2019-20) is shown on Table 3-1B to be 71,986 AF, which is also less than both the historic long-term (1979-2018) and recent five-year averages from these basins.

As shown on Tables 3-1A and 3-1B, the City of Burbank plans to pump 9,800 AF of groundwater from the SFB in the 2018-19 Water Year; this volume exceeds its annual pumping entitlement from this basin (exclusive of stored water credits). Groundwater extractions by Burbank for Water Year 2018-19 are projected to be 257 AF lower than its five-year average of 10,057 AFY, but 3,258 AF higher than its long-term average of 6,542 AFY for the period of Water Years 1979-80 to 2017-18 (these latter historic averages include groundwater extractions by wells owned by Valhalla Mortuary in Burbank; Valhalla Mortuary no longer extracts groundwater because it converted to recycled water use in January 2016). Burbank's annual entitlement for the 2018-19 Water Year is 3,919 AFY, based on its 20 percent import return credit (as reported in the 2017-18 Annual Watermaster Report).

Existing and planned extractions by Burbank are required by its United States Environmental Protection Agency (USEPA)-mandated groundwater clean-up operations by its BOU facilities, which have a total pumping capacity of 9,000 gallons per minute (gpm, or about 14,000 AFY). Burbank can account for its pumping in excess of its annual import return credit by electing to purchase as much as 4,200 AFY of Physical Solution water from the City of Los Angeles. Burbank can also purchase and import water from MWD and store it in the SFB, or it may choose to deliver that imported water to the City of Los Angeles in exchange for water credits from the City of Los Angeles. Since the completion in 2010 of the Foothill Feeder connection, known as connection B-06, Burbank can spread MWD water in the Pacoima spreading grounds and thereby accumulate credits for that spread water. Burbank spread 13,336 AF of MWD water in the Pacoima spreading grounds during Water Year 2018-19. Burbank can also use a portion of its stored water credits, which were 21,198 AF as of October 1, 2018. Burbank reports that it did not purchase Physical Solution water from the City of Los Angeles in the subject Water Year. For the remaining four Water Years covered by this plan, Burbank also does not plan to purchase any Physical Solution water.

An agreement has been negotiated with LADWP to treat and deliver groundwater from Burbank to the City of Los Angeles, through an interconnection between the Burbank and LADWP distribution systems. This would occur during periods of low demand on the Burbank system, when the BOU would otherwise operate below capacity. These deliveries to LADWP began with an initial test run in August 2019, with the delivery totaling 0.7 AF of treated groundwater. Burbank reports that it could eventually transfer approximately 500 AF of treated groundwater from the BOU (plus any associated blend water) to LADWP each Water Year that this agreement is in effect.

CVWD plans to extract 1,670 AF during Water Year 2018-19 from Verdugo Basin. This volume is slightly more than half of its current full right of 3,294 AFY in this basin. These planned extractions by CVWD from Verdugo Basin are 1,042 AF less than its long-term average of 2,712

AFY for the period of 1979-2018 and 75 AF less than its five-year average of 1,745 AFY (2013-2018) from this basin.

In the 2018-19 Water Year, Glendale plans to pump 7,980 AF of groundwater from the SFB. This volume is 222 AF more than this City's five water year average of 7,758 AFY (2013-2018), and 3,413 AF higher than its long term historic (1979-2018) average pumping of 4,567 AFY from the SFB. Glendale's extraction right for this current water year is 4,405 AFY from SFB, based on its 20 percent import return credit for water delivered to its service area within this basin during the 2017-18 Water Year. Glendale has the right to purchase up to 5,500 AFY of Physical Solution water from the City of Los Angeles to cover the excess pumping. Glendale can also use a portion of its stored water credits, which totaled 25,215 AF as of October 1, 2018.

In the Verdugo Basin, Glendale plans to pump 1,022 AF of groundwater in Water Year 2018-19; this volume is 1,092 AF less than its long-term (1979-80 to 2017-18) historic average extraction of 2,114 AFY from this basin, and represents a decrease of 210 AF relative to its average pumping of 1,232 AFY during the recent five water year period of 2013-2018 (see Table 3-1B).

In the current water year, the City of Los Angeles expects to pump 45,890 AF of groundwater from the SFB. This volume is 36,338 AF less than this City's long-term (1979-80 to 2017-18) average of 82,228 AFY from this basin, and 14,025 AF less than its average pumping of 59,915 AFY over the last five water years (2013-2018). As of October 1, 2018, the City of Los Angeles' stored water credits were 591,460 AF in the SFB.

The City of Los Angeles does not expect to pump groundwater from the Sylmar Basin in this current Water Year. This City's average groundwater extractions from this basin for Water Years 1979-80 to 2017-18 were 2,377 AFY, and 270 AFY for Water Years 2013-18. In this basin, the City of Los Angeles had 9,014 AF of "frozen" water credits as of October 1, 2018, or 16,499 AF of credits using the 5-year calculation method.

During Water Year 2018-19, the City of San Fernando pumped 2,731 AF of groundwater from the Sylmar Basin. This volume is 174 AF less than its average pumping from the Sylmar Basin for the past five water years of 2,905 AFY, and 352 AF less than its long-term average for water years 1979 to 2018 of 3,083 AFY. The City of San Fernando has 404 AF of "frozen" water credits in Sylmar Basin as of October 1, 2018, or 3,081 AF of credits using the 5-year calculation method.

Estimated pumping capacities of the ULARA wellfields are provided in Table 3-1. Actual and projected amounts of pumping and spreading by the major parties during Water Year 2018-19 are shown in Tables 3-1A, 3-1B, and 5-1A.

B. Constraints on Pumping as of 2018-19

Constraints on Pumping in the San Fernando Basin

City of Burbank - The USEPA Consent Decree Project (also known as the Burbank Operable Unit, or BOU) became fully operational on January 3, 1996. The source of water for treatment at the BOU is the groundwater pumped from Burbank Wells VO-1 through VO-8; the treatment plant has a capacity of 9,000 gpm.

The BOU is funded by Lockheed-Martin under a USEPA Consent Decree, but the BOU is owned and operated by the City of Burbank. The BOU uses air stripping (vapor-phase) and liquid-phase granular activated carbon (VPGAC and LPGAC, respectively) to remove volatile organic compounds (VOCs) from groundwater (local groundwater also contains elevated concentrations of nitrate and chromium [Cr]). Over the past few years, several process enhancements and repairs were made to the LPGAC vessels and to the VPGAC vessels. Following treatment, the treated water is blended with water imported from the MWD for delivery within the City of Burbank.

The City of Burbank is also concerned about hexavalent chromium (CrVI) in the groundwater produced by BOU. More information about the BOU can be found via USEPA's website, https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902251.

As part of the requirement to close the first consent decree, USEPA required Burbank to demonstrate that the BOU would operate at its design capacity. In the fall of 2010, Burbank successfully completed a 60-day performance test at the BOU while operating at 9,000 gpm. To ensure the effectiveness of the remedy, USEPA monitored water level drawdown and the extent of the cone of depression by conducting a multi-well pumping test for 30 days during the demonstration time frame. USEPA used water levels and pumping rate data monitored during this pumping test to update values of aquifer hydraulic conductivity, transmissivity and storativity for the BOU for use in the basin-wide groundwater model. The BOU treated 10,307 AF of groundwater in Water Year 2017-18.

Groundwater extracted by the City of Burbank also contains Cr, which cannot be removed by the BOU or by Burbank's other groundwater treatment facility (the Lake Street GAC Treatment Plant). Operations at the BOU are currently limited by fluctuations in city-wide water demands and blending requirements for managing Cr concentrations. Burbank has been blending the pumped groundwater with imported water to keep the concentration of total Cr at or below 7 micrograms per liter (µg/L) in the delivered water. The City of Burbank currently contracts with the consulting firm of TerranearPMC for day-to-day operations of the BOU.

The GAC Treatment Plant treats the groundwater produced from Burbank Well No. 7. This well and treatment plant can deliver 1,100 gallons per minute (gpm). In recent years, the well and treatment plant have been operated to replace recycled water in the Magnolia Power Project cooling towers for industrial cooling because the recycled water supply has been temporarily reduced due to the shutdown of a major sewer force main. The volume of water that was produced and delivered to the Magnolia Power Project cooling towers was 102 AF in Water Year 2017-18 and 132 AF in Water Year 2018-19. As of December 2019, Burbank plans to keep the GAC Treatment plant on an active status, but it has been shut down, except for emergencies, water quality testing, or onsite non-potable use. Burbank reports that this treatment facility was last operated for non-potable use in mid-November 2019.

Burbank reports that its Well No. 15 was removed from service and permanently destroyed in WY 2017-18. Burbank also reports that no capital improvements are planned at this time for either its wells or its GAC treatment plant.

City of Glendale - Construction of the Glendale Operable Unit (GOU) allowed for treated water to be available for delivery in December 2000. The system currently includes four Glendale North OU extraction wells (with a total pumping capacity of 3,300 gpm) and five Glendale South OU extraction wells (with a total capacity of 2,525 gpm). The GOU treatment process uses aeration and LPGAC to treat VOC-contaminated groundwater and then blends the treated water with imported MWD water at the Grandview Pump Station. As a result of elevated CrVI concentrations in the pumped groundwater, only a small quantity of water could be initially pumped and delivered. Full operation started on January 6, 2002. The wells were being pumped and blended with MWD water in a manner to limit CrVI concentrations to achieve the City's target concentration of 5 μg/L in the delivered water.

The City managed a major research effort on identifying viable treatment technologies for the removal of CrVI from its pumped groundwater. In 2010, Glendale constructed the Weak Base Anion (WBA) Chromium Removal facility to remove CrVI from groundwater pumped from GOU Well GS-3 using WBA exchange technology. The City also constructed a 100-gpm demonstration-scale facility adjacent to the Glendale Water Treatment Plant (GWTP), which uses reduction, coagulation and filtration (RCF) technology to remove CrVI. These facilities effectively removed CrVI in the extracted groundwater to concentrations below 5 μg/L. The Hexavalent Chromium Removal Research Project Report was published on February 28, 2013, and was completed in 2015, followed by a Supplemental Project Report in December 2015.

To maintain the reliability of the GWTP water supply, the City also worked with the California Division of Drinking Water (DDW) and the Glendale Respondents Group (GRG) to construct a full-scale Weak-Base Anion Exchange (WBA) facility at the GWTP to treat the CrVI at Well GN-3 and the ninth GOU well (GS-5), which is located in the City of Los Angeles. The new WBA facility and Well GS-5 began full operation in December and October 2016, respectively. With the operation of the new WBA facility and the ability to blend effluent from the WBA facility with imported water from MWD, Glendale continues to meet its concentration goal of less than 5 μg/L CrVI entering its distribution system.

City of Los Angeles - All wellfields operated by the City of Los Angeles within the SFB have been impacted to varying degrees by groundwater contamination. Use of the SFB groundwater supply by this City is largely constrained by the impacts of groundwater contamination, including most significantly PCE, TCE, 1,4-dioxane, CrVI (potentially), perchlorate, and other emerging chemicals. VOCs that have escaped the containment area of the NHOU have affected other nearby water-supply wells in the eastern portion of the SFB. This contamination has greatly impacted the ability of the City of Los Angeles to pump groundwater from the SFB. Certain VOC concentrations have exceeded their respective State Primary Maximum Contaminant Levels (MCLs) in a large percentage of the active wells operated by the City of Los Angeles. Whereas the City of Los Angeles' five-year pumping plans reflect continued reductions in its groundwater pumping, this City is responding to the challenges of groundwater contamination by pursuing plans to construct new facilities for contaminant removal. When completed, these facilities will help restore the City of Los Angeles' ability to pump groundwater from the SFB and to serve potable groundwater to its customers. These improvements are reflected by the dramatically increased pumping by this City from the SFB that is projected to be 87,099 AF for Water Years 2020-21 through 2022-23.

CONSTRAINTS ON PUMPING IN THE SYLMAR BASIN

City of San Fernando - All groundwater pumped by the City of San Fernando is extracted from the Sylmar Basin. VOC contamination has not been detected in any of this City's municipal-supply wells in this basin. However, two of its wells have pumped groundwater with nitrate concentrations that have exceeded the State's Primary MCL for nitrate (as NO_3) of 45 milligrams per liter (mg/L). One of these wells (Well 7A) was placed on inactive status whereas the other well (Well 3) remains inactive until a nitrate mitigation plan is implemented. Old septic systems and past agricultural practices in the region are the likely causes of these elevated nitrate concentrations in the local groundwater. This City reports that Well 7A was reactivated in October 2018, following installation of an ion-exchange treatment system for removal of nitrate from the pumped groundwater.

City of Los Angeles - The City of Los Angeles has not been able to pump its full adjudicated water right from the Sylmar Basin as a result of elevated VOC concentrations in the wells that comprise its Mission Wellfield, and also because of the physical deterioration of the infrastructure at this facility over the years. To help address these limitations, the City of Los Angeles has implemented the Mission Wells Improvement Project. This project's goal is the rehabilitation and replacement of the City's deteriorating groundwater facilities in Sylmar Basin, including construction of three replacement production wells and a few monitoring wells, along with new piping, a new pump station, electrical upgrades, and various controls. An application has been submitted to DDW to permit the operation of Well No. 10, one of the three new production wells constructed for Los Angeles in the Sylmar Basin. LADWP reports that the other two wells, Nos. 8 and 9, will not be operated due to very low production capacity (Well No. 8), and concentrations of TCE (Well No. 9) that exceed the State's Primary MCL for this VOC in drinking water. The recently constructed on-site Chlorination Generation System has been permitted and is in operation, and LADWP expects Well No. 10 to be able to be operational by December 2019.

CONSTRAINTS ON PUMPING IN THE VERDUGO BASIN

Crescenta Valley Water District - The pumping rights of CVWD occur solely within the Verdugo Basin. In this basin, nitrate contamination is widespread and methyl tertiary butyl ether (MTBE), a component of gasoline, has also been detected in the past in a few CVWD-owned wells. Elevated nitrate concentrations are mitigated in the water supply by treating a portion of the pumped groundwater using anion exchange at the existing Glenwood Nitrate Water Treatment Plant, and by blending untreated groundwater with treated groundwater and/or with imported MWD supplies in order to meet drinking water standards.

Following the initial detection of MTBE in 2005, groundwater pumped by the 12 wells in CVWD's service area has had MTBE concentrations as high as approximately 50 µg/L. In August 2006, concentrations of MTBE increased to values above its State Primary MCL of 13 µg/L in Well 7, whereupon this well was immediately taken out of service. In November 2006, the prior ULARA Watermaster responded by establishing the Verdugo Basin MTBE Task Force. Task force members included the California Department of

Public Health (CDPH, now known as DDW), the RWQCB-LA, the Watermaster, GWP, CVWD, and various oil companies and independent gas station owners in the Verdugo Basin. The Task Force had historically been meeting at the CVWD office on a bi-monthly basis to coordinate site-remediation activities among the various responsible parties.

In Water Year 2009-10, CVWD received a grant from CDPH under the Drinking Water Treatment and Research Fund for funding the installation of a GAC water treatment system for removal of MTBE at its Well 5. In February 2011, CVWD performed a pumping test at Well 5 to determine if MTBE concentrations might increase during operational pumping activities. The results of the pumping test were that the MTBE concentrations in the groundwater remained steady at 0.20 µg/L. CVWD was given permission by CDPH to place Well 5 back into service in March 2011 and, in addition, CDPH suspended CVWD's grant for funding the installation of the GAC at Well 5. Since the MTBE levels in Well 5 were below the constituent's State Secondary and State Primary MCLs, grant funding was put on hold until such time that MTBE concentrations might increase once again. In Water Year 2011-12, the grant funding was eliminated by the State, so if MTBE concentrations do rise again, CVWD will have to find a new funding source for the treatment. In Water Year 2017-18, the Task Force did not meet; it will reconvene if and when MTBE concentrations become greater than 1.0 µg/L in any CVWD well.

Declining water levels in the Verdugo Basin have also affected CVWDs ability to extract groundwater. In Water Year 2012-13, CVWD received a Local Groundwater Assistance (LGA) grant from DWR to perform a feasibility study for stormwater recharge within the Verdugo Basin. The study is a cooperative effort with the City of Glendale, the County of Los Angeles and other local stakeholders to determine if stormwater can be captured, stored and then recharged at Crescenta Valley County Park. The feasibility study started in August 2013 and was completed in October 2016. The results of the study reportedly showed that an estimated 500 AFY of stormwater water could be put into the Verdugo Basin, which CVWD reports would help reduce the wide fluctuations in water levels and increase well capacity on an annual basis.

CVWD received a 2015 Integrated Regional Water Management (IRWM) Grant as part of Proposition 84 in March 2016 to reactivate its Well 2 and install a new nitrate removal treatment facility at its Ordunio Reservoir site. CVWD's Well 2 was drilled in 1927 and taken out of service in 1977 due to nitrate levels above the State's nitrate MCL and lack of a nitrate removal treatment facility. The project is estimated to produce 150 gpm, or 240 AFY, which will add to CVWD's groundwater production capacity. Project construction is planned to begin in November 2018 and to be completed by June 2019. CVWD is working with the DDW for a permit amendment for the new nitrate removal treatment facility, which is anticipated to be completed by July 2019.

CVWD continued its well rehabilitation program that includes replacing the existing pumps with lower capacity pumps and rehabilitation of the well casings. In Water Year 2017-18, CVWD performed well rehabilitation on Wells 5 and 10 and is planning to perform well rehabilitation on Wells 1 and 7 in Water Year 2018-19 to obtain better well efficiency and to potentially increase groundwater production. Furthermore, CVWD has included a project to construct a new water production well within the next 5 to 7 years as part of its 10-year Capital Improvement program.

City of Glendale - The City of Glendale has made only limited use of its current maximum adjudicated right of 3,856 AFY from the Verdugo Basin, due to water quality problems, groundwater level declines and limited extraction capacity in this basin. Over the years, Glendale has worked to increase the utilization of its water rights. The City completed construction of the Verdugo Park Water Treatment Plant (VPWTP) in 1995 as part of its initial efforts to increase production. This facility treats water from the City's two low-capacity wells (Verdugo Well A and B), and from a subsurface horizontal collection system within Verdugo Canyon. These wells and the plant were temporarily taken offline in September 2013, and currently remain offline pending further study. Recently, Glendale completed rehabilitation work of its Glorietta Well No. 6 in 2016, and Glorietta Well Nos. 3 and 4 in 2013. Glendale also began rehabilitation of Glorietta Well No. 3 in late-2016 and this well resumed full operation on August 27, 2017.

In Water Year 2010-11, Glendale rehabilitated an old, unused well on Foothill Boulevard and eventually connected it to the City's water supply system in mid-2011. Additionally, a new well was constructed at the Rockhaven Sanitarium in mid-2011 to further increase its extraction capacity from the Verdugo Basin, but this well could not be used immediately because of the elevated concentrations of nitrate in that portion of the basin. In 2014, Glendale and CVWD applied for and were awarded a grant through the Greater Los Angeles County IRWM Group for a joint project to make use of groundwater from the Rockhaven Well. Groundwater extracted from the Rockhaven Well is now conveyed to CVWD's Glenwood Nitrate Water Treatment Plant for nitrate removal and disinfection, and then delivered the treated water to the La Crescenta-Montrose area. The volume of groundwater extracted from the Rockhaven Well is counted against the adjudicated water right of Glendale in the Verdugo Basin; these extractions are then reported to the ULARA

Watermaster on a monthly basis. Glendale Water and Power (GWP) entered into an agreement with CVWD for this arrangement. Design and construction of the Rockhaven Well project were completed in March 2016, at which time the well was placed into operation in accordance with the treatment agreement between Glendale and CVWD.

Glendale is planning on drilling a new well in the in the near future to replace its Glorietta Well 6, and also plans to conduct an evaluation of the Verdugo Basin groundwater supply and the potential rehabilitation of Verdugo Wells A and B in its fiscal year 2018-19. As a result of the regional drought conditions in the past several years, Glendale has not been able to pump to its full adjudicated right from the Verdugo Basin.

TABLE 3-1: ESTIMATED CAPACITY OF EXISTING WELLFIELDS

Party/Well Field	Number of Active Wells	Number of Inactive Wells	Estimated Capacity (All Wells) (cfs)	(gpm)
SAN FERNANDO BASIN				
City of Los Angeles				
Aeration (NHOU)	---	7	2.2	987
Erwin	2	5	6.1	2,738
North Hollywood	8	28	25.3	11,355
Pollock	2	1	6.3	2,828
Rinaldi-Toluca	15	---	104.1	46,723
Tujunga	12	---	103.3	46,364
Verdugo	2	7	7.4	3,321
Whitnall	4	6	14.8	6,643
City of Burbank	8	5	22.5	10,100
City of Glendale	11	---	16.6	7,450
TOTAL	64	59	308.6	138,510
SYLMAR BASIN				
City of Los Angeles	2	---	4.7	2,110
City of San Fernando	3	1	10.0	4,500
TOTAL	5	1	14.7	6,610
VERDUGO BASIN				
CVWD	13	1	2.8	1,250
City of Glendale	7	---	1.6	730
TOTAL	20	1	4.4	1,980

Note:
- There are no municipal-supply water wells in the Eagle Rock Basin.

TABLE 3-1A: HISTORIC AND PROJECTED GROUNDWATER EXTRACTIONS 2018-19

(Acre-feet)

Party/Well Field	2018			2019									Total
	Oct.	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
							SAN FERNANDO BASIN						
City of Los Angeles													
Aeration (NHOU)	0	0	0	0	0	0	0	0	0	0	0	0	-
Erwin	0	1	0	0	0	0	0	0	0	0	0	0	1
North Hollywood	1,118	423	5	3	0	3	0	923	298	861	1,169	357	5,160
Pollock	0	0	0	121	163	181	143	148	143	148	148	143	1,338
Rinaldi-Toluca	2,055	786	10	10	9	13	0	1,845	1,190	2,276	2,276	1,190	11,660
Tujunga	3,250	1,901	1,412	1,513	1,350	1,544	1,500	3,321	2,083	3,321	3,321	3,214	27,730
Verdugo	1	0	0	0	0	0	0	0	0	0	0	0	1
Whitnall	0	0	0	0	0	0	0	0	0	0	0	0	-
SUBTOTAL City of Los Angeles:	6,424	3,111	1,427	1,647	1,522	1,741	1,643	6,237	3,714	6,606	6,914	4,904	45,890
City of Burbank[A]	838	841	832	789	612	708	710	873	814	948	943	892	9,800
City of Glendale[B]	710	577	653	660	593	665	682	646	677	694	716	707	7,980
TOTAL San Fernando Basin:	**7,972**	**4,529**	**2,912**	**3,096**	**2,727**	**3,114**	**3,035**	**7,756**	**5,205**	**8,248**	**8,573**	**6,503**	**63,670**
							SYLMAR BASIN						
City of Los Angeles	0	0	0	0	0	0	0	0	0	0	0	0	-
City of San Fernando	251	229	200	188	159	188	222	216	246	276	289	267	2,731
TOTAL Sylmar Basin:	**251**	**229**	**200**	**188**	**159**	**188**	**222**	**216**	**246**	**276**	**289**	**267**	**2,731**
							VERDUGO BASIN						
Crescenta Valley Water Dist.[C]	129	112	113	119	119	156	167	150	147	155	170	133	1,670
City of Glendale[D]	93	89	89	87	73	86	84	88	86	86	82	79	1,022
TOTAL Verdugo Basin:	**222**	**201**	**202**	**206**	**192**	**242**	**251**	**238**	**233**	**241**	**252**	**212**	**2,692**
ULARA TOTAL:	**8,445**	**4,959**	**3,314**	**3,490**	**3,078**	**3,544**	**3,508**	**8,210**	**5,684**	**8,765**	**9,114**	**6,982**	**69,093**

Notes:

A. Includes BOU and GAC.

B. Includes GOU, Forest Lawn and Grayson Power Plant.

C. Includes all CVWD municipal-supply well extractions and the CVWD portion of Pickens Tunnel production.

D. Includes production for CVWD's Rockhaven Well.

- Shaded cells denote projected values.
- There are no municipal-supply water wells in the Eagle Rock Basin.
- All values published in this table supersede values published in previous Groundwater Pumping and Spreading Plans for ULARA. Any errors discovered in previously published tables have been resolved upon discovery.

TABLE 3-1B: HISTORIC AVERAGE AND PROJECTED GROUNDWATER EXTRACTIONS

(Acre-feet)

Party/Wellfield	Historic Average Pumping (AF)		Projected Groundwater Pumping (AF)				
SAN FERNANDO BASIN							
City of Los Angeles	1979-2018[A]	2013-2018[B]	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Aeration (NHOU)	1,112	652	0	0	0	0	0
Erwin	3,039	1	1	1	0	0	0
North Hollywood	23,238	9,917	5,160	4,990	18,185	18,185	18,185
Pollock	1,422	2,418	1,338	1,973	1,738	1,738	1,738
Rinaldi-Toluca	23,799	16,342	11,660	6,682	24,951	24,951	24,951
Tujunga	21,298	29,378	27,730	31,490	42,225	42,225	42,225
Verdugo	3,675	1,014	1	2	0	0	0
Whitnall	4,645	193	0	0	0	0	0
SUBTOTAL City of Los Angeles[C]	82,228	59,915	45,890	45,138	87,099	87,099	87,099
City of Burbank[D]	6,542	10,057	9,800	10,540	11,255	11,280	11,290
City of Glendale[E]	4,567	7,758	7,980	8,448	8,475	8,475	8,475
TOTAL San Fernando Basin:	**93,337**	**77,730**	**63,670**	**64,126**	**106,829**	**106,854**	**106,864**
SYLMAR BASIN							
City of Los Angeles	2,377	270	0	2,172	4,170	4,170	4,170
City of San Fernando	3,083	2,905	2,731	2,950	2,950	2,950	2,950
TOTAL Sylmar Basin:	**5,460**	**3,175**	**2,731**	**5,122**	**7,120**	**7,120**	**7,120**
VERDUGO BASIN							
Crescenta Valley Water District[F]	2,712	1,745	1,670	1,730	1,910	2,065	2,090
City of Glendale[G]	2,114	1,232	1,022	1,008	1,065	1,065	1,065
TOTAL Verdugo Basin:	**4,826**	**2,977**	**2,692**	**2,738**	**2,975**	**3,130**	**3,155**
TOTAL ULARA:	103,623	83,882	69,093	71,986	116,924	117,104	117,139

Notes:

A. In prior reports, the long term-average included only municipal wellfield pumping. Herein, the averages include physical solution pumping for Burbank, Glendale and CVWD (but not Los Angeles). Historic pumping averages include wells that are no longer in service.

B. 5-year average. Please note that in the historic report dated July 2011, this 5-year average did not include physical solution pumping.

C. Projections are not provided for the City of Los Angeles' Van Norman wells.
Production from this city's Van Norman wells are therefore not included in the long-term averages, the short-term averages, or the totals presented on this table.
As a result, values may differ between this table and corresponding values in the Annual ULARA Watermaster Report.

D. Includes BOU, City pumping, and Valhalla.
Valhalla converted to recycled water use in January 2016 and is now included only in the Historic Average Pumping values.

E. Includes Forest Lawn, GOU, and Grayson Power Plant pumping.

F. Projections from Water Year 2019-20 and on may not include Pickens Tunnel production.

G. Includes production for CVWD's Rockhaven Well.

- There are no municipal-supply water wells in the Eagle Rock Basin.

IV. GROUNDWATER PUMPING AND TREATMENT FACILITIES

A. Wellfields

As shown on Table 3-1, there are ten municipal-supply wellfields located in the SFB, two in the Sylmar Basin, and two in the Verdugo Basin; there are no municipal-supply wells in the Eagle Rock Basin. Table 3-1, as mentioned previously, also lists the current number of active municipal-supply wells in each basin and the estimated pumping capacity of each municipal-supply wellfield (as reported by each Party). The general locations of wellfields within the SFB are shown on Plate 3.

Table 4-1 has been prepared to summarize the volumes of groundwater that have reportedly been pumped and treated in the San Fernando, Sylmar, and Verdugo basins by each of the various treatment facilities owned and/or historically operated by the five Parties in ULARA. The volumes of treated groundwater are listed for the Water Years 1985-86 through 2017-18. As seen on Table 4-1, a total of 654,661 AF of groundwater has been treated during that time period by the eight listed treatment facilities. Table 4-2 lists the volumes of groundwater that are projected to be treated at these treatment facilities during Water Years 2018-19 through 2022-23. As shown on Table 4-2, the Parties report that approximately 290,080 AF of water are projected to be treated at their existing treatment facilities during Water Years 2018-19 through 2022-23.

TABLE 4-1 HISTORIC AND CURRENT GROUNDWATER TREATMENT

(Acre-feet)

Water Year	Burbank GAC	Lockheed Aqua Detox	Burbank OU	Glendale North/South OUs	CVWD Glenwood Nitrate Water Treatment Plant	Los Angeles North Hollywood OU	Los Angeles Pollock Wells Treatment Plant	Los Angeles Tujunga Wells Treatment Plant	Annual Total
1985-86		1							1
1986-87		1							1
1987-88		1							1
1988-89		924							924
1989-90		1,108				1,148			2,256
1990-91		747				1,438			2,185
1991-92		917			847	786			2,550
1992-93	1,205	692			337	1,279			3,513
1993-94	2,395	425	378		1,550	726			5,474
1994-95	2,590		462		1,626	1,626			6,304
1995-96	2,295		5,772		1,419	1,182			10,668
1996-97	1,620		9,280		1,562	1,448			13,910
1997-98	1,384		2,580		1,391	2,166			7,521
1998-99	1,555		9,184		1,281	1,515	1,513		15,048
1999-00	1,096		11,451	979	1,137	1,213	1,851		17,727
2000-01	995		9,133	6,345	989	1,092	1,256		19,810
2001-02	0		10,540	6,567	515	998	1,643		20,263
2002-03	0		9,170	7,508	216	1,838	1,720		20,452
2003-04	0		9,660	6,941	164	1,150	1,137		19,052
2004-05	0		6,399	7,541	782	1,042	1,752		17,517
2005-06	0		10,108	6,777	997	1,766	2,442		22,090
2006-07	0		9,780	7,562	644	1,307	2,231		21,524
2007-08	0		6,817	7,347	660	1,038	2,573		18,435
2008-09	148		9,818	7,148	459	662	1,698		19,932
2009-10	5		10,043	7,300	410	935	2,377	36,623	57,693
2010-11	4		10,394	7,473	592	1,150	3,127	12,200	34,940
2011-12	4		9,993	7,830	447	1,248	2,957	20,648	43,128
2012-13	0		11,387	6,518	488	343	1,629	5,718	26,084
2013-14	1		10,148	7,231	150	968	2,580	38,304	59,382
2014-15	2		10,006	7,025	186	1,132	3,037	10,442	31,830
2015-16	65		9,377	7,250	533	835	1,731	34,703	54,494
2016-17	0		9,501	7,740	246	525	2,278	20,411	40,700
2017-18	102		10,307	7,435	273	56	1,675	19,405	39,252
Total AF	**15,465**	**4,815**	**211,689**	**130,517**	**19,901**	**32,612**	**41,208**	**198,454**	**654,661**

All values published in this table supersede values published in previous Groundwater Pumping and Spreading Plans for ULARA. Any errors discovered in previously published tables have been resolved upon discovery.

TABLE 4-2 PROJECTED GROUNDWATER TREATMENT

(Acre-feet)

Water Year	Burbank GAC	Burbank OU	Glendale North/South OUs [1]	CVWD Glenwood Nitrate Water Treatment Plant	Los Angeles North Hollywood OU	Los Angeles Pollock Wells Treatment Plant	Los Angeles Tujunga Wells Treatment Plant [2]	Annual Total
2018-19	114	9,686	7,923	190	0	1,338	27,730	46,981
2019-20	0	10,540	8,038	250	0	1,973	31,490	52,291
2020-21	0	11,255	8,065	300	0	1,738	42,225	63,583
2021-22	0	11,280	8,065	300	0	1,738	42,225	63,608
2022-23	0	11,290	8,065	300	0	1,738	42,225	63,618
TOTAL	**114**	**54,051**	**40,156**	**1,340**	**0**	**8,525**	**185,895**	**290,081**

1. Groundwater treatment includes chromium removal via the WBA Chromium Removal facility and the RCF demonstration project.
2. Treatment plant utilizing GAC wellhead treatment only on Wells #6 and #7 of the twelve extraction wells at Tujunga Wellfield.

B. Active Groundwater Pumping and Treatment Facilities

Glendale OU (GOU) - City of Glendale

Construction of the GOU allowed for treated water to be available for delivery in Glendale in August 2000. The system includes four Glendale North OU (GNOU) extraction wells (with a total pumping capacity of 3,300 gpm) and four Glendale South OU (GSOU) extraction wells (with a total capacity of 1,700 gpm). The treatment process uses aeration and LPGAC to treat VOC-contaminated groundwater and then blends the treated water with imported MWD water at the Grandview Pump Station.

More information about the GOU can be found at USEPA's website:
https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.cleanup&id=0902252.

Burbank OU (BOU) - City of Burbank

The BOU is funded by Lockheed-Martin under a USEPA Consent Decree but is owned and operated by the City of Burbank. Air stripping and LPGAC are used at the BOU to remove VOCs from groundwater (local groundwater also contains elevated concentrations of nitrate and Cr). Following this treatment, the treated water is then blended with water imported from MWD for delivery within the City of Burbank. Burbank reports that the BOU treatment plant currently has a capacity of 9,000 gpm.

The City of Burbank is also concerned about CrVI in the groundwater produced by BOU wells and has been blending the pumped groundwater with imported water to keep the concentration of total Cr at or below 7 µg/L in its distribution system; the BOU treatment facility was not designed to treat Cr.

More information about the BOU can be found via USEPA's website at:
https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902251.

GAC Treatment Plant - City of Burbank

The City of Burbank GAC system (Lake St wells) was shut down in March 2001 as a result of the elevated concentrations of CrVI in the pumped groundwater, and it has remained out of service through the 2007-08 Water Year. The plant saw limited use for non-potable purposes in Water Year 2008-09, and since then it has been used only when necessary to obtain water quality data from the wells. If the plant is returned to service, production may be considered as part of the average pumping goal of 9,000 gpm for the BOU.

North Hollywood OU (NHOU) - City of Los Angeles

The North Hollywood Operable Unit (NHOU) began operating in December 1989 and was designed to remove chlorinated VOC contamination (TCE and PCE) from the groundwater via aeration, with a treatment capacity of 2,000 gpm. USEPA provides 100 percent of the funding for the operation and maintenance of this facility, which is operated and maintained by LADWP under the direction of USEPA. This treatment facility operates by pumping water into an aeration tower where VOCs are removed from the water by an air stripper, and VPGAC vessels are used on the aeration tower's air emissions to prevent introduction of VOCs to the atmosphere. Treated water is chlorinated and blended with other sources of clean water before distribution in the public water supply. Water quality testing from the treated effluent have shown that VOCs are being effectively removed by the treatment process.

More recently, USEPA detected new emerging contaminants, including CrVI and 1,4-dioxane. Concentrations have been in excess of the former State MCL for CrVI and in excess of the notification level (NL) for 1,4-dioxane at two of the NHOU extraction wells. The existing NHOU treatment system is not capable of removing these contaminants. A sharp increase in the Cr concentrations has caused all of the five NHOU extraction wells to be shut down and removed from the system while the untreated effluent from two wells has been redirected for discharge into the municipal sewer system. These wells serve an important plume containment function for the high levels of contamination, and these shutdowns demonstrated the need for a change in the original USEPA remedy.

In response to these shutdowns and continued migration of VOC-contaminated groundwater, USEPA conducted a Focused Feasibility Study (FFS) to evaluate alternatives for changing the groundwater remedy. USEPA summarized the results in its July 2009 Proposed Plan and selected the preferred remedy in its September 2009 Second Interim Record of Decision. The Second Interim Remedy is intended to upgrade and expand the existing NHOU groundwater supply production wellfields, and address treatment of emerging contaminants. The selected remedy included: installation of wellhead treatment for CrVI and 1,4-dioxane; expansion of the combined treatment system; construction of additional groundwater monitoring wells; construction and operation of three additional groundwater extraction wells; and continuing to provide the treated water to LADWP for a drinking water end use. USEPA amended the 2009 Second Interim Record of Decision in 2014 to allow for consideration of the treated effluent to be reinjected back into the local aquifer system (reinjection end use).

LADWP reports that, in preparation for the construction of the NHOU2IR Phase 1B facility, the Aeration wells were taken offline in the fourth quarter of 2017. As seen on Table 4-2, no groundwater was projected to be pumped by the Aeration wells during Water Year 2018-19.

For more information about the NHOU, please visit the following USEPA website: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902251.

Pollock Wells Treatment Plant (PWTP) - City of Los Angeles

The San Fernando Valley (Area 4) USEPA Superfund site is an area of contaminated groundwater covering approximately 5,860 acres that lies near the Pollock Wellfield in the City of Los Angeles. This area is part of the SFB, where groundwater is known to be contaminated with various chlorinated VOCs including TCE and PCE.

USEPA completed an interim investigation of the Pollock Wellfield in April 1994 and concluded that selecting and implementing a Superfund remedy for the Pollock Area was not immediately necessary because LADWP planned to conduct a wellhead treatment project in the Pollock Wellfield. In March 1999, LADWP reactivated wells in its Pollock Wellfield to extract and treat the groundwater using LPGAC at its local treatment plant (the PWTP). Installation of the LPGAC vessels restored the use of Pollock Wells, and these wells also reduce the potential for discharge of rising groundwater from the SFB into the Los Angeles River. This treatment plant was designed to remove TCE and PCE from groundwater extracted by two extraction wells at rates as high as 3,000 gpm. The treated water is delivered to LADWP's distribution system for a drinking water end use. Water quality measurements from the treated effluent show that VOCs have been effectively removed by the treatment process.

USEPA and the California Regional Water Quality Control Board entered into a Cooperative Agreement to perform an investigation of potential sources of contamination in the SFB. Currently, USEPA is conducting a search for Potentially Responsible Parties within the Pollock Site 4 Area, as well as a data gap analysis to identify where additional groundwater sampling and site characterization are needed. Following these activities, USEPA will conduct a Remedial Investigation and Feasibility Study to identify further the extent of contamination and evaluate clean up alternatives.

For more information about Superfund Area 4 and the Pollock Wells Treatment Plant, please visit the following USEPA website: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902253.

Temporary Tujunga Wells Treatment Study Project (TTW) - City of Los Angeles

The Tujunga Wellfield was constructed in the SFB in 1992 and has utilized 12 production wells to produce groundwater for municipal-supply use. Certain VOCs, including TCE and PCE, were detected in each of the wells. Over time, VOC concentrations increased sharply above their respective Federal and/or State MCLs, requiring the shutdown of multiple wells and, at times, the entire wellfield. In 2010, LADWP and MWD completed the Temporary Tujunga Wells Treatment Study Project, which is a wellhead treatment project that included the installation of LPGAC vessels on two of the more severely impacted wells. Water quality test results from the treated effluent show that VOCs were effectively removed by the treatment process. The plant has a treatment capacity of 8,000 gpm and has restored more than 20,000 AFY of groundwater pumping capacity that had been previously unavailable due to water quality constraints. In this wellfield, Well No. 8 has been connected to the treatment system for use as a backup when Well Nos. 6 or 7 are shut down for either mechanical or maintenance needs. LADWP has requested a permit amendment from DDW to operate this connection.

Glenwood Nitrate Water Treatment Plant - Crescenta Valley Water District

Groundwater pumped from wells operated by CVWD in the Verdugo Basin often contains elevated to excessive concentrations of nitrate. A portion of the pumped groundwater is treated by ion exchange at the City's Glenwood Nitrate Water Treatment Plant and is then blended with untreated water from MWD and/or imported water to reduce nitrate concentrations to concentrations that are below the State's Primary MCL for nitrate (as NO_3) of 45 mg/L. In the past few years, the ion-exchange plant has been in operation for the majority of each year. The plant began to receive water from the Rockhaven Well in March 2016. This ion-exchange plant was in operation for eleven of the twelve months of Water Year 2017-18 and produced 273 AF of treated water, which helped CVWD to maximize its use of local groundwater. This trend of operation was projected by CVWD to continue in Water Year 2018-19.

C. Other Projects

1. Future Groundwater Pumping and/or Treatment Facilities

Groundwater System Improvement Study - City of Los Angeles

In early-2015, LADWP completed a groundwater characterization study in the SFB and constructed twenty-five new groundwater monitoring wells. In mid-2015, LADWP began the necessary planning for the groundwater basin remediation facilities, which may consist of centralized and localized treatment, to effectively cleanup and remove contaminants from the SFB and restore its groundwater to beneficial use. Contaminants of concern and proposed treatment will be determined through site-specific remedial investigations and feasibility studies. The four highest-priority basin remediation facilities are anticipated to be operational by 2021.

LADWP has begun evaluating potential response actions to restore the beneficial use of groundwater in the vicinity of various wellfields. These efforts include studies, activities, and other analyses required by USEPA's National Contingency Plan to evaluate appropriate response actions. While additional work is required to evaluate the appropriate interim and final response actions for each area, one potential set of alternatives would consist of a series of local and centralized treatment facilities that could produce water for potable use. Certain facts suggest this approach could be useful. These include the size and location of the plumes, the beneficial uses of the groundwater, reliability concerns of long-term availability of alternative water sources, and its high cost if such groundwater treatment did not occur.

The information LADWP will evaluate includes an analysis of pumping rates and treatment capacity that would be appropriate to capture contaminant mass and to help to restore the beneficial use of the aquifer systems for that wellfield, based on fate and transport modeling and other types of analyses. LADWP also plans to evaluate ways to minimize the volume of groundwater that requires treatment by prioritizing pumping from wells with higher levels of contamination to minimize the potential for contamination to spread to wells that currently do not contain contaminant concentrations that would otherwise require treatment. These analyses will also evaluate other alternatives.

LADWP will leverage its actions with current and planned response actions in the basin by LADWP and other parties, such as remedial actions undertaken by or overseen by state or federal regulatory agencies, as well as other feasible alternatives, including source control, in-situ treatment, or pumping from other areas.

As reported by LADWP, other agencies in Southern California are generally focusing on source control and other "hot spot" areas, whereas LADWP generally focuses more on restoring the beneficial uses of groundwater in the vicinity of production wells that has already migrated away from the source areas.

To provide information about these potential response action alternatives, LADWP has completed a preliminary analysis of the scope and anticipated project costs. Preliminary analysis indicates that production from its major SFB wellfields, either alone or in conjunction with other response actions, could attain a maximum well production capacity of over 300 cubic feet per second (cfs). LADWP anticipates that the treatment systems would have modularity for addressing additional treatment capacity that may be needed as a result of regulatory changes or plume migration over time. Design and construction costs for this set of alternatives were estimated to be on the order of $600 million, with remediation treatment costs of up to $50 million per year. These estimates assume that these facilities would be designed to utilize multiple best-available technologies to clean up contaminants including TCE, PCE, and 1,4-dioxane, eventually resulting in restoration of LADWP's highest producing wellfields in the northern portion of SFB.

North Hollywood West Advanced Oxidation Processes (AOP) Pilot Project

The North Hollywood West Advanced Oxidation Process Pilot Project (UV/AOP) was a pilot test for treatment of VOCs and 1,4-dioxane using the Ultraviolet Advanced Oxidation Process (UV AOP). The testing as part of this Pilot Project had two phases: Phase 1 incorporated bench scale testing with lab results, utilizing the oxidation from peroxide, chloride, and other background chemicals at flow rates ranging from 10 to 50 gpm; and Phase 2 testing evaluated low flow on-site pilot testing, increasing the flow rate up to 100 gpm and increasing the UV dose with the goal of better understanding reactor efficiency. In both phases, project feasibility was evaluated through monitoring of contaminant removal efficiency and through the identification of possible byproducts formed during the various treatment methods.

North Hollywood West Wellfield Treatment Project

The North Hollywood West (NHW) Wellfield is impacted by 1,4-dioxane contamination reportedly emanating from industrial landfills. As part of LADWP's efforts to restore and maintain the beneficial uses of the groundwater in the SFB and to meet other cleanup objectives, an Interim Remedial Action (IRA) for the NHW Wellfield was approved by the LADWP Board of Commissioners on August 1, 2017 in the form of an Interim Remedial Action Decision (IRAD). A pump and treat interim alternative was approved and adopted by LADWP. Groundwater will be pumped to an aboveground treatment system designed to break down or remove the contaminants. The above-ground treatment system selected for NHW will contain an Ultraviolet Advanced Oxidation Process (UV AOP) treatment to remediate the contaminants present in the NHW wellfield. Other parts of the treatment system will include sand separators, cartridge filters, and GAC vessels.

Mission Wellfield Improvement Project

The purposes of the Mission Wells Improvement Project are to rehabilitate and replace deteriorating City of Los Angeles groundwater facilities in Sylmar Basin, including construction of three replacement water wells and multiple groundwater monitoring wells, along with new piping, a new pump station, and electrical upgrades and controls. An application has been submitted to DDW to permit the operation of Well No. 10, one of the three new production wells in the Sylmar Basin. The other two wells, Nos. 8 and 9, will not be operated because of very low production capacity and because TCE concentrations in the pumped groundwater exceed the constituent's State MCL, respectively. The recently constructed onsite Chlorination Generation System has been permitted and is in operation, and Well No. 10 is expected to be able to be operational by December 2019.

Electrical upgrades that consist of a new industrial station, switch station, and appurtenances to allow 34.5 kV power to the site, and the construction of the new Pump Station Motor Control Center have reportedly been completed. Start-up and testing activities are on-going and targeted for completion by January 2020 followed by the commissioning phase in February 2020.

Van Norman Complex Investigation

Two exploratory wells designated VN-EW-01 and VN-EW-02 were drilled in 2015 to depths of approximately 1,500 feet below ground surface (bgs) on the LADWP Van Norman Complex property to investigate the existence and extent of potable groundwater within the Saugus Formation. Results of short-term aquifer testing performed in 2015 and 2017 indicated significant potential production capacity, although groundwater produced from the initial pumping tests of these two exploratory wells yielded groundwater with total dissolved solids (TDS) concentrations that were in excess of 1,000 mg/L. The water generated from these pumping tests was to be discharged to the high-speed channel that feeds directly to the Los Angeles Aqueduct

Filtration Plant. Final work on the wells was conducted in Summer 2017, and further testing was scheduled for Spring 2019. Long-term testing was recommended to study the feasibility and viability of producing groundwater from the Saugus Formation for use as a local supply source and as an emergency supply source. To support the delivery of the long-term aquifer testing, the Van Norman Exploratory Wells Projects (Project) was initiated under the Water System's CIP. CIP Projects follow the Water System's project delivery process from the initial conception (Project Initiation) through planning, design, construction, and post construction (Project Closeout). As of September 2019, the Project was in the Planning phase.

Other Groundwater Remediation Projects

Many privately-owned, industrial-type properties in the ULARA groundwater basins have been found to have contaminated the soils and/or the groundwater beneath their facilities. Many of these facilities are under Cleanup and Abatement Orders from the RWQCB-LA; some sites are under the regulatory authority of the State Department of Toxic Substance Control (DTSC). Each known contaminated site typically has soil vapor borings and/or groundwater monitoring wells, and some have extraction wells, treatment facilities, and/or injection wells to help remove contaminant mass and to help mitigate the further spread of contamination. USEPA has been including CrVI in the quarterly sampling from its monitoring wells in SFB as a step in the eventual containment and cleanup of this contaminant. The RWQCB-LA has also been evaluating properties and/or facilities in the eastern portion of the SFB for their possible onsite use, storage and/or release of CrVI to the environment over time.

The reader can obtain current information and more details for various contamination and/or cleanup sites within ULARA, which are regulated by the RWQCB-LA, via that agency's GeoTracker website: http://geotracker.waterboards.ca.gov/. The DTSC website, http://www.envirostor.dtsc.ca.gov/public/, also contains information regarding groundwater quality investigations and/or cleanup sites within ULARA.

2. Dewatering Operations

Temporary Construction Dewatering

Temporary construction excavations, such as for deep subterranean parking structures or pipelines, sometimes require dewatering in areas that have a high (shallow) water table. Groundwater that is discharged from such temporary dewatering operations may, depending on volume, be required to be accounted for by the ULARA Watermaster.

The annual groundwater withdrawals by these dewatering activities could be deducted from the local water rights holder.

Permanent Dewatering Operations

A few facilities along the southern and western portions of the SFB have deep foundations and subterranean parking structures that have been constructed into areas of shallow (high) groundwater; these facilities require permanent dewatering. The amount of groundwater pumped at each of these facilities is reported to the Watermaster. These activities are subject to approval by the affected municipal-supply Party, and the dewaterer is required to pay for the replacement cost of the extracted groundwater. The pumped groundwater is subtracted from the affected Party's water rights by the Watermaster.

3. Unauthorized Pumping in the County

There are numerous individuals, primarily within the unincorporated hill and mountain area of ULARA, who are or may be pumping groundwater without reporting the annual volume of production to the Watermaster. This groundwater was adjudicated and, in the opinion of prior Watermasters, is owned by the City of Los Angeles. The volume produced by each such pumper is probably small. Working in cooperation with the Los Angeles County Department of Public Health and Los Angeles County Planning, the former Watermaster and LADWP initiated a process to help begin identification and monitoring of the water usage of these private pumpers through a water license agreement. LADWP and the Watermaster's office continue to work together to identify and track groundwater extractions associated with these private pumpers.

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS

A. Agency-Owned Spreading Facilities

There are five active spreading facilities located in the SFB (see Plate 1). The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima spreading grounds, whereas the Tujunga spreading grounds are operated by LACDPW in cooperation with LADWP. These spreading facilities are used for spreading native and imported water, when such types of water are available. LADWP and LACDPW, in cooperation with the City of Los Angeles Bureau of Engineering, Bureau of Sanitation, and Bureau of Street Services continue to partner on, jointly fund, and collaborate on several projects that will enhance the capacity for recharge of stormwater and recycled water into the groundwater basin via existing spreading grounds in the eastern portion of the SFB. The City of Burbank completed construction of a service connection to MWD at the end of the Foothill Feeder in 2010, which can deliver up to 50 cfs to the Pacoima spreading grounds, via the Pacoima Wash. This connection, known as B-06, enables Burbank to spread untreated imported MWD water when it is available. These facilities also allow Burbank to direct water to the Lopez spreading grounds via the Lopez Ditch. These facilities allow Burbank to spread the roughly 7,000 AFY (Burbank-reported average annual extraction deficit after accounting for import return credits) of untreated water that is needed to avoid depleting its stored groundwater credits. By agreement with MWD, Burbank will reportedly spread a minimum of 150 AF twice a year to maintain water quality at the end of the Foothill Feeder. Burbank spread 8,050 AF of water in the Pacoima spreading grounds via B-06 in the 2017-18 Water Year. In the 2018-19 Water Year, Burbank spread 13,366 AF in the Pacoima spreading grounds. An upcoming improvement project at the Pacoima Spreading Grounds beginning May 2020 will reportedly cause Burbank's spreading activity to be greatly reduced through Water Year 2021-22. During this period, Burbank expects to only spread minimal amounts of water at the Lopez Spreading Grounds, while relying on stored groundwater credits to meet its demands.

B. Proposed Spreading Facilities

Rory M. Shaw Wetlands Park

The Rory M. Shaw Wetlands Park, Strathern Wetlands Park Project consists of stormwater capture and treatment facilities within a 46-acre site that was previously used as a gravel borrow pit. The project includes the construction of detention ponds and wetlands to store and treat stormwater runoff that will be pumped to Sun Valley Park for infiltration. This project has the potential to recharge an average of approximately 590 AF of runoff per year and is currently being designed; construction is estimated to start in 2018 and be completed by 2022.

C. <u>Actual and Projected Spreading Operations</u>

Table 5-1A shows the recent volumes of native and imported water spread in SFB for the 2018-19 Water Year. An estimated total of 36,829 AF of native runoff and imported water are projected to be spread in Water Year 2018-19 in SFB. This projection is 8,206 AF higher than the long-term (1968-2018) average of 28,623 AFY, and 24,424 AF greater than the average spreading over the past five water year period (2013-2018) of 12,405 AFY.

TABLE 5-1A RECENT AND PROJECTED SPREADING OPERATIONS, Water Year 2018-19

(Acre-feet)

Month	Basin Operator					Total
	LACDPW				LACDPW and LADWP	
	Branford	Hansen	Lopez[A]	Pacoima[A,B,C]	Tujunga[B]	
Actual						
Oct-18	14	0	795	1,440	0	2,249
Nov-18	60	0	833	1,480	0	2,373
Dec-18	82	193	446	2,080	0	2,801
Jan-19	177	1,430	597	1,300	0	3,504
Feb-19	134	8,320	35	3,530	0	12,019
Mar-19	72	7,420	447	3,750	0	11,689
Projected						
Apr-19	18	224	25	170	0	437
May-19	19	142	49	102	0	312
Jun-19	12	48	13	106	0	179
Jul-19	14	42	0	68	0	124
Aug-19	12	9	118	336	0	475
Sep-19	20	3	108	536	0	667
TOTAL	634	17,831	3,466	14,898	0	36,829
2013-2018 Average (AFY)	469	3,433	1,235	7,070	198	12,405
1968-2018 Average (AFY)	543	12,626	652	6,873	7,929	28,623

A) Includes imported MWD water spread by Burbank via the B-06 Foothill Feeder connection.

B) Includes native and imported water.

C) Includes imported LAA water spread by the City of Los Angeles via the Maclay Highline.

- Headworks Spreading Grounds out of service since 1981-82. The average spreading from 1968-69 to 1981-82 was 5,283 AF.
- All values published in this table supersede values published in previous Groundwater Pumping and Spreading Plans for ULARA. Any errors discovered in previously published tables have been resolved upon discovery.

Precipitation on the valley fill area in the SFB was 22.83 inches during Water Year 2018-19. This precipitation total is higher than both the long-term average (1968-2018) of 16.95 inches per water year, and the five-year average for 2013-18 of 10.24 inches per water year, as shown on Table 5-1B.

TABLE 5-1B HISTORICAL PRECIPITATION ON THE VALLEY FILL

(Inches per water year)

1968-18	2013-18	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19**
16.95	10.24	6.30	10.79	8.53	18.43	7.14	22.83

** Actual (not projected)

The estimated capacities of the five spreading grounds in the northeastern portion of the SFB according to LADWP are shown on Table 5-2. Also listed for each spreading grounds are the site operator, the type of basin, the approximate total wetted area and the maximum experienced recharge. The total maximum experienced recharge of these five spreading grounds is 109,163 AFY.

TABLE 5-2 ESTIMATED CAPACITIES OF EXISTING SPREADING GROUNDS

Name of Spreading Grounds	Basin Type	Total Wetted Area (ac)	Max Experienced Recharge (AFY)
Operated by LACDPW			
Branford	Deep	7	1,448
Hansen	Shallow	117	35,221
Lopez	Shallow	12	5,513
Pacoima	Shallow	107	24,164
Operated by LACDPW and LADWP			
Tujunga	Shallow	83	42,817
	TOTAL:	326	109,163

D. Stormwater Recharge Capacity Enhancements

Background Information

During the 1997-98 Water Year, area-weighted-average precipitation in the valley-fill and hill-and-mountain areas in ULARA was approximately 225% of normal. This amount of rainfall provided a well above-average volume of stormwater runoff that became available for capture in upstream reservoirs and diversion into existing spreading grounds. In April 1998, the original Watermaster received notice from the LACDPW that spreading at both the Hansen and Tujunga spreading grounds would be suspended temporarily. The reasons for curtailing spreading were that: the water table had risen to a level that threatened to inundate the base of the Bradley-East

Landfill near the Hansen spreading grounds; and methane gas generated from the refuse was migrating from the Sheldon-Arleta Landfill and into the surrounding neighborhood due to the recharge operations at the nearby Tujunga spreading grounds. At that time, reservoirs in Los Angeles County were full, and thus thousands of acre-feet of surface water runoff had to otherwise be discharged and lost to the ocean. The spreading activities were suspended for at least one month at that time.

In response to this undesirable condition, in May 1998, that original Watermaster formed the Tujunga and Hansen Spreading Grounds Task Force which later became the San Fernando Basin Recharge Task Force. The task force included representatives from the LACDPW, LADWP, Los Angeles Bureau of Sanitation and the Watermaster. After a series of meetings, the task force developed preliminary mitigation measures to help improve the utilization of both spreading grounds, particularly during years of above-normal runoff and recharge.

The task force met as the Stormwater Recharge Committee for a period of time and has since become a collaborative effort between LACDPW and LADWP to focus on projects to enhance the recharge capacity of spreading basins in the eastern portion of the SFB. As a result, watershed management groups have been formed within both the LACDPW and LADWP to address the entire cycle of pumping and recharge as an interrelated discipline, and these groups are working in partnership to study and develop solutions to enhance the groundwater supply in the SFB.

As mentioned above, LADWP and the LACDPW, in cooperation with the City of Los Angeles Bureau of Engineering, Bureau of Sanitation and Bureau of Street Services, continue to partner on, jointly fund, and collaborate on several projects that are projected to enhance the capacity for recharge of native water into the SFB via existing spreading grounds in the northeastern portion of this basin.

Below is a list of plans for modifying existing spreading facilities and construction of new facilities to provide expanded opportunities for enhancing the recharge capacity of the SFB and the Verdugo Basin.

Projects

Centralized projects implemented to date have increased the amount of stormwater captured on an annual basis by an average of 10,600 AFY, according to LADWP. Below are examples of completed centralized projects

- Big Tujunga Dam Seismic Retrofit Project

  LACDPW completed a major seismic retrofit of this dam in January 2012 and this effort has also restored its storage capacity for flood control and water conservation. Notably, the structural improvements to Big Tujunga Dam increased its storage capacity from 1,500 AF to 6,000 AF. This project, which was partially funded by the City of Los Angeles, greatly enhances LACDPW's ability to retain and manage stormwater for flood protection, water conservation, and environmental restoration.

- Sheldon-Arleta Gas Management

  Construction was completed in 2009. It is expected that the project could increase average annual stormwater capture by 3,000 AF, to a total of 5,000 AF, at the Tujunga spreading grounds.

- Hansen Spreading Grounds Upgrade

  Improvements to deepen and combine the existing basins, as well as to retrofit and automate the intake structure, were completed in January 2013. No additional modifications to the spreading basin are currently proposed. LADWP and LACFCD shared the $8.4 million cost for construction of this project, and it is expected that the project will increase average stormwater recharge by 2,100 AFY.

❑ Tujunga Spreading Grounds

Tujunga spreading grounds occupy a 150-acre parcel located along the Tujunga Wash Channel, at its confluence with the Pacoima Wash Channel. This spreading facility, which is owned by LADWP and operated by LACFCD, has a total wetted area of 83 acres, a maximum intake capacity of 250 cfs, and a storage capacity of 100 AF at this time.

The Tujunga Spreading Grounds Upgrade project entered the construction phase in August 2016 and is expected to be completed in 2020. As a result of this construction, the intake structure for these spreading grounds is out of commission and spreading is not feasible until completion of the work. The scope of construction includes consolidating and deepening existing spreading basins, installing two high-flow intakes with rubber dams, adding telemetry, and modifying the existing intake. Additional passive recreational and educational components, including a walking path and an outdoor classroom, will also be included. This project is expected to increase regional average stormwater capture and recharge by 8,000 AFY. As a result of this construction, no spreading is projected to occur in these facilities throughout the current water year.

- <u>Pacoima Spreading Grounds</u>

The 169-acre Pacoima spreading grounds surround old Pacoima Wash Channel downstream of Pacoima Dam and Reservoir. This spreading facility is owned and operated by LACFCD and has a total wetted area of 107 acres, a maximum intake capacity of 600 cfs, and a storage capacity of 530 AF.

LADWP and LACFCD are currently working cooperatively to improve stormwater capture at this facility by consolidating existing spreading basins, excavating sediment to improve infiltration rates, adding telemetry, and installing a new automated intake structure as part of the Pacoima Spreading Grounds Upgrade project. This upgrade project is currently in design, with construction expected to begin in mid-2021 and be completed by 2024. Once completed, this project is expected to increase regional average stormwater capture and recharge by 5,300 AFY.

- <u>Lopez Spreading Grounds</u>

Lopez spreading grounds, owned and operated by the LACFCD, are located downstream of Pacoima Dam. The facility has a total wetted area of 12 acres, a maximum intake rate of 25 cfs, and storage capacity of 24 AF.

LADWP and LACFCD are currently working cooperatively to improve stormwater capture at the Lopez spreading grounds as part of the Lopez Spreading Grounds Upgrade project. This upgrade project is currently under design, with construction expected to begin in 2024 and be completed in 2026. The scope includes expanding and deepening existing spreading basins, excavating sediment to improve infiltration rates, constructing a slurry wall along the channel to prevent seepage, and improving the intake structure. This project, once completed, is expected to increase regional average stormwater capture and recharge by approximately 480 AFY.

- <u>Branford Spreading Grounds</u>

Branford spreading grounds, owned and operated by LACFCD and are located adjacent to the Tujunga spreading grounds, along the Pacoima diversion channel. Most of the water that arrives at the Branford spreading grounds is urban runoff from Branford Street Channel. The total wetted area of the facility is 7 acres; it has with a maximum intake rate of 1,540 cfs and a storage capacity of 137 AF.

The Branford Spreading Basin Upgrade project is currently in design, with construction expected to begin in 2021 and be completed by 2023. The scope includes installing a new pump and pipe to divert water from the Branford Basin into the Tujunga spreading grounds. Once completed, this project is expected to increase regional average stormwater capture and recharge by 597 AFY.

- <u>CVWD Stormwater Recharge Feasibility Study</u>

CVWD's Verdugo Basin Groundwater Recharge, Storage, and Conjunctive Use Feasibility Study was completed in 2005 by CVWD and this study's recommendations included conceptual plans for stormwater recharge and storage within this basin. In Water Year 2012-13, CVWD received a Local Groundwater Assistance (LGA) grant from DWR to perform a feasibility study for stormwater recharge within the Verdugo Basin at Crescenta Valley County Park.

The study is a cooperative effort with the City of Glendale, the County of Los Angeles and other local stakeholders to determine if stormwater can be stored at Crescenta Valley County Park. The feasibility study started in August 2013 and was completed in October 2016. The results of this study showed that an estimated 500 AFY of stormwater could be infiltrated into the Verdugo Basin, which would reportedly help to reduce the wide fluctuations in the groundwater levels in the basin, which in turn would help to increase well capacity on an annual basis.

CVWD is currently preparing a conceptual design plan for the stormwater capture within Crescenta Valley County Park. The conceptual plan will be circulated among stakeholders including the City of Glendale; LACDPW; Los Angeles County, Parks and Recreation; and the Crescenta Valley Town Council for comments and approval. In addition, CVWD will be pursuing State and Federal grant funding for implementation of the project.

VI. GROUNDWATER INVESTIGATION PROGRAMS

There are numerous ongoing groundwater quality investigations in ULARA, particularly in the eastern portion of the SFB. The reader can obtain current information and more details for the sites mentioned below, which are regulated by the RWCQCB-LA, via that agency's GeoTracker website, http://geotracker.waterboards.ca.gov/.

The DTSC website, http://www.envirostor.dtsc.ca.gov/public/, also contains information regarding other groundwater quality investigations and/or cleanup sites within ULARA.

Below are brief descriptions of some of the groundwater quality investigations for contaminated and/or potentially contaminated sites within ULARA. The discussion below does not provide an exhaustive list of these sites within ULARA. Possible omission of a site from the list below does not imply that the omitted site is not important or not of concern to the Watermaster or to the Parties to the ULARA adjudication.

Pacoima Area Groundwater Investigation

A major VOC contaminant plume exists in the groundwater near the intersection of San Fernando Road and the Simi Valley Freeway (118 Freeway), in the Pacoima area of the SFB. This area lies approximately 2.5 miles north of and upgradient from the LADWP Tujunga wellfield. Groundwater pumped at this wellfield has experienced increasing concentrations of VOCs over time.

To help characterize the extent and potential migration of contamination in the Pacoima area, LADWP constructed two groundwater monitoring wells in 1997, including: PA-01, approximately 0.5 miles downgradient; and PA-02, approximately 1.25 miles downgradient from the suspected source areas.

The suspected sources reportedly include the Chase chemical (formerly Holchem) and the Black & Decker (formerly Price-Pfister) sites, which are under the jurisdiction of DTSC and RWQCB-LA, respectively.

Chromium Investigations

The RWQCB-LA, funded in part with a grant from USEPA, reviewed a large number of sites for potential CrVI contamination in the SFB and published its original findings in December 2002. Based on this RWQCB-LA review, 255 suspected CrVI sites were identified and inspected. As a result of those inspections, the RWQCB-LA recommended closure (i.e., no further action) for 150 of those sites and further assessment of the remaining 105 sites. In addition, the RWQCB-LA issued Cleanup and Abatement Orders to several sites including, among others, B.F. Goodrich (formerly Menasco Aerospace Division), PRC-Desoto (formerly Courtauld), Drilube, Honeywell (formerly Allied Signal), Lockheed (2), ITT, and Excello Plating. The RWQCB-LA may eventually issue additional orders to several other sites as well. These Cleanup and Abatement Orders require a responsible party to assess, clean up, and remediate the effects of contamination encountered in the soil and groundwater. Increasing concentrations of Cr(VI) in the groundwater have caused the shutdown or reduced pumping of several municipal-supply water wells associated with groundwater treatment plants because those plants were not designed to remove this contaminant (or any other newly-emerging contaminants). Shutdowns of those municipal-supply wells may allow the continued vertical and lateral migration of the VOCs and Cr to other production wells, and may also continue to complicate the ongoing and future extraction, management and delivery of potable water by the Parties within the SFB.

The Glendale Chromium Operable Unit (GCOU) was established in 2007 to help characterize the extent of Cr contamination in groundwater in the Glendale area, and to determine appropriate remedial action. USEPA is working with the DTSC and the RWQCB-LA to identify and clean up sources of Cr contamination. Remedial investigation of Cr contamination in groundwater in the GCOU began in 2011. To date, at least 29 groundwater monitoring wells have been constructed to help evaluate the location and extent of the Cr contamination in soils and groundwater beneath the area.

Information for the GCOU is available from USEPA's website at:
https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0902252

Tujunga Discovery Project

In 2008, the LADWP formed a task force in conjunction with USEPA and DTSC to conduct an inter-agency investigation into groundwater contamination at the Tujunga wellfield. The investigation began with LADWP's comprehensive sampling of eight existing groundwater monitoring wells in the vicinity of this wellfield. Two additional monitoring wells were sampled in December 2009. The lack of VOCs detected in groundwater samples collected from LADWP monitoring well TJ-MW-01 suggests that the Sheldon-Arleta Landfill, adjacent to the Tujunga wellfield, may not be the source of this contamination.

USEPA's contractor performed soil vapor sampling and limited soil sampling along several miles of transects upgradient of LADWP's Tujunga wellfield. The site-specific soil vapor results indicated low levels of PCE at most of the investigated sites. In early-2010, sediment sampling was conducted in the adjacent Branford spreading grounds to determine whether sediments in this basin might be a source of VOC contamination. Numerous borings were drilled, and many soil samples were analyzed for various analytes, including VOCs. TCE was not detected in any of these soil samples, but acetone and 2-butanone were detected in certain samples, although reportedly, these may be related to laboratory contamination.

The next stage of the investigation involved the construction of several new groundwater monitoring wells in the capture zone of the Tujunga wellfield. The locations of these new monitoring wells were prioritized based on data gaps in the existing wellfield. LADWP completed the construction of four new monitoring wells near the Tujunga wellfield between April 2012 and June 2013, and two other monitoring wells were to be constructed in late-2013. USEPA also constructed a monitoring well (TJ-MW-09) in 2013. Construction of these monitoring wells was completed in 2014.

VII. ULARA WATERMASTER MODELING ACTIVITIES

A. Introduction

LADWP continues to support the ULARA Watermaster by performing groundwater modeling of the SFB. The purpose of this groundwater modeling is to evaluate the combined effects of the proposed groundwater pumping and estimated groundwater recharge in the SFB projected over a five-year period. The projected pumping volumes used in the model were obtained from the “Water Year 2018-19 through 2022-23 Pumping and Spreading Plans" submitted by each Party pursuant to the provisions established in the revised February 1998 Policies and Procedures report. A copy of the current Pumping and Spreading Plan of each Party is included in the appendices of this report.

The groundwater flow model used is a comprehensive three-dimensional computer model that was developed originally for USEPA during the Remedial Investigation Study of the San Fernando Valley (December 1992). This model is a tool that has been used to estimate the future response to pumping and spreading in the SFB for the five-year period ending September 30, 2023, as presented herein.

The model code, “Modular Three-Dimensional Finite-Difference Groundwater Flow Model,” commonly called MODFLOW, was originally developed by the U.S. Geological Survey (McDonald-Harbaugh); this model code is currently used to develop the San Fernando Basin Groundwater Flow Model. This model consists of 64 rows, 86 columns, and up to four layers to reflect the varying geologic and hydrogeologic characteristics of the SFB in three dimensions. In the deepest portion of the SFB (i.e., in the eastern portion of the SFB), the model is subdivided into four layers, each layer characterizing a specific depth zone beneath ground surface. The model has a variable horizontal grid with cells that range from 1,000 by 1,000 feet in size in the southeastern portion of the SFB, to 3,000 by 3,000 feet in size in the northwestern portion of this basin (Figure 7-1) or where less data are available. This model is regularly updated by LADWP.

B. Model Inputs

The input data for this model are illustrated in Table 7-1. Table 7-1A provides the various elements of recharge into the SFB; recharge occurs from precipitation, delivered water, hill and mountain runoff, spreading, and subsurface inflow. Table 7-1B provides the volumes of groundwater extracted from the SFB by each major Party, including the City of Los Angeles, the City of Burbank, the City of Glendale, and other individual pumpers. Both tables show projected values for the five-year study period, from Fall 2018 to Fall 2023, as well as actual values that were reported for portions of the 2018-19 Water Year.

In Table 7-1A, the projected values for percolation and spreading activities were estimated by LADWP modeling staff using the long-term average rainfall and recharge amounts, and the resulting estimates were then used as inputs to the model. The projections include the actual amounts reported for portions of the 2018-19 Water Year. The spreading estimates reflect temporary shutdowns during construction of the Tujunga spreading grounds. Construction to enhance the spreading capacity at the Tujunga spreading grounds is planned to occur within the next few years. The anticipated spreading of imported water at the Pacoima spreading grounds by the City of Burbank is also included in these projections. Subsurface inflows to the SFB occur from the Sylmar Basin (through the Sylmar Notch and Pacoima Notch) were estimated by the current ULARA Watermaster to be approximately 250 AFY. The amounts of subsurface inflows from the Verdugo Basin were those determined in the 1962 Report of Referee. These values were used as constants in the model throughout the current five-year study period.

The volumes for all groundwater extractions shown on Table 7-1B and used as model inputs were obtained from the "Groundwater Pumping and Spreading Plans" submitted by the five municipal-supply producers. The total extraction by each wellfield was initially allocated among the individual wells comprising each wellfield, and then a percentage of the pumping allocated to each well was assigned to each model layer based on the percentage of casing perforations considered to be contained within each layer.

The initial head values (groundwater elevations) were derived from the actual data from Water Year 2018-19, and these values set the initial conditions for model analysis for the next five-year period. These initial conditions reflect the increase in simulated groundwater elevations observed in most areas of the SFB resulting from decreased pumping in the wellfields operated by the City of Los Angeles.

At the close of every water year, the Watermaster staff at LADWP update the model input files with the actual basin recharge and extraction data; this activity is performed each year by LADWP and incorporates actual data from as early as 1981.

Table 7-1
MODEL INPUT
San Fernando Basin Recharge & Extractions
2018-2023

Table 7-1A

Projected San Fernando Basin Recharge 2018-2023

WATER YEAR	RAINFALL (IN/Y) VALLEY	RAINFALL (IN/Y) HILL & MTN	PERCOLATION VALLEY FILL	PERCOLATION RETURN WATER	PERCOLATION SUB TOTAL	H&M (A) HILL & MTN	SPREADING GROUNDS BRANFORD	SPREADING GROUNDS HANSEN (B) (NATIVE)	SPREADING GROUNDS LOPEZ	SPREADING GROUNDS PACOIMA PACOIMA (NATIVE)	SPREADING GROUNDS PACOIMA PACOIMA (C) (MWD)	SPREADING GROUNDS PACOIMA PACOIMA (TOTAL)	SPREADING GROUNDS TUJUNGA (D)	SPREADING GROUNDS SUB-TOTAL	SUBSURFACE INFLOW PACOIMA NOTCH (E)	SUBSURFACE INFLOW SYLMAR NOTCH (E)	SUBSURFACE INFLOW VERDUGO BASIN	SUBSURFACE INFLOW SUB-TOTAL	TOTAL RECHARGE
2018-19	22.83	29.11	15,860	45,545	61,404	4,971	634	17,831	3,466	1,532	13,366	14,898	0	36,829	117	133	70	320	103,525
2019-20	16.95	20.97	11,775	47,114	58,889	3,582	540	13,900	540	6,564	4,150	10,714	0	25,694	117	133	70	320	88,485
2020-21	16.95	20.97	11,775	47,114	58,889	3,582	540	13,900	540	6,564	300	6,864	0	21,844	117	133	70	320	84,635
2021-22	16.95	20.97	11,775	47,114	58,889	3,582	540	13,900	540	6,564	6,950	13,514	5,100	33,594	117	133	70	320	96,385
2022-23	16.95	20.97	11,775	47,114	58,889	3,582	540	13,900	540	6,564	6,950	13,514	5,100	33,594	117	133	70	320	96,385

Table 7-1B

Projected San Fernando Basin Extraction 2018-2023

WATER YEAR	LADWP AE	LADWP ER	LADWP HW	LADWP NH (WEST)	LADWP NH (EAST)	LADWP PL	LADWP RT	LADWP TJ	LADWP VD	LADWP WH	LADWP TOTAL LADWP (F)	BURBANK BURBANK PSD	BURBANK LOCKHEED	BURBANK NON-BURBANK (VMP)	GLENDALE CITY OF GLENDALE	GLENDALE OU-NORTH	GLENDALE OU-SOUTH	OTHERS TOTAL NON-LADWP	OTHERS TOTAL NON-GLENDALE (F. LAWN)	TOTAL EXTRACTION
2018-19	0	-1	0	-5,160	0	-1,338	-11,660	-27,729	-1	0	-45,890	-114	-9,686	0	0	-5,150	-2,773	-713	-57	-64,382
2019-20	0	-1	0	-4,990	0	-1,973	-6,682	-31,490	-2	0	-45,138	0	-10,540	0	-10	-5,225	-2,813	-713	-400	-64,839
2020-21	0	0	0	-18,185	0	-1,738	-24,951	-42,225	0	0	-87,099	0	-11,255	0	-10	-5,242	-2,823	-713	-400	-107,542
2021-22	0	0	0	-18,185	0	-1,738	-24,951	-42,225	0	0	-87,099	0	-11,280	0	-10	-5,242	-2,823	-713	-400	-107,567
2022-23	0	0	0	-18,185	0	-1,738	-24,951	-42,225	0	0	-87,099	0	-11,290	0	-10	-5,242	-2,823	-713	-400	-107,577

NOTES:

(A) Hill & Mountain runoff

(B) Hansen Spreading Grounds activated in the water year of 2009-10 after completing the modification work.

(C) Burbank projected to spread imported water (MWD) at Pacoima Spreading Grounds: 4,140 AF for 2019-20, 300 AF for 2020-21 (Due to expected consturction) and 6,9

(D) Tujunga Spreading Grounds is completing construction and expected to be in service by June 2021.

(E) The values were estimated on the updated Safe Yield for the Sylmar Basin by Mr. Richard Slade, the Watermaster of Upper Los Angeles River Area.

(F) The values shown for Los Angeles on this extraction plan are estimates only. The estimated groundwtaer pumping amounts for the above-mentioned wellfields may be increased as treatment faculities are installed or as the blending with external source of water will continue to be allowable.

C. <u>Simulated Groundwater Elevations and Flow Directions</u>

After running the model for five separate but successive stress periods (Water Years 2018-2023), each lasting 365 days, the MODFLOW code generated various numerical data, including the heads (groundwater elevations), the drawdown (change in groundwater elevations) and the cell-by-cell flow (vector or flow direction data). These numerical data were used to create the following figures and plates:

- The simulated groundwater (water table) elevation contour results for Model Layer 1 for Fall 2023 are shown on Plate 1 and the simulated groundwater elevation contours for Model Layer 2 are shown on Plate 2 for the same period.

- The changes in the simulated groundwater elevation contours were generated from the drawdown data from the Fall 2018 to Fall 2023 simulation period and the results are shown on Plate 3 for Layer 1 and on Plate 4 for Layer 2.

- The simulated horizontal groundwater flow directions for Fall 2023 are shown on Plate 5 for Model Layer 1 and on Plate 6 for Layer 2 for the same period.

- Plates 7 through 10 depict the most recently generated contaminant plumes for TCE, PCE, nitrate, and total dissolved chromium. TCE and PCE plumes adapted from 2017-dated work published by USEPA, total dissolved chromium plumes adapted from 2014-dated work published by USEPA, and nitrate plumes adapted from 2010-dated work published by USEPA, superimposed onto the Layer 1 simulated horizontal groundwater flow direction for the year 2023.

D. <u>Evaluation of Model Results</u>

Plate 1: Simulated Groundwater Elevation Contours: Model Layer 1 - Fall 2023

The most noticeable feature of the simulated groundwater contours shown on Plate 1 is the cone of depression (pumping cone) that continues to occur around the BOU. Extractions by wells at this facility occur primarily from Layer 1, although Layer 2 does provide some recharge to Layer 1. The City of Burbank projected average water year pumping of 10,810 AFY from the BOU between Fall 2018 and Fall 2023. The radius of pumping influence provided by the model extends nearly one mile in the downgradient (southeasterly) direction from the BOU wells. The downgradient radius of influence is usually larger than the upgradient radius of influence. Plate 1 also illustrates the subtler influence of pumping by the GOU wells and the Pollock Treatment Plant Wells on groundwater elevations.

Plate 2: Simulated Groundwater Elevation Contours Model Layer 2 - Fall 2023

The most pronounced features of the simulated groundwater contours shown on Plate 2 are the simulated cones of depression near the Tujunga wellfield, the Rinaldi-Toluca wellfield, the North Hollywood wellfield, and the BOU wells. Approximately 75 percent of the projected groundwater pumping from the Tujunga, Rinaldi-Toluca and North Hollywood wellfields was simulated as being extracted from model Layers 2, 3 and 4.

Plate 3: Simulated Changes in Groundwater Elevation: Model Layer 1 - Fall 2018 to Fall 2023

The model simulation results show a decrease in groundwater elevations in most areas of the SFB, particularly in areas near the wellfields. This simulated decrease in water levels primarily results from the difference between the volumes of pumping and recharge that were simulated to occur during the five-year period of model simulation.

Table 7-1A and 7-1B show that the estimated volume of groundwater recharge within the SFB during the five years of simulation (469,415 AF) was 17,508 AF higher that the estimated volume of groundwater extracted from the SFB during this period (451,907 AF), which represents an average storage increase of 3,502 AFY during the simulation period.

The items below provide a more detailed review of Plate 3:

- The area in the vicinity of the Tujunga spreading grounds shows a decrease in simulated groundwater elevations of about 20 feet.
- The area in the vicinity of Hansen spreading grounds shows an increase in simulated groundwater elevations of about 80 to 120 feet.
- The increase in simulated groundwater elevations from 2018 to 2023 in the vicinity of the Pacoima spreading grounds results from proposed spreading of imported water by Burbank (6,343 AFY), in addition to the recharge of native surface water by LACDPW.
- Groundwater elevations proximal to the Rinaldi-Toluca wellfield were simulated by the model to decrease by about 20 to 30 feet.
- The elevations of groundwater near the Erwin, Whitnall, and Verdugo wellfields were simulated to decrease by 5 to 20 feet.

- The simulated groundwater elevations near the BOU showed an expected decrease of up to about 25 feet in one area, and an increase of up to approximately 30 feet in another area near the BOU.

Plate 4: Simulated Changes in Groundwater Elevation: Model Layer 2 - Fall 2018 to Fall 2023

- Similar to the results for Model Layer 1 (shown on Plate 3), Plate 4 illustrates much of the same decreases in simulated groundwater elevations in Model Layer 2, resulting from decreased groundwater recharge, relative to the increased groundwater extractions, during the five years of the model scenario.

- The model simulated a decrease in the groundwater elevations by 20 to 30 feet in the area near the Rinaldi-Toluca wellfield. Simulated groundwater elevations in the area near the Erwin, Whitnall, and Verdugo wellfields were projected by the model to decrease by 5 to 20 feet.

Plate 5: Simulated Groundwater Flow Directions: Model Layer 1 - Fall 2023

- Plate 5 consists of groundwater flow direction arrows superimposed on the simulated groundwater elevation contours to illustrate the general (or regional) direction of groundwater flow within Layer 1 of the model.

- Groundwater pumped at the Rinaldi-Toluca, Tujunga, North Hollywood, GOU, and BOU wellfields and water spread at the Hansen, Pacoima and Tujunga spreading grounds caused the most pronounced effect on the direction of groundwater flow in the SFB. In particular, pumping by the BOU may create such a significant cone of pumping depression that groundwater appears to flow inward toward the wellfield from all directions (radial flow).

- A groundwater divide apparently develops south of the BOU wells. This appears to be primarily due to the "pumping trough" formed by groundwater extractions at the BOU.

Plate 6: Simulated Groundwater Flow Directions: Model Layer 2 - Fall 2023

- Plate 6 consists of groundwater flow direction arrows superimposed on the simulated groundwater elevation contours to illustrate the general, or regional, direction of groundwater flow within Layer 2 of the model.

Plates 7 – 10: Simulated Groundwater Flow Directions Model Layer 1 for Fall 2023 and TCE, PCE, NO_3, and Chromium (Cr) Contamination

- Plates 7 through 10 depict the most recent TCE (2017), PCE (2017), NO_3 (2010) and Total Cr (2014) contaminant plumes available from the work of USEPA. These plumes are superimposed onto the horizontal direction of groundwater movement in Layer 1 for Fall 2023. The BOU appears to contain a large portion of the 0-5, 5-50, 100-500, and 500-1,000 μg/L regions of the TCE and PCE plumes. The uncaptured portions of these plumes are likely to continue migrating in a southeasterly direction toward the GOU and the Narrows area along the Los Angeles River.

- Pumping by the BOU during the model simulation period (10,804 AFY) flattened (reduced) the horizontal gradient in a southeasterly direction, slowing the natural movement of groundwater located to the southeast of the plume, near the BOU.

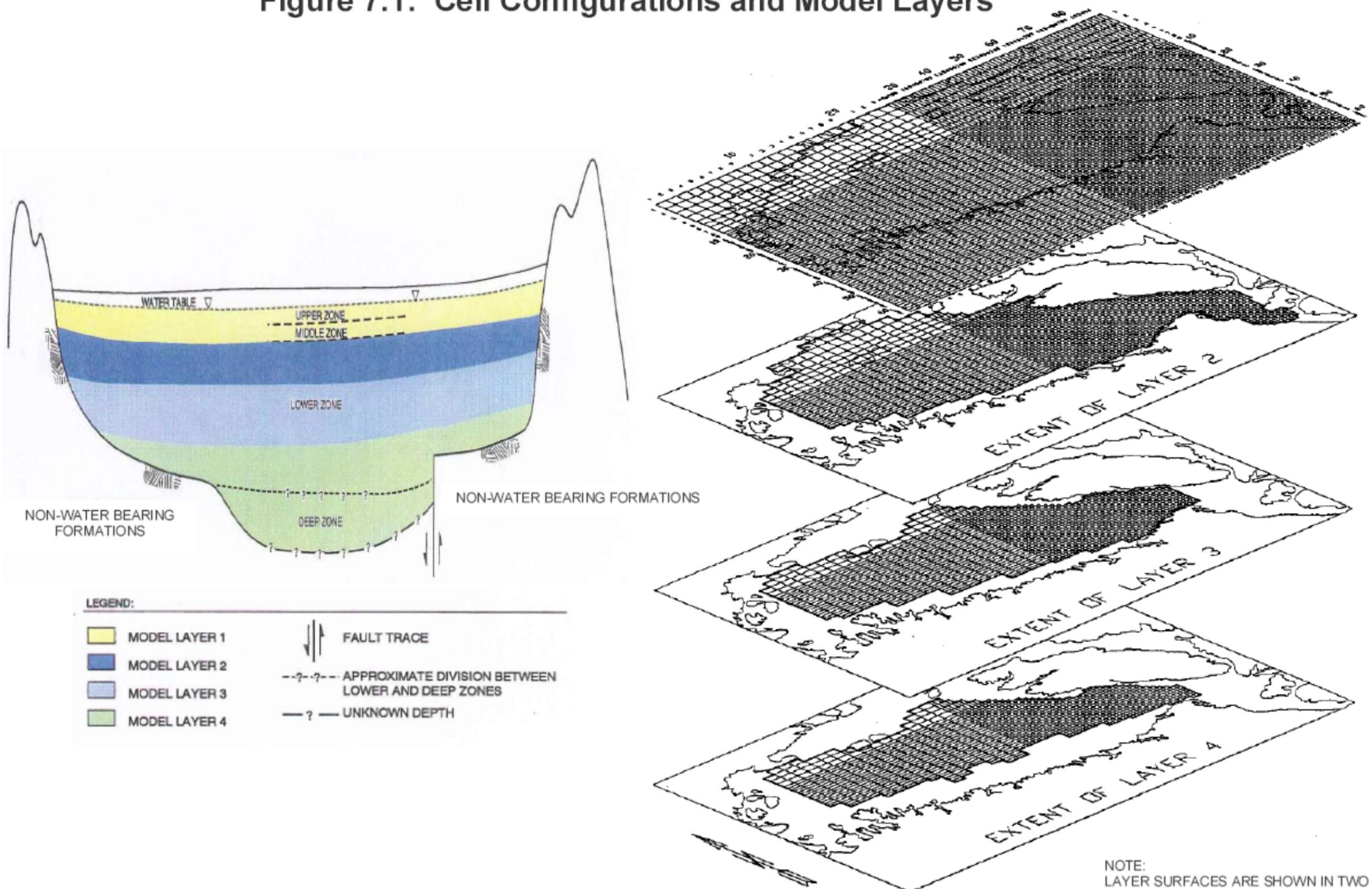
- Wells in the Glendale NOU and SOU capture a portion of the plume(s) that is (are) not captured by the BOU wells. GOU wells also appear to capture the plume located upgradient but within the radius of influence of these wells.

- Pumping by the Pollock wells appears to have little effect on Layer 1 because approximately 75 percent of the pumping by this facility extracts groundwater from the zones within Layer 2.

- Plate 9 (NO_3 Contamination) indicates that Layer 1 extractions by the NHOU, BOU, and GOU wells may be impacted by nitrate.

- Plate 10 (Total Dissolved Chromium) indicates that Layer 1 extractions by wells in the NHOU, BOU, GNOU, GSOU, and the Pollock Wellfield may be impacted by the Cr plume(s).

Figure 7.1: Cell Configurations and Model Layers



NOTE:
LAYER SURFACES ARE SHOWN IN TWO DIAMENSIONS FOR THE PURPOSE OF THIS ILLUSTRATION ONLY. ACTUAL MODEL LAYER THICKNESS VARIES BY NODE.

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

VIII. WATERMASTER EVALUATION AND RECOMMENDATIONS

The Parties to the Judgment continue to evaluate ways to increase groundwater recharge in the ULARA groundwater basins. In an effort to increase stormwater recharge in SFB, the City and County of Los Angeles initiated and continue to fund an ambitious and very important program to increase the recharge capacity in several of the local spreading grounds. The City of Los Angeles also continues to investigate additional alternatives to increase water conservation. This Watermaster commends the City and County of Los Angeles for these vital efforts. The City of Burbank has continued spreading imported water in certain spreading basins, when possible, to increase basin recharge. CVWD continues to work independently and with the City of Glendale and others to possibly try to implement stormwater capture programs to increase recharge in the Verdugo Basin. Further, the Cities of Burbank, Glendale and Los Angeles continue to expand their recycled water programs to offset groundwater and imported water use in the SFB.

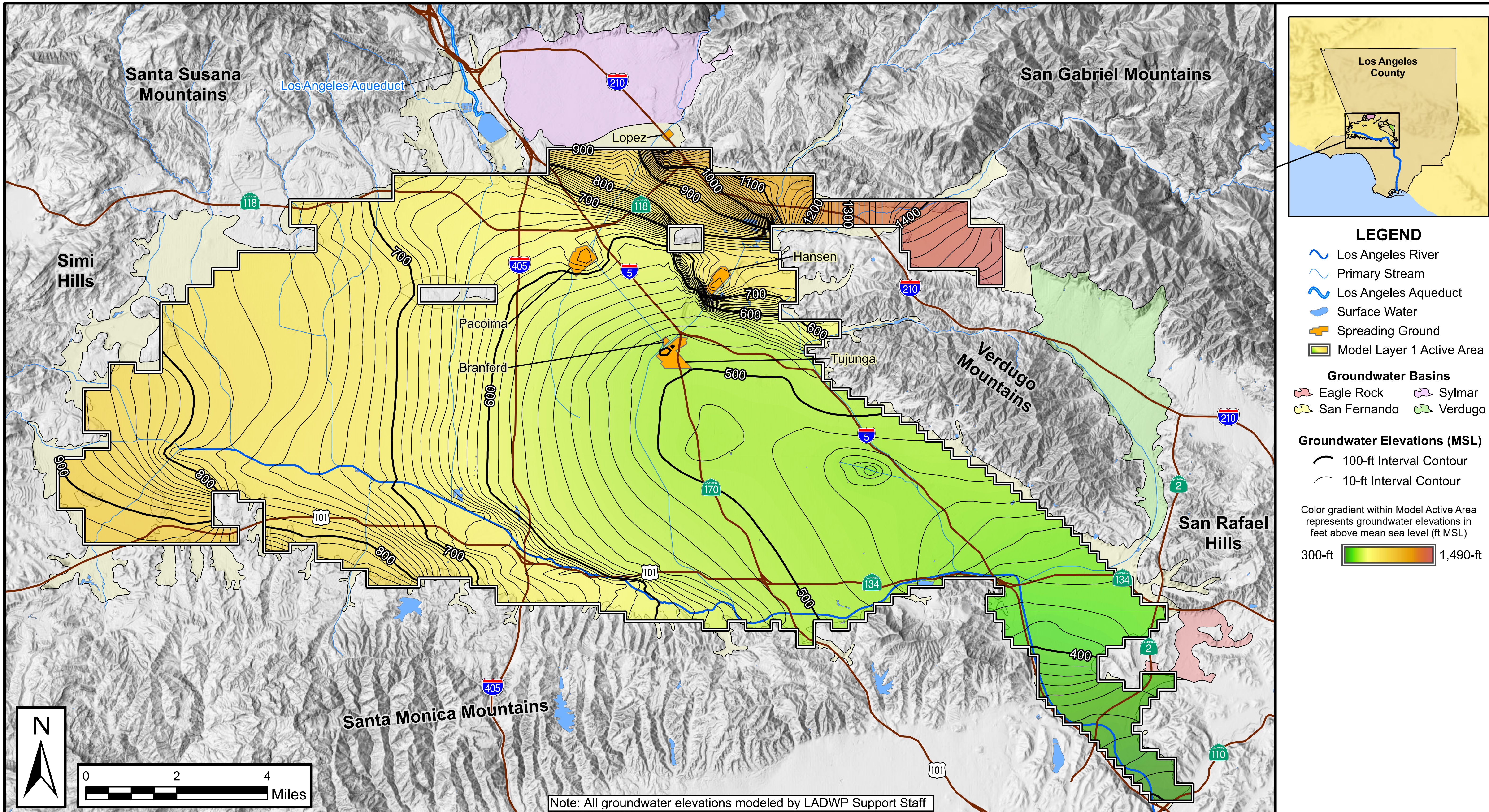
Contamination of the groundwater within the SFB by a variety of anthropogenic pollutants including VOCs and newly discovered contaminants (such as 1,4-dioxane) in some areas continues to be the most serious challenges to water quality and to the ability of the Parties to pump their water rights (without treatment) from the SFB. The contaminant plumes are large and continue to migrate, despite years of ongoing groundwater remediation and treatment. For example, the VOC plumes in North Hollywood have not been fully contained by the extraction wells in the NHOU, due in large part to declining groundwater levels, which have resulted in the reduced pumping capacity of those extraction wells. It is encouraging to see USEPA's proposed Second Interim Remedy for the NHOU which entails facility improvements to increase its peak pumping capacity to as much as 4,000 gpm (3,050 gpm on average). Although the planned implementation of these improvements is several years away, this Remedy should eventually help remove additional contaminant mass and control contaminant migration in the nearby plumes. NHOU pumping is currently suspended until these improvements are implemented, but it is important to reactivate this treatment facility to reduce the migration and mass of this contamination. The BOU has undergone several capital improvements and the facility now operates with much greater reliability for pumping and treatment of VOC-contaminated groundwater on a consistent basis at near its 9,000 gpm design capacity.

This Watermaster continues to be aware of and concerned about the detections of CrVI in several production wells in the eastern portion of the SFB. As Watermaster, I continue to support an aggressive approach by regulatory agencies, including USEPA, RWQCB-LA and DTSC, in identifying the various sources of this contaminant and in requiring effective, efficient and timely cleanup by the responsible parties. The Watermaster also appreciates Glendale's lead in the development of chromium treatment technology in the area and in the construction of its Chromium (VI) Removal Demonstration Facilities.

As a result of the geologic conditions in Verdugo Basin and the presence of local bedrock constrictions, groundwater tends to rise to ground surface near the Verdugo Wash Narrows and eventually leaves this basin as surface outflow. Glendale is currently unable to pump its full right from the Verdugo Basin, but by rehabilitating one of its previously abandoned wells and constructing a new municipal-supply well, Glendale has taken steps to increase its use of groundwater from this basin and help reduce the continued groundwater outflow from this basin. The Watermaster commends the ongoing efforts of Glendale to increase its pumping capacity. The Watermaster also notes the efforts of CVWD on its ongoing evaluation of potential stormwater recharge projects in Verdugo Basin.

The Parties should continue to expect significant challenges to both the availability and quality of groundwater in the ULARA groundwater basins during the next five water years. It is the opinion of this Watermaster that, over the forthcoming years, it will be essential for the continuing safe yield operation of the ULARA groundwater basins to continue to: provide more recharge at existing spreading basins; define and implement new locations and/or other methods (such as the use of injection wells) for recharging these groundwater basins; and actively pursue the possible spreading of recycled water in existing spreading basins in the northeastern portion of the SFB in order to augment groundwater recharge that occurs naturally during the rainy season in those existing spreading basins.

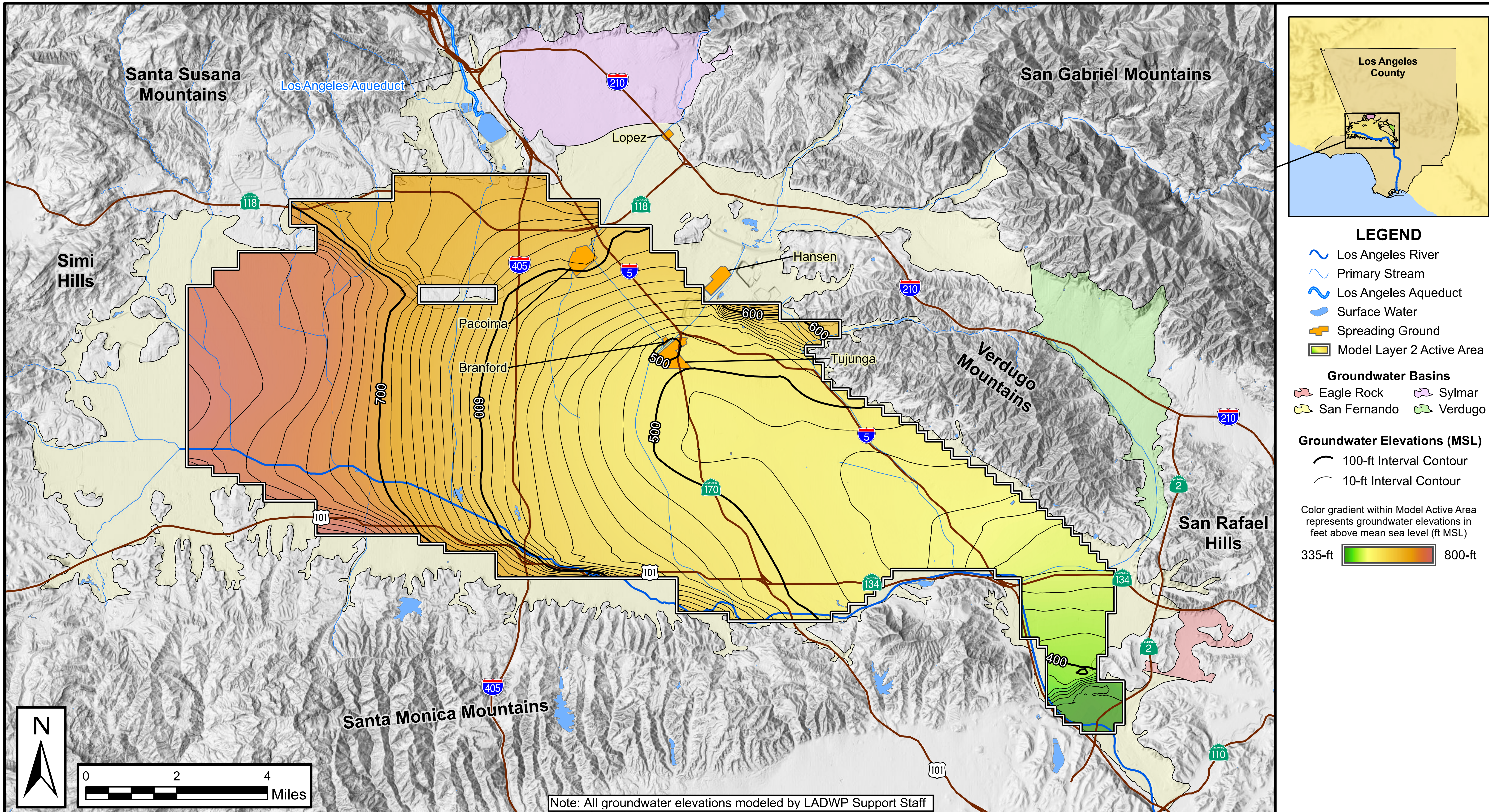
PLATES



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

Simulated Groundwater Elevation Contours: Model Layer 1 - Fall 2023

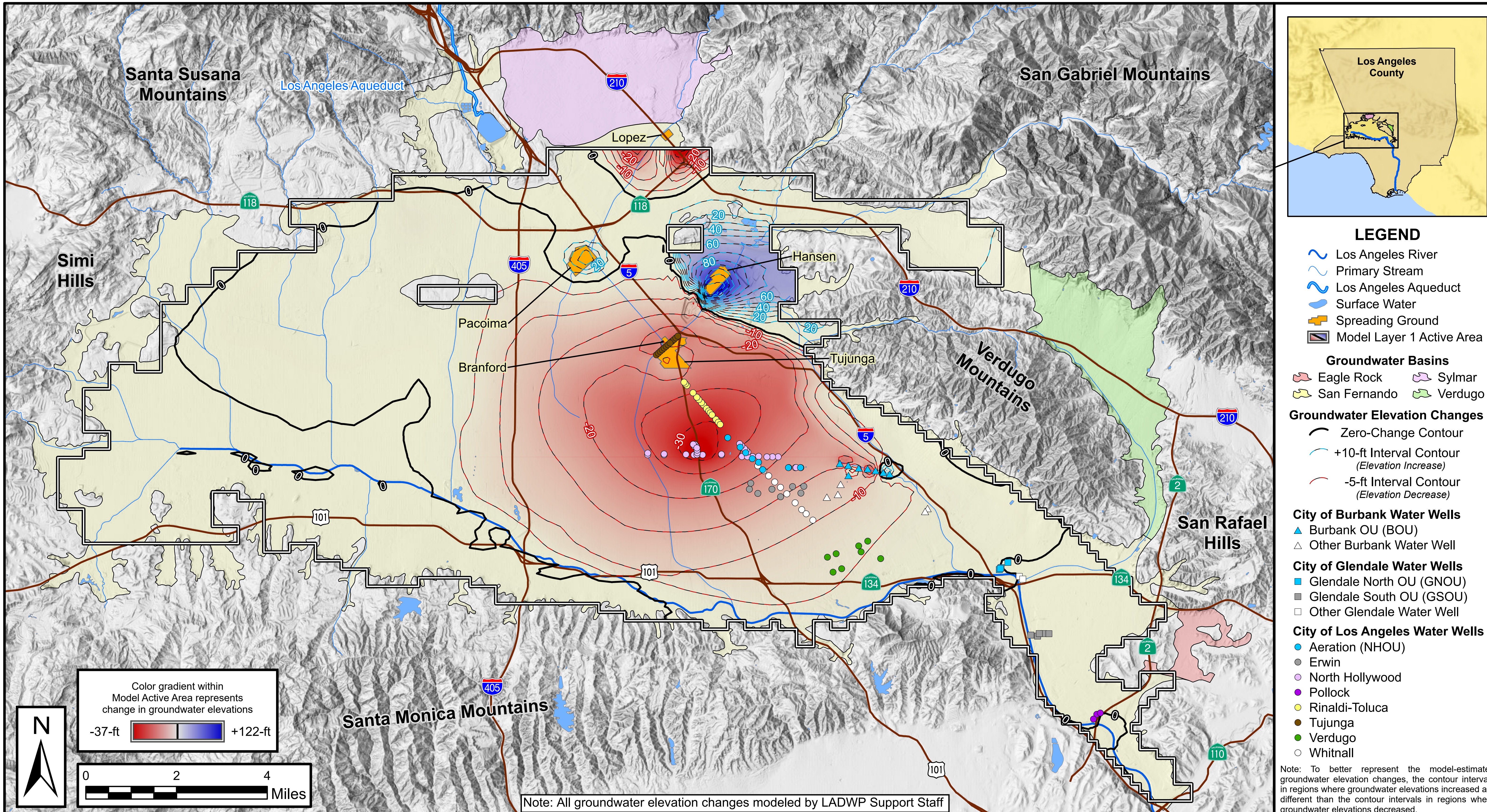
Plate 1



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

Simulated Groundwater Elevation Contours:
Model Layer 2 - Fall 2023

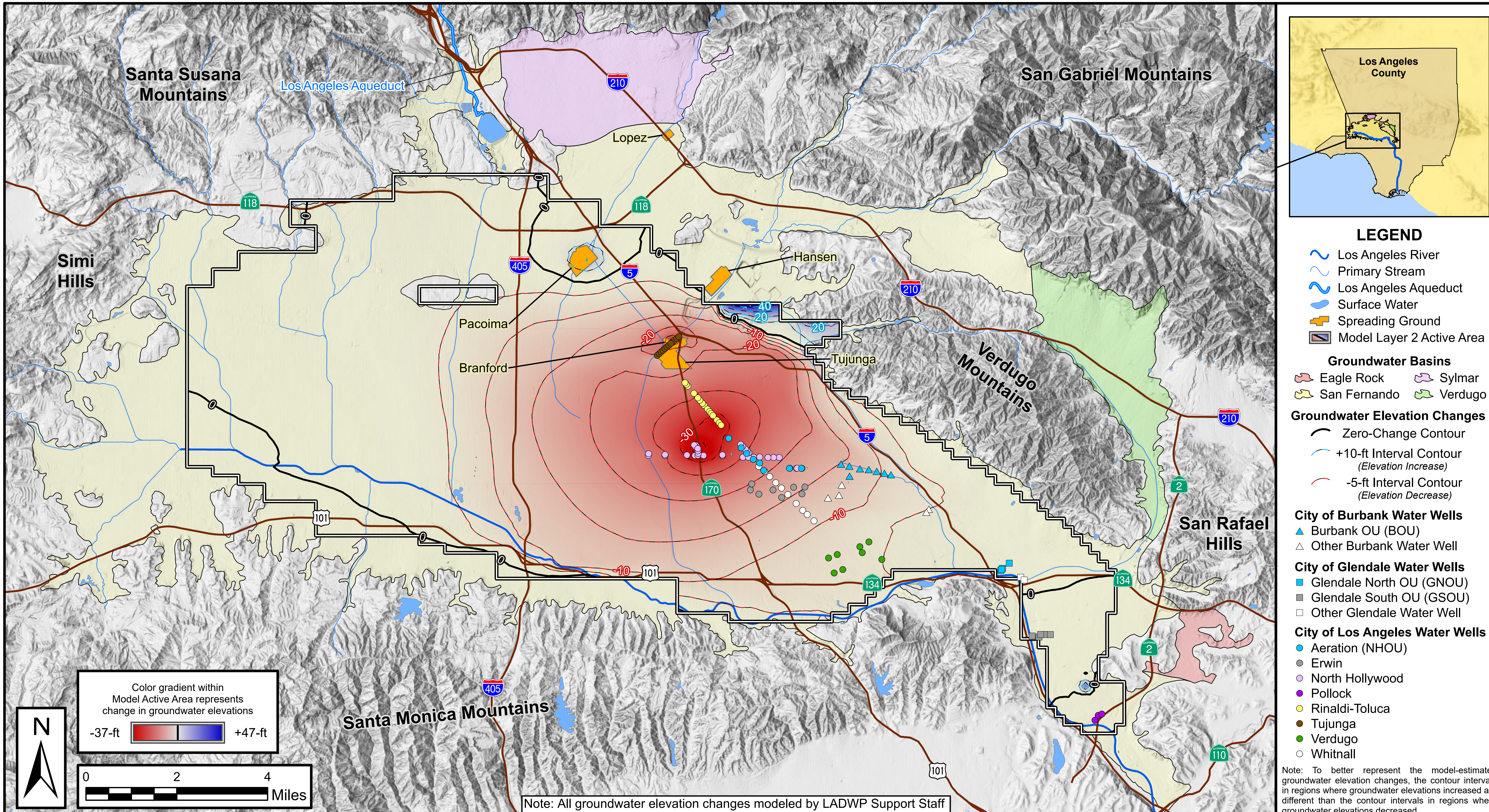
Plate 2



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

Simulated Changes in Groundwater Elevation:
Model Layer 1 - Fall 2018 to Fall 2023

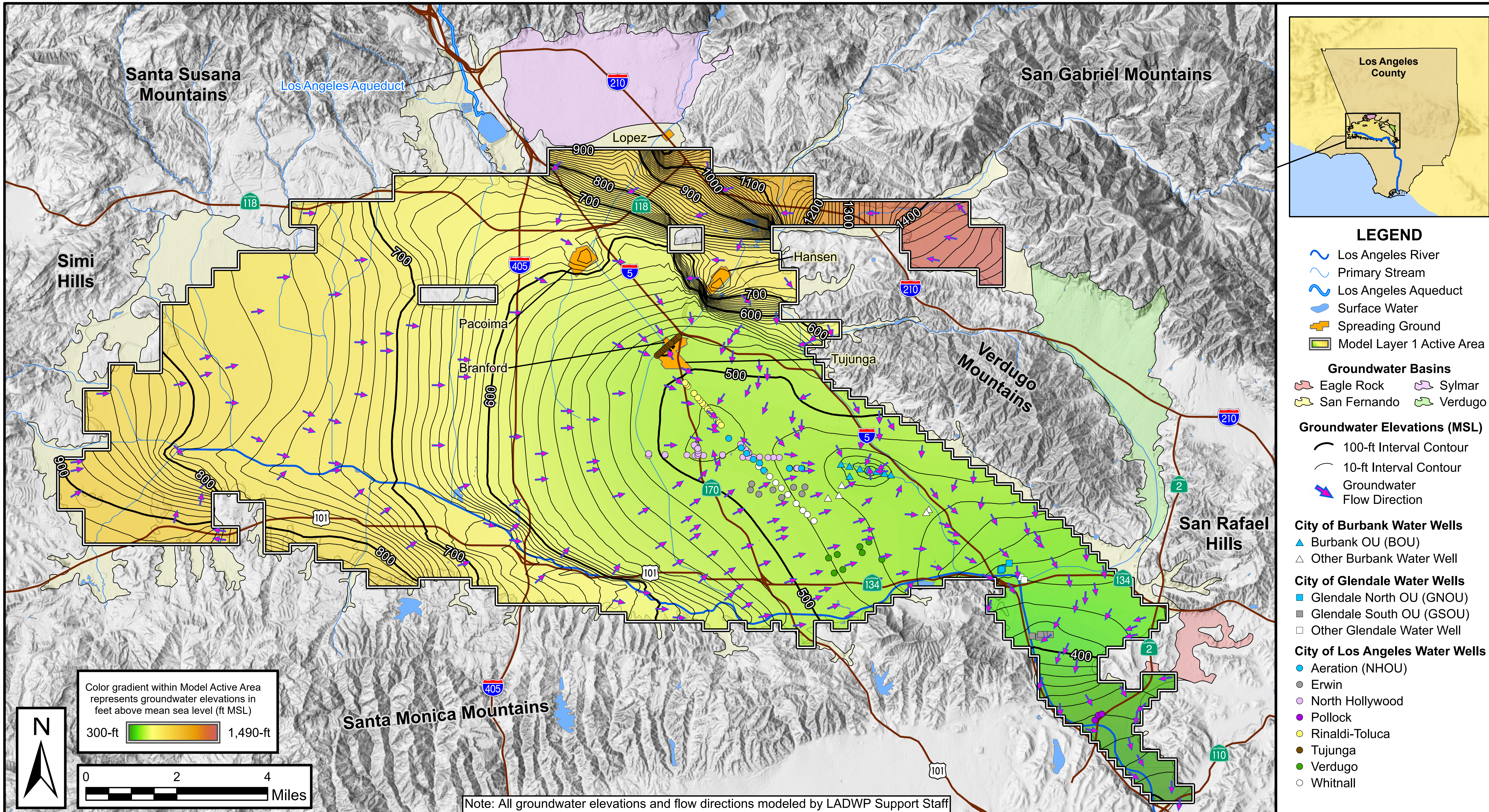
Plate 3



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

Simulated Changes in Groundwater Elevation: Model Layer 2 - Fall 2018 to Fall 2023

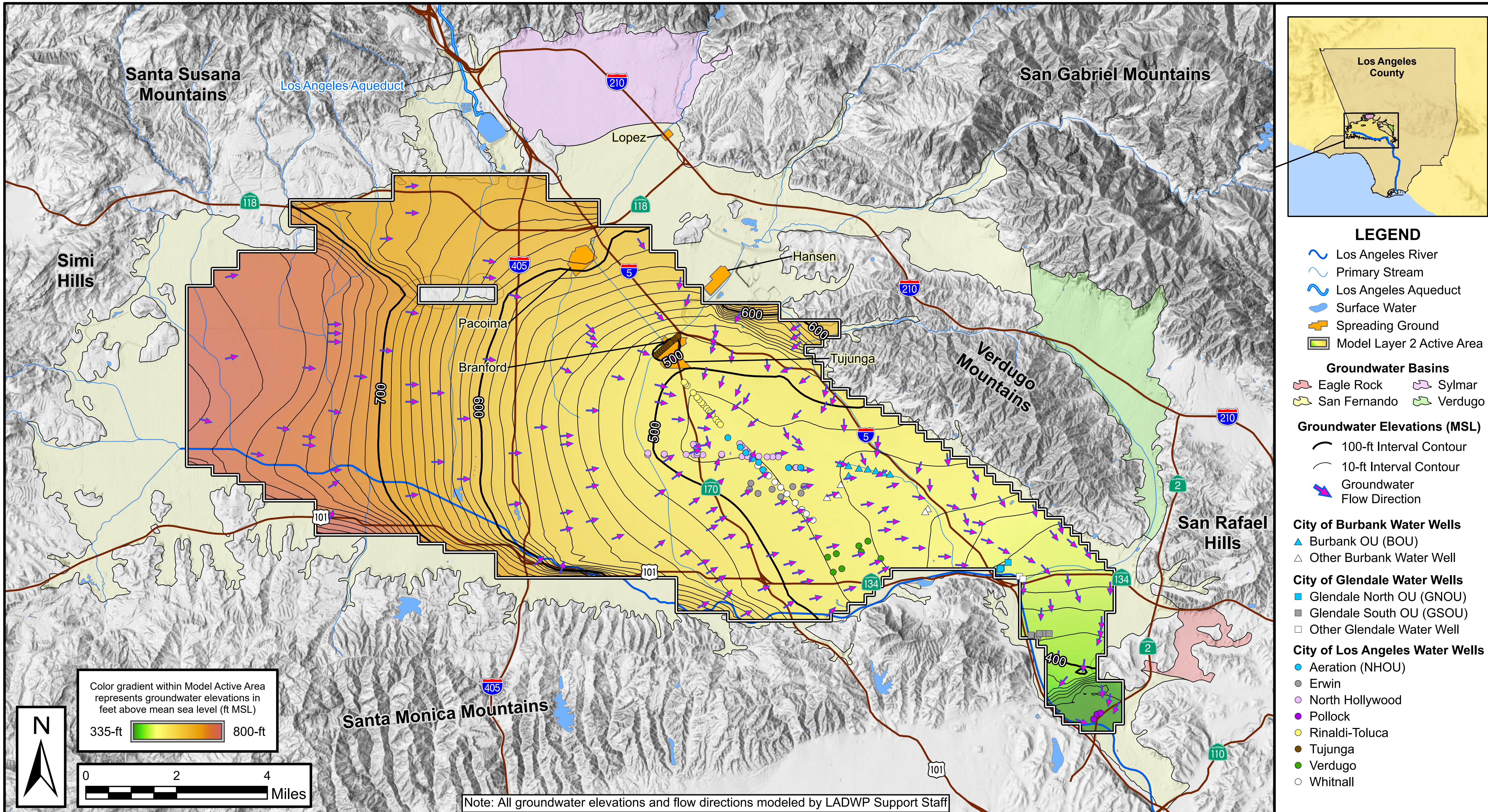
Plate 4



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

Simulated Groundwater Flow Directions: Model Layer 1 - Fall 2023

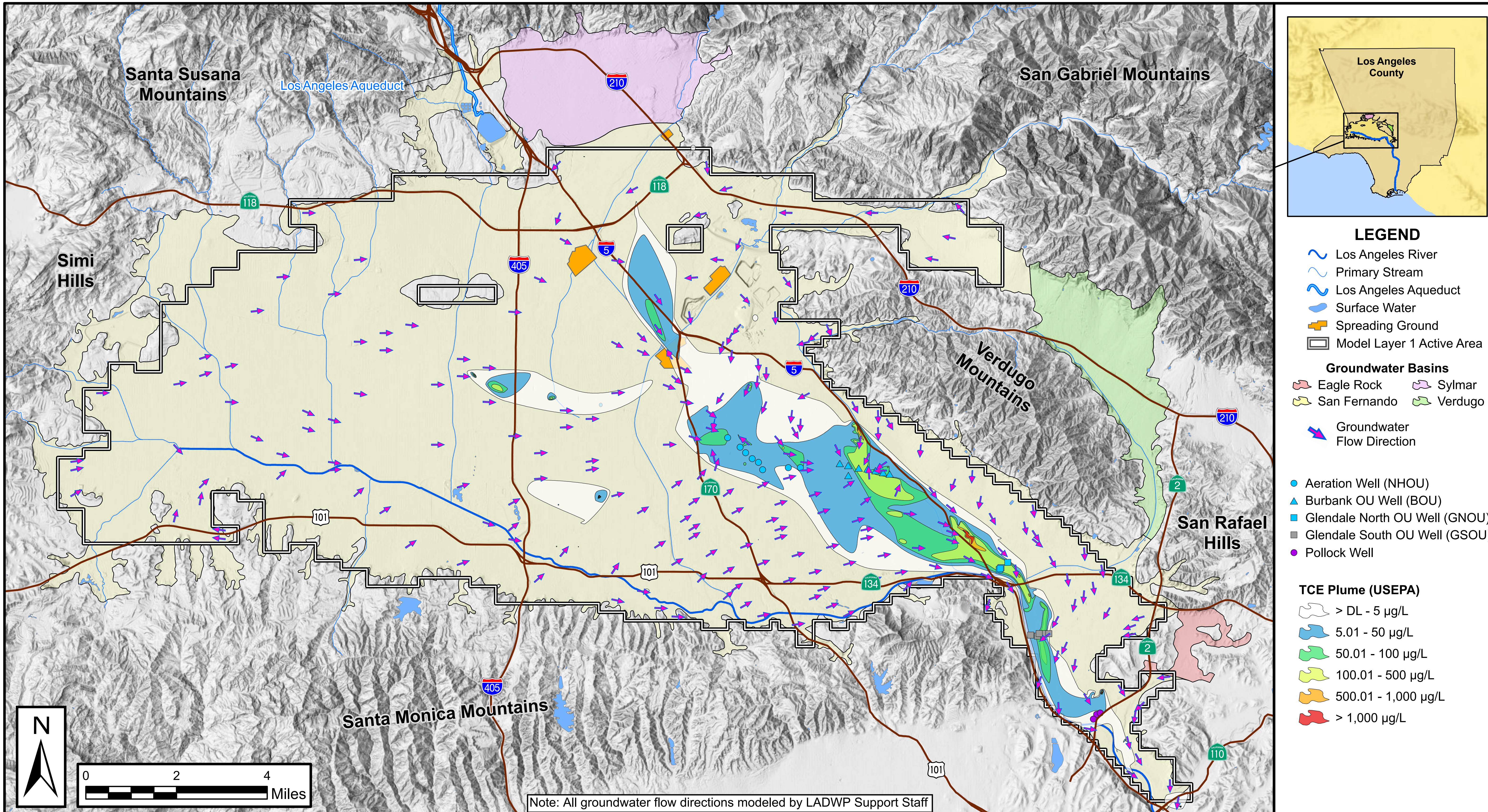
Plate 5



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

Simulated Groundwater Flow Directions: Model Layer 2 - Fall 2023

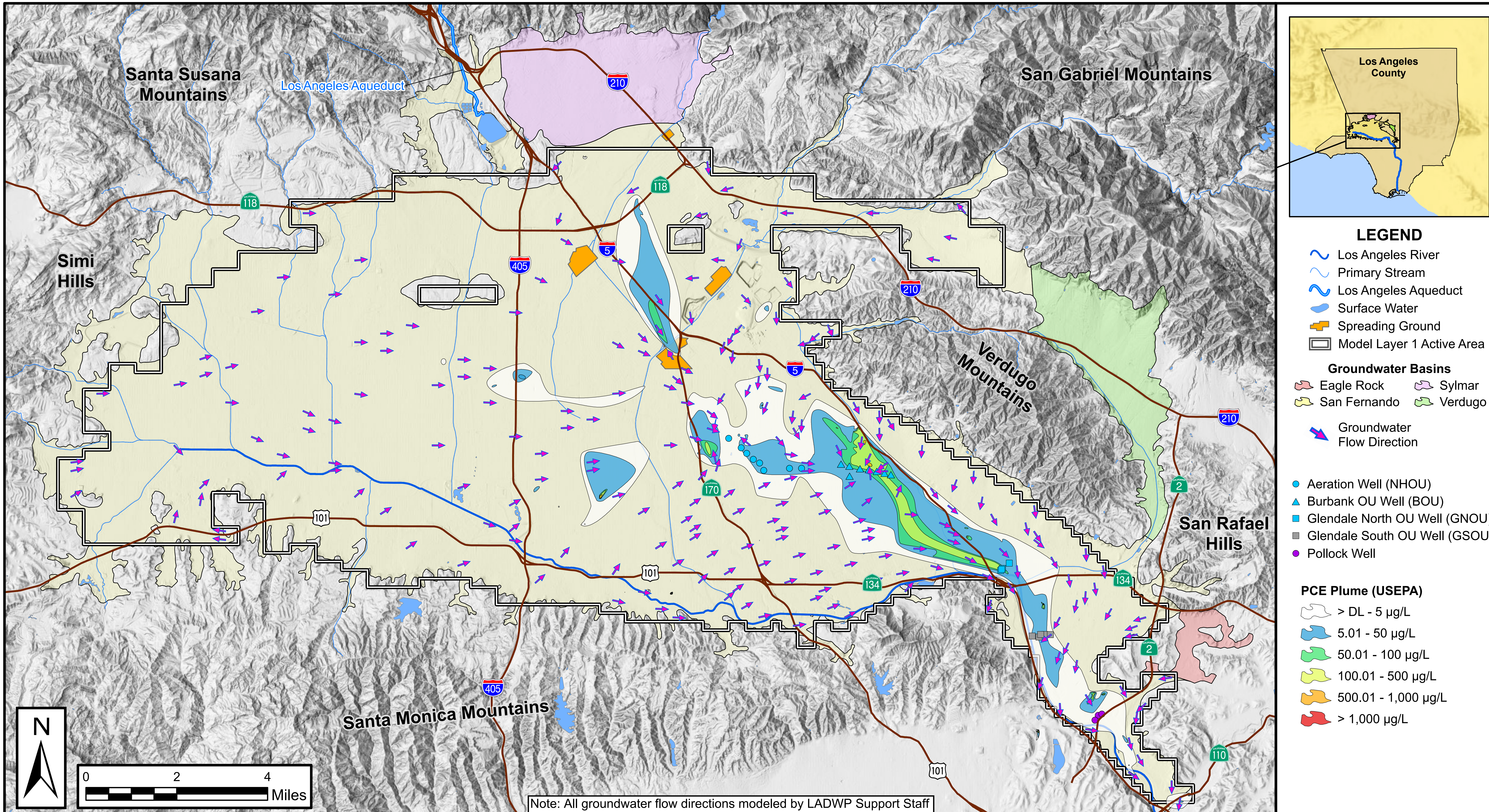
Plate 6



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

2017 TCE Contamination and
2023 Simulated Groundwater Flow Directions:
Model Layer 1

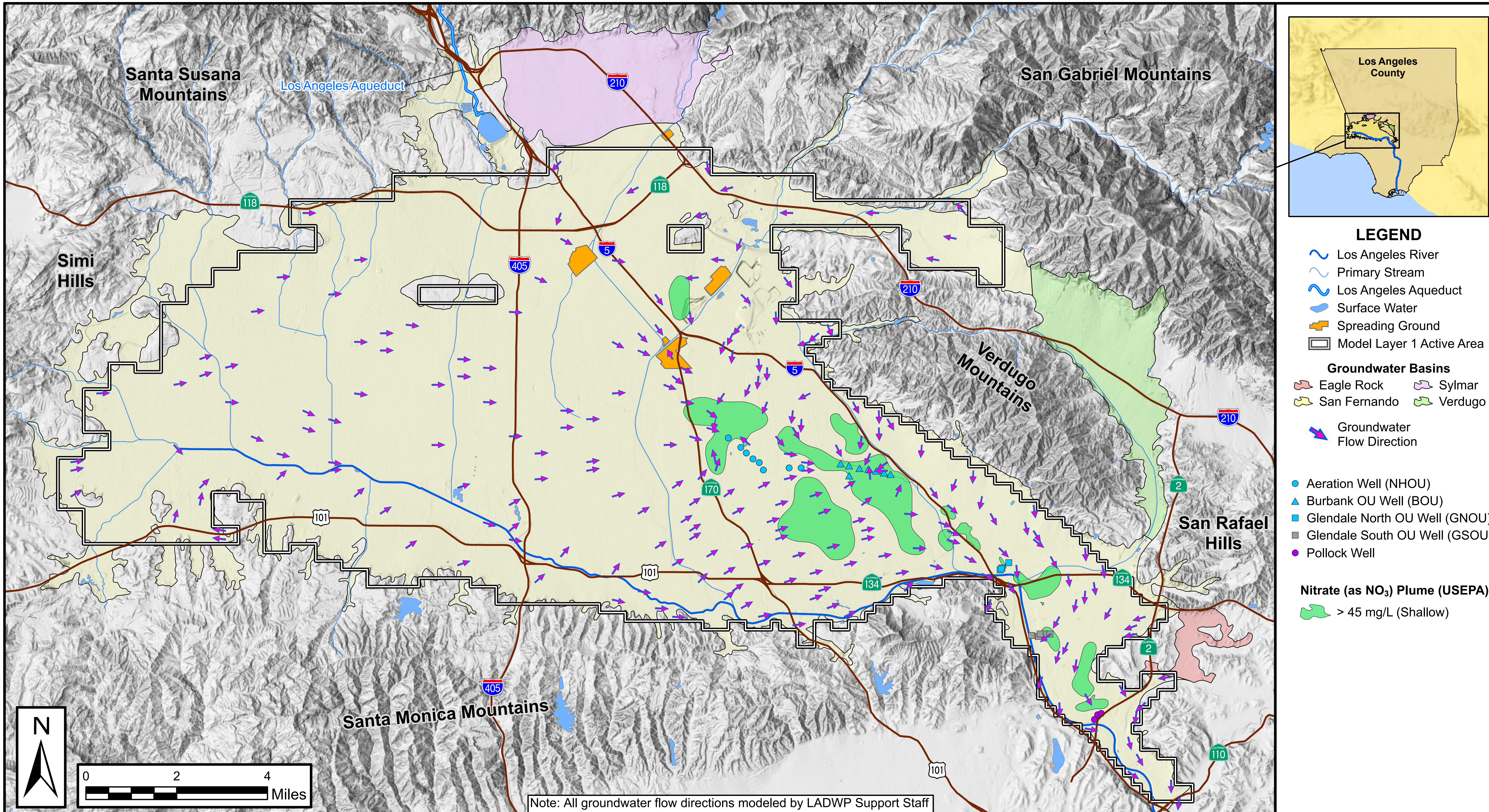
Plate 7



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

2017 PCE Contamination and 2023 Simulated Groundwater Flow Directions: Model Layer 1

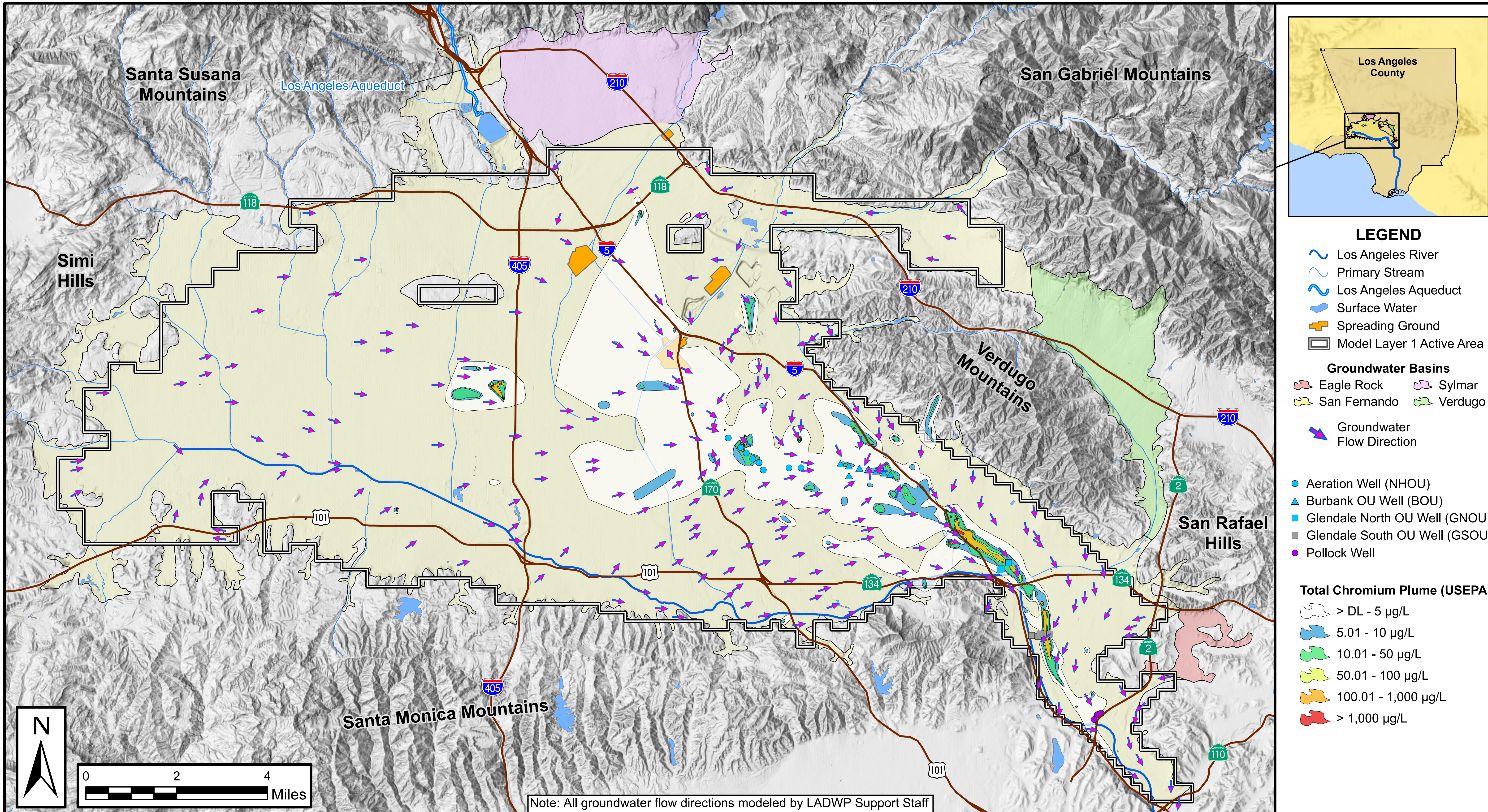
Plate 8



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

2010 Nitrate (as NO_3) Contamination and 2023 Simulated Groundwater Flow Directions: Model Layer 1

Plate 9



ULARA Watermaster
Groundwater Pumping and Spreading Plan
Water Years 2018-19 through 2022-23

2014 Total Dissolved Chromium Contamination and 2023 Simulated Groundwater Flow Directions: Model Layer 1

Plate 10

APPENDIX A

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

2018-19 through 2022-23 Water Years

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR WATER YEARS 2018-2023

2019

Prepared by:
Water Rights & Groundwater Management Group
Water Resources Division
Los Angeles Department of Water and Power

TABLE OF CONTENTS

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Introduction

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

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

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

This report presents the five-year Groundwater Pumping and Spreading Plan for the Water Years 2018–2023 for the City of Los Angeles.

Section 1: Facilities Description

Groundwater conditions in ULARA are influenced by facilities owned or operated by the Los Angeles Department of Water and Power (LADWP).

a. *Spreading Grounds*

There are five spreading ground facilities that can be used for groundwater recharge of native water in ULARA. The Los Angeles County Flood Control District (LACFCD) owns, operates, and maintains the Branford spreading basin, Hansen, Lopez, and Pacoima spreading grounds. LADWP owns and maintains the Tujunga spreading grounds which are operated by LACFCD. Estimated capacities for the spreading grounds are shown in Table 1-1.

TABLE 1-1
ESTIMATED CAPACITIES OF SPREADING GROUNDS

Spreading Ground	Basin Type	Wetted area (acre)	Max Experienced Recharge (acre-feet/year)
Branford	Deep	7	1,448
Hansen	Shallow	117	35,221
Lopez	Shallow	12	5,513
Pacoima	Shallow	107	24,164
Tujunga	Shallow	83	42,817
		TOTAL:	109,000

b. Extraction Wells

LADWP has eight active wellfields in the San Fernando Basin, and one in the Sylmar Basin. The rated capacities of the nine wellfields are shown in Table 1-2. The rated capacities are approximate, as operating capacities vary depending on the water levels. Actual groundwater pumping will vary due to maintenance schedules and water quality for each well.

TABLE 1-2
RATED CAPACITIES OF LADWP WELLFIELDS IN ULARA

Wellfield	**Number of Wells**			**Rated Capacity**	
San Fernando Basin	**Active**	**Inactive**	**Total**	**cfs**	**gpm**
Aeration	0	7	7	2.2	987
Erwin	2	5	7	6.1	2,738
North Hollywood	8	28	36	25.3	11,355
Pollock	2	1	3	6.3	2,828
Rinaldi-Toluca	15	0	15	104.1	46,723
Tujunga	12	0	12	103.3	46,364
Verdugo	2	7	9	7.4	3,321
Whitnall	4	6	10	14.8	6,643
Sylmar Basin					
Mission	2	0	2	4.7	2,110
TOTAL	47	54	101	274.2	123,069

c. Groundwater Remediation Facilities

LADWP operates three groundwater remediation facilities. Treated effluent produced by these facilities is conveyed to the water distribution system and delivered to LADWP customers for potable supply as a beneficial end use.

<u>North Hollywood Operable Unit</u>
Under United States Environmental Protection Agency (USEPA) oversight, the North Hollywood Operable Unit First Interim Remedy (the "NHOU-1IR"), located in the North Hollywood Wellfield, was completed in December 1989 to contain the contamination from various potentially responsible parties (the "PRPs"), including Honeywell International, Inc. ("Honeywell") and Lockheed Martin Corporation ("Lockheed"). The NHOU-1IR was designed to extract up to 2,000 gpm of groundwater utilizing an Aeration Facility. The NHOU-1IR was designed to treat for Volatile Organic Compounds (VOCs) and focus on the most concentrated part of the contamination plume. However, in 2005, it was determined by the USEPA that NHOU-1IR was not able to fully contain the contamination, and the plume continued to migrate towards LADWP production wells. In addition, emerging contaminants, 1,4-Dioxane and Hexavalent Chromium, were detected in the groundwater. Due to these emerging contaminants, the NHOU-1IR treatment system will be expanded, as discussed in Section 5c.

<u>Pollock Wells Treatment Plant</u>
The Pollock Wells Treatment Plant was placed into service March 1999 to remove VOCs from the groundwater at a rate of up to 3,000 gpm. This facility was designed to remove trichloroethylene (TCE) and perchloroethylene (PCE) from groundwater produced by two extraction wells. Liquid-phase GAC vessels restored the use of Pollock Wells, which also reduces the potential of rising groundwater discharge from the San Fernando Basin into the Los Angeles River.

<u>Temporary Tujunga Wells Treatment Study Project</u>
The Temporary Tujunga Wells Treatment Study Project was placed into service May 2010 to remove VOCs from the groundwater with a remediation capacity of approximately 8,000 gpm. Liquid-phase GAC vessels designed to remove VOCs from groundwater were installed at two wells at the Tujunga Wellfield, and have restored more than 20,000 acre feet per year (AFY) of pumping capacity that was unavailable due to water quality constraints.

Section 2: Annual Pumping and Spreading Projections

a. Pumping Projections for Water Years 2018-2023

The City of Los Angeles has the following six sources of water supply:

1) Los Angeles Aqueduct supply imported from the Owens Valley/Mono Basin areas,
2) Local groundwater supply from the San Fernando, Sylmar, Central, and West Coast Basins
3) Metropolitan Water District of Southern California (MWD) supply imported from the San Francisco Bay Delta via the State Water Project (SWP) and the Colorado River Aqueduct,
4) Recycled water,
5) Stormwater, and
6) Conservation.

LADWP's use of groundwater from the San Fernando Basin fluctuates from year to year depending on the availability of the imported water sources, which can vary as a result of hydrologic conditions and operational constraints. Use of the San Fernando Basin groundwater supply is largely constrained by the impacts of groundwater contamination, including most significantly PCE, TCE, 1,4-Dioxane, potentially hexavalent chromium (Cr-VI) and perchlorate, and other emerging chemicals. VOCs that have escaped the containment area of the NHOU have affected nearby groundwater supply wells. To a lesser degree, VOCs have impaired LADWPs use of groundwater in Sylmar Basin and Central Basin.

The San Fernando, Sylmar, Central, and West Coast Basins provide the City's local groundwater supply. The City of Los Angeles has the following average annual water rights, in acre feet (AF), which comprise approximately 21% of the City's supply:

San Fernando Basin:	87,000 AF
Sylmar Basin:	3,570 AF
Central Basin:	17,236 AF
West Coast Basin:	1,503 AF

Table 2-1 shows the amount of groundwater extractions that are expected, during the 2018-2019 Water Year, from the San Fernando and Sylmar Basins. Projected 2018 to 2023 groundwater extractions are provided in Table 2-2. These projections are based upon water demand forecasts and availability of Los Angeles Aqueduct flows, and are subject to yearly adjustments.

TABLE 2-1
ACTUAL AND PROJECTED PUMPING
BY THE CITY OF LOS ANGELES FOR WY 2018-2019
(acre-feet)

		Actual Extraction						Projected Extraction					
Wellfield	**Total**	**Oct-18**	**Nov-18**	**Dec-18**	**Jan-09**	**Feb-19**	**Mar-19**	**Apr-19**	**May-19**	**Jun-19**	**Jul-19**	**Aug-19**	**Sep-19**
San Fernando Basin													
Aeration	0	0	0	0	0	0	0	0	0	0	0	0	0
Erwin	1	0	1	0	0	0	0	0	0	0	0	0	0
North Hollywood	5,160	1,118	423	5	3	0	3	0	923	298	861	1,169	357
Pollock	1,338	0	0	0	121	163	181	143	148	143	148	148	143
Rinaldi-Toluca	11,660	2,055	786	10	10	9	13	0	1,845	1,190	2,276	2,276	1,190
Tujunga	27,729	3,250	1,901	1,412	1,513	1,350	1,544	1,500	3,321	2,083	3,321	3,321	3,214
Verdugo	1	1	0	0	0	0	0	0	0	0	0	0	0
Whitnall	0	0	0	0	0	0	0	0	0	0	0	0	0
San Fernando Basin Total	45,890	6,424	3,111	1,428	1,647	1,521	1,740	1,643	6,237	3,714	6,606	6,914	4,904
Sylmar Basin													
Mission	0	0	0	0	0	0	0	0	0	0	0	0	0
ULARA Total	**45,890**	**6,424**	**3,111**	**1,428**	**1,647**	**1,521**	**1,740**	**1,643**	**6,237**	**3,714**	**6,606**	**6,914**	**4,904**

TABLE 2-2
PROJECTED PUMPING IN THE SAN FERNANDO AND SYLMAR BASINS BY THE CITY OF LOS ANGELES FOR 2018-2023
(acre-feet)

San Fernando Basin					
Wellfield	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2022-2023**
Aeration	0	0	0	0	0
Erwin	1	1	0	0	0
North Hollywood	5,160	4,990	18,185	18,185	18,185
Pollock	1,338	1,973	1,738	1,738	1,738
Rinaldi-Toluca	11,660	6,682	24,951	24,951	24,951
Tujunga	27,729	31,490	42,225	42,225	42,225
Verdugo	1	2	0	0	0
Whitnall	0	0	0	0	0
Total for SFB	**45,890**	**45,138**	**87,099**	**87,099**	**87,099**
Sylmar Basin					
Mission	0	2,172	4,170	4,170	4,170

b. Spreading Projections for the 2018-2019 Water Year

Native groundwater recharge from captured storm runoff occurs primarily as a result of runoff diversion from adjacent storm channels into engineered spreading grounds. Spreading grounds are operated by Los Angeles County Flood Control District (LACFCD). Table 2-3 represents the anticipated spreading volumes for Water Year 2018-2019.

TABLE 2-3
ACTUAL AND PROJECTED CENTRALIZED SPREADING
IN ULARA SPREADING GROUNDS FOR WY 2018-2019
(acre-feet)

	Operated by:					
Month	**LACDPW**				**LACDPW and LADWP**	**Monthly Total**
	Branford	**Hansen**	**Lopez**	**Pacoima**	**Tujunga**	
	Actual					
Oct-18	14	0	795	1,440	0	**2,249**
Nov-18	60	0	833	1,480	0	**2,373**
Dec-18	82	193	446	2,080	0	**2,801**
Jan-19	177	1,430	597	1,300	0	**3,504**
Feb-19	134	8,320	35	3,530	0	**12,019**
Mar-19	72	7,420	447	3,750	0	**11,689**
	Projected					
Apr-19	18	224	25	170	0	**437**
May-19	19	142	49	102	0	**312**
Jun-19	12	48	13	106	0	**179**
Jul-19	14	42	0	68	0	**124**
Aug-19	12	9	118	336	0	**475**
Sep-19	20	3	108	536	0	**667**
Total	**634**	**17,831**	**3,466**	**14,898**	**0**	**36,829**

LADWP and the LACFCD are cooperatively working to enhance the 150 acre Tujunga Spreading Grounds. Enhancements include expanding and combining the spreading basins and installing new intake structures, which will increase the facility's storage and intake capacity and allow more stormwater to be captured. The project will result in an increase in groundwater recharge of the San Fernando Groundwater Basin. The intake structure has been out of commission since construction started in August 2016 and spreading is not anticipated until completion of the improvements in late 2019. As seen in Table 2-3, Tujunga has no spreading throughout the 2018-19 water year.

Section 3: Water Quality Monitoring Program Description

All of LADWP's 60 active wells in ULARA are monitored in conformance with the requirements set forth in Title 22, California Code of Regulations (CCR). For all active wells, monitoring is required whether the well is in production or not. State regulations require the following types of monitoring regimens:

1. Inorganic compounds
2. Organic compounds
3. General Minerals
4. Radiological compounds
5. Secondary Standards: VOC, SOC

Each well, whether on active or standby status, is monitored every three years for many types of inorganic and organic compounds. Monitoring is performed at various frequencies commensurate with regulatory standards. A complete list of the parameters that must be tested for is contained in Title 22 of the CCR.

Appendix A provides the concentrations of various compounds detected in LADWP's groundwater wells in the San Fernando and Sylmar Basins during the period of April 2018 through March 2019. This report includes concentrations detected for a number of contaminants including TCE, PCE, Perchlorate, Cr+6, and 1-4 Dioxane.

Section 4: Groundwater Treatment Facilities Operations Summary

a. North Hollywood Operable Unit (NHOU)

In preparation for the construction of the NHOU2IR Phase 1B facility, the Aeration wells were turned offline in the fourth quarter of 2017. As seen in Table 4-1, there was no groundwater pumped during the 2018-2019 Water Year.

TABLE 4-1
GROUNDWATER TREATMENT FROM THE NORTH HOLLYWOOD OPERABLE UNIT (AERATION) WELLS

	Groundwater Treatment from Aeration Wells (AF)								PCE (µg/L)		TCE (µg/L)	
Mon-Yr	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Total	Influent	Effluent	Influent	Effluent
Apr-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
May-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Jun-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Jul-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Aug-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Sep-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Oct-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Nov-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Dec-18	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Jan-19	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Feb-19	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Mar-19	--	--	0	0	0	0	0	**0**	ns	ns	ns	ns
Total								**0**				

Note:
ns: Not Sampled

b. Pollock Wells Treatment Plant (PWTP)

Table 4-2 provides the volume of groundwater extracted by each well and treated through the liquid-phase GAC vessels for VOC removal. This table also provides the concentrations of TCE and PCE detected in the raw groundwater from the influent line before treatment. Water quality measurements from the treated effluent show that VOCs were effectively removed by the treatment process.

TABLE 4-2
GROUNDWATER TREATMENT FROM POLLOCK WELLS

	Treatment (AF)			PCE (µg/L)		TCE (µg/L)	
Mon-Yr	No. 4	No. 6	Total	Influent	Effluent	Influent	Effluent
Apr-18	172.54	0.12	172.66	3.52	ND	3.56	1.86
May-18	181.06	0.13	181.19	3.82	ND	3.51	2.55
Jun-18	171.41	0.12	171.53	3.97	ND	3.65	3.26
Jul-18	92.76	0.10	92.86	3.98	ND	3.69	3.63
Aug-18	0.00	0.00	0.00	ns	ns	ns	ns
Sep-18	0.00	0.00	0.00	ns	ns	ns	ns
Oct-18	0.00	0.00	0.00	ns	ns	ns	ns
Nov-18	0.00	0.00	0.00	ns	ns	ns	ns
Dec-18	0.22	0.17	0.39	ns	ns	ns	ns
Jan-19	121.00	0.08	121.08	1.71	ns	1.47	ns
Feb-19	162.69	0.08	162.77	2.57	ND	2.46	ND
Mar-19	180.80	0.08	180.88	2.53	ns	2.27	ns
Total			1083.36				

Note: Pollock was offline between August and December for maintenance operations.
ND: Not Detected
ns: Not Sampled

c. Temporary Tujunga Wells Treatment Study Project

Table 4-3 provides the volume of groundwater extracted by each well and treated through the liquid-phase GAC vessels for VOC removal. This table also provides the concentrations of TCE and PCE detected in the raw groundwater from each wellhead before treatment. Water quality measurements from the treated effluent show that VOCs were effectively removed by the treatment process.

Well No. 8 has been connected to the treatment system to run as a backup when Well Nos. 6 or 7 are shutdown either for mechanical or maintenance needs. LADWP has requested a permit amendment from the Division of Drinking Water to operate this connection.

TABLE 4-3
GROUNDWATER TREATMENT FROM TUJUNGA WELLS

Mon-Yr	Tujunga Well No. 6					Tujunga Well No. 7					Treatment Totals
	Treatment (AF)	PCE (µg/L)		TCE (µg/L)		Treatment (AF)	PCE (µg/L)		TCE (µg/L)		
		Influent	Effluent	Influent	Effluent		Influent	Effluent	Influent	Effluent	
Apr-18	452	9.6	ND	5.84	ND	507	52.2	ND	30.8	ND	**960**
May-18	436	11.3	ND	7.34	ND	488	39.6	ND	25.6	ND	**924**
Jun-18	419	19.6	ND	11.1	ND	470	43.6	ND	27.2	ND	**889**
Jul-18	491	22.6	ND	13.1	ND	550	44.2	ND	28.7	ND	**1,041**
Aug-18	222	22.6	ND	13.1	ND	249	42.3	ND	27.3	ND	**472**
Sep-18	394	24.2	ND	15.7	ND	440	59.6	ND	39.3	ND	**834**
Oct-18	468	21.7	ND	12.6	ND	0	40.4	ND	27.0	ND	**468**
Nov-18	506	22.2	ND	13.1	ND	0	42.3	ND	27.0	ND	**506**
Dec-18	422	16.4	ND	9.21	ND	2	38.1	ND	24.3	ND	**424**
Jan-19	452	11.3	ND	6.23	ND	75	35.9	ND	21.6	ND	**527**
Feb-19	404	10.2	ND	6.22	ND	413	38.8	ND	24.9	ND	**817**
Mar-19	461	9.3	ND	5.42	ND	424	36.5	ND	22.7	ND	**885**
Total											**8,746**

ND: Not Detected
ns: Not Sampled
* : sample was “non-representative”

Section 5: Proposed Facility Modifications

LADWP and LACFCD, in cooperation with the City of Los Angeles Bureau of Engineering, Bureau of Sanitation, and Bureau of Street Services continue to partner on, jointly fund, and collaborate on several projects that will enhance the capacity for recharge of stormwater and recycled water into the groundwater basin via existing spreading grounds in the eastern portion of the San Fernando Basin. This section describes plans for modifying existing spreading facilities and construction of new facilities to provide expanded opportunities for enhancing the groundwater recharge potential.

a. *Spreading Grounds*

<u>Tujunga Spreading Grounds Upgrade</u>

The project is currently under construction and is expected to complete in 2020. The scope includes consolidating and deepening existing spreading basins, installing two high-flow intakes with rubber dams, adding telemetry and modifying the existing intake. Additional passive recreational and educational components, including walking path and outdoor classroom, will also be included. This project is expected to increase regional annual average stormwater capture and recharge by about 8,000 AFY.

<u>Lopez Spreading Grounds Upgrade</u>

This upgrade project is currently in design, with construction expected to begin in early 2024 and be completed in 2026. The scope includes expanding and deepening existing spreading basins, excavating sediment to improve infiltration rates, constructing a slurry wall along the channel to prevent seepage, and improving the intake structure. This project is expected to increase regional annual average stormwater capture and recharge by approximately 480 AFY.

<u>Branford Spreading Basin Upgrade</u>

This upgrade project is currently in design, with construction expected to begin in 2021 and be completed by 2023. The scope includes installing a new pump and pipe system to divert water from the Branford Basin into the Tujunga Spreading Grounds. This project is expected to increase regional annual average stormwater capture and recharge by approximately 597 AFY.

<u>Pacoima Spreading Grounds Upgrade</u>

This upgrade project is currently in design, with construction expected to begin in mid-2021 and be completed in 2024. The scope includes consolidating existing spreading basins, excavating sediment to improve infiltration rates, adding telemetry and installing a new automated intake structure. This project is expected to increase regional annual average stormwater capture and recharge by approximately 5,300 AFY.

b. Groundwater Production Facilities

Mission Wellfield Improvement Project

The purpose of the Mission Wells Improvement Project is to rehabilitate and replace deteriorating groundwater facilities in Sylmar Basin, including installation of three replacement production wells, monitoring wells, new piping, new pump station, electrical upgrades, and controls. An application has been submitted to California Division of Drinking Water to permit the operation of Well No. 10, one of the three new production wells. The other two wells, Nos. 8 and 9 will not be operated due to very low production capacity and TCE concentrations exceeding the State Maximum Contamination Level, respectively. The recently constructed on-site Chlorination Generation System has been permitted and is in operation and Well No. 10 is expected to be able to be operational by December 2019

Electrical upgrades that consist of a new industrial station, switch station and appurtenances to allow 34.5 kV power to the site, and the construction of the new Pump Station Motor Control Center have been completed. Start-up and testing activities are on-going and targeted for completion by January 2020 followed by the commissioning phase in February 2020.

Van Norman Complex Investigation

In 2015 two exploratory wells designated VN-EW-01 and VN-EW-02 were drilled on the LADWP Van Norman Complex property to investigate the existence and extent of potable groundwater at depths (approximately 1500’ below ground surface) within the Saugus geologic formation. Results of short-term aquifer testing performed in 2015 and 2017 indicated significant potential production capacity. Long-term testing was recommended to study the feasibility and viability of producing groundwater from the Saugus Formation for use as a local supply source and as an emergency supply source. To support the delivery of the long-term aquifer testing, the Van Norman Exploratory Wells Projects (Project) was initiated under the Water System’s Capital Improvement Program (CIP). CIP Projects follow the Water System’s project delivery process from the initial conception (Project Initiation) through planning, design, construction, and post construction (Project Closeout). As of September 2019, the Project is in the Planning phase.

c. Groundwater Remediation Facilities

North Hollywood Operable Unit (NHOU)

The NHOU, which has been in operation since December 1989, was designed to remove TCE and PCE contaminants from groundwater via aeration. The treated effluent is disinfected and conveyed into the municipal water distribution system.

More recently, EPA has detected emerging contaminants, including Cr-VI and 1,4-dioxane, in excess of the state MCL and notification level (NL) for 1,4-dioxane at two of the NHOU extraction wells. The existing NHOU treatment system is incapable of removing these contaminants. This sharp increase in the chromium concentrations has caused all of the five extraction wells to be shut down and removed from the system while the untreated effluent from two wells have been redirected for discharge into the municipal sewer. These wells serve an important plume containment function for the high levels of contamination, and these shut downs demonstrated the need for a change in the remedy.

In response to the above shut downs and continued migration of VOC-contaminated groundwater, USEPA conducted a Focused Feasibility Study (FFS) to evaluate alternatives for changing the groundwater remedy. USEPA summarized the results in its July 2009 Proposed Plan, and selected the preferred remedy in its September 2009 Second Interim Record of Decision. The selected remedy is to install well-head treatment for hexavalent chromium and 1,4 dioxane, expand the combined treatment system, install additional monitoring wells, install and operate three additional groundwater extraction wells, and to continue to provide the treated water to LADWP for a drinking water end use. USEPA amended the 2009 Second Interim Record of Decision in 2014 to allow for consideration of the treated effluent to be reinjected back into the aquifer (reinjection end use).

San Fernando Groundwater Basin Remediation Efforts

LADWP has begun evaluating potential response actions to restore the beneficial use of groundwater in the vicinity of various well fields. These efforts include studies, activities, and other analysis required by the EPA’s National Contingency Plan to evaluate appropriate response actions. While additional work is required to evaluate the appropriate interim and final response actions for each area, one potential set of alternatives would consist of a series of local and centralized treatment facilities that produce water for potable use. Some facts suggest this approach could be ideal. These include the size and location of the plumes, the beneficial uses of the groundwater, and reliability concerns of long-term availability of alternative water sources and its high cost if such groundwater treatment did not occur.

The information LADWP will evaluate includes an analysis of pump rates and treatment capacity that would be appropriate to capture contaminant mass and help to restore the beneficial use of the aquifer for that wellfield, based on fate and transport modeling and other analysis. LADWP also plans to evaluate ways to minimize the volume of water that requires treatment by prioritizing pumping from wells with higher levels of contamination to minimize the potential for contamination to spread to wells that currently do not contain levels of contamination that would require treatment. This analysis will also evaluate other alternatives.

LADWP will leverage its actions with current and planned response actions in the basin by LADWP and other parties, such as remedial actions undertaken by or overseen by the state or federal regulatory agencies, as well as other feasible alternatives, such as source control, in-situ treatment or pumping from other areas. Generally, other agencies are focusing on source control and other hot spot areas, while LADWP generally focuses more on restoring the beneficial uses of water in the vicinity of production wells that has already migrated from the source areas.

To provide information about these potential response action alternatives, LADWP has completed a rough preliminary analysis of the scope and anticipated project costs. Preliminary analysis indicates that production of major SFB wellfields, either alone or in conjunction with other response actions, could reach a maximum of over 300 cfs well production capacity. LADWP would anticipate that the treatment systems would have modularity for addressing additional treatment capacity that may be needed due to regulatory changes or plume migration. Design and construction costs for this set of alternatives are estimated to be approximately $600 million, with remediation treatment costs of up to $50 million per year. This estimate assumes that the facilities would be designed to utilize multiple best-available technologies to clean up the contaminants including TCE, PCE, and 1,4-dioxane, restoring LADWP's highest producing wellfields in the northern SFB.

<u>North Hollywood West Well Field Treatment Project</u>

The North Hollywood West (NHW) Well Field is impacted by the 1,4-dioxane contamination emanating from industrial landfills. As part of LADWP's efforts to restore and maintain the beneficial uses of the San Fernando Basin and meet other cleanup objectives, an Interim Remedial Action (IRA) for the NHW Well Field was approved by the LADWP Board of Commissioners on August 1, 2017 in the form of an Interim Remedial Action Decision (IRAD). A pump and treat interim alternative were approved and adopted by LADWP. Groundwater will be pumped to an above-ground treatment system designed to break down or remove the contaminants. The above-ground treatment system selected for NHW will contain an Ultraviolet Advanced Oxidation Process (UV AOP) treatment to remediate the contaminants present in the NHW well field. Other parts of the treatment system will include sand separators, cartridge filters, and granular activated carbon vessels.

In the Fall of 2017 construction of the wellhead treatment facilities at NHW were initiated. Construction is anticipated to be completed in May 2020.

d. Recycled Water Projects

Los Angeles Groundwater Replenishment (GWR) Project

The Los Angeles Department of Water and Power (LADWP), in partnership with the Los Angeles Bureau of Sanitation (LASAN), is moving forward with the Groundwater Replenishment Project. This project will be implemented in phases. For the initial phase, recycled water from the Donald C. Tillman Water Reclamation Plant (Tillman) will be conveyed through an existing recycled water pipeline to the Hansen Spreading Grounds for replenishment of the San Fernando Groundwater Basin. This phase includes an ozone demonstration component and construction of an EQ tank to balance diurnal flows. Ozone units, which were installed at Tillman in 2019, will demonstrate the water quality benefits of ozone in combination with the natural treatment process in the soil, which water undergoes during percolation. In this phase, up to 10,000 acre-feet per year of recycled water will become part of the groundwater supply. The initial phase will begin operations in late 2020, pending the recycled water permit from the Regional Water Quality Control Board. Future phases will increase the amount of Recycled Water available for spreading and construct advanced treatment at Tillman.

APPENDIX A

Water Quality Sampling Results
April 2018 through March 2019

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AERATION

COLLECTION DATE	WELL No. (LOCATION CODE)	ANALYTE	RESULT	UNIT
4/19/2018 10:35:00 AM	AT002	Tetrachloroethylene (PCE)	7.43	ug/L
4/19/2018 10:35:00 AM	AT002	Trichloroethene (TCE)	89.9	ug/L
4/19/2018 10:35:00 AM	AT002	1,4-Dioxane	3.97	ug/L
4/19/2018 10:35:00 AM	AT002	Perchlorate	ND	ug/L
4/19/2018 10:35:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	39.8	ug/L
5/7/2018 8:54:00 AM	AT002	Tetrachloroethylene (PCE)	6.79	ug/L
5/7/2018 8:54:00 AM	AT002	Trichloroethene (TCE)	81.5	ug/L
5/7/2018 8:54:00 AM	AT002	1,4-Dioxane	4.00	ug/L
5/7/2018 8:54:00 AM	AT002	Perchlorate	ND	ug/L
5/7/2018 8:54:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	39.4	ug/L
6/11/2018 8:01:00 AM	AT002	Tetrachloroethylene (PCE)	7.83	ug/L
6/11/2018 8:01:00 AM	AT002	Trichloroethene (TCE)	84.0	ug/L
6/11/2018 8:01:00 AM	AT002	1,4-Dioxane	3.49	ug/L
6/11/2018 8:01:00 AM	AT002	Perchlorate	ND	ug/L
6/11/2018 8:01:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	37.0	ug/L
7/9/2018 9:35:00 AM	AT002	Tetrachloroethylene (PCE)	7.50	ug/L
7/9/2018 9:35:00 AM	AT002	Trichloroethene (TCE)	85.3	ug/L
7/9/2018 9:35:00 AM	AT002	1,4-Dioxane	3.50	ug/L
7/9/2018 9:35:00 AM	AT002	Perchlorate	ND	ug/L
7/9/2018 9:35:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	38.2	ug/L
8/2/2018 9:16:00 AM	AT002	Tetrachloroethylene (PCE)	6.68	ug/L
8/2/2018 9:16:00 AM	AT002	Trichloroethene (TCE)	77.8	ug/L
8/2/2018 9:16:00 AM	AT002	1,4-Dioxane	3.60	ug/L
8/2/2018 9:16:00 AM	AT002	Perchlorate	ND	ug/L
8/2/2018 9:16:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	37.5	ug/L
9/7/2018 9:28:00 AM	AT002	Tetrachloroethylene (PCE)	6.68	ug/L
9/7/2018 9:28:00 AM	AT002	Trichloroethene (TCE)	76.3	ug/L
9/7/2018 9:28:00 AM	AT002	1,4-Dioxane	3.42	ug/L
9/7/2018 9:28:00 AM	AT002	Perchlorate	ND	ug/L
9/7/2018 9:28:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	33.9	ug/L
10/4/2018 10:50:00 AM	AT002	Tetrachloroethylene (PCE)	5.57	ug/L
10/4/2018 10:50:00 AM	AT002	Trichloroethene (TCE)	70.8	ug/L

10/4/2018 10:50:00 AM	AT002	1,4-Dioxane	3.72	ug/L
10/4/2018 10:50:00 AM	AT002	Perchlorate	ND	ug/L
10/4/2018 10:50:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	34.2	ug/L
11/15/2018 10:15:00 AM	AT002	Tetrachloroethylene (PCE)	6.17	ug/L
11/15/2018 10:15:00 AM	AT002	Trichloroethene (TCE)	71.0	ug/L
11/15/2018 10:15:00 AM	AT002	Perchlorate	ND	ug/L
11/15/2018 10:15:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	33.8	ug/L
1/4/2019 10:55:00 AM	AT002	Tetrachloroethylene (PCE)	5.86	ug/L
1/4/2019 10:55:00 AM	AT002	Trichloroethene (TCE)	60.0	ug/L
1/4/2019 10:55:00 AM	AT002	Perchlorate	ND	ug/L
1/4/2019 10:55:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	32.5	ug/L
3/29/2019 11:34:00 AM	AT002	Tetrachloroethylene (PCE)	6.83	ug/L
3/29/2019 11:34:00 AM	AT002	Trichloroethene (TCE)	65.3	ug/L
3/29/2019 11:34:00 AM	AT002	Perchlorate	ND	ug/L
3/29/2019 11:34:00 AM	AT002	Hexavalent Chromium (Cr+6), IC	29.3	ug/L

MISSION

COLLECTION DATE	WELL NO. (LOCATION CODE)	ANALYTE	RESULT	UNIT
6/14/2018 9:35:00 AM	MI006	Tetrachloroethylene (PCE)	ND	ug/L
6/14/2018 9:35:00 AM	MI006	Trichloroethene (TCE)	ND	ug/L
6/14/2018 9:35:00 AM	MI006	Perchlorate	ND	ug/L
6/14/2018 9:35:00 AM	MI006	Hexavalent Chromium (Cr+6), IC	1.80	ug/L
7/24/2018 11:19:00 AM	MI006	Tetrachloroethylene (PCE)	ND	ug/L
7/24/2018 11:19:00 AM	MI006	Trichloroethene (TCE)	ND	ug/L
9/18/2018 1:00:00 PM	MI010	Tetrachloroethylene (PCE)	ND	ug/L
9/18/2018 1:00:00 PM	MI010	Trichloroethene (TCE)	ND	ug/L
9/18/2018 1:00:00 PM	MI010	1,4-Dioxane	ND	ug/L
9/18/2018 1:00:00 PM	MI010	Perchlorate	ND	ug/L
9/18/2018 1:00:00 PM	MI010	Hexavalent Chromium (Cr+6), IC	0.497	ug/L
10/4/2018 10:05:00 AM	MI006	Tetrachloroethylene (PCE)	ND	ug/L
10/4/2018 10:05:00 AM	MI006	Trichloroethene (TCE)	ND	ug/L
12/17/2018 10:00:00 AM	MI006	Tetrachloroethylene (PCE)	ND	ug/L
12/17/2018 10:00:00 AM	MI006	Trichloroethene (TCE)	ND	ug/L
1/14/2019 10:20:00 AM	MI006	Tetrachloroethylene (PCE)	ND	ug/L
1/14/2019 10:20:00 AM	MI006	Trichloroethene (TCE)	ND	ug/L
1/14/2019 10:20:00 AM	MI006	1,4-Dioxane	ND	ug/L

NORTH HOLLYWOOD

COLLECTION DATE	WELL No. (LOCATION CODE)	ANALYTE	RESULT	UNIT
4/17/2018 9:20:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
4/17/2018 9:20:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
4/17/2018 9:20:00 AM	NH022	1,4-Dioxane	ND	ug/L
4/17/2018 10:00:00 AM	NH026	Tetrachloroethylene (PCE)	0.869	ug/L
4/17/2018 10:00:00 AM	NH026	Trichloroethene (TCE)	1.71	ug/L
4/17/2018 10:00:00 AM	NH026	1,4-Dioxane	ND	ug/L
4/20/2018 9:45:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L
4/20/2018 9:45:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
4/20/2018 9:45:00 AM	NH032	1,4-Dioxane	ND	ug/L
4/20/2018 10:30:00 AM	NH007	Tetrachloroethylene (PCE)	1.08	ug/L
4/20/2018 10:30:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
4/20/2018 10:30:00 AM	NH007	Perchlorate	ND	ug/L
4/20/2018 10:30:00 AM	NH007	1,4-Dioxane	ND	ug/L
4/20/2018 11:15:00 AM	NH004	Tetrachloroethylene (PCE)	0.625	ug/L
4/20/2018 11:15:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
4/20/2018 11:15:00 AM	NH004	1,4-Dioxane	ND	ug/L
4/20/2018 12:06:00 PM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
4/20/2018 12:06:00 PM	NH033	Trichloroethene (TCE)	ND	ug/L
4/20/2018 12:06:00 PM	NH033	1,4-Dioxane	ND	ug/L
5/8/2018 9:25:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
5/8/2018 9:25:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
5/8/2018 9:25:00 AM	NH022	1,4-Dioxane	ND	ug/L
5/8/2018 10:30:00 AM	NH026	Perchlorate	ND	ug/L
5/8/2018 10:30:00 AM	NH026	Tetrachloroethylene (PCE)	ND	ug/L
5/8/2018 10:30:00 AM	NH026	Trichloroethene (TCE)	0.675	ug/L
5/8/2018 10:30:00 AM	NH026	1,4-Dioxane	ND	ug/L
5/10/2018 10:36:00 AM	NH004	Tetrachloroethylene (PCE)	0.574	ug/L
5/10/2018 10:36:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
5/10/2018 9:25:00 AM	NH007	Tetrachloroethylene (PCE)	ND	ug/L
5/10/2018 9:25:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
5/10/2018 9:25:00 AM	NH007	1,4-Dioxane	ND	ug/L
5/10/2018 9:48:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L

5/10/2018 9:48:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
5/10/2018 9:48:00 AM	NH032	1,4-Dioxane	ND	ug/L
5/10/2018 10:52:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
5/10/2018 10:52:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
6/19/2018 9:04:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
6/19/2018 9:04:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
6/19/2018 10:15:00 AM	NH023	Tetrachloroethylene (PCE)	ND	ug/L
6/19/2018 10:15:00 AM	NH023	Trichloroethene (TCE)	0.979	ug/L
6/19/2018 10:15:00 AM	NH023	Hexavalent Chromium (Cr+6), IC	0.585	ug/L
6/19/2018 10:15:00 AM	NH023	1,4-Dioxane	ND	ug/L
6/19/2018 9:36:00 AM	NH026	Tetrachloroethylene (PCE)	ND	ug/L
6/19/2018 9:36:00 AM	NH026	Trichloroethene (TCE)	ND	ug/L
6/19/2018 9:36:00 AM	NH026	1,4-Dioxane	ND	ug/L
6/20/2018 10:50:00 AM	NH004	Tetrachloroethylene (PCE)	0.833	ug/L
6/20/2018 10:50:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
6/20/2018 9:40:00 AM	NH007	Tetrachloroethylene (PCE)	0.807	ug/L
6/20/2018 9:40:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
6/20/2018 9:40:00 AM	NH007	1,4-Dioxane	ND	ug/L
6/20/2018 10:02:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L
6/20/2018 10:02:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
6/20/2018 10:02:00 AM	NH032	1,4-Dioxane	ND	ug/L
6/20/2018 11:37:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
6/20/2018 11:37:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
7/17/2018 9:21:00 AM	NH022	Tetrachloroethylene (PCE)	0.515	ug/L
7/17/2018 9:21:00 AM	NH022	Trichloroethene (TCE)	0.780	ug/L
7/17/2018 9:21:00 AM	NH022	1,4-Dioxane	ND	ug/L
7/17/2018 10:13:00 AM	NH026	Tetrachloroethylene (PCE)	ND	ug/L
7/17/2018 10:13:00 AM	NH026	Trichloroethene (TCE)	ND	ug/L
7/17/2018 10:13:00 AM	NH026	1,4-Dioxane	ND	ug/L
7/18/2018 8:09:00 AM	NH004	Tetrachloroethylene (PCE)	0.804	ug/L
7/18/2018 8:09:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
7/18/2018 8:09:00 AM	NH004	1,4-Dioxane	ND	ug/L
7/18/2018 8:43:00 AM	NH007	Tetrachloroethylene (PCE)	0.690	ug/L
7/18/2018 8:43:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
7/18/2018 8:43:00 AM	NH007	1,4-Dioxane	ND	ug/L

7/18/2018 9:11:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L
7/18/2018 9:11:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
7/18/2018 9:11:00 AM	NH032	1,4-Dioxane	ND	ug/L
7/18/2018 8:20:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
7/18/2018 8:20:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
7/18/2018 8:20:00 AM	NH033	1,4-Dioxane	ND	ug/L
8/21/2018 10:45:00 AM	NH004	Tetrachloroethylene (PCE)	0.978	ug/L
8/21/2018 10:45:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
8/21/2018 11:05:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
8/21/2018 11:05:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
8/21/2018 11:29:00 AM	NH007	Tetrachloroethylene (PCE)	0.662	ug/L
8/21/2018 11:29:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
8/21/2018 11:29:00 AM	NH007	1,4-Dioxane	ND	ug/L
8/21/2018 11:56:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L
8/21/2018 11:56:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
8/21/2018 11:56:00 AM	NH032	1,4-Dioxane	ND	ug/L
8/22/2018 9:12:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
8/22/2018 9:12:00 AM	NH022	Trichloroethene (TCE)	0.601	ug/L
8/22/2018 9:26:00 AM	NH026	Tetrachloroethylene (PCE)	ND	ug/L
8/22/2018 9:26:00 AM	NH026	Trichloroethene (TCE)	ND	ug/L
8/22/2018 9:26:00 AM	NH026	1,4-Dioxane	ND	ug/L
9/12/2018 8:49:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
9/12/2018 8:49:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
9/12/2018 9:06:00 AM	NH026	Tetrachloroethylene (PCE)	0.808	ug/L
9/12/2018 9:06:00 AM	NH026	Trichloroethene (TCE)	1.17	ug/L
9/12/2018 9:06:00 AM	NH026	1,4-Dioxane	ND	ug/L
9/13/2018 8:36:00 AM	NH004	Tetrachloroethylene (PCE)	1.09	ug/L
9/13/2018 8:36:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
9/13/2018 9:24:00 AM	NH007	Tetrachloroethylene (PCE)	0.738	ug/L
9/13/2018 9:24:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
9/13/2018 9:24:00 AM	NH007	1,4-Dioxane	ND	ug/L
9/13/2018 9:47:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L
9/13/2018 9:47:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
9/13/2018 9:47:00 AM	NH032	1,4-Dioxane	ND	ug/L
9/13/2018 8:53:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L

9/13/2018 8:53:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
9/20/2018 10:05:00 AM	NH025	Tetrachloroethylene (PCE)	0.961	ug/L
9/20/2018 10:05:00 AM	NH025	Trichloroethene (TCE)	ND	ug/L
9/20/2018 10:05:00 AM	NH025	1,4-Dioxane	ND	ug/L
10/9/2018 10:40:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
10/9/2018 10:40:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
10/9/2018 10:40:00 AM	NH022	1,4-Dioxane	ND	ug/L
10/9/2018 10:05:00 AM	NH026	Tetrachloroethylene (PCE)	0.887	ug/L
10/9/2018 10:05:00 AM	NH026	Trichloroethene (TCE)	1.49	ug/L
10/9/2018 10:05:00 AM	NH026	1,4-Dioxane	ND	ug/L
10/11/2018 8:46:00 AM	NH004	Tetrachloroethylene (PCE)	1.01	ug/L
10/11/2018 8:46:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
10/11/2018 9:47:00 AM	NH007	Tetrachloroethylene (PCE)	0.604	ug/L
10/11/2018 9:47:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
10/11/2018 9:47:00 AM	NH007	1,4-Dioxane	ND	ug/L
10/11/2018 10:08:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L
10/11/2018 10:08:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
10/11/2018 10:08:00 AM	NH032	1,4-Dioxane	ND	ug/L
10/11/2018 9:00:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
10/11/2018 9:00:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
10/11/2018 9:00:00 AM	NH033	1,4-Dioxane	ND	ug/L
10/12/2018 9:05:00 AM	NH025	Tetrachloroethylene (PCE)	0.852	ug/L
10/12/2018 9:05:00 AM	NH025	Trichloroethene (TCE)	ND	ug/L
10/12/2018 9:05:00 AM	NH025	1,4-Dioxane	ND	ug/L
10/22/2018 9:18:00 AM	NH023	Tetrachloroethylene (PCE)	ND	ug/L
10/22/2018 9:18:00 AM	NH023	Trichloroethene (TCE)	1.07	ug/L
10/22/2018 9:18:00 AM	NH023	1,4-Dioxane	ND	ug/L
10/22/2018 9:18:00 AM	NH023	Perchlorate	ND	ug/L
11/15/2018 9:18:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
11/15/2018 9:18:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
11/15/2018 10:05:00 AM	NH023	Tetrachloroethylene (PCE)	ND	ug/L
11/15/2018 10:05:00 AM	NH023	Trichloroethene (TCE)	0.658	ug/L
11/15/2018 10:05:00 AM	NH023	1,4-Dioxane	ND	ug/L
11/15/2018 10:05:00 AM	NH023	Perchlorate	ND	ug/L
11/15/2018 8:45:00 AM	NH026	Tetrachloroethylene (PCE)	1.22	ug/L

11/15/2018 8:45:00 AM	NH026	Trichloroethene (TCE)	2.06	ug/L
11/15/2018 8:45:00 AM	NH026	1,4-Dioxane	ND	ug/L
11/15/2018 8:45:00 AM	NH026	Hexavalent Chromium (Cr+6), IC	1.98	ug/L
12/11/2018 10:31:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
12/11/2018 10:31:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
12/11/2018 10:13:00 AM	NH023	Tetrachloroethylene (PCE)	ND	ug/L
12/11/2018 10:13:00 AM	NH023	Trichloroethene (TCE)	1.76	ug/L
12/11/2018 10:13:00 AM	NH023	1,4-Dioxane	ND	ug/L
12/11/2018 10:13:00 AM	NH023	Perchlorate	ND	ug/L
12/11/2018 10:46:00 AM	NH025	Tetrachloroethylene (PCE)	ND	ug/L
12/11/2018 10:46:00 AM	NH025	Trichloroethene (TCE)	ND	ug/L
12/11/2018 9:53:00 AM	NH026	Tetrachloroethylene (PCE)	ND	ug/L
12/11/2018 9:53:00 AM	NH026	Trichloroethene (TCE)	ND	ug/L
12/11/2018 9:53:00 AM	NH026	1,4-Dioxane	ND	ug/L
12/13/2018 10:20:00 AM	NH004	Tetrachloroethylene (PCE)	1.16	ug/L
12/13/2018 10:20:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
12/13/2018 10:20:00 AM	NH004	1,4-Dioxane	ND	ug/L
12/13/2018 10:40:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
12/13/2018 10:40:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
12/13/2018 11:07:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L
12/13/2018 11:07:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
12/13/2018 11:07:00 AM	NH032	1,4-Dioxane	ND	ug/L
12/13/2018 11:40:00 AM	NH007	Tetrachloroethylene (PCE)	0.977	ug/L
12/13/2018 11:40:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
12/13/2018 11:40:00 AM	NH007	1,4-Dioxane	ND	ug/L
1/10/2019 11:10:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L
1/10/2019 11:10:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
1/10/2019 11:10:00 AM	NH022	1,4-Dioxane	ND	ug/L
1/10/2019 11:10:00 AM	NH022	Perchlorate	ND	ug/L
1/10/2019 11:45:00 AM	NH026	Tetrachloroethylene (PCE)	ND	ug/L
1/10/2019 11:45:00 AM	NH026	Trichloroethene (TCE)	ND	ug/L
1/10/2019 11:45:00 AM	NH026	1,4-Dioxane	ND	ug/L
1/10/2019 12:15:00 PM	NH023	Tetrachloroethylene (PCE)	ND	ug/L
1/10/2019 12:15:00 PM	NH023	Trichloroethene (TCE)	1.62	ug/L
1/10/2019 12:15:00 PM	NH023	1,4-Dioxane	ND	ug/L

1/10/2019 12:50:00 PM	NH025	Tetrachloroethylene (PCE)	ND	ug/L
1/10/2019 12:50:00 PM	NH025	Trichloroethene (TCE)	ND	ug/L
1/10/2019 12:50:00 PM	NH025	1,4-Dioxane	ND	ug/L
1/11/2019 9:40:00 AM	NH004	Tetrachloroethylene (PCE)	1.22	ug/L
1/11/2019 9:40:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
1/11/2019 9:40:00 AM	NH004	1,4-Dioxane	ND	ug/L
1/11/2019 9:07:00 AM	NH007	Tetrachloroethylene (PCE)	1.06	ug/L
1/11/2019 9:07:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
1/11/2019 9:07:00 AM	NH007	1,4-Dioxane	ND	ug/L
1/11/2019 9:25:00 AM	NH032	Tetrachloroethylene (PCE)	ND	ug/L
1/11/2019 9:25:00 AM	NH032	Trichloroethene (TCE)	ND	ug/L
1/11/2019 9:25:00 AM	NH032	1,4-Dioxane	ND	ug/L
1/11/2019 10:28:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
1/11/2019 10:28:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
1/11/2019 10:28:00 AM	NH033	1,4-Dioxane	ND	ug/L
3/28/2019 9:29:00 AM	NH004	Tetrachloroethylene (PCE)	0.998	ug/L
3/28/2019 9:29:00 AM	NH004	Trichloroethene (TCE)	ND	ug/L
3/28/2019 9:29:00 AM	NH004	Perchlorate	ND	ug/L
3/28/2019 9:29:00 AM	NH004	Hexavalent Chromium (Cr+6), IC	ND	ug/L
3/28/2019 10:06:00 AM	NH007	Tetrachloroethylene (PCE)	0.874	ug/L
3/28/2019 10:06:00 AM	NH007	Trichloroethene (TCE)	ND	ug/L
3/28/2019 10:06:00 AM	NH007	1,4-Dioxane	ND	ug/L
3/28/2019 10:06:00 AM	NH007	Perchlorate	ND	ug/L
3/28/2019 10:06:00 AM	NH007	Hexavalent Chromium (Cr+6), IC	ND	ug/L
3/28/2019 9:49:00 AM	NH033	Tetrachloroethylene (PCE)	ND	ug/L
3/28/2019 9:49:00 AM	NH033	Trichloroethene (TCE)	ND	ug/L
3/28/2019 9:49:00 AM	NH033	Perchlorate	ND	ug/L
3/29/2019 9:05:00 AM	NH026	Tetrachloroethylene (PCE)	ND	ug/L
3/29/2019 9:05:00 AM	NH026	Trichloroethene (TCE)	ND	ug/L
3/29/2019 9:05:00 AM	NH026	1,4-Dioxane	ND	ug/L
3/29/2019 9:35:00 AM	NH023	Tetrachloroethylene (PCE)	0.652	ug/L
3/29/2019 9:35:00 AM	NH023	Trichloroethene (TCE)	3.94	ug/L
3/29/2019 9:35:00 AM	NH023	1,4-Dioxane	ND	ug/L
3/29/2019 9:55:00 AM	NH022	Tetrachloroethylene (PCE)	ND	ug/L

3/29/2019 9:55:00 AM	NH022	Trichloroethene (TCE)	ND	ug/L
3/29/2019 10:35:00 AM	NH025	Tetrachloroethylene (PCE)	ND	ug/L
3/29/2019 10:35:00 AM	NH025	Trichloroethene (TCE)	ND	ug/L
3/29/2019 10:35:00 AM	NH025	Perchlorate	ND	ug/L

POLLOCK

COLLECTION DATE	WELL No. (LOCATION CODE)	ANALYTE	RESULT	UNIT
4/3/2018 8:55:00 AM	PL004	Tetrachloroethylene (PCE)	3.98	ug/L
4/3/2018 8:55:00 AM	PL004	Trichloroethene (TCE)	3.83	ug/L
4/3/2018 8:55:00 AM	PL004	1,4-Dioxane	0.967	ug/L
4/3/2018 8:55:00 AM	PL004	Perchlorate	2.30	ug/L
4/3/2018 8:55:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.72	ug/L
4/4/2018 12:45:00 PM	PL006	Tetrachloroethylene (PCE)	6.45	ug/L
4/4/2018 12:45:00 PM	PL006	Trichloroethene (TCE)	4.53	ug/L
4/4/2018 12:45:00 PM	PL006	1,4-Dioxane	ND	ug/L
4/4/2018 12:45:00 PM	PL006	Perchlorate	3.00	ug/L
4/4/2018 12:45:00 PM	PL006	Hexavalent Chromium (Cr+6), IC	1.78	ug/L
5/2/2018 10:30:00 AM	PL004	Tetrachloroethylene (PCE)	4.20	ug/L
5/2/2018 10:30:00 AM	PL004	Trichloroethene (TCE)	4.04	ug/L
5/2/2018 10:30:00 AM	PL004	1,4-Dioxane	0.845	ug/L
5/2/2018 10:30:00 AM	PL004	Perchlorate	2.43	ug/L
5/2/2018 10:30:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.83	ug/L
5/2/2018 9:45:00 AM	PL006	Tetrachloroethylene (PCE)	6.87	ug/L
5/2/2018 9:45:00 AM	PL006	Trichloroethene (TCE)	4.40	ug/L
5/2/2018 9:45:00 AM	PL006	1,4-Dioxane	ND	ug/L
5/2/2018 9:45:00 AM	PL006	Perchlorate	3.03	ug/L
5/2/2018 9:45:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.90	ug/L
6/5/2018 8:23:00 AM	PL004	Tetrachloroethylene (PCE)	4.21	ug/L
6/5/2018 8:23:00 AM	PL004	Trichloroethene (TCE)	3.83	ug/L
6/5/2018 8:23:00 AM	PL004	1,4-Dioxane	0.808	ug/L
6/5/2018 8:23:00 AM	PL004	Perchlorate	2.39	ug/L
6/5/2018 8:23:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.79	ug/L
6/5/2018 9:16:00 AM	PL006	Tetrachloroethylene (PCE)	7.89	ug/L
6/5/2018 9:16:00 AM	PL006	Trichloroethene (TCE)	4.76	ug/L
6/5/2018 9:16:00 AM	PL006	1,4-Dioxane	ND	ug/L
6/5/2018 9:16:00 AM	PL006	Perchlorate	2.98	ug/L
6/5/2018 9:16:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.86	ug/L
7/3/2018 8:58:00 AM	PL004	Tetrachloroethylene (PCE)	4.22	ug/L
7/3/2018 8:58:00 AM	PL004	Trichloroethene (TCE)	4.02	ug/L

7/3/2018 8:58:00 AM	PL004	1,4-Dioxane	0.894	ug/L
7/3/2018 8:58:00 AM	PL004	Perchlorate	2.62	ug/L
7/3/2018 8:58:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.91	ug/L
7/3/2018 10:12:00 AM	PL006	Tetrachloroethylene (PCE)	6.90	ug/L
7/3/2018 10:12:00 AM	PL006	Trichloroethene (TCE)	4.40	ug/L
7/3/2018 10:12:00 AM	PL006	1,4-Dioxane	ND	ug/L
7/3/2018 10:12:00 AM	PL006	Perchlorate	3.02	ug/L
7/3/2018 10:12:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.97	ug/L
12/12/2018 11:30:00 AM	PL006	Tetrachloroethylene (PCE)	3.95	ug/L
12/12/2018 11:30:00 AM	PL006	Trichloroethene (TCE)	3.56	ug/L
12/12/2018 11:30:00 AM	PL006	1,4-Dioxane	ND	ug/L
12/12/2018 11:30:00 AM	PL006	Perchlorate	3.02	ug/L
12/12/2018 11:30:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.66	ug/L
12/14/2018 9:20:00 AM	PL004	Tetrachloroethylene (PCE)	1.45	ug/L
12/14/2018 9:20:00 AM	PL004	Trichloroethene (TCE)	0.833	ug/L
12/14/2018 9:20:00 AM	PL004	1,4-Dioxane	ND	ug/L
12/14/2018 9:20:00 AM	PL004	Perchlorate	2.76	ug/L
12/14/2018 9:20:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.34	ug/L
1/31/2019 10:20:00 AM	PL004	Tetrachloroethylene (PCE)	2.36	ug/L
1/31/2019 10:20:00 AM	PL004	Trichloroethene (TCE)	2.19	ug/L
1/31/2019 10:20:00 AM	PL004	1,4-Dioxane	ND	ug/L
1/31/2019 10:20:00 AM	PL004	Perchlorate	2.74	ug/L
1/31/2019 10:20:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.76	ug/L
1/31/2019 9:29:00 AM	PL006	Tetrachloroethylene (PCE)	5.89	ug/L
1/31/2019 9:29:00 AM	PL006	Trichloroethene (TCE)	4.16	ug/L
1/31/2019 9:29:00 AM	PL006	1,4-Dioxane	ND	ug/L
1/31/2019 9:29:00 AM	PL006	Perchlorate	2.88	ug/L
1/31/2019 9:29:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.85	ug/L
2/25/2019 8:50:00 AM	PL004	Tetrachloroethylene (PCE)	2.43	ug/L
2/25/2019 8:50:00 AM	PL004	Trichloroethene (TCE)	2.25	ug/L
2/25/2019 8:50:00 AM	PL004	1,4-Dioxane	ND	ug/L
2/25/2019 8:50:00 AM	PL004	Perchlorate	2.45	ug/L
2/25/2019 8:50:00 AM	PL004	Hexavalent Chromium (Cr+6), IC	1.78	ug/L
2/25/2019 9:48:00 AM	PL006	Tetrachloroethylene (PCE)	5.72	ug/L
2/25/2019 9:48:00 AM	PL006	Trichloroethene (TCE)	4.07	ug/L

2/25/2019 9:48:00 AM	PL006	1,4-Dioxane	ND	ug/L
2/25/2019 9:48:00 AM	PL006	Perchlorate	3.10	ug/L
2/25/2019 9:48:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.95	ug/L
3/27/2019 12:30:00 PM	PL004	Tetrachloroethylene (PCE)	2.54	ug/L
3/27/2019 12:30:00 PM	PL004	Trichloroethene (TCE)	2.29	ug/L
3/27/2019 12:30:00 PM	PL004	1,4-Dioxane	ND	ug/L
3/27/2019 12:30:00 PM	PL004	Perchlorate	2.19	ug/L
3/27/2019 12:30:00 PM	PL004	Hexavalent Chromium (Cr+6), IC	1.62	ug/L
3/27/2019 11:25:00 AM	PL006	Tetrachloroethylene (PCE)	6.00	ug/L
3/27/2019 11:25:00 AM	PL006	Trichloroethene (TCE)	4.01	ug/L
3/27/2019 11:25:00 AM	PL006	1,4-Dioxane	ND	ug/L
3/27/2019 11:25:00 AM	PL006	Perchlorate	2.85	ug/L
3/27/2019 11:25:00 AM	PL006	Hexavalent Chromium (Cr+6), IC	1.69	ug/L

RINALDI-TOLUCA

COLLECTION DATE	WELL NO. (LOCATION CODE)	ANALYTE	RESULT	UNIT
4/9/2018 8:56:00 AM	RT001	Tetrachloroethylene (PCE)	0.877	µg/L
4/9/2018 8:56:00 AM	RT001	Trichloroethene (TCE)	10.0	µg/L
4/9/2018 8:56:00 AM	RT001	1,4-Dioxane	ND	µg/L
4/9/2018 8:36:00 AM	RT011	Tetrachloroethylene (PCE)	0.910	µg/L
4/9/2018 8:36:00 AM	RT011	Trichloroethene (TCE)	6.04	µg/L
4/9/2018 9:42:00 AM	RT014	Tetrachloroethylene (PCE)	0.743	µg/L
4/9/2018 9:42:00 AM	RT014	Trichloroethene (TCE)	9.83	µg/L
4/9/2018 9:54:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
4/9/2018 9:54:00 AM	RT015	Trichloroethene (TCE)	0.939	µg/L
4/10/2018 10:33:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
4/10/2018 10:33:00 AM	RT002	Trichloroethene (TCE)	1.54	µg/L
4/10/2018 10:33:00 AM	RT002	1,4-Dioxane	ND	µg/L
4/10/2018 8:34:00 AM	RT010	Tetrachloroethylene (PCE)	2.17	µg/L
4/10/2018 8:34:00 AM	RT010	Trichloroethene (TCE)	14.4	µg/L
4/10/2018 9:15:00 AM	RT012	Tetrachloroethylene (PCE)	1.57	µg/L
4/10/2018 9:15:00 AM	RT012	Trichloroethene (TCE)	12.5	µg/L
4/10/2018 9:28:00 AM	RT013	Tetrachloroethylene (PCE)	1.01	µg/L
4/10/2018 9:28:00 AM	RT013	Trichloroethene (TCE)	7.22	µg/L
4/12/2018 9:42:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
4/12/2018 9:42:00 AM	RT003	Trichloroethene (TCE)	0.873	µg/L
4/12/2018 9:42:00 AM	RT003	Perchlorate	2.56	µg/L
4/12/2018 9:42:00 AM	RT003	1,4-Dioxane	ND	µg/L
4/12/2018 10:25:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
4/12/2018 10:25:00 AM	RT004	Trichloroethene (TCE)	0.668	µg/L
4/12/2018 10:25:00 AM	RT004	Perchlorate	3.98	µg/L
4/12/2018 10:25:00 AM	RT004	1,4-Dioxane	ND	µg/L
4/12/2018 8:37:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
4/12/2018 8:37:00 AM	RT007	Trichloroethene (TCE)	0.817	µg/L
4/12/2018 8:37:00 AM	RT007	Perchlorate	ND	µg/L
4/12/2018 8:59:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
4/12/2018 8:59:00 AM	RT008	Trichloroethene (TCE)	0.639	µg/L
4/12/2018 8:59:00 AM	RT008	Perchlorate	ND	µg/L
4/12/2018 9:12:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
4/12/2018 9:12:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L

5/15/2018 9:04:00 AM	RT001	Tetrachloroethylene (PCE)	1.04	µg/L
5/15/2018 9:04:00 AM	RT001	Trichloroethene (TCE)	9.66	µg/L
5/15/2018 8:47:00 AM	RT011	Tetrachloroethylene (PCE)	1.31	µg/L
5/15/2018 8:47:00 AM	RT011	Trichloroethene (TCE)	9.10	µg/L
5/15/2018 9:30:00 AM	RT014	Tetrachloroethylene (PCE)	0.732	µg/L
5/15/2018 9:30:00 AM	RT014	Trichloroethene (TCE)	9.24	µg/L
5/15/2018 9:56:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
5/15/2018 9:56:00 AM	RT015	Trichloroethene (TCE)	0.803	µg/L
5/16/2018 11:11:00 AM	RT002	Tetrachloroethylene (PCE)	0.633	µg/L
5/16/2018 11:11:00 AM	RT002	Trichloroethene (TCE)	3.68	µg/L
5/16/2018 11:11:00 AM	RT002	Perchlorate	2.06	µg/L
5/16/2018 10:21:00 AM	RT010	Tetrachloroethylene (PCE)	1.71	µg/L
5/16/2018 10:21:00 AM	RT010	Trichloroethene (TCE)	12.9	µg/L
5/16/2018 10:21:00 AM	RT010	Perchlorate	ND	µg/L
5/16/2018 10:21:00 AM	RT010	1,4-Dioxane	ND	µg/L
5/16/2018 9:09:00 AM	RT012	Tetrachloroethylene (PCE)	1.53	µg/L
5/16/2018 9:09:00 AM	RT012	Trichloroethene (TCE)	11.7	µg/L
5/16/2018 9:09:00 AM	RT012	Perchlorate	ND	µg/L
5/16/2018 9:30:00 AM	RT013	Tetrachloroethylene (PCE)	1.72	µg/L
5/16/2018 9:30:00 AM	RT013	Trichloroethene (TCE)	10.4	µg/L
5/17/2018 10:23:00 AM	RT003	Tetrachloroethylene (PCE)	1.98	µg/L
5/17/2018 10:23:00 AM	RT003	Trichloroethene (TCE)	3.34	µg/L
5/17/2018 10:23:00 AM	RT003	Perchlorate	2.70	µg/L
5/17/2018 11:23:00 AM	RT004	Perchlorate	4.10	µg/L
5/17/2018 11:23:00 AM	RT004	Tetrachloroethylene (PCE)	1.23	µg/L
5/17/2018 11:23:00 AM	RT004	Trichloroethene (TCE)	0.918	µg/L
5/17/2018 8:51:00 AM	RT007	Perchlorate	ND	µg/L
5/17/2018 8:51:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
5/17/2018 8:51:00 AM	RT007	Trichloroethene (TCE)	1.21	µg/L
5/17/2018 8:51:00 AM	RT007	1,4-Dioxane	ND	µg/L
5/17/2018 9:20:00 AM	RT008	Perchlorate	ND	µg/L
5/17/2018 9:20:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
5/17/2018 9:20:00 AM	RT008	Trichloroethene (TCE)	0.698	µg/L
5/17/2018 9:20:00 AM	RT008	1,4-Dioxane	ND	µg/L
5/17/2018 9:32:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
5/17/2018 9:32:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L

5/17/2018 9:32:00 AM	RT009	1,4-Dioxane	ND	µg/L
6/12/2018 9:42:00 AM	RT001	Tetrachloroethylene (PCE)	1.36	µg/L
6/12/2018 9:42:00 AM	RT001	Trichloroethene (TCE)	10.4	µg/L
6/12/2018 9:42:00 AM	RT001	Perchlorate	ND	µg/L
6/12/2018 9:12:00 AM	RT011	Tetrachloroethylene (PCE)	1.88	µg/L
6/12/2018 9:12:00 AM	RT011	Trichloroethene (TCE)	12.6	µg/L
6/12/2018 9:12:00 AM	RT011	Perchlorate	ND	µg/L
6/12/2018 9:12:00 AM	RT011	1,4-Dioxane	ND	µg/L
6/12/2018 10:22:00 AM	RT014	Tetrachloroethylene (PCE)	0.793	µg/L
6/12/2018 10:22:00 AM	RT014	Trichloroethene (TCE)	9.42	µg/L
6/12/2018 10:22:00 AM	RT014	1,4-Dioxane	ND	µg/L
6/12/2018 10:45:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
6/12/2018 10:45:00 AM	RT015	Trichloroethene (TCE)	ND	µg/L
6/12/2018 10:45:00 AM	RT015	1,4-Dioxane	ND	µg/L
6/13/2018 10:45:00 AM	RT002	Tetrachloroethylene (PCE)	0.872	µg/L
6/13/2018 10:45:00 AM	RT002	Trichloroethene (TCE)	4.49	µg/L
6/13/2018 9:57:00 AM	RT010	Tetrachloroethylene (PCE)	1.67	µg/L
6/13/2018 9:57:00 AM	RT010	Trichloroethene (TCE)	13.7	µg/L
6/13/2018 8:57:00 AM	RT012	Tetrachloroethylene (PCE)	1.63	µg/L
6/13/2018 8:57:00 AM	RT012	Trichloroethene (TCE)	12.1	µg/L
6/13/2018 8:57:00 AM	RT012	1,4-Dioxane	ND	µg/L
6/13/2018 9:10:00 AM	RT013	Tetrachloroethylene (PCE)	2.15	µg/L
6/13/2018 9:10:00 AM	RT013	Trichloroethene (TCE)	11.6	µg/L
6/13/2018 9:10:00 AM	RT013	1,4-Dioxane	ND	µg/L
6/14/2018 9:37:00 AM	RT003	Tetrachloroethylene (PCE)	2.38	µg/L
6/14/2018 9:37:00 AM	RT003	Trichloroethene (TCE)	3.59	µg/L
6/14/2018 9:37:00 AM	RT003	Perchlorate	2.65	µg/L
6/14/2018 10:13:00 AM	RT004	Perchlorate	3.69	µg/L
6/14/2018 10:13:00 AM	RT004	Tetrachloroethylene (PCE)	1.58	µg/L
6/14/2018 10:13:00 AM	RT004	Trichloroethene (TCE)	1.03	µg/L
6/14/2018 8:16:00 AM	RT007	Perchlorate	ND	µg/L
6/14/2018 8:16:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
6/14/2018 8:16:00 AM	RT007	Trichloroethene (TCE)	1.38	µg/L
6/14/2018 8:31:00 AM	RT008	Perchlorate	ND	µg/L
6/14/2018 8:31:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
6/14/2018 8:31:00 AM	RT008	Trichloroethene (TCE)	0.797	µg/L

6/14/2018 8:58:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
6/14/2018 8:58:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
6/14/2018 8:58:00 AM	RT009	Perchlorate	ND	µg/L
7/10/2018 9:53:00 AM	RT001	Tetrachloroethylene (PCE)	1.39	µg/L
7/10/2018 9:53:00 AM	RT001	Trichloroethene (TCE)	11.6	µg/L
7/10/2018 9:53:00 AM	RT001	1,4-Dioxane	ND	µg/L
7/10/2018 9:07:00 AM	RT011	Tetrachloroethylene (PCE)	2.25	µg/L
7/10/2018 9:07:00 AM	RT011	Trichloroethene (TCE)	17.4	µg/L
7/10/2018 10:41:00 AM	RT014	Tetrachloroethylene (PCE)	0.682	µg/L
7/10/2018 10:41:00 AM	RT014	Trichloroethene (TCE)	9.29	µg/L
7/10/2018 11:29:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
7/10/2018 11:29:00 AM	RT015	Trichloroethene (TCE)	ND	µg/L
7/11/2018 10:30:00 AM	RT002	Tetrachloroethylene (PCE)	0.985	µg/L
7/11/2018 10:30:00 AM	RT002	Trichloroethene (TCE)	4.83	µg/L
7/11/2018 10:30:00 AM	RT002	Perchlorate	2.33	µg/L
7/11/2018 10:30:00 AM	RT002	1,4-Dioxane	ND	µg/L
7/11/2018 9:42:00 AM	RT010	Tetrachloroethylene (PCE)	1.66	µg/L
7/11/2018 9:42:00 AM	RT010	Trichloroethene (TCE)	13.5	µg/L
7/11/2018 9:42:00 AM	RT010	Perchlorate	ND	µg/L
7/11/2018 8:50:00 AM	RT012	Tetrachloroethylene (PCE)	1.76	µg/L
7/11/2018 8:50:00 AM	RT012	Trichloroethene (TCE)	12.4	µg/L
7/11/2018 8:50:00 AM	RT012	Perchlorate	ND	µg/L
7/11/2018 9:14:00 AM	RT013	Tetrachloroethylene (PCE)	2.77	µg/L
7/11/2018 9:14:00 AM	RT013	Trichloroethene (TCE)	14.9	µg/L
7/12/2018 9:57:00 AM	RT003	Tetrachloroethylene (PCE)	2.40	µg/L
7/12/2018 9:57:00 AM	RT003	Trichloroethene (TCE)	3.10	µg/L
7/12/2018 9:57:00 AM	RT003	Perchlorate	2.73	µg/L
7/12/2018 9:57:00 AM	RT003	1,4-Dioxane	0.888	µg/L
7/12/2018 11:06:00 AM	RT004	Tetrachloroethylene (PCE)	1.27	µg/L
7/12/2018 11:06:00 AM	RT004	Trichloroethene (TCE)	1.02	µg/L
7/12/2018 11:06:00 AM	RT004	Perchlorate	4.18	µg/L
7/12/2018 11:06:00 AM	RT004	1,4-Dioxane	0.613	µg/L
7/12/2018 8:10:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
7/12/2018 8:10:00 AM	RT007	Trichloroethene (TCE)	1.45	µg/L
7/12/2018 8:10:00 AM	RT007	Perchlorate	ND	µg/L
7/12/2018 8:33:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L

7/12/2018 8:33:00 AM	RT008	Trichloroethene (TCE)	0.926	µg/L
7/12/2018 8:33:00 AM	RT008	Perchlorate	ND	µg/L
7/12/2018 9:02:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
7/12/2018 9:02:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
8/7/2018 10:20:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
8/7/2018 10:20:00 AM	RT007	Trichloroethene (TCE)	1.59	µg/L
8/7/2018 10:20:00 AM	RT007	1,4-Dioxane	ND	µg/L
8/7/2018 10:20:00 AM	RT007	Perchlorate	ND	µg/L
8/7/2018 10:20:00 AM	RT007	Hexavalent Chromium (Cr+6), IC	2.83	µg/L
8/7/2018 11:35:00 AM	RT012	Tetrachloroethylene (PCE)	1.58	µg/L
8/7/2018 11:35:00 AM	RT012	Trichloroethene (TCE)	11.4	µg/L
8/14/2018 9:37:00 AM	RT003	Tetrachloroethylene (PCE)	2.06	µg/L
8/14/2018 9:37:00 AM	RT003	Trichloroethene (TCE)	3.81	µg/L
8/14/2018 9:37:00 AM	RT003	Perchlorate	ND	µg/L
8/14/2018 10:09:00 AM	RT004	Perchlorate	2.66	µg/L
8/14/2018 10:09:00 AM	RT004	Tetrachloroethylene (PCE)	1.33	µg/L
8/14/2018 10:09:00 AM	RT004	Trichloroethene (TCE)	1.05	µg/L
8/14/2018 9:02:00 AM	RT008	Perchlorate	ND	µg/L
8/14/2018 9:02:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
8/14/2018 9:02:00 AM	RT008	Trichloroethene (TCE)	1.02	µg/L
8/14/2018 9:02:00 AM	RT008	1,4-Dioxane	ND	µg/L
8/14/2018 9:16:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
8/14/2018 9:16:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
8/14/2018 9:16:00 AM	RT009	1,4-Dioxane	ND	µg/L
8/15/2018 10:47:00 AM	RT002	Tetrachloroethylene (PCE)	1.36	µg/L
8/15/2018 10:47:00 AM	RT002	Trichloroethene (TCE)	6.67	µg/L
8/15/2018 10:47:00 AM	RT002	Perchlorate	ND	µg/L
8/15/2018 11:45:00 AM	RT010	Tetrachloroethylene (PCE)	3.29	µg/L
8/15/2018 11:45:00 AM	RT010	Trichloroethene (TCE)	17.2	µg/L
8/15/2018 11:45:00 AM	RT010	1,4-Dioxane	0.915	µg/L
8/15/2018 12:36:00 PM	RT013	Tetrachloroethylene (PCE)	3.31	µg/L
8/15/2018 12:36:00 PM	RT013	Trichloroethene (TCE)	17.9	µg/L
8/15/2018 12:36:00 PM	RT013	Perchlorate	ND	µg/L
8/16/2018 9:25:00 AM	RT011	Tetrachloroethylene (PCE)	2.66	µg/L
8/16/2018 9:25:00 AM	RT011	Trichloroethene (TCE)	24.4	µg/L
8/16/2018 10:10:00 AM	RT001	Tetrachloroethylene (PCE)	1.56	µg/L

8/16/2018 10:10:00 AM	RT001	Trichloroethene (TCE)	13.8	µg/L
8/16/2018 10:30:00 AM	RT014	Tetrachloroethylene (PCE)	0.836	µg/L
8/16/2018 10:30:00 AM	RT014	Trichloroethene (TCE)	11.7	µg/L
8/16/2018 10:50:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
8/16/2018 10:50:00 AM	RT015	Trichloroethene (TCE)	0.949	µg/L
9/18/2018 10:53:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
9/18/2018 10:53:00 AM	RT007	Trichloroethene (TCE)	1.88	µg/L
9/18/2018 10:53:00 AM	RT007	Perchlorate	ND	µg/L
9/18/2018 11:06:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
9/18/2018 11:06:00 AM	RT008	Trichloroethene (TCE)	0.961	µg/L
9/18/2018 11:06:00 AM	RT008	Perchlorate	ND	µg/L
9/18/2018 11:17:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
9/18/2018 11:17:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
9/18/2018 11:17:00 AM	RT009	Hexavalent Chromium (Cr+6), IC	2.78	µg/L
9/18/2018 10:17:00 AM	RT010	Tetrachloroethylene (PCE)	4.07	µg/L
9/18/2018 10:17:00 AM	RT010	Trichloroethene (TCE)	17.8	µg/L
9/18/2018 10:17:00 AM	RT010	Hexavalent Chromium (Cr+6), IC	1.47	µg/L
9/18/2018 9:33:00 AM	RT012	Tetrachloroethylene (PCE)	1.73	µg/L
9/18/2018 9:33:00 AM	RT012	Trichloroethene (TCE)	11.5	µg/L
9/19/2018 9:10:00 AM	RT002	Tetrachloroethylene (PCE)	0.941	µg/L
9/19/2018 9:10:00 AM	RT002	Trichloroethene (TCE)	4.95	µg/L
9/19/2018 8:52:00 AM	RT003	Tetrachloroethylene (PCE)	2.94	µg/L
9/19/2018 8:52:00 AM	RT003	Trichloroethene (TCE)	4.62	µg/L
9/19/2018 8:52:00 AM	RT003	Perchlorate	ND	µg/L
9/19/2018 9:25:00 AM	RT004	Tetrachloroethylene (PCE)	1.80	µg/L
9/19/2018 9:25:00 AM	RT004	Trichloroethene (TCE)	1.38	µg/L
9/19/2018 9:25:00 AM	RT004	Perchlorate	2.20	µg/L
9/20/2018 9:28:00 AM	RT001	Tetrachloroethylene (PCE)	1.79	µg/L
9/20/2018 9:28:00 AM	RT001	Trichloroethene (TCE)	14.7	µg/L
9/20/2018 9:08:00 AM	RT011	Tetrachloroethylene (PCE)	3.23	µg/L
9/20/2018 9:08:00 AM	RT011	Trichloroethene (TCE)	27.0	µg/L
9/20/2018 10:32:00 AM	RT013	Tetrachloroethylene (PCE)	3.06	µg/L
9/20/2018 10:32:00 AM	RT013	Trichloroethene (TCE)	19.1	µg/L
9/20/2018 9:48:00 AM	RT014	Tetrachloroethylene (PCE)	0.778	µg/L
9/20/2018 9:48:00 AM	RT014	Trichloroethene (TCE)	10.0	µg/L
9/20/2018 10:11:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L

9/20/2018 10:11:00 AM	RT015	Trichloroethene (TCE)	2.96	µg/L
9/20/2018 10:11:00 AM	RT015	Perchlorate	ND	µg/L
10/10/2018 10:03:00 AM	RT001	Tetrachloroethylene (PCE)	1.78	µg/L
10/10/2018 10:03:00 AM	RT001	Trichloroethene (TCE)	16.0	µg/L
10/10/2018 10:03:00 AM	RT001	1,4-Dioxane	ND	µg/L
10/10/2018 10:03:00 AM	RT001	Hexavalent Chromium (Cr+6), IC	1.27	µg/L
10/10/2018 9:25:00 AM	RT011	Tetrachloroethylene (PCE)	3.13	µg/L
10/10/2018 9:25:00 AM	RT011	Trichloroethene (TCE)	26.6	µg/L
10/10/2018 9:25:00 AM	RT011	1,4-Dioxane	0.540	µg/L
10/10/2018 9:25:00 AM	RT011	Hexavalent Chromium (Cr+6), IC	1.02	µg/L
10/10/2018 11:34:00 AM	RT013	Tetrachloroethylene (PCE)	3.43	µg/L
10/10/2018 11:34:00 AM	RT013	Trichloroethene (TCE)	21.9	µg/L
10/10/2018 10:37:00 AM	RT014	Tetrachloroethylene (PCE)	0.751	µg/L
10/10/2018 10:37:00 AM	RT014	Trichloroethene (TCE)	9.44	µg/L
10/10/2018 11:03:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
10/10/2018 11:03:00 AM	RT015	Trichloroethene (TCE)	4.23	µg/L
10/16/2018 10:13:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
10/16/2018 10:13:00 AM	RT007	Trichloroethene (TCE)	2.01	µg/L
10/16/2018 10:13:00 AM	RT007	1,4-Dioxane	ND	µg/L
10/16/2018 10:13:00 AM	RT007	Perchlorate	ND	µg/L
10/16/2018 10:30:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
10/16/2018 10:30:00 AM	RT008	Trichloroethene (TCE)	0.856	µg/L
10/16/2018 10:30:00 AM	RT008	1,4-Dioxane	ND	µg/L
10/16/2018 10:30:00 AM	RT008	Perchlorate	ND	µg/L
10/16/2018 10:44:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
10/16/2018 10:44:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
10/16/2018 9:36:00 AM	RT010	Tetrachloroethylene (PCE)	5.49	µg/L
10/16/2018 9:36:00 AM	RT010	Trichloroethene (TCE)	20.1	µg/L
10/16/2018 9:36:00 AM	RT010	Perchlorate	ND	µg/L
10/16/2018 9:11:00 AM	RT012	Tetrachloroethylene (PCE)	1.93	µg/L
10/16/2018 9:11:00 AM	RT012	Trichloroethene (TCE)	12.3	µg/L
10/16/2018 9:11:00 AM	RT012	1,4-Dioxane	ND	µg/L
10/16/2018 9:11:00 AM	RT012	Perchlorate	ND	µg/L
10/18/2018 9:48:00 AM	RT002	Tetrachloroethylene (PCE)	1.39	µg/L
10/18/2018 9:48:00 AM	RT002	Trichloroethene (TCE)	7.04	µg/L
10/18/2018 9:48:00 AM	RT002	1,4-Dioxane	ND	µg/L

10/18/2018 9:48:00 AM	RT002	Perchlorate	ND	µg/L
10/18/2018 10:07:00 AM	RT003	Tetrachloroethylene (PCE)	3.65	µg/L
10/18/2018 10:07:00 AM	RT003	Trichloroethene (TCE)	5.11	µg/L
10/18/2018 10:07:00 AM	RT003	1,4-Dioxane	4.45	µg/L
10/18/2018 10:07:00 AM	RT003	Perchlorate	ND	µg/L
10/18/2018 9:19:00 AM	RT004	Tetrachloroethylene (PCE)	1.64	µg/L
10/18/2018 9:19:00 AM	RT004	Trichloroethene (TCE)	1.47	µg/L
10/18/2018 9:19:00 AM	RT004	1,4-Dioxane	0.877	µg/L
10/18/2018 9:19:00 AM	RT004	Perchlorate	2.15	µg/L
10/23/2018 11:30:00 AM	RT005	Tetrachloroethylene (PCE)	1.53	µg/L
10/23/2018 11:30:00 AM	RT005	Trichloroethene (TCE)	1.22	µg/L
10/23/2018 11:30:00 AM	RT005	1,4-Dioxane	ND	µg/L
10/23/2018 11:30:00 AM	RT005	Perchlorate	3.59	µg/L
10/23/2018 11:30:00 AM	RT005	Hexavalent Chromium (Cr+6), IC	1.06	µg/L
10/30/2018 9:27:00 AM	RT011	1,4-Dioxane	ND	µg/L
10/30/2018 10:50:00 AM	RT013	1,4-Dioxane	ND	µg/L
10/30/2018 10:03:00 AM	RT014	1,4-Dioxane	ND	µg/L
10/30/2018 10:10:00 AM	RT015	1,4-Dioxane	ND	µg/L
11/1/2018 9:17:00 AM	RT003	Tetrachloroethylene (PCE)	3.64	µg/L
11/1/2018 9:17:00 AM	RT003	Trichloroethene (TCE)	5.31	µg/L
11/1/2018 9:17:00 AM	RT003	Perchlorate	ND	µg/L
11/1/2018 9:34:00 AM	RT004	Tetrachloroethylene (PCE)	1.72	µg/L
11/1/2018 9:34:00 AM	RT004	Trichloroethene (TCE)	1.55	µg/L
11/1/2018 9:34:00 AM	RT004	Perchlorate	ND	µg/L
11/1/2018 8:45:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
11/1/2018 8:45:00 AM	RT007	Trichloroethene (TCE)	1.98	µg/L
11/1/2018 8:45:00 AM	RT007	Perchlorate	ND	µg/L
11/1/2018 8:51:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
11/1/2018 8:51:00 AM	RT008	Trichloroethene (TCE)	0.873	µg/L
11/1/2018 8:51:00 AM	RT008	Perchlorate	ND	µg/L
11/1/2018 9:03:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
11/1/2018 9:03:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
11/1/2018 9:03:00 AM	RT009	1,4-Dioxane	ND	µg/L
11/8/2018 9:17:00 AM	RT001	Tetrachloroethylene (PCE)	1.01	µg/L
11/8/2018 9:17:00 AM	RT001	Trichloroethene (TCE)	8.35	µg/L
11/8/2018 8:58:00 AM	RT011	Tetrachloroethylene (PCE)	1.40	µg/L

11/8/2018 8:58:00 AM	RT011	Trichloroethene (TCE)	8.45	µg/L
11/8/2018 8:58:00 AM	RT011	1,4-Dioxane	ND	µg/L
11/8/2018 10:27:00 AM	RT013	Tetrachloroethylene (PCE)	1.38	µg/L
11/8/2018 10:27:00 AM	RT013	Trichloroethene (TCE)	8.00	µg/L
11/8/2018 10:27:00 AM	RT013	1,4-Dioxane	ND	µg/L
11/8/2018 10:27:00 AM	RT013	Perchlorate	ND	µg/L
11/8/2018 9:42:00 AM	RT014	Tetrachloroethylene (PCE)	ND	µg/L
11/8/2018 9:42:00 AM	RT014	Trichloroethene (TCE)	5.76	µg/L
11/8/2018 9:42:00 AM	RT014	1,4-Dioxane	ND	µg/L
11/8/2018 9:42:00 AM	RT014	Perchlorate	ND	µg/L
11/8/2018 9:54:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
11/8/2018 9:54:00 AM	RT015	Trichloroethene (TCE)	0.829	µg/L
11/8/2018 9:54:00 AM	RT015	1,4-Dioxane	ND	µg/L
11/13/2018 8:36:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
11/13/2018 8:36:00 AM	RT002	Trichloroethene (TCE)	0.699	µg/L
11/13/2018 11:15:00 AM	RT005	Tetrachloroethylene (PCE)	ND	µg/L
11/13/2018 11:15:00 AM	RT005	Trichloroethene (TCE)	0.792	µg/L
11/13/2018 11:15:00 AM	RT005	1,4-Dioxane	ND	µg/L
11/13/2018 9:11:00 AM	RT010	Tetrachloroethylene (PCE)	4.52	µg/L
11/13/2018 9:11:00 AM	RT010	Trichloroethene (TCE)	16.9	µg/L
11/13/2018 9:11:00 AM	RT010	1,4-Dioxane	3.70	µg/L
11/27/2018 12:15:00 PM	RT010	1,4-Dioxane	2.55	µg/L
12/6/2018 10:03:00 AM	RT013	Tetrachloroethylene (PCE)	0.742	µg/L
12/6/2018 10:03:00 AM	RT013	Trichloroethene (TCE)	5.61	µg/L
12/7/2018 9:24:00 AM	RT001	Tetrachloroethylene (PCE)	0.932	µg/L
12/7/2018 9:24:00 AM	RT001	Trichloroethene (TCE)	9.05	µg/L
12/7/2018 10:51:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
12/7/2018 10:51:00 AM	RT002	Trichloroethene (TCE)	ND	µg/L
12/7/2018 10:31:00 AM	RT010	Tetrachloroethylene (PCE)	2.80	µg/L
12/7/2018 10:31:00 AM	RT010	Trichloroethene (TCE)	10.6	µg/L
12/7/2018 9:03:00 AM	RT011	Tetrachloroethylene (PCE)	0.991	µg/L
12/7/2018 9:03:00 AM	RT011	Trichloroethene (TCE)	6.94	µg/L
12/7/2018 9:45:00 AM	RT014	Tetrachloroethylene (PCE)	ND	µg/L
12/7/2018 9:45:00 AM	RT014	Trichloroethene (TCE)	4.70	µg/L
12/7/2018 10:05:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
12/7/2018 10:05:00 AM	RT015	Trichloroethene (TCE)	ND	µg/L

12/12/2018 11:21:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2018 11:21:00 AM	RT004	Trichloroethene (TCE)	0.586	µg/L
12/12/2018 11:21:00 AM	RT004	Perchlorate	4.22	µg/L
12/12/2018 12:23:00 PM	RT005	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2018 12:23:00 PM	RT005	Trichloroethene (TCE)	0.673	µg/L
12/12/2018 12:23:00 PM	RT005	Perchlorate	4.55	µg/L
12/12/2018 12:23:00 PM	RT005	Hexavalent Chromium (Cr+6), IC	2.16	µg/L
12/12/2018 1:15:00 PM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2018 1:15:00 PM	RT007	Trichloroethene (TCE)	ND	µg/L
12/12/2018 1:15:00 PM	RT007	Perchlorate	2.68	µg/L
12/12/2018 1:25:00 PM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2018 1:25:00 PM	RT008	Trichloroethene (TCE)	0.819	µg/L
12/12/2018 1:25:00 PM	RT008	Perchlorate	2.28	µg/L
12/12/2018 1:39:00 PM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
12/12/2018 1:39:00 PM	RT009	Trichloroethene (TCE)	ND	µg/L
1/15/2019 9:20:00 AM	RT001	Tetrachloroethylene (PCE)	0.888	µg/L
1/15/2019 9:20:00 AM	RT001	Trichloroethene (TCE)	9.76	µg/L
1/15/2019 9:20:00 AM	RT001	1,4-Dioxane	ND	µg/L
1/15/2019 9:06:00 AM	RT011	Tetrachloroethylene (PCE)	0.889	µg/L
1/15/2019 9:06:00 AM	RT011	Trichloroethene (TCE)	7.02	µg/L
1/15/2019 9:06:00 AM	RT011	1,4-Dioxane	ND	µg/L
1/15/2019 9:58:00 AM	RT013	Tetrachloroethylene (PCE)	0.773	µg/L
1/15/2019 9:58:00 AM	RT013	Trichloroethene (TCE)	5.55	µg/L
1/15/2019 9:58:00 AM	RT013	1,4-Dioxane	ND	µg/L
1/15/2019 10:38:00 AM	RT014	Tetrachloroethylene (PCE)	ND	µg/L
1/15/2019 10:38:00 AM	RT014	Trichloroethene (TCE)	4.97	µg/L
1/15/2019 10:38:00 AM	RT014	1,4-Dioxane	ND	µg/L
1/15/2019 10:55:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L
1/15/2019 10:55:00 AM	RT015	Trichloroethene (TCE)	ND	µg/L
1/15/2019 10:55:00 AM	RT015	1,4-Dioxane	ND	µg/L
1/16/2019 9:35:00 AM	RT010	Tetrachloroethylene (PCE)	1.82	µg/L
1/16/2019 9:35:00 AM	RT010	Trichloroethene (TCE)	7.60	µg/L
1/16/2019 9:35:00 AM	RT010	1,4-Dioxane	1.44	µg/L
1/16/2019 9:35:00 AM	RT010	Perchlorate	ND	µg/L
1/16/2019 10:00:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
1/16/2019 10:00:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L

1/16/2019 10:00:00 AM	RT007	1,4-Dioxane	ND	µg/L
1/16/2019 10:00:00 AM	RT007	Perchlorate	2.45	µg/L
1/16/2019 10:47:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
1/16/2019 10:47:00 AM	RT008	Trichloroethene (TCE)	0.864	µg/L
1/16/2019 10:47:00 AM	RT008	1,4-Dioxane	ND	µg/L
1/16/2019 10:47:00 AM	RT008	Perchlorate	2.49	µg/L
1/16/2019 11:17:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
1/16/2019 11:17:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
1/16/2019 11:17:00 AM	RT009	1,4-Dioxane	ND	µg/L
1/18/2019 9:23:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
1/18/2019 9:23:00 AM	RT002	Trichloroethene (TCE)	ND	µg/L
1/18/2019 9:23:00 AM	RT002	1,4-Dioxane	ND	µg/L
1/18/2019 9:23:00 AM	RT002	Perchlorate	2.00	µg/L
1/18/2019 11:50:00 AM	RT003	Tetrachloroethylene (PCE)	ND	µg/L
1/18/2019 11:50:00 AM	RT003	Trichloroethene (TCE)	0.549	µg/L
1/18/2019 11:50:00 AM	RT003	1,4-Dioxane	ND	µg/L
1/18/2019 11:50:00 AM	RT003	Perchlorate	2.93	µg/L
1/18/2019 11:40:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
1/18/2019 11:40:00 AM	RT004	Trichloroethene (TCE)	0.562	µg/L
1/18/2019 11:40:00 AM	RT004	1,4-Dioxane	ND	µg/L
1/18/2019 11:40:00 AM	RT004	Perchlorate	4.17	µg/L
1/18/2019 11:15:00 AM	RT005	Tetrachloroethylene (PCE)	ND	µg/L
1/18/2019 11:15:00 AM	RT005	Trichloroethene (TCE)	0.621	µg/L
1/18/2019 11:15:00 AM	RT005	1,4-Dioxane	ND	µg/L
1/23/2019 12:10:00 PM	RT006	Tetrachloroethylene (PCE)	ND	µg/L
1/23/2019 12:10:00 PM	RT006	Trichloroethene (TCE)	0.700	µg/L
1/23/2019 12:10:00 PM	RT006	1,4-Dioxane	ND	µg/L
1/23/2019 12:10:00 PM	RT006	Perchlorate	4.36	µg/L
1/23/2019 12:10:00 PM	RT006	Hexavalent Chromium (Cr+6), IC	1.90	µg/L
2/11/2019 9:35:00 AM	RT011	Tetrachloroethylene (PCE)	0.697	µg/L
2/11/2019 9:35:00 AM	RT011	Trichloroethene (TCE)	6.35	µg/L
2/11/2019 9:55:00 AM	RT001	Tetrachloroethylene (PCE)	0.940	µg/L
2/11/2019 9:55:00 AM	RT001	Trichloroethene (TCE)	10.5	µg/L
2/11/2019 10:35:00 AM	RT014	Tetrachloroethylene (PCE)	ND	µg/L
2/11/2019 10:35:00 AM	RT014	Trichloroethene (TCE)	5.81	µg/L
2/11/2019 10:58:00 AM	RT015	Tetrachloroethylene (PCE)	ND	µg/L

2/11/2019 10:58:00 AM	RT015	Trichloroethene (TCE)	ND	µg/L
2/11/2019 11:50:00 AM	RT013	Tetrachloroethylene (PCE)	ND	µg/L
2/11/2019 11:50:00 AM	RT013	Trichloroethene (TCE)	4.04	µg/L
2/14/2019 10:37:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
2/14/2019 10:37:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
2/14/2019 10:37:00 AM	RT007	Perchlorate	2.15	µg/L
2/14/2019 10:05:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
2/14/2019 10:05:00 AM	RT008	Trichloroethene (TCE)	0.947	µg/L
2/14/2019 10:05:00 AM	RT008	Perchlorate	2.54	µg/L
2/14/2019 11:35:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
2/14/2019 11:35:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
2/14/2019 11:55:00 AM	RT005	Tetrachloroethylene (PCE)	ND	µg/L
2/14/2019 11:55:00 AM	RT005	Trichloroethene (TCE)	0.664	µg/L
2/22/2019 9:44:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L
2/22/2019 9:44:00 AM	RT002	Trichloroethene (TCE)	ND	µg/L
2/22/2019 11:59:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
2/22/2019 11:59:00 AM	RT004	Trichloroethene (TCE)	0.668	µg/L
2/22/2019 11:59:00 AM	RT004	Perchlorate	3.11	µg/L
2/22/2019 9:05:00 AM	RT010	Tetrachloroethylene (PCE)	1.28	µg/L
2/22/2019 9:05:00 AM	RT010	Trichloroethene (TCE)	5.34	µg/L
3/8/2019 9:04:00 AM	RT005	Tetrachloroethylene (PCE)	ND	µg/L
3/8/2019 9:04:00 AM	RT005	Trichloroethene (TCE)	0.589	µg/L
3/8/2019 9:35:00 AM	RT007	Tetrachloroethylene (PCE)	ND	µg/L
3/8/2019 9:35:00 AM	RT007	Trichloroethene (TCE)	ND	µg/L
3/8/2019 9:35:00 AM	RT007	Perchlorate	2.14	µg/L
3/8/2019 10:08:00 AM	RT008	Tetrachloroethylene (PCE)	ND	µg/L
3/8/2019 10:08:00 AM	RT008	Trichloroethene (TCE)	0.890	µg/L
3/8/2019 10:08:00 AM	RT008	Perchlorate	2.25	µg/L
3/8/2019 10:18:00 AM	RT009	Tetrachloroethylene (PCE)	ND	µg/L
3/8/2019 10:18:00 AM	RT009	Trichloroethene (TCE)	ND	µg/L
3/12/2019 9:15:00 AM	RT010	Tetrachloroethylene (PCE)	1.04	µg/L
3/12/2019 9:15:00 AM	RT010	Trichloroethene (TCE)	5.00	µg/L
3/12/2019 11:15:00 AM	RT004	Tetrachloroethylene (PCE)	ND	µg/L
3/12/2019 11:15:00 AM	RT004	Trichloroethene (TCE)	0.576	µg/L
3/12/2019 11:15:00 AM	RT004	Perchlorate	3.59	µg/L
3/12/2019 10:20:00 AM	RT002	Tetrachloroethylene (PCE)	ND	µg/L

3/12/2019 10:20:00 AM	RT002	Trichloroethene (TCE)	ND	µg/L
3/12/2019 10:20:00 AM	RT002	Hexavalent Chromium (Cr+6), IC	2.43	µg/L
3/13/2019 9:53:00 AM	RT001	Tetrachloroethylene (PCE)	0.901	µg/L
3/13/2019 9:53:00 AM	RT001	Trichloroethene (TCE)	10.5	µg/L
3/13/2019 9:38:00 AM	RT011	Tetrachloroethylene (PCE)	0.830	µg/L
3/13/2019 9:38:00 AM	RT011	Trichloroethene (TCE)	7.39	µg/L
3/13/2019 11:44:00 AM	RT013	Tetrachloroethylene (PCE)	ND	µg/L
3/13/2019 11:44:00 AM	RT013	Trichloroethene (TCE)	3.38	µg/L
3/13/2019 10:48:00 AM	RT014	Tetrachloroethylene (PCE)	ND	µg/L
3/13/2019 10:48:00 AM	RT014	Trichloroethene (TCE)	6.22	µg/L
3/13/2019 11:06:00 AM	RT015	Tetrachloroethylene (PCE)	ND	
3/13/2019 11:06:00 AM	RT015	Trichloroethene (TCE)	0.647	µg/L

TUJUNGA

COLLECTION DATE	WELL NO. (LOCATION CODE)	ANALYTE	RESULT	UNIT
4/4/2018 8:50:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
4/4/2018 8:50:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
4/4/2018 8:50:00 AM	TJ005	1,4-Dioxane	ND	µg/L
4/4/2018 8:50:00 AM	TJ005	Perchlorate	ND	µg/L
4/4/2018 8:18:00 AM	TJ006	Tetrachloroethylene (PCE)	9.63	µg/L
4/4/2018 8:18:00 AM	TJ006	Trichloroethene (TCE)	5.84	µg/L
4/4/2018 8:18:00 AM	TJ006	1,4-Dioxane	ND	µg/L
4/4/2018 8:18:00 AM	TJ006	Perchlorate	ND	µg/L
4/4/2018 10:40:00 AM	TJ007	Tetrachloroethylene (PCE)	52.2	µg/L
4/4/2018 10:40:00 AM	TJ007	Trichloroethene (TCE)	30.8	µg/L
4/4/2018 10:40:00 AM	TJ007	1,4-Dioxane	1.81	µg/L
4/4/2018 10:40:00 AM	TJ007	Perchlorate	2.09	µg/L
4/4/2018 10:05:00 AM	TJ008	Tetrachloroethylene (PCE)	33.5	µg/L
4/4/2018 10:05:00 AM	TJ008	Trichloroethene (TCE)	30.6	µg/L
4/4/2018 10:05:00 AM	TJ008	1,4-Dioxane	1.70	µg/L
4/4/2018 10:05:00 AM	TJ008	Perchlorate	ND	µg/L
4/25/2018 10:35:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
4/25/2018 10:35:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
4/25/2018 10:35:00 AM	TJ001	1,4-Dioxane	ND	µg/L
4/25/2018 10:35:00 AM	TJ001	Perchlorate	2.20	µg/L
4/25/2018 10:48:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
4/25/2018 10:48:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
4/25/2018 10:48:00 AM	TJ002	1,4-Dioxane	ND	µg/L
4/25/2018 10:48:00 AM	TJ002	Perchlorate	ND	µg/L
4/25/2018 11:00:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
4/25/2018 11:00:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
4/25/2018 11:00:00 AM	TJ003	1,4-Dioxane	ND	µg/L
4/25/2018 11:00:00 AM	TJ003	Perchlorate	ND	µg/L
4/25/2018 11:12:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
4/25/2018 11:12:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
4/25/2018 11:12:00 AM	TJ004	1,4-Dioxane	ND	µg/L
4/25/2018 11:12:00 AM	TJ004	Perchlorate	2.00	µg/L
4/26/2018 8:38:00 AM	TJ009	Tetrachloroethylene (PCE)	5.78	µg/L

4/26/2018 8:38:00 AM	TJ009	Trichloroethene (TCE)	9.77	µg/L
4/26/2018 8:38:00 AM	TJ009	1,4-Dioxane	0.572	µg/L
4/26/2018 8:38:00 AM	TJ009	Perchlorate	ND	µg/L
4/26/2018 9:30:00 AM	TJ011	Tetrachloroethylene (PCE)	2.24	µg/L
4/26/2018 9:30:00 AM	TJ011	Trichloroethene (TCE)	9.79	µg/L
4/26/2018 9:30:00 AM	TJ011	1,4-Dioxane	0.733	µg/L
4/26/2018 9:30:00 AM	TJ011	Perchlorate	2.05	µg/L
4/26/2018 8:54:00 AM	TJ012	Tetrachloroethylene (PCE)	0.985	µg/L
4/26/2018 8:54:00 AM	TJ012	Trichloroethene (TCE)	6.17	µg/L
4/26/2018 8:54:00 AM	TJ012	1,4-Dioxane	ND	µg/L
4/26/2018 8:54:00 AM	TJ012	Perchlorate	2.03	µg/L
5/9/2018 11:35:00 AM	TJ005	1,4-Dioxane	ND	µg/L
5/9/2018 11:35:00 AM	TJ005	Perchlorate	ND	µg/L
5/9/2018 11:35:00 AM	TJ005	Hexavalent Chromium (Cr+6), IC	1.40	µg/L
5/9/2018 1:20:00 PM	TJ006	Tetrachloroethylene (PCE)	11.3	µg/L
5/9/2018 1:20:00 PM	TJ006	Trichloroethene (TCE)	7.34	µg/L
5/9/2018 1:20:00 PM	TJ006	1,4-Dioxane	ND	µg/L
5/9/2018 1:20:00 PM	TJ006	Perchlorate	ND	µg/L
5/9/2018 1:20:00 PM	TJ006	Hexavalent Chromium (Cr+6), IC	1.14	µg/L
5/9/2018 1:30:00 PM	TJ007	Tetrachloroethylene (PCE)	39.6	µg/L
5/9/2018 1:30:00 PM	TJ007	Trichloroethene (TCE)	25.6	µg/L
5/9/2018 1:30:00 PM	TJ007	1,4-Dioxane	1.84	µg/L
5/9/2018 1:30:00 PM	TJ007	Perchlorate	2.10	µg/L
5/9/2018 1:30:00 PM	TJ007	Hexavalent Chromium (Cr+6), IC	1.65	µg/L
5/9/2018 12:30:00 PM	TJ008	Tetrachloroethylene (PCE)	19.6	µg/L
5/9/2018 12:30:00 PM	TJ008	Trichloroethene (TCE)	20.5	µg/L
5/9/2018 12:30:00 PM	TJ008	1,4-Dioxane	1.18	µg/L
5/9/2018 12:30:00 PM	TJ008	Perchlorate	ND	µg/L
5/9/2018 12:30:00 PM	TJ008	Hexavalent Chromium (Cr+6), IC	0.990	µg/L
5/10/2018 9:30:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
5/10/2018 9:30:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
5/22/2018 9:50:00 AM	TJ009	Tetrachloroethylene (PCE)	8.02	µg/L
5/22/2018 9:50:00 AM	TJ009	Trichloroethene (TCE)	14.6	µg/L
5/22/2018 9:50:00 AM	TJ009	1,4-Dioxane	0.635	µg/L
5/22/2018 9:50:00 AM	TJ009	Perchlorate	ND	µg/L
5/22/2018 9:07:00 AM	TJ011	Tetrachloroethylene (PCE)	3.49	µg/L

5/22/2018 9:07:00 AM	TJ011	Trichloroethene (TCE)	13.9	µg/L
5/22/2018 9:07:00 AM	TJ011	1,4-Dioxane	0.944	µg/L
5/22/2018 9:07:00 AM	TJ011	Perchlorate	2.71	µg/L
5/22/2018 8:39:00 AM	TJ012	Tetrachloroethylene (PCE)	1.00	µg/L
5/22/2018 8:39:00 AM	TJ012	Trichloroethene (TCE)	4.82	µg/L
5/22/2018 8:39:00 AM	TJ012	1,4-Dioxane	ND	µg/L
5/22/2018 8:39:00 AM	TJ012	Perchlorate	ND	µg/L
5/24/2018 7:43:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
5/24/2018 7:43:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
5/24/2018 7:43:00 AM	TJ001	1,4-Dioxane	ND	µg/L
5/24/2018 7:43:00 AM	TJ001	Perchlorate	2.27	µg/L
5/24/2018 8:08:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
5/24/2018 8:08:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
5/24/2018 8:08:00 AM	TJ002	1,4-Dioxane	ND	µg/L
5/24/2018 8:08:00 AM	TJ002	Perchlorate	ND	µg/L
5/24/2018 8:31:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
5/24/2018 8:31:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
5/24/2018 8:31:00 AM	TJ003	1,4-Dioxane	ND	µg/L
5/24/2018 8:31:00 AM	TJ003	Perchlorate	ND	µg/L
5/24/2018 8:49:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
5/24/2018 8:49:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
5/24/2018 8:49:00 AM	TJ004	1,4-Dioxane	ND	µg/L
5/24/2018 8:49:00 AM	TJ004	Perchlorate	ND	µg/L
6/6/2018 8:25:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
6/6/2018 8:25:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
6/6/2018 8:25:00 AM	TJ005	1,4-Dioxane	ND	µg/L
6/6/2018 8:25:00 AM	TJ005	Perchlorate	ND	µg/L
6/6/2018 7:46:00 AM	TJ006	Tetrachloroethylene (PCE)	19.6	µg/L
6/6/2018 7:46:00 AM	TJ006	Trichloroethene (TCE)	11.1	µg/L
6/6/2018 7:46:00 AM	TJ006	1,4-Dioxane	0.502	µg/L
6/6/2018 7:46:00 AM	TJ006	Perchlorate	ND	µg/L
6/6/2018 8:02:00 AM	TJ007	Tetrachloroethylene (PCE)	43.6	µg/L
6/6/2018 8:02:00 AM	TJ007	Trichloroethene (TCE)	27.2	µg/L
6/6/2018 8:02:00 AM	TJ007	1,4-Dioxane	1.69	µg/L
6/6/2018 8:02:00 AM	TJ007	Perchlorate	2.13	µg/L
6/6/2018 9:00:00 AM	TJ008	Tetrachloroethylene (PCE)	27.1	µg/L

6/6/2018 9:00:00 AM	TJ008	Trichloroethene (TCE)	29.2	µg/L
6/6/2018 9:00:00 AM	TJ008	1,4-Dioxane	1.27	µg/L
6/6/2018 9:00:00 AM	TJ008	Perchlorate	ND	µg/L
6/6/2018 9:00:00 AM	TJ008	Hexavalent Chromium (Cr+6), IC	1.10	µg/L
6/6/2018 10:00:00 AM	TJ009	Tetrachloroethylene (PCE)	9.56	µg/L
6/6/2018 10:00:00 AM	TJ009	Trichloroethene (TCE)	17.7	µg/L
6/6/2018 10:00:00 AM	TJ009	1,4-Dioxane	Preserv Error	µg/L
6/6/2018 10:00:00 AM	TJ009	Perchlorate	ND	µg/L
6/6/2018 10:00:00 AM	TJ009	Hexavalent Chromium (Cr+6), IC	0.872	µg/L
6/26/2018 10:30:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
6/26/2018 10:30:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
6/26/2018 10:30:00 AM	TJ001	1,4-Dioxane	ND	µg/L
6/26/2018 10:30:00 AM	TJ001	Perchlorate	2.35	µg/L
6/26/2018 10:30:00 AM	TJ001	Hexavalent Chromium (Cr+6), IC	3.85	µg/L
6/26/2018 11:45:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
6/26/2018 11:45:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
6/26/2018 11:45:00 AM	TJ002	1,4-Dioxane	ND	µg/L
6/26/2018 11:45:00 AM	TJ002	Perchlorate	ND	µg/L
6/26/2018 12:30:00 PM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
6/26/2018 12:30:00 PM	TJ003	Trichloroethene (TCE)	ND	µg/L
6/26/2018 12:30:00 PM	TJ003	1,4-Dioxane	ND	µg/L
6/26/2018 12:30:00 PM	TJ003	Perchlorate	ND	µg/L
6/26/2018 1:05:00 PM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
6/26/2018 1:05:00 PM	TJ004	Trichloroethene (TCE)	ND	µg/L
6/26/2018 1:05:00 PM	TJ004	1,4-Dioxane	ND	µg/L
6/26/2018 1:05:00 PM	TJ004	Perchlorate	ND	µg/L
6/28/2018 9:58:00 AM	TJ009	1,4-Dioxane	0.579	µg/L
6/28/2018 9:05:00 AM	TJ011	Tetrachloroethylene (PCE)	4.29	µg/L
6/28/2018 9:05:00 AM	TJ011	Trichloroethene (TCE)	14.9	µg/L
6/28/2018 9:05:00 AM	TJ011	1,4-Dioxane	0.892	µg/L
6/28/2018 9:05:00 AM	TJ011	Perchlorate	2.77	µg/L
6/28/2018 8:46:00 AM	TJ012	Tetrachloroethylene (PCE)	1.11	µg/L
6/28/2018 8:46:00 AM	TJ012	Trichloroethene (TCE)	5.22	µg/L
6/28/2018 8:46:00 AM	TJ012	1,4-Dioxane	ND	µg/L
6/28/2018 8:46:00 AM	TJ012	Perchlorate	ND	µg/L
7/5/2018 11:18:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L

7/5/2018 11:18:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
7/5/2018 11:18:00 AM	TJ005	1,4-Dioxane	ND	µg/L
7/5/2018 11:18:00 AM	TJ005	Perchlorate	ND	µg/L
7/5/2018 11:18:00 AM	TJ005	Hexavalent Chromium (Cr+6), IC	1.50	µg/L
7/5/2018 9:15:00 AM	TJ006	Tetrachloroethylene (PCE)	22.6	µg/L
7/5/2018 9:15:00 AM	TJ006	Trichloroethene (TCE)	13.1	µg/L
7/5/2018 9:15:00 AM	TJ006	1,4-Dioxane	0.587	µg/L
7/5/2018 9:15:00 AM	TJ006	Perchlorate	ND	µg/L
7/5/2018 9:15:00 AM	TJ006	Hexavalent Chromium (Cr+6), IC	1.17	µg/L
7/5/2018 10:39:00 AM	TJ007	Tetrachloroethylene (PCE)	44.2	µg/L
7/5/2018 10:39:00 AM	TJ007	Trichloroethene (TCE)	28.7	µg/L
7/5/2018 10:39:00 AM	TJ007	1,4-Dioxane	1.70	µg/L
7/5/2018 10:39:00 AM	TJ007	Perchlorate	2.24	µg/L
7/5/2018 10:39:00 AM	TJ007	Hexavalent Chromium (Cr+6), IC	1.82	µg/L
7/5/2018 12:05:00 PM	TJ008	Tetrachloroethylene (PCE)	29.3	µg/L
7/5/2018 12:05:00 PM	TJ008	Trichloroethene (TCE)	32.5	µg/L
7/5/2018 12:05:00 PM	TJ008	1,4-Dioxane	1.30	µg/L
7/5/2018 12:05:00 PM	TJ008	Perchlorate	ND	µg/L
7/5/2018 12:05:00 PM	TJ008	Hexavalent Chromium (Cr+6), IC	1.16	µg/L
7/24/2018 9:14:00 AM	TJ009	Tetrachloroethylene (PCE)	10.3	µg/L
7/24/2018 9:14:00 AM	TJ009	Trichloroethene (TCE)	18.9	µg/L
7/24/2018 9:14:00 AM	TJ009	1,4-Dioxane	0.673	µg/L
7/24/2018 9:14:00 AM	TJ009	Perchlorate	ND	µg/L
7/24/2018 10:08:00 AM	TJ011	Tetrachloroethylene (PCE)	4.63	µg/L
7/24/2018 10:08:00 AM	TJ011	Trichloroethene (TCE)	15.1	µg/L
7/24/2018 10:08:00 AM	TJ011	1,4-Dioxane	0.912	µg/L
7/24/2018 10:08:00 AM	TJ011	Perchlorate	2.85	µg/L
7/25/2018 10:51:00 AM	TJ012	Tetrachloroethylene (PCE)	1.26	µg/L
7/25/2018 10:51:00 AM	TJ012	Trichloroethene (TCE)	5.50	µg/L
7/25/2018 10:51:00 AM	TJ012	1,4-Dioxane	ND	µg/L
7/25/2018 10:51:00 AM	TJ012	Perchlorate	ND	µg/L
7/25/2018 10:51:00 AM	TJ012	Hexavalent Chromium (Cr+6), IC	0.717	µg/L
7/26/2018 8:22:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
7/26/2018 8:22:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
7/26/2018 8:22:00 AM	TJ001	1,4-Dioxane	ND	µg/L
7/26/2018 8:22:00 AM	TJ001	Perchlorate	2.40	µg/L

7/26/2018 8:42:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
7/26/2018 8:42:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
7/26/2018 8:42:00 AM	TJ002	1,4-Dioxane	ND	µg/L
7/26/2018 8:42:00 AM	TJ002	Perchlorate	ND	µg/L
7/26/2018 9:05:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
7/26/2018 9:05:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
7/26/2018 9:05:00 AM	TJ003	1,4-Dioxane	ND	µg/L
7/26/2018 9:05:00 AM	TJ003	Perchlorate	ND	µg/L
7/26/2018 9:34:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
7/26/2018 9:34:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
7/26/2018 9:34:00 AM	TJ004	1,4-Dioxane	ND	µg/L
7/26/2018 9:34:00 AM	TJ004	Perchlorate	ND	µg/L
8/8/2018 9:37:00 AM	TJ006	Tetrachloroethylene (PCE)	22.6	µg/L
8/8/2018 9:37:00 AM	TJ006	Trichloroethene (TCE)	13.1	µg/L
8/8/2018 9:37:00 AM	TJ006	1,4-Dioxane	0.671	µg/L
8/8/2018 9:37:00 AM	TJ006	Perchlorate	ND	µg/L
8/8/2018 9:50:00 AM	TJ007	Tetrachloroethylene (PCE)	42.3	µg/L
8/8/2018 9:50:00 AM	TJ007	Trichloroethene (TCE)	27.3	µg/L
8/8/2018 9:50:00 AM	TJ007	1,4-Dioxane	1.79	µg/L
8/8/2018 9:50:00 AM	TJ007	Perchlorate	2.28	µg/L
8/28/2018 12:29:00 PM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
8/28/2018 12:29:00 PM	TJ001	Trichloroethene (TCE)	ND	µg/L
8/28/2018 12:29:00 PM	TJ001	1,4-Dioxane	ND	µg/L
8/28/2018 12:29:00 PM	TJ001	Perchlorate	2.44	µg/L
8/28/2018 12:47:00 PM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
8/28/2018 12:47:00 PM	TJ002	Trichloroethene (TCE)	ND	µg/L
8/28/2018 12:47:00 PM	TJ002	1,4-Dioxane	ND	µg/L
8/28/2018 12:47:00 PM	TJ002	Perchlorate	ND	µg/L
8/28/2018 1:33:00 PM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
8/28/2018 1:33:00 PM	TJ003	Trichloroethene (TCE)	ND	µg/L
8/28/2018 1:33:00 PM	TJ003	1,4-Dioxane	ND	µg/L
8/28/2018 1:33:00 PM	TJ003	Perchlorate	ND	µg/L
8/28/2018 1:07:00 PM	TJ009	Tetrachloroethylene (PCE)	13.9	µg/L
8/28/2018 1:07:00 PM	TJ009	Trichloroethene (TCE)	23.1	µg/L
8/28/2018 1:07:00 PM	TJ009	1,4-Dioxane	0.774	µg/L
8/28/2018 1:07:00 PM	TJ009	Perchlorate	2.48	µg/L

8/28/2018 12:11:00 PM	TJ008	Tetrachloroethylene (PCE)	42.6	µg/L
8/28/2018 12:11:00 PM	TJ008	Trichloroethene (TCE)	42.6	µg/L
8/28/2018 12:11:00 PM	TJ008	1,4-Dioxane	1.99	µg/L
8/28/2018 12:11:00 PM	TJ008	Perchlorate	2.01	µg/L
8/30/2018 11:00:00 AM	TJ005	Tetrachloroethylene (PCE)	0.806	µg/L
8/30/2018 11:00:00 AM	TJ005	Trichloroethene (TCE)	0.956	µg/L
8/30/2018 11:00:00 AM	TJ005	1,4-Dioxane	ND	µg/L
8/30/2018 11:00:00 AM	TJ005	Perchlorate	ND	µg/L
8/30/2018 10:35:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
8/30/2018 10:35:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
8/30/2018 10:35:00 AM	TJ004	1,4-Dioxane	ND	µg/L
8/30/2018 10:35:00 AM	TJ004	Perchlorate	ND	µg/L
8/30/2018 1:30:00 PM	TJ011	Tetrachloroethylene (PCE)	4.53	µg/L
8/30/2018 1:30:00 PM	TJ011	Trichloroethene (TCE)	13.9	µg/L
8/30/2018 1:30:00 PM	TJ011	1,4-Dioxane	0.913	µg/L
8/30/2018 1:30:00 PM	TJ011	Perchlorate	2.87	µg/L
8/30/2018 1:58:00 PM	TJ012	Tetrachloroethylene (PCE)	1.42	µg/L
8/30/2018 1:58:00 PM	TJ012	Trichloroethene (TCE)	9.71	µg/L
8/30/2018 1:58:00 PM	TJ012	1,4-Dioxane	0.752	µg/L
8/30/2018 1:58:00 PM	TJ012	Perchlorate	2.78	µg/L
9/5/2018 9:27:00 AM	TJ006	Tetrachloroethylene (PCE)	24.2	µg/L
9/5/2018 9:27:00 AM	TJ006	Trichloroethene (TCE)	15.7	µg/L
9/5/2018 9:27:00 AM	TJ006	1,4-Dioxane	0.721	µg/L
9/5/2018 9:27:00 AM	TJ006	Perchlorate	ND	µg/L
9/5/2018 9:40:00 AM	TJ007	Tetrachloroethylene (PCE)	59.6	µg/L
9/5/2018 9:40:00 AM	TJ007	Trichloroethene (TCE)	39.3	µg/L
9/5/2018 9:40:00 AM	TJ007	1,4-Dioxane	2.53	µg/L
9/5/2018 9:40:00 AM	TJ007	Perchlorate	2.27	µg/L
9/25/2018 11:22:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
9/25/2018 11:22:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
9/25/2018 11:22:00 AM	TJ001	1,4-Dioxane	ND	µg/L
9/25/2018 11:22:00 AM	TJ001	Perchlorate	2.19	µg/L
9/25/2018 11:46:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
9/25/2018 11:46:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
9/25/2018 11:46:00 AM	TJ002	1,4-Dioxane	ND	µg/L
9/25/2018 11:46:00 AM	TJ002	Perchlorate	ND	µg/L

9/25/2018 12:04:00 PM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
9/25/2018 12:04:00 PM	TJ003	Trichloroethene (TCE)	ND	µg/L
9/25/2018 12:04:00 PM	TJ003	1,4-Dioxane	ND	µg/L
9/25/2018 12:04:00 PM	TJ003	Perchlorate	ND	µg/L
9/25/2018 12:30:00 PM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
9/25/2018 12:30:00 PM	TJ004	Trichloroethene (TCE)	ND	µg/L
9/25/2018 12:30:00 PM	TJ004	1,4-Dioxane	ND	µg/L
9/25/2018 12:30:00 PM	TJ004	Perchlorate	ND	µg/L
9/26/2018 11:05:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
9/26/2018 11:05:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
9/26/2018 11:05:00 AM	TJ005	1,4-Dioxane	ND	µg/L
9/26/2018 11:05:00 AM	TJ005	Perchlorate	ND	µg/L
9/26/2018 11:28:00 AM	TJ008	Tetrachloroethylene (PCE)	22.3	µg/L
9/26/2018 11:28:00 AM	TJ008	Trichloroethene (TCE)	23.7	µg/L
9/26/2018 11:28:00 AM	TJ008	1,4-Dioxane	1.26	µg/L
9/26/2018 11:28:00 AM	TJ008	Perchlorate	ND	µg/L
9/27/2018 9:07:00 AM	TJ009	Tetrachloroethylene (PCE)	7.96	µg/L
9/27/2018 9:07:00 AM	TJ009	Trichloroethene (TCE)	14.0	µg/L
9/27/2018 9:07:00 AM	TJ009	1,4-Dioxane	0.652	µg/L
9/27/2018 9:07:00 AM	TJ009	Perchlorate	ND	µg/L
9/27/2018 9:54:00 AM	TJ011	Tetrachloroethylene (PCE)	4.52	µg/L
9/27/2018 9:54:00 AM	TJ011	Trichloroethene (TCE)	14.1	µg/L
9/27/2018 9:54:00 AM	TJ011	1,4-Dioxane	0.849	µg/L
9/27/2018 9:54:00 AM	TJ011	Perchlorate	2.21	µg/L
9/27/2018 10:44:00 AM	TJ012	Tetrachloroethylene (PCE)	1.07	µg/L
9/27/2018 10:44:00 AM	TJ012	Trichloroethene (TCE)	8.69	µg/L
9/27/2018 10:44:00 AM	TJ012	1,4-Dioxane	0.719	µg/L
9/27/2018 10:44:00 AM	TJ012	Perchlorate	2.48	µg/L
10/3/2018 9:54:00 AM	TJ005	Tetrachloroethylene (PCE)	0.541	µg/L
10/3/2018 9:54:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
10/3/2018 9:54:00 AM	TJ005	1,4-Dioxane	ND	µg/L
10/3/2018 9:54:00 AM	TJ005	Perchlorate	ND	µg/L
10/3/2018 9:54:00 AM	TJ005	Hexavalent Chromium (Cr+6), IC	1.37	µg/L
10/3/2018 11:00:00 AM	TJ006	Tetrachloroethylene (PCE)	21.7	µg/L
10/3/2018 11:00:00 AM	TJ006	Trichloroethene (TCE)	12.6	µg/L
10/3/2018 11:00:00 AM	TJ006	1,4-Dioxane	0.633	µg/L

10/3/2018 11:00:00 AM	TJ006	Perchlorate	ND	µg/L
10/3/2018 11:00:00 AM	TJ006	Hexavalent Chromium (Cr+6), IC	1.16	µg/L
10/3/2018 11:25:00 AM	TJ007	Tetrachloroethylene (PCE)	40.4	µg/L
10/3/2018 11:25:00 AM	TJ007	Trichloroethene (TCE)	27.0	µg/L
10/3/2018 11:25:00 AM	TJ007	1,4-Dioxane	1.77	µg/L
10/3/2018 11:25:00 AM	TJ007	Perchlorate	2.26	µg/L
10/3/2018 11:25:00 AM	TJ007	Hexavalent Chromium (Cr+6), IC	1.76	µg/L
10/3/2018 10:39:00 AM	TJ008	Tetrachloroethylene (PCE)	24.0	µg/L
10/3/2018 10:39:00 AM	TJ008	Trichloroethene (TCE)	26.0	µg/L
10/3/2018 10:39:00 AM	TJ008	1,4-Dioxane	1.29	µg/L
10/3/2018 10:39:00 AM	TJ008	Perchlorate	ND	µg/L
10/3/2018 10:39:00 AM	TJ008	Hexavalent Chromium (Cr+6), IC	1.04	µg/L
10/24/2018 8:45:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
10/24/2018 8:45:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
10/24/2018 8:45:00 AM	TJ001	1,4-Dioxane	ND	µg/L
10/24/2018 8:45:00 AM	TJ001	Perchlorate	2.12	µg/L
10/24/2018 9:08:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
10/24/2018 9:08:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
10/24/2018 9:08:00 AM	TJ002	1,4-Dioxane	ND	µg/L
10/24/2018 9:08:00 AM	TJ002	Perchlorate	ND	µg/L
10/24/2018 9:38:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
10/24/2018 9:38:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
10/24/2018 9:38:00 AM	TJ003	1,4-Dioxane	ND	µg/L
10/24/2018 9:38:00 AM	TJ003	Perchlorate	ND	µg/L
10/24/2018 9:58:00 AM	TJ004	Tetrachloroethylene (PCE)	0.622	µg/L
10/24/2018 9:58:00 AM	TJ004	Trichloroethene (TCE)	0.559	µg/L
10/24/2018 9:58:00 AM	TJ004	1,4-Dioxane	ND	µg/L
10/24/2018 9:58:00 AM	TJ004	Perchlorate	ND	µg/L
10/25/2018 10:42:00 AM	TJ009	Tetrachloroethylene (PCE)	8.80	µg/L
10/25/2018 10:42:00 AM	TJ009	Trichloroethene (TCE)	15.9	µg/L
10/25/2018 10:42:00 AM	TJ009	1,4-Dioxane	0.634	µg/L
10/25/2018 10:42:00 AM	TJ009	Perchlorate	ND	µg/L
10/25/2018 11:25:00 AM	TJ011	Tetrachloroethylene (PCE)	4.14	µg/L
10/25/2018 11:25:00 AM	TJ011	Trichloroethene (TCE)	13.8	µg/L
10/25/2018 11:25:00 AM	TJ011	1,4-Dioxane	0.903	µg/L
10/25/2018 11:25:00 AM	TJ011	Perchlorate	2.57	µg/L

10/25/2018 11:55:00 AM	TJ012	Tetrachloroethylene (PCE)	1.01	µg/L
10/25/2018 11:55:00 AM	TJ012	Trichloroethene (TCE)	8.18	µg/L
10/25/2018 11:55:00 AM	TJ012	1,4-Dioxane	0.693	µg/L
10/25/2018 11:55:00 AM	TJ012	Perchlorate	2.43	µg/L
11/7/2018 8:57:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
11/7/2018 8:57:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
11/7/2018 8:57:00 AM	TJ005	1,4-Dioxane	ND	µg/L
11/7/2018 8:57:00 AM	TJ005	Perchlorate	ND	µg/L
11/7/2018 8:38:00 AM	TJ006	Tetrachloroethylene (PCE)	22.2	µg/L
11/7/2018 8:38:00 AM	TJ006	Trichloroethene (TCE)	13.1	µg/L
11/7/2018 8:38:00 AM	TJ006	1,4-Dioxane	0.684	µg/L
11/7/2018 8:38:00 AM	TJ006	Perchlorate	ND	µg/L
11/7/2018 8:45:00 AM	TJ007	Tetrachloroethylene (PCE)	40.6	µg/L
11/7/2018 8:45:00 AM	TJ007	Trichloroethene (TCE)	26.0	µg/L
11/7/2018 8:45:00 AM	TJ007	1,4-Dioxane	1.79	µg/L
11/7/2018 8:45:00 AM	TJ007	Perchlorate	2.21	µg/L
11/7/2018 9:47:00 AM	TJ008	Tetrachloroethylene (PCE)	35.7	µg/L
11/7/2018 9:47:00 AM	TJ008	Trichloroethene (TCE)	40.0	µg/L
11/7/2018 9:47:00 AM	TJ008	1,4-Dioxane	1.49	µg/L
11/7/2018 9:47:00 AM	TJ008	Perchlorate	ND	µg/L
11/14/2018 11:57:00 AM	TJ007	Tetrachloroethylene (PCE)	42.3	µg/L
11/14/2018 11:57:00 AM	TJ007	Trichloroethene (TCE)	27.0	µg/L
11/14/2018 11:57:00 AM	TJ007	1,4-Dioxane	1.74	µg/L
11/14/2018 11:57:00 AM	TJ007	Perchlorate	2.15	µg/L
11/14/2018 11:57:00 AM	TJ007	Hexavalent Chromium (Cr+6), IC	1.65	µg/L
11/19/2018 9:56:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
11/19/2018 9:56:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
11/19/2018 9:56:00 AM	TJ001	1,4-Dioxane	ND	µg/L
11/19/2018 9:56:00 AM	TJ001	Perchlorate	2.04	µg/L
11/21/2018 10:08:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
11/21/2018 10:08:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
11/21/2018 10:08:00 AM	TJ002	1,4-Dioxane	ND	µg/L
11/21/2018 10:08:00 AM	TJ002	Perchlorate	ND	µg/L
11/21/2018 10:58:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
11/21/2018 10:58:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
11/21/2018 10:58:00 AM	TJ003	1,4-Dioxane	ND	µg/L

11/21/2018 10:58:00 AM	TJ003	Perchlorate	ND	µg/L
11/21/2018 11:43:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
11/21/2018 11:43:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
11/21/2018 11:43:00 AM	TJ004	1,4-Dioxane	ND	µg/L
11/21/2018 11:43:00 AM	TJ004	Perchlorate	ND	µg/L
11/27/2018 9:15:00 AM	TJ009	Tetrachloroethylene (PCE)	12.1	µg/L
11/27/2018 9:15:00 AM	TJ009	Trichloroethene (TCE)	25.2	µg/L
11/27/2018 9:15:00 AM	TJ009	1,4-Dioxane	0.664	µg/L
11/27/2018 9:15:00 AM	TJ009	Perchlorate	2.20	µg/L
11/27/2018 9:43:00 AM	TJ011	Tetrachloroethylene (PCE)	4.46	µg/L
11/27/2018 9:43:00 AM	TJ011	Trichloroethene (TCE)	17.5	µg/L
11/27/2018 9:43:00 AM	TJ011	1,4-Dioxane	0.924	µg/L
11/27/2018 9:43:00 AM	TJ011	Perchlorate	2.98	µg/L
11/27/2018 10:09:00 AM	TJ012	Tetrachloroethylene (PCE)	1.18	µg/L
11/27/2018 10:09:00 AM	TJ012	Trichloroethene (TCE)	9.69	µg/L
11/27/2018 10:09:00 AM	TJ012	1,4-Dioxane	0.655	µg/L
11/27/2018 10:09:00 AM	TJ012	Perchlorate	2.78	µg/L
12/5/2018 9:09:00 AM	TJ005	Tetrachloroethylene (PCE)	0.754	µg/L
12/5/2018 9:09:00 AM	TJ005	Trichloroethene (TCE)	0.748	µg/L
12/5/2018 9:09:00 AM	TJ005	1,4-Dioxane	ND	µg/L
12/5/2018 9:09:00 AM	TJ005	Perchlorate	ND	µg/L
12/5/2018 8:30:00 AM	TJ006	Tetrachloroethylene (PCE)	16.4	µg/L
12/5/2018 8:30:00 AM	TJ006	Trichloroethene (TCE)	9.21	µg/L
12/5/2018 8:30:00 AM	TJ006	1,4-Dioxane	ND	µg/L
12/5/2018 8:30:00 AM	TJ006	Perchlorate	ND	µg/L
12/5/2018 9:02:00 AM	TJ007	Tetrachloroethylene (PCE)	38.1	µg/L
12/5/2018 9:02:00 AM	TJ007	Trichloroethene (TCE)	24.3	µg/L
12/5/2018 9:02:00 AM	TJ007	1,4-Dioxane	1.72	µg/L
12/5/2018 9:02:00 AM	TJ007	Perchlorate	2.22	µg/L
12/5/2018 9:45:00 AM	TJ008	Tetrachloroethylene (PCE)	28.2	µg/L
12/5/2018 9:45:00 AM	TJ008	Trichloroethene (TCE)	31.0	µg/L
12/5/2018 9:45:00 AM	TJ008	1,4-Dioxane	1.29	µg/L
12/5/2018 9:45:00 AM	TJ008	Perchlorate	ND	µg/L
12/18/2018 9:50:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
12/18/2018 9:50:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
12/18/2018 9:50:00 AM	TJ002	1,4-Dioxane	ND	µg/L

12/18/2018 9:50:00 AM	TJ002	Perchlorate	ND	µg/L
12/18/2018 10:15:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
12/18/2018 10:15:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
12/18/2018 10:15:00 AM	TJ003	1,4-Dioxane	ND	µg/L
12/18/2018 10:15:00 AM	TJ003	Perchlorate	2.06	µg/L
12/18/2018 10:40:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
12/18/2018 10:40:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
12/18/2018 10:40:00 AM	TJ004	1,4-Dioxane	ND	µg/L
12/18/2018 10:40:00 AM	TJ004	Perchlorate	ND	µg/L
12/18/2018 11:00:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
12/18/2018 11:00:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
12/18/2018 11:00:00 AM	TJ001	1,4-Dioxane	ND	µg/L
12/18/2018 11:00:00 AM	TJ001	Perchlorate	ND	µg/L
12/20/2018 11:48:00 AM	TJ009	Tetrachloroethylene (PCE)	11.2	µg/L
12/20/2018 11:48:00 AM	TJ009	Trichloroethene (TCE)	21.6	µg/L
12/20/2018 11:48:00 AM	TJ009	1,4-Dioxane	0.652	µg/L
12/20/2018 11:48:00 AM	TJ009	Perchlorate	2.07	µg/L
12/20/2018 12:29:00 PM	TJ011	Tetrachloroethylene (PCE)	4.05	µg/L
12/20/2018 12:29:00 PM	TJ011	Trichloroethene (TCE)	14.7	µg/L
12/20/2018 12:29:00 PM	TJ011	1,4-Dioxane	1.05	µg/L
12/20/2018 12:29:00 PM	TJ011	Perchlorate	3.24	µg/L
12/20/2018 1:12:00 PM	TJ012	Tetrachloroethylene (PCE)	1.20	µg/L
12/20/2018 1:12:00 PM	TJ012	Trichloroethene (TCE)	8.52	µg/L
12/20/2018 1:12:00 PM	TJ012	1,4-Dioxane	0.680	µg/L
12/20/2018 1:12:00 PM	TJ012	Perchlorate	2.68	µg/L
1/3/2019 10:28:00 AM	TJ010	Tetrachloroethylene (PCE)	5.90	µg/L
1/3/2019 10:28:00 AM	TJ010	Trichloroethene (TCE)	13.7	µg/L
1/3/2019 10:28:00 AM	TJ010	1,4-Dioxane	0.647	µg/L
1/3/2019 10:28:00 AM	TJ010	Perchlorate	2.28	µg/L
1/3/2019 10:28:00 AM	TJ010	Hexavalent Chromium (Cr+6), IC	0.901	µg/L
1/9/2019 10:45:00 AM	TJ006	Tetrachloroethylene (PCE)	11.3	µg/L
1/9/2019 10:45:00 AM	TJ006	Trichloroethene (TCE)	6.23	µg/L
1/9/2019 10:45:00 AM	TJ006	1,4-Dioxane	ND	µg/L
1/9/2019 10:45:00 AM	TJ006	Perchlorate	ND	µg/L
1/9/2019 10:45:00 AM	TJ006	Hexavalent Chromium (Cr+6), IC	1.05	µg/L
1/9/2019 11:15:00 AM	TJ007	Tetrachloroethylene (PCE)	35.9	µg/L

1/9/2019 11:15:00 AM	TJ007	Trichloroethene (TCE)	21.6	µg/L
1/9/2019 11:15:00 AM	TJ007	1,4-Dioxane	1.64	µg/L
1/9/2019 11:15:00 AM	TJ007	Perchlorate	2.15	µg/L
1/9/2019 11:15:00 AM	TJ007	Hexavalent Chromium (Cr+6), IC	1.56	µg/L
1/22/2019 12:00:00 PM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
1/22/2019 12:00:00 PM	TJ001	Trichloroethene (TCE)	ND	µg/L
1/22/2019 12:00:00 PM	TJ001	1,4-Dioxane	ND	µg/L
1/22/2019 12:00:00 PM	TJ001	Perchlorate	2.00	µg/L
1/22/2019 10:15:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
1/22/2019 10:15:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
1/22/2019 10:15:00 AM	TJ002	1,4-Dioxane	ND	µg/L
1/22/2019 10:15:00 AM	TJ002	Perchlorate	ND	µg/L
1/22/2019 10:50:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
1/22/2019 10:50:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
1/22/2019 10:50:00 AM	TJ003	1,4-Dioxane	ND	µg/L
1/22/2019 10:50:00 AM	TJ003	Perchlorate	ND	µg/L
1/22/2019 11:35:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
1/22/2019 11:35:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
1/22/2019 11:35:00 AM	TJ004	1,4-Dioxane	ND	µg/L
1/22/2019 11:35:00 AM	TJ004	Perchlorate	ND	µg/L
1/23/2019 10:38:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
1/23/2019 10:38:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
1/23/2019 10:38:00 AM	TJ005	1,4-Dioxane	ND	µg/L
1/23/2019 10:38:00 AM	TJ005	Perchlorate	ND	µg/L
1/23/2019 10:38:00 AM	TJ005	Hexavalent Chromium (Cr+6), IC	1.46	µg/L
1/23/2019 11:27:00 AM	TJ008	Tetrachloroethylene (PCE)	24.1	µg/L
1/23/2019 11:27:00 AM	TJ008	Trichloroethene (TCE)	27.8	µg/L
1/23/2019 11:27:00 AM	TJ008	1,4-Dioxane	1.15	µg/L
1/23/2019 11:27:00 AM	TJ008	Perchlorate	ND	µg/L
1/23/2019 11:27:00 AM	TJ008	Hexavalent Chromium (Cr+6), IC	1.03	µg/L
1/24/2019 9:45:00 AM	TJ009	Tetrachloroethylene (PCE)	9.65	µg/L
1/24/2019 9:45:00 AM	TJ009	Trichloroethene (TCE)	19.5	µg/L
1/24/2019 9:45:00 AM	TJ009	1,4-Dioxane	0.640	µg/L
1/24/2019 9:45:00 AM	TJ009	Perchlorate	ND	µg/L
1/24/2019 10:25:00 AM	TJ011	Tetrachloroethylene (PCE)	3.35	µg/L
1/24/2019 10:25:00 AM	TJ011	Trichloroethene (TCE)	13.7	µg/L

1/24/2019 10:25:00 AM	TJ011	1,4-Dioxane	1.03	µg/L
1/24/2019 10:25:00 AM	TJ011	Perchlorate	3.11	µg/L
1/28/2019 12:40:00 PM	TJ012	Tetrachloroethylene (PCE)	1.19	µg/L
1/28/2019 12:40:00 PM	TJ012	Trichloroethene (TCE)	8.42	µg/L
1/28/2019 12:40:00 PM	TJ012	1,4-Dioxane	0.736	µg/L
1/28/2019 12:40:00 PM	TJ012	Perchlorate	2.69	µg/L
2/6/2019 10:38:00 AM	TJ006	Tetrachloroethylene (PCE)	10.2	µg/L
2/6/2019 10:38:00 AM	TJ006	Trichloroethene (TCE)	6.22	µg/L
2/6/2019 10:38:00 AM	TJ006	1,4-Dioxane	ND	µg/L
2/6/2019 10:38:00 AM	TJ006	Perchlorate	ND	µg/L
2/6/2019 12:35:00 PM	TJ007	Tetrachloroethylene (PCE)	38.8	µg/L
2/6/2019 12:35:00 PM	TJ007	Trichloroethene (TCE)	24.9	µg/L
2/6/2019 12:35:00 PM	TJ007	1,4-Dioxane	1.57	µg/L
2/6/2019 12:35:00 PM	TJ007	Perchlorate	ND	µg/L
2/20/2019 8:25:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
2/20/2019 8:25:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
2/20/2019 8:25:00 AM	TJ001	1,4-Dioxane	ND	µg/L
2/20/2019 8:25:00 AM	TJ001	Perchlorate	ND	µg/L
2/20/2019 8:59:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
2/20/2019 8:59:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L
2/20/2019 8:59:00 AM	TJ002	1,4-Dioxane	ND	µg/L
2/20/2019 8:59:00 AM	TJ002	Perchlorate	ND	µg/L
2/20/2019 9:45:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
2/20/2019 9:45:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
2/20/2019 9:45:00 AM	TJ003	1,4-Dioxane	ND	µg/L
2/20/2019 9:45:00 AM	TJ003	Perchlorate	ND	µg/L
2/20/2019 10:30:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
2/20/2019 10:30:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
2/20/2019 10:30:00 AM	TJ004	1,4-Dioxane	ND	µg/L
2/20/2019 10:30:00 AM	TJ004	Perchlorate	ND	µg/L
2/20/2019 11:00:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
2/20/2019 11:00:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
2/20/2019 11:00:00 AM	TJ005	1,4-Dioxane	ND	µg/L
2/20/2019 11:00:00 AM	TJ005	Perchlorate	ND	µg/L
2/20/2019 11:36:00 AM	TJ008	Tetrachloroethylene (PCE)	21.3	µg/L
2/20/2019 11:36:00 AM	TJ008	Trichloroethene (TCE)	26.5	µg/L

2/20/2019 11:36:00 AM	TJ008	1,4-Dioxane	1.07	µg/L
2/20/2019 11:36:00 AM	TJ008	Perchlorate	ND	µg/L
2/21/2019 9:10:00 AM	TJ009	Tetrachloroethylene (PCE)	9.39	µg/L
2/21/2019 9:10:00 AM	TJ009	Trichloroethene (TCE)	19.7	µg/L
2/21/2019 9:10:00 AM	TJ009	1,4-Dioxane	0.645	µg/L
2/21/2019 9:10:00 AM	TJ009	Perchlorate	ND	µg/L
2/21/2019 9:52:00 AM	TJ010	Tetrachloroethylene (PCE)	6.13	µg/L
2/21/2019 9:52:00 AM	TJ010	Trichloroethene (TCE)	15.4	µg/L
2/21/2019 9:52:00 AM	TJ010	1,4-Dioxane	0.661	µg/L
2/21/2019 9:52:00 AM	TJ010	Perchlorate	2.42	µg/L
2/21/2019 10:30:00 AM	TJ012	Tetrachloroethylene (PCE)	1.14	µg/L
2/21/2019 10:30:00 AM	TJ012	Trichloroethene (TCE)	8.18	µg/L
2/21/2019 10:30:00 AM	TJ012	1,4-Dioxane	0.644	µg/L
2/21/2019 10:30:00 AM	TJ012	Perchlorate	2.59	µg/L
3/6/2019 9:10:00 AM	TJ005	Tetrachloroethylene (PCE)	ND	µg/L
3/6/2019 9:10:00 AM	TJ005	Trichloroethene (TCE)	ND	µg/L
3/6/2019 9:10:00 AM	TJ005	1,4-Dioxane	ND	µg/L
3/6/2019 9:10:00 AM	TJ005	Perchlorate	ND	µg/L
3/6/2019 9:35:00 AM	TJ006	Tetrachloroethylene (PCE)	9.27	µg/L
3/6/2019 9:35:00 AM	TJ006	Trichloroethene (TCE)	5.42	µg/L
3/6/2019 9:35:00 AM	TJ006	1,4-Dioxane	ND	µg/L
3/6/2019 9:35:00 AM	TJ006	Perchlorate	ND	µg/L
3/6/2019 10:40:00 AM	TJ007	Tetrachloroethylene (PCE)	36.5	µg/L
3/6/2019 10:40:00 AM	TJ007	Trichloroethene (TCE)	22.7	µg/L
3/6/2019 10:40:00 AM	TJ007	1,4-Dioxane	1.54	µg/L
3/6/2019 10:40:00 AM	TJ007	Perchlorate	2.06	µg/L
3/6/2019 10:15:00 AM	TJ008	Tetrachloroethylene (PCE)	22.7	µg/L
3/6/2019 10:15:00 AM	TJ008	Trichloroethene (TCE)	27.0	µg/L
3/6/2019 10:15:00 AM	TJ008	1,4-Dioxane	1.19	µg/L
3/6/2019 10:15:00 AM	TJ008	Perchlorate	ND	µg/L
3/19/2019 9:10:00 AM	TJ001	Tetrachloroethylene (PCE)	ND	µg/L
3/19/2019 9:10:00 AM	TJ001	Trichloroethene (TCE)	ND	µg/L
3/19/2019 9:10:00 AM	TJ001	1,4-Dioxane	ND	µg/L
3/19/2019 9:10:00 AM	TJ001	Perchlorate	ND	µg/L
3/19/2019 9:30:00 AM	TJ002	Tetrachloroethylene (PCE)	ND	µg/L
3/19/2019 9:30:00 AM	TJ002	Trichloroethene (TCE)	ND	µg/L

3/19/2019 9:30:00 AM	TJ002	1,4-Dioxane	ND	µg/L
3/19/2019 9:30:00 AM	TJ002	Perchlorate	ND	µg/L
3/19/2019 10:20:00 AM	TJ003	Tetrachloroethylene (PCE)	ND	µg/L
3/19/2019 10:20:00 AM	TJ003	Trichloroethene (TCE)	ND	µg/L
3/19/2019 10:20:00 AM	TJ003	1,4-Dioxane	ND	µg/L
3/19/2019 10:20:00 AM	TJ003	Perchlorate	ND	µg/L
3/19/2019 11:15:00 AM	TJ004	Tetrachloroethylene (PCE)	ND	µg/L
3/19/2019 11:15:00 AM	TJ004	Trichloroethene (TCE)	ND	µg/L
3/19/2019 11:15:00 AM	TJ004	1,4-Dioxane	ND	µg/L
3/19/2019 11:15:00 AM	TJ004	Perchlorate	ND	µg/L
3/20/2019 9:30:00 AM	TJ009	Tetrachloroethylene (PCE)	9.29	µg/L
3/20/2019 9:30:00 AM	TJ009	Trichloroethene (TCE)	19.2	µg/L
3/20/2019 9:30:00 AM	TJ009	1,4-Dioxane	0.631	µg/L
3/20/2019 9:30:00 AM	TJ009	Perchlorate	ND	µg/L
3/20/2019 9:50:00 AM	TJ010	Tetrachloroethylene (PCE)	6.83	µg/L
3/20/2019 9:50:00 AM	TJ010	Trichloroethene (TCE)	15.8	µg/L
3/20/2019 9:50:00 AM	TJ010	1,4-Dioxane	0.759	µg/L
3/20/2019 9:50:00 AM	TJ010	Perchlorate	2.43	µg/L
3/20/2019 10:15:00 AM	TJ011	Tetrachloroethylene (PCE)	3.22	µg/L
3/20/2019 10:15:00 AM	TJ011	Trichloroethene (TCE)	13.5	µg/L
3/20/2019 10:15:00 AM	TJ011	1,4-Dioxane	1.09	µg/L
3/20/2019 10:15:00 AM	TJ011	Perchlorate	3.39	µg/L
3/20/2019 10:45:00 AM	TJ012	Tetrachloroethylene (PCE)	1.08	µg/L
3/20/2019 10:45:00 AM	TJ012	Trichloroethene (TCE)	8.22	µg/L
3/20/2019 10:45:00 AM	TJ012	1,4-Dioxane	0.745	µg/L
3/20/2019 10:45:00 AM	TJ012	Perchlorate	2.47	µg/L

VERDUGO

COLLECTION DATE	WELL NO. (LOCATION CODE)	ANALYTE	RESULT	UNIT
6/21/2018 11:20:00 AM	VE011	Tetrachloroethylene (PCE)	ND	ug/L
6/21/2018 11:20:00 AM	VE011	Trichloroethene (TCE)	0.646	ug/L
6/21/2018 11:20:00 AM	VE011	1,4-Dioxane	ND	ug/L
6/21/2018 11:20:00 AM	VE011	Perchlorate	ND	ug/L
6/21/2018 11:20:00 AM	VE011	Hexavalent Chromium (Cr+6), IC	1.29	ug/L
6/21/2018 9:00:00 AM	VE024	Tetrachloroethylene (PCE)	ND	ug/L
6/21/2018 9:00:00 AM	VE024	Trichloroethene (TCE)	0.752	ug/L
6/21/2018 9:00:00 AM	VE024	1,4-Dioxane	ND	ug/L
6/21/2018 9:00:00 AM	VE024	Perchlorate	ND	ug/L
6/21/2018 9:00:00 AM	VE024	Hexavalent Chromium (Cr+6), IC	0.428	ug/L
7/16/2018 10:30:00 AM	VE011	Tetrachloroethylene (PCE)	ND	ug/L
7/16/2018 10:30:00 AM	VE011	Trichloroethene (TCE)	0.687	ug/L
7/16/2018 11:35:00 AM	VE024	Tetrachloroethylene (PCE)	ND	ug/L
7/16/2018 11:35:00 AM	VE024	Trichloroethene (TCE)	0.764	ug/L
10/15/2018 11:32:00 AM	VE011	Tetrachloroethylene (PCE)	ND	ug/L
10/15/2018 11:32:00 AM	VE011	Trichloroethene (TCE)	0.730	ug/L
10/15/2018 11:15:00 AM	VE024	Tetrachloroethylene (PCE)	ND	ug/L
10/15/2018 11:15:00 AM	VE024	Trichloroethene (TCE)	0.883	ug/L
12/10/2018 10:55:00 AM	VE024	Tetrachloroethylene (PCE)	ND	ug/L
12/10/2018 10:55:00 AM	VE024	Trichloroethene (TCE)	0.831	ug/L
12/10/2018 11:20:00 AM	VE011	Tetrachloroethylene (PCE)	ND	ug/L
12/10/2018 11:20:00 AM	VE011	Trichloroethene (TCE)	0.627	ug/L
1/14/2019 12:50:00 PM	VE011	Tetrachloroethylene (PCE)	ND	ug/L
1/14/2019 12:50:00 PM	VE011	Trichloroethene (TCE)	0.722	ug/L
1/14/2019 11:40:00 AM	VE024	Tetrachloroethylene (PCE)	ND	ug/L
1/14/2019 11:40:00 AM	VE024	Trichloroethene (TCE)	0.883	ug/L

APPENDIX B

CITY OF BURBANK

PUMPING AND SPREADING PLAN

2018-19 through 2022-23 Water Years

GROUNDWATER PUMPING
AND
SPREADING PLAN

FIVE WATER YEARS

OCTOBER 1, 2018 TO SEPTEMBER 30, 2023

BURBANK

Water and Power

Since 1913

WATER DIVISION
164 W. MAGNOLIA BOULEVARD
DECEMBER 2019

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SECTION 1: INTRODUCTION

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

In 1993, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Section 2.9, Groundwater Quality Management. This addition was made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup of the groundwater and limit the spread of contamination in the San Fernando Basin. The 1998 revision of the Policies and Procedures now includes Section 5.0, Watermaster Management of Groundwater Quality. This report is in response to Section 5.4, Groundwater Pumping and Spreading Plan for the Upper Los Angeles River Area.

The annual Groundwater Pumping and Spreading Plan is based on the water year, October 1 to September 30, and normally includes projections for five years beginning with the current water year. Whereas in the past, the Pumping and Spreading Plan has been published in July, this Plan for Burbank will be submitted to the Watermaster in December 2019, and therefore will include actual data (rather than projected) for all of WY 2018-19. The Watermaster will evaluate the impact of pumping and spreading by all the parties, and the ULARA Pumping and Spreading Plan will be published by the Watermaster.

Burbank's Plan was prepared by the Water Engineering and Planning Section of City of Burbank Water and Power. Questions may be addressed to Kody Whisman, Civil Engineering Assistant, at (818) 238-3500 or by e-mail to kwhisman@burbankca.gov.

SECTION 2: WATER DEMAND

The annual total water demand for the last ten years and projected annual water demand for the next five years are usually shown in Table 2. Being that this Plan is being submitted later than usual, Table 2 herein shows actual total water demand for WY 2018-19 and projected demand for the next four years.

Since 2007, with increasing public awareness of water supply issues, and with new State legislation, and especially since the recent drought, Burbank has achieved significant reductions in its water demands. For this plan, per-capita water use is predicted to remain lower than in 2013 because watering restrictions have been made permanent. Treated groundwater and recycled water will be used as much as possible in order to reduce the demand on treated imported water from the Metropolitan Water District of Southern California (MWD). (Ultimately, all of Burbank's water supply depends on MWD.) The projected water demand may vary significantly due to weather and/or economic conditions in the Burbank area; a variance of ±5% may be expected. A major expansion of the recycled system was completed in 2013, and demand on the potable water system has been offset by recycled water.

SECTION 3: WATER SUPPLY

The water supply for the City of Burbank is composed of purchased water from MWD, locally produced and treated groundwater, and recycled water from the Burbank Water Reclamation Plant. A discussion about each of the sources of supply is included below, and historic and projected use of each water source is shown in Table 3.

3.1 MWD

Burbank continues to directly rely on MWD for thirty to forty percent of its treated, potable water supply, purchasing water from MWD for direct delivery into its distribution system. Burbank also purchases untreated water from MWD for groundwater basin replenishment. Indirectly, it depends on MWD for all of its water. The City must purchase and spread water within the basin or purchase Physical Solution credits from the Los Angeles Department of Water and Power (LADWP) to operate its local groundwater wells. The economics determine which of these two options or what percentage of each Burbank will exercise in a given water year.

3.2 GAC Treatment Plant

The GAC Treatment Plant treats the groundwater produced from Well No. 7 (Figure 3.1). The well and treatment plant can deliver 1,100 gallons per minute (gpm). In recent years, the well and treatment plant have been operated to replace recycled water in the cooling towers for the power plant because the recycled water supply has been temporarily reduced due to a major sewer force main being shut down. The amount of water produced and delivered to the Magnolia Power Project cooling towers for industrial cooling in WY 2017/18 and WY 2018/19 was 101.6 acre-feet (AF) and 113.7 AF respectively. Current operation plans are to keep the plant shut down, except for emergencies, water quality testing, or onsite non-potable use.

3.3 EPA Consent Decree Project

The EPA Consent Decree Project (also known as Burbank Operable Unit or BOU) became operational January 3, 1996. Wells VO-1 through VO-8 (Figure 3.1) are the source of groundwater for treatment, and the treatment plant has a capacity of 9,000 gpm. The Second Consent Decree was entered on June 22, 1998. An agreement has been negotiated with LADWP to treat and deliver groundwater from Burbank to LADWP during periods of low demand on the Burbank system, when the BOU would otherwise operate below capacity. Deliveries to LADWP per this agreement began with an initial test run in August 2019 with the delivery totaling 0.7 AF of treated groundwater. BWP will pass a minimum of 500 AF of treated groundwater (plus any associated blend water) to LADWP each water year as long as this agreement is in effect. The increased groundwater extractions and MWD purchased water for blending associated with the deliveries to LADWP are not included in this Plan because they are reported as LADWP demands.

3.4 Recycled Water

The recycled water system is continually expanding and recycled water deliveries have doubled since 2010. Burbank delivers up to 3,300 acre-feet per year (AFY) of recycled water to its customers, offsetting potable and groundwater deliveries. Valhalla Memorial Park (Valhalla) converted its irrigation system to use recycled water, eliminating the need to pump approximately 375 AFY of groundwater for irrigation. Additionally, an agreement with LADWP allows Burbank to deliver recycled water to LADWP's North Hollywood recycled water system in exchange 1:1 for groundwater pumping credits, which is projected to reach approximately 250 AFY.

3.5 Production Wells

Burbank has eight wells that are part of the BOU collector system, plus another three wells which are mechanically and electrically operable, and two others which have had equipment removed. The eight BOU wells are on "Active" status, while all the others are on "Inactive" status with the California State Water Resources Control Board, Division of Drinking Water (DDW). (See Table 1.) Except for water quality testing at Well 7, Burbank does not plan to operate the inactive wells unless an emergency develops. Well 7 may be operated for non-potable power plant use in the instance that there is an interruption or shortfall in the recycled water supply from the wastewater reclamation plant. Well No. 7 produces 1,100 gpm to the GAC treatment plant during operation.

TABLE 1

BWP'S WELL STATUS

Active Wells	Inactive Wells	Inactive-Pulled
VO-1	No. 6A	No. 11A
VO-2	No. 7	No. 12
VO-3	No. 13A	
VO-4		
VO-5		
VO-6		
VO-7		
VO-8		

SECTION 4: GROUNDWATER CREDITS

The Judgment includes a number of procedures related to groundwater pumping that Burbank and the other defendants must follow. In order to pump groundwater, rights to groundwater must be established, and in the San Fernando Basin those rights are accounted for as groundwater credits. Rights and procedures related to establishing, counting and maintaining groundwater credits are discussed in the following paragraphs. Historic and projected future groundwater credits are shown in Table 4.

4.1 Import Return Water

Under the Judgment, Burbank is entitled to extract 20 percent of the volume of water it delivered (potable and recycled) in the prior water year. This is known as import return water. The import return water credited for WY 2018/19 (based on water delivered in WY 2017/18) was 3,919 AF. The calculated import return water to be credited for WY 2019/20 is 3,664 AF.

4.2 Physical Solution

Burbank has a Physical Solution right to 4,200 AFY in addition to its import return water extraction rights. This is a right to purchase up to 4,200 AFY of groundwater credits from the City of Los Angeles. The price paid to the City of Los Angeles for this groundwater is set by a formula described in the Judgment.

Depending on the price of MWD untreated imported water and Physical Solution water from the City of Los Angeles, a decision will be made each year regarding which to purchase. MWD untreated water continues to remain less expensive than Physical Solution water. Therefore, Burbank did not purchase Physical Solution water from the City of Los Angeles in WY 2018/19, nor will Burbank purchase Physical Solution water from Los Angeles in WY 2019/20. The current plan reflects the spreading of imported water instead of the purchase of Physical Solution credits.

In the Judgment, Valhalla and Lockheed Martin have the right under the Physical Solution to pump up to 300 AFY and 25 AFY, respectively. In these instances, Burbank will charge the Physical Solution right holders for groundwater they extracted and claim the extractions against Burbank's rights. Valhalla, however, has shut down its well and is now using recycled water.

4.3 Stored Water Credit

Burbank had a stored water credit of 21,194 AF as of October 1, 2018. After all pumping, spreading, and exchanges through WY 2018/19, Burbank’s current stored water credit as of October 1, 2019 is 28,682 AF. Burbank’s objective is to maintain a reserve of 10,000 AF of stored water credits. (See Appendix B.) Since Burbank has no right to native water supplies, some combination of Physical Solution and/or spreading of imported water is necessary to avoid depleting the stored water credits.

4.4 Spreading Operations and Transfers of Credits

In 2010 Burbank completed a new service connection to MWD at the end of the Foothill Feeder. (See Figure 4.1.) Connection B-06 is capable of delivering 50 cubic feet per second (cfs) of untreated imported water to the Pacoima Wash, where the water is conveyed down to the Pacoima Spreading Grounds operated by the L.A. County Public Works Department. Additionally, this service connection allows Burbank to direct water to the Lopez Spreading Grounds via the Lopez Ditch. These facilities allow Burbank to spread the roughly 7,000 AFY (average annual extraction deficit after accounting for import return credits) of untreated water that is needed to avoid depleting its stored groundwater credits. By agreement with MWD, Burbank will spread a minimum of 150 AF twice a year to maintain water quality at the end of the Foothill Feeder. In wetter years, Burbank may accept untreated MWD deliveries for spreading ahead of payment under The Cyclic Storage Agreement signed in 2017. This gives Burbank the ability to rely on stored credits as opposed to purchasing new groundwater replenishment water during dry years.

In WY 2017/18, Burbank spread a total of 8,049.7 AF via B-06. In WY 2018/19, Burbank spread a much more significant total of 13,366.4 AF, approximately 7,000 AF of which was Cyclic Storage deliveries. Due to an upcoming improvement project at the Pacoima Spreading Grounds beginning May 2020, Burbank's spreading activity will be greatly reduced through WY 2021/22. During this period, Burbank is expected to only spread minimal amounts of water directed to the Lopez Spreading Grounds, while relying on stored groundwater credits for its demand.

SECTION 5: CAPITAL IMPROVEMENTS

5.1 Wells

Burbank plans to continue the use of Well No. 7 for the GAC Treatment Plant when it is operated. This well and the Lake GAC serve as a backup water supply for the Magnolia Power Plant. Well No. 15 was removed from service and properly destroyed in WY 2017/18. Wells V-01 through V-08 will continue to be operated to supply water to the BOU. No capital improvements are planned for any wells.

5.2 Groundwater Treatment Facilities

EPA Project: The EPA Consent Decree Project became fully operational on January 3, 1996. Burbank assumed responsibility for operation and maintenance of the BOU on March 12, 2001.

The City of Burbank currently contracts with TerranearPMC for the day-to-day operation and maintenance of the BOU.

GAC Treatment Plant: The plant will remain on an active status, but will not be operated except for well water quality tests and for emergencies. It was last operated for non-potable use on 11/18/2019. No capital improvement projects are planned for the GAC Treatment Plant.

TABLE 2

ACTUAL AND PROJECTED WATER DEMAND

Water Year	Acre-Feet
2008/09	22,532
2009/10	20,852
2010/11	19,735
2011/12	20,938
2012/13	20,937
2013/14	21,874
2014/15	18,234
2015/16	17,494
2016/17	18,300
2017/18	19,611
2018/19	18,337
2019/20*	19,280
2020/21*	19,545
2021/22*	19,660
2022/23*	19,690

* Projected

NOTES:

1) Water demand equals the total of MWD, extractions (GAC, Valley/BOU not including delivered to LA, other pumpers under 1979 Judgment), and recycled.
2) The trailing five-year average water demand was 19,103 AFY for WY 2013/14 through 2017/18.

TABLE 3

GROUNDWATER EXTRACTIONS, MWD TREATED WATER, AND RECYCLED WATER

Water Year	MWD	GAC	BOU	Recycled	Valhalla	Total
2008/09	10,202	148	9,818	2,011	346	22,525
2009/10	8,401	5	10,043	2,080	317	20,846
2010/11	7,376	4	10,394	1,568	387	19,729
2011/12	8,602	4	9,993	2,000	338	20,937
2012/13	7,507	0	11,387	1,608	435	20,937
2013/14	8,901	1	10,148	2,407	417	21,874
2014/15	5,619	2	10,006	2,307	300	18,234
2015/16	5,092	65	9,377	2,903	57	17,494
2016/17	5,718	0	9,501	3,081	0	18,300
2017/18	6,205	102	10,307	2,997	0	19,611
2018/19	5,800	114	9,686	2,738	0	18,338 (8)
2019/20*	5,540	0	10,540	3,200	0	19,280
2020/21*	5,040	0	11,255	3,250	0	19,545
2021/22*	5,130	0	11,280	3,250	0	19,660
2022/23*	5,150	0	11,290	3,250	0	19,690

*Projected

Notes:

1. Use of BOU will be maximized, with MWD used for required blending and to meet total demand.
2. MWD amounts are treated water. (Untreated MWD purchases are in Table 4.)
3. GAC was used only for non-potable use in the Magnolia Power Plant.
4. BOU includes small amounts of non-municipal use which is not included in the import return calculation.
5. Groundwater extractions need to be balanced over time by groundwater credits (Table 4).
6. Valhalla converted to recycled water in January 2016.
7. Groundwater extractions by small cleanup pumpers are not included in this table. They were about 6 to 8 AFY from 2004/05 through 2010/11, but have dropped to zero since then.
8. Actual Total Demand for WY 2018/19 was 18,337.3 AF. Due to rounding the total in this table sums to 18,338.

TABLE 4

GROUNDWATER CREDITS

Water Year	Physical Solution	Import Return	Spreading Operations	Other (4)	Total
2008/09	4,200	4,432	0	2,000 (1)	10,632
2009/10	0	4,103	34	0	4,137
2010/11	0	3,864	11,187	0	15,051
2011/12	0	4,117	1,371	0	5,488
2012/13	0	4,096	6,703	0	10,799
2013/14	0	4,288	7,000	0	11,288
2014/15	0	3,583	150	7,200 (2)	10,933
2015/16	0	3,484	306	7,200 (3)	10,990
2016/17	0	3,657	11,791	0	15,448
2017/18	0	3,919	8,050	28	11,997
2018/19	0	3,664	13,366	3 (6)	17,033
2019/20*	0	3,850	4,150 (5)	125	8,125
2020/21*	0	3,900	300 (5)	190	4,390
2021/22*	0	3,925	6,950	280	11,155
2022/23*	0	3,950	6,950	280	11,180

*Projected

Notes:

1. A 2,000 AF exchange of untreated MWD water for groundwater credits was arranged with LADWP for WY 2008/09.
2. A 7,200 AF exchange of untreated MWD water for groundwater credits was arranged with LADWP in December 2014 for WY 2014/15.
3. A 7,200 AF exchange of untreated MWD water for groundwater credits was arranged with LADWP in October 2015 for WY 2015/16.
4. Beginning WY 2017/18, Burbank has delivered recycled water to LADWP in exchange for an equal amount of groundwater credits.
5. Spreading operations in WY 2019/20 and WY 2020/21 are projected to be reduced due to Pacoima Spreading Grounds Improvement Project.
6. A prior year adjustment debit of 44.7 AF was made to correct a previous spreading operation credit which was recorded in error due to a penalty charge from MWD in December 2017. 47.55 AF of recycled water was exchanged with LADWP in WY 2018/19.

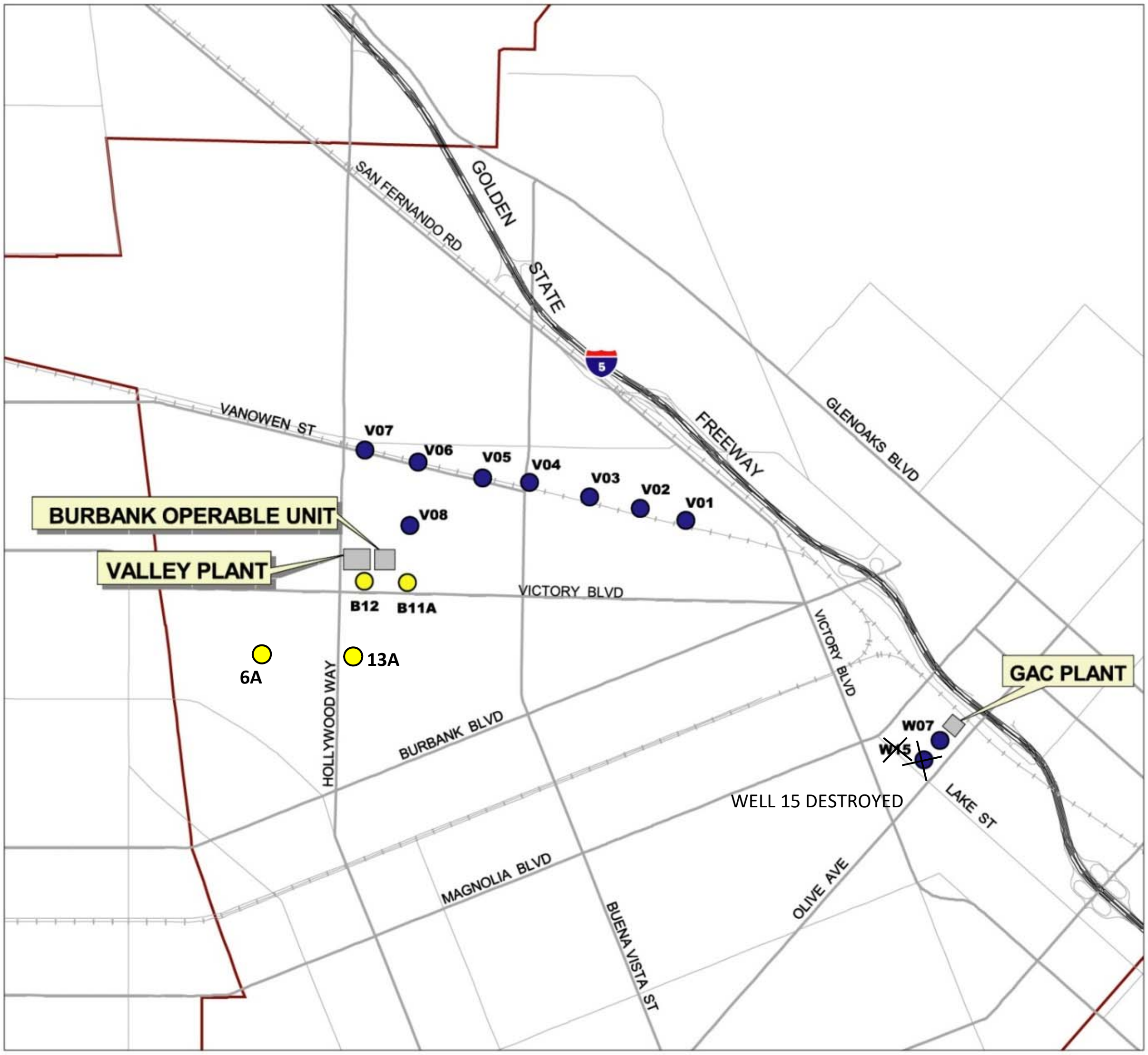


FIGURE 3.1

WELLS AND GROUNDWATER TREATMENT PLANTS

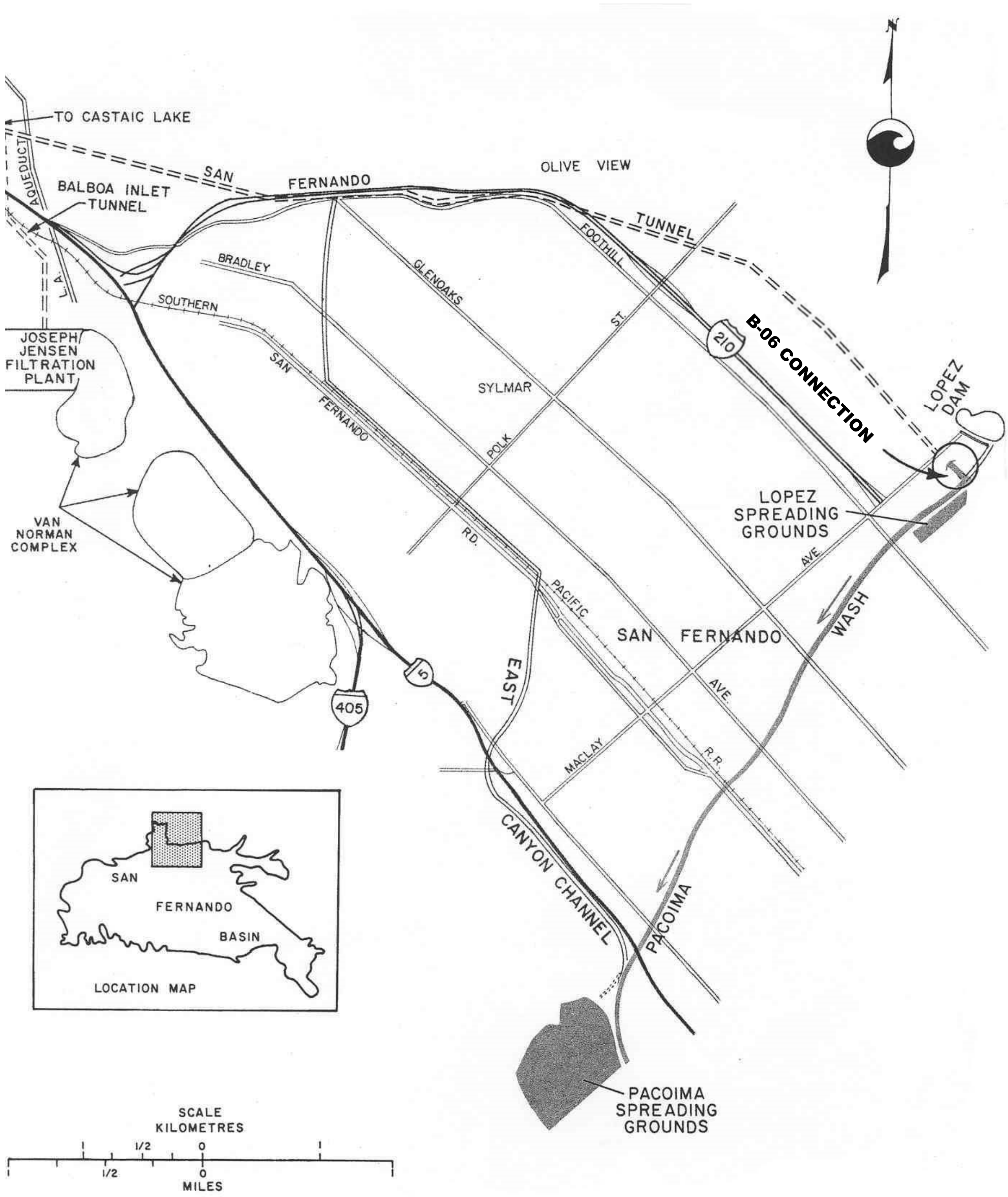


FIGURE 4.1

LOCATION OF MWD UNTREATED WATER CONNECTION

Appendix A

Water Treatment Facilities

LAKE STREET GAC TREATMENT PLANT

320 North Lake Street
Burbank CA 91502

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division
Kevin Mitchell, Manager Production/ Operations

QUANTITY TREATED (10/1/17 through 9/30/18):

101.6 AF

WATER QUALITY:

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

DISPOSITION:

Magnolia Power Project
Non-potable Water

EPA CONSENT DECREE PROJECT – BURBANK OPERABLE UNIT

2030 North Hollywood Way
Burbank CA 91505

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division
Kevin Mitchell, Manager Production/ Operations

QUANTITY TREATED (10/1/17 through 9/30/18):

10,306.7 AF

WATER QUALITY:

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

DISPOSITION:

1) Test Water- Waste
2) Operation Water (backwash, etc.) - Waste
3) Burbank Water System-(Potable water after blending)

Appendix B

Stored Groundwater

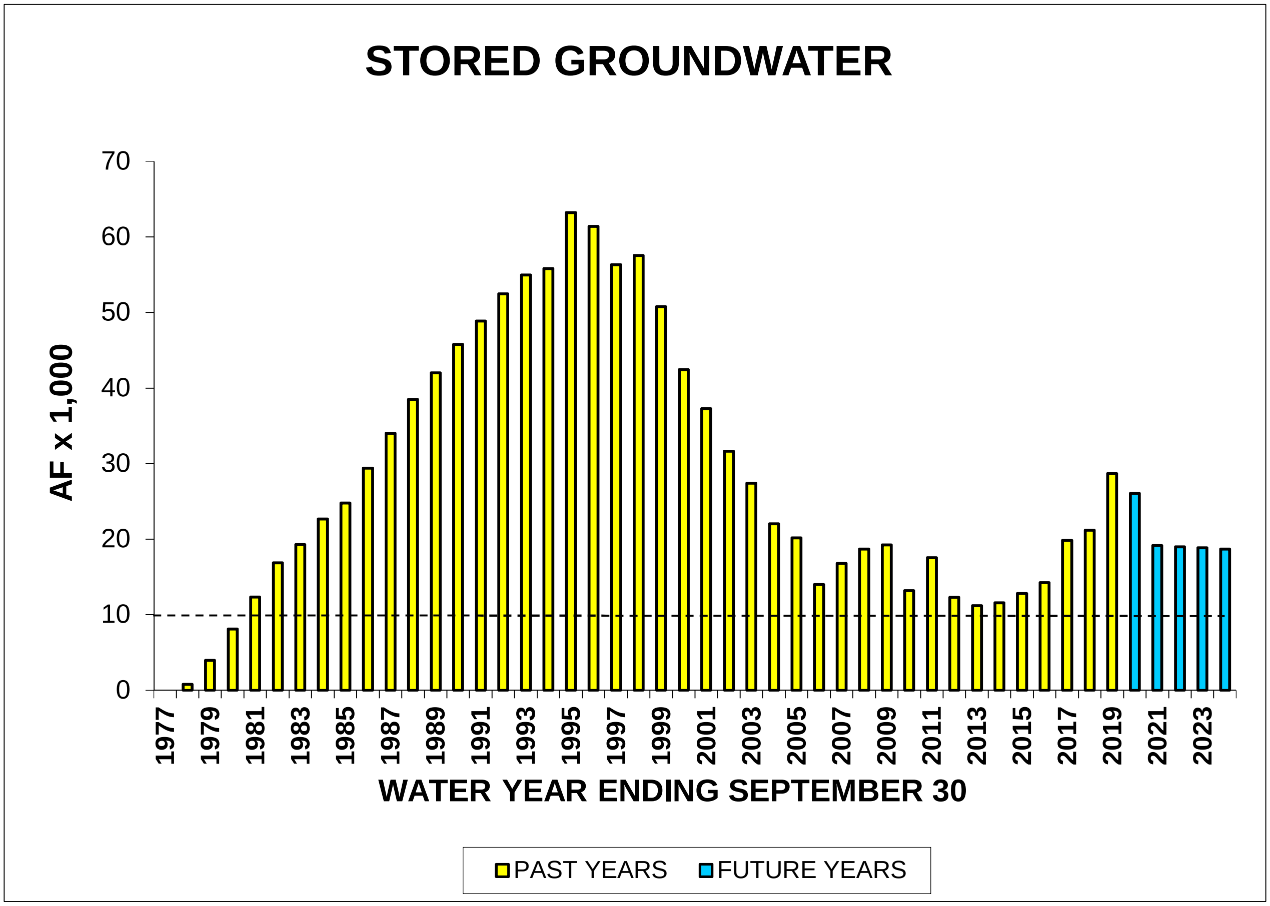
CITY OF BURBANK WATER AND POWER
WATER DIVISION

BURBANK'S STORED GROUNDWATER

Column #	1	2	3	4	5	6
WATER YEAR	DELIVERED WATER AF	RETURN FLOW CREDIT AF	SPREAD WATER AF	OTHER CREDITS AF	PUMPED GROUNDWATER AF	STORED WATER CREDIT AF
1976/77	22,743	4,549				
1977/78	22,513	4,503			3,767	(1) 782
1978/79	24,234	4,847			1,358	(2) 3,947
1979/80	24,184	4,837			677	8,117
1980/81	25,202	5,040			595	12,359
1981/82	22,120	4,424			523	16,876
1982/83	22,118	4,424			2,002	19,298
1983/84	24,927	4,985			1,063	22,659
1984/85	23,641	4,728			2,863	24,781
1985/86	23,180	4,636			123	29,386
1986/87	23,649	4,730			0	34,022
1987/88	23,712	4,742			253	38,498
1988/89	23,863	4,773			1,213	42,027
1989/90	23,053	4,611	378		1,401	45,777
1990/91	20,270	4,054	504		2,032	48,860
1991/92	20,930	4,186	503		938	52,479
1992/93	21,839	4,368	500		(3) 2,184	54,981
1993/94	24,566	4,913	0		(3) 3,539	55,810
1994/95	22,541	4,508	0	5,380	2,888	63,215
1995/96	23,124	4,625	0	2,000	8,308	61,415
1996/97	24,888	4,977	0	1,500	11,243	56,297
1997/98	22,447	4,489	0	0	3,731	57,543
1998/99	22,671	4,534	0	2,000	13,262	50,770
1999/2000	26,312	5,262	0	0	12,862	42,442
2000/01	25,619	5,124	0	0	10,440	37,264
2001/02	24,937	4,987	0	0	10,764	31,624
2002/03	23,108	4,622	0	300	9,483	27,428
2003/04	24,235	4,847	0	44	10,057	22,037
2004/05	21,749	4,350	0	0	6,694	20,190
2005/06	24,084	4,817	0	0	10,543	13,999
2006/07	25,288	5,058	0	8,200	10,220	16,796
2007/08	24,277	4,855	0	4,200	7,161	18,704
2008/09	22,160	4,432	0	6,200	10,319	19,246
2009/10	20,513	4,103	34	0	10,371	13,208
2010/11	19,322	3,864	11,187	0	10,791	17,530
2011/12	20,584	4,117	1,371	0	10,336	12,305
2012/13	20,480	4,096	6,703	0	11,822	11,190
2013/14	21,442	4,288	7,000	0	10,567	11,602
2014/15	17,917	3,583	150	7,200	10,308	12,803
2015/16	17,422	3,484	306	7,200	9,499	14,249
2016/17	18,283	3,657	11,791	0	9,501	19,824
2017/18	19,594	3,919	8,094	28	10,408	21,194
2018/19	18,321	3,664	13,366	3	9,800	28,682
2019/20	19,260	3,852	4,150	125	10,550	26,071
2020/21	19,525	3,905	300	190	11,270	19,143
2021/22	19,640	3,928	6,950	280	11,290	18,988
2022/23	19,670	3,934	6,950	280	11,300	18,846
2023/24	19,670	3,934	6,950	280	11,300	18,710

(1) STORED WATER AS OF OCTOBER 1, 1978 (2) STORED WATER AS OF OCTOBER 1, 1979
(3) EXCLUDES 150 AF OF PUMPING FOR TESTING.
SPREAD WATER INCLUDES CYCLIC STORAGE PROGRAM.
OTHER CREDITS INCLUDE PHYSICAL SOLUTION PURCHASES, IN-LIEU STORAGE,
OTHER TRANSFERS OF GROUNDWATER CREDITS, AND PRIOR YEAR ADJUSTMENTS.
COLUMNS 1 THROUGH 6 - FROM ULARA WATERMASTER REPORTS.
COLUMN 2 = 20% OF COL. 1.
PUMPED GROUNDWATER INCLUDES CITY, VALHALLA, LOCKHEED, DISNEY, MENASCO, HOME DEPOT.
FOR WY 2007-08 THROUGH 2016-17, 1% WAS DEDUCTED FROM THE STORED WATER AT THE END OF EACH YEAR.
SHADED AREAS OF TABLE ARE PROJECTED VALUES.

BURBANK WATER AND POWER
WATER DIVISION
WY 2018/19



NOTES:

- 10,000 AF RECOMMENDED AS BASIN BALANCE. THIS EQUATES TO ABOUT ONE YEAR OF DOMESTIC SYSTEM PRODUCTION IF REPLENISHMENT NOT AVAILABLE FROM MWD.
- STORED WATER IS REDUCED WHEN PRODUCTION EXCEEDS THE RETURN FLOW CREDIT (~4,200 AF) PLUS SPREAD WATER OR PHYSICAL SOLUTION CREDITS.
- SPREADING WATER OR GROUNDWATER CREDIT PURCHASES TO BE CONTINUED TO MAINTAIN BASIN BALANCE.
- PROJECTED DROP IN STORAGE IN 2020 AND 2021 IS DUE TO UPCOMING CLOSURE OF PACOIMA SPREADING GROUNDS.

APPENDIX C

CITY OF GLENDALE

PUMPING AND SPREADING PLAN

2018-19 through 2022-23 Water Years

CITY OF GLENDALE

GROUNDWATER PUMPING AND SPREADING PLAN

WATER YEARS 2018-19 through 2022-23

Prepared By

GLENDALE *WATER & POWER*

December 2019

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Introduction

This report discusses water supplies to the City of Glendale for Water Year 2018-19 and projections in local water resources available to meet future water demands and to reduce Glendale dependency on imported water. This information is used by the ULARA Watermaster and a wide group of individuals and organizations including Glendale's City Manager and Council Members, regulatory agencies and others interested in the future conditions of Glendale's water resources.

Executive Summary

Glendale receives its groundwater supply from San Fernando Groundwater Basin and Verdugo Groundwater Basin. Table 1 illustrates the actual (in bold) and projected pumping activities in the two basins between 2018-19 and 2022-23. Glendale currently does not have any spreading facilities to store additional groundwater.

TABLE 1

CTUAL & PROJECTED PUMPING ACTIVITIES IN WATER YEAR 2018-19 THROUGH 2022-2

(Acre Feet Per Year)

Source	**2018-19**	2019-20	2020-21	2021-22	2022-23
San Fernando Basin					
Glendale Operable Units	***7,923***	*8,038*	*8,065*	*8,065*	*8,065*
Forest Lawn Memorial Pa	***57***	*400*	*400*	*400*	*400*
Grayson Power Plant	***0***	*10*	*10*	*10*	*10*
San Fernando Basin Total	**7,980**	8,448	8,475	8,475	8,475
Verdugo Basin	**1,022**	1,008	1,065	1,065	1,065

Existing Water Sources and Supplies

The City of Glendale (City) currently has four sources of water available to meet demands: groundwater from the San Fernando Basin and Verdugo Basin, imported water from the Metropolitan Water District of Southern California and recycled water from the Los Angeles/Glendale Water Reclamation Plant (LAGWRP). Each of these sources is described below. The entry points into the City water system for the various supplies are shown in Figure 1.

1. San Fernando Basin

The City's water right to San Fernando Basin supplies is defined by the judgment entitled "The City of Los Angeles vs. the City of San Fernando, et al." (1979) hereinafter referred to as the "Judgment". The Judgment consists of a return flow credit, which is a type of water right based on the assumption that a percentage of water used in the City is returned to the groundwater basin. The City has a right to accumulate its return flow credits annually if its water rights are not used. In the water year of 2018-19, the City projected a storage credit of 25,214 acre feet (AF) within the basin. In addition, the Judgment contains rights for physical solution water. This is a right to produce water in excess of return flow credit and the accumulated credits, subject to a payment obligation to the City of Los Angeles based as defined in the Judgement. This option to produce physical solution water in excess of the return flow credit and the accumulated credits is a significant factor in relation to the water production at the Glendale Water Treatment Plant (GWTP). The GWTP is part of a U.S. Environmental Protection Agency (EPA) Superfund clean-up project in Glendale. The project consists of a 5,250[*] gallon per minute (gpm) facility and nine (9)[†] extraction wells that supply raw groundwater to the plant. Further discussion regarding the GWTP can be found in the Section: *Past Water Use and Trends* on page 7 in this report. The various San Fernando Basin supplies are:

> **<u>Return Flow Credit</u>** – Glendale is entitled to a return flow credit of twenty (20.0) percent of all City-delivered water, including recycled water, in the San Fernando Basin and its tributary hill and mountain areas. A location map is shown in Figure 2 *(Source: 2016-17 Water Year ULARA Watermaster Annual Report)*. This credit ranges from about 4,500 acre feet per year (AFY) to 5,400 AFY depending on actual water use. This is the City's primary water right in the San Fernando Basin.
>
> **<u>Physical Solution Water</u>** – The City has an agreement to extract water over and above the return flow credit and accumulated credits, and it is chargeable against the rights of the City of Los Angeles upon payment of specified charges as defined in the Judgement. The City's physical solution right is 5,500 AFY.
>
> **<u>Pumping for Groundwater Cleanup</u>** – Section 2.5 of the Upper Los Angeles River Area's ("ULARA") Policies and Procedures, dated July, 1993, provides for the extraction of basin water for SUPERFUND activities, subject to payment of specified charges similar to physical solution water. This right became a significant factor with the completion of the GWTP in 2000.

** State Water Resources Control Board – Division of Drinking Water (DDW) approved to increase the overall treatment plant capacity from the original 5,000 gpm to 5,250 gpm in October 2008.*

† The ninth extraction well (GS-5) began operation in November 2016.

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

The San Fernando Basin is expected to provide about 7,300 AFY to the City, which will meet about twenty-six percent (26%) of projected near-term water demands. The Forest Lawn Memorial Park also has a physical solution right of 400 acre-feet per year from the Basin. Historically, the Glendale Grayson Power Plant used about 10-20 AFY on the cooling tower and steam and gas combustion turbines. The total groundwater extraction from the San Fernando Basin by the City of Glendale and its physical solution pumping parties is approximately 7,720 AFY. As of October 1, 2019, the City projected an accumulated pumping credit of 21,584 AF in the San Fernando Basin.

2. Verdugo Basin

Historically, groundwater supplies from the Verdugo Basin contributed a small portion to the City's water supplies via five wells and an underground water infiltration system. The Judgment granted Glendale the right to extract 3,856 AFY from the Verdugo Basin. Crescenta Valley Water District (CVWD) also has water rights of 3,294 AFY and is the only other entity allowed to extract water from the Verdugo Basin.

Use of the Verdugo Basin supplies has been limited in the past due to water quality problems, groundwater levels, and limited extraction capacity. In order to increase the use of these supplies, the City completed construction of the Verdugo Park Water Treatment Plant (VPWTP) in 1995. VPWTP treats water pumped from two low capacity wells, referred to as Verdugo Wells A & B, and from the water supplies in the Verdugo Pickup System, a subsurface horizontal infiltration system. The water is then pumped into the City's distribution system. The plant was originally designed to treat 1,150 gpm, however, at VPWTP startup in July of 1995 the flow was 550 gpm and over the years, the production of VPWTP has slowly declined. Due to the low production, the Verdugo Wells A & B and the VPWTP were temporarily taken offline on September 17, 2013 and currently remains offline pending further study.

In 2011, the City completed the rehabilitation of the Foothill Well and the drilling of the Rockhaven Well in the Montrose area to increase its extraction capacity from the Verdugo Basin. Glendale has five active wells in the Verdugo Basin.

In 2014, the City and CVWD worked together as a joint project to construct and develop the Rockhaven Well and to pipe water from the well to an existing CVWD nitrate removal facility for use in CVWD's water system. The new Rockhaven Well began operation in March 2016. CVWD is leasing the Rockhaven Well and the water rights for water extracted from this well from Glendale.

3. Metropolitan Water District of Southern California (MWD)

The City relies on the water supplies developed and treated by MWD to meet a majority of its current water demand. To meet customer demands in Water Year 2018-2019, the City purchased 13,784 AF of treated water MWD which constituted approximately 62% of the City's total potable water supply. Due to the limitations of the Judgement, the City will continue to rely on water from MWD to meet a majority of its future water supply requirements.

The following information regarding has been obtained from MWD and sources that the City believes to be reliable, but the City takes no responsibility for the accuracy or completeness hereof. Additional information about MWD can be obtained at *www.mwdh2o.com*.

3.1. History and Background

The MWD is a public agency organized in 1928 by a vote of the electorates of eleven (11) southern California cities which included the City of Glendale, under authority of the Metropolitan Water District Act (California Statutes 1927, Chapter 429, as reenacted in 1969 as Chapter 209, as amended, herein referred to as the "Metropolitan Act"). The Metropolitan Act authorizes MWD to levy property taxes within its service area; establish water rates; impose charges for water standby and service availability; incur general obligation bonded indebtedness and issue revenue bonds, notes and short-term revenue certificates; execute contracts; and exercise the power of eminent domain for the purpose of acquiring property. In addition, MWD's Board of Directors is authorized to establish terms and conditions under which additional areas may be annexed to MWD's service area.

MWD's primary purpose is to provide a supplemental supply of water for domestic and municipal uses at wholesale rates to its member public agencies. The City of Glendale is one of the 26 MWD member public agencies. If additional water is available, such water may be sold for other beneficial uses. MWD serves its member agencies as a water wholesaler and has no retail customers.

To supply Southern California with reliable and safe water, MWD owns and operates an extensive range of capital facilities including the Colorado River Aqueduct, 16 hydroelectric power recovery plants, approximately 850 miles of pipeline, nine reservoirs and five water treatment plants. Two of these treatment plants supply treated water to the City – Joseph Jensen Water Treatment Plant and the F.E. Weymouth Water Treatment Plant. The Joseph Jensen Water Treatment Plant receives water from the State Water Project only and the F.E. Weymouth Water Treatment Plant treats a blend of the Colorado River Water and State Project Water. The locations of the California Aqueduct and Colorado River Aqueduct are shown in Figure 4.

3.2. State Water Project (SWP)

One of MWD's two major sources of water is the State Water Project, which is owned by the State and operated by the State Department of Water Resources ("DWR"). The SWP transports water from San Francisco Bay/Sacramento-San Joaquin River Delta ("Bay-Delta") south via the California Aqueduct to MWD. The total length of the California Aqueduct is approximately 444 miles. The State Water Contract, under a 100 percent allocation, provides MWD 1.9 million acre-feet (MAF) of water per year.

The final SWP allocation for calendar year 2018 was 35 percent or approximately 669,000 AF due to the dry conditions in the Northern California in early 2018. *(Source: MWDSC Annual Report 2018)*

3.3. Colorado River Aqueduct (CRA)

MWD has a legal entitlement to receive water from the Colorado River under a permanent service contract with the Secretary of the Interior. Water from the Colorado River or its tributaries is also available to other users in California, as well as users in the states of Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming, resulting in both competition and the need for cooperation among these holders of Colorado River entitlements. The Colorado River Aqueduct, which is owned and operated by MWD, transports water from the Colorado River approximately 242 miles to its terminus at Lake Mathews in Riverside County.

At the beginning of fiscal year 2017-2018, MWD continued to maximize storage of the Colorado River water upstream of the district's service area due to the wet conditions. However, for the first two months of 2018, conditions in Northern California began to turn dry. In mid-June 2018, facing a lower SWP allocation in 2018, MWD increased CRA pumping to a 7-pump flow, which is just below the maximum rate of 8-pump flow. *(Source: MWDSC Annual Report 2018)*

3.4. MWD's Services to Glendale

Glendale receives water from MWD through three service connections as shown on Figure 1. The service connection number and capacity are summarized in Table 2 below. In total, Glendale has a total delivery capacity of seventy-eight (78) cubic feet-per-second (cfs) of water from MWD.

TABLE 2 MWD CONNECTIONS AND CAPACITY	
Service Connection Number	Capacity (cfs)
G-1	48
G-2	10
G-3	20

Over the years, MWD has provided a high level of reliability in meeting Glendale's supplemental water supply needs. It is believed that the reliability of water supplied to the City will continue in the future as a result of the many water resource programs under way and the proposed future programs now being considered based on MWD's Integrated Water Resources Plan (IRP) and the Water Shortage and Drought Management Plan (WSDM). These sources will always be necessary in meeting the water needs of the City. The City closely follows the planning activities at MWD to assure that it has adequate supplies to meet the needs of its member agencies.

4. Recycled Water

The City has been delivering recycled water from the LAGWRP since the late 1970's. This is a 20 million gallon-per-day (MGD) facility co-owned by the Cities of Los Angeles and Glendale. By contract, Glendale is entitled to fifty percent (50%) of any effluent produced at the plant, which is more than sufficient to for all current recycled water use within City of Glendale. Currently, treated wastewater that is not used in either the Glendale or Los Angeles system is discharged to the Los Angeles River and eventually reaches the ocean and Glendale has plans to ultimately beneficially reuse its entire share of water at LAGWRP.

The main recycled water distribution pipelines and existing recycled water facilities are shown in more detail in Figure 5.

As of October 2019, Glendale has a total of eighty seven (87) recycled water services. These include a landfill, the Grayson Power Plant, two golf courses, two cemeteries, seven schools, seven recreation parks, and other irrigation areas. Other users include three (3) high-rise buildings, the Americana at Brand, the Glendale Police Headquarters, the Disney Complex on Flower Street, and the facilities at the Glendale Community College that are dual-plumbed to use recycled water for sanitary flushing purposes. (Figure 6).

5. Summary of Local Supplies

A general summary of the City's rights to local water resources compared to the amount currently being used is shown on Table 3.

TABLE 3 LOCAL WATER PROJECTS AND USE (AFY)			
Potential Source	**Credit/Right**	**Current Use**	**Near Term Future Use**
San Fernando Basin*	4,500 - 5,400	7,764	8,878
Verdugo Basin	3,856	1,180	1,665
Recycled Water	10,000	1,740	5,000

** The Judgement allows Glendale to extract groundwater above the return flow credit from the San Fernando Basin.*

Past Water Use and Trends

Historically, the City used groundwater to meet a varying portion of its water demand. In the 1940s and 1950s essentially all of the City's water needs were obtained from the San Fernando and the Verdugo Basins with limited supplies from MWD. In the 1960's, groundwater production from the San Fernando Basin reached a peak of about 17,000 AFY. The Grandview well water collection system in the San Fernando Basin and the Grandview Pumping Plant originally pumped a peak capacity of about 24,000 gpm (34.6 MGD) from the San Fernando Basin directly into Glendale's potable water system.

In the mid-1970s, Glendale limited production from the San Fernando Basin to about 12,000 AFY as part of a court decree arising from a Water Rights lawsuit by the City of Los Angeles. In 1975, the California Supreme Court issued the Judgment in City of Los Angeles vs. City of San Fernando which further limited Glendale's production right. The current right is about 5,500 AFY based on a Return Flow Credit right from water use in Glendale, with certain additional rights as described above. Other limitations to groundwater use occurred in the late 1970s, when production from the Verdugo pick-up system in the Verdugo Basin was discontinued because of water quality problems.

In late 1979, Assembly Bill 1803 required that all water agencies using groundwater conduct tests for the presence of certain industrial solvents. The tests indicated that volatile organic compounds (VOC's) such as trichlorethylene and perchloroethylene were present in the San Fernando Basin groundwater supplies in concentrations exceeding the State Department of Health Services' maximum contaminant levels. Both chemicals were used extensively in the past as degreasers in manufacturing industries.

As a result of the findings, Glendale had to further limit its use of San Fernando Basin supplies. From 1980 to 1992, Glendale reduced production; and from 1992 to 2000, Glendale totally suspended production from the basin because of the presence of VOC's. During the twenty year period of reduced production, Glendale was allowed to accumulate the groundwater storage credits that could be used in the future.

In late 1990s, the EPA had designated several locations in the San Fernando Basin as Superfund sites and required construction of cleanup treatment facilities. The Glendale cleanup project – Glendale Operable Unit (GOU) was one of the last in a series of EPA-required cleanup facilities for VOC.

The GOU is comprised of a 5,250-gpm VOC treatment plant (the GWTP), nine (9) groundwater extraction wells, a pumping and blending facility, and the associated piping. A general layout of these facilities is shown in Figure 3. In December 2000, the City started operating the GOU. Due to elevated hexavalent chromium Cr(VI) issues, only a small volume was initially pumped and delivered. Full operation began on January 6, 2002.

In 2003, the City began a major research effort on identifying viable and economically feasible treatment technologies for the removal of Cr(VI) from the raw groundwater. The Cr(VI) Removal Research Project was completed in 2015. Based on the findings of the Research Project, the City, in partnership with the Glendale Respondents Group, constructed a full-scale Weak Base Anion Exchange (WBA) Cr(VI) Removal Facility adjacent to the existing GWTP to remove Cr(VI) from the groundwater from GNOU Well GN-3. The GN-3/WBA facility began operation in December 2016.

In the Verdugo Basin, Glendale currently has four active wells referred to as Glorietta Wells 3, 4 & 6 and Foothill Well that produced about 819.5 AF in Water Year 2018-19 and account for about four percent (4%) of Glendale's total potable water supply. The declining water levels have significantly reduced supplies for this source, and accordingly, the City has reduced its projections of supply from this source. Due to the low production from the Verdugo Wells A & B, the two wells and the VPWTP were temporarily shut down since September 17, 2013 pending well performance evaluation and rehabilitation. The location of the VPWTP and existing wells are shown on Figure 1.

The City rehabilitated Glorietta Well 6 and Glorietta Well 3 in 2016 and 2017, respectively.

Due to the drought conditions between 2011 and 2017 and in spite of the multiple well rehabilitations, the City has not been able to pump its full adjudicated right from the Verdugo Basin.

The City is committed to aggressively advocating the use of recycled water for irrigation & toilet flushing, which will help with increased conservation of potable water and reduced the dependency on imported supplies. GWP continues to work with the City of Pasadena to facilitate the delivery of 3,100 AFY of recycled water from the Glendale system to Pasadena via existing infrastructure partially funded by Pasadena when it was originally constructed.

Glendale's Ability To Meet Demands

Reliability of water supplies is a key goal in the operation of Glendale's water distribution system to serve the current and futures water demands. In Water Year 2018-19 Glendale imported approximately 62 percent of its potable water supply from MWD. Consequently, the reliability of MWD water supplies to meet Glendale water needs becomes exceptionally crucial. Glendale continues to maximize local groundwater production and work closely with MWD on imported water delivery to meet the needs of our citizens.

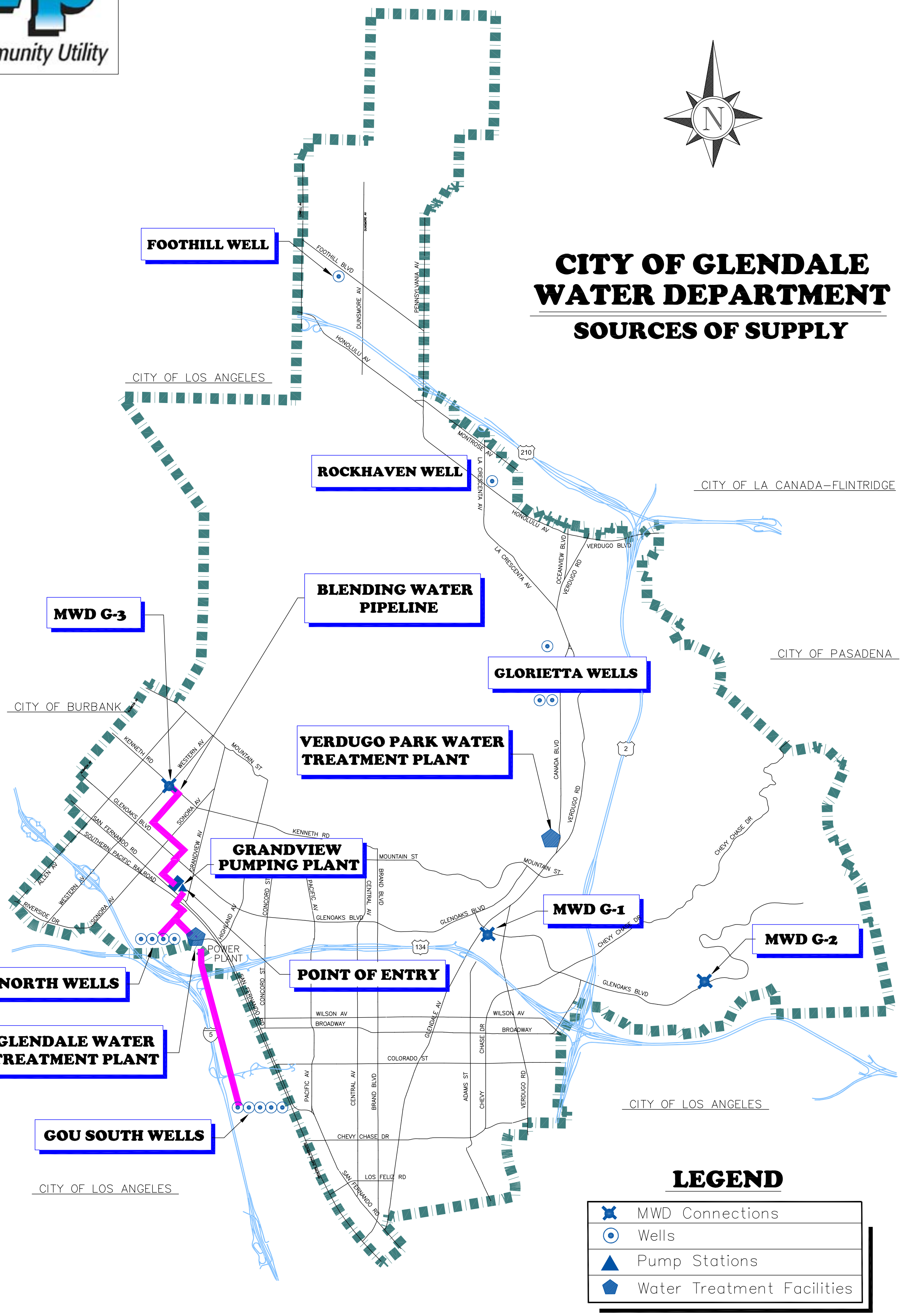
Future Goals

Glendale's goal is to increase its extraction capacity from the Verdugo Basin. GWP is planning on drilling a new extraction well near the existing Glorietta Well 6 and to conduct an evaluation of the Verdugo Basin groundwater supply and the potential rehabilitation of Verdugo Wells A & B in in the near future.

In the next several years, GWP is planning for at least three major capital improvement projects to extend the recycled water supply to (1) Camino San Rafael & Chevy Oaks (120 AFY), (2) the Chevy Chase Golf Course (100 AFY), and (3) the Glendale T Project (50 AFY). The total estimated recycled water usage from these improvements is 329 AFY.

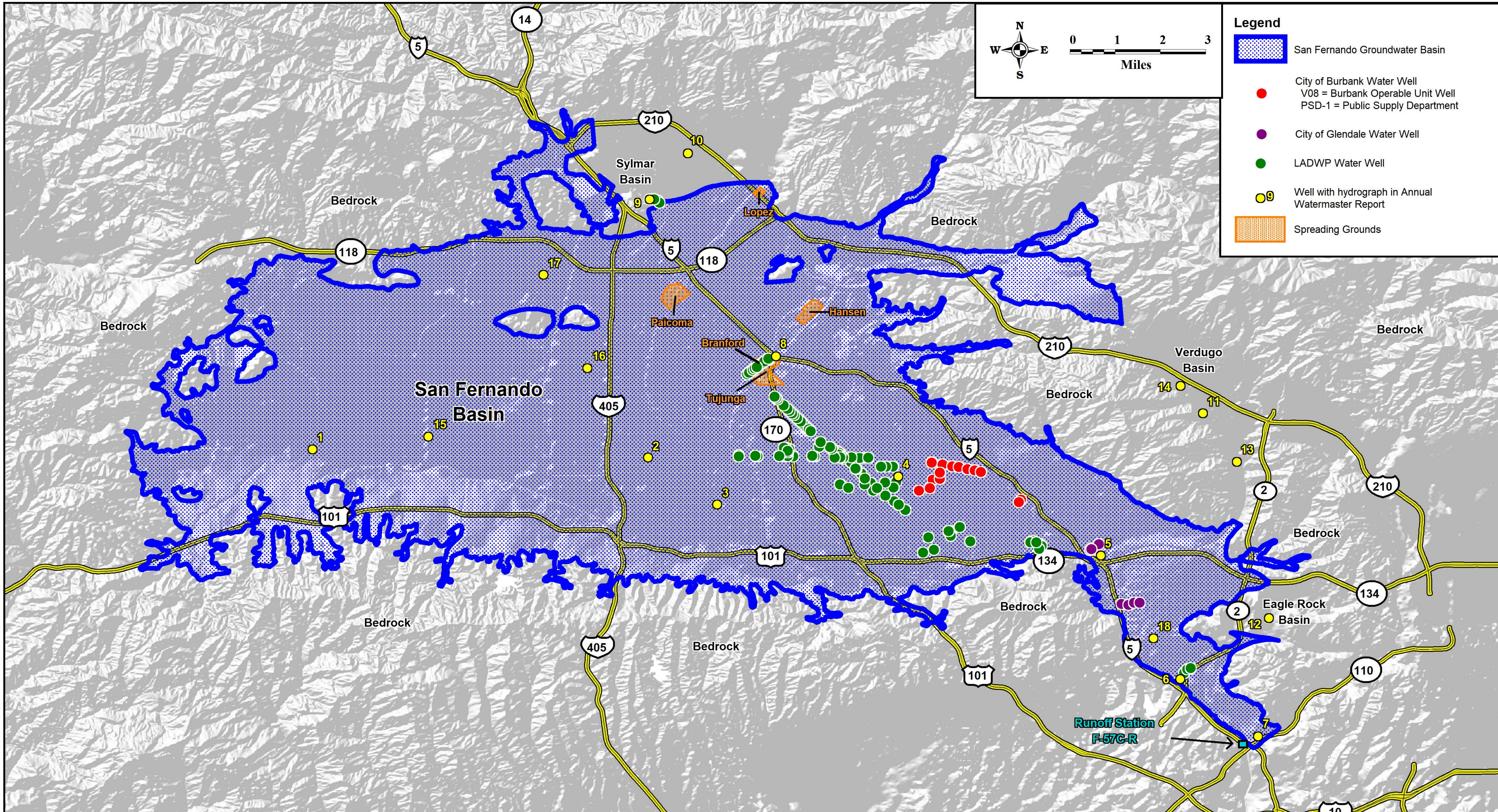
FIGURES

FIGURE 1



CITY OF GLENDALE WATER DEPARTMENT
SOURCES OF SUPPLY
FOOTHILL WELL
ROCKHAVEN WELL
BLENDING WATER PIPELINE
MWD G-3
GLORIETTA WELLS
VERDUGO PARK WATER TREATMENT PLANT
GRANDVIEW PUMPING PLANT
MWD G-1
MWD G-2
POINT OF ENTRY
POWER PLANT
GOU NORTH WELLS
GLENDALE WATER TREATMENT PLANT
GOU SOUTH WELLS
CITY OF LOS ANGELES
CITY OF LA CANADA-FLINTRIDGE
CITY OF PASADENA
CITY OF BURBANK
CITY OF LOS ANGELES
CITY OF LOS ANGELES
LEGEND
MWD Connections
Wells
Pump Stations
Water Treatment Facilities

FIGURE 2



2016-2017 Water Year ULARA Wastermaster Report	Upper Los Angeles River Area: San Fernando Groundwater Basin Map	PLATE 1A

FIGURE 3

GLENDALE WATER TREATMENT PLANT SYSTEM LAYOUT

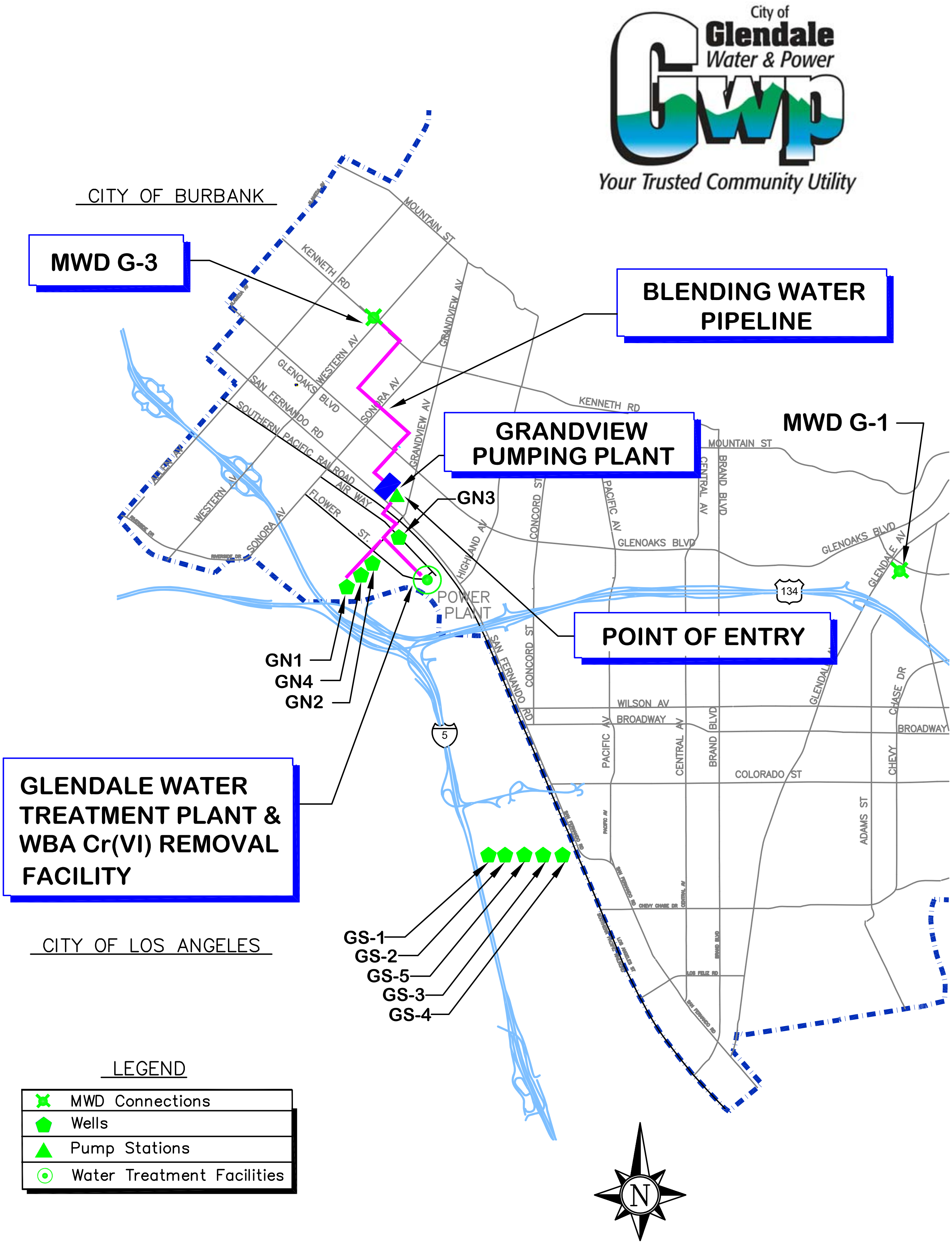
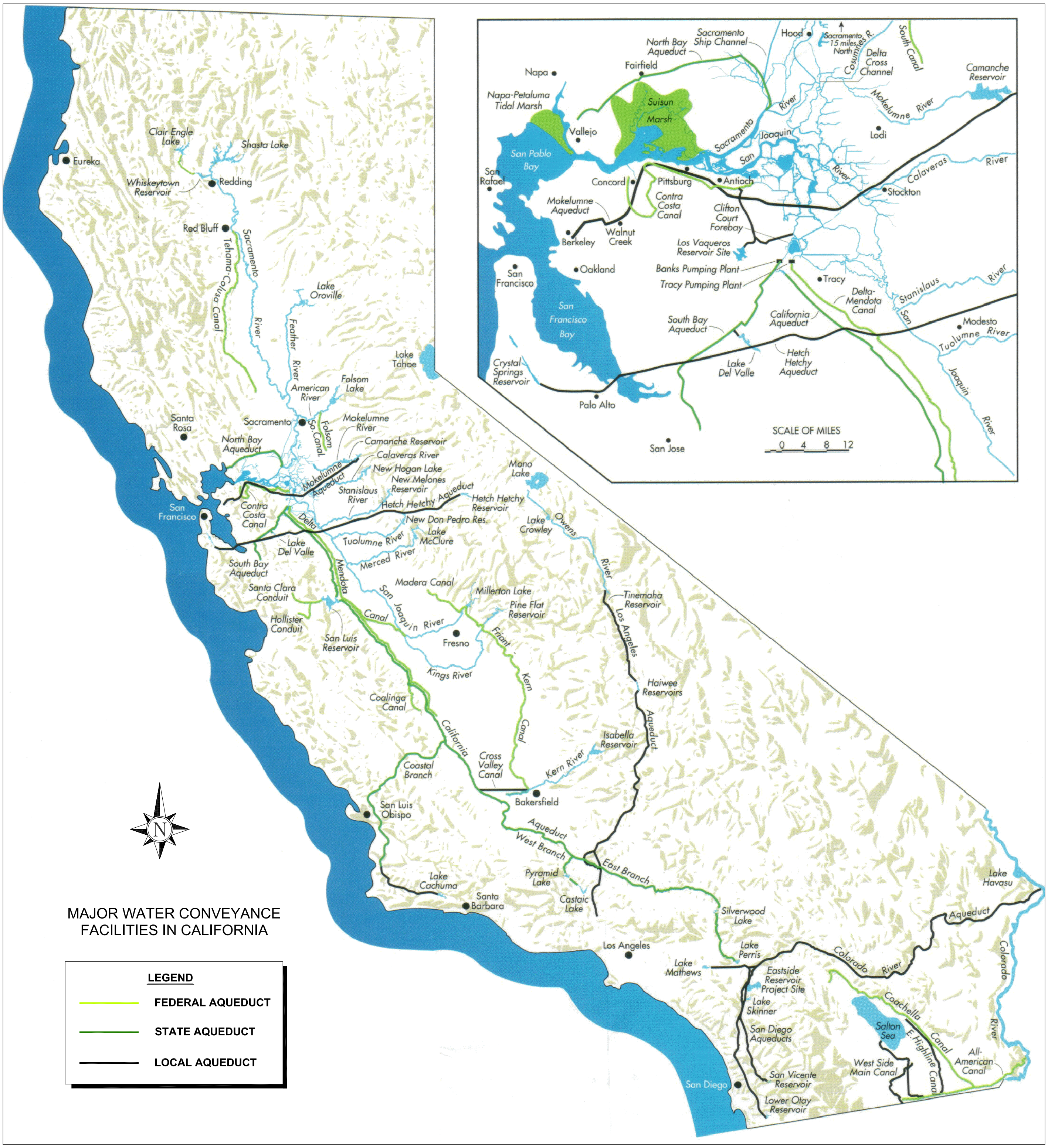


FIGURE 4



MAJOR WATER CONVEYANCE FACILITIES IN CALIFORNIA
LEGEND
FEDERAL AQUEDUCT
STATE AQUEDUCT
LOCAL AQUEDUCT
N
SCALE OF MILES
0 4 8 12
Eureka
Redding
Red Bluff
Sacramento
Santa Rosa
San Francisco
Fresno
Bakersfield
San Luis Obispo
Santa Barbara
Los Angeles
San Diego
Shasta Lake
Lake Oroville
Lake Tahoe
Folsom Lake
Mono Lake
Lake Crowley
Tinemaha Reservoir
Haiwee Reservoirs
Isabella Reservoir
Millerton Lake
Pine Flat Reservoir
San Luis Reservoir
Lake Del Valle
Pyramid Lake
Castaic Lake
Silverwood Lake
Lake Perris
Lake Mathews
Lake Skinner
Lake Havasu
Salton Sea
Lake Cachuma
Clair Engle Lake
Whiskeytown Reservoir
Tehama-Colusa Canal
Sacramento River
Feather River
American River
Folsom So. Canal
Mokelumne River
Camanche Reservoir
Calaveras River
New Hogan Lake
New Melones Reservoir
Stanislaus River
Hetch Hetchy Aqueduct
Hetch Hetchy Reservoir
New Don Pedro Res.
Lake McClure
Tuolumne River
Merced River
Madera Canal
San Joaquin River
Friant Kern Canal
Kings River
Delta Mendota Canal
California Aqueduct
Coalinga Canal
Coastal Branch
Cross Valley Canal
Kern River
Owens River
Los Angeles Aqueduct
West Branch
East Branch
North Bay Aqueduct
Mokelumne Aqueduct
Contra Costa Canal
South Bay Aqueduct
Santa Clara Conduit
Hollister Conduit
Eastside Reservoir Project Site
San Diego Aqueducts
San Vicente Reservoir
Lower Otay Reservoir
Colorado River Aqueduct
Colorado River
Coachella Canal
E. Highline Canal
West Side Main Canal
All-American Canal
Napa
Napa-Petaluma Tidal Marsh
Vallejo
Fairfield
Suisun Marsh
Sacramento Ship Channel
Hood
Sacramento 15 miles North
Cosumnes R.
Delta Cross Channel
South Canal
Camanche Reservoir
Lodi
San Pablo Bay
San Rafael
Concord
Pittsburg
Antioch
Stockton
Contra Costa Canal
Clifton Court Forebay
Walnut Creek
Berkeley
Oakland
Los Vaqueros Reservoir Site
Banks Pumping Plant
Tracy Pumping Plant
Tracy
Delta-Mendota Canal
California Aqueduct
Hetch Hetchy Aqueduct
Lake Del Valle
San Francisco Bay
Crystal Springs Reservoir
Palo Alto
San Jose
Modesto

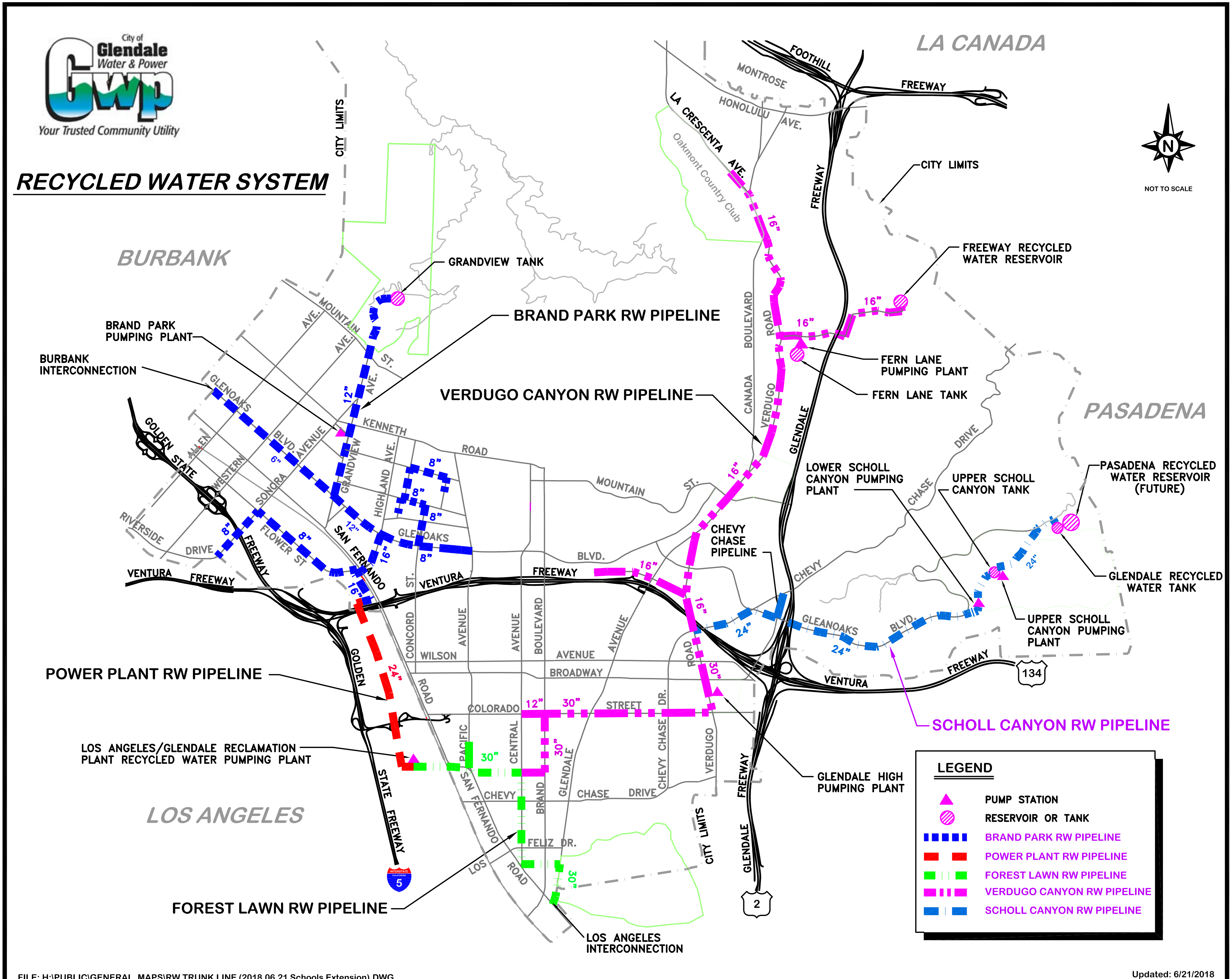

City of Glendale Water & Power
Your Trusted Community Utility
RECYCLED WATER SYSTEM
BURBANK
LA CANADA
PASADENA
LOS ANGELES
NOT TO SCALE
GRANDVIEW TANK
BRAND PARK RW PIPELINE
BRAND PARK PUMPING PLANT
BURBANK INTERCONNECTION
VERDUGO CANYON RW PIPELINE
FREEWAY RECYCLED WATER RESERVOIR
FERN LANE PUMPING PLANT
FERN LANE TANK
CITY LIMITS
LOWER SCHOLL CANYON PUMPING PLANT
UPPER SCHOLL CANYON TANK
PASADENA RECYCLED WATER RESERVOIR (FUTURE)
GLENDALE RECYCLED WATER TANK
UPPER SCHOLL CANYON PUMPING PLANT
CHEVY CHASE PIPELINE
SCHOLL CANYON RW PIPELINE
GLENDALE HIGH PUMPING PLANT
POWER PLANT RW PIPELINE
LOS ANGELES/GLENDALE RECLAMATION PLANT RECYCLED WATER PUMPING PLANT
FOREST LAWN RW PIPELINE
LOS ANGELES INTERCONNECTION
LEGEND
PUMP STATION
RESERVOIR OR TANK
BRAND PARK RW PIPELINE
POWER PLANT RW PIPELINE
FOREST LAWN RW PIPELINE
VERDUGO CANYON RW PIPELINE
SCHOLL CANYON RW PIPELINE
FILE: H:\PUBLIC\GENERAL_MAPS\RW TRUNK LINE (2018.06.21 Schools Extension).DWG
Updated: 6/21/2018

FIGURE 5

FIGURE 6

CITY OF GLENDALE

Recycled Water Account Information

NO.	PROJECT NAME	ADDRESS	NO. OF METER	Meter Installed	TYPE OF USE
		FOREST LAWN PROJECT (A - 1)			
1	City of Glendale Transportation - Brand Median	1600 S Brand Boulevard	1	1995	Irrigation
2	Forest Lawn Memorial Park	1712 S Glendale Avenue	1	1992	Irrigation
3	Forest Lawn Memorial Park	3690 San Fernando Road	1	1992	Irrigation
4	Silver Crest Homes	316 W Windsor Road	1	2000	Irrigation
5	Cerritos Elementary School	120 E Cerritos Avenue	1	2006	Irrigation
6	Cerritos Elementary School	1715 S Glendale Avenue	1	2006	Irrigation
7	Cerritos School Park	3690 San Fernando Road	1	2007	Irrigation
8	Edison Elementary & Pacific Park	501 Riverdale Drive	1	Mar 2007	Irrigation
9	Community Services and Park	4699 SAN FERNANDO RD	1	Mar 2019	Irrigation
		POWER PLANT PROJECT (A - 2)			
10	CalTrans	943 W Doran Street	1	1978	Irrigation
11	Grayson Power Plant - GWP	800 Air Way	1	1978	Cooling Towers
12	Glendale Water & Power - UOC	800 Air Way	1	2010	Irrigation
13	Public Works - Parkway Irrigation	(No AMI Meter)	1	-	Irrigation
		BRAND PARK PROJECT (A - 3)			
14	City of Glendale Transportation - Glenoaks Median	2008 W Glenoaks Boulevard	1	1996	Irrigation
15	City of Glendale Transportation - Glenoaks Median	1818 W Glenoaks Boulevard	1	1996	Irrigation
16	City of Glendale Transportation - Glenoaks Median	1108 W Glenoaks Boulevard	1	1996	Irrigation
17	City of Glendale Transportation - Glenoaks Median	978 W Glenoaks Boulevard	1	1996	Irrigation
18	City of Glendale Transportation - Glenoaks Median	720 W Glenoaks Boulevard	1	1996	Irrigation
19	City of Glendale Transportation - Glenoaks Median	618 W Glenoaks Boulevard	1	1996	Irrigation
20	City of Glendale Transportation - Glenoaks Median	532 W Glenoaks Boulevard	1	1996	Irrigation
21	City of Glendale Transportation - Glenoaks Median	1628 W Glenoaks Boulevard	1	1996	Irrigation
22	City of Glendale Transportation - Glenoaks Median	1400 W Glenoaks Boulevard	1	1996	Irrigation
23	Brand Park	1700 W Mountain Street	1	1997	Irrigation
24	Pelanconi Park	905 Cleveland Road	2	1996	Irrigation
25	Grandview Memorial Park	1341 Glenwood Road	2	2001	Irrigation
26	Grandview Memorial Park	1341 Glenwood Road	1	2009	Irrigation
27	Disney Complex (Dual Plumbed-Future)	1049 Flower Street	1	Jun-17	Irrigation
28	Disney Complex (Dual Plumbed-Future)	1101 Flower Street	1	2007	Irrigation
29	Walt Disney Co.	900 Grand Central Ave	1	Sep 2012	Irrigation
30	Walt Disney Co.	1200 Grand Central Ave	2	Aug 2012	Irrigation
31	San Fernando Landscape Project	5775 San Fernando Road	1	Jan 2009	Irrigation
32	Public Works - Glendale Narrow Riverwalk	900 Flower St.	1	Feb 2013	Irrigation
33	Public Works - Fairmont Street Extension Project	907 Flower Street	2	Mar 2010	Irrigation
34	J DE SIGIO CONSTRUCTION INC	1500 KENNETH RD	1	Feb 2019	Construction
35	Grayson Power Plant - GWP	630 Kellogg Ave	1	May 2007	Irrigation
		VERDUGO SCHOLL PROJECT (B)			
36	Colorado Blvd - Parkway Irrigation	815 E Colorado Street	1	1997	Irrigation
37	Colorado Blvd - Parkway Irrigation	1311 E Colorado Street	1	1997	Irrigation
38	Colorado Blvd - Parkway Irrigation	1401 E Colorado Street	1	1997	Irrigation
39	CalTrans	1970 E Glenoaks Blvd (E/S,W/S I2)	2	1995	Irrigation
40	Caltrans	406 N Verdugo Rd (at Chevy Chase Dr)	1	1995	Irrigation
41	Caltrans	709 Howard Street (at Monterey Road)	1	1995	Irrigation

CITY OF GLENDALE

Recycled Water Account Information

NO.	PROJECT NAME	ADDRESS	NO. OF METER	Meter Installed	TYPE OF USE
42	741 S. Brand Median	741 S Brand Boulevard (Median)	1	1995	Irrigation
43	Caltrans	2000 E Chevy Chase Drive (at Harvey)	1	1995	Irrigation
44	Montecito Park	2978 N Verdugo Road (at Sparr)	1	1995	Irrigation
45	N. Verdugo Rd Median/La Cresenta Ave	3220 N Verdugo Road/Median/ La Crescenta Avenue *OPP	1	1996	Irrigation
46	Verdugo Rd/Canada (North Median)	3021 N Verdugo/Canada Median	1	1996	Irrigation
47	Verdugo Rd/Canada South Overpass	1388 N Verdugo/Canada (South) Overpass	1	1995	Irrigation
48	Parque Vaquero	1285 N Verdugo Road	1	1998	Irrigation
49	701 N. Glendale Ave - Median @ Monterey Rd	701 N Glendale Avenue (Median)	1	1995	Irrigation
50	Civic Auditorium	1401 N Verdugo Road	1	1996	Irrigation
51	Sports Complex	2200 Fern Lane	1	1998	Irrigation
52	Adult Recreation Center	201 E Colorado Street	1	1995	Irrigation
53	Glenoaks Park	2531 E Glenoaks Boulevard	1	1995	Irrigation
54	Scholl Canyon Park	2849 E Glenoaks Boulevard	1	1996	Irrigation
55	Scholl Canyon Ballfield	3200 E Glenoaks Boulevard	1	1997	Irrigation
56	Glendale High School	1440 E Broadway	1	1995	Irrigation
57	Wilson Junior High School	1220 Monterey Road	1	1995	Irrigation
58	Glendale Adventist Hospital	1520 E Chevy Chase Drive	1	1997	Irrigation / Cooling Towers
59	Glenoaks Elementary School	2015 E Glenoaks Boulevard	1	1998	Irrigation
60	Glendale Community College	1500 N Verdugo Road	2	1996 & 2004	Irrigation / Toilet Flushing
61	Oakmont Country Club	3100 Country Club Drive	1	1996	Irrigation
62	Central Library	222 E Harvard Street	2	1995	Irrigation
63	Armory	220 E Colorado Street	1	1996	Irrigation
64	Scholl Canyon Golf Course	3800 E Glenoaks Boulevard	1	1998	Irrigation
65	Scholl Canyon Landfill (PW)	3798 E Glenoaks Boulevard	2	1996	Irrigation/ Soil Compaction/ Dust Control
66	Scholl Canyon Landfill (PW)	3798 E Glenoaks Boulevard	1	1996	Irrigation/ Soil Compaction/ Dust Control
67	Scholl Canyon Landfill (LACSD)	2847 E Glenoaks Boulevard	1	1997	Irrigation/ Soil Compaction/ Dust Control
68	Scholl Canyon Landfill (PW)	3798 E Glenoaks Boulevard	1	1996	Irrigation
69	Fern Lane (Freeway Tank + Median)	1926 Fern Lane	1	1997	Irrigation
70	Glendale Retirement Home	1551 E Chevy Chase Drive	1	Jul-09	Irrigation
71	Americana at Brand LLC	233 S Brand Boulevard	1	Apr-09	Irrigation
72	Monterey Community Garden	870 Monterey Road	1	Aug-09	Irrigation
73	City of Glendale - CCBG	827 Monterery Road	1	Jan-11	Irrigation
74	City of Glenadle - PUBLIC WORKS PARKING SECTION	101 E HARVARD ST	1	Apr-15	Irrigation
75	GWP - WATER DIVISION	210 S VERDUGO RD	1	Jun-07	Irrigation
76	Caltrans	Chevy Chase / 134 Fwy	1	Jul-16	Irrigation
77	City of Glendale / Public Works	825 MONTEREY RD	1	May-17	Irrigation
78	CITY OF LA CANADA FLINTRIDGE	3200 LA CRESCENTA AVE	1	Sep-17	Irrigation
79	VERDUGO WOODLANDS ELEMENTARY	1751 N VERDUGO RD	1	Jan-18	Irrgation

APPENDIX D

CITY OF SAN FERNANDO

PUMPING AND SPREADING PLAN

2018-19 through 2022-23 Water Years

CITY OF SAN FERNANDO

GROUNDWATER PUMPING AND SPREADING PLAN

OCTOBER 1, 2018 TO SEPTEMBER 30, 2023

2018-2019 Water Year

Prepared by:

Public Works Department

Water Division

117 Macneil Street

San Fernando, California 91340

December 2019

TABLE OF CONTENTS

I. INTRODUCTION

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

On August 26, 1983, the Upper Los Angeles River Area (ULARA) Watermaster reported to the court pursuant to Section 10.2 of the Judgment that the Sylmar Basin was in condition of overdraft. On October 1, 1984, San Fernando and Los Angeles were assigned equal rights to pump the safe yield of the Basin (6,210 acre-feet) thus, San Fernando and Los Angeles were each allowed to pump approximately 3,105 acre-feet per year. Thereafter, on October 1, 1996, the safe yield of the Basin was determined to be 6,510 acre-feet per year. A stipulation approved by the Court, on December 13, 2006, allows for a temporary increase in the safe yield of the Basin to 6,810 AF/Y beginning October 1, 2006. Therefore, San Fernando and Los Angeles were then allowed to each pump approximately 3,405 acre-feet per year. In a report dated July 31, 2012, the current Watermaster, Richard C. Slade, provided his analysis of newly-available data and conditionally increased the safe yield of this basin to 7,140 AF/Y; this amounts to 3,570 AF/Y for each of the two cities.

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

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

II. WATER DEMAND

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

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

Projected water demands for the next five years are expected to slightly decrease or remain the same due to conservation efforts.

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

III. WATER SUPPLY

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

A. MWD: Treated water is purchased from the MWD to supplement ground water supplies. Historic and projected use of MWD water is shown in Table 2.1.

B. Production Wells: The City of San Fernando currently owns and operates three (3) wells that are on "active status" with the State Water Resources Control Board as indicated below:

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

2. ***Well 4A***-*"Active"*
   Location: 12900 Dronfield Avenue, Sylmar
   Capacity: 300 GPM

3. ***Well 3***-*"Inactive"*
   Location: 13003 Borden Avenue, Sylmar
   Capacity: 1200 GPM
   Well 3A has been inactive since May 2018

4. ***Well 7A***-*"Active"*
   Location: 13180 Dronfield Avenue, Sylmar
   Capacity: 900 GPM
   Well 7A was reactivated in October 2018 with an ion-exchange treatment system. The ion-exchange treatment system is located at 12900 Dronfield Avenue, Sylmar CA.

C. Water Pumped From Each Well (2018-2019) in Acre-Feet

1.	Well 2A	2,114.11
2.	Well 3	0
3.	Well 4A	325.52
4.	Well 7A	291.60
	Total:	2,731.23

D. Wells Groundwater Level Data (2018-2019)

1.	Well 2A	1078.5 Taken 4/13 (Transducer out of service)
2.	Well 3	1104.2 Taken 12/18
3.	Well 4A	1057.1 Taken 12/18
4.	Well 7A	1097.3 Taken 12/18

E. Well Locations

Well 2A - 14060 Sayre Street, Sylmar, CA 91342

Well 3 - 13003 Borden Street, Sylmar, CA 91342

Well 4A - 12900 Dronfield Avenue, Sylmar, CA 91342

Well 7A 13180 Dronfield Avenue, Sylmar, CA 91342

IV JUDGMENT CONSIDERATIONS

A. Native and Imported Return Water

The safe yield of the Sylmar Basin was 6,810 acre-feet and the cities of San Fernando and Los Angeles have equal rights to pump from this basin. After subtracting the overlaying pumping rights of two private parties, San Fernando and Los Angeles were each allowed to pump approximately 3,405 acre-feet per year.

A stipulation approved by the Court May 01, 2013 allows for a temporary increase in the safe yield of the Basin to 7,140 AF/Y beginning October 1, 2012. Therefore, San Fernando and Los Angeles are now allowed to each pump approximately 3,570 acre-feet per year, for the next five years (2018-19 through 2022-23)

B. Stored Water Credit

San Fernando and Los Angeles each have the right to store water in the Sylmar Basin and the right to extract equivalent amounts.
As of 2018-19 through 2022-23 water years the City of San Fernando has a "frozen" water credit of 1,514 acre feet.

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

(Acre – Feet)

FY	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
DEMAND										
WELLS	3,352	2,736	2,766	2,777	2,895	2,731	2,950	2,950	2,950	2,950
MWD	9	100	9	0	0	0	0	0	0	0
TOTAL	3,361	2,836	3,361	2,777	2,895	2,731	2,950	2,950	2,950	2,950
ACTUAL						**PROJECTED**				

APPENDIX A

WATER QUALITY DATA

SEE ATTACHED WATER QUALITY REPORT, 2019

CITY OF SAN FERNANDO

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

APPENDIX B

POLICIES AND PROCEDURES

(By ULARA)

<u>WATERMASTER SERVICE</u>

<u>UPPER LOS ANGELES RIVER AREA</u>

<u>POLICIES AND PROCEDURES</u>

February 1998

APPENDIX E

CRESCENTA VALLEY WATER DISTRICT

PUMPING AND SPREADING PLAN

2018-19 through 2022-23 Water Years

CRESCENTA VALLEY WATER DISTRICT

GROUNDWATER PUMPING & SPREADING PLAN

FOR

WATER YEARS

OCTOBER 1, 2018 TO SEPTEMBER 30, 2023

Prepared by:
David S. Gould, P.E.
Director of Engineering

Prepared for:
ULARA Watermaster's Office

December 2019

I. INTRODUCTION

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

This report as prepared by CVWD is in response to Section 5.4, Groundwater Pumping and Spreading Plan. This report refers to groundwater pumping only since there is no groundwater spreading performed by CVWD.

The Groundwater Pumping Plan is based on the water years October 1, 2018 to September 30, 2023.

II. WATER DEMAND

The annual total water demand for the last five (5) years and the projected annual water demand for the next five (5) years are shown in Table 2.1.

Water demands between WY 2013/14 and WY 2017/18 were affected by a number of factors including less than average annual rainfall, five-year statewide drought, and water conservation efforts within the Crescenta Valley. Water demands in the CVWD's service area vary due to seasonal conditions, which is part of the residential character of the District and the large percentage of water consumption is used for outdoor residential landscaping.

CVWD anticipated an increase in water demand of approximately 1% to 2% in WY 18/19 and an estimated 3% annual increase in demand from WY 19/20 to WY 22/23 as water conservation measures become the norm in California and the increase in residential development as the economy improves.

In WY 2017/18, CVWD saw an increase of 2.5% in water demand as compared to WY 2016/17, which is related to the continuing effort in water conservation.

State Regulations and Water Conservation:

Senate Bill 606 and Assembly Bill 1668 were passed in 2018 and these Bills call for new urban-efficiency standards for indoor and outdoor uses, water lost to leaks and appropriate variances in California. These new regulation will have to be implemented within 5-years and could affect CVWD's water demand. As the State finalizes the details, CVWD will start implementing these water conservation measures.

III. WATER SUPPLY

A. Existing Water Supply Overview:

The water supply for CVWD is composed of locally produced and treated groundwater, and imported water from MWD purchased on a wholesale basis from Foothill Municipal Water District (FMWD). In WY 2017/18, CVWD had an overall ratio of 44% local groundwater (including water produced from CVWDs Well 16) and 56% imported water from FMWD.

In WY 2017/18, CVWD saw an increase in groundwater production of 7.2% as compared to WY 2016/17. CVWD's wells produced 1,436 ac-ft, which is 1,858 ac-ft under adjudicated right of 3,294 AFY. CVWD did produce an additional 304 ac-ft from the Rockhaven Well, which will be included in Glendale's annual groundwater production.

In general, the well levels in the Verdugo Basin slightly increased over WY 2017/18 and the total rainfall for the water year was 11.02", which was 52% above below rainfall. It was observed that static well levels rose slightly (about 10 – 12 feet), which was probably due to the above average rainfall in WY 16/17.

CVWD continued its well rehabilitation program that includes replacing the existing pumps with lower capacity pumps and cleaning of the well casings. In WY 2017/18, CVWD performed well rehabilitation on Wells 5 & 10 and is planning to perform well rehabilitation on Well 1 & 7 in WY 18/19 to obtain better well efficiency and to potentially increase groundwater production.

B. PRODUCTION WELLS

Currently CVWD has thirteen (13) active wells in operation. Historic and projected production from these wells is shown in Table 3.1.

Well pumping capacity for WY 2017/18 varied from a high of 2.0 MGD to a low of 1.2 MGD and the average was 1.8 MGD, which is 58% less than the well design capacity of 4.2 MGD.

This is due to declining water levels and Wells 5, 8, 10 & 12 being out of service at various times throughout the year for rehabilitation and bacteriological issues.

B.1 Nitrate (NO_3) in Production Wells

CVWD's groundwater wells produce water which typically contains nitrate (as NO_3) levels above the 45 mg/L maximum contaminant level (MCL) as set by the EPA and the State Water Resources Control Board, Division of Drinking Water (DDW).

B.1.1 Glenwood

The Glenwood Nitrate Removal Treatment Plant is an ion-exchange process used to treat and remove nitrates from CVWD's well water. Untreated water and water treated at the Glenwood Plant are blended to produce water with a nitrate level less than the MCL.

In WY 2017/18, the ion-exchange plant was in operation for eleven (11) of the twelve (12) months and produced 273 ac-ft of treated water, which allows CVWD to maximize the use of local groundwater.

B.1.2 Mills

Water production at CVWD's Mills Plant is blended with FMWD water to decrease the nitrate levels below the MCL.

B.2 Methyl tertiary-butyl ether (MTBE) in Wells

In 2004, CVWD detected low levels of MTBE in Well 5 during routine sampling. In 2006, Well 7 was taken out of service because of MTBE above the 13 ug/L MCL. In 2008, Well 5 was taken out of service when the MTBE level reached 14 ppb, which is above the MCL of 13 ppb. MTBE levels have decreased below the MCL and since 2010, Wells 5 & 7 have been back in service. In WY 2017/18, the MTBE levels in CVWD's wells were Non-Detect.

B.3 Groundwater Recharge - Rainfall

CVWD has observed less than average rainfall amounts in the Verdugo Basin over the past five (5) years as shown in the table below. In WY 2017/18, the rainfall was 11.02 inches, which was 52% below the annual average of 23.1 inches.

CVWD Annual Rainfall Total	
Water Year	**Total Rainfall (In)**
17-18	**11.02**
16-17	**24.96**
15-16	**13.49**
14-15	**14.28**
13-14	**9.11**

The forecast for WY 2018/19 is a normal year for rainfall and CVWD is planning to decrease its water conservation efforts next year.

C. WELL REPLACEMENT PROGRAM

The age of the District's active wells range from 7 to 86 years old and are mostly beyond their useful life.

CVWD has included in its 10-year Capital Improvement program, a project to install a new water production well within the next 5 – 7 years.

C.1 Reactivation of Well 2 with a New Nitrate Treatment Removal Facility

CVWD received a 2015 Integrated Regional Water Management (IRWM) Grant as part of Proposition 84 in March 2016 to reactivate Well 2 and install a new nitrate removal treatment facility at CVWD's Ordunio Reservoir site. Well 2 was drilled in 1927 and taken out of service in 1977 due to nitrate levels above the MCL and lack of a nitrate removal treatment facility.

The project is estimated to produce 150 gpm or 240 ac-ft/yr, which will add to CVWD's groundwater production. Project construction is planned to begin in November 2018 and completed by July 2019.

CVWD is working with the State Water Resources Control Board, Division of Drinking Water (DDW) for a permit amendment for the new nitrate removal treatment facility, which is anticipated to be completed by July 2019.

D. WELL REHABILITATION PROGRAM

CVWD, as part of its annual Capital Improvement program will continue rehabilitation of its existing wells to maintain well capacity and extend the life of the wells. In WY 2017/18, CVWD performed well rehabilitation on Well 10 and is planning rehabilitating of Wells 1 & 7 in WY 2018/19.

E. GLENWOOD NITRATE REMOVAL PLANT

The Glenwood ion-exchange nitrate removal treatment plant was placed into operation in 1990. CVWD replaced the ion-exchange resin in WY 2010/11 during its annual maintenance shut-down.

During WY 2017/18, the plant was in operation eleven (11) months of the year to maximize the use of groundwater production and this trend will continue in WY 2018/19, unless there are maintenance issues requiring the plant to discontinue operation. The historic and projected production from the Glenwood Plant is shown in Table 3.2.

F. PICKENS GRAVITY TUNNEL PRODUCTION

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

G. FMWD/MWD – IMPORTED WATER

In WY 2017/18, the amount of imported water purchased from MWD via FMWD slightly increased from the previous year because of the overall decrease in groundwater production. Proportionally, the ratio of groundwater to import water in WY 2017/18 was 56/44, which shows a decrease in ground water production from previous years.

In WY 2018/19, CVWD anticipates a decrease in the amount of imported water received from FMWD as groundwater production increases slightly and water demands increases about 2%. CVWD also anticipates that imported water purchases will remain the same over the next 5-years.

Historic and projected of FMWD/MWD water production are shown in Table 3.4.

H. CITY OF GLENDALE INTERCONNECTION

In 2004, CVWD completed the installation of a new water supply interconnection with the City of Glendale. This connection allowed CVWD to increase its water supply capacity by 5.0 cfs or 3.2 mgd.

An agreement between the City of Glendale, FMWD, and CVWD was signed in 2004, where CVWD will pay FMWD for the water used and the City of Glendale for the maintenance, and operation of bringing the water to CVWD.

In WY 2017/18, CVWD used 9.60 MG (30 ac-ft) of water from the Glendale/CVWD interconnection (GCI) in January and March 2018. This was used for emergency water supply due to a FMWD/MWD water shutdown for repairs.

I. CITY OF LOS ANGELES INTERCONNECTION

In 2006, CVWD received a Proposition 50, Water Security Grant from CDPH to install an emergency water supply connection with the City of Los Angeles. The new connection will provide 2.2 cfs or 1.44 mgd. In addition, the new interconnection and associated facilities will allow CVWD to provide water during an emergency to FMWD and its sub-agencies in case of a local disaster or when MWD's Weymouth plant is out of service.

Currently, the project is under construction, and the facilities should be completed in WY 2019/20. CVWD will be working with DDW and FMWD on amending the DDW permit and performing operational testing of the system.

J. STORMWATER RECHARGE PROJECT AT CRESCENTA VALLEY COUNTY PARK

A Verdugo Basin Groundwater Recharge, Storage, and Conjunctive Use Feasibility Study was completed in 2005 by CVWD and its recommendations included conceptual plans for stormwater recharge and storage within the basin. In WY 2012/13, CVWD received a Local Groundwater Assistance (LGA) grant from the Department of Water Resources (DWR) to perform a feasibility study to look at stormwater recharge at Crescenta Valley County Park.

The study is a cooperative effort with the City of Glendale, the County of Los Angeles, and other local stakeholders to determine if stormwater can be stored at Crescenta Valley County Park. The feasibility study started in August 2013 and was completed October 2016. The results of the study showed that an estimated 500 ac-ft/year of stormwater water could be put into the Verdugo Basin, which would reduce the wide fluctuation of water levels and increase well capacity on an annual basis.

CVWD is currently working on preparing a conceptual design plan for the stormwater capture within Crescenta Valley County Park. The conceptual plan would be circulated among stakeholders, such as the City of Glendale, Los Angeles County, Department of Public Works, Los Angeles County, Parks and Recreation and the Crescenta Valley Town Council for comments and approval. In additional, CVWD will be pursuing State and Federal grant funding for implementation of the project.

IV. JUDGEMENT CONSIDERATIONS

The adjudicated rights of CVWD from the Verdugo Basin are 3,294 acre-feet per year:

- WY 1978/79 to WY 1991/92 - CVWD pumped 1,700 to 2,900 ac-ft/yr.
- WY 1993/94 to WY 2000/01 - CVWD pumped over its adjudicated right, up to 500 ac-ft/yr, which was allowed by the Watermaster's office.
- WY 2001/02 to WY 2003/04 - CVWD pumped below its adjudication due to declining basin production.
- WY 2004/05 - CVWD increased its water production because of higher than normal rainfall and was able to pump over its adjudication by 16 ac-ft.
- WY 2005/06 - CVWD pumped over the adjudication by 59 ac-ft. CVWD and the City of Glendale agreed upon compensation for the amount of water pumped over the adjudication for WY 2004/05 & WY 2005/06.
- WY 2006/07 - CVWD planned to maintain well production within the adjudication, however due to operator error, CVWD pumped over the adjudication by 11 ac-ft. CVWD and Glendale agreed upon compensation for the amount of water pumped based on the WY 2005/06 agreement.
- WY 2007/08 - CVWD adjusted its pumping schedule to maintain well production within the adjudication and was 15 ac-ft below, since Well 7 was out of service for high MTBE levels.
- WY 2008/09 – CVWD pumped below its adjudication by 330 ac-ft, due to Well 5 being out of service for high MTBE levels and Well 9 being out of service due to bacteriological problems.
- WY 2009/10 - CVWD pumped below its adjudication by 640 ac-ft, which was due to Well 5 being out of service for high MTBE levels, Well 9 being out of service due to bacteriological problems, and Well 11 being out of service due to pump failure.
- WY 2010/11 - CVWD pumped below its adjudication by 368 ac-ft, which was due to Well 5 being out of service for high MTBE levels for three (3) months and decrease in water demand.
- WY 2011/12 - CVWD pumped below its adjudication by 195 ac-ft, this increase in production over previous years was due mainly to an increase in well efficiency from rehabilitation.
- WY 2012/13 - CVWD pumped below its adjudication by 368 ac-ft due to Well 1 and 12 being out of service for rehabilitation, declining well levels, and declining water demands.
- WY 2013/14 - CVWD pumped below its adjudication by 1,038 ac-ft due to Well 5, 8, 9, 11 and 12 being out of service for rehabilitation, recurring bacteriological problems, and declining water levels.

IV. JUDGEMENT CONSIDERATIONS (Cont.)

- WY 2014/15 - CVWD pumped below its adjudication by 1,265 ac-ft due to Well 10, 11 and 12 being out of service for rehabilitation, recurring bacteriological problems, and declining water levels.
- WY 2015/16 - CVWD pumped below its adjudication by 1,583 ac-ft due to Wells 9, 10, 12 & 16 being out of service for rehabilitation, recurring bacteriological problems, and declining water levels.
- WY 2016/17 - CVWD pumped below its adjudication by 1,953 ac-ft due to Wells 5, 8, 10, 12 being out of service for rehabilitation, recurring bacteriological problems, and declining water levels.
- WY 2017/18 - CVWD pumped below its adjudication by 1,856 ac-ft due to Wells 5 & 10 being out of service for rehabilitation and recurring bacteriological problems.

TABLE 2.1

HISTORIC AND PROJECTED
WATER DEMAND
(Acre-Feet)

2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
4,603	3,744	3,867	3,863	3,981	3,750	4,050	4,185	4,275	4,435
ACTUAL					PROJECTED				

TABLE 3.1

HISTORIC AND PROJECTED
COMBINED WELL AND TUNNEL GROUNDWATER PRODUCTION
(Acre-Feet)

2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
2,256	2,029	1,711	1,331	1,426	1,670	1,730	1,910	2,065	2,090
ACTUAL					PROJECTED				

TABLE 3.2

HISTORIC AND PROJECTED
GLENWOOD NITRATE REMOVAL PLANT PRODUCTION BEFORE BLENDING
(Acre-Feet)

2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
150	186	533	246	273	190	250	300	300	300
ACTUAL					PROJECTED				

NOTES:

(1) The Glenwood Treatment Plant has a capacity of 2.1 MGD of blended water.

(2) The Glenwood Treatment Plant began operation January 1990.

TABLE 3.3

HISTORIC AND PROJECTED
PICKENS TUNNEL WATER PRODUCTION
(Acre-Feet)

2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
59	58	57	53	51	55	55	55	55	55
ACTUAL					PROJECTED				

TABLE 3.4

HISTORIC AND PROJECTED
FMWD/MWD TREATED WATER PRODUCTION
(Acre-Feet)

2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
2,348	1,715	1,717	2,175	2,238	1,900	2,100	2,000	2,000	2,000
ACTUAL					PROJECTED				

TABLE 3.5

HISTORIC AND PROJECTED
GWP (Rockhaven) WELL WATER PRODUCTION
(Acre-Feet)

2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
0	0	259	347	304	200	210	285	340	360
ACTUAL					PROJECTED				

NOTES:

(1) Rockhaven Well (Well 16) was put into service in March 2016.

(2) Rockhaven Well Production to be included in GWP's adjudicated right.

APPENDIX F

ANNUAL MUNICIPAL EXTRACTIONS IN ULARA

1979-2018

ANNUAL MUNICIPAL EXTRACTIONS IN ULARA
1979-80 through 2017-18
(acre-feet)

Water Year	San Fernando Basin*				Sylmar Basin			Verdugo Basin			ULARA
	Burbank	Glendale	Los Angeles	TOTAL	Los Angeles	San Fernando	TOTAL	CVWD	Glendale	TOTAL	TOTAL
2017-18	10,408	7,435	36,623	54,466	0	2,896	2,896	1,426	1,167	2,593	59,955
2016-17	9,501	7,752	36,789	54,042	0	2,777	2,777	1,331	1,283	2,614	59,433
2015-16	9,442	7,270	73,806	90,518	683	2,766	3,449	1,704	1,172	2,876	96,843
2014-15	10,008	7,054	72,582	89,644	0	2,736	2,736	2,019	1,145	3,164	95,544
2013-14	10,150	7,241	79,768	97,159	668	3,352	4,020	2,246	1,393	3,639	104,818
2012-13	11,387	7,176	52,751	71,314	1,673	3,284	4,957	2,917	1,670	4,587	80,858
2011-12	9,997	7,876	49,273	67,146	1,093	3,202	4,295	3,090	1,982	5,072	76,513
2010-11	10,398	7,476	43,951	61,825	964	3,082	4,046	2,917	1,827	4,744	70,615
2009-10	10,048	7,935	59,958	77,941	2,544	3,143	5,687	2,645	2,135	4,780	88,408
2008-09	9,966	7,151	52,896	70,013	868	3,473	4,341	2,957	2,087	5,044	79,398
2007-08	6,816	7,411	50,009	64,236	2,997	3,670	6,667	3,270	2,687	5,957	76,860
2006-07	9,780	7,622	76,251	93,653	3,919	2,894	6,813	3,294	2,568	5,862	106,328
2005-06	10,108	7,374	38,042	55,524	2,175	2,857	5,032	3,343	2,390	5,733	66,289
2004-05	6,399	7,792	49,085	63,276	1,110	3,143	4,253	3,302	2,357	5,659	73,188
2003-04	9,660	7,282	68,626	85,568	3,033	3,454	6,487	2,568	2,117	4,685	96,740
2002-03	9,170	8,507	73,376	91,053	3,549	3,357	6,906	2,836	1,613	4,449	102,408
2001-02	10,540	6,838	66,823	84,201	1,240	3,766	5,006	3,266	2,129	5,395	94,602
2000-01	10,128	6,886	65,409	82,423	2,606	3,696	6,302	3,422	2,227	5,649	94,374
1999-00	12,547	1,023	98,016	111,586	2,634	3,807	6,441	3,699	2,727	6,426	124,453
1998-99	10,729	31	123,207	133,967	4,536	3,528	8,064	3,797	2,627	6,424	148,455
1997-98	3,964	28	85,292	89,284	3,642	3,308	6,950	3,747	2,820	6,567	102,801
1996-97	11,171	20	89,935	101,126	2,482	3,259	5,741	3,672	2,674	6,346	113,213
1995-96	8,067	26	72,286	80,379	2,766	2,985	5,751	3,705	2,133	5,838	91,968
1994-95	3,052	53	55,478	58,583	2,311	3,421	5,732	3,708	1,633	5,341	69,656
1993-94	2,773	115	60,480	63,368	2,052	3,398	5,450	3,634	1,402	5,036	73,854
1992-93	1,354	91	34,973	36,418	1,369	2,145	3,514	2,557	990	3,547	43,479
1991-92	39	489	75,684	76,212	3,292	2,826	6,118	2,631	633	3,264	85,594
1990-91	1,278	2,755	67,032	71,065	3,281	2,266	5,547	2,615	1,230	3,845	80,457
1989-90	16	1,500	79,949	81,465	2,626	2,763	5,389	2,903	1,329	4,232	91,086
1988-89	29	1,315	126,630	127,974	3,259	2,199	5,458	2,285	2,064	4,349	137,781
1987-88	30	1,020	104,419	105,469	3,133	777	3,910	2,268	2,096	4,364	113,743
1986-87	29	5,758	85,845	91,632	3,113	3,026	6,139	2,255	2,619	4,874	102,645
1985-86	123	5,819	80,963	86,905	3,075	3,166	6,241	2,075	3,418	5,493	98,639
1984-85	2,863	3,086	95,641	101,590	3,130	3,102	6,232	1,997	3,837	5,834	113,656
1983-84	1,063	1,708	112,840	115,611	3,106	3,907	7,013	2,009	3,551	5,560	128,184
1982-83	2,187	1,028	65,178	68,393	3,048	3,133	6,181	1,759	3,427	5,186	79,760
1981-82	523	952	83,207	84,682	3,486	3,290	6,776	1,876	3,732	5,608	97,066
1980-81	595	1,129	91,067	92,791	4,117	3,380	7,497	2,140	2,122	4,262	104,550
1979-80	677	934	57,304	58,915	3,111	2,991	6,102	1,873	1,434	3,307	68,324
Average	6,077	4,178	71,575	81,831	2,377	3,083	5,459	2,712	2,114	4,826	92,116

*Includes municipal pumping only.