GROUNDWATER MONITORING REPORT

CITY OF EAST PALO ALTO

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Table of Contents

List of Tables

List of Figures

Appendices

1. INTRODUCTION

The City of East Palo Alto has relied on imported water from the San Francisco Public Utilities Commission for its drinking water supply. Recognizing the need for water supply reliability, public safety and security in emergencies, and additional supplies to support economic development, the City has embarked on groundwater development and management. The City intends to construct a water quality treatment system at the existing Gloria Way well site, and construct a new full-scale production well at the Pad D site (**Figure 1**).

In order to ensure that the City's groundwater supply is protected for potential quantity and quality impacts and remains sustainable, and in accordance with the City's 2013 Environmental Review for the Gloria Way Well Feasibility Study and 2015 Groundwater Management Plan (GWMP), the City has implemented a groundwater monitoring program. This Groundwater Monitoring Report represents the first routine groundwater monitoring conducted by the City, and is intended to establish baseline groundwater conditions in 2016 and prior years, prior to initiation of pumping in late 2017 (Gloria Way) and late 2018 (Pad D).

The following provides additional background on the City's groundwater supply initiative and the groundwater conditions beneath and adjacent to East Palo Alto.

1.1. BACKGROUND

1.1.1. City Groundwater Supply Planning

The City is progressing toward groundwater development, including reactivation of the existing Gloria Way Well and exploration for additional well sites. Over the past four years, the City completed the *Gloria Way Water Well Production Alternatives Analysis & East Palo Alto Water Security Feasibility Study* (*Gloria Way FS* - Todd Engineers, 2012), which recommended retrofit the Gloria Way Well, exploration of an additional well site (referred to as Pad D), and development of a *Groundwater Management Plan* (*GWMP* – Todd Groundwater, 2015).

The *Gloria Way FS* was followed by the *Gloria Way Well Retrofit Project, Joint Initial Study and Environmental Assessment* (*IS/EA* - ESA, 2013) and design of a groundwater treatment system for the Gloria Way Well has been completed as of the publication date of this Report. The City also has progressed with its exploration of an additional production well site as summarized in the *Report on Drilling, Construction, and Testing of the Pad D Test Well* (EKI, 2014).

Based on the *Gloria Way FS* and the *IS/EA*, the City and stakeholders have recognized the probability of significant local groundwater development and the potential risk of contaminant migration, overdraft, salt water intrusion, and subsidence. This recognition has resulted in development of the *GWMP*. One element of the GWMP is establishment of an

annual groundwater monitoring program that includes groundwater level and quality monitoring, baseline surveying for monitoring future land subsidence, surface water, pumping rate monitoring, and annual reporting.

Initiation of groundwater production from the Gloria Way and Pad D supply wells is currently planned for late 2017 and late 2018, respectively. Accordingly, this first annual groundwater monitoring report is intended to document baseline conditions prior to initiation of pumping. These baseline levels will provide points of reference for comparing future groundwater conditions and for evaluating well system performance and aquifer impacts.

1.1.2. Groundwater Setting and Aquifer Characteristics

The City lies over the San Mateo Plain groundwater sub-basin, which is a portion of the Santa Clara Valley Groundwater Basin (California Department of Water Resources (DWR) Groundwater Basin No. 2-9). The San Mateo Plain occupies a geologic trough between the Santa Cruz Mountains and East Bay Hills that is filled with alluvial and bay sediments, and partially inundated by San Francisco Bay. This subbasin covers approximately 75 square miles on the west side of San Francisco Bay, extending from the West Side Basin north of San Mateo to the boundary with Santa Clara County, which happens to be San Francisquito Creek.

The San Mateo Plain Subbasin is composed of alluvial fans formed by a series of streams draining to sloughs along San Francisco Bay. From north to south, major streams include San Mateo, Laurel, Belmont, Pulgas, Cordilleras, Redwood, Atherton, and San Francisquito creeks (Oakland Museum, 2014). All but two of these streams have relatively small watersheds draining mostly the plain and accordingly, have relatively small alluvial fans. With the exception of the area around San Mateo Creek, the alluvial deposits are thinner and more fine-grained in the northern subbasin relative to the southern portions. However, San Francisquito Creek, with a watershed extending into the foothills, has a relatively extensive and thick alluvial fan also known as the San Francisquito Cone. The San Mateo Plain lies entirely in San Mateo County, while San Francisquito Creek and the San Francisquito Cone straddles San Mateo and Santa Clara Counties. The United States Geologic Survey (USGS) previously characterized the San Francisquito Cone as a separate groundwater subbasin (e.g., Oliver, 1990; Fio and Leighton, 1995; Metzger, 2002).

Geology and Aquifer Characteristics

The principal groundwater aquifers of the basin and subbasins are composed of interbedded coarse- and fine-grained alluvial fan deposits of San Francisquito Creek, extending from the Santa Cruz Mountains north and under San Francisco Bay, and distal alluvial fan deposits of the Niles Cone, extending from the Diablo Range in the East Bay. Most of the permeable alluvial sediments occurring in the groundwater subbasin and beneath the City originated from the Santa Cruz Mountains to the south-southwest. However, some alluvial sediments from the Niles Cone may interfinger under San Francisco Bay with sediments of the San Francisquito Cone. The alluvial fan deposits vary in composition with distance from the head of the San Francisquito Cone. Deposits near the head of the fan are characterized as

poorly sorted clays and gravels, and deposits near the central portion of the fan and the active stream course are generally cleaner sands and gravels. Deposits near the terminal or distal portion of the fan consist of finer-grained silts, clays and fine sands. Relatively finer-grained materials were deposited laterally away from the stream channel course. Overlying most of the alluvial sediments beneath the City are thick, laterally-extensive fine-grained materials, deposited when the area was below sea level. These Bay Mud sediments form aquitards or confining layers, thereby producing a multiple aquifer zone system. At the Gloria Way site, the Bay Mud extends from near the ground surface to 250 feet below ground surface (ft bgs). At Pad D, further inland and near the San Francisquito Creek, only a few possible discontinuous clay layers are present in the upper 250 feet. A simplified stratigraphic description used to characterize the aquifer system is a shallow aquifer overlying or incised into the aquitard, the Bay Mud, and a deeper principal aquifer zone. Most of the municipal production wells in the study area pump from the deeper aquifer zone.

Groundwater Flow

Historical flow conditions have been characterized in a pair of USGS Reports (Fio and Leighton, 1995; Metzger and Fio, 1997) and more recently in San Mateo County's ongoing *San Mateo Plain Groundwater Basin Assessment* Project (EKI, Todd Groundwater, and Hydrofocus, 2016). Under natural conditions, groundwater flow is from the edge of the basin near the bedrock uplands toward San Francisco Bay to the northeast. Groundwater levels in the San Francisquito Cone Subbasin were near and in some areas above the ground surface (artesian) in the early 1900s. In the early part of the 20th century, increased pumping and periodic drought reduced local groundwater levels to below sea level. By the early 1960s, groundwater extraction from the San Francisquito Cone was estimated to be about 7,500 acre-feet per year (AFY). This amount of pumping resulted in historical overdraft including local subsidence and salt water intrusion.

Groundwater extraction declined significantly with importation of Hetch Hetchy water in the 1960s. As a result, groundwater levels steadily increased over much of the area. Between 1962 and 1987, groundwater levels in the City of Palo Alto rose more than 150 feet to levels comparable to those of the early 1900s and then stabilized.

Groundwater Quality

Natural groundwater quality within the City and San Mateo Plain Subbasin varies spatially and with depth. Shallow groundwater tends to be similar in composition to recharge water (surface water, precipitation, imported water). Deeper groundwater varies in composition as a result of contact and residence time with formation sediments (Metzger, 2002).
In general, groundwater in the San Francisquito Cone Subbasin tends to be somewhat hard (i.e., high in calcium carbonate) with levels in some wells of chloride, iron, manganese, specific conductance, and total dissolved solids (TDS) that exceed secondary drinking water standards (also termed maximum contaminant levels or MCLs). Elevated levels of these constituents make groundwater undesirable for potable use for aesthetic (rather than health) reasons and thus secondary MCLs apply. Aesthetic concerns include problems with

soap lathering, taste, odor, and plumbing/clothing staining. Primary MCLs are health-based water quality criteria.

TDS (the sum of dissolved anions and cations in water) is used as a general representation of inorganic water quality. TDS reflects the effect of many water quality influences, including surface sources (e.g., nitrate from fertilizer) and subsurface sources (e.g., mixing with deep groundwater sources). The recommended secondary MCL (SMCL) for TDS is 500 mg/L with an upper limit (primary MCL – PMCL) of 1,000 mg/L. Several wells in the area have historically exceed the SMCL of 500 mg/L, including the City's Gloria Way Well, which had concentrations of 840 and 820 mg/L in 2003 and 2012, respectively. In August 2014, the City's Pad D Well had a concentration of 359 mg/L.

In general, there is a trend of increasing TDS concentrations with depth and from upgradient to downgradient areas within the subbasin (Todd, 2012 – Figure 12).

Water Balance

Groundwater recharge (inflow) occurs from surface water percolating into the subsurface, and from subsurface inflows from other adjacent areas within or outside of the groundwater basin. The sources of recharge include percolation of rainfall, irrigation return flow, water, sewer, and storm drain pipe leaks, streamflow infiltration (particularly via San Francisquito Creek), and subsurface groundwater inflow from adjacent areas or groundwater basins. Groundwater discharge (outflow) occurs where groundwater leaves the aquifer. Groundwater discharge occurs via groundwater supply pumping, dewatering, and contaminated site remediation system pumping, stream baseflow, evapotranspiration, and subsurface outflow (i.e., to San Francisco Bay and/or Santa Clara County).

A water balance is the basis for defining the sustainable yield of a basin, or the maximum long-term quantity of water that can be withdrawn annually without causing an undesirable result. A basin's yield is estimated through a water balance study that examines inflow to the basin, outflow from the basin, and change in groundwater storage in the basin, recognizing the following relationship:

Inflows – Outflows = Change in Storage

A water balance of the entire San Mateo Plain Subbasin was conducted as a part of the recent *San Mateo Plain Groundwater Basin Assessment* Project (EKI, Todd Groundwater, and Hydrofocus, 2016). However, a detailed water balance evaluation of the San Francisquito Cone portion and area contributing groundwater flow and storage to the City has not yet been conducted.

This monitoring program includes documentation of annual precipitation and San Francisquito creek flows, both indicators of the relative amount of recharge to the aquifer underlying the City. Future water balance and groundwater flow modeling studies by others of the southern portion of the San Mateo Plain and the San Fransiquito Cone could utilize this information to estimate local groundwater recharge.

1.1.3 Potential Impacts of Groundwater Pumping

The City's proximity to San Francisco Bay presents a risk of saline water intrusion and groundwater quality degradation if groundwater pumping results in excessive drawdown that reverses the natural groundwater flow direction toward the Bay. Land subsidence also can occur as a result of excessive drawdown. When groundwater levels are drawn down, compressible clays and/or silt deposits can gradually compact, and the effects are seen as a lowering of the land surface. During the 1920's through the 1960's, both saline water intrusion from the Bay and land subsidence occurred in East Palo Alto and other areas of the Santa Clara Valley (Todd Engineers 2012, ESA, 2012).

The amount of groundwater that can be produced safely without triggering adverse impacts is finite, and depends on several variables including the rate and distribution of pumping, recharge rates, aquifer properties, and other characteristics. Because the City, neighboring municipalities, and private pumpers currently extract groundwater and plan to increase production, implementation of a groundwater monitoring program and development of a groundwater management plan for the City are necessary key steps in ensuring that groundwater production is sustainable.

1.2. MONITORING PROGRAM OBJECTIVES

The primary objective of this groundwater monitoring program is to provide data and information to support groundwater management and operations of the City's well system such that the groundwater supply is protected and production is sustainable. Data collected from the monitoring program will support the City and neighboring municipalities in evaluating current and future groundwater subbasin storage, flow, and quality conditions, identify areas of concern and data gaps, and support groundwater management activities.

The specific objectives of this monitoring program include:

- Monitoring of groundwater elevations and associated groundwater storage in the City and adjacent portions of the Groundwater Subbasins
- Monitoring of groundwater quality including the presence and potential migration of saline water from San Francisco Bay, other potential quality degradation, and the potential presence of contaminants associated with the Romic and 1990 Bay Road (Rhone Poulenc) sites
- Monitoring of potential land subsidence induced by lowered groundwater elevations
- Monitoring of rainfall and surface water flows in San Francisquito Creek, as gages of relative amounts of recharge to the subbasin

The City has implemented groundwater monitoring and management activities on its own, focused on its jurisdiction. However, the City recognizes that surface water and groundwater monitoring are regional issues, and the City desires to conduct groundwater

monitoring and management in cooperation and conjunction with neighboring water companies, cities, and other agencies. Given the current groundwater production by nearby mutual water companies, planned future groundwater production by neighboring municipalities, and the extent and connectivity of the San Francisquito groundwater subbasin (which includes portions of the cities of Palo Alto, Menlo Park, and Redwood City), the monitoring program should ideally include basin-wide groundwater monitoring of wells both within East Palo Alto and in neighboring cities.

1.3. SCOPE OF WORK

The 2016 groundwater monitoring program includes the following components:

- Measurement of depth to water and calculation of groundwater elevations in wells
- Measurement of water quality field parameters during pumping or purging
- Collection and laboratory analysis of water quality samples for a suite of inorganic analytes
- Measurement and recording of flow rates and total volumes pumped from production wells (no pumping was performed by the City in 2016)
- Compilation of rainfall data
- Compilation of San Francisquito Creek flow rates
- Collection of land subsidence monitoring data
- Analysis and evaluation of monitoring results
- Preparation of this annual groundwater monitoring report

These specific components fall into the following general categories:

Groundwater Elevation Monitoring
Monitoring of groundwater levels is fundamental to determine groundwater hydraulic heads above (or below) sea level, and actual trends in groundwater storage in the subbasin over time. Water levels were measured quarterly in City monitoring and production wells, and in several non-City monitoring wells at other frequencies. Historical groundwater elevation data were also collated and evaluated to assess aquifer storage trends.

Groundwater Quality Monitoring
Groundwater quality sampling of City wells was performed in April 2016 to establish the current distribution and provide baseline concentrations to compare with future water quality trends, if any, of selected chemicals of concern, including general minerals (cations and anions), total dissolved solids (TDS), bromide, and chloride, indicators of saline water intrusion from the Bay, and iron and manganese, which are known to exceed secondary drinking water standards in wells in the City. Groundwater quality data from several non-City monitoring wells sampled in 2016 were also obtained and evaluated, along with historical sampling results from City and non-City wells.

Surface Water Monitoring

Surface water data was collected for use in future recharge and surface water-groundwater evaluations and modeling. Surface water monitoring included collation and evaluation of hydrologic data measured at a nearby meteorological station (National Oceanic and Atmospheric Administration (NOAA) Station No. COOP:046646, in Palo Alto) and streamflow in San Francisquito Creek as measured at the existing USGS Stream Gage Station No. 11164500.

Land Subsidence Monitoring

In 2016, the City monitored land subsidence using five existing survey benchmarks within and adjacent to the City.

Data Analysis and Reporting

In addition to data collection, data analysis and reporting is a component of the monitoring program. The City compiled and evaluated groundwater elevation, quality, surface water, and land subsidence data, as discussed in Section 3.

2. MONITORING PROGRAM METHODOLOGIES

This section describes the monitoring program methodologies, including procedures for measuring water levels and collecting groundwater quality samples. All field monitoring and sampling was conducted in accordance with the *City of East Palo Alto Groundwater Sampling and Analysis Plan* (Todd Groundwater, 2016).

2.1. MONITORING FACILITIES AND LOCATIONS

Groundwater Level and Quality Sampling Locations
In 2016, groundwater levels and quality were monitored in six City-owned and third-party wells. **Table 1** summarizes the construction information and specifications for the six wells. All six wells are completed with intake screens below the shallow Bay Mud aquitard, and are suitable for monitoring water levels and groundwater quality in the deeper principal aquifer zone.

The two City-owned wells are the Gloria Way well and the Pad D test well. The Gloria Way Well is screened from 260 to 325 feet below ground surface (ft bgs). The Pad D test well has multiple screened intervals between 170 and 525 ft bgs,

One deep aquifer monitoring well is installed at the 1990 Bay Road (Rhone-Poulenc) site, and two deep monitoring wells (referred to as RP-3D and RP-16D) are installed at the Romic Environmental Technologies Corporation (Romic) site at 2081 Bay Road. Both of these sites are near the margin of San Francisco Bay (**Figure 1**). Owners of the Romic and 1990 Bay Road Sites measured and sampled these monitoring wells in 2016 and provided groundwater elevation and groundwater quality data (Romic) or a sample at the wellhead (Rhone Poulenc) to the City for these wells. The 1990 Bay Road monitoring well W-101, is screened from 158 to 178 ft bgs, near the top of the principal aquifer zone. In 2014, Romic installed new "D-Zone" monitoring well RW-3D to a total depth of 250 ft bgs, with a screened interval between 230 and 250 ft bgs. Existing Romic D-Zone well RW-16D is screened from 164 to 184 ft bgs. .

Long-term groundwater level data are also available for the Hale Well in Palo Alto, just south of San Francisquito Creek (**Figure 1**). The Hale Well is screened between 108 and 828 ft bgs and monitors the principal aquifer zone. Water levels in the Hale well are monitored monthly, and these data were also obtained from the Santa Clara Valley Water District.

Climate and Surface Water Stations
As a component of the groundwater monitoring program, selected surface water data collected by State and Federal agencies were collated and evaluated. **Figure 1** shows the locations of surface water stations currently monitored by Federal Agencies. Surface water data, including precipitation and creek flows, are indicators of relative amounts of groundwater recharge over time and groundwater storage in the Sub-basin.

The National Oceanic and Atmospheric Administration (NOAA) maintains a climate station in Palo Alto. Station No. COOP: 046646 monitors daily precipitation using a Standard Rain Gage, and historical precipitation data are available for the period 1953 to present. The USGS maintains a stream gage on San Francisquito Creek in Palo Alto. Station No. 11164500 monitors daily stage and flow, and historical streamflow data are available for the period 1930 to present. Historical precipitation and streamflow data were downloaded from the NOAA and USGS websites and tabulated.

Land Subsidence Stations
In August 2014, the City installed five new survey benchmarks at locations distributed across the City (**Figure 1**). The survey benchmarks consist of stainless steel rods set in sleeve monuments in at-grade boxes. The City initially surveyed these benchmarks in 2014, and re-surveyed these benchmarks in April 2016 as a part of the monitoring program. The 2014 elevations and 2016 elevations are listed in **Table 5**.

2.2. GROUNDWATER LEVEL MONITORING

During 2016, groundwater levels were measured in the City's Gloria Way and Pad D wells, Romic Wells RW-3D and RW-16D, Rhone-Poulenc Well W-101, and the Hale Well. Quarterly water level monitoring of the Gloria Way and Pad D wells was performed on January 28, April 8, June 22, and October 12, 2016.

For the Gloria way well, the water level was measured from the top of the 1-inch PCV access tube installed in the well top plate. For the Pad D well, the water level measurement was made from the north side of the top of the 8-inch PVC well casing. Depth to groundwater was measured to the nearest 0.01 foot using a calibrated electric well sounder.

Water level monitoring of Romic Wells RW-3D and RW-16D (quarterly), Rhone-Poulenc Well W-101 (quarterly), and the Hale Well (monthly) was also performed during 2016. Water level measurements of RW-3D and RW-16D were conducted on March 30, June 27, September 29, and December 21, 2016), while measurements of W-101 were made on January 29, April 21, July 19, and October 21, 2016). Water levels for the Romic and Rhone Poulenc wells and the Hale Well were conducted by third parties and the water level data were provided to the City.

Note that top of casing or other measuring point reference elevations are available for all wells.

2.3. GROUNDWATER QUALITY MONITORING

Annual groundwater quality samples were collected from the Gloria Way and Pad D wells on April 8, 2016. Additional samples were collected in 2016 from Romic Wells RW-3D (semi-annually) and RW-16D (annually) and Rhone-Poulenc Well W-101 (annually) by contractors for those sites, and results for those samples were provided to the City. The samples from the Gloria Way and Pad D wells and from Well W-101 were analyzed for a suite of water

quality parameters identified in the GWMP and Sampling and Analysis Plan (SAP - Todd Groundwater, 2015 and 2016) and described below. The samples from Romic Wells RW-3D and RW-16D were only analyzed for general field parameters and volatile organic compounds (VOCs). Results for the 2016 samples, along with historical sampling results, were uploaded to the City Groundwater Monitoring database for data analysis (see **Section 2.6**).

The following describes the sampling procedures for each well.

Gloria Way Well
For the April 8, 2016 Gloria Way Well sampling, the well was turned on and purged by staff from American Water Enterprises, a contractor to the City. American Water Enterprises installed a temporary in-line totalizing flow meter and discharge hose from the well (hydrant) to the nearby storm sewer. Well discharge to the storm sewer was made under the City's general NPDES Permit.

The well was pumped for a duration of 24 minutes, at an average flow rate of 243 gallons per minute (gpm). A total of around 5800 gallons (approximately 3 well volumes) was purged prior to sampling. Totalizing flowmeter readings were made every five minutes and at the time of sampling to confirm purge volume. Water quality field parameters (including temperature and specific conductivity) were measured every eight minutes using a calibrated Multi-Parameter Hanna HI 991300 meter, and recorded on the sample data sheet (**Appendix A**). After purging, the groundwater sample was collected from the discharge hose downstream of the fire hydrant, and the sample bottles supplied by the laboratory were filled. The sample containers were labeled and stored in a cooler with ice and kept chilled to 4 degrees Celsius until they were delivered to the laboratory. The samples were transported under chain-of-custody that listed the sample date and time, the destination laboratory, and the requested analyses.

Pad D Well
The Pad D well was sampled on April 8, 2016 after purging the well using a temporary Grunfos electrical submersible pump. The pump intake was set at a depth of approximately 20 feet below the top of the well casing, and a temporary in-line totalizing flow meter and discharge hose from the well to the nearby storm sewer catch basin was installed. Discharge to the storm sewer was made under the City's general NPDES Permit. The well was purged for a duration of 30 minutes, and a total of approximately 4,160 gallons was pumped during purging (three well volumes). Water quality field parameters, including pH, temperature, specific conductance, and turbidity were measured every 10 minutes using a calibrated Ultrameter 6235543. After purging, the groundwater sample was collected using a disposable Teflon bailer lowered into the well, and the sample bottles supplied by the laboratories were filled, cooled, and transported under chain-of-custody to the laboratory.

Rhone Poulenc Well W-101
Well W-101 was measured and sampled on April 21, 2016. The well was purged by contractors for Rhone Poulenc, and a Todd Groundwater staff geologist was present during

purging. The contractors for Rhone Poulenc then provided a water sample at the well head, sample containers were filled, the sample was cooled, and transported under chain-of-custody to the laboratory.

Romic Wells RW-3D and RW-16D
Well RW-3D was sampled on March 30, June 27, September 29, and December 21, 2016. Well RW-16D was sampled on September 28, 2016 and December 21, 2016. The samples were collected by Ninyo and Moore, contractor for Romic, and analyzed for volatile organic compounds (VOCs), along with field parameters (including specific conductivity). In addition, the December 21, 2016 samples from RW-3D and RW-16D were analyzed for general minerals and ions. Romic conducted the sampling and laboratory analyses on behalf of the City.

Groundwater Sample Laboratory Analyses
The groundwater samples from Gloria Way, Pad D, and W-101 were analyzed by Alpha Analytical, Inc, a California Department of Public Health Certified Environmental Laboratory Accreditation Program (ELAP) analytical laboratory. The samples from RW-3D and RW-16D were analyzed by SGS Accutest Laboratories, also ELAP certified. The samples were analyzed for the following parameters:

- Bicarbonate
- Boron
- Bromide
- Calcium
- Chloride
- Iodide
- Iron (total)
- Magnesium
- Manganese
- Potassium
- Sodium
- pH
- Total Dissolved Solids (TDS)
- Sulfate

Analytical test methods and method detection limits for the laboratory analyses are listed in **Table 3**. The sample from W-101 was also analyzed for arsenic (the chemical of concern at Rhone Poulenc), while the samples from Romic wells RW-3D and RW-16D were analyzed for VOCs and field parameters.

2.4. SURFACE WATER MONITORING

Climate and surface water information for the East Palo Alto vicinity was obtained and reviewed, with the goal of identifying relative amounts of groundwater recharge during

2016, as compared with previous years. Surface water data are indicators of relative amounts of groundwater recharge over time and groundwater storage in the Sub-basin. These data may also be used in future water balance and groundwater modeling projects performed by others.

Available climate and surface water information include precipitation and San Francisquito Creek flows. Precipitation data were obtained from the NOAA for the National Weather Service station in Palo Alto (Station No. COOP: 046646), and San Francisquito Creek flow data were obtained from the USGS, who maintains a permanent gaging station (Station No. 11164500), located near the Junipero Serra Boulevard/Alpine Road intersection where the creek flows from the upland watershed onto the alluvial fan (see **Figure 1**).

Data from both stations were collected for the period 1954 through 2016. Note that the surface water data are for calendar years (January 1 through December 31), rather than for water years (October 1 through September 30).

2.5. LAND SUBSIDENCE MONITORING

The City's land subsidence monitoring program utilizes existing land surface elevation benchmarks currently monitored by the City. In August 2014, licensed land surveyors from Wilsey-Ham Engineers installed five new survey benchmarks at locations distributed across the City (**Figure 1**). The survey benchmarks consist of stainless steel rods set in sleeve monuments in grade boxes. During April 2016, Wilsey Ham re-surveyed the benchmarks. The results are summarized in **Section 3**, below.

3. MONITORING PROGRAM RESULTS

3.1. GROUNDWATER LEVELS

Groundwater elevation data are summarized in **Table 2** and groundwater elevations or depth to water over time are illustrated on **Figure 2**. In the City's Pad D Well, depth to water during 2016 ranged from 3.41 (April) to 8.56 (October) feet below the top of the well casing (ft btoc). In the City's Gloria Well, depth to water during 2016 ranged from 14.58 (June) to 19.82 (October) feet below the top of the access port at the well head. Depth to water in Romic Well RW-3D ranged from 4.90 (March) to 8.67 (September) ft btoc, while depth to water in Romic Well RW-16D ranged from 4.29 (September) to 6.49 (December) ft btoc. In Rhone Poulenc Well W-101, near San Francisco Bay, depth to water ranged from 3.23 ft btoc (December) to -0.36 ft btoc (April), when groundwater was artesian. Depth to groundwater was greatest in the Hale Well (42.2 feet bgs during September 2016), located in Palo Alto south of Highway 101.

Hydrographs of groundwater levels over time for the six wells monitored are shown on **Figure 2**. For the Gloria Way well, no measuring point elevation datum is available, and only depth to groundwater is plotted. For the other wells groundwater elevations are plotted.

Note that the historical measurement periods for the six wells vary based on the age of the well and frequency of measurement by the well owner. Water level measurements of the Hale well began in 1962. Water level measurements of Rhone Poulenc Well W-101 and Romic Well RW-16D began in 1986 and 2000, respectively. Romic Well RW-3D and City Well Pad D were installed in 2014, and water level measurements of those wells began at that time. A new water level sounding access port was installed in the Gloria Way Well in 2015, and water level data for this well are available for 2016 only. Long-term water level trends are monitored in Hale, W-101, and RW-16D, with additional short-term trends monitored quarterly in RW-3D, Pad D, and Gloria Way.

The hydrographs reveal that water levels in all wells were relatively stable in 2016 and prior years. Seasonal fluctuations were apparent in most wells during 2016, with higher levels recorded in Spring 2016 than in Fall 2016, likely a result of winter rainfall and groundwater recharge (see **Section 3.3**, below).

3.2. GROUNDWATER QUALITY

Groundwater quality data are summarized in **Table 4**, and concentrations of TDS and chloride over time are shown on **Figure 3**. For 2016, water quality samples were collected from Rhone Poulenc W-101, Romic RW-3D and 16D, Pad D, and Gloria Way, and analyzed for the inorganic water quality parameters listed in **Table 3**. Additional historical water quality data also are available for Romic RW-3D and 16D, Pad D, and Gloria Way. Historical electrical conductivity or specific conductance data, an indicator of TDS, are available for Rhone Poulenc W-101 for the period 2000-2016.

The following discusses water quality results for key analytes, along with historical water quality trends.

3.2.1 TDS

During April 2016, TDS in the Gloria Way Well was 840 milligrams per liter (mg/L). During previous sampling of the Gloria Way Well, TDS concentrations were 840 (December 2003), 820 (May 2012), and 850 (March 2015) mg/L. All of the Gloria Way Well TDS sampling results exceed the Secondary Maximum Contaminant Limit (SMCL) for TDS of 500 mg/L, but are below the Primary Maximum Contaminant Limit (PMCL) of 1,000 mg/L.

During April 2016, TDS in the Pad D Well was 380 mg/L. During a previous sampling of the Pad D Well in August 2014, TDS was 359 mg/L. These concentrations are below the SMCL for TDS.

TDS in Rhone Poulenc Well W-101 during April 2016 was 2,300 mg/L.

TDS in Romic Wells RW-3D and RW-16D during December 2016 was 374 and 2,320 mg/L, respectively. During previous sampling of in Romic Wells RW-3D and RW-16D in March 2015, the TDS concentrations were 461 and 413 mg/L, respectively.

Historical TDS concentrations in Romic Wells RW-3D and RW-16D also were estimated by converting the specific conductance (electrical conductivity) monitored during routine sampling (Todd, 1980; Hem, 1989). Specific conductance was converted to TDS Value by using the relationship:

Concentration as TDS (mg/L) = Specific Conductance (micromhos per liter - umho/L) x A, where A=0.54

Although not as reliable as the laboratory analysis for TDS, the estimated TDS values provide relative values that may reveal historical trends (**Figure 3**). The estimated TDS from specific conductance for Well RW-16D ranged from 410 mg/L (September 2010) to 4,700 mg/L (September 2007).

The variability and fluctuations in TDS concentrations in Well RW-16D may indicate this well (along with Rhone Poulenc Well W-101) is partially influenced by saline water along the Bay margin. The TDS of Pacific Ocean water is approximately 35,100 mg/L, and the fraction of seawater in South San Francisco Bay is approximately 75%, yielding a TDS in Bay water of approximately 26,200 mg/L (USGS, 2016). Although Romic Well RW-16D exhibited elevated TDS (2,320 mg/L in December 2016), the 2015 TDS concentration was much lower (413 mg/L). This variability, along with the variable historical TDS values estimated from specific conductance, may indicate the well is located near the interface between fresh and brackish groundwater. Changes in regional groundwater recharge and flow to the Bay may cause brackish water to migrate landward during low recharge/flow periods and Bayward during high recharge/flow periods. However, the concentration of bromide in Well RW-16D during 2016 was relatively low, and did not indicate intrusion of Bay water. Continued monitoring

of the Romic and Rhone Poulenc wells is recommended to track the groundwater quality conditions along the Bay and ensure saline water intrusion into the aquifer does not increase.

3.2.2 Chloride

During April 2016, chloride in the Gloria Way Well was 340 mg/L. During previous Gloria Way Well sampling events, chloride concentrations were 280 (December 2003), 350 (May 2012), and 360 (March 2015) mg/L. All of these Gloria Way Well concentrations exceed the SMCL for chloride of 250 mg/L, but are below the PMCL of 500 mg/L.

During April 2016, chloride in the Pad D Well was 44 mg/L. During a previous sampling of the Pad D Well in August 2014, chloride was detected at 33.3 mg/L. These concentrations are well below the SMCL.

Chloride in Romic Wells RW-3D and RW-16D during December 2016 was 26.8 and 1,220 mg/L, respectively. During previous sampling of in Romic Wells RW-3D and RW-16D in March 2015, chloride concentrations were 29.8 and 265 mg/L, respectively. Chloride in Rhone Poulenc Well W-101 during April 2016 was 380 mg/L.

Chloride in South San Francisco Bay water is approximately 14,400 mg/L (USGS, 2016; Murray, 2004). Based on the detected chloride concentrations in the Romic and Rhone Poulenc monitoring wells, groundwater near the Bay margin may be partially affected by saline water intrusion from the Bay. However, other sources of chloride, such as chloride contained in fine-grained clay layers adjacent to the well screens, may contribute to the variable chloride concentrations between wells.

3.2.3 Bromide

Other monitored saline water quality indicators are the trace elements bromide, iodide, and boron. During April 2016, bromide concentrations in the Gloria Way Well, Pad D Well, and Rhone Poulenc Well W-101 were 1.4, 0.2, and 1.4 mg/L, respectively. Bromide in Romic Wells RW-3D and RW-16D was not detected above the reporting limit of 5.0 mg/L during December 2016. During previous sampling events, bromide in the Gloria Way Well (May, 2012), Romic Well RW-16D March 2015) were 1.3 and 0.95 mg/L, respectively. These concentrations are similar to bromide concentrations in other wells in the San Francisquito Cone monitored by the USGS (Metzger, 2002), which had a range of 0.11 to 0.98 mg/L.

Bromide concentrations in seawater are approximately 65 mg/l (Murray, 2004; Al-Mutaz, 2000), and the estimated bromide concentration in South San Francisco Bay water is approximately 49 mg/L. Freshwater concentrations range typically from a trace to about 0.5 mg/l, although bromide forms as a disinfection by-product in treated surface water, and return flow to groundwater can elevate 'background' concentrations to above 0.5 mg/L.

Based on the detected bromide concentrations in the groundwater monitoring wells, groundwater does not appear to be affected by saline water intrusion from the Bay.

3.2.4 Iodide

During April 2016, iodide concentrations in the Gloria Way, Pad D Wells, and Rhone Poulenc Well W-101 were 620, 180, and 280 micrograms per liter (ug/L), respectively. Due to limitations of Romic's contract laboratory, iodide was not analyzed in Romic Wells RW-3D and RW-16D, during December 2016. During previous sampling events, iodide in the Gloria Way Well (May, 2012), Romic Well RW-3D (March 2015) were 530 and 380 ug/L, respectively.

Seawater typically contains 50–60 ug/L iodide, with a wide range of observed concentrations (Hurum and Rohrer, 2015; Hem, 1985). The estimated iodide concentration in South San Francisco Bay water is approximately 37-46 ug/L, much lower than the detected groundwater concentrations. This indicates iodide in groundwater likely originated from another source and not Bay water. Metzger (2002) hypothesized that wells in the San Francisquito Cone area may have elevated iodide concentrations (relative to Bay water) due to contact with marine sedimentary deposits (i.e., the Bay Mud aquitard) containing salts and/or organic material, which can concentrate iodide.

Accordingly, iodide is not considered a good indicator of Bay water intrusion and can be deleted from future City groundwater quality monitoring.

3.2.5 Boron

During April 2016, boron concentrations in the Gloria Way, Pad D Wells, and Rhone Poulenc Well W-101 were 220, 130, and 230 micrograms per liter (ug/L), respectively. Iodide in Romic Wells RW-3D and RW-16D, during December 2016 and were 230, and 442 ug/L, respectively. During previous sampling events, boron in the March 2015 samples from Romic Well RW-3D and RW-16D were 259 and 108 ug/L, respectively. Boron in well RW-16D appears slightly elevated (similar to TDS and chloride concentrations in this well). However, all of the boron concentrations are similar to concentrations in other wells in the San Francisquito Cone monitored by the USGS (Metzger, 2002), which had a range of 170 to 660 ug/L.

Boron concentrations in seawater are approximately 4,500 ug/l (Murray, 2004; Hem, 1985), and the estimated bromide concentration in South San Francisco Bay water is approximately 3,400 ug/L. The boron concentrations detected in the groundwater samples are not indicative of saline water intrusion from the Bay.

3.2.6 Manganese and Iron

During April 2016, manganese in the Gloria Way Well was 180 ug/L. During previous sampling of the Gloria Way Well, manganese concentrations were 190 (December 2003), 160 (May 2012), and 190 (March 2015) ug/L, respectively. All of these Gloria Way Well concentrations exceed the SMCL for manganese of 50 ug/L.

During April 2016, manganese in the Pad D Well was 39 ug/L. During a previous sampling of the Pad D Well in August 2014, manganese was detected at 38 ug/L. These concentrations are below the SMCL.

Manganese in Romic Wells RW-3D and RW-16D during December 2016 was 4.8 and 1,490 ug/L, respectively. During previous sampling of in Romic Well RW-16D in March 2015, the manganese concentration was 120 ug/L. Manganese in Rhone Poulenc Well W-101 during April 2016 was 370 ug/L. Again, manganese in RW-16D increased relative to the 2015 concentration, concentrations in this well and in Rhone Poulenc Well W-101 may indicate mixing of brackish water along the Bay margin.

During April 2016, total iron in the Gloria Way Well was 1,200 ug/L. During a previous sampling of the Gloria Way Well in March 2015, total and dissolved iron concentrations were 160 and 22 ug/L, respectively. The increase in iron concentrations in the 2016 Gloria Way Well sample is suspected to be due to the presence of suspended rust in the sample collected downstream of the cast iron fire hydrant. Future water quality sampling of the Gloria Way Well will be conducted via a new sampling port which will be installed at the wellhead after construction of the new treatment system.

3.2.7 Other Water Quality Parameters

Additional water quality parameters including major anions and cations for the water quality samples are listed in **Table 3**. These major ions can be used to interpret future geochemical changes once pumping begins.

The 2016 samples from Romic Wells RW-3D (March, June, September, and December) and RW-16D (September) are monitored for volatile organic compounds (VOCs). No VOCs were detected in the 2016 samples from RW-3D and RW-16D. These results indicate shallow VOC contamination at the Romic site has not migrated downward into the deep aquifer zone.

The April 2016 sample from Rhone Poulenc Well W-101 was analyzed for arsenic, which was detected at a concentration of 0.00061 mg/L. This was similar to the previous sample from W-101 collected in 2014, which had an arsenic concentration of 0.0006 mg/L. These concentrations are well below the MCL of 0.010 mg/L and indicate shallow arsenic contamination at the Rhone Poulenc site has not migrated downward into the deep aquifer zone.

3.2.8 Concentration Trends over Time

TDS and chloride concentration trends are illustrated on **Figure 3**. TDS and chloride concentrations in the Gloria Way Well between 2003 and 2016 and the Pad D Well between 2014 and 2016 were relatively stable, providing a good baselines for evaluating future concentration changes. Similarly, manganese concentrations in the Gloria Way Well between 2003 and 2016 have only varied from between 160 and 190 ug/L. TDS values estimated from specific conductance measurements in Rhone Poulenc Well W-101 from

generally between 2,000 and 3,000 mg/L in the 2000's to less than 1500 mg/L in the 2010's. However, these estimated values are considered less reliable than laboratory tests for TDS.

3.3. SURFACE WATER

Surface water data includes precipitation data from the NOAA Palo Alto station and San Francisquito Creek flow data from the USGS gaging station. Note that surface water data discussed below are for historical and 2016 calendar years (January 1 through December 31), rather than for water years (October 1 through September 30).

Rainfall and creekflow data are available hourly, daily, monthly, and annually. For the purposes of this report, only annual totals and averages are discussed, as they best represent overall hydrologic conditions during the year.

Figure 4 shows the historical and 2016 total annual precipitation at the NOAA Palo Alto Station. The annual average precipitation between 1954 and 2016 was 14.76 inches. During 2016, total precipitation totaled 15.33 inches, slightly higher than the annual average.

Figure 5 shows the historical and 2016 total average annual flow in San Francisquito Creek. The annual average creekflow rate between 1954 and 2016 was 22.35 cubic feet per second (cfs). During 2016, average creekflow was 26.7 cfs, slightly higher than the annual average.

These surface water data suggest that groundwater basin recharge was normal or slightly higher than normal in 2016.

3.4. LAND SUBSIDENCE

The April 2016 benchmark re-survey report from Wilsey Ham is included as **Attachment B** and the results are summarized in **Table 5**. Wilsey Ham reported they made multiple observations of the five benchmarks, as well as nearby National Geodetic Survey (NGS) benchmarks. The resulting combined observations indicated no change in the land surface elevations at any of the five City benchmarks between 2014 and 2016.

4. OTHER CITY WATER SUPPLY AND GROUNDWATER BASIN ACTIVITIES

4.1. OTHER 2016 ACTIVITIES

The City completed design of the iron and manganese treatment system for the Gloria Way Well and received bids for construction of the treatment system in on January 12, 2017. At the time of preparation of this report, the City was evaluating the bids received and anticipated initiating construction in late Spring or early Summer of 2017.

Design of the Pad D well system continued in 2016 and is expected to be completed in 2017. The City is also preparing the Draft Initial Study and Focused Environmental Impact Report (IS/FEIR) for the Pad D well system and anticipates issuing the IS/FEIR in 2017.

San Mateo County initiated the San Mateo Plain Groundwater Basin Assessment project in 2016, and compiled significant regional groundwater data. A report documenting hydrogeologic conditions throughout the San Mateo Plain Groundwater Subbasin was prepared in August 2016 (EKI, Todd Groundwater, and Hydrofocus, 2016). This project is ongoing and potential future groundwater basin management activities are currently being evaluated.

4.2. PLANNED 2017 ACTIVITIES

The City is moving forward with construction of the Gloria Way Well treatment system construction project. Construction is scheduled to begin in late Spring or early Summer of 2017, with a targeted completion by the end of 2017.

Design of the Pad D well system will continue in 2017, and is scheduled for completion in Summer of 2017 with construction beginning in late 2017 or early 2018. The Draft IS/FEIR for Pad D is anticipated to be issued in early 2017. Pad D is anticipated to begin operation in 2018.

5. SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1. SUMMARY AND CONCLUSIONS

The following summarizes the City's 2016 monitoring program, monitoring results, and provides conclusions.

Monitoring Scope of Work

- For this first annual groundwater monitoring program, historical groundwater elevation, groundwater quality, and surface water data were compiled in a Microsoft Access database constructed for ongoing City use
- In 2016, groundwater levels were monitored in six wells, and groundwater quality was monitored in five wells
- The Gloria Way and Pad D Wells, along with Rhone Poulenc Well W-101 were sampled for water quality in April
- Romic Wells RW-3D and RW-16D were sampled in March, September, and December
- San Francisquito Creek average annual flow and annual precipitation at the Palo Alto Station was obtained from the USGS and NOAA
- The City's five land elevation benchmarks were re-surveyed in April

Monitoring Results

- Groundwater elevation data indicate that water levels in all wells were relatively stable in 2016 and in recent years
- Minor seasonal water level fluctuations were apparent in most wells during 2016, with higher water levels recorded in Spring 2016 than in Fall 2016, likely a result of winter rainfall and groundwater recharge
- Groundwater quality varies between the Gloria Way, Pad D, and Romic and Rhone-Poulenc sites
- 2016 and historical TDS and chloride concentrations in the Gloria Way Well exceed the SMCLs but are below the PMCLs
- TDS and chloride concentrations in the Gloria Well have been relatively stable since 2002
- TDS and chloride concentrations in the Pad D Well during 2016 were similar to 2014 sampling results, and are low as compared with Gloria Way Well concentrations

- TDS and chloride concentrations in Romic Well RW-3D near San Francisco Bay are relatively low and less than the SMCLs
- TDS and chloride concentrations in Romic Well RW-16D near San Francisco Bay are elevated and greater than the SMCLs
- TDS and chloride in Rhone-Poulenc Well W-101 near San Francisco Bay are elevated, but below representative Bay Water concentrations
- The bromide and boron concentrations detected in the groundwater samples from Gloria Way, Pad D, and Romic Well RW-3D are not indicative of saline water intrusion from the Bay. Boron in Romic Well RW-16D and in Rhone Poulenc Well W-101 are slightly elevated, indicated possible mixing with brackish water near the Bay
- Iodide in groundwater is elevated relative to Bay water, therefore iodide is not a good indicator of saline water intrusion
- Average annual creekflow and precipitation during 2016 were slightly higher that historical averages, indicating overall average groundwater recharge conditions during 2016
- Land survey benchmark elevations for the five City benchmarks did not change between 2014 and 2016.

5.2. RECOMMENDATIONS

The following groundwater monitoring recommendations are provided.

- Continue the annual groundwater monitoring program in 2017
- Measure water levels in City and 3rd party wells quarterly, and collect water quality samples annually
- Analyze water quality samples for parameters listed in Table 2
- Review the analytical results and evaluate any changes in analyte concentrations. Identify any increases in TDS, chloride, boron, bromide, and manganese in Bay Margin wells RW-16D and W-101
- Delete iodide from water quality analytical program
- Re-survey City Benchmarks in 2018 after initiation of groundwater pumping
- Work with San Mateo County and other municipalities to facilitate a cooperate groundwater monitoring program

- Evaluate opportunities to install additional monitoring wells, particularly in the area east and northeast of Pad D

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Table 1. Well Construction Information City of East Palo Alto 2016 Groundwater Monitoring									
Well	**Location (East Palo Alto)**	**Northing**	**Easting**	**Rim or Ground Surface Elev (ft amsl)**	**Top of Well Casing Elev (ft amsl)**	**Installation Date**	**Depth (ft)**	**Diameter (in)**	**Screen Intervals (ft bgs)**
Gloria Way	Gloria Way & Bay Rd	NA - TBD after treatment system construction	NA - TBD after treatment system construction	NA - TBD after treatment system construction	NA - TBD after treatment system construction	11/1979	351	12.75	258-280; 318-323
Pad D Test Well	East Bayshore Rd & Clarke Ave	1993255.02	6087139.59	NA	17.93	5/2014	540	6	170-180; 320-345; 375-385; 435-460; 505-525
RW-3D	2081 Bay Rd	1999955.80	6088600.73	11.54	11.14	2/2014	220	4	200-220
RW-16D	2081 Bay Rd	1999459.86	6088623.94	12.10	11.65	5/1992	191	4	164-184
W-101	1990 Bay Rd	1998623.47	6088685.33	7.07	6.57	4/1986	180	5	158.3-178.3
Hale	Hale Street, Palo Alto	1992563.56	6081217.08	44	44.5	12/1/1955	840	14	108-828

NA - information not available

ft - feel

ft amsl - feet above mean sea level

in - inches

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
Gloria Way	1/28/2016	15.32	NA	NA
Gloria Way	4/8/2016	15.64	NA	NA
Gloria Way	6/22/2016	14.58	NA	NA
Gloria Way	10/12/2016	19.82	NA	NA
Hale	7/2/1962	186	44.5	-141.5
Hale	7/25/1962	176.8	44.5	-132.3
Hale	9/7/1962	175.9	44.5	-131.4
Hale	1/7/1963	130.9	44.5	-86.4
Hale	2/7/1963	125	44.5	-80.5
Hale	3/1/1963	126.6	44.5	-82.1
Hale	4/2/1963	124	44.5	-79.5
Hale	7/16/1963	154.9	44.5	-110.4
Hale	10/1/1963	152.9	44.5	-108.4
Hale	10/1/1964	109.9	44.5	-65.4
Hale	3/15/1965	100.1	44.5	-55.6
Hale	10/14/1965	100.1	44.5	-55.6
Hale	3/15/1966	71.9	44.5	-27.4
Hale	10/14/1966	95.1	44.5	-50.6
Hale	3/9/1967	79.1	44.5	-34.6
Hale	10/13/1967	84	44.5	-39.5
Hale	4/16/1968	74.1	44.5	-29.6
Hale	7/11/1968	80.1	44.5	-35.6
Hale	3/26/1969	68.9	44.5	-24.4
Hale	3/25/1970	65	44.5	-20.5
Hale	10/5/1970	73.2	44.5	-28.7
Hale	4/14/1971	62	44.5	-17.5
Hale	10/29/1971	69.9	44.5	-25.4
Hale	5/25/1972	53.1	44.5	-8.6
Hale	8/29/1972	73.2	44.5	-28.7
Hale	4/17/1974	40	44.5	4.5
Hale	10/2/1975	37.1	44.5	7.4
Hale	4/1/1976	39	44.5	5.5
Hale	8/3/1976	55.1	44.5	-10.6
Hale	9/2/1976	51.8	44.5	-7.3
Hale	9/16/1976	50.9	44.5	-6.4
Hale	10/1/1976	47.9	44.5	-3.4
Hale	12/1/1976	44.9	44.5	-0.4
Hale	2/1/1977	44	44.5	0.5
Hale	3/1/1977	42	44.5	2.5
Hale	4/1/1977	41	44.5	3.5
Hale	5/2/1977	43	44.5	1.5
Hale	5/31/1977	44.9	44.5	-0.4
Hale	6/30/1977	42	44.5	2.5
Hale	8/2/1977	48.9	44.5	-4.4
Hale	9/1/1977	49.9	44.5	-5.4
Hale	9/30/1977	48.9	44.5	-4.4
Hale	12/30/1977	45.9	44.5	-1.4
Hale	1/31/1978	44	44.5	0.5
Hale	3/1/1978	41	44.5	3.5
Hale	3/30/1978	36.1	44.5	8.4
Hale	5/1/1978	35.1	44.5	9.4
Hale	6/1/1978	36.1	44.5	8.4
Hale	6/30/1978	36.1	44.5	8.4
Hale	8/1/1978	36.1	44.5	8.4
Hale	9/1/1978	37.1	44.5	7.4
Hale	10/2/1978	0	44.5	44.5
Hale	11/1/1978	37.1	44.5	7.4
Hale	12/1/1978	37.1	44.5	7.4
Hale	1/2/1979	36.1	44.5	8.4

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
Hale	2/1/1979	35.1	44.5	9.4
Hale	3/1/1979	30.8	44.5	13.7
Hale	3/30/1979	32.2	44.5	12.3
Hale	5/1/1979	30.8	44.5	13.7
Hale	6/1/1979	33.1	44.5	11.4
Hale	6/29/1979	34.1	44.5	10.4
Hale	8/1/1979	35.1	44.5	9.4
Hale	8/13/1979	35.1	44.5	9.4
Hale	8/31/1979	36.1	44.5	8.4
Hale	9/4/1979	37.1	44.5	7.4
Hale	1/2/1980	35.1	44.5	9.4
Hale	2/1/1980	33.1	44.5	11.4
Hale	3/3/1980	32.2	44.5	12.3
Hale	4/1/1980	20	44.5	24.5
Hale	5/1/1980	30.8	44.5	13.7
Hale	6/2/1980	29.9	44.5	14.6
Hale	7/1/1980	32.2	44.5	12.3
Hale	8/4/1980	35.1	44.5	9.4
Hale	8/29/1980	33.1	44.5	11.4
Hale	10/2/1980	33.1	44.5	11.4
Hale	1/2/1981	32.2	44.5	12.3
Hale	2/2/1981	33.1	44.5	11.4
Hale	3/2/1981	32.2	44.5	12.3
Hale	3/30/1981	30.8	44.5	13.7
Hale	5/4/1981	33.1	44.5	11.4
Hale	6/1/1981	33.1	44.5	11.4
Hale	7/16/1981	34.1	44.5	10.4
Hale	7/31/1981	34.1	44.5	10.4
Hale	9/1/1981	36.1	44.5	8.4
Hale	10/1/1981	37.1	44.5	7.4
Hale	10/30/1981	36.1	44.5	8.4
Hale	12/1/1981	34.1	44.5	10.4
Hale	1/5/1982	33.1	44.5	11.4
Hale	2/2/1982	32.2	44.5	12.3
Hale	3/1/1982	30.8	44.5	13.7
Hale	4/1/1982	28.9	44.5	15.6
Hale	4/30/1982	27.9	44.5	16.6
Hale	6/1/1982	30.8	44.5	13.7
Hale	7/1/1982	32.2	44.5	12.3
Hale	8/5/1982	27.9	44.5	16.6
Hale	9/2/1982	33.1	44.5	11.4
Hale	10/1/1982	33.1	44.5	11.4
Hale	1/3/1983	28.9	44.5	15.6
Hale	2/1/1983	26.9	44.5	17.6
Hale	3/1/1983	24	44.5	20.5
Hale	3/31/1983	22	44.5	22.5
Hale	5/2/1983	21	44.5	23.5
Hale	6/1/1983	27.9	44.5	16.6
Hale	7/1/1983	26.9	44.5	17.6
Hale	8/1/1983	27.9	44.5	16.6
Hale	9/1/1983	28.9	44.5	15.6
Hale	10/31/1983	29.9	44.5	14.6
Hale	12/1/1983	24	44.5	20.5
Hale	1/3/1984	23	44.5	21.5
Hale	2/2/1984	24	44.5	20.5
Hale	3/1/1984	23	44.5	21.5
Hale	3/30/1984	23	44.5	21.5
Hale	5/1/1984	24.9	44.5	19.6
Hale	6/1/1984	28.9	44.5	15.6

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
Hale	7/3/1984	28.9	44.5	15.6
Hale	8/1/1984	27.9	44.5	16.6
Hale	8/31/1984	27.9	44.5	16.6
Hale	10/4/1984	28.9	44.5	15.6
Hale	1/2/1985	24.9	44.5	19.6
Hale	2/1/1985	28.9	44.5	15.6
Hale	3/1/1985	24.9	44.5	19.6
Hale	4/1/1985	25.9	44.5	18.6
Hale	5/1/1985	26.9	44.5	17.6
Hale	6/1/1985	28.9	44.5	15.6
Hale	7/1/1985	30.8	44.5	13.7
Hale	8/1/1985	29.9	44.5	14.6
Hale	8/30/1985	32.2	44.5	12.3
Hale	10/1/1985	29.9	44.5	14.6
Hale	11/1/1985	29.9	44.5	14.6
Hale	12/2/1985	28.9	44.5	15.6
Hale	2/3/1986	26.9	44.5	17.6
Hale	3/2/1986	26.9	44.5	17.6
Hale	4/1/1986	26.9	44.5	17.6
Hale	12/31/1986	26	44.5	18.5
Hale	2/2/1987	29	44.5	15.5
Hale	3/2/1987	30	44.5	14.5
Hale	4/1/1987	28	44.5	16.5
Hale	4/30/1987	28	44.5	16.5
Hale	6/1/1987	30	44.5	14.5
Hale	6/30/1987	30	44.5	14.5
Hale	8/2/1987	31	44.5	13.5
Hale	9/1/1987	31	44.5	13.5
Hale	10/1/1987	32	44.5	12.5
Hale	11/2/1987	33	44.5	11.5
Hale	12/1/1987	31	44.5	13.5
Hale	12/31/1987	30	44.5	14.5
Hale	2/1/1988	28	44.5	16.5
Hale	3/1/1988	28	44.5	16.5
Hale	4/1/1988	30	44.5	14.5
Hale	5/2/1988	31	44.5	13.5
Hale	6/1/1988	32	44.5	12.5
Hale	7/1/1988	36	44.5	8.5
Hale	8/2/1988	112	44.5	-67.5
Hale	9/1/1988	137	44.5	-92.5
Hale	10/5/1988	140	44.5	-95.5
Hale	11/1/1988	61	44.5	-16.5
Hale	1/3/1989	49	44.5	-4.5
Hale	2/1/1989	46	44.5	-1.5
Hale	3/1/1989	44	44.5	0.5
Hale	4/1/1989	42	44.5	2.5
Hale	5/1/1989	42	44.5	2.5
Hale	6/1/1989	44	44.5	0.5
Hale	6/30/1989	43	44.5	1.5
Hale	8/1/1989	42	44.5	2.5
Hale	9/1/1989	42	44.5	2.5
Hale	10/2/1989	41	44.5	3.5
Hale	10/31/1989	42	44.5	2.5
Hale	12/1/1989	41	44.5	3.5
Hale	1/2/1990	39	44.5	5.5
Hale	2/2/1990	38	44.5	6.5
Hale	3/1/1990	41	44.5	3.5
Hale	4/2/1990	45	44.5	-0.5
Hale	4/30/1990	45	44.5	-0.5

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
Hale	5/2/1990	48	44.5	-3.5
Hale	7/3/1990	47	44.5	-2.5
Hale	7/30/1990	47	44.5	-2.5
Hale	8/28/1990	47	44.5	-2.5
Hale	10/1/1990	45	44.5	-0.5
Hale	11/1/1990	45	44.5	-0.5
Hale	12/5/1990	46	44.5	-1.5
Hale	12/31/1990	44	44.5	0.5
Hale	2/1/1991	46	44.5	-1.5
Hale	3/1/1991	47	44.5	-2.5
Hale	5/2/1991	53	44.5	-8.5
Hale	5/31/1991	44	44.5	0.5
Hale	7/1/1991	40	44.5	4.5
Hale	8/1/1991	36	44.5	8.5
Hale	8/30/1991	44	44.5	0.5
Hale	10/1/1991	40	44.5	4.5
Hale	10/31/1991	38	44.5	6.5
Hale	12/2/1991	43	44.5	1.5
Hale	1/2/1992	43	44.5	1.5
Hale	1/31/1992	40	44.5	4.5
Hale	3/3/1992	38	44.5	6.5
Hale	4/1/1992	37	44.5	7.5
Hale	5/4/1992	37	44.5	7.5
Hale	6/1/1992	44	44.5	0.5
Hale	7/2/1992	40	44.5	4.5
Hale	8/3/1992	42	44.5	2.5
Hale	9/1/1992	41	44.5	3.5
Hale	9/30/1992	42	44.5	2.5
Hale	11/3/1992	41	44.5	3.5
Hale	12/3/1992	43	44.5	1.5
Hale	1/4/1993	41	44.5	3.5
Hale	2/1/1993	43	44.5	1.5
Hale	3/1/1993	37	44.5	7.5
Hale	4/1/1993	33	44.5	11.5
Hale	6/1/1993	42	44.5	2.5
Hale	7/1/1993	37	44.5	7.5
Hale	7/30/1993	38	44.5	6.5
Hale	9/1/1993	36	44.5	8.5
Hale	10/4/1993	40	44.5	4.5
Hale	11/1/1993	37	44.5	7.5
Hale	12/1/1993	37	44.5	7.5
Hale	1/3/1994	34	44.5	10.5
Hale	2/2/1994	32	44.5	12.5
Hale	3/1/1994	33	44.5	11.5
Hale	4/1/1994	37	44.5	7.5
Hale	5/2/1994	34	44.5	10.5
Hale	6/1/1994	35	44.5	9.5
Hale	7/1/1994	34	44.5	10.5
Hale	8/1/1994	36	44.5	8.5
Hale	9/1/1994	41	44.5	3.5
Hale	10/1/1994	45	44.5	-0.5
Hale	11/1/1994	45	44.5	-0.5
Hale	12/1/1994	40	44.5	4.5
Hale	1/3/1995	37	44.5	7.5
Hale	2/1/1995	37	44.5	7.5
Hale	3/1/1995	32	44.5	12.5
Hale	3/31/1995	32	44.5	12.5
Hale	5/1/1995	29	44.5	15.5
Hale	6/1/1995	30	44.5	14.5

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
Hale	6/30/1995	31	44.5	13.5
Hale	8/1/1995	32	44.5	12.5
Hale	9/1/1995	33	44.5	11.5
Hale	10/2/1995	37	44.5	7.5
Hale	11/1/1995	37	44.5	7.5
Hale	12/4/1995	38	44.5	6.5
Hale	1/2/1996	37	44.5	7.5
Hale	2/5/1996	36	44.5	8.5
Hale	3/4/1996	35	44.5	9.5
Hale	4/2/1996	27	44.5	17.5
Hale	5/1/1996	30	44.5	14.5
Hale	5/31/1996	33	44.5	11.5
Hale	7/1/1996	38	44.5	6.5
Hale	8/2/1996	31	44.5	13.5
Hale	9/4/1996	37	44.5	7.5
Hale	10/2/1996	33	44.5	11.5
Hale	11/1/1996	35	44.5	9.5
Hale	1/2/1997	32	44.5	12.5
Hale	2/28/1997	25	44.5	19.5
Hale	6/30/1997	32	44.5	12.5
Hale	1/2/1998	28	44.5	16.5
Hale	2/2/1998	32	44.5	12.5
Hale	3/2/1998	24	44.5	20.5
Hale	4/3/1998	25	44.5	19.5
Hale	6/5/1998	23	44.5	21.5
Hale	7/2/1998	26	44.5	18.5
Hale	8/3/1998	28	44.5	16.5
Hale	9/3/1998	29	44.5	15.5
Hale	10/1/1998	30	44.5	14.5
Hale	1/4/1999	27	44.5	17.5
Hale	2/1/1999	26	44.5	18.5
Hale	3/1/1999	26	44.5	18.5
Hale	4/1/1999	25	44.5	19.5
Hale	5/5/1999	26	44.5	18.5
Hale	9/1/1999	32	44.5	12.5
Hale	10/1/1999	32	44.5	12.5
Hale	1/7/2000	29	44.5	15.5
Hale	4/21/2000	29	44.5	15.5
Hale	5/25/2000	29	44.5	15.5
Hale	6/2/2000	65	44.5	-20.5
Hale	7/12/2000	34	44.5	10.5
Hale	8/2/2000	33.5	44.5	11
Hale	9/6/2000	33	44.5	11.5
Hale	10/6/2000	33.5	44.5	11
Hale	11/19/2000	30	44.5	14.5
Hale	12/18/2000	29	44.5	15.5
Hale	1/2/2001	28.25	44.5	16.25
Hale	2/1/2001	28	44.5	16.5
Hale	3/5/2001	28	44.5	16.5
Hale	4/1/2001	29	44.5	15.5
Hale	5/1/2001	24	44.5	20.5
Hale	6/1/2001	32	44.5	12.5
Hale	7/9/2001	32.5	44.5	12
Hale	8/2/2001	34	44.5	10.5
Hale	9/10/2001	38	44.5	6.5
Hale	10/1/2001	42	44.5	2.5
Hale	11/2/2001	39	44.5	5.5
Hale	12/19/2001	30	44.5	14.5
Hale	1/2/2002	4	44.5	40.5

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
Hale	2/4/2002	30	44.5	14.5
Hale	3/4/2002	30	44.5	14.5
Hale	4/8/2002	29	44.5	15.5
Hale	5/1/2002	29	44.5	15.5
Hale	6/3/2002	34	44.5	10.5
Hale	7/2/2002	35	44.5	9.5
Hale	8/5/2002	32	44.5	12.5
Hale	9/3/2002	25.5	44.5	19
Hale	10/1/2002	40	44.5	4.5
Hale	11/6/2002	38.5	44.5	6
Hale	12/4/2002	35.5	44.5	9
Hale	1/2/2003	32	44.5	12.5
Hale	2/5/2003	31	44.5	13.5
Hale	3/3/2003	28	44.5	16.5
Hale	4/2/2003	5	44.5	39.5
Hale	4/30/2003	28	44.5	16.5
Hale	6/4/2003	30	44.5	14.5
Hale	7/2/2003	28.8	44.5	15.7
Hale	8/15/2003	31	44.5	13.5
Hale	9/12/2003	33	44.5	11.5
Hale	10/1/2003	34	44.5	10.5
Hale	11/5/2003	34	44.5	10.5
Hale	12/1/2003	32.5	44.5	12
Hale	1/7/2004	30	44.5	14.5
Hale	3/3/2004	30	44.5	14.5
Hale	4/1/2004	28	44.5	16.5
Hale	5/5/2004	30.5	44.5	14
Hale	6/3/2004	33	44.5	11.5
Hale	7/7/2004	33.3	44.5	11.2
Hale	8/4/2004	34.5	44.5	10
Hale	9/1/2004	35.8	44.5	8.7
Hale	10/6/2004	38.7	44.5	5.8
Hale	11/3/2004	36	44.5	8.5
Hale	12/1/2004	34.3	44.5	10.2
Hale	1/5/2005	31.3	44.5	13.2
Hale	3/2/2005	31.7	44.5	12.8
Hale	4/6/2005	26	44.5	18.5
Hale	5/4/2005	26.8	44.5	17.7
Hale	6/1/2005	26.4	44.5	18.1
Hale	7/7/2005	26.3	44.5	18.2
Hale	8/17/2005	26.3	44.5	18.2
Hale	9/7/2006	32.8	44.5	11.7
Hale	10/30/2006	29.2	44.5	15.3
Hale	11/30/2006	27	44.5	17.5
Hale	2/1/2007	26.7	44.5	17.8
Hale	2/28/2007	26.2	44.5	18.3
Hale	3/30/2007	26.5	44.5	18
Hale	5/1/2007	29	44.5	15.5
Hale	6/5/2007	32	44.5	12.5
Hale	7/2/2007	39	44.5	5.5
Hale	8/1/2007	40.1	44.5	4.4
Hale	9/6/2007	41.3	44.5	3.2
Hale	10/2/2007	41	44.5	3.5
Hale	10/31/2007	39.3	44.5	5.2
Hale	11/28/2007	36.5	44.5	8
Hale	1/30/2008	32.1	44.5	12.4
Hale	4/2/2008	29.5	44.5	15
Hale	5/1/2008	30.5	44.5	14
Hale	6/5/2008	31.4	44.5	13.1

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
Hale	7/1/2008	31.8	44.5	12.7
Hale	7/30/2008	36.3	44.5	8.2
Hale	10/30/2008	39.5	44.5	5
Hale	11/24/2008	36	44.5	8.5
Hale	12/31/2008	33.1	44.5	11.4
Hale	2/4/2009	33.5	44.5	11
Hale	3/4/2009	31.5	44.5	13
Hale	4/1/2009	29.8	44.5	14.7
Hale	4/30/2009	31.9	44.5	12.6
Hale	5/27/2009	33.1	44.5	11.4
Hale	7/8/2009	38.3	44.5	6.2
Hale	8/25/2009	37	44.5	7.5
Hale	10/29/2009	34.1	44.5	10.4
Hale	12/2/2009	34.5	44.5	10
Hale	12/30/2009	32.1	44.5	12.4
Hale	1/29/2010	30.3	44.5	14.2
Hale	2/25/2010	29.3	44.5	15.2
Hale	3/31/2010	28.5	44.5	16
Hale	5/26/2010	27.8	44.5	16.7
Hale	6/30/2010	36.8	44.5	7.7
Hale	8/25/2010	33.5	44.5	11
Hale	4/25/2013	32	44.5	12.5
Hale	4/25/2013	32	44.5	12.5
Hale	6/27/2013	37.8	44.5	6.7
Hale	6/27/2013	37.8	44.5	6.7
Hale	8/29/2013	38	44.5	6.5
Hale	9/26/2013	41	44.5	3.5
Hale	10/31/2013	42.3	44.5	2.2
Hale	1/30/2014	40.6	44.5	3.9
Hale	2/26/2014	40.6	44.5	3.9
Hale	3/26/2014	41.8	44.5	2.7
Hale	4/30/2014	41.8	44.5	2.7
Hale	5/29/2014	52.3	44.5	-7.8
Hale	6/25/2014	47.2	44.5	-2.7
Hale	7/29/2014	48.9	44.5	-4.4
Hale	9/25/2014	48.5	44.5	-4
Hale	10/30/2014	48.6	44.5	-4.1
Hale	1/29/2015	37.2	44.5	7.3
Hale	4/1/2015	38.3	44.5	6.2
Hale	4/29/2015	39.5	44.5	5
Hale	5/28/2015	41.4	44.5	3.1
Hale	6/24/2015	39.3	44.5	5.2
Hale	7/30/2015	39	44.5	5.5
Hale	8/31/2015	40.1	44.5	4.4
Hale	9/29/2015	43	44.5	1.5
Hale	10/28/2015	43.5	44.5	1
Hale	1/27/2016	38	44.5	6.5
Hale	2/25/2016	36	44.5	8.5
Hale	4/29/2016	35.2	44.5	9.3
Hale	7/28/2016	37	44.5	7.5
Hale	9/28/2016	42.2	44.5	2.3
Pad D	7/28/2014	8.65	35	26.35
Pad D	1/28/2016	5.64	35	29.36
Pad D	4/8/2016	3.41	35	31.59
Pad D	6/22/2016	5.4	35	29.6
Pad D	10/12/2016	8.56	35	26.44
RW-16D	9/11/2000	2.22	8.99	6.77
RW-16D	12/4/2000	0.9	8.99	8.09
RW-16D	6/15/2001	1.05	8.99	7.94

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
RW-16D	9/4/2001	3.61	8.99	5.38
RW-16D	12/17/2001	2.79	8.99	6.2
RW-16D	4/1/2002	0	8.99	8.99
RW-16D	6/10/2002	1.85	8.99	7.14
RW-16D	9/25/2002	4.78	8.99	4.21
RW-16D	12/30/2002	2.75	8.99	6.24
RW-16D	3/10/2003	4.88	8.99	4.11
RW-16D	6/16/2003	0.6	8.99	8.39
RW-16D	9/16/2003	6.2	8.99	2.79
RW-16D	12/16/2003	5.92	8.99	3.07
RW-16D	6/21/2004	1.64	8.99	7.35
RW-16D	9/27/2004	4.24	8.99	4.75
RW-16D	12/20/2004	2.24	8.99	6.75
RW-16D	6/6/2005	4.85	8.99	4.14
RW-16D	8/16/2005	0.55	8.99	8.44
RW-16D	11/28/2005	0.3	8.99	8.69
RW-16D	3/22/2006	4.46	8.99	4.53
RW-16D	6/14/2006	0.1	8.99	8.89
RW-16D	9/20/2006	0	8.99	8.99
RW-16D	3/13/2007	0	8.99	8.99
RW-16D	6/18/2007	5.9	8.99	3.09
RW-16D	9/24/2007	4	8.99	4.99
RW-16D	3/17/2008	0.92	8.99	8.07
RW-16D	6/23/2008	1.03	8.99	7.96
RW-16D	9/15/2008	3.72	8.99	5.27
RW-16D	9/21/2009	1.7	8.99	7.29
RW-16D	9/14/2010	0.58	8.99	8.41
RW-16D	12/13/2010	4.14	8.99	4.85
RW-16D	9/6/2011	4.37	8.99	4.62
RW-16D	9/24/2012	2.71	8.99	6.28
RW-16D	9/23/2013	4.11	8.99	4.88
RW-16D	9/22/2014	8.59	8.99	0.4
RW-16D	3/30/2015	5.58	8.99	3.41
RW-16D	9/28/2016	4.29	8.99	4.7
RW-16D	12/21/2016	6.49	8.99	2.5
RW-3D	3/24/2014	8.82	11.14	2.32
RW-3D	6/17/2014	12.51	11.14	-1.37
RW-3D	9/24/2014	14.69	11.14	-3.55
RW-3D	12/22/2014	10.6	11.14	0.54
RW-3D	3/30/2015	7.4	11.14	3.74
RW-3D	6/17/2015	9.9	11.14	1.24
RW-3D	3/30/2016	4.9	11.14	6.24
RW-3D	6/27/2016	5.02	11.14	6.12
RW-3D	9/29/2016	8.67	11.14	2.47
RW-3D	12/21/2016	7.02	11.14	4.12
W-101	8/26/1986	3.68	6.54	2.86
W-101	12/8/1986	3.35	6.54	3.19
W-101	3/11/1987	1.78	6.54	4.76
W-101	6/9/1987	3.62	6.54	2.92
W-101	12/9/1987	3.34	6.54	3.2
W-101	2/4/1988	3.2	6.54	3.34
W-101	6/15/1988	3.34	6.54	3.2
W-101	6/12/1989	11.85	6.54	-5.31
W-101	6/14/1990	14.36	6.54	-7.82
W-101	4/8/1991	15.08	6.54	-8.54
W-101	4/6/1992	4.82	6.54	1.72
W-101	7/29/1992	7.24	6.54	-0.7
W-101	4/12/1993	1.84	6.54	4.7
W-101	4/11/1994	2.88	6.54	3.66

Table 2: Groundwater Levels City of East Palo Alto 2016 Groundwater Monitoring				
Well	Date	Depth to Water (ft)	Measuring Point Elevation (ft)	Water Level Elevation (ft amsl)
W-101	4/12/1995	2.07	6.54	4.47
W-101	4/10/1996	1.78	6.54	4.76
W-101	10/2/1996	5.15	6.54	1.39
W-101	4/14/1997	1.25	6.54	5.29
W-101	4/20/1998	0	6.54	6.54
W-101	4/22/2002	-2.63	6.87	9.5
W-101	10/20/2003	0.37	6.87	6.5
W-101	4/27/2009	-2.32	6.87	9.19
W-101	4/27/2010	-3.61	6.62	10.23
W-101	4/20/2011	-4.52	6.62	11.14
W-101	4/24/2012	-3.44	6.62	10.06
W-101	4/24/2013	-2.95	6.62	9.57
W-101	4/17/2014	3.52	6.62	3.1
W-101	4/21/2015	3.33	6.62	3.29
W-101	10/14/2015	4.99	6.62	1.63
W-101	1/29/2016	2.68	6.62	3.94
W-101	4/21/2016	-0.36	6.62	6.98
W-101	7/19/2016	0.47	6.62	6.15
W-101	10/21/2016	3.23	6.62	3.39

Table 3. Groundwater Sample Laboratory Analytes for City Wells City of East Palo Alto 2016 Groundwater Monitoring							
Analysis	**Method (EPA/SM)**	**Recommended Reporting Limits**	**Holding Time (days)**	**Preservation**	**Standards (mg/L)**		
					CA Primary MCL	**PHG**	**CA Secondary MCL**
Bicarbonate (HCO_3^-)	SM 2320B	5 mg/L	14	<6 ºC	–	–	–
Boron	EPA 200.7	50 µg/L	28	<6 ºC	–	–	–
Bromide(Br^-)*	EPA 300.1	5 µg/L	28	<6 ºC	–	–	–
Calcium (Ca^{2+})	EPA 200.7	1.0 mg/L	180	Add HNO_3 to pH <2	–	–	—
Chloride (Cl^-)	EPA 300.0	0.5 mg/L	28	<6 ºC	–	250	–
Iodide (I^-)*	200.7	5 µg/L	28	<6 ºC	–	–	—
Iron (Fe) (total)	EPA 200.8	100 µg/L	180	Add HNO_3 to pH <2	–	–	0.300
Magnesium (Mg^{2+})	EPA 200.7	1 mg/L	180	Add HNO_3 to pH <2	–	–	–
Manganese (Mn^{2+})	EPA 200.8	20 µg/L	180	Add HNO_3 to pH <2	–	0.050	–
Potassium (K^+)	EPA 200.7	1 mg/L	180	Add HNO_3 to pH <2	–	–	–
Sodium (Na^+)	EPA 200.7	1 mg/L	180	Add HNO_3 to pH <2	–	–	–
pH (units)	SM 4500	1 pH units	0.01	<6 ºC	–	6.5-8.5	–
Total Dissolved Solids (TDS)	SM 2540C	10 mg/L	7	<6 ºC	–	500	–
Sulfate (SO_4^{2-})	EPA 300	0.5 mg/L	28	<6 ºC	–	250	–

Notes:
mg/L = milligrams per liter
µg/L = micrograms per liter
MCL = Maximum Contaminant Level for drinking water
PHG = Public Health Goal for drinking water
HNO_3 = nitric acid

Table 4. Groundwater Quality Sampling Results City of East Palo Alto 2016 Groundwater Monitoring							
Well	**Sample Date**	**Analyte**	**Result**	**Qualifier**	**Reporting Limit**	**Method**	**Units**
Gloria Way	12/15/2003	Arsenic	1.4				µg/L
Gloria Way	5/22/2012	Arsenic	2.8				µg/L
Gloria Way	3/25/2015	Arsenic III		<	1	EPA 200.8	µg/L
Gloria Way	3/25/2015	Arsenic Total ICAP/MS	1.4			EPA 200.8	µg/L
Gloria Way	3/25/2015	Arsenic V		<	1	EPA 200.8	µg/L
Gloria Way	3/25/2015	Bicarb.Alkalinity as HCO3calc	250			SM2330B	mg/L
Gloria Way	5/22/2012	Bicarbonate	250			SM 2320B	mg/L
Gloria Way	4/8/2016	Bicarbonate	250		5.0	SM2320B	mg/L
Gloria Way	12/15/2003	Bicarbonate Alkalinity	200				mg/L
Gloria Way	5/22/2012	Bicarbonate Alkalinity	250				mg/L
Gloria Way	4/8/2016	Boron	220		50	EPA 200.8	µg/L
Gloria Way	5/22/2012	Bromide	1.3			EPA 300.0	mg/L
Gloria Way	4/8/2016	Bromide	1.4		0.25	EPA 300.1	mg/L
Gloria Way	12/15/2003	Calcium	57				mg/L
Gloria Way	5/22/2012	Calcium	59				mg/L
Gloria Way	4/8/2016	Calcium	53		1.0	EPA 200.7	mg/L
Gloria Way	5/22/2012	Calcium	59			EPA 200.7	mg/L
Gloria Way	3/25/2015	Calcium Total ICAP	55			EPA 200.7	mg/L
Gloria Way	3/25/2015	Carbonate as CO3, Calculated	2.6			SM2330B	mg/L
Gloria Way	12/15/2003	Chloride	280				mg/L
Gloria Way	5/22/2012	Chloride	350				mg/L
Gloria Way	5/22/2012	Chloride	350			EPA 300.0	mg/L
Gloria Way	3/25/2015	Chloride	360			EPA 300	mg/L
Gloria Way	4/8/2016	Chloride	340		12	EPA 300.0	mg/L
Gloria Way	5/22/2012	Iodide	530		5	EPA 300.0	µg/L
Gloria Way	4/8/2016	Iodide	620		250	EPA 9056M	µg/L
Gloria Way	4/8/2016	Iron	1200		50	EPA 200.8	µg/L
Gloria Way	3/25/2015	Iron Dissolved ICAP	0.022			EPA 200.7	mg/L
Gloria Way	3/25/2015	Iron Total ICAP	0.16			EPA 200.7	mg/L
Gloria Way	12/15/2003	Magnesium	26				mg/L
Gloria Way	5/22/2012	Magnesium	25				mg/L
Gloria Way	4/8/2016	Magnesium	24		1.0	EPA 200.7	mg/L
Gloria Way	5/22/2012	Magnesium	25			EPA 200.7	mg/L
Gloria Way	3/25/2015	Magnesium Total ICAP	25			EPA 200.7	mg/L
Gloria Way	12/15/2003	Manganese	0.19				mg/L
Gloria Way	5/22/2012	Manganese	0.16				mg/L
Gloria Way	5/22/2012	Manganese	160			EPA 200.8	µg/L
Gloria Way	4/8/2016	Manganese	180		5.0	EPA 200.8	µg/L
Gloria Way	3/25/2015	Manganese Dissolved ICAP	0.18			EPA 200.7	mg/L
Gloria Way	3/25/2015	Manganese Total ICAP/MS	190			EPA 200.8	µg/L
Gloria Way	5/22/2012	pH	7.98			SM 4500	pH units
Gloria Way	4/8/2016	pH	8.01		1.68	H+B	pH units
Gloria Way	3/25/2015	PH (H3=past HT not compliant)	8.2			SM 4500	pH units
Gloria Way	3/25/2015	pH of CaCO3 saturation(25C)	7.3			SM2330B	pH Units
Gloria Way	3/25/2015	pH of CaCO3 saturation(60C)	6.8			SM2330B	pH Units
Gloria Way	12/15/2003	pH Units	7.95				ph Units
Gloria Way	5/22/2012	pH Units	7.98				ph Units
Gloria Way	12/15/2003	Potassium		<	2		mg/L
Gloria Way	5/22/2012	Potassium	1.1	<	2		mg/L
Gloria Way	4/8/2016	Potassium	1.1		1.0	EPA 200.7	mg/L
Gloria Way	5/22/2012	Potassium				EPA 200.7	mg/L
Gloria Way	3/25/2015	Potassium Total ICAP	1.1			EPA 200.7	mg/L

Table 4. Groundwater Quality Sampling Results City of East Palo Alto 2016 Groundwater Monitoring							
Well	**Sample Date**	**Analyte**	**Result**	**Qualifier**	**Reporting Limit**	**Method**	**Units**
Gloria Way	12/15/2003	Sodium	230				mg/L
Gloria Way	5/22/2012	Sodium	240				mg/L
Gloria Way	4/8/2016	Sodium	220		1.0	EPA 200.7	mg/L
Gloria Way	5/22/2012	Sodium	240			EPA 200.7	mg/L
Gloria Way	3/25/2015	Sodium Total ICAP	230			EPA 200.7	mg/L
Gloria Way	12/15/2003	Specific Conductance	1500				µS/cm
Gloria Way	5/22/2012	Specific Conductance	1500				µS/cm
Gloria Way	5/22/2012	Specific Conductance	1500			SM 2510B	µS/cm
Gloria Way	3/25/2015	Specific Conductance, 25 C	1600			SM 2510B	umho/cm
Gloria Way	12/15/2003	Sulfate	30				mg/L
Gloria Way	5/22/2012	Sulfate	33				mg/L
Gloria Way	5/22/2012	Sulfate	33			EPA 300	mg/L
Gloria Way	4/8/2016	Sulfate	31		12	EPA 300.0	mg/L
Gloria Way	3/25/2015	Sulfate (SO42−)	33			EPA 300	mg/L
Gloria Way	12/15/2003	Total Dissolved Solids	840				mg/L
Gloria Way	5/22/2012	Total Dissolved Solids	820				mg/L
Gloria Way	5/22/2012	Total Dissolved Solids (TDS)	820			SM 2540C	mg/L
Gloria Way	3/25/2015	Total Dissolved Solids (TDS)	850			SM 2540C	mg/L
Gloria Way	4/8/2016	Total Dissolved Solids (TDS)	840		10	SM2540C	mg/L
Pad D	8/5/2014	Arsenic	3.58				µg/L
Pad D	4/8/2016	Bicarbonate	270		5.0	SM2320B	mg/L
Pad D	8/5/2014	Bicarbonate Alkalinity	245				mg/L
Pad D	4/8/2016	Boron	130		50	EPA 200.8	µg/L
Pad D	4/8/2016	Bromide	0.2		0.050	EPA 300.1	mg/L
Pad D	8/5/2014	Calcium	12				mg/L
Pad D	4/8/2016	Calcium	12		1.0	EPA 200.7	mg/L
Pad D	8/5/2014	Chloride	33.3				mg/L
Pad D	4/8/2016	Chloride	44		5.0	EPA 300.0	mg/L
Pad D	4/8/2016	Iodide	180		120	EPA 9056M	µg/L
Pad D	4/8/2016	Iron	270		50	EPA 200.8	µg/L
Pad D	8/5/2014	Magnesium	4.7				mg/L
Pad D	4/8/2016	Magnesium	4.9		1.0	EPA 200.7	mg/L
Pad D	8/5/2014	Manganese	0.038				mg/L
Pad D	4/8/2016	Manganese	39		5.0	EPA 200.8	µg/L
Pad D	4/8/2016	pH	8.07		1.68	H+B	pH units
Pad D	8/5/2014	pH Units	8.22				ph Units
Pad D	8/5/2014	Potassium		<	2		mg/L
Pad D	4/8/2016	Potassium		<	1.0	EPA 200.7	mg/L
Pad D	8/5/2014	Sodium	120				mg/L
Pad D	4/8/2016	Sodium	120		1.0	EPA 200.7	mg/L
Pad D	8/5/2014	Specific Conductance	624				µS/cm
Pad D	8/5/2014	Sulfate	19.1				mg/L
Pad D	4/8/2016	Sulfate	15		5.0	EPA 300.0	mg/L
Pad D	8/5/2014	Total Dissolved Solids	359				mg/L
Pad D	4/8/2016	Total Dissolved Solids (TDS)	380		10	SM2540C	mg/L
RW-16D	12/21/2016	Alkalinity, Bicarbonate	211		5.0	11	mg/L
RW-16D	12/21/2016	Alkalinity, Total as CaCO3	211		5.0	11	mg/L
RW-16D	3/30/2015	Boron	108		100	6010B	µg/L
RW-16D	12/21/2016	Boron	442		100	EPA 200.7	µg/L
RW-16D	3/30/2015	Bromide	0.95		0.2	EPA 300	mg/L
RW-16D	12/21/2016	Bromide		<	0.50	300/SW846	mg/L
RW-16D	3/30/2015	Calcium	73200		5000	6010B	µg/L

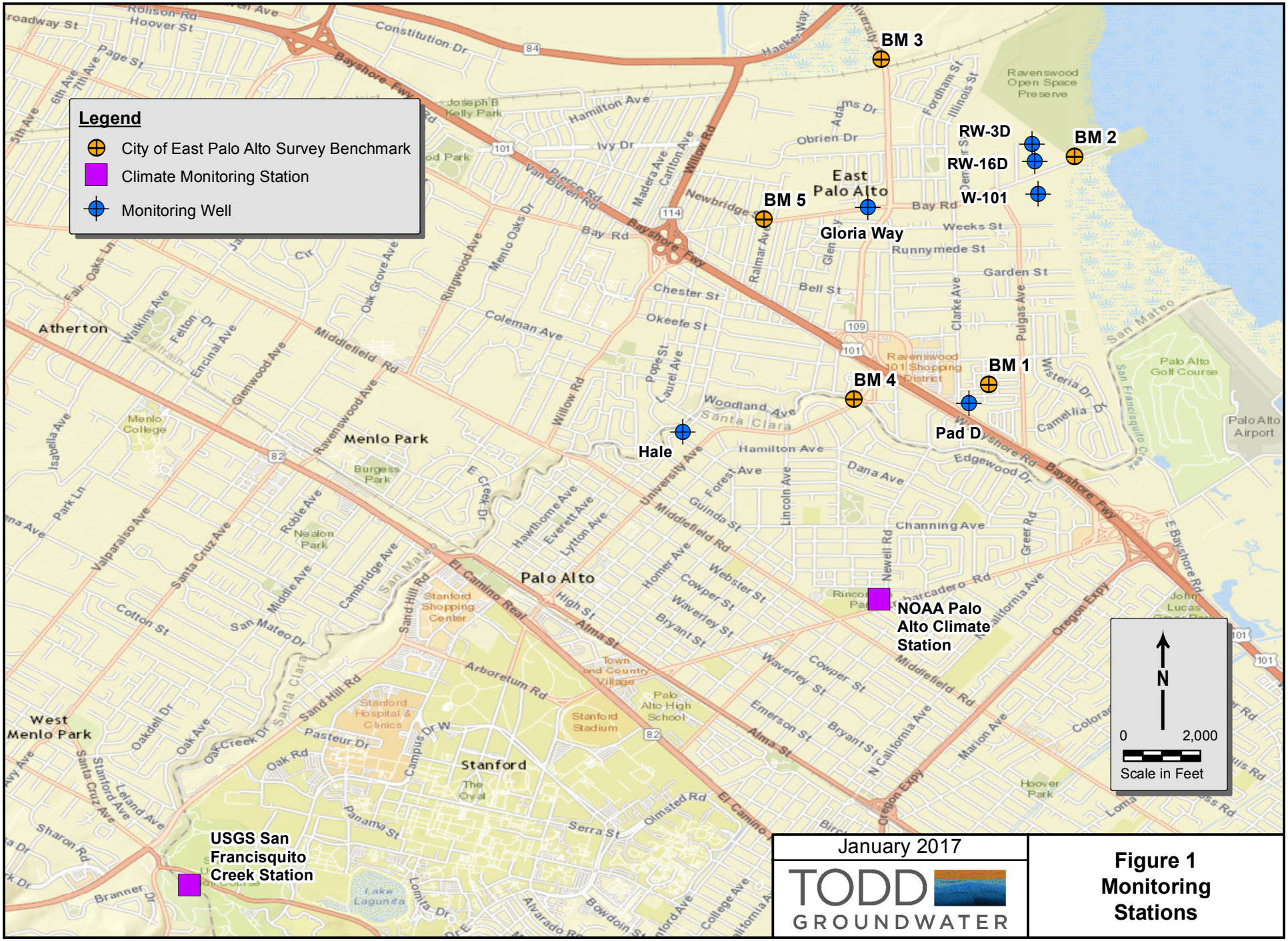
Table 4. Groundwater Quality Sampling Results City of East Palo Alto 2016 Groundwater Monitoring							
Well	**Sample Date**	**Analyte**	**Result**	**Qualifier**	**Reporting Limit**	**Method**	**Units**
RW-16D	12/21/2016	Calcium	232000		1000	EPA 200.7	µg/L
RW-16D	3/30/2015	Chloride	265		25	EPA 300	mg/L
RW-16D	12/21/2016	Chloride	1220		2.0	9056A	mg/L
RW-16D	3/30/2015	Iron	311		200	6010B	µg/L
RW-16D	12/21/2016	Iron	873		50	EPA 200.8	µg/L
RW-16D	3/30/2015	Magnesium	20000		5000	6010B	µg/L
RW-16D	12/21/2016	Magnesium	182000		25000	EPA 200.7	µg/L
RW-16D	3/30/2015	Manganese	120		15	6010B	µg/L
RW-16D	12/21/2016	Manganese	1490		5.0	EPA 200.8	µg/L
RW-16D	3/30/2015	pH	7.3			SM4500H+	pH Units
RW-16D	12/21/2016	pH	7.01			11/SW9040	su
RW-16D	12/21/2016	Potassium		<	10000	EPA 200.7	µg/L
RW-16D	3/30/2015	Sodium	104000		10000	6010B	µg/L
RW-16D	12/21/2016	Sodium	310000		50000	EPA 200.7	µg/L
RW-16D	9/11/2000	Specific Conductance	4470				µS/cm
RW-16D	3/19/2001	Specific Conductance	4562				µS/cm
RW-16D	9/4/2001	Specific Conductance	4688				µS/cm
RW-16D	4/1/2002	Specific Conductance	4081				µS/cm
RW-16D	9/25/2002	Specific Conductance	4651				µS/cm
RW-16D	9/16/2003	Specific Conductance	3725				µS/cm
RW-16D	9/27/2004	Specific Conductance	3745				µS/cm
RW-16D	8/16/2005	Specific Conductance	3756				µS/cm
RW-16D	3/22/2006	Specific Conductance	6510				µS/cm
RW-16D	9/20/2006	Specific Conductance	3585				µS/cm
RW-16D	9/24/2007	Specific Conductance	8730				µS/cm
RW-16D	3/17/2008	Specific Conductance	3201				µS/cm
RW-16D	9/15/2008	Specific Conductance	3378				µS/cm
RW-16D	9/21/2009	Specific Conductance	5450				µS/cm
RW-16D	9/14/2010	Specific Conductance	754				µS/cm
RW-16D	9/6/2011	Specific Conductance	801				µS/cm
RW-16D	9/24/2012	Specific Conductance	1107				µS/cm
RW-16D	9/23/2013	Specific Conductance	1149				µS/cm
RW-16D	9/22/2014	Specific Conductance	1479				µS/cm
RW-16D	9/26/2016	Specific Conductance	2370				µS/cm
RW-16D	3/30/2015	Sulfate	6		0.5	EPA 300	mg/L
RW-16D	12/21/2016	Sulfate	29.6		2.0	300/SW846	mg/L
RW-16D	9/11/2000	TDS (Calculated)	2414				mg/L
RW-16D	3/19/2001	TDS (Calculated)	2463				mg/L
RW-16D	9/4/2001	TDS (Calculated)	2532				mg/L
RW-16D	4/1/2002	TDS (Calculated)	2204				mg/L
RW-16D	9/25/2002	TDS (Calculated)	2511				mg/L
RW-16D	9/16/2003	TDS (Calculated)	2012				mg/L
RW-16D	9/27/2004	TDS (Calculated)	2022				mg/L
RW-16D	8/16/2005	TDS (Calculated)	2028				mg/L
RW-16D	3/22/2006	TDS (Calculated)	3515				mg/L
RW-16D	9/20/2006	TDS (Calculated)	1936				mg/L
RW-16D	9/24/2007	TDS (Calculated)	4714				mg/L
RW-16D	3/17/2008	TDS (Calculated)	1729				mg/L
RW-16D	9/15/2008	TDS (Calculated)	1824				mg/L
RW-16D	9/21/2009	TDS (Calculated)	2943				mg/L
RW-16D	9/14/2010	TDS (Calculated)	407				mg/L
RW-16D	9/6/2011	TDS (Calculated)	433				mg/L

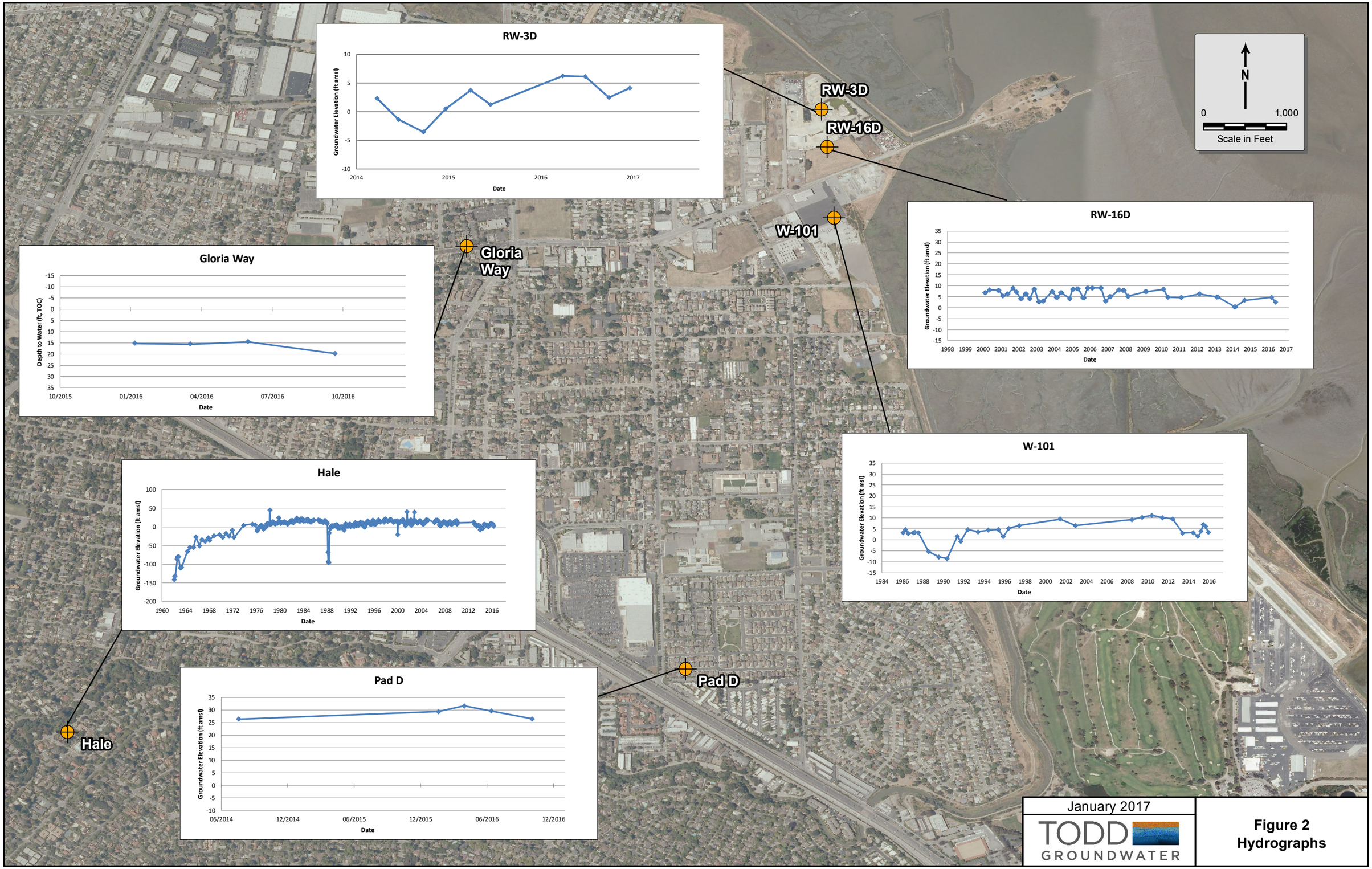
Table 4. Groundwater Quality Sampling Results City of East Palo Alto 2016 Groundwater Monitoring							
Well	**Sample Date**	**Analyte**	**Result**	**Qualifier**	**Reporting Limit**	**Method**	**Units**
RW-16D	9/24/2012	TDS (Calculated)	598				mg/L
RW-16D	9/23/2013	TDS (Calculated)	620				mg/L
RW-16D	9/22/2014	TDS (Calculated)	799				mg/L
RW-16D	9/26/2016	TDS (Calculated)	1280				mg/L
RW-16D	3/30/2015	Total Dissolved Solids (TDS)	413		10	SM2540	mg/L
RW-16D	12/21/2016	Total Dissolved Solids (TDS)	2320		10	11	mg/L
RW-3D	12/21/2016	Alkalinity, Bicarbonate	232		5.0	11	mg/L
RW-3D	12/21/2016	Alkalinity, Total as CaCO3	246		5.0	11	mg/L
RW-3D	9/24/2014	Arsenic		<	10	6010B	µg/L
RW-3D	3/30/2015	Boron	259		100	6010B	µg/L
RW-3D	12/21/2016	Boron	230		100	EPA 200.7	µg/L
RW-3D	12/21/2016	Bromide		<	0.50	300/SW846	mg/L
RW-3D	3/30/2015	Calcium	7760		5000	6010B	µg/L
RW-3D	12/21/2016	Calcium	7990		1000	EPA 200.7	µg/L
RW-3D	3/30/2015	Chloride	29.8		2.5	EPA 300	mg/L
RW-3D	12/21/2016	Chloride	26.8		2.0	9056A	mg/L
RW-3D	3/30/2015	Iodide	380		250	EPA 9056M	µg/L
RW-3D	12/21/2016	Iron		<	50	EPA 200.8	µg/L
RW-3D	3/30/2015	Magnesium	7050		5000	6010B	µg/L
RW-3D	12/21/2016	Magnesium	7260		5000	EPA 200.7	µg/L
RW-3D	12/21/2016	Manganese	4.8		1.0	EPA 200.8	µg/L
RW-3D	3/30/2015	pH	9.4			SM4500H+	pH Units
RW-3D	12/21/2016	pH	8.33			11/SW9040	su
RW-3D	3/30/2015	Potassium	26100		10000	6010B	µg/L
RW-3D	12/21/2016	Potassium	13000		10000	EPA 200.7	µg/L
RW-3D	12/21/2016	Sodium	123000		40000	EPA 200.7	µg/L
RW-3D	3/30/2015	Sodium	147000		10000	6010B	µg/L
RW-3D	3/24/2014	Specific Conductance	963				µS/cm
RW-3D	6/17/2014	Specific Conductance	755				µS/cm
RW-3D	9/24/2014	Specific Conductance	1370				µS/cm
RW-3D	12/22/2014	Specific Conductance	835				µS/cm
RW-3D	6/17/2015	Specific Conductance	775				µS/cm
RW-3D	3/30/2016	Specific Conductance	1233				µS/cm
RW-3D	6/27/2016	Specific Conductance	757				µS/cm
RW-3D	9/26/2016	Specific Conductance	778				µS/cm
RW-3D	3/30/2015	Sulfate	55.5		2.5	EPA 300	mg/L
RW-3D	12/21/2016	Sulfate	50.2		2.0	300/SW846	mg/L
RW-3D	3/24/2014	TDS (Calculated)	520				mg/L
RW-3D	6/17/2014	TDS (Calculated)	408				mg/L
RW-3D	9/24/2014	TDS (Calculated)	740				mg/L
RW-3D	12/22/2014	TDS (Calculated)	451				mg/L
RW-3D	6/17/2015	TDS (Calculated)	419				mg/L
RW-3D	3/30/2016	TDS (Calculated)	666				mg/L
RW-3D	6/27/2016	TDS (Calculated)	409				mg/L
RW-3D	9/26/2016	TDS (Calculated)	420				mg/L
RW-3D	3/30/2015	Total Dissolved Solids (TDS)	461		10	SM2540	mg/L
RW-3D	12/21/2016	Total Dissolved Solids (TDS)	374		10	11	mg/L
W-101	4/1/2014	Arsenic	0.0006				mg/L
W-101	4/22/2016	Arsenic	0.00061				mg/L
W-101	4/21/2016	Bicarbonate	240		5	SM2320B	mg/L
W-101	4/21/2016	Boron	230		200	EPA 200.8	µg/L
W-101	4/21/2016	Bromide	1.4		0.5	EPA 300.1	mg/L

Table 4. Groundwater Quality Sampling Results City of East Palo Alto 2016 Groundwater Monitoring							
Well	**Sample Date**	**Analyte**	**Result**	**Qualifier**	**Reporting Limit**	**Method**	**Units**
W-101	4/21/2016	Calcium	120		1	EPA 200.7	mg/L
W-101	4/21/2016	Chloride	380		12	EPA 300.0	mg/L
W-101	4/22/2016	Iodide	280		50	EPA 9056M	µg/L
W-101	4/21/2016	Iron		<	200	EPA 200.8	µg/L
W-101	4/21/2016	Magnesium	28		1	EPA 200.7	mg/L
W-101	4/21/2016	Manganese	370		20	EPA 200.8	µg/L
W-101	4/21/2016	pH	7.77		1.68	H+B	pH Units
W-101	4/21/2016	Potassium	5.3		1	EPA 200.7	mg/L
W-101	4/21/2016	Sodium	130		1	EPA 200.7	mg/L
W-101	4/21/2016	Sulfate	29		0.5	EPA 300.0	mg/L
W-101	4/21/2016	Total Dissolved Solids (TDS)	2300		10	SM2540C	mg/L

Table 5. Land Survey Benchmark Elevations City of East Palo Alto 2016 Groundwater Monitoring					
Benchmark ID	**Northing**	**Easting**	**2014 Elevation**	**2016 Elevation**	**Description**
City of East Palo Alto BM 1	1993704.80	6087885.94	13.17	13.17	Driven stainless steel rod in sleeve monument grade box in the lawn in University Square Park at Tate and Oaks Streets east side of concrete path.
City of East Palo Alto BM 2	1999609.22	6089767.25	10.06	10.06	A 2" aluminum disc in wetlands on the northeasterly headwall of a Bay Trail bridge at the north side of Bay Road.
City of East Palo Alto BM 3	2002206.13	6085811.80	9.78	9.78	Driven stainless steel rod in sleeve monument grade box in the concrete median of University Avenue between SR84 and the Union Pacific Railroad tracks. Located 400 ft +/- north of railroad.
City of East Palo Alto BM 4	1993379.43	6085090.94	37.21	37.21	A brass disc in the walkway in the northeast quadrant of the University Avenue bridge over San Francisquito Creek. Also SCVWD BM 455.
City of East Palo Alto BM 5	1998092.34	6083303.85	16.81	16.81	Driven stainless steel rod in sleeve monument grade box in landscaping at south edge of Newbridge Street sidewalk near intersection with Bay Road and 100' west of bus stop.

Northing and Easting in CA State Plane Coordinates NAD83 (feet).
Benchmark elevations in feet above mean sea level.


Legend
City of East Palo Alto Survey Benchmark
Climate Monitoring Station
Monitoring Well
BM 3
BM 2
RW-3D
RW-16D
W-101
BM 5
East Palo Alto
Gloria Way
BM 1
BM 4
Pad D
Hale
NOAA Palo Alto Climate Station
USGS San Francisquito Creek Station
Atherton
Menlo Park
Palo Alto
West Menlo Park
Stanford
Ravenswood Open Space Preserve
Palo Alto Golf Course
Palo Alto Airport
Stanford Shopping Center
Stanford Hospital & Clinics
Stanford Stadium
Palo Alto High School
Town and Country Village
Ravenswood 101 Shopping District
Bayshore Fwy
El Camino Real
Oregon Expy
Alma St
Middlefield Rd
University Ave
Willow Rd
Hamilton Ave
Bay Rd
Woodland Ave
Santa Clara
Channing Ave
Arboretum Rd
Sand Hill Rd
Olmsted Rd
Embarcadero Rd
N
0
2,000
Scale in Feet
January 2017
TODD GROUNDWATER
Figure 1
Monitoring Stations

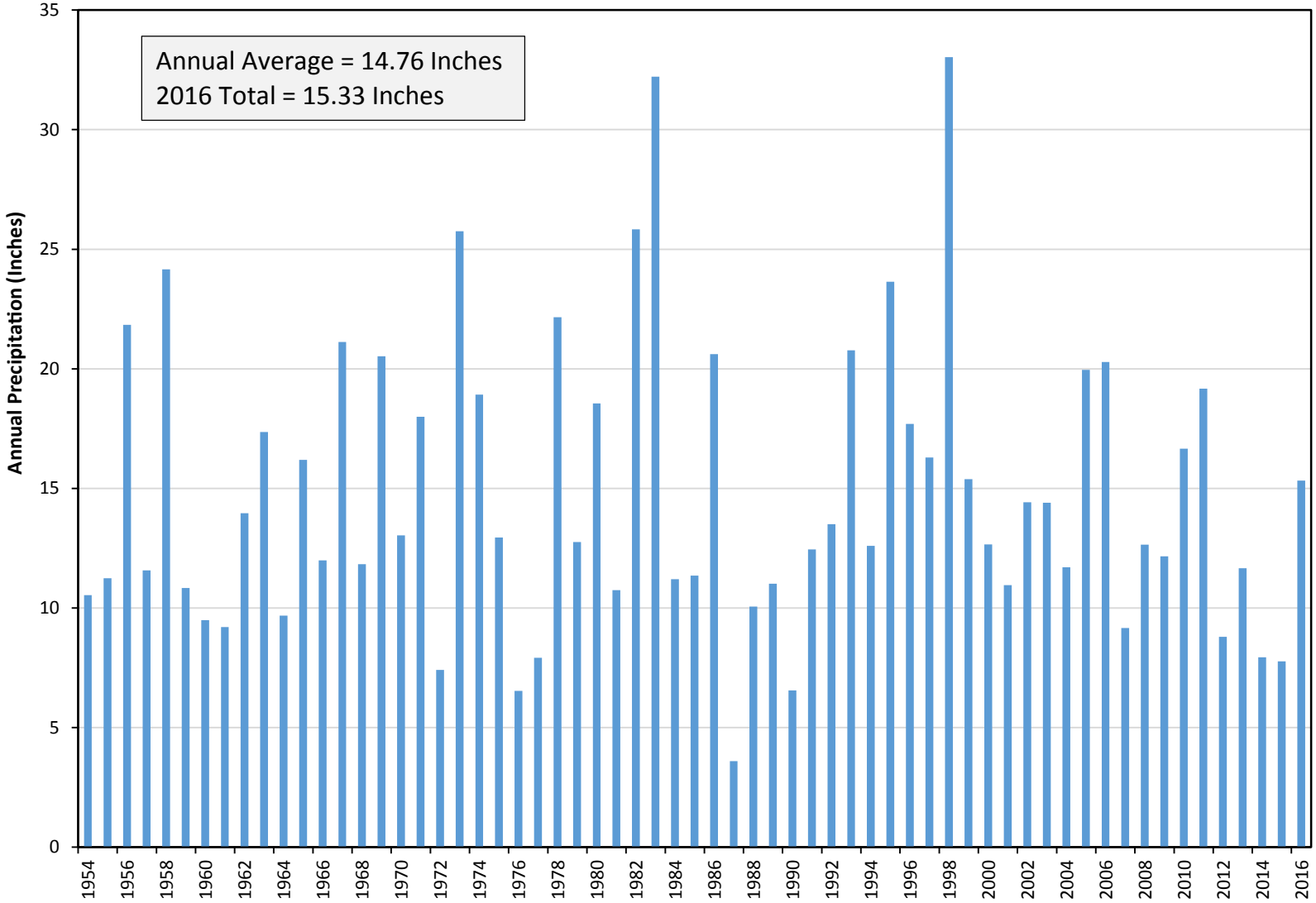


January 2017

TODD GROUNDWATER

Figure 2
Hydrographs

Annual Precipitation (Inches) at NOAA Palo Alto Station 046646

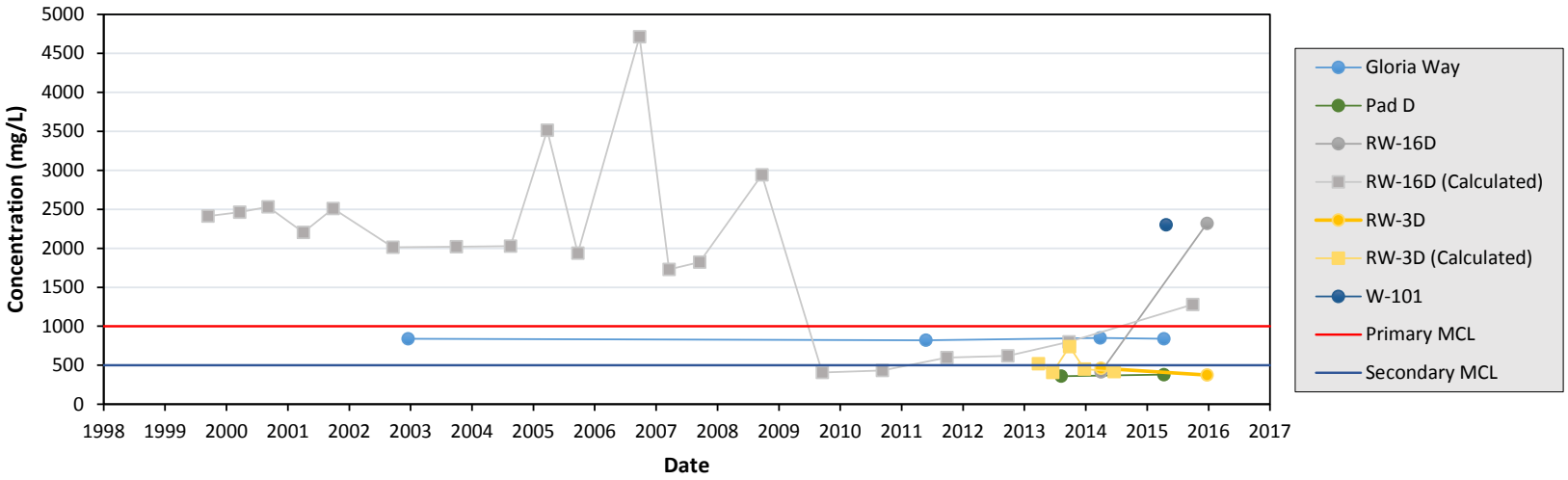


January 2017

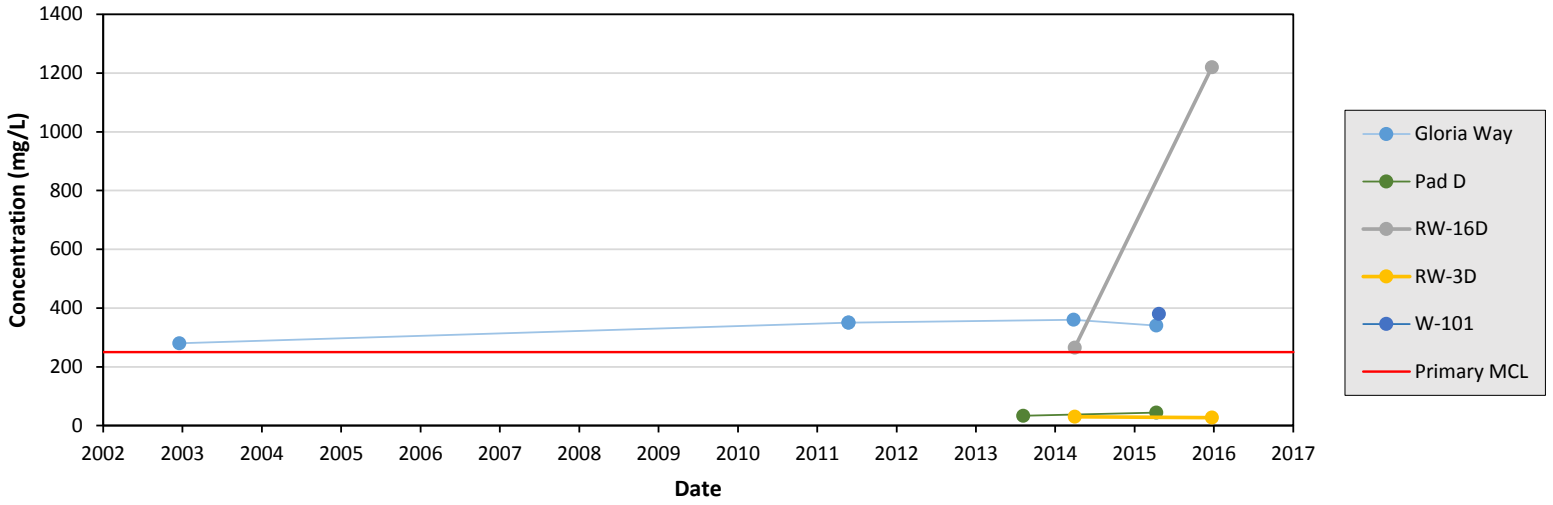
TODD GROUNDWATER

Figure 4
Annual Precipitation

Total Dissolved Solids in Groundwater



Chloride Concentrations in Groundwater

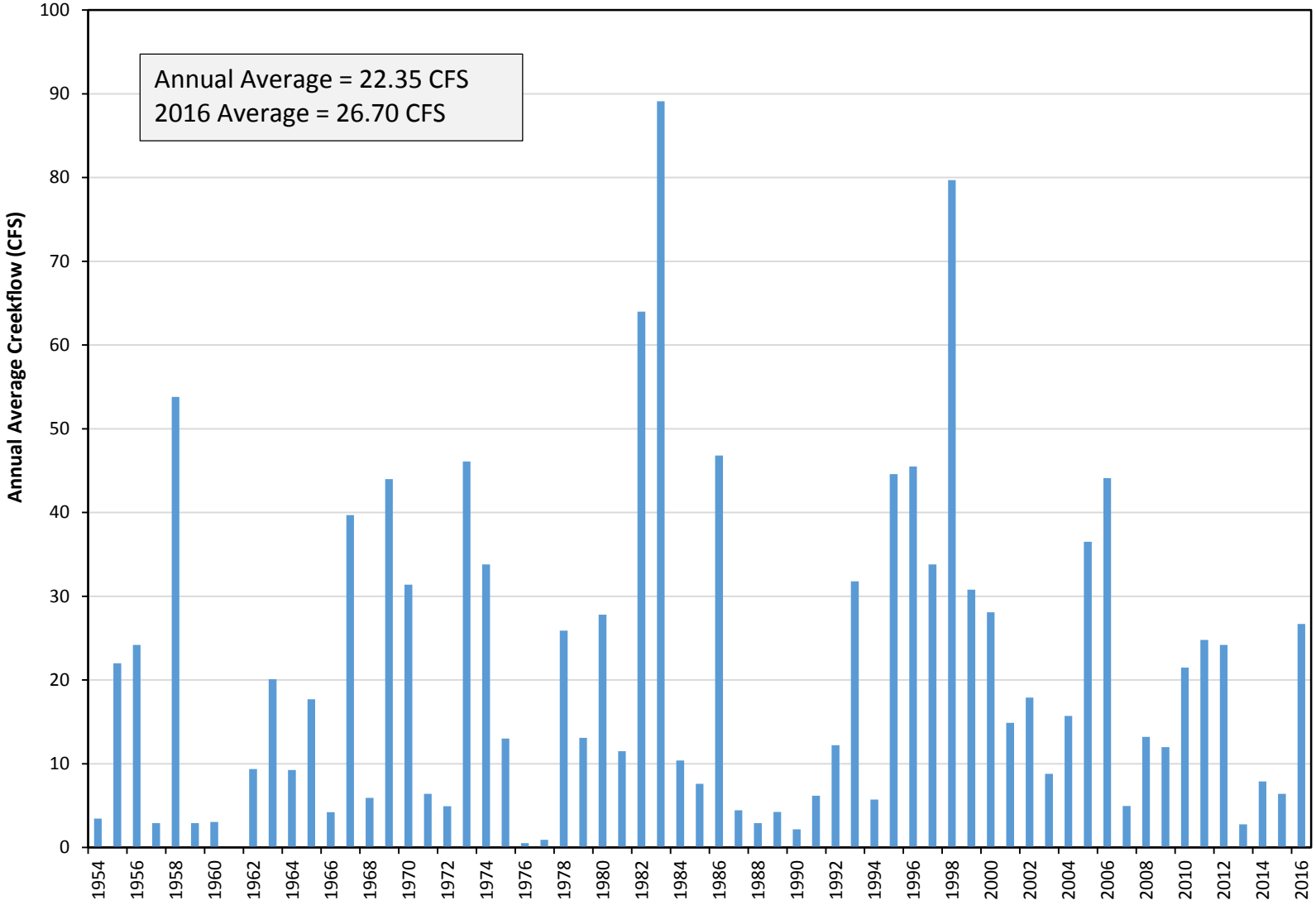


January 2017

TODD GROUNDWATER

Figure 3
TDS and Chloride Concentrations Over Time

Annual Average Creekflow (Cubic Feet per Second) at USGS Station 11164500



January 2017

TODD GROUNDWATER

Figure 5
Average
Annual Creekflow

Appendix A

April 2016 Gloria Way Pad D and W-101 Well Sample Laboratory Reports

Alpha Analytical Laboratories Inc.
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Central Valley: 9090 Union Park Way, Suite 113, Elk Grove, CA 95624 • Phone: (916) 686-5190 • Fax: (916) 686-5192

ELAP Certificates 1551, 2728, and 2922

26 April 2016

Todd Groundwater
Attn: Amber Ritchie
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

RE: East Palo Alto Groundwater Wells
Work Order: 16D0912

Enclosed are the results of analyses for samples received by the laboratory on 04/11/16 21:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

Alpha Analytical Laboratories Inc.
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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Gloria Way Well	16D0912-01	Water	04/08/16 13:24	04/11/16 21:15

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

	Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	Method	Note
Gloria Way Well (16D0912-01)		**Sample Type: Water**			**Sampled: 04/08/16 13:24**			
Metals by EPA 200 Series Methods								
Calcium	**53 mg/L**	**1.0**	1	AD63459	04/20/16 14:44	04/26/16 13:11	EPA 200.7	
Magnesium	**24 mg/L**	**1.0**	1	AD63459	04/20/16 14:44	04/26/16 13:11	EPA 200.7	
Potassium	**1.1 mg/L**	**1.0**	1	AD63459	04/20/16 14:44	04/26/16 13:11	EPA 200.7	
Sodium	**220 mg/L**	**1.0**	1	AD63459	04/20/16 14:44	04/26/16 13:11	EPA 200.7	
Metals by EPA Method 200.8 ICP/MS								
Boron	**220 ug/L**	**50**	1	AD63410	04/19/16 14:24	04/21/16 01:09	EPA 200.8	
Iron	**1200 ug/L**	**50**	1	AD63410	04/19/16 14:24	04/21/16 01:09	EPA 200.8	
Manganese	**180 ug/L**	**5.0**	1	AD63410	04/19/16 14:24	04/21/16 01:09	EPA 200.8	
Conventional Chemistry Parameters by APHA/EPA Methods								
Bicarbonate	**250 mg/L**	**5.0**	1	AD63111	04/14/16 08:00	04/14/16 17:00	SM2320B	
pH	**8.01 pH Units**	**1.68**	1	AD63192	04/12/16 17:00	04/12/16 17:00	SM4500-H+ B	T-14
Total Dissolved Solids	**840 mg/L**	**10**	1	AD63243	04/14/16 09:45	04/18/16 12:00	SM2540C	
Anions by EPA Method 300.0								
Chloride	**340 mg/L**	**12**	25	AD63154	04/12/16 15:17	04/12/16 15:17	EPA 300.0	
Sulfate as SO4	**31 mg/L**	**12**	25	AD63154	04/12/16 15:17	04/12/16 15:17	EPA 300.0	
Anions by EPA Method 300.1								
Bromide	**1.4 mg/L**	**0.25**	5	AD63378	04/19/16 13:44	04/19/16 13:44	EPA 300.1	
Surrogate: Dichloroacetate	*99.1 %*	*90-115*		*AD63378*	*04/19/16 13:44*	*04/19/16 13:44*	*EPA 300.1*	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63459 - Metals Digest										
Blank (AD63459-BLK1)				Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	ND	1.0	mg/L							
Magnesium	ND	1.0	mg/L							
Potassium	ND	1.0	mg/L							
Sodium	ND	1.0	mg/L							
LCS (AD63459-BS1)				Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	7.37	1.0	mg/L	8.00		92.2	85-115			
Magnesium	7.42	1.0	mg/L	8.00		92.8	85-115			
Potassium	6.97	1.0	mg/L	8.00		87.1	85-115			
Sodium	7.68	1.0	mg/L	8.00		95.9	85-115			
Duplicate (AD63459-DUP1)		**Source: 16D0915-01**		Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	12.5	1.0	mg/L		12.4			1.45	20	
Magnesium	5.01	1.0	mg/L		4.94			1.51	20	
Potassium	ND	1.0	mg/L		ND			0.777	20	
Sodium	117	1.0	mg/L		115			1.27	20	
Matrix Spike (AD63459-MS1)		**Source: 16D0915-01**		Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	19.8	1.0	mg/L	8.00	12.4	93.2	70-130			
Magnesium	11.7	1.0	mg/L	8.00	4.94	84.5	70-130			
Potassium	8.27	1.0	mg/L	8.00	ND	93.7	70-130			
Sodium	120	1.0	mg/L	8.00	115	54.4	70-130			QM-4X
Matrix Spike (AD63459-MS2)		**Source: 16D1024-01**		Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	13.3	1.0	mg/L	8.00	4.71	107	70-130			
Magnesium	8.49	1.0	mg/L	8.00	ND	95.4	70-130			
Potassium	31.2	1.0	mg/L	8.00	23.0	103	70-130			
Sodium	135	1.0	mg/L	8.00	116	234	70-130			QM-4X

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63459 - Metals Digest										
Matrix Spike Dup (AD63459-MSD1)	**Source: 16D0915-01**			Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	20.5	1.0	mg/L	8.00	12.4	101	70-130	3.29	20	
Magnesium	12.4	1.0	mg/L	8.00	4.94	93.5	70-130	5.95	20	
Potassium	8.09	1.0	mg/L	8.00	ND	91.5	70-130	2.20	20	
Sodium	125	1.0	mg/L	8.00	115	122	70-130	4.42	20	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

Metals by EPA Method 200.8 ICP/MS - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63410 - EPA 200.8										
Blank (AD63410-BLK1)				Prepared: 04/19/16 Analyzed: 04/20/16						
Boron	ND	50	ug/L							
Iron	ND	50	ug/L							
Manganese	ND	5.0	ug/L							
LCS (AD63410-BS1)				Prepared: 04/19/16 Analyzed: 04/20/16						
Boron	101	50	ug/L	100		101	85-115			
Iron	522	50	ug/L	520		100	85-115			
Manganese	20.7	5.0	ug/L	20.0		104	85-115			
Duplicate (AD63410-DUP1)		**Source: 16D1523-01**		Prepared: 04/19/16 Analyzed: 04/20/16						
Boron	ND	200	ug/L		ND			5.31	20	R-01
Iron	ND	200	ug/L		ND			28.7	20	R-01
Manganese	ND	20	ug/L		ND			1.63	20	R-01

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63111 - General Preparation										
Duplicate (AD63111-DUP1)		**Source: 16D0865-01**		Prepared & Analyzed: 04/13/16						
Bicarbonate	26.8	5.0	mg/L		26.8			0.00	20	
Batch AD63192 - General Preparation										
Duplicate (AD63192-DUP1)		**Source: 16D0977-01**		Prepared & Analyzed: 04/12/16						
pH	7.76	1.68	pH Units		7.78			0.257	20	
Batch AD63243 - General Preparation										
Blank (AD63243-BLK1)				Prepared: 04/14/16 Analyzed: 04/18/16						
Total Dissolved Solids	ND	10	mg/L							
Duplicate (AD63243-DUP1)		**Source: 16D0912-01**		Prepared: 04/14/16 Analyzed: 04/18/16						
Total Dissolved Solids	780	10	mg/L		840			7.41	15	
Duplicate (AD63243-DUP2)		**Source: 16D1035-01**		Prepared: 04/14/16 Analyzed: 04/18/16						
Total Dissolved Solids	640	10	mg/L		600			6.45	15	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

Anions by EPA Method 300.0 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63154 - General Preparation										
Blank (AD63154-BLK1)				Prepared & Analyzed: 04/12/16						
Chloride	ND	0.50	mg/L							
Sulfate as SO4	ND	0.50	mg/L							
LCS (AD63154-BS1)				Prepared & Analyzed: 04/12/16						
Sulfate as SO4	23.0	0.50	mg/L	22.2		103	90-110			
Chloride	11.4	0.50	mg/L	11.1		102	90-110			
Duplicate (AD63154-DUP1)	Source: 16D0857-01			Prepared & Analyzed: 04/12/16						
Chloride	4.42	0.50	mg/L		4.44			0.361	20	
Sulfate as SO4	1.22	0.50	mg/L		1.24			1.63	20	
Matrix Spike (AD63154-MS1)	Source: 16D0857-01			Prepared & Analyzed: 04/12/16						
Chloride	15.9	0.50	mg/L	11.1	4.44	103	80-120			
Sulfate as SO4	24.5	0.50	mg/L	22.2	1.24	104	80-120			
Matrix Spike (AD63154-MS2)	Source: 16D0875-01			Prepared & Analyzed: 04/12/16						
Sulfate as SO4	67.7	5.0	mg/L	22.2	45.5	100	80-120			
Chloride	91.3	5.0	mg/L	11.1	80.5	96.9	80-120			
Matrix Spike Dup (AD63154-MSD1)	Source: 16D0857-01			Prepared & Analyzed: 04/12/16						
Sulfate as SO4	24.5	0.50	mg/L	22.2	1.24	105	80-120	0.349	20	
Chloride	16.0	0.50	mg/L	11.1	4.44	104	80-120	0.216	20	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

Anions by EPA Method 300.1 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63378 - General Preparation										
Blank (AD63378-BLK1)				Prepared & Analyzed: 04/19/16						
Bromide	ND	0.050	mg/L							
Surrogate: Dichloroacetate	*0.965*		*mg/L*	*1.00*		*96.5*	*90-115*			
LCS (AD63378-BS1)				Prepared & Analyzed: 04/19/16						
Bromide	0.198	0.050	mg/L	0.200		99.1	75-125			
Surrogate: Dichloroacetate	*1.08*		*mg/L*	*1.00*		*108*	*90-115*			
Matrix Spike (AD63378-MS1)	**Source: 16D0245-01**			Prepared & Analyzed: 04/19/16						
Bromide	0.183	0.050	mg/L	0.200	ND	88.1	75-125			
Surrogate: Dichloroacetate	*1.43*		*mg/L*	*1.00*		*143*	*90-115*			*S-04*
Matrix Spike Dup (AD63378-MSD1)	**Source: 16D0245-01**			Prepared & Analyzed: 04/19/16						
Bromide	0.182	0.050	mg/L	0.200	ND	87.4	75-125	0.857	20	
Surrogate: Dichloroacetate	*1.46*		*mg/L*	*1.00*		*146*	*90-115*			*S-04*

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 16:05

Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
S-04	The surrogate recovery for this sample is outside of established control limits possibly due to a sample matrix effect.
T-14	Residual chlorine, dissolved oxygen, and pH must be analyzed in the field to meet the EPA specified 15 minute hold time.
ND	Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
REC	Recovery
RPD	Relative Percent Difference

Certificate of Analysis

Report Date: 04/20/16 16:49
Received Date: 04/15/16 11:30
Turnaround Time: Normal

Project: 16D0912

Phones: (925) 872-9637
Fax: (707) 468-5267

P.O. #:

Attn: David S. Pingatore

Client: Alpha Analytical Laboratories - Ukiah
208 Mason St
Ukiah, CA 95482

Dear David S. Pingatore :

Enclosed are the results of analyses for samples received 4/15/2016 with the Chain of Custody document. The samples were received in good condition, at 2.3 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab ID: 6D15043-01 **Sample ID: 16D0912-01 (Gloria Way Well)** **Matrix:** Water
Sampled by: Client **Sampled: 04/08/16 13:24**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Iodide	**620**		250	ug/l	25	EPA 9056M	4/19/16	4/19/16 15:31	W6D0965	

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
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Certificate of Analysis

Quality Control Section

Anions by IC, EPA Method 9056 - Quality Control

Batch W6D0965 - EPA 9056M

Blank (W6D0965-BLK1) — **Prepared: 04/19/16 Analyzed: 04/19/16 12:04**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide		ND		ug/l					

LCS (W6D0965-BS1) — **Prepared: 04/19/16 Analyzed: 04/19/16 12:18**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide		41.5		ug/l	40.0	104	85-115		

Duplicate (W6D0965-DUP1) — **Source: 6D15042-01** — **Prepared: 04/19/16 Analyzed: 04/19/16 13:47**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide	184	180		ug/l				2	20

Duplicate (W6D0965-DUP2) — **Source: 6D15042-01** — **Prepared: 04/19/16 Analyzed: 04/19/16 14:35**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide	184	186		ug/l				1	20

Matrix Spike (W6D0965-MS1) — **Source: 6D06013-02** — **Prepared: 04/19/16 Analyzed: 04/19/16 15:45**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide	52.5	87.7		ug/l	40.0	88	80-120		

Matrix Spike Dup (W6D0965-MSD1) — **Source: 6D06013-02** — **Prepared: 04/19/16 Analyzed: 04/19/16 16:05**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide	52.5	93.0		ug/l	40.0	101	80-120	6	20

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www.wecklabs.com

Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature

Contact: Kim G. Tu
(Project Manager)

ELAP # 1132
LACSD # 10143
NELAC #4047-002 ORELAP

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

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Chain of Custody - Work Order

Alpha Analytical Laboratories Inc.
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ELAP Certifications
Ukiah 1551 / Dublin 2728 / Elk Grove 2922

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Reports and Invoices delivered by email in PDF format

Lab No 16D0912 Pg 1 of 1

Signature below authorizes work under terms stated on reverse side.

Report to	Invoice to (if different)	Project Information
Company: Todd Groundwater	Contact:	Project ID: East Palo Alto Groundwater Wells
Attn: Amber J Ritchie, GIT	Email address:	Project No:
Address: 2490 Mariner Square Loop, Suite 215 Alameda CA 94501	Address:	PO Number:
Phone/Fax: 510-747.6920 x103; 846.633.9712	Phone/Fax:	
Email Address: aritchie@toddgroundwater.com		

Field Sampler - Printed Name & Signature: Amber Ritchie

TAT
Standard 10 days ●
RUSH: 5 days ○ 48 hours ○ Other: ___days ○
Lab preapproval required

Temp upon Receipt °C
Ukiah temp: 4.6
Dublin temp:
Elk Grove temp:

Sample Identification	Sampling Date	Sampling Time	Container: 40ml Vial	Container: Poly	Container: Glass	Container: Sleeve	Container: Other	Preservative: HCl	Preservative: HNO3	Preservative: H2SO4	Preservative: Other	Preservative: None	Matrix: Water	Matrix: Soil	Matrix: Other	Total Number of Containers per Sample ID	Analysis Request: Bromide 300.1	Analysis Request: 200.8 - B Fe Mn	Analysis Request: 200.7 - Ca Mg K Na	Analysis Request: Iodide by 9056M - sub Weck	Analysis Request: Bicarbonate, Chloride, pH	Analysis Request: Total Dissolved Solids, Sulfate	Sample Notes or DDW Source Numbers:
Gloria Way Well	4/8/16	1:24		x							x		x			1	x						
	4/8/16	1:24		x					x				x			1		x	x				
	4/8/16	1:24		x								x	x			1				x			
	4/8/16	1:24		x								x	x			1					x	x	

Relinquished by	Date	Time	Received by
Amber Ritchie	4/8/16	1417	
	4/11/16	18:00	
	4/11/16	21:15	

DDW Write On EDT Transmission? ○ Yes ○ No
State System Number: _____
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Global ID: Sampling Company Log Code:
EDF to (Email Address):

Travel and Site Time:	Mileage:	Misc. Supplies:

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ELAP Certificates 1551, 2728, and 2922

13 May 2016

Todd Groundwater
Attn: Amber Ritchie
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

RE: East Palo Alto Groundwater Wells
Work Order: 16D2032

Enclosed are the results of analyses for samples received by the laboratory on 04/25/16 22:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
ROMIC W-101	16D2032-01	Water	04/21/16 13:46	04/25/16 22:30

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

	Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	Method	Note
ROMIC W-101 (16D2032-01)		**Sample Type: Water**				**Sampled: 04/21/16 13:46**		
Metals by EPA 200 Series Methods								
Calcium	**120 mg/L**	**1.0**	1	AE63273	05/04/16 15:23	05/09/16 10:59	EPA 200.7	
Magnesium	**28 mg/L**	**1.0**	1	AE63273	05/04/16 15:23	05/09/16 10:59	EPA 200.7	
Potassium	**5.3 mg/L**	**1.0**	1	AE63273	05/04/16 15:23	05/09/16 10:59	EPA 200.7	
Sodium	**130 mg/L**	**1.0**	1	AE63273	05/04/16 15:23	05/09/16 10:59	EPA 200.7	
Metals by EPA Method 200.8 ICP/MS								
Boron	**230 ug/L**	**200**	4	AE63160	05/02/16 10:42	05/03/16 12:34	EPA 200.8	
Iron	ND ug/L	200	4	AE63160	05/02/16 10:42	05/03/16 12:34	EPA 200.8	R-01
Manganese	**370 ug/L**	**20**	4	AE63160	05/02/16 10:42	05/03/16 12:34	EPA 200.8	
Conventional Chemistry Parameters by APHA/EPA Methods								
Bicarbonate	**240 mg/L**	**5.0**	1	AD63588	04/27/16 11:00	04/27/16 14:42	SM2320B	
pH	**7.77 pH Units**	**1.68**	1	AD63713	04/26/16 17:00	04/28/16 10:39	SM4500-H+ B	T-14
Total Dissolved Solids	**2300 mg/L**	**10**	1	AD63600	04/26/16 08:00	04/27/16 16:15	SM2540C	
Anions by EPA Method 300.0								
Chloride	**380 mg/L**	**12**	25	AD63619	04/26/16 14:50	04/26/16 14:50	EPA 300.0	
Sulfate as SO4	**29 mg/L**	**0.50**	1	AD63619	04/26/16 15:06	04/26/16 15:06	EPA 300.0	
Anions by EPA Method 300.1								
Bromide	**1.4 mg/L**	**0.50**	10	AE63551	05/11/16 11:00	05/11/16 23:08	EPA 300.1	
Surrogate: Dichloroacetate	*106 %*	*90-115*		*AE63551*	*05/11/16 11:00*	*05/11/16 23:08*	*EPA 300.1*	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AE63273 - Metals Digest										
Blank (AE63273-BLK1)				Prepared: 05/04/16 Analyzed: 05/06/16						
Calcium	ND	1.0	mg/L							
Magnesium	ND	1.0	mg/L							
Potassium	ND	1.0	mg/L							
Sodium	ND	1.0	mg/L							
LCS (AE63273-BS1)				Prepared: 05/04/16 Analyzed: 05/06/16						
Calcium	7.60	1.0	mg/L	8.00		94.9	85-115			
Magnesium	7.56	1.0	mg/L	8.00		94.6	85-115			
Potassium	7.40	1.0	mg/L	8.00		92.5	85-115			
Sodium	8.38	1.0	mg/L	8.00		105	85-115			
Duplicate (AE63273-DUP1)		**Source: 16D2032-01**		Prepared: 05/04/16 Analyzed: 05/06/16						
Calcium	123	1.0	mg/L		118			3.43	20	
Magnesium	29.2	1.0	mg/L		28.1			3.84	20	
Potassium	5.78	1.0	mg/L		5.32			8.41	20	
Sodium	143	1.0	mg/L		135			6.15	20	
Matrix Spike (AE63273-MS1)		**Source: 16D2032-01**		Prepared: 05/04/16 Analyzed: 05/06/16						
Calcium	139	1.0	mg/L	8.00	118	260	70-130			QM-4X
Magnesium	36.7	1.0	mg/L	8.00	28.1	108	70-130			
Potassium	13.3	1.0	mg/L	8.00	5.32	99.7	70-130			
Sodium	157	1.0	mg/L	8.00	135	283	70-130			QM-4X
Matrix Spike (AE63273-MS2)		**Source: 16D2028-01**		Prepared: 05/04/16 Analyzed: 05/06/16						
Calcium	10.0	1.0	mg/L	8.00	2.51	93.9	70-130			
Magnesium	8.31	1.0	mg/L	8.00	1.02	91.0	70-130			
Potassium	191	1.0	mg/L	8.00	184	89.2	70-130			

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AE63273 - Metals Digest										
Matrix Spike Dup (AE63273-MSD1)	**Source: 16D2032-01**			Prepared: 05/04/16 Analyzed: 05/06/16						
Calcium	128	1.0	mg/L	8.00	118	118	70-130	8.49	20	
Magnesium	36.8	1.0	mg/L	8.00	28.1	108	70-130	0.133	20	
Potassium	13.4	1.0	mg/L	8.00	5.32	101	70-130	0.898	20	
Sodium	146	1.0	mg/L	8.00	135	138	70-130	7.65	20	QM-4X

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

Metals by EPA Method 200.8 ICP/MS - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AE63160 - EPA 200.8										
Blank (AE63160-BLK1)				Prepared: 05/02/16 Analyzed: 05/03/16						
Boron	ND	50	ug/L							
Iron	ND	50	ug/L							
Manganese	ND	5.0	ug/L							
LCS (AE63160-BS1)				Prepared: 05/02/16 Analyzed: 05/03/16						
Boron	108	50	ug/L	100		108	85-115			
Iron	560	50	ug/L	520		108	85-115			
Manganese	21.4	5.0	ug/L	20.0		107	85-115			
Duplicate (AE63160-DUP1)	**Source: 16D2032-01**			Prepared: 05/02/16 Analyzed: 05/03/16						
Boron	225	200	ug/L		228			1.36	20	
Iron	ND	200	ug/L		ND			7.62	20	R-01
Manganese	362	20	ug/L		375			3.31	20	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63588 - General Preparation										
Duplicate (AD63588-DUP1)	**Source: 16D1861-01**			Prepared & Analyzed: 04/27/16						
Bicarbonate	43.9	5.0	mg/L		43.9			0.00	20	
Batch AD63600 - General Preparation										
Blank (AD63600-BLK1)				Prepared: 04/26/16 Analyzed: 04/27/16						
Total Dissolved Solids	ND	10	mg/L							
Duplicate (AD63600-DUP1)	**Source: 16D1876-02**			Prepared: 04/26/16 Analyzed: 04/27/16						
Total Dissolved Solids	988	10	mg/L		1020			3.19	15	
Duplicate (AD63600-DUP2)	**Source: 16D1876-03**			Prepared: 04/26/16 Analyzed: 04/27/16						
Total Dissolved Solids	972	10	mg/L		912			6.37	15	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

Anions by EPA Method 300.0 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63619 - General Preparation										
LCS (AD63619-BS1)				Prepared & Analyzed: 04/26/16						
Chloride	11.5	0.50	mg/L	11.1		104	90-110			
Sulfate as SO4	23.3	0.50	mg/L	22.2		105	90-110			
Duplicate (AD63619-DUP1)	**Source: 16D2181-01**			Prepared & Analyzed: 04/27/16						
Chloride	6.97	0.50	mg/L		6.91			0.821	20	
Sulfate as SO4	3.97	0.50	mg/L		4.11			3.32	20	
Matrix Spike (AD63619-MS1)	**Source: 16D2181-01**			Prepared & Analyzed: 04/27/16						
Chloride	18.5	0.50	mg/L	11.1	6.91	105	80-120			
Sulfate as SO4	28.5	0.50	mg/L	22.2	4.11	110	80-120			
Matrix Spike Dup (AD63619-MSD1)	**Source: 16D2181-01**			Prepared & Analyzed: 04/27/16						
Chloride	18.6	0.50	mg/L	11.1	6.91	105	80-120	0.0959	20	
Sulfate as SO4	28.5	0.50	mg/L	22.2	4.11	110	80-120	0.00779	20	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

Anions by EPA Method 300.1 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AE63551 - General Preparation										
Blank (AE63551-BLK1)				Prepared & Analyzed: 05/11/16						
Bromide	ND	0.050	mg/L							
Surrogate: Dichloroacetate	*1.00*		*mg/L*	*1.00*		*100*	*90-115*			
LCS (AE63551-BS1)				Prepared & Analyzed: 05/11/16						
Bromide	0.200	0.050	mg/L	0.200		99.8	75-125			
Surrogate: Dichloroacetate	*1.02*		*mg/L*	*1.00*		*102*	*90-115*			
Matrix Spike (AE63551-MS1)	**Source: 16E0917-03**			Prepared: 05/11/16 Analyzed: 05/12/16						
Bromide	0.450	0.050	mg/L	0.200	0.244	103	75-125			
Surrogate: Dichloroacetate	*15.4*		*mg/L*	*1.00*		*NR*	*90-115*			*S-09*
Matrix Spike Dup (AE63551-MSD1)	**Source: 16E0917-03**			Prepared: 05/11/16 Analyzed: 05/12/16						
Bromide	0.452	0.050	mg/L	0.200	0.244	104	75-125	0.336	20	
Surrogate: Dichloroacetate	*15.5*		*mg/L*	*1.00*		*NR*	*90-115*			*S-09*

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	05/13/16 16:31

Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
S-09	The surrogate recovery for this sample is outside of established control limits due to matrix interference.
T-14	Residual chlorine, dissolved oxygen, and pH must be analyzed in the field to meet the EPA specified 15 minute hold time.
ND	Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
REC	Recovery
RPD	Relative Percent Difference

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ELAP Certifications
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Chain of Custody - Work Order

Reports and Invoices delivered by email in PDF format

Lab No 16D2032 Pg ____ of ____

Report to	Invoice to (if different)	Project Information
Company: Todd Groundwater	Contact:	Project ID: East Palo Alto Groundwater Wells
Attn: Amber J Ritchie, GIT	Email address:	Project No:
Address: 2490 Mariner Square Loop, Suite 215 Alameda CA 94501	Address:	PO Number:
Phone/Fax: 510-747.6920 x103; 846.633.9712	Phone/Fax:	
Email Address: aritchie@toddgroundwater.com		

Signature below authorizes work under terms stated on reverse side.

Field Sampler - Printed Name & Signature: Amber Ritchie Amber Ritchie

Sample Identification	Sampling Date	Sampling Time	Container: 40ml Vial	Container: Poly	Container: Glass	Container: Sleeve	Container: Other	Preservative: HCl	Preservative: HNO3	Preservative: H2SO4	Preservative: Other	Preservative: None	Matrix: Water	Matrix: Soil	Matrix: Other	Total Number of Containers per Sample ID	Analysis Request: Bromide 300.1	Analysis Request: 200.8 - B Fe Mn	Analysis Request: 200.7 - Ca Mg K Na	Analysis Request: Iodide by 9056M - sub Weck	Analysis Request: Bicarbonate, Chloride, pH	Analysis Request: Total Dissolved Solids, Sulfate	Sample Notes or DDW Source Numbers:
Romic W-101	4/21/16	1:46p		x							x		x			1	x						
Romic W-101	4/21/16	1:46p		x					x				x			1		x	x				
Romic W-101	4/21/16	1:46p		x								x	x			1				x			
Romic W-101	4/21/16	1:46p		x								x	x			1					x	x	

TAT
Standard 10 days ●
RUSH: 5 days ○ 48 hours ○ Other: ___days ○ Lab preapproval required

Temp upon Receipt °C
Ukiah temp: 4.6
Dublin temp:
Elk Grove temp:

Relinquished by	Received by	Date	Time
Amber J. Ritchie		4/21	11:15
		4/25/16	1800
		4/25/16	2230

DDW Write On EDT Transmission? ○ Yes ○ No
State System Number: _____
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Global ID: Sampling Company Log Code:
EDF to (Email Address):

Travel and Site Time: | Mileage: | Misc. Supplies:

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ELAP Certificates 1551, 2728, and 2922

26 April 2016

Todd Groundwater
Attn: Amber Ritchie
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

RE: East Palo Alto Groundwater Wells
Work Order: 16D0915

Enclosed are the results of analyses for samples received by the laboratory on 04/11/16 21:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette Poplin

Jeanette L. Poplin For David S. Pingatore
Project Manager

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Pad D Well	16D0915-01	Water	04/08/16 09:38	04/11/16 21:15

Alpha Analytical Laboratories Inc.
e-mail: clientservices@alpha-labs.com
Corporate: 208 Mason St., Ukiah, CA 95482 • Phone: (707) 468-0401 • Fax: (707) 468-5267
Bay Area: 6398 Dougherty Rd., Suite 35, Dublin, CA 94568 • Phone: (925) 828-6226 • Fax: (925) 828-6309
Central Valley: 9090 Union Park Way, Suite 113, Elk Grove, CA 95624 • Phone: (916) 686-5190 • Fax: (916) 686-5192

Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

	Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	Method	Note
Pad D Well (16D0915-01)		**Sample Type: Water**			**Sampled: 04/08/16 09:38**			
Metals by EPA 200 Series Methods								
Calcium	**12 mg/L**	**1.0**	1	AD63459	04/20/16 14:44	04/21/16 16:15	EPA 200.7	
Magnesium	**4.9 mg/L**	**1.0**	1	AD63459	04/20/16 14:44	04/21/16 16:15	EPA 200.7	
Potassium	ND mg/L	1.0	1	AD63459	04/20/16 14:44	04/21/16 16:15	EPA 200.7	
Sodium	**120 mg/L**	**1.0**	1	AD63459	04/20/16 14:44	04/21/16 16:15	EPA 200.7	
Metals by EPA Method 200.8 ICP/MS								
Boron	**130 ug/L**	**50**	1	AD63410	04/19/16 14:24	04/21/16 00:54	EPA 200.8	
Iron	**270 ug/L**	**50**	1	AD63410	04/19/16 14:24	04/21/16 00:54	EPA 200.8	
Manganese	**39 ug/L**	**5.0**	1	AD63410	04/19/16 14:24	04/21/16 00:54	EPA 200.8	
Conventional Chemistry Parameters by APHA/EPA Methods								
Bicarbonate	**270 mg/L**	**5.0**	1	AD63111	04/14/16 08:00	04/14/16 17:00	SM2320B	
pH	**8.07 pH Units**	**1.68**	1	AD63192	04/12/16 17:00	04/12/16 17:00	SM4500-H+ B	T-14
Total Dissolved Solids	**380 mg/L**	**10**	1	AD63243	04/14/16 09:45	04/18/16 12:00	SM2540C	
Anions by EPA Method 300.0								
Chloride	**44 mg/L**	**5.0**	10	AD63154	04/12/16 15:33	04/12/16 15:33	EPA 300.0	
Sulfate as SO4	**15 mg/L**	**5.0**	10	AD63154	04/12/16 15:33	04/12/16 15:33	EPA 300.0	
Anions by EPA Method 300.1								
Bromide	**0.20 mg/L**	**0.050**	1	AD63378	04/19/16 12:31	04/19/16 12:31	EPA 300.1	
Surrogate: Dichloroacetate	*400 %*	*90-115*		*AD63378*	*04/19/16 12:31*	*04/19/16 12:31*	*EPA 300.1*	*S-04*

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63459 - Metals Digest										
Blank (AD63459-BLK1)				Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	ND	1.0	mg/L							
Magnesium	ND	1.0	mg/L							
Potassium	ND	1.0	mg/L							
Sodium	ND	1.0	mg/L							
LCS (AD63459-BS1)				Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	7.37	1.0	mg/L	8.00		92.2	85-115			
Magnesium	7.42	1.0	mg/L	8.00		92.8	85-115			
Potassium	6.97	1.0	mg/L	8.00		87.1	85-115			
Sodium	7.68	1.0	mg/L	8.00		95.9	85-115			
Duplicate (AD63459-DUP1)		**Source: 16D0915-01**		Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	12.5	1.0	mg/L		12.4			1.45	20	
Magnesium	5.01	1.0	mg/L		4.94			1.51	20	
Potassium	ND	1.0	mg/L		ND			0.777	20	
Sodium	117	1.0	mg/L		115			1.27	20	
Matrix Spike (AD63459-MS1)		**Source: 16D0915-01**		Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	19.8	1.0	mg/L	8.00	12.4	93.2	70-130			
Magnesium	11.7	1.0	mg/L	8.00	4.94	84.5	70-130			
Potassium	8.27	1.0	mg/L	8.00	ND	93.7	70-130			
Sodium	120	1.0	mg/L	8.00	115	54.4	70-130			QM-4X
Matrix Spike (AD63459-MS2)		**Source: 16D1024-01**		Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	13.3	1.0	mg/L	8.00	4.71	107	70-130			
Magnesium	8.49	1.0	mg/L	8.00	ND	95.4	70-130			
Potassium	31.2	1.0	mg/L	8.00	23.0	103	70-130			
Sodium	135	1.0	mg/L	8.00	116	234	70-130			QM-4X

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63459 - Metals Digest										
Matrix Spike Dup (AD63459-MSD1)	**Source: 16D0915-01**			Prepared: 04/20/16 Analyzed: 04/21/16						
Calcium	20.5	1.0	mg/L	8.00	12.4	101	70-130	3.29	20	
Magnesium	12.4	1.0	mg/L	8.00	4.94	93.5	70-130	5.95	20	
Potassium	8.09	1.0	mg/L	8.00	ND	91.5	70-130	2.20	20	
Sodium	125	1.0	mg/L	8.00	115	122	70-130	4.42	20	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

Metals by EPA Method 200.8 ICP/MS - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63410 - EPA 200.8										
Blank (AD63410-BLK1)				Prepared: 04/19/16 Analyzed: 04/20/16						
Boron	ND	50	ug/L							
Iron	ND	50	ug/L							
Manganese	ND	5.0	ug/L							
LCS (AD63410-BS1)				Prepared: 04/19/16 Analyzed: 04/20/16						
Boron	101	50	ug/L	100		101	85-115			
Iron	522	50	ug/L	520		100	85-115			
Manganese	20.7	5.0	ug/L	20.0		104	85-115			
Duplicate (AD63410-DUP1)		**Source: 16D1523-01**		Prepared: 04/19/16 Analyzed: 04/20/16						
Boron	ND	200	ug/L		ND			5.31	20	R-01
Iron	ND	200	ug/L		ND			28.7	20	R-01
Manganese	ND	20	ug/L		ND			1.63	20	R-01

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63111 - General Preparation										
Duplicate (AD63111-DUP1)		**Source: 16D0865-01**		Prepared & Analyzed: 04/13/16						
Bicarbonate	26.8	5.0	mg/L		26.8			0.00	20	
Batch AD63192 - General Preparation										
Duplicate (AD63192-DUP1)		**Source: 16D0977-01**		Prepared & Analyzed: 04/12/16						
pH	7.76	1.68	pH Units		7.78			0.257	20	
Batch AD63243 - General Preparation										
Blank (AD63243-BLK1)				Prepared: 04/14/16 Analyzed: 04/18/16						
Total Dissolved Solids	ND	10	mg/L							
Duplicate (AD63243-DUP1)		**Source: 16D0912-01**		Prepared: 04/14/16 Analyzed: 04/18/16						
Total Dissolved Solids	780	10	mg/L		840			7.41	15	
Duplicate (AD63243-DUP2)		**Source: 16D1035-01**		Prepared: 04/14/16 Analyzed: 04/18/16						
Total Dissolved Solids	640	10	mg/L		600			6.45	15	

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Todd Groundwater	Project Manager: Amber Ritchie	
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Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

Anions by EPA Method 300.0 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63154 - General Preparation										
Blank (AD63154-BLK1)				Prepared & Analyzed: 04/12/16						
Sulfate as SO4	ND	0.50	mg/L							
Chloride	ND	0.50	mg/L							
LCS (AD63154-BS1)				Prepared & Analyzed: 04/12/16						
Chloride	11.4	0.50	mg/L	11.1		102	90-110			
Sulfate as SO4	23.0	0.50	mg/L	22.2		103	90-110			
Duplicate (AD63154-DUP1)		**Source: 16D0857-01**		Prepared & Analyzed: 04/12/16						
Sulfate as SO4	1.22	0.50	mg/L		1.24			1.63	20	
Chloride	4.42	0.50	mg/L		4.44			0.361	20	
Matrix Spike (AD63154-MS1)		**Source: 16D0857-01**		Prepared & Analyzed: 04/12/16						
Sulfate as SO4	24.5	0.50	mg/L	22.2	1.24	104	80-120			
Chloride	15.9	0.50	mg/L	11.1	4.44	103	80-120			
Matrix Spike (AD63154-MS2)		**Source: 16D0875-01**		Prepared & Analyzed: 04/12/16						
Sulfate as SO4	67.7	5.0	mg/L	22.2	45.5	100	80-120			
Chloride	91.3	5.0	mg/L	11.1	80.5	96.9	80-120			
Matrix Spike Dup (AD63154-MSD1)		**Source: 16D0857-01**		Prepared & Analyzed: 04/12/16						
Sulfate as SO4	24.5	0.50	mg/L	22.2	1.24	105	80-120	0.349	20	
Chloride	16.0	0.50	mg/L	11.1	4.44	104	80-120	0.216	20	

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

Anions by EPA Method 300.1 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AD63378 - General Preparation										
Blank (AD63378-BLK1)				Prepared & Analyzed: 04/19/16						
Bromide	ND	0.050	mg/L							
Surrogate: Dichloroacetate	*0.965*		*mg/L*	*1.00*		*96.5*	*90-115*			
LCS (AD63378-BS1)				Prepared & Analyzed: 04/19/16						
Bromide	0.198	0.050	mg/L	0.200		99.1	75-125			
Surrogate: Dichloroacetate	*1.08*		*mg/L*	*1.00*		*108*	*90-115*			
Matrix Spike (AD63378-MS1)	**Source: 16D0245-01**			Prepared & Analyzed: 04/19/16						
Bromide	0.183	0.050	mg/L	0.200	ND	88.1	75-125			
Surrogate: Dichloroacetate	*1.43*		*mg/L*	*1.00*		*143*	*90-115*			*S-04*
Matrix Spike Dup (AD63378-MSD1)	**Source: 16D0245-01**			Prepared & Analyzed: 04/19/16						
Bromide	0.182	0.050	mg/L	0.200	ND	87.4	75-125	0.857	20	
Surrogate: Dichloroacetate	*1.46*		*mg/L*	*1.00*		*146*	*90-115*			*S-04*

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Todd Groundwater	Project Manager: Amber Ritchie	
2490 Mariner Square Loop, Suite 215	Project: East Palo Alto Groundwater Wells	Reported:
Alameda, CA 94501	Project Number: [none]	04/26/16 11:12

Notes and Definitions

QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
R-01	The Reporting Limit for this analyte has been raised to account for matrix interference.
S-04	The surrogate recovery for this sample is outside of established control limits possibly due to a sample matrix effect.
T-14	Residual chlorine, dissolved oxygen, and pH must be analyzed in the field to meet the EPA specified 15 minute hold time.
ND	Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
REC	Recovery
RPD	Relative Percent Difference

Certificate of Analysis

Report Date: 04/20/16 16:49
Received Date: 04/15/16 11:30
Turnaround Time: Normal

Project: 16D0915

Phones: (925) 872-9637
Fax: (707) 468-5267

P.O. #:

Attn: David S. Pingatore

Client: Alpha Analytical Laboratories - Ukiah
208 Mason St
Ukiah, CA 95482

Dear David S. Pingatore :

Enclosed are the results of analyses for samples received 4/15/2016 with the Chain of Custody document. The samples were received in good condition, at 2.3 °C and on ice. All analysis met the method criteria except as noted below or in the report with data qualifiers.

Lab ID: 6D15042-01 **Sample ID: 16D0915-01 (Pad D Well)** **Matrix:** Water
Sampled by: Client **Sampled: 04/08/16 09:38**

Analyte	Result	MDL	MRL	Units	Dil	Method	Prepared	Analyzed	Batch	Qualifier
Iodide	**180**		120	ug/l	12.5	EPA 9056M	4/19/16	4/19/16 14:58	W6D0965	

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Certificate of Analysis

Quality Control Section

Anions by IC, EPA Method 9056 - Quality Control

Batch W6D0965 - EPA 9056M

Blank (W6D0965-BLK1) — **Prepared: 04/19/16 Analyzed: 04/19/16 12:04**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide		ND		ug/l					

LCS (W6D0965-BS1) — **Prepared: 04/19/16 Analyzed: 04/19/16 12:18**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide		41.5		ug/l	40.0	104	85-115		

Duplicate (W6D0965-DUP1) — **Source: 6D15042-01** — **Prepared: 04/19/16 Analyzed: 04/19/16 13:47**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide	184	180		ug/l				2	20

Duplicate (W6D0965-DUP2) — **Source: 6D15042-01** — **Prepared: 04/19/16 Analyzed: 04/19/16 14:35**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide	184	186		ug/l				1	20

Matrix Spike (W6D0965-MS1) — **Source: 6D06013-02** — **Prepared: 04/19/16 Analyzed: 04/19/16 15:45**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide	52.5	87.7		ug/l	40.0	88	80-120		

Matrix Spike Dup (W6D0965-MSD1) — **Source: 6D06013-02** — **Prepared: 04/19/16 Analyzed: 04/19/16 16:05**

Analyte	Sample Result	QC Result	Qualifier	Units	Spike Level	%REC	%REC Limits	RPD	RPD Limit
Iodide	52.5	93.0		ug/l	40.0	101	80-120	6	20

Weck Laboratories, Inc 14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
www.wecklabs.com

Certificate of Analysis

Notes:
The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless otherwise specified.

An Absence of Total Coliform meets the drinking water standards as established by the State of California Department of Health Services.
The Reporting Limit (RL) is referenced as laboratory's Practical Quantitation Limit (PQL).
For Potable water analysis, the Reporting Limit (RL) is referenced as Detection Limit for reporting purposes (DLRs) defined by EPA.

If sample collected by Weck Laboratories, sampled in accordance to lab SOP MIS002

Authorized Signature

Contact: Kim G. Tu
(Project Manager)

ELAP # 1132
LACSD # 10143
NELAC #4047-002 ORELAP

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Weck Laboratories certifies that the test results meet all requirements of NELAC unless noted in the Case Narrative. This analytical report must be reproduced in its entirety.

Flags for Data Qualifiers:

ND	NOT DETECTED at or above the Reporting Limit. If J-value reported, then NOT DETECTED at or above the Method Detection Limit (MDL).
Sub	Subcontracted analysis, original report enclosed.
DL	Method Detection Limit
RL	Method Reporting Limit
MDA	Minimum Detectable Activity
NR	Not Reportable

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Central Valley Laboratory
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916-686-5190 F) 916-686-5192

Chain of Custody - Work Order

Reports and Invoices delivered by email in PDF format

Lab No 16D0915 Pg 1 of 1

Signature below authorizes work under terms stated on reverse side.

Report to	Invoice to (if different)	Project Information
Company: Todd Groundwater	Contact:	Project ID: East Palo Alto Groundwater Wells
Attn: Amber J Ritchie, GIT	Email address:	Project No:
Address: 2490 Mariner Square Loop, Suite 215 Alameda CA 94501	Address:	PO Number:
Phone/Fax: 510-747.6920 x103; 846.633.9712	Phone/Fax:	
Email Address: aritchie@toddgroundwater.com		

Field Sampler - Printed Name & Signature:

Sample Identification	Sampling Date	Sampling Time	Container: 40ml Vial	Container: Poly	Container: Glass	Container: Sleeve	Container: Other	Preservative: HCl	Preservative: HNO3	Preservative: H2SO4	Preservative: Other	Preservative: None	Matrix: Water	Matrix: Soil	Matrix: Other	Total Number of Containers per Sample ID	Analysis Request: Bromide 300.1	Analysis Request: 200.8 - B Fe Mn	Analysis Request: 200.7 - Ca Mg K Na	Analysis Request: Iodide by 9056M - sub Weck	Analysis Request: Bicarbonate, Chloride, pH	Analysis Request: Total Dissolved Solids, Sulfate
Pad D Well	4/8/16	9:38a		x							x		x			1	x					
	4/8/16	9:38a		x					x				x			1		x	x			
	4/8/16	9:38a		x								x	x			1				x		
	4/8/16	9:38a		x								x	x			1					x	x

TAT
Standard 10 days ●
RUSH: 5 days ○ 48 hours ○ Other: ___days ○
Lab preapproval required

Temp upon Receipt °C
Ukiah temp: 4.6
Dublin temp:
Elk Grove temp:

Sample Notes or DDW Source Numbers:

Relinquished by	Received by	Date	Time
Amber J. Ritchie		4/8/16	14:17
		4/11/16	18:20
		4/11/16	21:15

DDW Write On EDT Transmission? ○ Yes ○ No
State System Number:
If "Y" please enter the Source Number(s) in the column above

CA Geotracker EDF Report? ○ Yes ○ No
Global ID: Sampling Company Log Code:
EDF to (Email Address):

Travel and Site Time:	Mileage:	Misc. Supplies:

Appendix B

April 2016 Elevation Benchmark Survey Report

WILSEY HAM
Engineering, Surveying & Planning

May 2, 2016

Daniel J. Craig, PG, CHG
Todd Groundwater
2490 Mariner Square Loop, Suite 215
Alameda, CA 94501

Re: Bench Mark Report

Dear Daniel,

In September of 2014 Wilsey Ham set 5 permanent Bench Marks in accordance with FEMA requirements to meet CRS Credit standards. Copies of the Data sheets for each of these bench marks and Key map/photo are attached. These Bench Marks met the following requirements.

1. Permanent Monuments
2. These Bench Marks are second-order bench marks as defined by National Geodetic Survey (NGS)
3. These Bench Marks have a stability rating of "B" as defined by NGS
    a. Wilsey Ham set permanent monuments which are stainless steel rods in sleeves with discs at the sites of BM 1, BM 3, and BM 5
    b. BM 2 and BM 4 are discs set in concrete on substantial bridge structures
4. These Bench Marks are located within a mile of the community floodplain

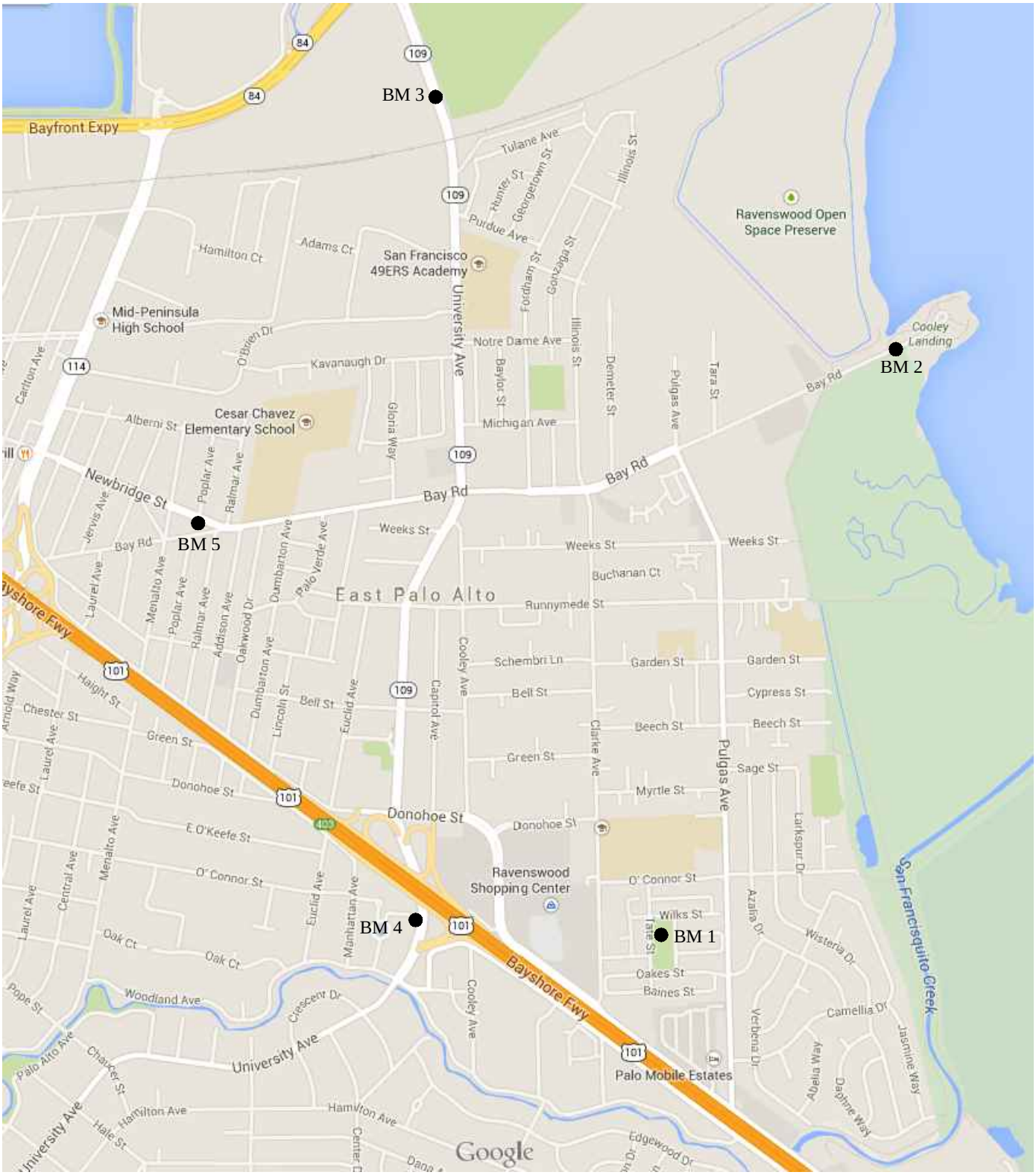
As directed by Todd Groundwater In 2016 Wilsey Ham re-evaluated these monuments.

Our re-evaluation was completed in April of 2016. We made multiple observations of the 5, Bench Mark's set in 2014, as well as the NGS bench marks. The resultant observations of this year were well within normal measurement standards, and the resultant combined observations confirmed our original published data. I have updated our original sheets to include this re-evaluation date. Copies are attached.

WILSEY HAM
A California Corporation

Kenneth P. Moore
Principal
CA Registration PLS 4918
Expires 12-31-16

Main: 650.349.2151 Fax: 650.345.4921
3130 La Selva Street, Suite 100, San Mateo, CA 94403
wilseyham.com



WILSEY HAM

3130 La Selva Street, Suite 100, San Mateo, CA 94403
Phone 650-349-2151 Fax 650-345-4921

PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14 REV. DATE: 04/16
		SCALE: N.T.S.
		SHEET 1 OF 6

EXHIBIT BM KEY MAP

T:\702-RAVENSWOOD\702-013 EPA MONUMENTS\Survey\Master Survey Drawings\Control Drawings\MONUMENT EXHIBITS.dwg 5-03-16 08:13:01 AM pbusinger

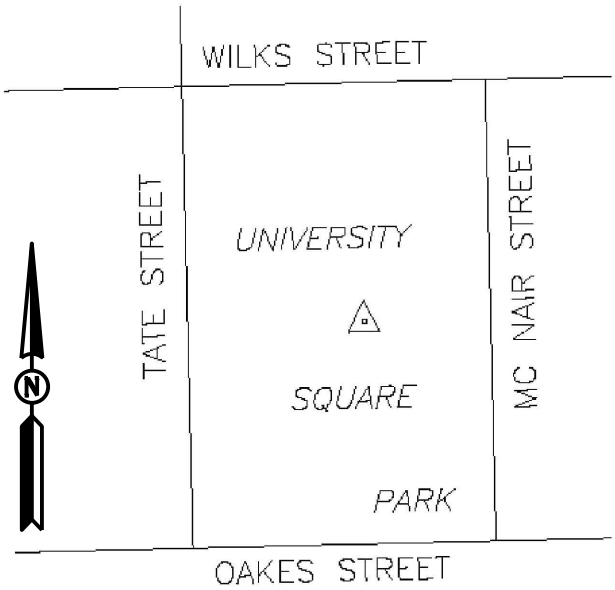
CITY OF EAST PALO ALTO BENCH MARK
BM 1

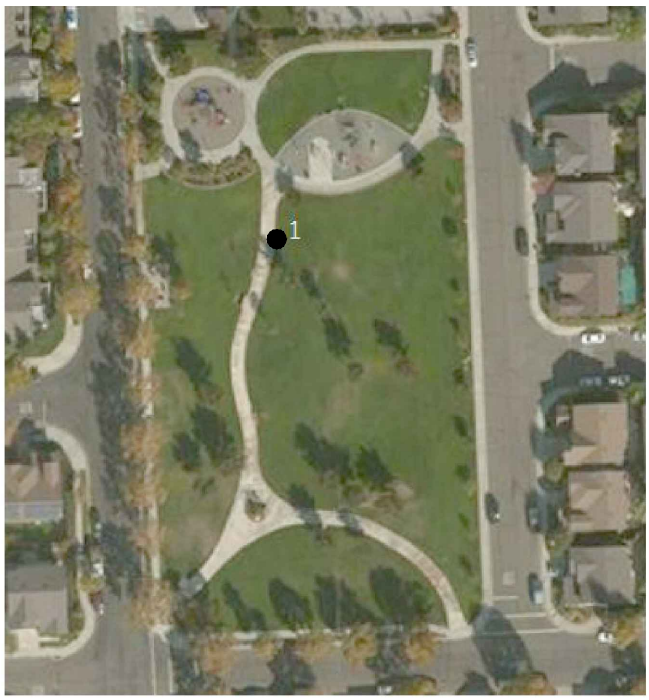
NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 1	1993704.80	6087885.94	13.17

The horizontal coodinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

Driven stainless steel rod in sleeve monument in grade box (marked Survey Monument EPA BM) in the lawn in University Square Park at Tate and Oakes Streets in the City of East Palo Alto located at east side of a concrete path





NOTES:

1. MONUMENT WAS SET IN AUGUST 2014
2. ELEVATION WAS RE-EVALUATED IN APRIL 2016

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PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14 REV. DATE: 04/16
		SCALE: N.T.S.
EXHIBIT BM 1		SHEET 2 OF 6

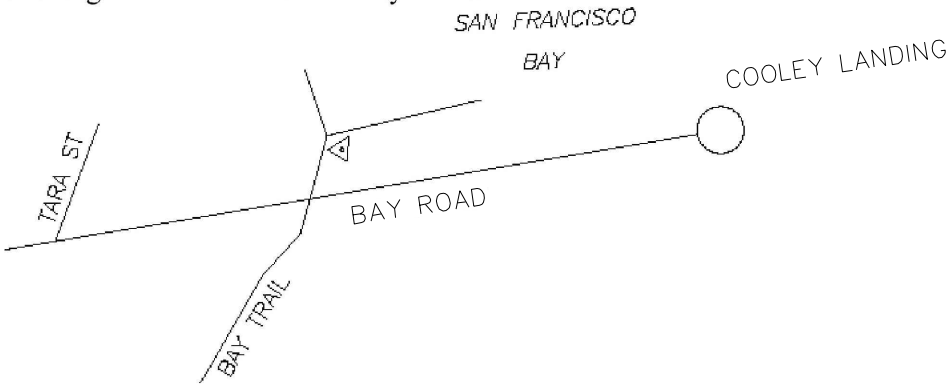
CITY OF EAST PALO ALTO BENCH MARK
BM 2

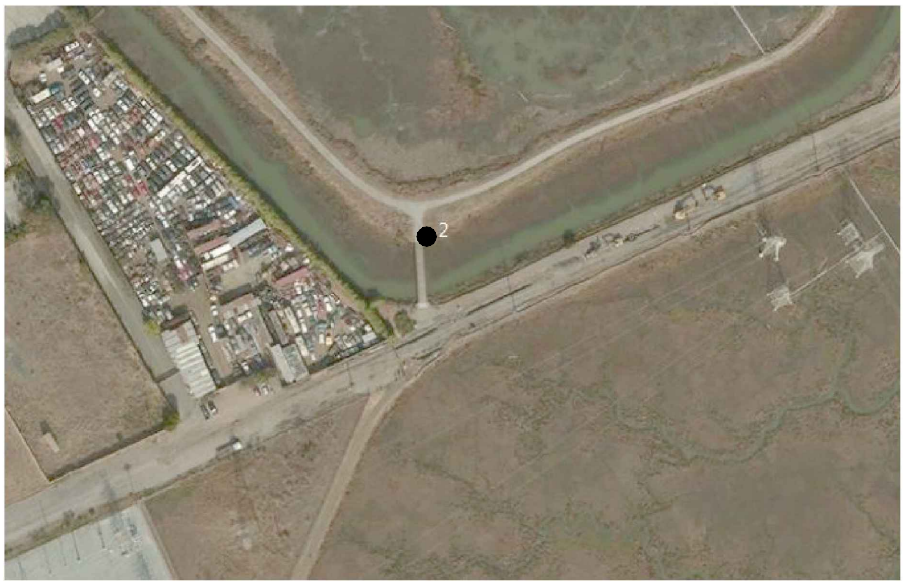
NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 2	1999609.22	6089767.25	10.06

The horizontal coodinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

A 2" aluminum disc stamped "East Palo Alto Bench Mark" in wetlands on the northeasterly headwall of a Bay Trail bridge at the north side of Bay Road.





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PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14 REV. DATE: 04/16
		SCALE: N.T.S.
EXHIBIT BM 2		SHEET 3 OF 6

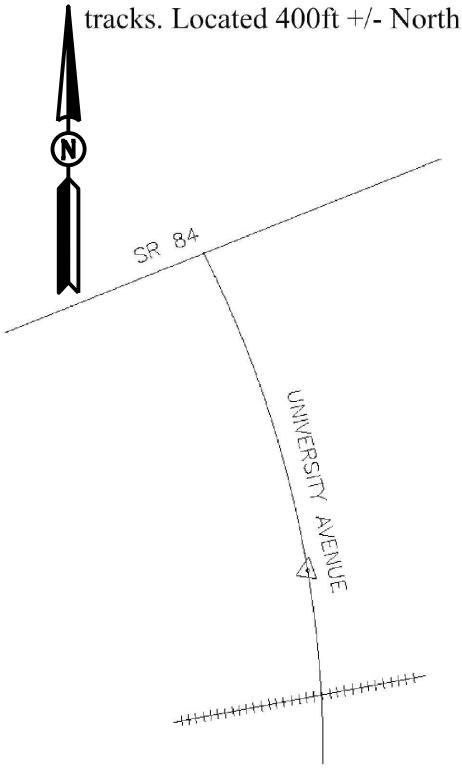
CITY OF EAST PALO ALTO BENCH MARK
BM 3

NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 3	2002206.13	6085811.80	9.78

The horizontal coodinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

Driven stainless steel rod in sleeve monument in grade box (marked Survey Monument EPA BM) in the concrete median of University Avenue between SR 84 and the Union Pacific Railroad tracks. Located 400ft +/- North of Railroad.



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PROJECT NUMBER: 702-013	CITY OF EAST PALO ALTO MONUMENTS	DATE: 11/12/14 REV. DATE: 04/16
		SCALE: N.T.S.
EXHIBIT BM 3		SHEET 4 OF 6

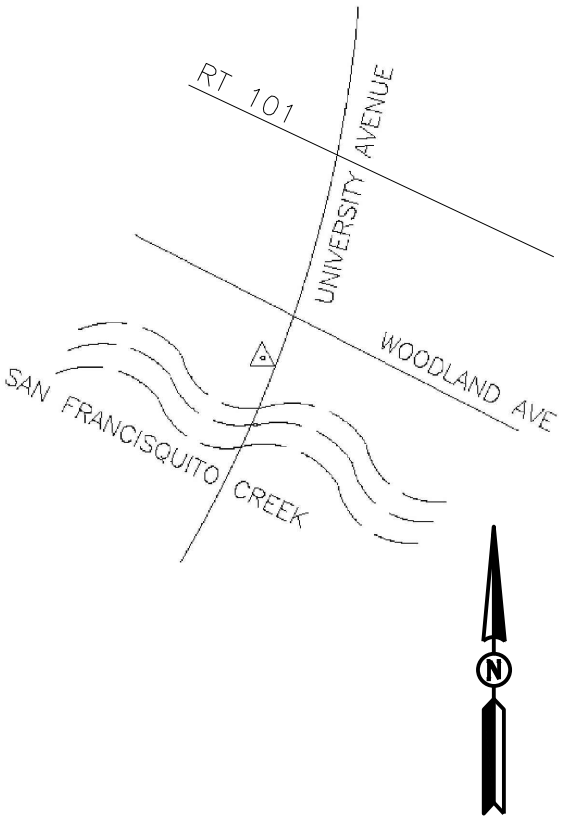
CITY OF EAST PALO ALTO BENCH MARK
BM 4

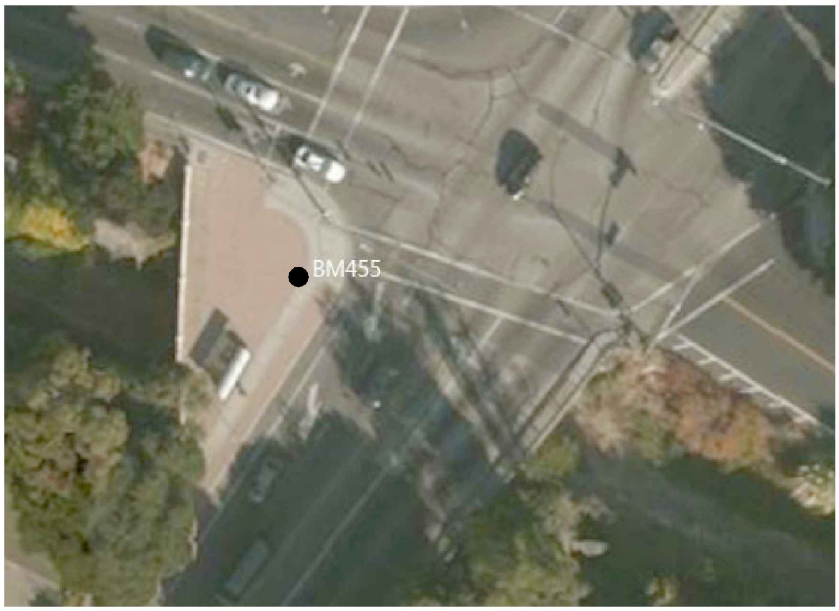
NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 4	1993379.43	6085090.94	37.21

The horizontal coodinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

A brass disc in the walkway in the northeast quadrant of the University Avenue Bridge over San Francisquito Creek. It is 35 feet easterly of a 3.3 tall concrete headwall and 19 feet southerly of a traffic light pole. This is Santa Clara Valley Water District Bench Mark BM455.





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		SCALE: N.T.S.
EXHIBIT BM 4		SHEET 5 OF 6

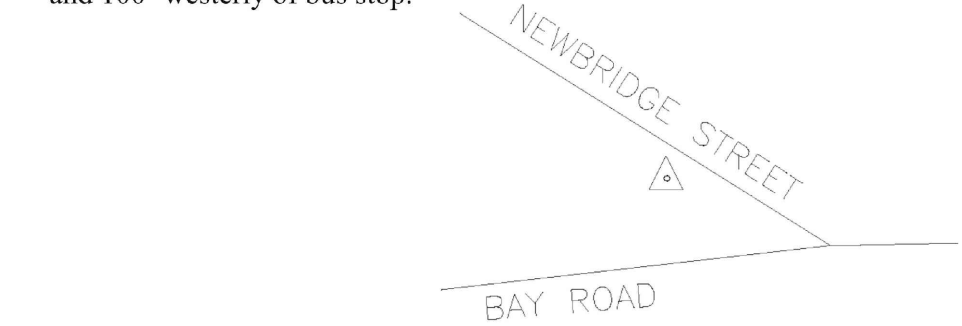
CITY OF EAST PALO ALTO BENCH MARK
BM 5

NAME	NORTHING (USft)	EASTING (USft)	ELEVATION (NAVD 88, USft)
BM 5	1998092.34	6083303.85	16.81

The horizontal coodinates are California State Plane Coordinates, zone III, NAD 83(2011). The elevation was produced using National Geodetic Survey Height Modernization Points.

DESCRIPTION

Driven stainless steel rod in sleeve monument in grade box (marked Survey Monument EPA BM) in landscaping at south edge of Newbridge Street sidewalk near intersection with Bay Road and 100' westerly of bus stop.



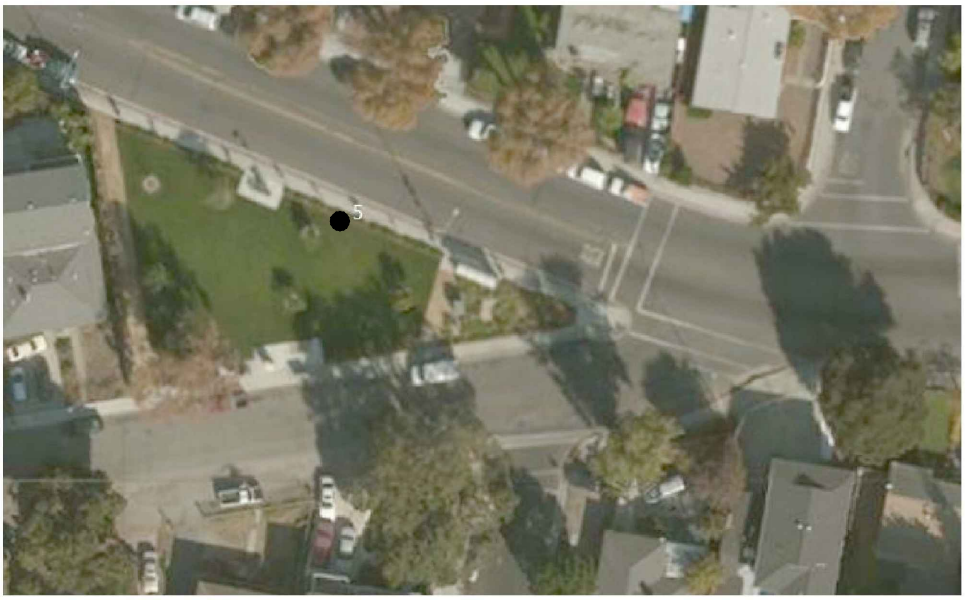


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EXHIBIT BM 5		SHEET 6 OF 6