HALEY ALDRICH

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2021 ANNUAL PROGRESS REPORT
FORMER RAYTHEON FACILITIES
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

by
Haley & Aldrich, Inc.
San Jose, California

for
Raytheon Company
Tewksbury, Massachusetts

File No. 0129571-012
April 2022

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SIGNATURE PAGE FOR

2021 ANNUAL PROGRESS REPORT
FORMER RAYTHEON FACILITIES
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

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15 April 2022

File No. 0129571-012

U.S. Environmental Protection Agency Region 9
Superfund Division
75 Hawthorne Street, SFD-7-3
San Francisco, California 94105

Attention: Ms. Alana Lee
Project Manager, Superfund Division

Subject: 2021 Annual Progress Report
Former Raytheon Facilities
350 Ellis Street
Mountain View, California

Dear Ms. Lee:

Haley & Aldrich, Inc., prepared this 2021 Annual Progress Report (Report) on behalf of Raytheon Company (Raytheon) for the former Raytheon facilities located at 350 Ellis Street, in Mountain View, California. This Report presents the results of the groundwater and air operations, maintenance, and monitoring activities conducted from 1 January through 31 December 2021.

Please do not hesitate to contact the undersigned if you have questions concerning this Report.

Sincerely yours,

HALEY & ALDRICH, INC.

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Enclosures

c: Raytheon Company; Attn: Robert Luhrs
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List of Acronyms and Abbreviations

Acronym	Description
APUs	air purification units
BAAQMD	Bay Area Air Quality Management District
bgs	below ground surface
COCs	chemicals of concern
EPA	United States Environmental Protection Agency
Haley & Aldrich	Haley & Aldrich, Inc.
gpd/ft	gallons per day per foot
gpm	gallons per minute
HiPOx™	high-pressure oxidation
LGAC	liquid-phase granular activated carbon
Locus	Locus Technologies
MEW	Middlefield-Ellis-Whisman
NPDES	National Pollutant Discharge Elimination System
OM&M	operations, monitoring, and maintenance
OM&M Plan	"Property-specific Long-term Vapor Intrusion Operations, Maintenance, and Monitoring Plan"
Permit	National Pollutant Discharge Elimination System Permit
QA/QC	quality assurance/quality control
Raytheon	Raytheon Company
Report	2021 Annual Progress Report
ROD	Record of Decision
RWQCB	San Francisco Bay Regional Water Quality Control Board
Site	the Raytheon Company facilities located at 350 Ellis Street in Mountain View, California
SSD	sub-slab depressurization
treatment system	groundwater extraction treatment system
TCE	trichloroethene
VGAC	vapor-phase granular activated carbon
VOCs	volatile organic compounds

1. Introduction

Haley & Aldrich, Inc., (Haley & Aldrich) prepared this 2021 Annual Progress Report (Report) for the former Raytheon Company (Raytheon) facilities at 350 Ellis Street in Mountain View, California (the "Site").[1] The Site is located within the Middlefield-Ellis-Whisman (MEW) Superfund Study Area (Figure 1). This Report summarizes the Site operations, maintenance, and monitoring (OM&M) activities and data collected from 1 January through 31 December 2021. Haley & Aldrich prepared the Report on behalf of Raytheon in accordance with the following documents:

- The U.S. Environmental Protection Agency's (EPA) Consent Decree for the MEW Site Section XI (EPA, 1991);
- EPA's 16 August 2010 "Record of Decision (ROD) Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View and Moffett Field, California" (EPA, 2010);
- EPA's requirements for annual progress report contents at MEW (EPA, 2005, 2011a, 2014);
- EPA's "Statement of Work (SOW), Remedial Design and Remedial Action to Address the Vapor Intrusion Pathway," Section 2.6.2, (EPA, 2011b); and
- San Francisco Bay Regional Water Quality Control Board (RWQCB) Order No. R2-2017-0048, amended by Order No. R2-2018-0050, and the National Pollutant Discharge Elimination System (NPDES) Permit No. CAG912002 (RWQCB, 2017, 2018a, 2018b).

1.1 SITE BACKGROUND

The 18-acre Site is in the MEW Study Area (Figure 1). The former facilities at 350 Ellis Street were constructed circa 1959. Raytheon occupied the Site from 1961 until it sold the property to Fairchild Semiconductor Corporation in 1997. In 2000, Veritas purchased the property, demolished the facilities, and constructed five new buildings (A, B, C, D, and E) and a multi-level parking garage. The five buildings have the following addresses:

Building	Address
A	370 Ellis Street
B	
C (C West and C East)	380 Ellis Street
D	
E	350 Ellis Street

In 2005, Symantec acquired Veritas. Broadcom acquired Symantec[2] in 2019.

[1] Work status for 401/415 East Middlefield Road is included in the 2019 Annual Report that Weiss Associates submitted to EPA.

[2] Symantec is now NortonLifeLock.

1.2 LOCAL HYDROGEOLOGY

An upper and a lower water-bearing formation are present beneath the Site and separated by a regional continuous aquitard. The upper formation is subdivided into the A, B1, B2, and B3 Zones. The lower formation includes the C and Deep Zones. The naming configuration for the aquitards is such that the aquitard separating the A and B1 Zones is the A/B1 Aquitard, the aquitard separating the B3 and C Zones is the B3/C Aquitard, etc. The zones at the Site can be summarized as follows:

Zone	Depth Below Ground Surface (feet bgs*)
A	0 to 45
B1	50 to 75
B2	75 to 110
B3	120 to 160
C	200 to 240
Deep	> 200

*bgs = below ground surface

The groundwater, which is not used for drinking water at the Site or within the MEW Study Area, generally flows north in the A, B1, and upper B2 Zones. It flows northwest in the lower B2 Zone and northeast in the B3 Zone. The presence of an underground slurry wall and operating groundwater extraction wells alter the local direction of the groundwater flow at the Site in the A, B1, and upper B2 Zones.

1.3 SUMMARY OF SITE REMEDIAL ACTIONS

Remediation at the Site has included mitigation measures to address the chemicals of concern (COCs)[3] in the groundwater, soil, and air. Implementation and results of the prior mitigation measures for the Site have been documented in previous reports (Golder Associates Inc., 1988; Groundwater Technology, Inc., 1995 and 1996; IT Corporation, 2000; Locus Technologies (Locus), 2000, 2001, 2002, 2003a, 2003b, 2004, 2008a, 2008b, 2008c, and 2008d; San Francisco Bay Regional Water Quality Control Board [RWQCB], 2009; Haley & Aldrich, 2014, 2015, 2016, 2017, 2018, 2019, 2020, and 2021a).

Sections 2 and 3 describe the progress of the current remedial actions. Appendix A, the Annual Report Remedy Performance Checklist, includes a summary of past and current Site remedial actions.

[3] COCs in groundwater and soil include chloroform, 1,2-dichlorobenzene, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethene, Freon-113, phenol, tetrachloroethene, 1,1,1-trichloroethane, trichloroethene, vinyl chloride, antimony, arsenic, cadmium, and lead. The 2010 ROD Amendment lists the COCs for the vapor intrusion pathway as: tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,1-dichloroethene, 1,1-dichloroethane, and vinyl chloride.

1.3.1 Soil

Raytheon installed a soil vapor extraction system in 1996 that operated until 2000, when it was shut down and decommissioned with EPA's approval. The soil vapor extraction system removed and treated approximately 3,000 pounds of volatile organic compounds (VOCs) from the vadose zone.

1.3.2 Groundwater

In 1987, Raytheon installed a slurry wall around the Site to a depth of approximately 100 feet bgs to physically contain VOCs on Site. The slurry wall isolates the A and B1 Zones as well as the upper portions of the B2 Zone. Raytheon began groundwater extraction activities in 1982. The current system includes eight extraction wells and an ozone oxidation system supplemented with activated carbon. As of 27 December 2021, Raytheon has removed and treated approximately 19,902 pounds of VOCs from the groundwater.

1.3.3 Vapor Intrusion

When Veritas constructed the current Site facilities in 2000, they installed a passive sub-slab ventilation system and a vapor barrier under Buildings A through E. Raytheon installed and continues to operate air purification units (APUs) in five utility rooms: A1034 in April 2004; A1015, B1038, and C110 in October 2005; and D106 in September 2012. In 2015, Raytheon voluntarily converted the passive system to an active sub-slab depressurization (SSD) system.

1.4 SUMMARY OF 2021 ACTIVITIES

The following activities were completed at the Site during this reporting period.

January	• No major activities needed.
February	• 15th – Submitted the 2020 Annual NPDES Self-Monitoring Report, Reporting Period 1 January 2020 through 31 December 2020, to the RWQCB (Haley & Aldrich, 2021a). • 15th to 16th – Shut off treatment system and drained both vessels to change out the liquid-phase granular activated carbon (LGAC). Restarted the treatment system on the 16th. • 16th – Changed out the vapor-phase granular activated carbon (VGAC) for the SSD system at Building D. • 18thth – Conducted the first quarter 2020 inspection and sampling of the SSD system and inspected the APUs installed in utility rooms A1034, A1015, B1038, C110, and D106.
March	• No major activities needed.
April	• 15th – Submitted the 2020 Annual Report to EPA (Haley & Aldrich, 2021b).

May	• 3rd to 4th – Shut off treatment system and drained both vessels to change out the LGAC. Restarted the treatment system on the 4th. • 19th – Cleaned and repaired pump in extraction well RAY-1A. • 24th – Conducted the second quarter 2020 inspection and sampling of the SSD system and inspected the APUs installed in utility rooms A1034, A1015, B1038, C110, and D106.
June	• No major activities needed.
July	• 20th- Replaced hydrogen peroxide metering pump.
August	• 15th – Submitted 2021 Semiannual NPDES Self-Monitoring Report, Reporting Period 1 January 2021 to 30 June 2021, to the RWQCB (Haley & Aldrich, 2021c). • 18th and 19th - Shut off treatment system and drained both vessels to change out the LGAC. Restarted the treatment system on the 19th. • 20th – Conducted third quarter 2020 inspection and sampling of the SSD system and inspected the APUs installed in utility rooms A1034, A1015, B1038, C110, and D106. • 25th – Conducted the annual conduit inspection in utility rooms A1015, A1034, B114, B1038, B1042, C102, C110, C113, C117, D106, D112, and E114.
September	• No major activities needed.
October	• No major activities needed.
November	• 10th and 11th - Shut off treatment system and drained both vessels to change out the LGAC. Restarted the treatment system on the 11th. • 18th – Conducted the fourth quarter 2020 inspection and sampling of the SSD system and inspected the APUs installed in utility rooms A1034, A1015, B1038, C110, and D106.
December	• 7th to 8th - Shut off the treatment system and drained both vessels to change out the LGAC. Restarted the treatment system on the 8th. • 23rd to 27th - The treatment system was shut down due to multiple issues that could not be resolved over the holiday weekend, which included bag filter replacement, low generator power, and chiller offline. EPA was notified on the shutdown via email.

In addition to the activities above, Raytheon performed NPDES system sampling per the requirement of the NPDES Permit No. CAG912002.

2. Groundwater Extraction and Treatment System

2.1 TREATMENT SYSTEM DESCRIPTION AND PERFORMANCE

The current groundwater extraction treatment system (treatment system) consists of eight groundwater extraction wells, an advanced high-pressure oxidation (HiPOx™) system for primary water treatment, and LGAC treatment as a polishing step.

Groundwater is extracted from the extraction wells and treated at the treatment system. Five extraction wells, RE-05A, RE-23A, RE-24A, RE-25A, and R-65B1(B2), are located within, and three extraction wells, RAY-1A, RAY-1B1, and I-1B2, are located immediately outside of the slurry wall enclosure (Figure 2).

The treatment system consists of a skid-mounted HiPOx™ unit followed by 3,000- and 1,000-pound LGAC vessels.[4] The HiPOx™ unit is the primary water treatment process and injects a 25 percent hydrogen peroxide solution and ozone generated from liquid oxygen into pipeline reactors contained within the HiPOx™ unit to oxidize VOCs and 1,4 dioxane. Once oxidized, the water undergoes a secondary water treatment process to further reduce VOCs by filtration through a vessel with 3,000 pounds of LGAC and then through a second vessel with 1,000 pounds of LGAC.

The water is termed "influent" before it enters the treatment system and "effluent" after it exits the LGAC vessels. The treated groundwater is conveyed to Stevens Creek for discharge (Figure 1) under NPDES Permit No. CAG912002, issued by the RWQCB on 18 December 2018 and modified by request of Raytheon on 26 March 2019 (RWQCB, 2018b, 2019).

In 2021, the treatment system operated at an average discharge flow rate of approximately 22 gallons per minute (gpm). Table 1 presents monthly and 2021 average groundwater extraction flow rate for each well and the treatment system.

2.1.1 Treatment System OM&M Activities

OM&M activities were performed in accordance with the current OM&M Manual (Locus, 2013) and included the following activities:

- Regular inspection and monitoring the treatment system operations;
- Treatment system sampling in accordance with NPDES Permit requirements and submitting laboratory analytical reports to the RWQCB;
- Inspecting the conditions of the groundwater monitoring and extraction wells; and
- Replacing or repairing the treatment system components as needed.

[4] Haley & Aldrich installed the 1,000-pound LGAC vessel in October 2016.

2.1.2 Treatment System Sampling and Mass Removal

Samples were collected monthly from the treatment system influent (RAYINF), the HiPOx™ system effluent (RAYMID1), and the system effluent (RAYEFT) to confirm that the treatment system effectively removed the COCs. Samples were also collected between the 3,000 and 1,000 capacity LGAC vessels (sample RAYMID2) to track the performance of the 3,000-pound LGAC treatment. The samples were analyzed for VOCs using EPA Method 8260B. Table 2 presents the analytical results for the system influent and effluent sampling points, and Table 3 presents treatment system VOC influent concentrations, groundwater flow rates, and VOC mass removed for 2021.

In 2021, the treatment system treated approximately 11.5 million gallons of water and removed approximately 218 pounds of VOCs (Table 3). Approximately 19,900 pounds of VOCs has been treated from 1986 through the end of 2021, as presented in Table 3 and Appendix B. The Appendix B table provides historical trichloroethene (TCE) and total VOC influent concentrations, treatment system flow rates, and VOC mass removal rates from 1986 through 15 December 2021. Appendix B-1 summarizes the TCE influent concentrations since 2001; Appendices B-2 and B-3 summarize the VOC influent concentrations and cumulative VOC mass removed since 1986.

2.1.3 System Operation

In 2021, the treatment system operated approximately 97 percent of the time and was shut down for planned OM&M activities such as carbon changeouts and minor disruptions to clean, replace, or update certain system components. In addition, the system was shut down for 87 hours between 23 and 27 December due to system alarms that could not be resolved over the holiday weekend, as previously communicated to the EPA via email. No untreated groundwater was discharged during any shutdowns.

2.2 GROUNDWATER LEVEL MEASUREMENTS

Groundwater level measurements were collected in March and September 2021 for slurry wall and aquitard well pairs and clusters. Slurry wall well pairs consist of one well inside and one well outside of the slurry wall and are used to measure the direction of the horizontal gradient across the slurry wall. Aquitard well clusters consist of wells near each other but screened in two zones, immediately above and below the aquitard, and are used to measure the direction of the vertical gradient.

Annual groundwater level measurements were collected in September 2021 for accessible monitoring wells at and around the Site as part of the annual regional groundwater monitoring program.

Similar to previous years, artesian conditions were gauged and documented in some of the lower B3 Zone wells (see Table 4). To prevent artesian conditions from surfacing, Haley & Aldrich maintained fifteen monitoring wells that are equipped with pressurized packers at the Site (noted in Table 4). Monitoring well R-51B3 was also equipped with a pressurized packer but was decommissioned and sealed by the regional groundwater monitoring program and is no longer monitored. Wells R-50B2, R-55B2, and R-56B3 were decommissioned between 29 June and 9 July 2020 by Weiss Associates, therefore water levels were not measured in these wells in 2021.

Figures 3 through 6 present groundwater level contour maps for the A, B1, Upper B2, and Lower B2, respectively. Appendix C presents historical well hydrographs.

2.2.1 Horizontal (Slurry Wall) and Vertical (Aquitard) Groundwater Gradients

Seven well pairs were used to evaluate groundwater gradient directions across the slurry wall, and fifteen well clusters were used to evaluate the vertical gradient directions across the aquitards (Figure 7).

2.2.1.1 Slurry Wall

Table 5 and Appendix D show the differences in groundwater levels across the slurry wall. Water level measurements collected in 2021 demonstrated that an inward gradient across the slurry wall has been maintained in three of the seven well pairs (Table 5). Wells with outward gradients were on the east wall (well pair R-57A and R-60A) and on the north wall (well pair R-55A and RE-07A and well pair R-05B1 and RP-23B).

2.2.1.2 Aquitards

Table 6 and Appendix D show the differences in groundwater levels across the aquitards. In March 2021, upward hydraulic gradients were observed in six of the eleven well pairs used to monitor the gradient across the A/B1 Aquitard. Slight downward gradients were observed in well pairs R-63B1/R-60A, RP-19B/R-60A, R-67B1/RE-08A, and R-68B1/R-67A. Groundwater elevation was not measured in well R-65B1B2 because it is being used as an extraction well; therefore, a gradient for well pair R-65B2B2/R-58A was not calculated.

In September 2021, upward hydraulic gradients were observed in seven of the eleven well pairs used to monitor the gradient across the A/B1 Aquitard. Wells with downward gradients were the same as in March 2021 except for well pair RP-19B/R60A, which had an upward gradient. Groundwater elevation was not measured in well R-65B1B2 because it is being used as an extraction well; therefore, a gradient for well pair R-65B2B2/R-58A was not calculated.

The vertical hydraulic gradient direction across the B1/B2 Aquitard and Upper and Lower B2 Zone was consistently upward throughout 2021, demonstrating upward vertical gradients at the bottom of the slurry wall enclosure.

2.2.2 Hydraulic Control and Capture Zone Analysis

The groundwater capture at the Site is evaluated according to the EPA's 2008 guidance (EPA, 2008). The 2008 EPA estimation of the capture zone is based on following general assumptions:

- Homogeneous, isotropic, confined aquifer of infinite extent;
- Uniform aquifer thickness;
- Fully penetrating extraction well(s);
- Uniform regional horizontal hydraulic gradient;
- Steady-state flow;
- Negligible vertical gradient;
- No net recharge accounted for in regional hydraulic gradient; and

- No other source of water introduced to the aquifer because of extraction.

The groundwater level contour lines along the eastern and western slurry walls were used to calculate the groundwater gradients for A and B Zones. The interpreted capture zone was then compared to the target capture zones and flow budget calculations using potentiometric surface maps.

Water-bearing transmissivity values at the Site were calculated using the results of pumping tests in 1987 (HLA Associates, 1987-1988). The average transmissivity of 3,088 gallons per day per foot (gpd/ft) selected for the A Zone was calculated from transmissivity values obtained from monitoring wells 69A, RW1A, and ME1A. The average transmissivity of 12,130 gpd/ft selected for the B Zone was calculated from transmissivity values obtained from monitoring wells RW1B1, R5B1, and RW1B1.

The calculated 2021 capture zones for extraction wells RAY-1A and RAY-1B1 are shown in Table 7. The average 2021 pump rates, listed in Table 1, were used for the 2021 capture zone calculations.

The capture zones calculated using EPA's 2008 guidance do not consider the presence of the slurry wall upgradient of the extraction wells. The estimated capture zones depicted on Figures 3 and 4 for wells RAY-1A and RAY-1B1, respectively, reflect the presence of the slurry wall. The estimated capture zone calculations provided in Tables 7 and 8 are based on our best professional judgments and Site knowledge.

RAY-1A and RAY-1B1 were installed to capture a target area of groundwater immediately downgradient of the slurry wall. The capture zones depicted on Figures 3 and 4 confirm our calculations and indicate that these wells effectively capture the target area.

2.2.3 Flow Budget Calculations

Water balance calculations were performed to verify the estimated capture zones by comparing the groundwater flux flowing into the Site with the rate of groundwater removal from extraction wells RAY-1A and RAY-1B1. If the estimated groundwater flux is greater than the pumping rate from the well, the depicted capture zone overestimates the actual capture. If the estimated groundwater flux is less than the pumping rate from the well, the depicted capture zone underestimates the actual capture. To be conservative, the estimated groundwater flux should be equal to or less than the pumping rate from the well.

Theoretically, inflow to the water-bearing zone could be caused by recharge from precipitation, surface water bodies, lateral inflow from upgradient areas, or vertical flow between aquifer zones. Outflow is the rate of groundwater flow being removed from the zone. Water outflow from the water-bearing zone could be caused by vertical leakage between the zones and groundwater extraction.

The 1988 Feasibility Study demonstrated that recharge is considered negligible at the MEW Site because most of the surface is covered by impermeable features such as paving and buildings (Canonie Environmental, 1988). Low-permeability clays extending from the surface to approximately 10 to 15 feet bgs further limit the extent of infiltration. With other inflow pathways being negligible, groundwater flow at the Site is mostly attributed to the lateral flow from upgradient areas.

The estimated groundwater flow into the aquifer zone and the estimated pumping required for adequate capture are calculated in Table 8. The estimated flow rate into the capture zone is calculated in accordance with the EPA's 2008 guidance (EPA, 2008).

Because extraction wells RAY-1A and RAY-1B1 are immediately downgradient of the slurry wall, groundwater removed from these wells must originate from incoming groundwater flux around the slurry wall. As such, a representative gradient "*i*" is calculated as the hydraulic gradient from the northern edge of the western side of the slurry wall.

2.2.3.1 RAY-1A

The average extraction rate was measured at 2.78 gpm (see Table 1). With an assumed factor of 1.5, the interpreted capture zones correspond to estimated groundwater flux of 2.09 gpm, which is lower than the actual pumping rate from Well RAY-1A (see Table 8).

2.2.3.2 RAY-1B1

The average extraction rate was measured at 3.75 gpm (see Table 1). With an assumed factor of 1.5, the interpreted capture zones correspond to an estimated groundwater flux of 2.82 gpm, which is lower than the actual pumping rate from Well RAY-1B1 (see Table 8).

In summary, the estimated groundwater flux in each of the A and B1 Zones is less than the pumping rates from RAY-1A and RAY-1B1, respectively. Therefore, the interpreted capture zones depicted on Figures 3 and 4 conservatively underestimate the actual capture zone, and extraction wells RAY-1A and RAY-1B1 provide appropriate capture of the target area.

2.3 VOC CONCENTRATIONS

In accordance with the approved sampling frequency Raytheon samples eleven Site-specific monitoring wells biennially, and twenty-four monitoring wells within the slurry wall enclosure every four years to align with the regional groundwater sampling program. These wells were sampled in 2020 and therefore no groundwater samples were collected from Raytheon monitoring wells during this reporting period. Previous groundwater analytical data, including iso contour maps was presented in the 2020 Annual Progress Report (Haley & Aldrich, 2021b). Table 9 presents the Site's monitoring program and corresponding wells.

Data collected in 2020 and in previous years indicate that TCE is typically present in the highest concentrations as compared to the other Site COCs. In general, groundwater concentrations were detected at their highest levels early in the investigation. Remedial activities conducted at the Site have removed and treated 3,000 pounds of VOCs from the vadose zone and 19,900 pounds of VOCs from the saturated zones (Table 3), consequently reducing the VOC concentrations by several orders of magnitude in many wells.

Groundwater sample will be collected for analysis in 2022 and the results reported in the annual report that will be submitted by 15 April 2023.

2.4 QUALITY ASSURANCE/QUALITY CONTROL

No groundwater samples were collected from Raytheon monitoring wells during this reporting period. Sixty-three NPDES samples (including performance samples RAYMID1 and RAYMID2), three field duplicates, and fourteen trip blanks were also collected and analyzed for VOCs using EPA Method 8260B during this reporting period to monitor treatment system operations.

Quality assurance/quality control (QA/QC) followed the procedures specified in the 1991 "Unified Quality Assurance Project Plan" (Canonie Environmental, 1991). The quality of the data during this reporting period was acceptable and valid with minor exceptions noted in the data usability summary reports compiled in Appendix E. Influent sampling requirements set by NPDES Permit No. CAG912002 were met in previous and subsequent months.

Appendix E includes a description and summary of the QA/QC findings. Laboratory reports of samples collected in 2021 are presented in Appendix F.

3. Vapor Intrusion Response Action

In 2015, Raytheon converted the passive sub-slab ventilation system beneath Buildings A, B, C, D, and E to an active SSD system to preemptively control potential vapor intrusion into indoor air. Haley & Aldrich documented the work in the "Property-specific Vapor Intrusion Response Action Implementation Report" submitted to EPA on 10 March 2016 (Haley & Aldrich, 2016). Confirmation indoor air samples collected with the heating, ventilating, and air conditioning system on and off after the startup of the SSD system showed COC concentrations less than their respective ROD commercial indoor air cleanup levels.

3.1 SSD SYSTEM DESCRIPTION AND PERFORMANCE

The SSD system extracts and treats vapor from beneath the buildings on Site at four locations identified as Extraction Points V002, V008, V011, and V014, located outside Buildings D, B, A, and E, respectively (Figure 8). At each extraction point a pipe conveys the vapors from beneath the building to an equipment enclosure for treatment. Each equipment enclosure includes an extraction fan (RadonAway™ HS5000), a VGAC filter (55-gallon drum filled with virgin coconut carbon), moisture knockout, control panel, telemetry system (Sensaphone® Sentinel Pro), monitoring ports, and connection piping. The equipment enclosures are lined with absorptive material to reduce the noise level. Upstream of each enclosure, an additional moisture trap is located in a vault outside each building.

This section summarizes the procedures and results of performance monitoring, including SSD system operational data collection and SSD system influent and effluent air sampling completed in accordance with the "Property-specific Long-term Vapor Intrusion Operations, Maintenance, and Monitoring (OM&M) Plan," submitted to EPA on 21 July 2015 ([OM&M Plan]; Haley & Aldrich, 2015).

3.1.1 SSD System Upgrades

Between 6 and 9 April 2021, upgrades were made to the telemetry system and instrumentation was added inside the drainage vault for each of the four extraction points shown on Figure 8. A new telemetry unit, a Sensaphone® Sentinel Pro, was installed at each extraction point enclosure to communicate with the programmable logic controller located at the treatment system. A water level sensor was also installed inside the each of the SSD system's drainage vaults that notifies system operators when the drainage vault is nearly full of water. These upgrades allow advanced notice of water accumulating in the drainage vaults so Haley & Aldrich can remove the water on an as-needed basis before it can affect operation of the SSD unit.

3.1.2 System Performance

Haley & Aldrich inspected the operation of the SSD system quarterly during 2021. The negative pressure differentials observed during each quarterly visit exceeded the design criterion of -0.020 inch of water column (Table 10).

During a routine maintenance visit of the SSD system on 9 March 2021, Haley & Aldrich observed the fan at Building D was operating at minimal capacity and replaced the fan on 11 March 2021. Pressure

monitoring locations influenced by the Building D fan were measured during the time of reduced operational capacity and were found to still meet the design criteria of -0.020 inch of water column.

During another routine maintenance visit of the SSD system on 26 April 2021, Haley & Aldrich observed an electric malfunction of the fan at Building B after it was shut down to drain water from the system. The electrical components were repaired the next day and the fan returned to service operating at normal capacity. Pressure monitoring locations influenced by the Building B fan were measured during the time of reduced operational capacity and were found to meet the design criteria of -0.020 inch of water column. Subsequent visits after repair showed the system to be operating as designed. No other non-routine maintenance was necessary in 2021. Table 10 shows the operational data from the time of system startup through the current reporting period.

In 2021, the SSD system operated continuously with only minor disruptions to replace certain system components as needed and for planned maintenance and modifications such as VGAC changeouts and system upgrades.

3.1.3 Treatment System Sampling

Influent and effluent air samples were collected from each treatment compound to confirm compliance with the substantive requirements of the Bay Area Air Quality Management District (BAAQMD). Air samples were collected quarterly at the influent and effluent points of the four SSD extraction points on 18 February, 24 May, 20 August, and 18 November 2021. Laboratory analytical reports for sampling conducted in 2021 are included in Appendix F.

Haley & Aldrich calculated the SSD system emission rates by multiplying the air flow rate measured on the discharge side of the fans by the effluent chemical concentrations (converted to mass) reported by the laboratory. Emission rates of the detected chemicals were compared with the emissions thresholds established by the BAAQMD in Regulation 2-1-103, BAAQMD Table 2-5-1, and BAAQMD Regulation 8-47-113. The SSD VGAC was changed out on 16 February 2021 for Building D. As shown in Table 11, the SSD system meets the emission requirements set by the BAAQMD.

3.2 INDOOR AIR SAMPLING

No indoor air samples were required or collected by Raytheon in 2021.

3.3 EVALUATION OF SSD SYSTEM EFFECTIVENESS

The SSD system is operating according to its design specifications and objectives.

3.4 EVALUATION OF APU SYSTEM

The APUs installed in utility rooms A1034, A1015, B1038, C110, and D106 operated continuously in 2021. Routine quarterly inspections of the units were conducted on 18 February, 24 May, 27 September, and 18 November 2021.

3.5 QUALITY ASSURANCE/QUALITY CONTROL

Haley & Aldrich conducted a QA/QC review of the SSD system analytical data for precision, accuracy, completeness, sample container contamination, conformance with holding times, and detection limits (Appendix E). Thirty-two SSD system influent and effluent air samples were collected and analyzed during this reporting period. Project samples and laboratory control samples were reviewed and evaluated in accordance with the OM&M Plan and EPA's updated National Functional Guidelines for Organic Data Review (EPA 540-R-2017-002; EPA, 2017). In summary, the analytical data are of acceptable quality.

4. Problems Encountered

No significant problems were encountered during the reporting period.

5. Technical Assessment

5.1 IS THE REMEDY FUNCTIONING AS INTENDED?

Based on the data review described in the previous sections, the groundwater and vapor intrusion remedies are functioning as intended. Appendix A includes the 2021 Annual Report Remedy Performance Checklist.

5.2 ARE CAPTURE ZONES ADEQUATE?

Section 2.3 presents an evaluation of the groundwater capture zones using several lines of evidence. Based on this evaluation, the overall plume capture at the Site is appropriate.

5.3 ARE GRADIENTS ACROSS THE SLURRY WALLS AND VERTICAL GRADIENTS APPROPRIATE?

Water level measurements collected in 2021 demonstrate that an inward gradient across the slurry wall is present in three of the seven pairs. Although the direction of the horizonal hydraulic gradient across the northern slurry wall and eastern slurry wall is outward, well operations within the slurry wall direct the water flow into those wells. Lines of evidence show that the groundwater on the downgradient side of the slurry wall is being captured by wells RAY-1A and RAY-1B1.

In 2021, upward gradients were observed in six of the eleven well pairs in March and seven of the eleven well pairs in September used to monitor the direction of the vertical hydraulic gradient across of the A/B1 Aquitard. Slight downward gradients were observed in four well pairs during at least one monitoring event in 2021. The gradient direction across the B1/B2 Aquitard and Upper and Lower B2 Zones was consistently upward throughout 2021, demonstrating proper vertical hydraulic gradients near the bottom of the slurry wall enclosure.

5.4 ARE CONCENTRATIONS DECREASING OVER TIME?

Remedial actions implemented by Raytheon at the Site have removed 3,000 pounds of VOCs from the vadose zone and more than 19,900 pounds of VOCs from the groundwater, consequently reducing VOC concentrations an order of magnitude or more in many wells at the Site.

6. Conclusions and Recommendations

The groundwater and vapor intrusion remedies implemented by Raytheon at the Site are performing as intended and remain protective of human health and the environment. No additional actions are warranted at this time.

7. Activities Planned for 2022

The following Site-specific activities are planned for 2022:

- Continue to operate and maintain the treatment system;
- Collect annual groundwater level measurements and water quality samples (in September) as part of the regional groundwater remediation program;
- Collect semiannual groundwater level measurements from well pairs and clusters;
- Evaluate the pump performance at extraction wells and conduct any corrective actions, if needed;
- Inspect the APUs at the Site quarterly;
- Investigate any reported obstruction in monitoring wells;
- Continue to monitor the SSD system as outlined in the OM&M Plan; and
- Submit annual and NPDES status reports.

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TABLES

TABLE 1

2021 AVERAGE EXTRACTION WELL FLOW RATES

350 ELLIS STREET

MOUNTAIN VIEW, CALIFORNIA

Extraction Wells	January	February	March	April	May	June	July	August	September	October	November	December	2021 Average
RAY-1A	2.51	2.28	2.29	4.52	1.62	2.90	2.87	3.03	3.18	2.86	2.97	2.32	2.78
RAY-1B1	3.84	3.82	3.96	3.66	4.15	3.77	3.77	3.86	3.89	3.63	3.71	2.98	3.75
I-1B2	2.90	2.69	2.84	2.52	2.70	2.59	2.60	2.70	2.80	2.42	2.46	1.94	2.60
R-65B2	3.51	3.40	3.55	3.32	4.12	3.54	3.51	3.69	3.85	3.43	3.50	2.59	3.50
RE-05A	3.35	3.29	3.44	3.20	3.79	3.93	3.80	3.92	3.96	3.47	3.53	2.96	3.55
RE-23A	2.64	2.57	2.59	2.45	2.62	2.20	1.93	1.72	1.60	1.15	1.00	0.21	1.89
RE-24A	4.31	4.04	3.92	3.59	3.38	2.53	2.30	2.16	2.04	1.67	1.62	1.01	2.71
RE-25A	0.57	0.47	0.44	0.28	0.35	0.29	0.26	0.24	0.23	0.16	0.07	0.85	0.35
Average GWTS Discharge Flow Rate [1]	25.01	20.55	23.33	23.96	20.48	23.03	21.95	19.37	22.08	17.45	16.44	16.44	20.84
Total treated groundwater (gallons)	11,476,800												

Abbreviations and Notes:

GWTS = Groundwater Treatment System

Flow rates are calculated averages based on the total monthly flow from each well and through the treatment system, in gallons per minute except as noted below.

[1] Based on effluent flow meter readings from the GWTS, in gallons per minute.

TABLE 2
2021 GROUNDWATER TREATMENT SYSTEM ANALYTICAL DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Location	Influent (RAYINF)														
Sample Date	01/05/2021	02/23/2021	02/23/2021	03/09/2021	04/05/2021	05/14/2021	05/14/2021	06/03/2021	07/06/2021	08/19/2021	09/09/2021	10/22/2021	11/15/2021	11/15/2021	12/02/2021
Sample Type	Primary	Primary	Duplicate	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	01/10/2021	02/25/2021	02/25/2021	03/12/2021	04/07/2021	05/18/2021	05/18/2021	06/05/2021	07/09/2021	08/24/2021	09/12/2021	10/28/2021	11/16/2021	11/19/2021	12/07/2021
	01/12/2021	02/26/2021	02/26/2021	03/16/2021	04/08/2021	05/20/2021	05/20/2021	06/08/2021	07/13/2021	08/25/2021	09/15/2021	10/29/2021	11/19/2021	11/22/2021	12/10/2021
Analysis Date(s)	--	--	--	--	04/12/2021	--	--	--	--	--	--	--	11/22/2021	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Inorganics (EPA 1631E, 200.8, 300.0, 7199; SM4500-CN-E)															
Mercury, Total	--	--	--	--	--	--	--	--	--	--	--	--	< 0.0005	--	--
Antimony, Total	--	--	--	--	--	--	--	--	--	--	--	--	< 0.50	--	--
Arsenic, Total	--	--	--	--	--	--	--	--	--	--	--	--	**0.36**	--	--
Beryllium, Total	--	--	--	--	--	--	--	--	--	--	--	--	< 0.10	--	--
Cadmium, Total	--	--	--	--	--	--	--	--	--	--	--	--	< 0.050	--	--
Chromium, Total	--	--	--	--	--	--	--	--	--	--	--	--	**0.91 J**	--	--
Copper, Total	--	--	--	--	--	--	--	--	--	--	--	--	**0.75**	--	--
Lead, Total	--	--	--	--	--	--	--	--	--	--	--	--	< 0.050	--	--
Manganese, Total	--	--	--	--	--	--	--	--	--	--	--	--	**380**	--	--
Nickel, Total	--	--	--	--	--	--	--	--	--	--	--	--	**1.1**	--	--
Silver, Total	--	--	--	--	--	--	--	--	--	--	--	--	< 0.10	--	--
Thallium, Total	--	--	--	--	--	--	--	--	--	--	--	--	< 0.050	--	--
Zinc, Total	--	--	--	--	--	--	--	--	--	--	--	--	**5.6 J**	--	--
Sulfate (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide	--	--	--	--	--	--	--	--	--	--	--	--	< 1.4	--	--
Chromium VI (Hexavalent)	--	--	--	--	--	--	--	--	--	--	--	--	**0.69**	--	--
Volatile Organic Compounds (EPA 8260B)[2]															
1,1,1,2-Tetrachloroethane	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.95	< 0.95	< 0.038	< 0.038	< 0.038	< 0.38	< 7.6	< 0.038	< 0.038	< 0.038
1,1,1-Trichloroethane	**1.0**	**0.83**	**0.85**	**0.89**	**0.96 J**	**0.97 J**	**0.91 J**	**0.87**	**0.93**	**0.93**	**10**	< 5.0	**0.94**	**0.89**	< 1.3
1,1,2,2-Tetrachloroethane	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 1.4	< 1.4	< 0.056	< 0.056	< 0.056	< 0.56	< 11	< 0.056	< 0.056	< 0.056
1,1,2-Trichloroethane	**0.24**	**0.28**	**0.27**	**0.18 J**	< 0.070	< 1.8	< 1.8	**0.19 J**	**0.19 J**	**0.073 J**	**2.3**	< 14	**0.15 J**	**0.15 J**	**0.17 J**
1,1-Dichloroethane	**5.4**	**4.6**	**4.7**	**5.4**	**6.0 J**	**5.4**	**5.6**	**4.6**	**5.3**	**5.5**	**48**	**7.0 J**	**4.4**	**4.4**	**4.7**
1,1-Dichloroethene	**8.3**	**6.4**	**6.6**	**7.1**	**8.3**	< 8.8	< 8.8	**6.1**	**8.8 J**	**7.4 J**	< 7.0	< 7.0	**5.5**	**5.9**	**5.8**
1,1-Dichloropropene	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	< 0.90	< 0.90	< 0.036	< 0.036	< 0.036	< 0.36	< 7.2	< 0.036	< 0.036	< 0.036
1,2,3-Trichlorobenzene	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 3.7	< 3.7	< 0.15	< 0.15	< 0.15	< 1.5	< 30	< 0.15	< 0.15	< 0.15
1,2,3-Trichloropropane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 1.3	< 1.3	< 0.050	< 0.050	< 0.050	< 0.50	< 10	< 0.050	< 0.050	< 0.050
1,2,4-Trichlorobenzene	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 4.3	< 4.3	< 0.17	< 0.17	< 0.17	< 1.7	< 34	< 0.17	< 0.17	< 0.17
1,2,4-Trimethylbenzene	< 0.072	< 0.30	< 0.30	< 0.072	< 0.072	< 1.8	< 1.8	< 0.072	< 0.072	< 0.072	< 0.72	< 14	< 0.30	< 0.072	< 0.072
1,2-Dibromo-3-chloropropane (DBCP)	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 11	< 11	< 0.44	< 0.44	< 0.44	< 4.4	< 88	< 0.44	< 0.44	< 0.44
1,2-Dibromoethane (Ethylene Dibromide)	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.63	< 0.63	< 0.025	< 0.025	< 0.025	< 0.25	< 5.0	< 0.025	< 0.025	< 0.025
1,2-Dichlorobenzene	**5.9**	**2.6**	**2.7**	**5.9**	**12 J**	**7.9**	**7.8**	**7.2**	**5.7**	**13**	**60**	< 7.6	**7.6**	**7.0**	**5.2**

TABLE 2
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350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Location	Influent (RAYINF)														
Sample Date	01/05/2021	02/23/2021	02/23/2021	03/09/2021	04/05/2021	05/14/2021	05/14/2021	06/03/2021	07/06/2021	08/19/2021	09/09/2021	10/22/2021	11/15/2021	11/15/2021	12/02/2021
Sample Type	Primary	Primary	Duplicate	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	01/10/2021	02/25/2021	02/25/2021	03/12/2021	04/07/2021	05/18/2021	05/18/2021	06/05/2021	07/09/2021	08/24/2021	09/12/2021	10/28/2021	11/16/2021	11/19/2021	12/07/2021
	01/12/2021	02/26/2021	02/26/2021	03/16/2021	04/08/2021	05/20/2021	05/20/2021	06/08/2021	07/13/2021	08/25/2021	09/15/2021	10/29/2021	11/19/2021	11/22/2021	12/10/2021
Analysis Date(s)	--	--	--	--	04/12/2021	--	--	--	--	--	--	--	11/22/2021	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds (EPA 8260B)[2]															
1,2-Dichloroethane	< 0.043	< 0.043	**0.071 J**	< 0.043	< 0.043	< 1.1	< 1.1	< 0.043	< 0.043	< 0.043	< 0.43	< 8.6	< 0.043	< 0.043	< 0.043
1,2-Dichloropropane	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 1.5	< 1.5	< 0.060	< 0.060	< 0.060	< 0.60	< 12	< 0.060	< 0.060	< 0.060
1,3,5-Trimethylbenzene	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 3.8	< 3.8	< 0.15	< 0.15	< 0.15	< 1.5	< 30	< 0.15	< 0.15	< 0.15
1,3-Dichlorobenzene	**0.30**	**0.26 J**	**0.25 J**	**0.25 J**	**0.13 J**	< 1.3	< 1.3	**0.26 J**	**0.27 J**	**0.31**	**3.2**	< 10	**0.24 J**	**0.23 J**	**0.22 J**
1,3-Dichloropropane	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.63	< 0.63	< 0.025	< 0.025	< 0.025	< 0.25	< 5.0	< 0.025	< 0.025	< 0.025
1,4-Dichlorobenzene	**2.5**	< 0.050	< 0.050	< 0.050	**2.1 J**	< 1.3	< 1.3	**2.0**	**2.0**	**2.1**	**20**	< 10	**2.1**	**2.1**	**2.2**
2,2-Dichloropropane	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 1.5	< 1.5	< 0.060	< 0.060	< 0.060	< 0.60	< 12	< 0.060	< 0.060	< 0.060
2-Butanone (Methyl Ethyl Ketone)	< 2.5	**120 J**	< 2.5 J	**160**	**170**	< 63	< 63	< 2.5	< 2.5	< 2.5	< 25	< 500	**87**	**85**	< 2.5
2-Chlorotoluene	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 2.9	< 2.9	< 0.12	< 0.12	< 0.12	< 1.2	< 23	< 0.12	< 0.12	< 0.12
2-Hexanone	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 24	< 24	< 0.94	< 0.94	< 0.94	< 9.4	< 190	< 0.94	< 0.94	< 0.94
2-Phenylbutane (sec-Butylbenzene)	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 4.2	< 4.2	< 0.17	< 0.17	< 0.17	< 1.7	< 34	< 0.17	< 0.17	< 0.17
4-Chlorotoluene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 1.3	< 1.3	< 0.050	< 0.050	< 0.050	< 0.50	< 10	< 0.050	< 0.050	< 0.050
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 43	< 43	< 1.7	< 1.7	< 1.7	< 17	< 340	< 1.7	< 1.7	< 1.7
Acetone	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 78	< 78	< 3.1	< 3.1	< 3.1	< 31	< 620	< 3.1	< 3.1	< 3.1
Benzene	**0.083 J**	**0.069 J**	**0.067 J**	**0.078 J**	**0.055 J**	< 0.75	< 0.75	**0.041 J**	**0.055 J**	**0.048 J**	< 2.0	< 6.0	**0.059 J**	**0.058 J**	**0.080 J**
Bromobenzene	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.95	< 0.95	< 0.038	< 0.038	< 0.038	< 0.38	< 7.6	< 0.038	< 0.038	< 0.038
Bromodichloromethane	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 1.5	**2.6 J**	< 0.060	< 0.060	< 0.060	< 0.60	< 12	< 0.060	< 0.060	< 0.060
Bromoform	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 3.9	< 3.9	< 0.16	< 0.16	< 0.16	< 1.6	< 31	< 0.16	< 0.16	< 0.16
Bromomethane (Methyl Bromide)	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 1.6	< 1.6	< 0.062	< 0.062	< 0.062	< 0.62	< 12	< 0.062	< 0.062	< 0.062
Carbon disulfide	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	< 2.1	< 2.1	< 0.083	< 0.083	< 0.083	< 0.83	< 17	< 0.083	< 0.083	< 0.083
Carbon tetrachloride	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.63	< 0.63	< 0.025	< 0.025	< 0.025	< 0.25	< 5.0	< 0.025	< 0.025	< 0.025
Chlorobenzene	**0.054 J**	< 0.025	< 0.025	< 0.025	< 0.025	< 0.63	< 0.63	< 0.025	< 0.025	< 0.025	< 0.25	< 5.0	**0.030 J**	**0.032 J**	< 0.025
Chlorobromomethane	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.63	< 0.63	< 0.025	< 0.025	< 0.025	< 0.25	< 5.0	< 0.025	< 0.025	< 0.025
Chloroethane	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	< 2.4	< 2.4	< 0.096	< 0.096	< 0.096	< 0.96	< 19	< 0.096	< 0.096	< 0.096
Chloroform (Trichloromethane)	**0.62**	**0.57**	**0.62**	**0.58**	**0.43 J**	< 0.75	< 0.75	**0.51**	**0.56**	**0.33**	**4.7**	< 6.0	**0.42**	**0.42**	**0.44**
Chloromethane (Methyl Chloride)	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 1.7	< 1.7	< 0.068	< 0.068	< 0.068	< 0.68	< 14	< 0.068	< 0.068	< 0.068
cis-1,2-Dichloroethene	**790**	**610**	**580**	**130**	**790 J**	**710**	**700**	**610**	**680**	**710**	**560**	**680**	**560**	**550**	**670**
cis-1,3-Dichloropropene	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	< 2.3	< 2.3	< 0.090	< 0.090	< 0.090	< 0.90	< 18	< 0.090	< 0.090	< 0.090
Cymene (p-Isopropyltoluene)	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 3.7	< 3.7	< 0.15	< 0.15	< 0.15	< 1.5	< 29	< 0.15	< 0.15	< 0.15
Dibromochloromethane	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 1.4	< 1.4	< 0.055	< 0.055	< 0.055	< 0.55	< 11	< 0.055	< 0.055	< 0.055

TABLE 2
2021 GROUNDWATER TREATMENT SYSTEM ANALYTICAL DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Location	Influent (RAYINF)														
Sample Date	**01/05/2021**	**02/23/2021**	**02/23/2021**	**03/09/2021**	**04/05/2021**	**05/14/2021**	**05/14/2021**	**06/03/2021**	**07/06/2021**	**08/19/2021**	**09/09/2021**	**10/22/2021**	**11/15/2021**	**11/15/2021**	**12/02/2021**
Sample Type	**Primary**	**Primary**	**Duplicate**	**Primary**	**Primary**	**Primary**	**Duplicate**	**Primary**	**Primary**	**Primary**	**Primary**	**Primary**	**Primary**	**Duplicate**	**Primary**
	01/10/2021	**02/25/2021**	**02/25/2021**	**03/12/2021**	**04/07/2021**	**05/18/2021**	**05/18/2021**	**06/05/2021**	**07/09/2021**	**08/24/2021**	**09/12/2021**	**10/28/2021**	**11/16/2021**	**11/19/2021**	**12/07/2021**
	01/12/2021	**02/26/2021**	**02/26/2021**	**03/16/2021**	**04/08/2021**	**05/20/2021**	**05/20/2021**	**06/08/2021**	**07/13/2021**	**08/25/2021**	**09/15/2021**	**10/29/2021**	**11/19/2021**	**11/22/2021**	**12/10/2021**
Analysis Date(s)	--	--	--	--	**04/12/2021**	--	--	--	--	--	--	--	**11/22/2021**	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds (EPA 8260B)[2]															
Dibromomethane	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 1.6	< 1.6	< 0.062	< 0.062	< 0.062	< 0.62	< 12	< 0.062	< 0.062	< 0.062
Dichlorodifluoromethane (CFC-12)	< 0.13	< 0.13	< 0.13	**0.32 J**	< 0.13	< 3.2	< 3.2	**0.26 J**	**0.33 J**	< 0.13	< 1.3	< 26	< 0.13	< 0.13	< 0.13
Ethylbenzene	< 0.030	< 0.030	< 0.030	< 0.030	< 0.20	< 0.75	< 0.75	< 0.030	< 0.030	< 0.030	< 0.30	< 6.0	< 0.030	< 0.030	< 0.030
Hexachlorobutadiene	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 1.7	< 1.7	< 0.067	< 0.067	< 0.067	< 0.67	< 13	< 0.067	< 0.067	< 0.067
Isopropylbenzene (Cumene)	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 4.7	< 4.7	< 0.19	< 0.19	< 0.19	< 1.9	< 37	< 0.19	< 0.19	< 0.19
Methyl Tert Butyl Ether	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 1.8	< 1.8	< 0.070	< 0.070	< 0.070	< 0.70	< 14	< 0.070	< 0.070	< 0.070
Methylene chloride	< 1.2	< 1.2	< 1.2	< 120	< 1.2	< 30	< 30	< 1.2	< 1.2	< 1.2	< 12	< 240	< 1.2	< 1.2	< 1.2
Naphthalene	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 5.5	< 5.5	< 0.22	< 0.22	< 0.22	< 2.2	< 44	< 0.22	< 0.22	< 0.22
n-Butylbenzene	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 5.6	< 5.6	< 0.23	< 0.23	< 0.23	< 2.3	< 45	< 0.23	< 0.23	< 0.23
n-Propylbenzene	< 0.091	< 0.30	< 0.30	< 0.091	< 0.091	< 2.3	< 2.3	< 0.091	< 0.091	< 0.091	< 0.91	< 18	< 0.091	< 0.091	< 0.091
Styrene	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 4.8	< 4.8	< 0.19	< 0.19	< 0.19	< 1.9	< 38	< 0.19	< 0.19	< 0.19
tert-Butylbenzene	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 6.4	< 6.4	< 0.26	< 0.26	< 0.26	< 2.6	< 51	< 0.26	< 0.26	< 0.26
Tetrachloroethene	**2.6**	**2.3**	**2.4**	**2.2**	**2.6 J**	**2.5 J**	**2.6 J**	**2.3**	**2.4**	**2.4**	**24**	< 17	**2.6**	**2.6**	**2.6**
Toluene	< 0.050	< 0.050	< 0.050	< 0.050	**0.22 J**	< 1.3	< 1.3	< 0.050	< 0.050	< 0.050	< 0.50	< 10	< 0.050	< 0.050	**0.072 J**
trans-1,2-Dichloroethene	**64**	**53**	**53**	**45**	**61**	**62**	**64**	**50**	**53**	**53**	**490**	**62**	**46**	**46**	**44**
trans-1,3-Dichloropropene	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 5.0	< 2.3	< 0.092	< 0.092	< 0.092	< 0.92	< 18	< 0.092	< 0.092	< 0.092
Trichloroethene	**1,900**	**2,000**	**2,000**	**1,400 J, 33**	**1,500 J**	**1,600**	**1,600**	**1,500**	**1,700**	**1,400**	**1,600**	**1,100**	**1,500**	**1,500**	**1,500**
Trichlorofluoromethane (CFC-11)	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 1.1	< 1.1	< 0.043	< 0.043	< 0.043	< 0.43	< 8.6	< 0.043	< 0.043	< 0.043
Trifluorotrichloroethane (Freon 113)	**16**	**15**	**15**	**16**	**16**	**16**	**17**	**14**	**17 J**	**11**	**96**	< 6.6	**16**	**17**	**15**
Vinyl acetate	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 11	< 11	< 0.44	< 0.44	< 0.44	< 4.4	< 89	< 0.44	< 0.44	< 0.44
Vinyl chloride	**16**	**17**	**17**	**27**	**63**	**28**	**23**	**27**	**26**	**130**	**350**	**95**	**33**	**29**	**50 J**
Xylene (total)	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 3.7	< 3.7	< 0.15	< 0.15	< 0.15	< 1.5	< 29	< 0.15	< 0.15	< 0.15
Acute Toxicity (EPA 821-R-02-012, 2019.0)															
Percent Survival	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Abbreviations and Notes:
1. NPDES effluent limitations apply to the VOC results and are specified in Table 2 of Regional Water Quality Control Board Order No. R2-2018-0050 (Order), NPDES Permit No. CAG912002.
Values are given as monthly average/maximum daily effluent limitation for discharge to drinking water areas in accordance with the Authorization to Discharge.
2. Influent and effluent samples are analyzed for the full EPA Method 8260B analyte list.
3. The survival of test fish in 96-hour static renewal biassay with the discharge shall not be less than a three sample moving median of 90% survival and a single test value of not less than 70% survival.
Bold values denote detection at the given concentration.
All units are micrograms per liter (µg/L), unless noted.
< 0.020 - Denotes chemical was not detected at or above the laboratory method detection limit shown.
-- = Compound not analyzed / no effluent limitation specified in Order.
J = Denotes estimated concentration.
J- = Denotes estimated, biased low.
mg/L - milligrams per liter

TABLE 2
2021 GROUNDWATER TREATMENT SYSTEM ANALYTICAL DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Location	Effluent (RAYEFT)												NPDES Effluent Limitation[1]
Sample Date	01/05/2021	02/23/2021	03/09/2021	04/05/2021	05/14/2021	06/03/2021	07/06/2021	08/19/2021	09/09/2021	10/22/2021	11/15/2021	12/02/2021	
Sample Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	
	01/10/2021	02/25/2021	03/11/2021	04/07/2021	05/17/2021	06/05/2021	07/09/2021	08/24/2021	09/12/2021	10/28/2021	11/16/2021	12/07/2021	
	01/12/2021	--	03/16/2021	04/08/2021	--	--	--	--	--	10/29/2021	11/18/2021	--	
Analysis Date(s)	--	--	--	--	--	--	--	--	--	--	11/19/2021	--	
	--	--	--	--	--	--	--	--	--	--	11/22/2021	--	
	--	--	--	--	--	--	--	--	--	--	11/26/2021	--	
Inorganics (EPA 1631E, 200.8, 300.0, 7199; SM4500-CN-E)													
Mercury, Total	--	--	--	--	--	--	--	--	--	--	< 0.0005	--	0.050/0.10
Antimony, Total	--	--	--	--	--	--	--	--	--	--	< 0.50	--	--/6.0
Arsenic, Total	--	--	--	--	--	--	--	--	--	--	**0.38**	--	--/10
Beryllium, Total	--	--	--	--	--	--	--	--	--	--	< 0.10	--	--
Cadmium, Total	--	--	--	--	--	--	--	--	--	--	< 0.050	--	0.90/1.8
Chromium, Total	--	--	--	--	--	--	--	--	--	--	< 0.25	--	--/10
Copper, Total	--	--	--	--	--	--	--	--	--	--	**0.32 J**	--	10/20
Lead, Total	--	--	--	--	--	--	--	--	--	--	< 0.050	--	2.6/5.2
Manganese, Total	--	--	--	--	--	--	--	--	--	--	**74**	--	--
Nickel, Total	--	--	--	--	--	--	--	--	--	--	**1.1**	--	22/44
Silver, Total	--	--	--	--	--	--	--	--	--	--	< 0.10	--	1.1/2.2
Thallium, Total	--	--	--	--	--	--	--	--	--	--	< 0.050	--	--/2.0
Zinc, Total	--	--	--	--	--	--	--	--	--	--	**14**	--	47/95
Sulfate (mg/L)	--	--	--	--	--	--	--	--	--	--	**100**	--	--
Cyanide	--	--	--	--	--	--	--	--	--	--	< 1.4	--	--
Chromium VI (Hexavalent)	--	--	--	--	--	--	--	--	--	--	< 0.0090	--	--/10
Volatile Organic Compounds (EPA 8260B)[2]													
1,1,1,2-Tetrachloroethane	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	--/--
1,1,1-Trichloroethane	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	--/0.50
1,1,2,2-Tetrachloroethane	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	< 0.056	--/--
1,1,2-Trichloroethane	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	--/0.50
1,1-Dichloroethane	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	--/0.50
1,1-Dichloroethene	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	< 0.035	0.057/0.11
1,1-Dichloropropene	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	< 0.036	--/--
1,2,3-Trichlorobenzene	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	--/--
1,2,3-Trichloropropane	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	--/--
1,2,4-Trichlorobenzene	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	--/--
1,2,4-Trimethylbenzene	< 0.072	< 0.30	< 0.072	< 0.072	< 0.072	< 0.072	< 0.072	< 0.072	< 0.072	< 0.072	< 0.072	< 0.072	--/--
1,2-Dibromo-3-chloropropane (DBCP)	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	--/--
1,2-Dibromoethane (Ethylene Dibromide)	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	--/--
1,2-Dichlorobenzene	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	--/--

TABLE 2
2021 GROUNDWATER TREATMENT SYSTEM ANALYTICAL DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Location	Effluent (RAYEFT)												NPDES Effluent Limitation[1]
Sample Date	01/05/2021	02/23/2021	03/09/2021	04/05/2021	05/14/2021	06/03/2021	07/06/2021	08/19/2021	09/09/2021	10/22/2021	11/15/2021	12/02/2021	
Sample Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	
	01/10/2021	02/25/2021	03/11/2021	04/07/2021	05/17/2021	06/05/2021	07/09/2021	08/24/2021	09/12/2021	10/28/2021	11/16/2021	12/07/2021	
	01/12/2021	--	03/16/2021	04/08/2021	--	--	--	--	--	10/29/2021	11/18/2021	--	
Analysis Date(s)	--	--	--	--	--	--	--	--	--	--	11/19/2021	--	
	--	--	--	--	--	--	--	--	--	--	11/22/2021	--	
	--	--	--	--	--	--	--	--	--	--	11/26/2021	--	
Volatile Organic Compounds (EPA 8260B)[2]													
1,2-Dichloroethane	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	0.38/0.50
1,2-Dichloropropane	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	--/--
1,3,5-Trimethylbenzene	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	--/--
1,3-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	--/--
1,3-Dichloropropane	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	--/--
1,4-Dichlorobenzene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	--/--
2,2-Dichloropropane	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	--/--
2-Butanone (Methyl Ethyl Ketone)	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	--/--
2-Chlorotoluene	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	--/--
2-Hexanone	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	< 0.94	--/--
2-Phenylbutane (sec-Butylbenzene)	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	< 0.17	--/--
4-Chlorotoluene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	--/--
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7	--/--
Acetone	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	--/--
Benzene	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.20	< 0.030	< 0.030	< 0.030	--/0.50
Bromobenzene	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	< 0.038	--/--
Bromodichloromethane	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	--/--
Bromoform	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	--/--
Bromomethane (Methyl Bromide)	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	--/--
Carbon disulfide	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	< 0.083	--/--
Carbon tetrachloride	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	--/--
Chlorobenzene	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	--/--
Chlorobromomethane	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	--/--
Chloroethane	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	< 0.096	--/--
Chloroform (Trichloromethane)	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	--/1.9
Chloromethane (Methyl Chloride)	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	--/--
cis-1,2-Dichloroethene	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	--/0.50
cis-1,3-Dichloropropene	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	< 0.090	--/--
Cymene (p-Isopropyltoluene)	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	--/--
Dibromochloromethane	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	--/--

TABLE 2
2021 GROUNDWATER TREATMENT SYSTEM ANALYTICAL DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Location	Effluent (RAYEFT)												NPDES Effluent Limitation[1]
Sample Date	01/05/2021	02/23/2021	03/09/2021	04/05/2021	05/14/2021	06/03/2021	07/06/2021	08/19/2021	09/09/2021	10/22/2021	11/15/2021	12/02/2021	
Sample Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	
	01/10/2021	02/25/2021	03/11/2021	04/07/2021	05/17/2021	06/05/2021	07/09/2021	08/24/2021	09/12/2021	10/28/2021	11/16/2021	12/07/2021	
	01/12/2021	--	03/16/2021	04/08/2021	--	--	--	--	--	10/29/2021	11/18/2021	--	
Analysis Date(s)	--	--	--	--	--	--	--	--	--	--	11/19/2021	--	
	--	--	--	--	--	--	--	--	--	--	11/22/2021	--	
	--	--	--	--	--	--	--	--	--	--	11/26/2021	--	
Volatile Organic Compounds (EPA 8260B)[2]													
Dibromomethane	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	< 0.062	--/--
Dichlorodifluoromethane (CFC-12)	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	--/--
Ethylbenzene	< 0.030	< 0.030	< 0.030	< 0.20	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030	--/0.50
Hexachlorobutadiene	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	--/--
Isopropylbenzene (Cumene)	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	--/--
Methyl Tert Butyl Ether	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	< 0.070	--/0.50
Methylene chloride	< 1.2	< 1.2	< 1.2	< 1.2	**1.6 J**	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	--/--
Naphthalene	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	--/--
n-Butylbenzene	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	--/--
n-Propylbenzene	< 0.091	< 0.30	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	< 0.091	--/--
Styrene	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	< 0.19	--/--
tert-Butylbenzene	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	< 0.26	--/--
Tetrachloroethene	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	--/0.50
Toluene	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	--/0.50
trans-1,2-Dichloroethene	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	--/0.50
trans-1,3-Dichloropropene	< 0.092	< 0.092	< 0.092	< 0.092	< 0.20	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	--/--
Trichloroethene	< 0.066	< 0.066	< 0.066	< 0.066	**0.10 J**	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	--/0.65
Trichlorofluoromethane (CFC-11)	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	< 0.043	--/--
Trifluorotrichloroethane (Freon 113)	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	< 0.033	--/--
Vinyl acetate	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	< 0.44	--/--
Vinyl chloride	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	< 0.013	--/0.50
Xylene (total)	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	--/0.50
Acute Toxicity (EPA 821-R-02-012, 2019.0)													
Percent Survival	--	--	--	--	--	--	--	--	--	100%	--	--	-[3]

Abbreviations and Notes:
1. NPDES effluent limitations apply to the VOC results and are specified in Table 2 of Regional Water Quality Control Board Order No. R2-2018-0050 (Order), NPDES Permit No. CAG912002.
Values are given as monthly average/maximum daily effluent limitation for discharge to drinking water areas in accordance with the Authorization to Discharge.
2. Influent and effluent samples are analyzed for the full EPA Method 8260B analyte list.
3. The survival of test fish in 96-hour static renewal biassay with the discharge shall not be less than a three sample moving median of 90% survival and a single test value of not less than 70% survival.
Bold values denote detection at the given concentration.
All units are micrograms per liter (µg/L), unless noted.
< 0.020 - Denotes chemical was not detected at or above the laboratory method detection limit shown.
-- = Compound not analyzed / no effluent limitation specified in Order.
J = Denotes estimated concentration.
J- = Denotes estimated, biased low.
mg/L - milligrams per liter

TABLE 3

CUMULATIVE VOC MASS REMOVAL FROM GROUNDWATER
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Month	Influent VOC Concentration (mg/L)[4]	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
1986-2020	See Appendix B				19,684
2021	January	2.812	1,002,875	23.49	19,707
	February	2.832/2.683[1]	975,380	21.79	19,729
	March	0.400	1,249,750	4.16	19,733
	April	2.632	808,680	17.73	19,751
	May	2.432/2.423[2]	1,095,117	22.10	19,773
	June	2.225	961,153	17.81	19,791
	July	2.502	1,094,895	22.81	19,814
	August	2.336	1,014,215	19.73	19,834
	September	3.268	983,095	26.76	19,860
	October	1.944	573,805	9.29	19,870
	November	2.266/2.250[3]	866,015	16.23	19,886
	December	2.300	851,820	16.32	19,902
Totals			**11,476,800**	**218**	

Abbreviations and Notes:

Total flow measurements were collected by Field Solutions, Inc.

[1] Duplicate samples were collected in February; both influent VOC totals are reported. Mass removal was calculated using the duplicate sample total 2.683 mg/L.

[2] Duplicate samples were collected in May; both influent VOC totals are reported. Mass removal was calculated using the duplicate sample total 2.423 mg/L.

[3] Duplicate samples were collected in November; both influent VOC totals are reported. Mass removal was calculated using the duplicate sample total 2.250 mg/L.

[4] Influent VOC Concentration is the total sum of VOC concentrations reported above the Method Detection Limit.

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
I-1B2	3/16/2017	25.83	32.93	58.76	Extraction pump on.
	9/21/2017	23.54	35.22		
	9/20/2018	17.83	40.93		
	9/19/2019	25.37	33.39		
	9/17/2020	27.48	31.28		
	9/16/2021	56.35	2.41		Double checked.
ME-1A	3/16/2017	12.56	45.44	58.00	
	9/21/2017	11.64	46.36		
	9/20/2018	12.35	45.65		
	9/19/2019	10.84	47.16		
	9/17/2020	11.20	46.80		
	9/16/2021	13.45	44.55		
ME-1B1	3/16/2017	9.27	48.73	58.00	
	9/21/2017	8.33	49.67		
	9/20/2018	9.53	48.47		
	9/19/2019	7.62	50.38		
	9/17/2020	8.57	49.43		
	9/16/2021	11.30	46.70		
R-10A	3/16/2017	14.44	37.39	51.83	
	9/21/2017	14.27	37.56		
	9/20/2018	14.51	37.32		
	9/19/2019	13.51	38.32		
	9/17/2020	13.43	38.40		
	9/16/2021	15.63	36.20		
R-13B1	3/16/2017	5.36	29.64	35.00	
	9/21/2017	6.07	28.93		
	9/20/2018	6.01	28.99		
	9/19/2019	5.54	29.46		
	9/17/2020	5.66	29.34		
	9/16/2021	6.57	28.43		
R-13B2	3/16/2017	3.05	31.95	35.00	
	9/21/2017	6.07	28.93		
	9/20/2018	3.88	31.12		
	9/19/2019	3.12	31.88		
	9/17/2020	3.31	31.69		
	9/16/2021	4.92	30.08		
R-14A	3/16/2017	10.13	45.28	55.41	
	9/21/2017	9.13	46.28		
	9/20/2018	10.13	45.28		
	9/19/2019	8.59	46.82		
	9/17/2020	8.97	46.44		
	9/16/2021	11.13	44.28		
R-14B1	3/16/2017	14.36	47.64	62.00	
	9/21/2017	14.70	47.30		
	9/20/2018	16.57	45.43		
	9/19/2019	14.31	47.69		
	9/17/2020	15.74	46.26		
	9/16/2021	18.45	43.55		

TABLE 4

2021 GROUNDWATER ELEVATION DATA

350 ELLIS STREET

MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R-15A	3/16/2017	11.32	45.62	56.94	
	9/21/2017	10.35	46.59		
	9/20/2018	11.27	45.67		
	9/19/2019	9.67	47.27		
	9/17/2020	10.07	46.87		
	9/16/2021	12.30	44.64		
R-16B1	3/16/2017	6.69	40.31	47.00	
	9/21/2017	6.65	40.35		
	9/20/2018	7.02	39.98		Water in well box.
	9/19/2019	6.07	40.93		Well under pressure.
	9/17/2020	6.38	40.62		
	9/16/2021	8.07	38.93		
R-17B2	3/16/2017	12.15	48.54	60.69	
	9/21/2017	11.16	49.53		
	9/20/2018	11.70	48.99		Water in well box.
	9/20/2018	14.82	45.87		
	9/17/2020	16.28	44.41		
	9/16/2021	18.71	41.98		
R-18B3	3/16/2017	0.00	51.66	51.66	
	9/21/2017	0.00	51.66		
	9/20/2018	-	-		Deflated packer.
	9/19/2019	-5.50	57.16		Artesian condition.
	9/17/2020	2.25	49.41		Artesian. Gauge Reading = 27 inH20.
	9/16/2021	1.00	50.66		Artesian, Gauge Reading = 12.0 inH20
R-1B1	3/16/2017	11.73	40.14	51.87	
	9/21/2017	11.51	40.36		
	9/20/2018	12.55	39.32		
	9/19/2019	11.29	40.58		
	9/17/2020	11.52	40.35		
	9/16/2021	13.67	38.20		
R-20A	3/16/2017	11.34	45.66	57.00	
	9/21/2017	10.26	46.74		
	9/20/2018	11.19	45.81		
	9/19/2019	9.51	47.49		
	9/17/2020	9.94	47.06		
	9/16/2021	12.35	44.65		
R-21A	3/16/2017	17.79	46.36	64.15	
	9/21/2017	16.75	47.40		
	9/20/2018	17.78	46.37		Well under pressure.
	9/19/2019	15.91	48.24		
	9/17/2020	16.42	47.73		
	9/16/2021	19.01	45.14		
R-21B1	3/16/2017	20.60	52.40	73.00	
	9/21/2017	20.49	52.51		
	9/20/2018	22.93	50.07		
	9/19/2019	20.06	52.94		
	9/17/2020	22.03	50.97		
	9/16/2021	25.28	47.72		

TABLE 4

2021 GROUNDWATER ELEVATION DATA

350 ELLIS STREET

MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R-22A	3/16/2017	26.23	46.77	73.00	
	9/21/2017	25.27	47.73		
	9/20/2018	26.57	46.43		
	9/19/2019	24.71	48.29		
	9/17/2020	25.48	47.52		
	9/16/2021	28.05	44.95		
R-22B1	3/16/2017	13.83	48.90	62.73	
	9/21/2017	12.81	49.92		
	9/20/2018	14.08	48.65		
	9/19/2019	12.10	50.63		
	9/17/2020	13.06	49.67		
	9/16/2021	15.92	46.81		
R-24A	3/16/2017	-	-	70.05	Well is obstructed at 22.20 ft.
	9/21/2017	-	-		Well is obstructed at 22.20 ft.
	9/20/2018	22.20	47.85		Well Redeveloped 10/26/2018.
	9/19/2019	20.88	49.17		
	9/17/2020	-	-		Obstruction at 21.0 ft.
	9/16/2021	-	-		Obstruction at 21.0 ft.
R-25A	3/16/2017	15.09	44.11	59.2	
	9/21/2017	14.32	44.88		
	9/20/2018	14.91	44.29		
	9/19/2019	13.56	45.64		
	9/17/2020	13.81	45.39		
	9/16/2021	16.02	43.18		
R-27A	3/16/2017	13.85	33.85	47.7	
	9/21/2017	14.21	33.49		
	9/20/2018	14.00	33.70		
	9/19/2019	13.08	34.62		
	9/17/2020	13.41	34.29		
	9/16/2021	15.10	32.60		
R-27B2	3/16/2017	4.20	47.46	51.66	
	9/21/2017	1.42	50.24		
	9/20/2018	2.18	49.48		
	9/19/2019	0.75	50.91		
	9/17/2020	2.04	49.62		
	9/16/2021	4.95	46.71		
R-27B3	3/16/2017	0.00	51.37	51.37	
	9/21/2017	0.00	51.37		
	9/20/2018	-	-		Deflated packer.
	9/19/2019	-7.11	58.48		Artesian condition.
	9/17/2020	4.92	46.45		Artesian. Gauge Reading = 59 inH20.
	9/16/2021	3.00	48.37		Artesian, Gauge Reading = 36.0 inH20
R-28B2	3/16/2017	2.63	54.94	57.57	
	9/21/2017	1.68	55.89		
	9/20/2018	3.40	54.17		
	9/19/2019	0.83	56.74		
	9/17/2020	2.76	54.81		
	9/16/2021	6.58	50.99		

TABLE 4

2021 GROUNDWATER ELEVATION DATA

350 ELLIS STREET

MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R-29A	3/16/2017	7.12	28.88	36.00	
	9/21/2017	7.79	28.21		
	9/20/2018	7.81	28.19		
	9/19/2019	7.77	28.23		
	9/17/2020	7.50	28.50		
	9/16/2021	7.85	28.15		Roots in well
R-2A	3/16/2017	20.41	37.44	57.85	
	9/21/2017	15.65	42.20		
	9/20/2018	15.64	42.21		
	9/19/2019	14.46	43.39		
	9/17/2020	14.70	43.15		
	9/16/2021	15.92	41.93		
R-30B2	3/16/2017	13.26	49.74	63.00	
	9/21/2017	12.26	50.74		
	9/20/2018	13.69	49.31		
	9/19/2019	11.50	51.50		
	9/17/2020	12.68	50.32		
	9/16/2021	15.71	47.29		
R-31A	3/16/2017	9.23	24.77	34.00	
	9/21/2017	9.65	24.35		
	9/20/2018	9.71	24.29		
	9/19/2019	9.40	24.60		
	9/17/2020	9.41	24.59		
	9/16/2021	10.01	23.99		
R-32A	3/16/2017	7.95	27.70	35.65	
	9/21/2017	8.51	27.14		
	9/20/2018	8.28	27.37		
	9/19/2019	7.90	27.75		
	9/17/2020	8.13	27.52		
	9/16/2021	8.82	26.83		
R-33B2	3/16/2017	8.41	48.23	56.64	
	9/21/2017	7.53	49.11		
	9/20/2018	8.79	47.85		
	9/19/2019	6.86	49.78		
	9/17/2020	7.79	48.85		
	9/16/2021	10.66	45.98		
R-36A	3/16/2017	20.30	33.69	53.99	
	6/15/2017	15.31	38.68		
	9/21/2017	13.79	40.20		
	12/21/2017	13.66	40.33		
	3/15/2018	12.95	41.04		
	6/21/2018	13.18	40.81		
	9/20/2018	13.65	40.34		
	12/20/2018	14.72	39.27		
	3/6/2019	12.47	41.52		
	6/6/2019	12.34	41.65		
	9/19/2019	12.25	41.74		
	4/16/2020	11.58	42.41		
	9/17/2020	13.00	40.99		
	3/18/2021	13.72	40.27		
	9/16/2021	14.38	39.61		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R-36B1	3/16/2017	13.13	45.62	58.75	
	9/21/2017	12.42	46.33		
	9/20/2018	13.39	45.36		Deflated packer.
	9/19/2019	11.74	47.01		
	9/17/2020	12.48	46.27		
	9/16/2021	14.97	43.78		
R-37B3	3/16/2017	0.09	60.43	60.52	Installed packer.
	9/21/2017	0.00	60.52		
	9/20/2018	1.91	58.61		Deflated packer.
	9/19/2019	0.00	60.52		Artesian condition.
	9/17/2020	0.54	59.98		
	9/16/2021	5.25	55.27		
R-39B2	3/16/2017	2.45	48.62	51.07	
	6/15/2017	1.05	50.02		
	9/21/2017	0.59	50.48		
	12/21/2017	-	-		Artesian conditions. Well box full of water.
	3/15/2018	1.18	49.89		
	6/21/2018	1.46	49.61		
	9/20/2018	1.77	49.30		
	12/20/2018	2.23	48.84		Deflated packer.
	3/6/2019	1.92	49.15		Deflated packer.
	6/6/2019	1.63	49.44		Deflated packer.
	9/19/2019	0.81	50.26		
	12/23/2019	0.52	50.55		Packer has been removed.
	4/16/2020	0.64	50.43		
	9/17/2020	1.18	49.89		
	3/18/2021	2.07	49.00		
	9/16/2021	3.12	47.95		
R-3B1	3/16/2017	12.43	34.73	47.16	
	9/21/2017	12.29	34.87		
	9/20/2018	12.90	34.26		
	9/19/2019	12.00	35.16		
	9/17/2020	12.15	35.01		
	9/16/2021	13.82	33.34		
R-3C	3/16/2017	4.34	65.76	70.10	
	9/21/2017	0.78	69.32		
	9/20/2018	3.81	66.29		Deflated packer.
	9/19/2019	0.00	70.10		Artesian condition.
	9/17/2020	1.95	68.15		
	9/16/2021	9.65	60.45		
R-40B1(B2)	3/16/2017	15.65	38.41	54.06	
	9/21/2017	15.32	38.74		
	9/20/2018	16.63	37.43		
	9/19/2019	15.70	38.36		
	9/17/2020	15.60	38.46		
	9/16/2021	17.63	36.43		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R-41A	3/16/2017	13.91	37.09	51.00	
	6/15/2017	11.35	39.65		
	9/21/2017	10.72	40.28		
	12/21/2017	-	-		Vehicle parked above well. Well inaccessible.
	3/15/2018	9.98	41.02		
	6/21/2018	10.30	40.70		
	9/20/2018	10.68	40.32		
	12/20/2018	11.34	39.66		
	3/6/2019	9.62	41.38		
	6/6/2019	9.79	41.21		Hard bottom.
	9/19/2019	9.66	41.34		
	12/23/2019	9.16	41.84		
	4/16/2020	9.63	41.37		
	9/17/2020	9.89	41.11		
	3/18/2021	10.54	40.46		
	9/16/2021	11.45	39.55		
R-41B2	3/16/2017	9.05	47.95	57.00	
	9/21/2017	8.13	48.87		
	9/20/2018	9.41	47.59		
	9/19/2019	7.41	49.59		
	9/17/2020	8.47	48.53		
	9/16/2021	11.31	45.69		
R-42B1	3/16/2017	11.06	45.55	56.61	
	9/21/2017	10.37	46.24		
	9/20/2018	11.05	45.56		Well under pressure.
	9/19/2019	9.67	46.94		
	9/17/2020	10.21	46.40		
	9/16/2021	12.48	44.13		
R-43A	3/16/2017	7.02	38.98	46.00	
	9/21/2017	6.95	39.05		
	9/20/2018	7.21	38.79		
	9/19/2019	6.46	39.54		
	9/17/2020	6.60	39.40		
	9/16/2021	7.96	38.04		
R-44A	3/16/2017	12.20	45.46	57.66	
	9/21/2017	11.18	46.48		
	9/20/2018	12.08	45.58		
	9/19/2019	10.72	46.94		
	9/17/2020	10.92	46.74		
	9/16/2021	13.28	44.38		Water in well box.
R-45A	3/16/2017	15.05	46.95	62.00	
	9/21/2017	15.56	46.44		
	9/20/2018	17.26	44.74		
	9/19/2019	15.22	46.78		
	9/17/2020	16.50	45.50		
	9/16/2021	19.06	42.94		

TABLE 4

2021 GROUNDWATER ELEVATION DATA

350 ELLIS STREET

MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R-46A	3/16/2017	25.13	47.87	73.00	
	9/21/2017	24.33	48.67		
	9/20/2018	25.98	47.02		
	9/19/2019	23.98	49.02		
	9/17/2020	25.12	47.88		
	9/16/2021	27.49	45.51		
R-46B1	3/16/2017	12.77	45.23	58.00	
	9/21/2017	12.04	45.96		
	9/20/2018	12.93	45.07		
	9/19/2019	11.38	46.62		
	9/17/2020	12.03	45.97		
	9/16/2021	14.41	43.59		
R-48A	3/16/2017	20.15	46.71	66.86	
	9/21/2017	19.02	47.84		
	9/20/2018	20.08	46.78		
	9/19/2019	18.26	48.60		
	9/17/2020	18.74	48.12		
	9/16/2021	21.35	45.51		
R-4C	3/16/2017	7.17	64.83	72.00	
	9/21/2017	4.36	67.64		
	9/20/2018	7.71	64.29		
	9/19/2019	1.86	70.14		
	9/17/2020	5.49	66.51		
	9/16/2021	12.94	59.06		
R-50A	3/16/2017	15.49	44.94	60.43	
	9/21/2017	14.75	45.68		
	9/20/2018	16.00	44.43		
	9/19/2019	14.26	46.17		
	9/17/2020	14.85	45.58		
	9/16/2021	17.25	43.18		Water Level collected by Weiss Associates.
R-50B2	3/16/2017	4.50	55.50	60.00	
	9/21/2017	3.35	56.65		Fluctuating water level.
	9/20/2018	5.49	54.51		
	9/19/2019	2.18	57.82		
	9/17/2020	-	-		Decommissioned.
R-51A	3/16/2017	14.21	45.79	60.00	
	9/21/2017	13.25	46.75		
	9/20/2018	14.18	45.82		
	9/19/2019	12.49	47.51		
	9/17/2020	12.89	47.11		
	9/16/2021	15.26	44.74		
R-51B3	3/16/2017	0.00	59.86	59.86	
	9/21/2017	0.00	59.86		
	9/20/2018	0.85	59.01		Deflated packer.
	9/19/2019	-3.56	63.42		Artesian condition.
	9/17/2020	-	-		Decommissioned.
R-52A	3/16/2017	18.45	45.55	64.00	
	9/21/2017	17.44	46.56		
	9/20/2018	18.52	45.48		
	9/19/2019	16.76	47.24		
	9/17/2020	17.83	46.17		Water Level collected by Weiss Associates.
	9/16/2021	19.61	44.39		Water Level collected by Weiss Associates.

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R-52B2	3/16/2017	13.49	50.75	64.24	
	9/21/2017	12.41	51.83		
	9/20/2018	14.07	50.17		
	9/19/2019	11.67	52.57		
	9/17/2020	13.19	51.05		
	9/16/2021	16.47	47.77		
R-53A	3/16/2017	16.29	42.31	58.60	
	9/21/2017	15.59	43.01		
	9/20/2018	16.01	42.59		
	9/19/2019	14.83	43.77		
	9/17/2020	15.03	43.57		
	9/16/2021	16.97	41.63		
R-53B2	3/16/2017	1.85	62.24	64.09	
	9/21/2017	0.48	63.61		
	9/20/2018	3.40	60.69		Deflated packer.
	9/19/2019	0.00	64.09		Artesian condition.
	9/17/2020	1.81	62.28		
	9/16/2021	7.52	56.57		
R-54A	3/16/2017	14.45	42.73	57.18	
	9/21/2017	13.79	43.39		
	9/20/2018	14.21	42.97		
	9/19/2019	13.00	44.18		
	9/17/2020	13.18	44.00		
	9/16/2021	15.18	42.00		
R-54B3	3/16/2017	0.94	63.58	64.52	
	9/21/2017	0.00	64.52		
	9/20/2018	2.43	62.09		Deflated packer.
	9/19/2019	0.00	64.52		Artesian condition.
	9/17/2020	0.93	63.59		
	9/16/2021	6.68	57.84		
R-55A	3/16/2017	14.47	33.29	47.76	
	6/15/2017	14.48	33.28		
	9/21/2017	14.41	33.35		
	12/21/2017	14.31	33.45		
	3/15/2018	13.68	34.08		
	6/21/2018	14.21	33.55		
	9/20/2018	14.52	33.24		
	12/20/2018	14.62	33.14		
	3/6/2019	12.63	35.13		
	6/6/2019	13.26	34.50		
	9/19/2019	13.64	34.12		
	12/23/2019	12.95	34.81		
	4/16/2020	13.31	34.45		
	9/17/2020	13.70	34.06		
	3/18/2021	14.00	33.76		
	9/16/2021	15.38	32.38		
R-55B2	3/16/2017	9.73	54.48	64.21	
	9/21/2017	8.82	55.39		
	9/20/2018	10.95	53.26		
	9/19/2019	7.79	56.42		
	9/17/2020	-	-		Decommissioned.

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R-56B3	3/16/2017	3.08	61.05	64.13	
	9/21/2017	1.97	62.16		
	9/20/2018	5.14	58.99		
	9/19/2019	0.20	63.93		
	9/17/2020	-	-		Decommissioned.
R-57A	3/16/2017	11.65	42.06	53.71	
	6/15/2017	11.07	42.64		
	9/21/2017	10.81	42.90		
	12/21/2017	10.81	42.90		
	3/15/2018	10.41	43.30		
	6/21/2018	10.88	42.83		
	9/20/2018	11.32	42.39		
	12/20/2018	11.68	42.03		
	3/6/2019	10.26	43.45		
	6/6/2019	10.13	43.58		
	9/19/2019	10.04	43.67		
	12/23/2019	9.81	43.90		
	4/16/2020	10.21	43.50		
	9/17/2020	10.38	43.33		
	3/18/2021	11.13	42.58		
	9/16/2021	12.32	41.39		
R-57B3	3/16/2017	3.31	53.69	57.00	Installed packer.
	9/21/2017	0.22	56.78		Deflated packer.
	9/19/2019	-4.07	61.07		Artesian condition.
	9/17/2020	1.92	55.08		Artesian. Gauge Reading = 23.0 inH20.
	9/16/2021	0.76	56.24		
R58A	3/16/2017	16.98	36.79	53.77	
	6/15/2017	11.91	41.86		
	9/21/2017	10.59	43.18		
	12/21/2017	10.53	43.24		
	3/15/2018	9.85	43.92		
	6/21/2018	10.20	43.57		
	9/20/2018	10.64	43.13		
	12/20/2018	11.43	42.34		
	3/6/2019	9.59	44.18		
	6/6/2019	9.66	44.11		
	9/19/2019	9.66	44.11		
	12/23/2019	8.75	45.02		
	4/16/2020	9.35	44.42		
	9/17/2020	10.09	43.68		
	3/18/2021	10.70	43.07		
	9/16/2021	11.26	42.51		
R58B2	3/16/2017	7.15	43.43	50.58	
	9/21/2017	6.22	44.36		
	9/20/2018	6.15	44.43		Water in well box.
	9/19/2019	4.92	45.66		
	9/17/2020	5.61	44.97		
	9/16/2021	8.57	42.01		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R59A	3/16/2017	10.33	44.36	54.69	
	6/15/2017	9.98	44.71		
	9/21/2017	9.91	44.78		
	12/21/2017	9.99	44.70		
	3/15/2018	9.77	44.92		
	6/21/2018	10.31	44.38		
	9/20/2018	10.53	44.16		
	12/20/2018	10.58	44.11		
	3/6/2019	9.62	45.07		
	6/6/2019	9.71	44.98		Hard bottom.
	9/19/2019	9.85	44.84		
	12/23/2019	9.47	45.22		
	4/16/2020	10.16	44.53		
	9/17/2020	10.08	44.61		
	3/18/2021	10.44	44.25		
	9/16/2021	11.48	43.21		
R59B2	3/16/2017	0.30	50.99	51.29	
	6/15/2017	0.00	51.29		Water in well box.
	9/21/2017	0.00	51.29		
	12/21/2017	-	-		Artesian condition.
	3/15/2018	-	-		Artesian condition.
	6/21/2018	-	-		Artesian condition.
	9/20/2018	0.76	50.53		Deflated packer.
	12/20/2018	1.27	50.02		
	3/6/2019	-	-		Artesian condition. Deflated packer
	6/6/2019	-	-		Artesian condition. Water in well box. Deflated packer and repumped to 15 psi.
	9/19/2019	-1.91	53.20		Artesian condition.
	12/23/2019	-	-		Artesian condition.
	4/16/2020	-	-		Artesian condition.
	9/17/2020	0.17	51.12		
	3/18/2021	1.13	50.16		
	9/16/2021	1.36	49.93		
R5B1	3/16/2017	13.26	34.18	47.44	
	6/15/2017	13.22	34.22		
	9/21/2017	13.15	34.29		
	12/21/2017	13.32	34.12		
	3/15/2018	12.57	34.87		
	6/21/2018	13.01	34.43		
	9/20/2018	13.76	33.68		
	12/20/2018	13.67	33.77		
	3/6/2019	11.95	35.49		
	6/6/2019	12.94	34.50		Well under pressure.
	9/19/2019	12.86	34.58		
	12/23/2019	12.17	35.27		
	4/16/2020	12.04	35.40		
	9/17/2020	13.00	34.44		
	3/18/2021	13.33	34.11		
	9/16/2021	14.67	32.77		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R5B2	3/16/2017	0.00	50.46	50.46	
	9/21/2017	0.00	50.46		
	9/20/2018	0.16	50.30		Deflated packer.
	9/19/2019	-2.45	52.91		Artesian condition.
	9/17/2020	0.17	50.29		Artesian. Gauge Reading = 2.0 inH20.
	9/16/2021	1.61	48.85		
R5B3	3/16/2017	0.00	50.20	50.20	
	9/21/2017	0.00	50.20		Replaced plug in well.
	9/20/2018	-	-		
	9/19/2019	-9.23	59.43		Artesian condition.
	9/17/2020	6.42	43.78		Artesian. Gauge Reading = 77.0 inH20.
	9/16/2021	2.33	47.87		Artesian, Gauge Reading = 28.0 inH20
R60A	3/16/2017	15.18	41.26	56.44	
	6/15/2017	15.11	41.33		
	9/21/2017	12.68	43.76		
	12/21/2017	12.55	43.89		
	3/15/2018	12.00	44.44		
	6/21/2018	12.34	44.10		
	9/20/2018	12.75	43.69		
	12/20/2018	13.30	43.14		
	3/6/2019	11.68	44.76		
	6/6/2019	11.71	44.73		Well under pressure.
	9/19/2019	11.64	44.80		
	12/23/2019	11.21	45.23		
	4/16/2020	11.75	44.69		
	9/17/2020	11.92	44.52		
	3/18/2021	12.59	43.85		
	9/16/2021	13.64	42.80		
R60B1	3/16/2017	7.59	50.42	58.01	
	6/15/2017	6.83	51.18		
	9/21/2017	6.68	51.33		
	12/21/2017	6.88	51.13		
	3/15/2018	6.78	51.23		
	6/21/2018	7.32	50.69		
	9/20/2018	7.93	50.08		
	12/20/2018	8.43	49.58		
	3/6/2019	6.87	51.14		
	6/6/2019	6.18	51.83		
	9/19/2019	5.57	52.44		
	4/16/2020	6.51	51.50		
	9/17/2020	6.91	51.10		
	3/18/2021	8.12	49.89		
	9/16/2021	9.62	48.39		
R61B3	3/16/2017	0.00	58.41	58.41	Installed packer.
	9/21/2017	0.00	58.41		
	9/20/2018	-	-		Released air in packer.
	9/19/2019	-4.76	63.17		Artesian condition.
	9/17/2020	2.17	56.24		Artesian. Gauge Reading = 26 inH20.
	9/16/2021	1.76	56.65		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R62A	3/16/2017	11.40	36.19	47.59	
	9/21/2017	11.40	36.19		
	9/20/2018	-	-		Vehicle parked above well. Well inaccessible.
	9/19/2019	10.40	37.19		
	9/17/2020	10.54	37.05		
	9/16/2021	11.83	35.76		
R62B2	3/16/2017	2.04	54.87	56.91	
	6/15/2017	0.55	56.36		
	9/21/2017	1.02	55.89		
	12/21/2017	1.31	55.60		Deflated packer.
	3/15/2018	1.39	55.52		
	6/21/2018	2.00	54.91		
	9/20/2018	2.79	54.12		Deflated packer.
	12/20/2018	3.95	52.96		
	3/6/2019	1.64	55.27		Deflated packer.
	6/6/2019	0.23	56.68		Deflated packer.
	9/19/2019	0.00	56.91		
	4/16/2020	0.47	56.44		
	9/17/2020	2.13	54.78		
	3/18/2021	3.78	53.13		
	9/16/2021	6.01	50.90		
R63A	3/16/2017	11.41	46.92	58.33	
	9/21/2017	14.78	43.55		
	9/20/2018	14.77	43.56		
	9/19/2019	13.47	44.86		
	9/17/2020	14.06	44.27		
	9/16/2021	15.52	42.81		
R63B1	3/16/2017	17.70	38.82	56.52	
	6/15/2017	14.24	42.28		Well box full of water.
	9/21/2017	13.30	43.22		
	12/21/2017	13.24	43.28		Water in well box.
	3/15/2018	12.57	43.95		
	6/21/2018	12.82	43.70		
	9/20/2018	13.33	43.19		
	12/20/2018	14.17	42.35		
	3/6/2019	12.31	44.21		
	6/6/2019	12.25	44.27		Water in well box.
	9/19/2019	12.12	44.40		
	12/23/2019	11.45	45.07		
	4/16/2020	11.98	44.54		
	9/17/2020	12.54	44.11		
	3/18/2021	13.23	43.29		
	9/16/2021	14.05	42.47		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R64B1	3/16/2017	9.77	46.88	56.65	
	6/15/2017	9.20	47.45		
	9/21/2017	9.10	47.55		
	12/21/2017	9.24	47.41		
	3/15/2018	8.95	47.70		
	6/21/2018	9.44	47.21		
	9/20/2018	9.96	46.69		
	12/20/2018	10.28	46.37		
	3/6/2019	8.81	47.84		
	6/6/2019	8.49	48.16		
	9/19/2019	8.43	48.22		
	12/23/2019	8.09	48.56		
	4/16/2020	8.70	47.95		
	9/17/2020	9.11	43.89		
	3/18/2021	10.00	46.65		
	9/16/2021	11.40	45.25		
R65B1(B2)	3/16/2017	-	-	53.00	Extraction well. No port to measure DTW.
	6/15/2017	-	-		Extraction well. No port to measure DTW.
	9/21/2017	-	-		Extraction well. No port to measure DTW.
	12/21/2017	-	-		Extraction well. No port to measure DTW.
	3/15/2018	-	-		Extraction well. No port to measure DTW.
	6/21/2018	-	-		Extraction well. No port to measure DTW.
	9/20/2018	-	-		Extraction well. No port to measure DTW.
	12/20/2018	-	-		Extraction well. No port to measure DTW.
	3/6/2019	-	-		Extraction well. No port to measure DTW.
	6/6/2019	-	-		Extraction well. No port to measure DTW.
	9/19/2019	-	-		Extraction well. No port to measure DTW.
	12/23/2019	-	-		Extraction well. No port to measure DTW.
	4/16/2020	-	-		Extraction well. No port to measure DTW.
	9/17/2020	-	-		Extraction well. No port to measure DTW.
	3/18/2021	-	-		Extraction well. No port to measure DTW.
	9/16/2021	-	-		Extraction well. No port to measure DTW.
R66B1	3/16/2017	12.57	36.15	48.72	
	9/21/2017	8.18	40.54		
	9/20/2018	8.22	40.50		
	9/19/2019	7.02	41.70		
	9/17/2020	7.38	41.34		
	9/16/2021	8.96	39.76		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R67A	3/16/2017	18.55	39.03	57.58	
	6/15/2017	14.90	42.68		Water in well box.
	9/21/2017	13.85	43.73		
	12/21/2017	13.78	43.80		
	3/15/2018	13.10	44.48		
	6/21/2018	13.34	44.24		
	9/20/2018	13.83	43.75		Water in well box.
	12/20/2018	14.70	42.88		
	3/6/2019	12.81	44.77		
	6/6/2019	12.70	44.88		Soft bottom. Sediment.
	9/19/2019	12.61	44.97		
	12/23/2019	11.93	45.65		
	4/16/2020	12.47	45.31		
	9/17/2020	13.07	44.71		
	3/18/2021	13.73	43.85		
	9/16/2021	14.56	43.02		
R67B1	3/16/2017	12.97	36.09	49.06	
	6/15/2017	9.48	39.58		
	9/21/2017	8.51	40.55		
	12/21/2017	8.47	40.59		Water in well box.
	3/15/2018	7.79	41.27		
	6/21/2018	8.02	41.04		
	9/20/2018	8.54	40.52		
	12/20/2018	9.40	39.66		
	3/6/2019	7.48	41.58		
	6/6/2019	7.40	41.66		Water in well box. Well under pressure. Soft bottom, sediment/silt at bottom.
	9/19/2019	7.33	41.73		
	12/23/2019	6.64	42.42		
	4/16/2020	7.13	41.93		
	9/17/2020	7.70	41.36		
	3/18/2021	8.44	40.62		
	9/16/2021	9.28	39.78		
R68A	3/16/2017	17.65	39.79	57.44	
	9/21/2017	14.46	42.98		
	9/20/2018	-	-		Vehicle parked above well. Well Inaccessible.
	9/19/2019	13.41	44.03		
	9/17/2020	13.62	43.82		
	9/16/2021	15.22	42.22		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R68B1	3/16/2017	20.72	36.24	56.96	
	6/15/2017	15.51	41.45		
	9/21/2017	13.93	43.03		
	12/21/2017	13.83	43.13		
	3/15/2018	13.11	43.85		
	6/21/2018	13.36	43.60		
	9/20/2018	13.83	43.13		
	12/20/2018	14.87	42.09		
	3/6/2019	12.83	44.13		
	6/6/2019	12.65	44.31		
	9/19/2019	12.58	44.38		
	4/16/2020	12.41	44.55		
	9/17/2020	13.19	43.77		
	3/18/2021	13.89	43.07		
	9/16/2021	14.55	42.41		
R68B2	3/16/2017	0.00	54.91	54.91	
	6/15/2017	0.00	54.91		Water in well box.
	9/21/2017	0.00	54.91		
	12/21/2017	-	-		Artesian condition.
	3/15/2018	-	-		
	6/21/2018	0.08	54.83		
	9/20/2018	-	-		Deflated packer.
	12/20/2018	-	-		
	3/6/2019	-	-		Artesian condition. Deflated packer.
	6/6/2019	-	-		Artesian condition. Deflated packer.
	9/19/2019	1.25	53.66		Water level stabilized. No artesian conditions observed.
	12/23/2019	1.43	53.48		
	4/16/2020	1.91	53.00		
	9/17/2020	0.25	54.66		Artesian. Gauge Reading = 3.0 inH20.
	3/18/2021	0.72	54.19		
	9/16/2021	0.40	54.51		
R69A	3/16/2017	19.95	36.27	56.22	
	6/15/2017	16.26	39.96		
	9/21/2017	15.00	41.22		
	12/21/2017	14.80	41.42		Water in well box.
	3/15/2018	13.76	42.46		
	6/21/2018	13.68	42.54		
	9/20/2018	15.09	41.13		
	12/20/2018	15.94	40.28		
	3/6/2019	13.85	42.37		
	6/6/2019	13.69	42.53		Well under pressure. Soft bottom.
	9/19/2019	13.43	42.79		
	12/23/2019	12.61	43.61		
	4/16/2020	12.87	43.35		
	9/17/2020	13.49	42.73		
	3/18/2021	14.16	42.06		
	9/16/2021	14.70	41.52		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R69B1	3/16/2017	18.51	38.77	57.28	
	9/21/2017	14.14	43.14		
	9/20/2018	14.16	43.12		
	9/19/2019	12.94	44.34		
	9/17/2020	13.32	43.96		
	9/16/2021	14.80	42.48		
R69B2	3/16/2017	6.42	48.43	54.85	
	6/15/2017	4.53	50.32		
	9/21/2017	4.31	50.54		
	12/21/2017	4.29	50.56		Fluctuating water level.
	3/15/2018	4.30	50.55		
	6/21/2018	4.69	50.16		
	9/20/2018	5.03	49.82		
	12/20/2018	6.14	48.71		
	3/6/2019	4.15	50.70		
	6/6/2019	3.29	51.56		
	9/19/2019	3.24	51.61		
	12/23/2019	2.64	52.21		
	4/16/2020	3.71	51.14		
	9/17/2020	4.54	50.31		
	3/18/2021	5.70	49.15		
	9/16/2021	7.39	47.46		
R6A	3/16/2017	9.48	46.16	55.64	
	6/15/2017	8.67	46.97		
	9/16/2016	8.42	47.22		
	12/21/2017	8.54	47.10		
	3/15/2018	8.36	47.28		
	6/21/2018	8.91	46.73		
	9/20/2018	6.48	49.16		
	12/20/2018	9.92	45.72		
	3/6/2019	8.54	47.10		
	6/6/2019	7.93	47.71		Some sediment on bottom.
	9/19/2019	7.72	47.92		
	12/23/2019	7.72	47.92		
	4/16/2020	8.06	47.58		
	9/17/2020	8.24	47.40		
	3/18/2021	9.34	46.30		
	9/16/2021	10.72	44.92		
R6B1	3/16/2017	7.87	38.13	46.00	
	9/21/2017	7.78	38.22		
	9/20/2018	8.22	37.78		Water in well box.
	9/19/2019	7.39	38.61		
	9/17/2020	7.62	38.38		
	9/16/2021	9.16	36.84		
R70A	3/16/2017	19.07	38.26	57.33	
	9/21/2017	14.70	42.63		
	9/20/2018	14.71	42.62		Water in well box.
	9/19/2019	13.63	43.70		
	9/17/2020	13.81	43.52		
	9/16/2021	15.22	42.11		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R70B1	3/16/2017	17.43	38.82	56.25	
	6/15/2017	13.92	42.33		
	9/21/2017	12.98	43.27		
	12/21/2017	12.92	43.33		
	3/15/2018	12.27	43.98		
	6/21/2018	12.46	43.79		
	9/20/2018	13.00	43.25		
	12/20/2018	13.82	42.43		
	3/6/2019	11.92	44.33		
	6/6/2019	11.95	44.30		
	9/19/2019	11.78	44.47		
	12/23/2019	11.31	44.94		
	4/16/2020	11.62	44.63		
	9/17/2020	12.19	44.06		
	3/18/2021	12.86	43.39		
	9/16/2021	13.71	42.54		
R70B2	3/16/2017	7.82	46.86	54.68	
	9/21/2017	7.17	47.51		
	9/20/2018	8.12	46.56		
	9/19/2019	6.47	48.21		
	9/17/2020	7.26	47.42		
	9/16/2021	9.67	45.01		
R71A	3/16/2017	16.79	37.74	54.53	
	9/21/2017	12.37	42.16		
	9/20/2018	12.34	42.19		
	9/19/2019	11.15	43.38		
	9/17/2020	11.42	43.11		
	9/16/2021	12.72	41.81		
R71B2	3/16/2017	5.80	51.65	57.45	
	9/21/2017	4.88	52.57		
	9/20/2018	6.71	50.74		
	9/19/2019	4.13	53.32		
	9/17/2020	5.36	52.09		
	9/16/2021	8.33	49.12		
R72A	3/16/2017	20.01	36.46	56.47	
	6/15/2017	16.18	40.29		Water in well box. Fluctuating water level.
	9/21/2017	15.07	41.40		
	12/21/2017	14.93	41.54		Water in well box. Fluctuating water level.
	3/15/2018	14.10	42.37		
	6/21/2018	14.24	42.23		
	9/20/2018	15.03	41.44		Water in well box. Well under pressure.
	12/20/2018	15.92	40.55		
	3/6/2019	13.97	42.50		Well under pressure. Stabilized before recording DTW.
	6/6/2019	13.94	42.53		Well under pressure. Stabilized before recording DTW.
	9/19/2019	13.73	42.74		
	12/23/2019	12.85	43.62		
	4/16/2020	12.54	43.93		
	9/17/2020	13.87	42.60		
	3/18/2021	14.52	41.95		
	9/16/2021	15.20	41.27		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R72B2	3/16/2017	9.11	48.00	57.11	
	6/15/2017	7.24	49.87		
	9/21/2017	6.92	50.19		
	12/21/2017	7.07	50.04		
	3/15/2018	6.89	50.22		
	6/21/2018	7.42	49.69		
	9/20/2018	7.71	49.40		
	12/20/2018	8.88	48.23		
	3/6/2019	6.32	50.79		
	6/6/2019	5.95	51.16		
	9/19/2019	5.94	51.17		
	4/16/2020	6.47	50.64		
	9/17/2020	7.21	49.90		
	3/18/2021	8.45	48.66		
	9/16/2021	10.08	47.03		
R73A	3/16/2017	21.83	37.36	59.19	
	6/15/2017	17.44	41.75		
	9/21/2017	16.08	43.11		
	12/21/2017	15.95	43.24		Water in well box.
	3/15/2018	15.24	43.95		
	6/21/2018	15.38	43.81		
	9/20/2018	15.96	43.23		
	12/20/2018	16.93	42.26		
	3/6/2019	14.89	44.30		
	6/6/2019	14.84	44.35		
	9/19/2019	14.70	44.49		
	12/23/2019	13.81	45.38		
	4/16/2020	13.71	45.48		
	9/17/2020	15.10	44.09		
	3/18/2021	15.82	43.37		
	9/16/2021	16.45	42.74		
R73B2	3/16/2017	7.72	49.43	57.15	
	6/15/2017	6.26	50.89		
	9/21/2017	6.07	51.08		
	12/21/2017	6.19	50.96		
	3/15/2018	6.22	50.93		
	6/21/2018	6.80	50.35		
	9/20/2018	6.93	50.22		
	12/20/2018	-	-		Vehicle parked above well. Well inaccessible .
	3/6/2019	6.28	50.87		
	6/6/2019	5.41	51.74		
	9/19/2019	5.40	51.75		
	12/23/2019	4.69	52.46		
	4/16/2020	6.12	51.03		
	9/17/2020	6.84	50.31		
	3/18/2021	8.10	49.05		
	9/16/2021	9.92	47.23		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
R74A	3/16/2017	19.27	38.57	57.84	
	9/21/2017	14.78	43.06		
	9/20/2018	14.74	43.10		
	9/19/2019	13.69	44.15		
	9/17/2020	14.00	43.84		
	9/16/2021	15.54	42.30		
R07B1	3/16/2017	12.97	43.50	56.47	
	6/15/2017	14.08	42.39		
	9/21/2017	13.18	43.29		
	12/21/2017	13.19	43.28		
	3/15/2018	12.39	44.08		
	6/21/2018	12.62	43.85		
	9/20/2018	13.11	43.36		
	12/20/2018	14.04	42.43		
	3/6/2019	12.12	44.35		
	6/6/2019	12.02	44.45		
	9/19/2019	11.93	44.54		
	4/16/2020	11.79	44.68		
	9/17/2020	12.37	44.10		
	3/18/2021	13.06	43.41		
	9/16/2021	13.89	42.58		
R9B1	3/16/2017	18.61	38.67	57.28	
	9/21/2017	17.42	39.86		
	9/20/2018	18.97	38.31		
	9/19/2019	16.53	40.75		
	9/17/2020	17.91	52.01	69.92	
	9/16/2021	21.11	48.81		
R9B2	3/16/2017	18.82	53.18	72.00	
	9/21/2017	17.82	54.18		
	9/20/2018	19.79	52.21		
	9/19/2019	17.03	54.97		
	9/17/2020	18.74	53.26		
	9/16/2021	22.20	49.80		
R9B3	3/16/2017	4.96	64.68	69.64	
	9/21/2017	3.27	66.37		
	9/20/2018	6.51	63.13		
	9/19/2019	1.20	68.44		
	9/17/2020	4.82	64.82		
	9/16/2021	10.80	58.84		
RAY-1A	3/16/2017	16.00	29.21	45.21	Extraction pump on.
	9/21/2017	16.53	28.68		
	9/20/2018	20.53	24.68		
	9/19/2019	13.46	31.75		
	9/17/2020	13.31	31.90		
	9/16/2021	15.15	30.06		
RAY-1B1	3/16/2017	13.37	32.40	45.77	Extraction pump on.
	9/21/2017	13.60	32.17		
	9/20/2018	14.37	31.40		
	9/19/2019	13.78	31.99		
	9/17/2020	14.05	31.72		
	9/16/2021	15.86	29.91		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
RE10A	3/16/2017	19.78	38.87	58.65	
	9/21/2017	15.51	43.14		
	9/20/2018	15.39	43.26		
	9/19/2019	14.43	44.22		
	9/17/2020	14.61	44.04		
	9/16/2021	16.02	42.63		
RE11A	3/16/2017	14.56	34.19	48.75	
	9/21/2017	9.95	38.80		
	9/20/2018	10.03	38.72		
	9/19/2019	8.60	40.15		
	9/17/2020	8.74	40.01		
	9/16/2021	9.98	38.77		
RE12A	3/16/2017	11.77	36.87	48.64	
	9/21/2017	8.47	40.17		
	9/20/2018	8.47	40.17		
	9/19/2019	7.44	41.20		
	9/17/2020	7.64	41.00		
	9/16/2021	9.20	39.44		
RE1B2	3/16/2017	2.37	50.51	52.88	Installed packer.
	9/21/2017	0.83	52.05		
	9/20/2018	2.26	50.62		Water in box. Deflated packer.
	9/19/2019	0.00	52.88		Artesian condition.
	9/17/2020	1.27	51.61		
	9/16/2021	4.92	47.96		
RE21A	3/16/2017	14.67	35.21	49.88	
	9/21/2017	10.33	39.55		
	9/20/2018	10.33	39.55		
	9/19/2019	9.20	40.68		
	9/17/2020	9.42	40.46		
	9/16/2021	10.74	39.14		
RE22A	3/16/2017	15.86	33.95	49.81	
	6/15/2017	12.08	37.73		
	9/21/2017	11.04	38.77		
	12/21/2017	10.96	38.85		
	3/15/2018	10.05	39.76		
	6/21/2018	10.07	39.74		
	9/20/2018	11.17	38.64		
	12/20/2018	12.01	37.80		
	3/6/2019	9.99	39.82		
	6/6/2019	9.90	39.91		
	9/19/2019	9.71	40.10		
	12/23/2019	8.96	40.85		
	4/16/2020	9.20	40.61		
	9/17/2020	9.83	39.98		
	3/18/2021	10.48	39.33		
	9/16/2021	11.06	38.75		
RE23A	3/16/2017	19.56	34.10	53.66	Extraction pump on.
	9/21/2017	13.74	39.92		
	9/20/2018	14.50	39.16		
	9/19/2019	12.29	41.37		
	9/17/2020	12.82	40.84		
	9/16/2021	13.46	40.20		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
RE24A	3/16/2017	25.48	29.76	55.24	Extraction pump on.
	9/21/2017	19.85	35.39		
	9/20/2018	21.18	34.06		
	9/19/2019	15.00	40.24		
	9/17/2020	14.57	40.67		
	9/16/2021	15.53	39.71		
RE25A	3/16/2017	19.41	37.59	57.00	Extraction pump on.
	9/21/2017	14.09	42.91		
	9/20/2018	29.82	27.18		
	9/19/2019	14.09	42.91		
	9/17/2020	14.12	42.88		
	9/16/2021	15.04	41.96		
RE3B1	3/16/2017	12.65	36.06	48.71	
	9/21/2017	8.24	40.47		
	9/20/2018	8.26	40.45		
	9/19/2019	7.04	41.67		
	9/17/2020	7.46	41.25		
	9/16/2021	8.96	39.75		
RE05A	3/16/2017	20.00	36.85	56.85	Extraction pump on.
	9/21/2017	15.67	41.18		
	9/20/2018	15.62	41.23		
	9/19/2019	14.94	41.91		
	9/17/2020	14.68	42.17		
	9/16/2021	16.04	40.81		
RE07A	3/16/2017	13.08	35.53	48.61	
	6/15/2017	9.74	38.87		
	9/21/2017	8.91	39.70		
	12/21/2017	8.82	39.79		
	3/15/2018	8.06	40.55		
	6/21/2018	8.24	40.37		
	9/20/2018	8.93	39.68		
	12/20/2018	9.72	38.89		
	3/6/2019	7.83	40.78		
	6/6/2019	7.86	40.75		
	9/19/2019	7.67	40.94		
	12/23/2019	7.04	41.57		
	4/16/2020	7.42	41.19		
	9/17/2020	7.94	40.67		
	3/18/2021	8.59	40.02		
	9/16/2021	9.37	39.24		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
RE08A	3/16/2017	15.07	36.59	51.66	
	6/15/2017	12.05	39.61		
	9/21/2017	11.27	40.39		
	12/21/2017	11.08	40.58		
	3/15/2018	10.27	41.39		
	6/21/2018	10.50	41.16		
	9/20/2018	11.28	40.38		
	12/20/2018	12.12	39.54		
	3/6/2019	9.97	41.69		
	6/6/2019	10.07	41.59		
	9/19/2019	10.04	41.62		
	12/23/2019	9.32	42.34		
	4/16/2020	9.56	42.10		
	9/17/2020	10.18	41.48		
	3/18/2021	10.72	40.94		
	9/16/2021	11.79	39.87		
RE09A	3/16/2017	20.96	37.77	58.73	
	9/21/2017	16.08	42.65		
	9/20/2018	15.96	42.77		Water in well box.
	9/19/2019	14.86	43.87		
	9/17/2020	14.95	43.78		
	9/16/2021	16.29	42.44		
RH1A	3/16/2017	16.69	45.70	62.39	
	9/21/2017	15.68	46.71		
	9/20/2018	16.76	45.63		
	9/19/2019	15.05	47.34		
	9/17/2020	15.55	46.84		
	9/16/2021	17.96	44.43		Water Level collected by Weiss Associates.
RP16B	3/16/2017	10.48	48.15	58.63	
	9/21/2017	9.57	49.06		
	9/20/2018	10.80	47.83		
	9/19/2019	9.07	49.56		
	9/17/2020	9.53	49.10		
	9/16/2021	12.10	46.53		
RP19B	3/16/2017	17.20	39.27	56.47	
	6/15/2017	13.72	42.75		
	9/21/2017	12.81	43.66		
	12/21/2017	12.77	43.70		
	3/15/2018	12.14	44.33		
	6/21/2018	12.36	44.11		
	9/20/2018	12.82	43.65		
	12/20/2018	13.71	42.76		
	3/6/2019	11.87	44.60		
	6/6/2019	11.72	44.75		
	9/19/2019	11.64	44.83		
	12/23/2019	11.01	45.46		
	4/16/2020	11.53	44.94		
	9/17/2020	12.05	44.42		
	3/18/2021	12.73	43.74		
	9/16/2021	13.58	42.89		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
RP21B	3/16/2017	14.46	38.88	53.34	
	6/15/2017	11.11	42.23		
	9/21/2017	10.21	43.13		
	12/21/2017	10.11	43.23		
	3/15/2018	9.46	43.88		
	6/21/2018	9.69	43.65		
	9/20/2018	10.19	43.15		
	12/21/2018	11.00	42.34		
	3/6/2019	9.14	44.20		
	6/6/2019	9.06	44.28		Hard bottom. Total Depth of Well vs. Measured Depth (63.0' vs. 65.78').
	9/19/2019	8.97	44.37		
	12/23/2019	8.33	45.01		
	4/16/2020	8.82	44.52		
	9/17/2020	9.41	43.93		
	3/18/2021	10.06	43.28		
	9/16/2021	10.91	42.43		
RP22B	3/16/2017	16.55	47.52	64.07	
	9/21/2017	15.50	48.57		
	9/20/2018	16.58	47.49		Well Redeveloped 10/26/2018.
	9/19/2019	14.62	49.45		
	9/17/2020	15.38	48.69		
	9/16/2021	18.12	45.95		
RP23B	3/16/2017	15.98	38.69	54.67	
	6/15/2017	12.51	42.16		
	9/21/2017	11.80	42.87		
	12/21/2017	11.53	43.14		
	3/15/2018	10.85	43.82		
	6/21/2018	11.10	43.57		
	9/20/2018	11.60	43.07		
	12/20/2018	12.45	42.22		
	3/6/2019	10.56	44.11		
	6/6/2019	10.52	44.15		15/16" size to unlock well. Well under pressure.
	9/19/2019	10.41	44.26		
	12/23/2019	9.76	44.91		
	4/16/2020	10.21	44.46		
	9/17/2020	10.76	43.91		
	3/18/2021	11.46	43.21		
	9/16/2021	12.31	42.36		
RP24B	3/16/2017	16.85	38.14	54.99	
	9/21/2017	15.50	39.49		
	9/20/2018	12.16	42.83		
	12/20/2018	18.31	36.68		
	9/19/2019	10.90	44.09		
	9/17/2020	11.29	43.70		
	3/18/2021	17.60	37.39		
	9/16/2021	12.68	42.31		

TABLE 4

2021 GROUNDWATER ELEVATION DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well ID	Date Measured	Depth to Groundwater (feet)	Groundwater Elevation (feet MSL)	Reference Elevation (feet MSL)	Comments
RP41B	3/16/2017	19.58	37.77	57.35	
	9/21/2017	13.90	43.45		
	9/20/2018	13.83	43.52		
	9/19/2019	12.60	44.75		
	9/17/2020	13.11	44.24		
	9/16/2021	14.47	42.88		
RP42B	3/16/2017	23.94	37.76	61.70	
	6/15/2017	19.24	42.46		Fluctuating water level.
	9/21/2017	18.51	43.19		
	12/21/2017	18.12	43.58		Well cap broken.
	3/15/2018	17.94	43.76		
	6/21/2018	17.54	44.16		
	9/20/2018	17.93	43.77		
	12/20/2018	18.31	43.39		
	3/6/2019	17.62	44.08		Well under pressure. Allowed to stabilize before recording.
	6/6/2019	17.34	44.36		Well under pressure. Allowed to stabilize before recording.
	9/19/2019	16.67	45.03		
	12/23/2019	16.41	45.29		
	4/16/2020	16.30	45.40		
	9/17/2020	17.33	44.37		
	3/18/2021	17.60	44.10		
	9/16/2021	18.82	42.88		
RP43B	3/16/2017	18.69	38.59	57.28	
	6/15/2017	15.22	42.06		Well box full of water.
	9/21/2017	14.27	43.01		
	12/21/2017	14.19	43.09		Well box full of water.
	3/15/2018	13.55	43.73		
	6/21/2018	13.73	43.55		
	9/20/2018	14.25	43.03		
	12/20/2018	15.06	42.22		
	3/6/2019	13.21	44.07		
	6/6/2019	13.16	44.12		
	9/19/2019	12.28	45.00		
	12/23/2019	12.45	44.83		
	4/16/2020	12.18	45.10		
	9/17/2020	13.30	43.98		
	3/18/2021	14.08	43.20		
	9/16/2021	14.94	42.34		

Abbreviations and Notes:

MSL - Mean Sea Level

- = water level was not measured.

Artesian Conditions = water in well overflows during groundwater elevation measurement within 15 minutes of packer removal.

Well under pressure = Water in well rises after packer removal, but does not overflow within 15 minutes.

Measurements were taken by Field Solutions, Inc.

TABLE 5

2021 DIFFERENTIAL WATER LEVELS IN WELL PAIRS ACROSS THE SLURRY WALL
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well Pair	Well ID	Location	18 March 2021		16 September 2021	
			Water Elevation (ft MSL)	Difference (ft)	Water Elevation (ft MSL)	Difference (ft)
1	R-06A[1]	South wall	46.30	6.03	44.92	5.31
	R-36A[2]		40.27		39.61	
5	R-60B1[1]	South wall	49.89	6.48	48.39	5.81
	R-07B1[2]		43.41		42.58	
2	R-59A[1]	West wall	44.25	1.18	43.21	0.70
	R-58A[2]		43.07		42.51	
3	R-57A[1]	East wall	42.58	-1.27	41.39	-1.41
	R-60A[2]		43.85		42.80	
4	R-64B1[1]	East wall	46.65	3.36	45.25	2.78
	R-63B1[2]		43.29		42.47	
6	R-55A[1]	North wall	33.76	-6.26	32.38	-6.86
	RE-07A[2]		40.02		39.24	
7	R-05B1[1]	North wall	34.11	-9.10	32.77	-9.59
	RP-23B[2]		43.21		42.36	

Abbreviations and Notes:

ft MSL = feet above Mean Sea Level

A positive difference indicates an inward gradient.

[1]Outside wells - Monitoring well is located outside the footprint of the slurry wall.

[2]Inside wells - Monitoring well is located inside the footprint of the slurry wall.

TABLE 6

2021 DIFFERENTIAL WATER LEVELS IN WELL PAIRS ACROSS THE AQUITARDS
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Well Cluster	Aquitards Monitored by Cluster	Well ID	18 March 2021		16 September 2021	
			Water Elevation (ft MSL)	Difference (ft)	Water Elevation (ft MSL)	Difference (ft)
1	A/B1	RP-21B	43.28	2.82	42.43	2.88
		R-41A	40.46		39.55	
2	B2	R-59B2 (l)	50.16	1.16	49.93	1.98
		R-39B2 (u)	49.00		47.95	
3	A/B1	R-65B1B2	NM	-	NM	-
		R-58A	43.07		42.51	
4	A/B1	R-07B1	43.41	3.14	42.58	2.97
		R-36A	40.27		39.61	
5	A/B1	R-63B1	43.29	-0.56	42.47	-0.33
		R-60A	43.85		42.80	
6	B2	R-68B2 (l)	54.19	5.04	54.51	7.05
		R-69B2 (u)	49.15		47.46	
7	B1/B2	R-73B2	49.05	5.98	47.23	4.82
		R-68B1	43.07		42.41	
8	A/B1	RP-19B	43.74	-0.11	42.89	0.09
		R-60A	43.85		42.80	
9	A/B1	RP-42B	44.10	0.73	42.88	0.14
		R-73A	43.37		42.74	
10	A/B1	RP-43B	43.20	1.25	42.34	1.07
		R-72A	41.95		41.27	
11	A/B1	R-67B1	40.62	1.29	39.78	1.03
		RE-22A	39.33		38.75	
12	A/B1	R-67B1	40.62	-0.32	39.78	-0.09
		RE-08A	40.94		39.87	
13	A/B1	R-70B1	43.39	1.33	42.54	1.02
		R-69A	42.06		41.52	
14	B2	R-62B2 (l)	53.13	4.47	50.90	3.87
		R-72B2 (u)	48.66		47.03	
15	A/B1	R-68B1	43.07	-0.78	42.41	-0.61
		R-67A	43.85		43.02	

Abbreviations and Notes:

ft MSL = foot above Mean Sea Level
"-" = Not calculated
NM = Not measured
A positive difference indicates an upward gradient.
(l) = Lower well in aquifer
(u) = Upper well in aquifer

TABLE 7
2021 CAPTURE ZONE WIDTH CALCULATION
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Extraction Well	Extraction Rate, Q [1] (gpm)	Transmissivity, T [2] (gpd/ft)	Hydraulic Gradient, I [3] (ft/ft)	Capture Zone width at well[4] (ft)	Maximum Capture Zone Width Upgradient[4] (ft)
RAY-1A	2.78	3,088	0.006	35	55
RAY-1B1	3.75	12,130	0.008	9	14

Abbreviations and Notes:
ft/ft = foot per foot
gpd/ft = gallons per day per foot
gpm = gallons per minute
[1]The pumping rates are the average rate of 2021.
[2]The transmissivities used in the calculations were averages of the nearby wells transmissivities calculated in the "Remedial Investigation Report" revised June 1988 by Harding Lawson Associates (Note: Transmisivity, T=K*b).
[3]Hydraulic gradient is based on the potentiometric surface maps depicted in Figures 3 and 4, where the equipotential lines along the eastern and western slurry walls are used to calculate two gradients which are averaged to produce a single hydraulic gradient.
[4]The calculation is based on January 2008 EPA guidance on capture zone analysis.

TABLE 8

2021 WATER BALANCE RESULTS
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Extraction Well	Upgradient Width of Incoming Groundwater Flux, w [1] (ft)	Transmissivity, T [2] (gpd/ft)	Hydraulic Gradient, i (ft/ft)	Estimated Pumping Rate, Q_{est} [3] (gpm)	Actual Pumping Rate, Q [4] (gpm)
RAY-1A	109	3,088	0.006	2.09	2.78
RAY-1B1	28	12,130	0.008	2.82	3.75

Abbreviations and Notes:

ft/ft = foot per foot

gpd/ft = gallons per day per foot

gpm = gallons per minute

[1]Estimation is based on January 2008 EPA guidance on capture zone analysis.

[2]The transmissivities used in the calculations were averages of the nearby wells transmissivities found in the "Remedial Investigation Report" revised June 1988 by Harding Lawson Associates (Note: Transmisivitty, T=K*b).

[3]The calculation is based on January 2008 EPA guidance on capture zone analysis.

[4]The actual pumping rates were measured on 16 September 2021.

TABLE 9

MONITORING, SAMPLING AND REPORTING SCHEDULES
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Wells Monitored Semi-anually - Groundwater Elevations		
A Zone	**B1 Zone**	**B2 Zone**
R-06A	R-05B1	R-39B2
R-36A	R-07B1	R-59B2
R-41A	R-60B1	R-62B2
R-55A	R-63B1	R-65B1(B2)
R-57A	R-64B1	R-68B2
R-58A	R-67B1	R-69B2
R-59A	R-68B1	R-72B2
R-60A	R-70B1	R-73B2
R-67A	RP-19B	
R-69A	RP-21B	
R-72A	RP-23B	
R-73A	RP-42B	
RE-07A	RP-43B	
RE-08A		
RE-22A		

Wells Monitored Biennially - Sampling and Groundwater Elevations		
A Zone	**B1 Zone**	**B2 Zone**
24A	007B1	I-1B2
83A	94B1	R-17B2
100A	97B1	
R-52A [1]	RAY-1B1	
RAY-1A		

Wells Monitored Every Five Years [2] - Sampling and Groundwater Elevations		
A Zone	**B1 Zone**	**B2 Zone**
R-36A	R-07B1	R-27B2
R-41A	R-67B1	R-39B2
R-60A	RP-19B	R-65B1(B2)
R-72A	RP-21B	R-68B2
RE-07A	RP-23B	RE-01B2
RE-08A	RP-24B	
RE-09A	RP-41B	
RE-10A	RP-43B	
RE-23A		
RE-24A		
RE-25A		

Reporting Schedule		
Report	**Agency**	**Frequency**
NPDES	RWQCB	Semi-annually (submitted on the 15th day of February and August of each year)
Annual Progress Report	EPA	Annually (submitted in April of each year)

Abbreviations and Notes:

[1] R-52A was sampled and gauged by Weiss Associates during the 2020 biennial groundwater monitoring event as part of a Site-specific study.

[2] Wells monitored once every four years in alignment with the biennial regional groundwater monitoring program.

TABLE 10
2021 SUB-SLAB DEPRESSURIZATION SYSTEM PERFORMANCE DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Date	V001	V002	V002 Building D Extraction Point							V003	V004	V005	V006	V007	V008	V008 Building B Extraction Point						
	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Vacuum - Influent (inH_2O)	Pressure - Effluent (inH_2O)	VOCs - Influent (ppmv)	VOCs - Effluent (ppmv)	Temp. - Influent (deg F)	Temp. - Effluent (deg F)	Flow - Effluent (SCFM)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Vacuum - Influent (inH_2O)	Pressure - Effluent (inH_2O)	VOCs - Influent (ppmv)	VOCs - Effluent (ppmv)	Temp. - Influent (deg F)	Temp. - Effluent (deg F)	Flow - Effluent (SCFM)
10/21/2015	-0.080	-0.300	-4.0	2.0	6.3	0.9	NM	NM	54	-0.030	-0.040	-0.050	-0.040	-0.120	-0.370	-9.0	2.0	0.0	1.1	NM	78	51
10/28/2015	-0.080	-0.290	-6.5	2.5	13.2	0.0	NM	80	52	-0.040	-0.040	-0.035	-0.030	-0.100	-0.330	-11.0	2.0	0.1	0.1	NM	83	49
11/17/2015	-0.120	-0.380	-6.0	2.0	8.0	6.2	NM	77	51	-0.080	-0.080	-0.060	-0.050	-0.130	-0.380	-11.0	2.0	0.0	0.0	NM	75	54
12/4/2015	-0.132	-0.359	-7.0	2.0	NM	NM	61	75	47	-0.090	-0.085	-0.064	-0.061	-0.137	-0.375	-11.0	2.0	NM	NM	60	72	50
12/6/2015	-0.123	-0.367	-7.0	2.0	NM	NM	61	77	47	-0.081	-0.078	-0.067	-0.069	-0.120	-0.352	-11.0	2.0	NM	NM	60	73	46
12/20/2015	-0.148	-0.375	-6.5	2.0	NM	NM	59	72	56	-0.087	-0.088	-0.081	-0.078	-0.141	-0.376	-12.0	2.0	NM	NM	60	67	48
1/18/2016	-0.150	-0.406	-7.0	2.0	36.4	23.4	61	78	51	-0.102	-0.095	-0.075	-0.067	-0.132	-0.367	-12.0	2.0	34.0	0.9	61	76	50
2/25/2016	-0.148	-0.380	-6.0	2.0	37.1	0.2	63	79	54	-0.099	-0.098	-0.074	-0.063	-0.134	-0.359	-12.0	2.5	5.2	0.1	60	67	43
3/22/2016	NM	NM	-6.0	2.0	NM	NM	60	78	54	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/12/2016	-0.134	-0.374	-8.2	3.2	6.8	0.7	76	84	53	-0.088	-0.080	-0.090	-0.081	-0.134	-0.356	-8.0	2.9	3.1	0.1	70	83	51
8/9/2016	-0.119	-0.355	-8.0	3.1	16.9	9.6	76	86	48	-0.066	-0.062	-0.063	-0.064	-0.118	-0.354	-7.5	3.0	14.6	6.5	76	86	52
11/8/2016	-0.121	-0.342	-7.2	3.0	5.1	5.1	79	80	50	-0.065	-0.071	-0.065	-0.162	-0.136	-0.353	-8.5	3.1	10.5	0.1	76	84	46
2/8/2017	-0.130	-0.385	-7.3	3.2	0.0	0.0	73	82	52	-0.091	-0.092	-0.081	-0.069	-0.152	-0.374	-8.5	3.1	0.5	0.0	74	82	50
5/2/2017	-0.139	-0.393	-7.2	3.1	8.0	6.6	80	87	49	-0.074	-0.080	-0.088	-0.069	-1.50	-0.372	-8.0	3.2	3.0	0.0	82	86	51
8/9/2017	-0.055	-0.358	-7.2	3.0	5.5	0.7	82	90	52	-0.075	-0.065	-0.041	-0.045	-0.141	-0.361	-7.5	3.3	4.8	1.8	80	88	52
11/8/2017	-0.160	-0.405	-7.6	2.9	4.0	2.0	66	79	57	-0.084	-0.052	-0.060	-0.053	-0.104	-0.273	-7.5	2.4	10.1	3.2	70	81	49
2/7/2018	-0.127	-0.375	-7.4	3.0	0.8	0	72	83	51	-0.084	-0.079	-0.066	-0.062	-0.139	-0.372	-6.5	3.0	4.2	1.5	68	80	51
5/7/2018	-0.145	-0.400	-7.4	3.0	0.4	0.0	78	85	55	-0.100	-0.101	-0.083	-0.08	-0.165	-0.385	-6.5	3.0	3.1	0.0	78	84	52
8/8/2018	-0.135	-0.377	-7.0	3.0	0.7	0.0	78	88	53	-0.082	-0.080	-0.063	-0.06	-0.122	-0.351	-6.5	3.1	5.7	0.8	76	87	52
11/6/2018	-0.149	-0.407	-7.4	3.0	1.2	0.0	72	84	50	-0.082	-0.070	-0.067	-0.069	-0.125	-0.354	-7.0	4.2	9.0	0.0	69	82	49
2/15/2019	-0.145	-0.417	-7.0	2.8	NM	NM	NM	NM	49	-0.100	-0.093	-0.052	-0.065	-0.137	-0.360	-7.5	4.0	NM	NM	NM	NM	50
2/17/2019	-0.214	-0.477	-7.0	3.0	NM	NM	69	79	51	-0.130	-0.107	-0.123	-0.127	-0.155	-0.413	-7.0	4.0	NM	NM	64	75	50
5/24/2019	-0.145	-0.376	-8.2	2.6	NM	NM	76	82	49	-0.091	-0.093	-0.095	-0.074	-0.133	-0.363	-8.0	3.0	NM	NM	74	84	49
8/18/2019	-0.178	-0.385	-8.6	3.0	NM	NM	89	96	51	-0.095	-0.090	-0.067	-0.072	-0.142	-0.339	-7.0	3.4	NM	NM	90	92	48
11/18/2019	0.212	-0.389	-6.5	3.0	NM	NM	70	70	53	-0.011	-0.019	-0.012	-0.014	-0.130	-0.295	-6.5	3.2	NM	NM	72	82	50

TABLE 10
2021 SUB-SLAB DEPRESSURIZATION SYSTEM PERFORMANCE DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

	V001	V002	V002 Building D Extraction Point							V003	V004	V005	V006	V007	V008	V008 Building B Extraction Point						
Date	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Vacuum - Influent (inH_2O)	Pressure - Effluent (inH_2O)	VOCs - Influent (ppmv)	VOCs - Effluent (ppmv)	Temp. - Influent (deg F)	Temp. - Effluent (deg F)	Flow - Effluent (SCFM)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Vacuum - Influent (inH_2O)	Pressure - Effluent (inH_2O)	VOCs - Influent (ppmv)	VOCs - Effluent (ppmv)	Temp. - Influent (deg F)	Temp. - Effluent (deg F)	Flow - Effluent (SCFM)
2/24/2020[2]	-0.002	0.002	-0.6	0.0	NM	NM	68	68	0.55	-0.022	-0.015	-0.030	-0.036	-0.112	-0.345	-8.5	3.0	NM	NM	66	76	53
5/27/2020	-0.114	-0.358	-7.5	3.2	NM	NM	85	90	53	-0.093	-0.095	-0.048	-0.052	-0.126	-0.354	-7.5	3.4	NM	NM	85	89	53
8/25/2020	-0.118	-0.292	-6.8	3.0	NM	NM	84	84	53	-0.073	-0.068	-0.050	-0.054	-0.137	-0.354	-7.0	3.4	NM	NM	82	76	53
11/24/2020[3]	-0.137	-0.367	-6.5	3.0	NM	NM	62	58	57	NM	NM	NM	NM	-0.085	-0.306	-8.0	3.2	NM	NM	64	74	49
12/14/2020[4]	-0.042	-0.092	-1.4	0.4	NM	NM	NM	NM	NM	-0.037	-0.055	-0.028	-0.028	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/15/2020[5]	NM	NM	-2.6	0.5	NM	NM	63	67	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/15/2020[6]	NM	NM	-6.7	3.1	NM	NM	63	67	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/18/2021	-0.150	-0.415	-7.5	3.0	NM	NM	70	80	52.00	-0.085	-0.081	-0.093	-0.078	-0.134	-0.361	-7.5	3.4	NM	NM	64	72	53
5/24/2021	-0.126	-0.365	-10.0	2.8	NM	NM	72.0	80.0	54.1	-0.070	-0.062	-0.081	-0.091	-0.149	-0.351	-7.0	3.4	NM	NM	68	79	58
8/20/2021	-0.148	-0.363	-10.0	2.8	NM	NM	84.0	86.0	49.3	-0.072	-0.062	-0.070	-0.065	-0.119	-0.339	-7.0	3.4	NM	NM	79	88	57
11/18/2021	-0.162	-0.409	-10.0	2.8	NM	NM	67.2	80.0	53.9	-0.095	-0.092	-0.060	-0.063	-0.126	-0.348	-7.5	3.4	NM	NM	71	80	53

Abbreviations and Notes:
CFM = cubic feet per minute
deg F = degrees Fahrenheit
inH2O = inches of water column
NM = not measured
ppmv = parts per million by volume
[1] Valve was installed to throttle flow. Values shown are suction side/discharge side, respectively.
[2] Fan was found operating at minimal capacity and replaced the following day.
[3] Not Measured due to limited building access during time of inspection. Pressure differential collected at the following drainage event.
[4] Drainage event during which measurments were collected at Pressure Monitoring points not collected during the 11/24/2020 inpsection. Fan at Building D was found operating at minimal capacity and replaced the following day.
[5] Measurements collected prior to installation of replacement fan at Building D.
[6] Measurements collected after replacement fan installed at Building D.

TABLE 10
2021 SUB-SLAB DEPRESSURIZATION SYSTEM PERFORMANCE DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

	V009	V010	V011	V011 Building A Extraction Point							V012	V013	V014	V014 Building E Extraction Point						
Date	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Vacuum - Influent (inH_2O)	Pressure - Effluent (inH_2O)	VOCs - Influent (ppmv)	VOCs - Effluent (ppmv)	Temp. - Influent (deg F)	Temp. - Effluent (deg F)	Flow - Effluent (SCFM)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Vacuum - Influent (inH_2O)[1]	Pressure - Effluent (inH_2O)	VOCs - Influent (ppmv)	VOCs - Effluent (ppmv)	Temp. - Influent (deg F)	Temp. - Effluent (deg F)	Flow - Effluent (SCFM)
10/21/2015	-0.070	-0.150	-0.380	-8.0	3.0	1.2	0.0	NM	NM	53	-0.040	-0.100	-0.400	-4.0	2.5	0.0	0.2	NM	NM	59
10/28/2015	-0.160	-0.140	-0.390	-8.5	2.0	0.1	0.3	NM	85	53	-0.060	-0.120	-0.390	-4.0	2.5	0.0	0.0	NM	86	59
11/17/2015	-0.200	-0.200	-0.400	-9.0	2.0	0.3	0.2	NM	78	53	-0.060	-0.100	-0.400	-10.0	2.3	1.7	0.8	NM	84	60
12/4/2015	-0.204	-0.169	-0.319	-11.0	2.0	NM	NM	61	78	52	-0.057	-0.105	-0.403	-9.8	2.0	NM	NM	68	79	54
12/6/2015	-0.191	-0.157	-0.379	-11.0	2.0	NM	NM	63	79	53	-0.057	-0.110	-0.407	-10.0	2.0	NM	NM	69	77	47
12/20/2015	-0.214	-0.175	-0.389	-11.0	1.5	NM	NM	60	75	50	-0.052	-0.104	-0.405	-11.0	2.0	NM	NM	65	78	60
1/18/2016	-0.210	-0.185	-0.400	-12.0	2.0	78.5	52.0	62	79	52	-0.065	-0.115	-0.403	-11.0	2.0	1.3	0.4	71	82	59
2/25/2016	-0.204	-0.166	-0.378	-12.0	2.0	3.6	0.0	62	76	41	-0.067	-0.120	-0.403	-11.0	2.5	0.7	0.2	65	85	63
3/22/2016	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/12/2016	-0.212	-0.181	-0.380	-11.0	3.0	0.7	0.0	72	84	51	-0.053	-0.078	-0.243	-8.2/-27 3	1.3	0.3	0.0	76	92	40
8/9/2016	-0.198	-0.153	-0.368	-9.0	3.2	4.4	2.6	78	84	51	-0.039	-0.088	-0.246	-8.0/-28 3	1.2	11.5	12.6	83	95	40
11/8/2016	-0.206	-0.151	-0.349	-11.3	3.0	4.4	8.3	82	84	45	-0.049	-0.087	-0.247	-8.2/-28 3	1.1	0.0	0.0	84	95	39
2/8/2017	-0.227	-0.198	-0.403	-11.5	3.1	0.0	0.0	71	75	51	-0.064	-0.099	-0.260	-9.2/-28.5	1.1	0.0	0.0	78	90	42
5/2/2017	-0.223	-0.186	-0.377	-11.5	3.1	1.9	0.0	76	84	48	-0.050	-0.095	-0.258	-8.4/-28.5	1.1	0.0	0.0	83	96	40
8/9/2017	-0.216	-0.183	-0.412	-9.5	3.2	10.8	9.6	80	90	52	-0.051	-0.095	-0.253	-8.6/-29.0	1.1	0.9	0.3	86	97	42
11/8/2017	-0.158	-0.143	-0.366	-11.0	3.2	7.5	1.7	69	79	52	-0.043	-0.092	-0.265	-8.9/-29.0	1.2	6.0	4.4	70	89	47
2/7/2018	-0.225	-0.22	-0.433	-11.0	3.0	3.5	0.4	66	80	49	-0.045	-0.087	-0.245	-8.8/-29	1.2	0.0	0.0	76	90	41
5/7/2018	-0.222	-0.182	-0.385	-10.5	3.0	4.7	0.0	74	84	50	-0.046	-0.087	-0.241	-8.8/-29	1.2	0.0	0.0	82	92	43
8/8/2018	-0.193	-0.147	-0.362	-10.0	3.0	3.6	0.8	78	89	50	-0.041	-0.073	-0.233	-8.8/-29	1.4	0.0	0.0	82	95	43
11/6/2018	-0.191	-0.166	-0.371	-10.5	3.2	2.0	0.0	68	86	47	-0.030	-0.072	-0.232	-8.8/-29	1.4	0.0	0.0	76	92	41
2/15/2019	-0.209	-0.223	-0.434	-12.5	3.2	NM	NM	NM	NM	48	-0.044	-0.097	-0.254	-9.5/NM	1.4	NM	NM	NM	NM	39
2/17/2019	-0.252	-0.248	-0.458	-11.0	3.2	1.9	0.0	60	77	47	-0.062	-0.101	-0.260	-9.5/-30	1.4	NM	NM	76	84	38
5/24/2019	-0.214	-0.188	-0.387	-11.0	3.0	NM	NM	70	87	46	-0.042	-0.072	-0.232	-9	1.4	NM	NM	79	93	40
8/18/2019	-0.205	-0.152	-0.361	-9.5	3.4	NM	NM	87	96	45	-0.092	-0.130	-0.284	-10/-31	1.4	NM	NM	89	98	40
11/18/2019	-0.135	-0.041	-0.040	-11.5	3.0	NM	NM	82	86	47	-0.030	-0.156	-0.305	-29	1.4	NM	NM	70	90	41

TABLE 10
2021 SUB-SLAB DEPRESSURIZATION SYSTEM PERFORMANCE DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

	V009	V010	V011	V011 Building A Extraction Point							V012	V013	V014	V014 Building E Extraction Point						
Date	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Vacuum - Influent (inH_2O)	Pressure - Effluent (inH_2O)	VOCs - Influent (ppmv)	VOCs - Effluent (ppmv)	Temp. - Influent (deg F)	Temp. - Effluent (deg F)	Flow - Effluent (SCFM)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Pressure Differential (inH_2O)	Vacuum - Influent (inH_2O)[1]	Pressure - Effluent (inH_2O)	VOCs - Influent (ppmv)	VOCs - Effluent (ppmv)	Temp. - Influent (deg F)	Temp. - Effluent (deg F)	Flow - Effluent (SCFM)
2/24/2020[2]	-0.180	-0.153	-0.360	-11.5	3.2	NM	NM	56	76	49	-0.036	-0.076	-0.233	-9.2	1.4	NM	NM	84	92	42
5/27/2020	-0.196	-0.167	-0.378	-11.0	3.4	NM	NM	78	90	49	-0.057	-0.073	-0.238	-9/-30	1.5	NM	NM	80	96	40
8/25/2020	-0.197	-0.146	-0.363	-9.5	3.4	NM	NM	82	79	51	-0.037	-0.070	-0.232	-9/-30	1.4	NM	NM	84	92	45
11/24/2020[3]	-0.149	-0.111	-0.348	-11.0	3.4	NM	NM	65	72	49	-	-0.066	-0.232	-10/-30	2.4	NM	NM	75	86	45
12/14/2020[4]	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	-0.028	-0.067	-0.233	NM	NM	NM	NM	NM	NM	NM
12/15/2020[5]	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/15/2020[6]	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/18/2021	-0.205	-0.156	-0.359	-11.0	3.4	NM	NM	74	76	51	-0.033	-0.082	-0.246	-10/-30	1.4	NM	NM	82	84	41
5/24/2021	-0.195	-0.157	-0.374	-8.0	3.5	NM	NM	70	80	55	-0.034	-0.109	-0.358	-4/14	3.0	NM	NM	79	85	58
8/20/2021	-0.182	-0.146	-0.370	-7.5	3.5	NM	NM	74	88	53	-0.034	-0.097	-0.340	-4/14	3.0	NM	NM	84	90	53
11/18/2021	-0.189	-0.155	-0.376	-8.0	3.6	NM	NM	70.9	80.0	53.2	-0.038	-0.098	-0.328	-4/14	3.0	NM	NM	65.2	84.0	57.7

Abbreviations and Notes:
CFM = cubic feet per minute
deg F = degrees Fahrenheit
inH2O = inches of water column
NM = not measured
ppmv = parts per million by volume
[1] Valve was installed to throttle flow. Values shown are suction side/discharge side, respectively.
[2] Fan was found operating at minimal capacity and replaced the following day.
[3] Not Measured due to limited building access during time of inspection. Pressure differential collected at the following drainage event.
[4] Pressure Monitoring points not collected during the 11/24/2020 quarterly inpsection due to limited building access. Fan at Building D was found operating at minimal capacity and replaced the following day.
[5] Measurements collected prior to installation of replacement fan at Building D.
[6] Measurements collected after replacement fan installed at Building D.

TABLE 11
2021 SUB-SLAB DEPRESSURIZATION SYSTEM BAAQMD DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Chemical [1]	Sample Date	Building A (Extraction Point V011)			Building B (Extraction Point V008)			Building D (Extraction Point V002)			Building E (Extraction Point V014)			Comparison with BAAQMD Toxic Air Contaminant Trigger Levels						
		Effluent Analytical Result ($\mu g/m^3$)	Effluent Reporting Limit ($\mu g/m^3$)	Flow Rate (CFM)	Effluent Analytical Result ($\mu g/m^3$)	Effluent Reporting Limit ($\mu g/m^3$)	Flow Rate (CFM)	Effluent Analytical Result ($\mu g/m^3$)	Effluent Reporting Limit ($\mu g/m^3$)	Flow Rate (CFM)	Effluent Analytical Result ($\mu g/m^3$)	Effluent Reporting Limit ($\mu g/m^3$)	Flow Rate (CFM)	Total SSD Emissions [2] (lb/hr)	Period [3] (Days)	SSD Emissions in Period [4] (lb)	Total SSD Emissions in 2021 [5] (lb/yr)	BAAQMD Acute (1-hr. max.) Trigger Level [6] (lb/hr)	BAAQMD Chronic Trigger Level [6] (lb/yr)	Below Acute BAAQMD Trigger Level?	Below Chronic BAAQMD Trigger Level?
Benzene	02/18/2021	< 3.2	3.2	51	< 3.2	3.2	53	< 3.3	3.3	52	< 3.4	3.4	41	2.4E-06	86	5.0E-03	2.1E-02	6.0E-02	2.9E+00	Yes	Yes
	5/24/2021	< 2.7	2.7	55	< 2.7	2.7	58	< 2.8	2.8	54	< 2.8	2.8	58	2.3E-06	95	5.3E-03				Yes	
	08/20/2021	< 2.8	2.8	53	< 2.8	2.8	57	< 2.7	2.7	49	< 2.8	2.8	53	2.2E-06	88	4.7E-03				Yes	
	11/18/2021	< 2.8	2.8	53	< 5.5	5.5	53	< 2.7	2.7	54	< 2.7	2.7	58	2.8E-06	90	6.0E-03				Yes	
2-Butanone (MEK)	02/18/2021	< 12	12	51	< 12	12	53	30	12	52	< 12	12	41	1.2E-05	86	2.6E-02	8.3E-02	2.9E+01	NA	Yes	NA
	5/24/2021	< 9.8	9.8	55	< 10	10	58	< 10	10	54	< 10	10	58	8.4E-06	95	1.9E-02				Yes	
	08/20/2021	< 10	10	53	< 10	10	57	< 10	10	49	< 10	10	53	8.0E-06	88	1.7E-02				Yes	
	11/18/2021	< 10	10	53	< 20	20	53	< 9.9	9.9	54	< 9.9	9.9	58	1.0E-05	90	2.2E-02				Yes	
Carbon Disulfide	02/18/2021	< 12	12	51	< 13	13	53	< 13	13	52	< 13	13	41	9.4E-06	86	1.9E-02	8.1E-02	1.4E+01	3.1E+04	Yes	Yes
	5/24/2021	< 10	10	55	< 11	11	58	< 11	11	54	< 11	11	58	9.1E-06	95	2.1E-02				Yes	
	08/20/2021	< 11	11	53	< 11	11	57	< 10	10	49	< 11	11	53	8.6E-06	88	1.8E-02				Yes	
	11/18/2021	< 11	11	53	< 21	21	53	< 10	10	54	< 10	10	58	1.1E-05	90	2.3E-02				Yes	
Carbon Tetrachloride	02/18/2021	< 6.3	6.3	51	< 6.4	6.4	53	< 6.4	6.4	52	< 6.7	6.7	41	4.7E-06	86	9.8E-03	4.1E-02	4.2E+00	1.9E+00	Yes	Yes
	5/24/2021	< 5.2	5.2	55	< 5.4	5.4	58	< 5.5	5.5	54	< 5.6	5.6	58	4.6E-06	95	1.0E-02				Yes	
	08/20/2021	< 5.5	5.5	53	< 5.5	5.5	57	< 5.3	5.3	49	< 5.5	5.5	53	4.3E-06	88	9.2E-03				Yes	
	11/18/2021	< 5.5	5.5	53	< 11	11	53	< 5.3	5.3	54	< 5.3	5.3	58	5.5E-06	90	1.2E-02				Yes	
Chlorobenzene	02/18/2021	< 4.6	4.6	51	< 4.7	4.7	53	< 4.7	4.7	52	< 4.9	4.9	41	3.5E-06	86	7.2E-03	3.0E-02	NA	3.9E+04	NA	Yes
	5/24/2021	< 3.8	3.8	55	< 4.0	4.0	58	< 4.0	4.0	54	< 4.1	4.1	58	3.4E-06	95	7.6E-03					
	08/20/2021	< 4.0	4.0	53	< 4.0	4.0	57	< 3.9	3.9	49	< 4.0	4.0	53	3.2E-06	88	6.7E-03					
	11/18/2021	< 4.0	4.0	53	< 7.9	7.9	53	< 3.9	3.9	54	< 3.9	3.9	58	4.0E-06	90	8.6E-03					
Chloroform	02/18/2021	< 4.8	4.8	51	< 5.0	5.0	53	< 5.0	5.0	52	< 5.2	5.2	41	3.7E-06	86	7.6E-03	3.9E-02	3.3E-01	1.5E+01	Yes	Yes
	5/24/2021	< 4.1	4.1	55	8.5	4.2	58	< 4.2	4.2	54	< 4.3	4.3	58	4.5E-06	95	1.0E-02				Yes	
	08/20/2021	< 4.3	4.3	53	13	4.3	57	< 4.2	4.2	49	< 4.3	4.3	53	5.3E-06	88	1.1E-02				Yes	
	11/18/2021	< 4.3	4.3	53	11	8.3	53	< 4.1	4.1	54	4.2	4.1	58	4.8E-06	90	1.0E-02				Yes	
1,1-Dichloroethane	02/18/2021	< 4.0	4.0	51	< 4.1	4.1	53	< 4.1	4.1	52	< 4.3	4.3	41	3.0E-06	86	6.3E-03	2.6E-02	NA	5.0E+01	NA	Yes
	5/24/2021	< 3.4	3.4	55	< 3.5	3.5	58	< 3.5	3.5	54	< 3.6	3.6	58	3.0E-06	95	6.7E-03					
	08/20/2021	< 3.6	3.6	53	< 3.5	3.5	57	< 3.4	3.4	49	< 3.6	3.6	53	2.8E-06	88	5.9E-03					
	11/18/2021	< 3.5	3.5	53	< 6.9	6.9	53	< 3.4	3.4	54	< 3.4	3.4	58	3.5E-06	90	7.5E-03					
1,1-Dichloroethene	02/18/2021	< 3.9	3.9	51	< 4.0	4.0	53	< 4.1	4.1	52	< 4.2	4.2	41	3.0E-06	86	6.2E-03	2.6E-02	NA	2.7E+03	NA	Yes
	5/24/2021	< 3.3	3.3	55	< 3.4	3.4	58	< 3.4	3.4	54	< 3.5	3.5	58	2.9E-06	95	6.5E-03					
	08/20/2021	< 3.5	3.5	53	< 3.5	3.5	57	< 3.4	3.4	49	< 3.5	3.5	53	2.8E-06	88	5.8E-03					
	11/18/2021	< 3.5	3.5	53	< 6.8	6.8	53	< 3.3	3.3	54	< 3.3	3.3	58	3.4E-06	90	7.4E-03					
Ethylbenzene	02/18/2021	< 4.3	4.3	51	< 4.4	4.4	53	< 4.4	4.4	52	< 4.6	4.6	41	3.3E-06	86	6.7E-03	2.8E-02	NA	3.3E+01	NA	Yes
	5/24/2021	< 3.6	3.6	55	< 3.7	3.7	58	< 3.8	3.8	54	< 3.9	3.9	58	3.2E-06	95	7.2E-03					
	08/20/2021	< 3.8	3.8	53	< 3.8	3.8	57	< 3.7	3.7	49	< 3.8	3.8	53	3.0E-06	88	6.3E-03					
	11/18/2021	< 3.8	3.8	53	< 7.4	7.4	53	< 3.6	3.6	54	< 3.6	3.6	58	3.7E-06	90	8.1E-03					
Methylene Chloride	02/18/2021	< 34	34	51	< 35	35	53	< 36	36	52	< 37	37	41	2.6E-05	86	5.4E-02	2.3E-01	3.1E+01	8.2E+01	Yes	Yes
	5/24/2021	< 29	29	55	< 30	30	58	< 30	30	54	< 31	31	58	2.5E-05	95	5.8E-02				Yes	
	08/20/2021	< 30	30	53	< 30	30	57	< 30	30	49	< 30	30	53	2.4E-05	88	5.0E-02				Yes	
	11/18/2021	< 30	30	53	< 59	59	53	< 29	29	54	< 29	29	58	3.0E-05	90	6.4E-02				Yes	
Styrene	02/18/2021	< 4.2	4.2	51	< 4.3	4.3	53	< 4.4	4.4	52	< 4.5	4.5	41	3.2E-06	86	6.6E-03	2.8E-02	4.6E+01	3.5E+04	Yes	Yes
	5/24/2021	< 3.6	3.6	55	< 3.7	3.7	58	< 3.7	3.7	54	< 3.8	3.8	58	3.1E-06	95	7.1E-03				Yes	
	08/20/2021	< 3.7	3.7	53	< 3.7	3.7	57	< 3.6	3.6	49	< 3.7	3.7	53	2.9E-06	88	6.2E-03				Yes	
	11/18/2021	< 3.7	3.7	53	< 7.3	7.3	53	< 3.6	3.6	54	< 3.6	3.6	58	3.7E-06	90	8.0E-03				Yes	

TABLE 11
2021 SUB-SLAB DEPRESSURIZATION SYSTEM BAAQMD DATA
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Chemical [1]	Sample Date	Building A (Extraction Point V011)			Building B (Extraction Point V008)			Building D (Extraction Point V002)			Building E (Extraction Point V014)			Comparison with BAAQMD Toxic Air Contaminant Trigger Levels						
		Effluent Analytical Result ($\mu g/m^3$)	Effluent Reporting Limit ($\mu g/m^3$)	Flow Rate (CFM)	Effluent Analytical Result ($\mu g/m^3$)	Effluent Reporting Limit ($\mu g/m^3$)	Flow Rate (CFM)	Effluent Analytical Result ($\mu g/m^3$)	Effluent Reporting Limit ($\mu g/m^3$)	Flow Rate (CFM)	Effluent Analytical Result ($\mu g/m^3$)	Effluent Reporting Limit ($\mu g/m^3$)	Flow Rate (CFM)	Total SSD Emissions [2] (lb/hr)	Period [3] (Days)	SSD Emissions in Period [4] (lb)	Total SSD Emissions in 2021 [5] (lb/yr)	BAAQMD Acute (1-hr. max.) Trigger Level [6] (lb/hr)	BAAQMD Chronic Trigger Level [6] (lb/yr)	Below Acute BAAQMD Trigger Level?	Below Chronic BAAQMD Trigger Level?
Tetrachloroethene	02/18/2021	< 6.7	6.7	51	< 6.9	6.9	53	< 7.0	7.0	52	< 7.2	7.2	41	5.1E-06	86	1.1E-02	4.5E-02	4.4E+01	1.4E+01	Yes	Yes
	5/24/2021	< 5.7	5.7	55	< 5.8	5.8	58	< 5.9	5.9	54	< 6.0	6.0	58	4.9E-06	95	1.1E-02				Yes	
	08/20/2021	< 6.0	6.0	53	< 5.9	5.9	57	< 5.8	5.8	49	< 6.0	6.0	53	4.7E-06	88	1.0E-02				Yes	
	11/18/2021	< 5.9	5.9	53	< 12	12	53	< 5.7	5.7	54	< 5.7	5.7	58	5.9E-06	90	1.3E-02				Yes	
Toluene	02/18/2021	< 3.7	3.7	51	< 3.8	3.8	53	< 3.9	3.9	52	< 4.0	4.0	41	2.8E-06	86	5.9E-03	2.5E-02	8.2E+01	1.2E+04	Yes	Yes
	5/24/2021	< 3.1	3.1	55	< 3.2	3.2	58	< 3.3	3.3	54	< 3.4	3.4	58	2.7E-06	95	6.3E-03				Yes	
	08/20/2021	< 3.3	3.3	53	< 3.3	3.3	57	< 3.2	3.2	49	< 3.3	3.3	53	2.6E-06	88	5.5E-03				Yes	
	11/18/2021	< 3.3	3.3	53	< 6.4	6.4	53	< 3.2	3.2	54	< 3.2	3.2	58	3.3E-06	90	7.1E-03				Yes	
1,1,1-Trichloroethane	02/18/2021	< 5.4	5.4	51	< 5.6	5.6	53	< 5.6	5.6	52	< 5.8	5.8	41	4.1E-06	86	8.5E-03	3.9E-02	1.5E+02	3.9E+04	Yes	Yes
	5/24/2021	< 4.6	4.6	55	< 4.7	4.7	58	< 4.7	4.7	54	< 4.8	4.8	58	4.0E-06	95	9.0E-03				Yes	
	08/20/2021	< 4.8	4.8	53	6.4	4.8	57	< 4.6	4.6	49	< 4.8	4.8	53	4.1E-06	88	8.7E-03				Yes	
	11/18/2021	< 4.8	4.8	53	14	9.3	53	< 4.6	4.6	54	4.9	4.6	58	5.7E-06	90	1.2E-02				Yes	
Trichloroethene	02/18/2021	< 5.3	5.3	51	< 5.5	5.5	53	< 5.5	5.5	52	< 5.7	5.7	41	4.1E-06	86	8.4E-03	1.6E+00	NA	4.1E+01	NA	Yes
	5/24/2021	< 4.5	4.5	55	< 4.6	4.6	58	< 4.7	4.7	54	< 4.8	4.8	58	3.9E-06	95	8.9E-03					
	08/20/2021	< 4.7	4.7	53	480	4.7	57	< 4.6	4.6	49	< 4.7	4.7	53	1.1E-04	88	2.2E-01					
	11/18/2021	21	4.7	53	3,200	9.2	53	28	4.5	54	< 4.5	4.5	58	6.5E-04	90	1.4E+00					
Vinyl Acetate	02/18/2021	< 14	14	51	< 14	14	53	< 14	14	52	< 15	15	41	1.0E-05	86	2.2E-02	9.1E-02	NA	7.7E+03	NA	Yes
	5/24/2021	< 12	12	55	< 12	12	58	< 12	12	54	< 12	12	58	1.0E-05	95	2.3E-02					
	08/20/2021	< 12	12	53	< 12	12	57	< 12	12	49	< 12	12	53	9.5E-06	88	2.0E-02					
	11/18/2021	< 12	12	53	< 24	24	53	< 12	12	54	< 12	12	58	1.2E-05	90	2.6E-02					
Vinyl Chloride	02/18/2021	< 2.5	2.5	51	< 2.6	2.6	53	< 2.6	2.6	52	< 2.7	2.7	41	1.9E-06	86	4.0E-03	1.7E-02	4.0E+02	1.1E+00	Yes	Yes
	5/24/2021	< 2.1	2.1	55	< 2.2	2.2	58	< 2.2	2.2	54	< 2.3	2.3	58	1.9E-06	95	4.2E-03					
	08/20/2021	< 2.2	2.2	53	< 2.2	2.2	57	< 2.2	2.2	49	< 2.2	2.2	53	1.8E-06	88	3.7E-03					
	11/18/2021	< 2.2	2.2	53	< 4.4	4.4	53	< 2.1	2.1	54	< 2.1	2.1	58	2.2E-06	90	4.7E-03					
m,p-Xylene	02/18/2021	< 4.3	4.3	51	< 4.4	4.4	53	< 4.4	4.4	52	< 4.6	4.6	41	3.3E-06	86	6.7E-03	2.8E-02	4.9E+01	2.7E+04	Yes	Yes
	5/24/2021	< 3.6	3.6	55	< 3.7	3.7	58	< 3.8	3.8	54	< 3.9	3.9	58	3.2E-06	95	7.2E-03					
	08/20/2021	< 3.8	3.8	53	< 3.8	3.8	57	< 3.7	3.7	49	< 3.8	3.8	53	3.0E-06	88	6.3E-03					
	11/18/2021	< 3.8	3.8	53	< 7.4	7.4	53	< 3.6	3.6	54	< 3.6	3.6	58	3.7E-06	90	8.1E-03					
o-Xylene	02/18/2021	< 4.3	4.3	51	< 4.4	4.4	53	< 4.4	4.4	52	< 4.6	4.6	41	3.3E-06	86	6.7E-03	2.8E-02	4.9E+01	2.7E+04	Yes	Yes
	5/24/2021	< 3.6	3.6	55	< 3.7	3.7	58	< 3.8	3.8	54	< 3.9	3.9	58	3.2E-06	95	7.2E-03					
	08/20/2021	< 3.8	3.8	53	< 3.8	3.8	57	< 3.7	3.7	49	< 3.8	3.8	53	3.0E-06	88	6.3E-03					
	11/18/2021	< 3.8	3.8	53	< 7.4	7.4	53	< 3.6	3.6	54	< 3.6	3.6	58	3.7E-06	90	8.1E-03					

ABBREVIATIONS AND NOTES:

$\mu g/m^3$ = micrograms per cubic meter
BAAQMD = Bay Area Air Quality Management District
lb/hr = pounds per hour
lb/yr = pounds per year
NA = BAAQMD Toxic Air Contaminant Trigger Level not established for chemical
< 3.1 = Denotes chemical was not detected at or above the laboratory reporting limit shown
CFM = cubic feet per minute

[1] Only detected compounds for which BAAQMD Toxic Air Contaminant Trigger Levels were established are shown in this table.

[2] Emissions are calculated as the cumulative emissions from all four treatment systems using the flow rate measured in each effluent flow measurement port and the corresponding detected concentrations of effluent samples.

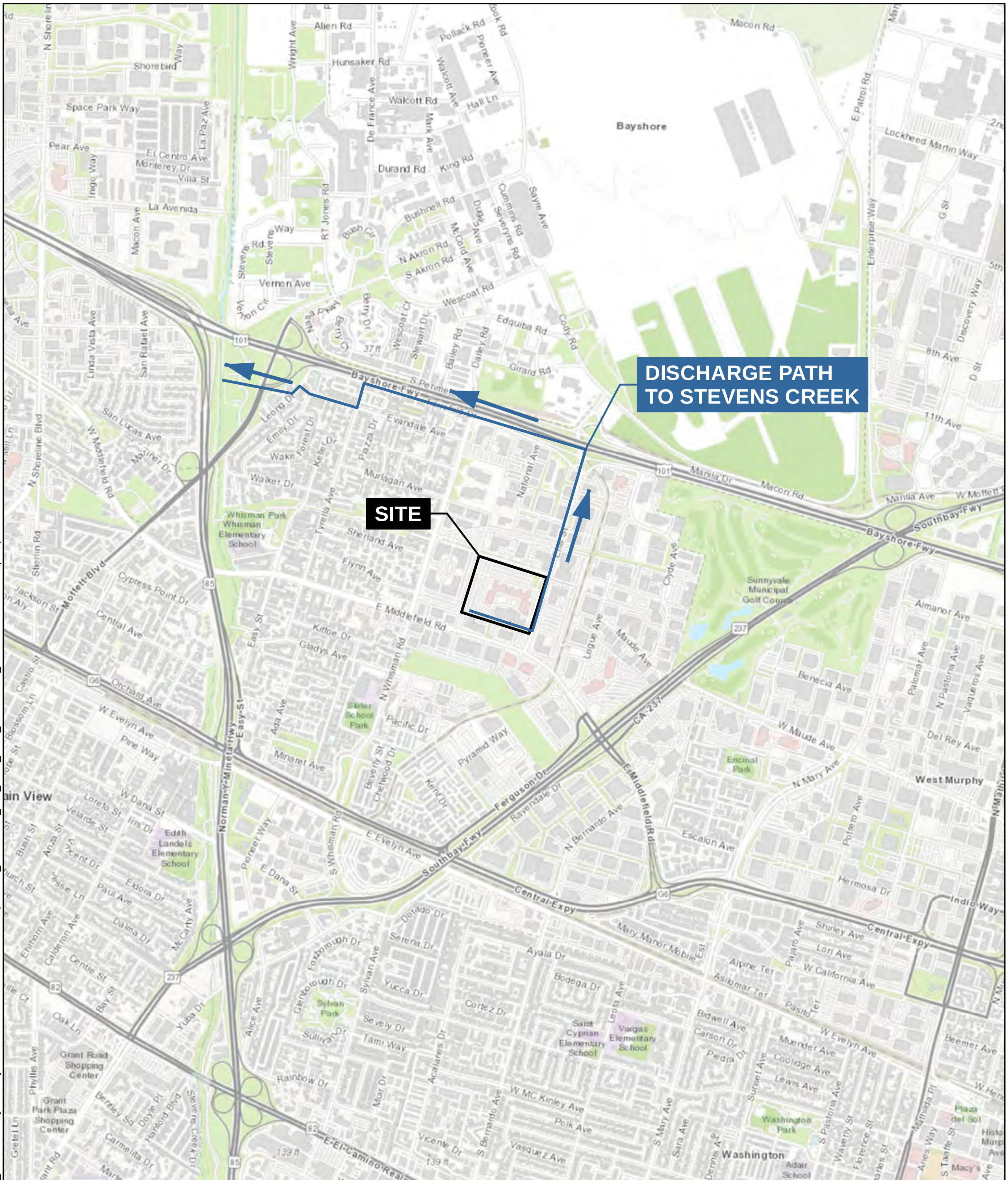
[3] Period is calculated as the number of days between the previous sampling date and the next sampling date.

[4] Emissions in period is calculated as the SSD emissions times the period (days) times 24 (hours per day).

[5] Emissions are cumulative for the calendar year since the last sampling date in 2020 (11/24/2020) and are presented in lb/yr.

[6] BAAQMD Toxic Air Contaminant Trigger Levels are established in BAAQMD Table 2-5-1.

FIGURES



MAP SOURCE: ESRI
USGS QUAD: MOUNTAIN VIEW, CA
SITE COORDINATES: 37°23'53.3"N, 122°3'17.2"W

HALEY ALDRICH

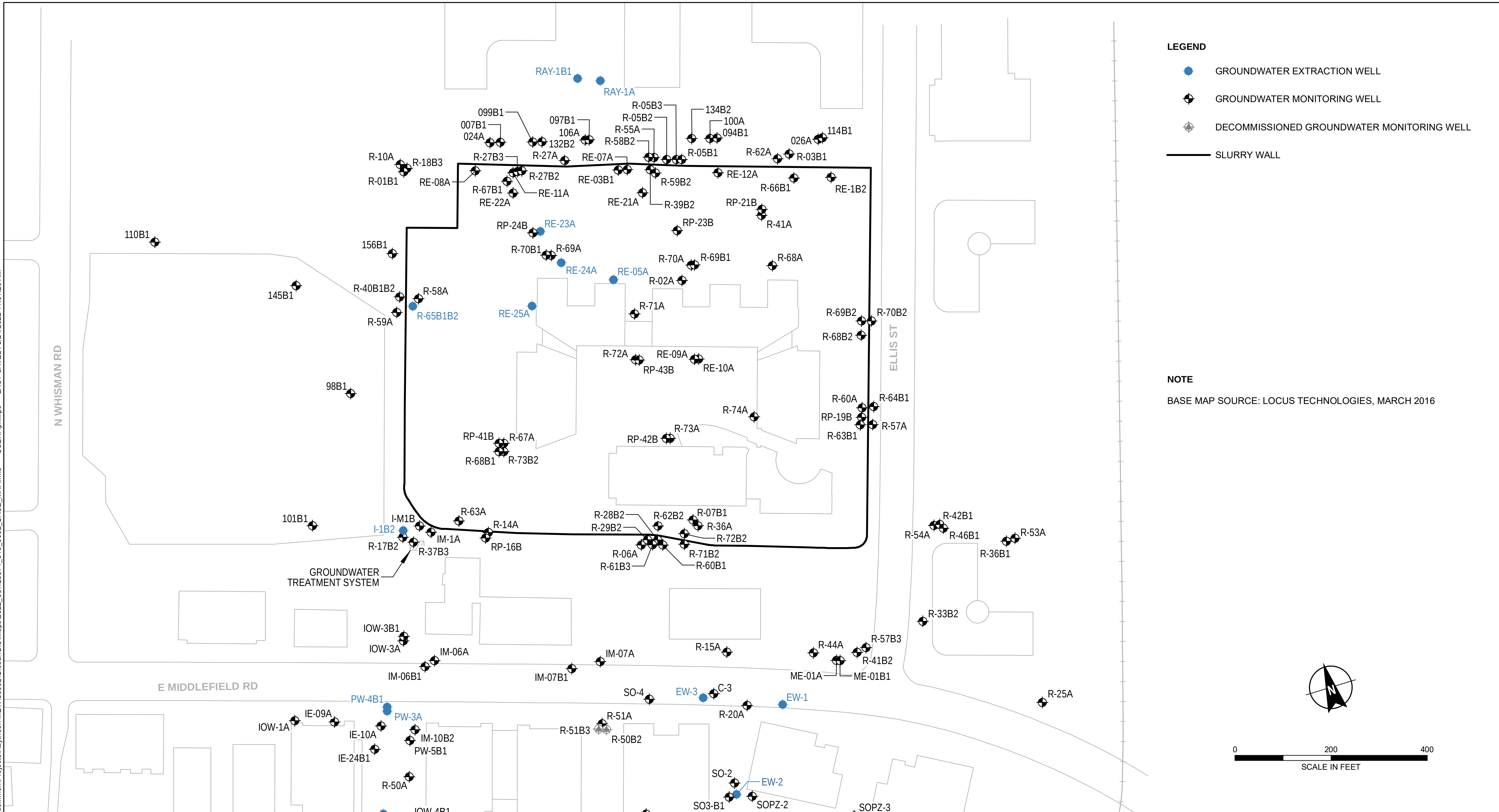
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

SITE LOCATION MAP

APPROXIMATE SCALE: 1 IN = 2000 FT
APRIL 2022

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\phx_common\Projects\Raytheon MEW36032\Global\GIS\Maps\2022_03\129571_013_0001_SITE_LOCATION_MAP.mxd — USER: lphillips — LAST SAVED: 4/1/2021 12:56:50 PM


N WHISMAN RD
ELLIS ST
E MIDDLEFIELD RD
RAY-1B1
RAY-1A
099B1
007B1
024A
097B1
106A
132B2
R-05B3
R-05B2
R-55A
R-58B2
134B2
100A
094B1
026A
114B1
R-10A
R-18B3
R-01B1
RE-08A
R-27B3
R-27A
RE-07A
R-05B1
R-62A
R-03B1
R-27B2
RE-03B1
R-59B2
RE-12A
R-67B1
RE-11A
RE-22A
RE-21A
R-39B2
R-66B1
RE-1B2
RP-21B
R-41A
110B1
RP-24B
RE-23A
RP-23B
156B1
R-70B1
R-69A
RE-24A
RE-05A
R-70A
R-69B1
R-68A
R-02A
145B1
R-40B1B2
R-58A
R-65B1B2
RE-25A
R-71A
R-59A
R-69B2
R-70B2
R-68B2
R-72A
RE-09A
RP-43B
RE-10A
98B1
R-60A
R-64B1
R-74A
RP-19B
R-57A
R-63B1
R-73A
RP-41B
R-67A
RP-42B
R-68B1
R-73B2
101B1
I-M1B
R-63A
I-1B2
R-14A
IM-1A
R-17B2
R-37B3
RP-16B
R-28B2
R-62B2
R-07B1
R-29B2
R-36A
R-72B2
R-06A
R-71B2
R-61B3
R-60B1
R-42B1
R-54A
R-46B1
R-53A
R-36B1
GROUNDWATER
TREATMENT SYSTEM
R-33B2
IOW-3B1
IOW-3A
IM-06A
IM-07A
R-15A
R-44A
R-57B3
R-41B2
IM-06B1
IM-07B1
ME-01A
ME-01B1
SO-4
EW-3
C-3
EW-1
R-25A
PW-4B1
IE-09A
PW-3A
R-51A
R-20A
IOW-1A
IE-10A
IM-10B2
R-51B3
R-50B2
PW-5B1
IE-24B1
SO-2
EW-2
R-50A
SO3-B1
SOPZ-2
SOPZ-3
IOW-4B1
PW-2A
C-2
SOPZ-1
EW-4
RH-01A
IM-18A
PW-1A
IM-08B1
R-52A
R-52B2
R-54B3
SO-1
IE-07A
IM-19B1
IM-19A
IE-06A
R-56B3
R-55B2
R-53B2
R-21A
RP-22B
R-30B2
R-22B1
R-48A
0
200
400
SCALE IN FEET

LEGEND

- GROUNDWATER EXTRACTION WELL
- GROUNDWATER MONITORING WELL
- DECOMMISSIONED GROUNDWATER MONITORING WELL
- SLURRY WALL

NOTE

BASE MAP SOURCE: LOCUS TECHNOLOGIES, MARCH 2016

HALEY ALDRICH

350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

BASE MAP

APRIL 2022

FIGURE 2

GIS FILE PATH: \\haleyaldrich.com\share\phx_common\Projects\Raytheon MEW\36032\Global\GIS\Maps\2022_03\129571_013_0002_BASE_MAP.mxd — USER: lphillips — LAST SAVED: 3/24/2022 11:31:29 AM

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N WHISMAN RD

E MIDDLEFIELD RD

ELLIS ST

RAY-1A 30.06*

106A 32.41

100A 33.27

24A 32.87

R-27A 32.60

R-55A 32.38

R-62A 35.76

26A 36.45

RE-08A 39.87

R-10A 36.20

RE-07A 39.24

RE-11A 38.77

RE-21A 39.14

RE-12A 39.44

RE-22A 38.75

R-41A 39.55

RE-23A 40.20

R-69A 41.52

RE-05A 40.81

RE-24A 39.71*

R-70A 42.11

R-68A 42.22

R-58A 42.51

RE-25A 41.96

R-02A 41.93

R-59A 43.21

R-71A 41.81

R-72A 41.27

RE-10A 42.63

RE-09A 42.44

R-74A 42.30

R-60A 42.80

R-67A 43.02

R-73A 42.74

R-57A 41.39

R-63A 42.81

R-14A 44.28

R-36A 39.61

R-54A 42.00

R-53A 41.63

IM-1A NA

R-06A 44.92

GROUNDWATER TREATMENT SYSTEM

IOW-3A 42.23

IM-06A 42.60

IM-07A 44.60

R-15A 44.64

R-44A 44.38

ME-01A 44.55

SO-4 44.71

EW-3 44.68

C-3 44.69

R-20A 44.65

EW-1 44.52

R-25A 43.18

IE-09A 43.27

PW-3A 41.44*

IE-10A 43.40

IOW-1A 43.11

R-51A 44.74

R-50A 43.18

SO-2 44.75

IM-18A 43.94

C-2 44.69

EW-2 44.88

SOPZ-2 44.86

SOPZ-3 44.70

SOPZ-1 44.87

EW-4 45.20

SO-1 44.80

RH-01A 44.43

R-52A 44.39

IM-19A 44.12

R-21A 45.14

R-48A 45.51

33 34 35 36 37 38 39 40 41 42 43 44 45

LEGEND

- GROUNDWATER EXTRACTION WELL
- GROUNDWATER MONITORING WELL
- RAY-1A ESTIMATED CAPTURE ZONE
- GROUNDWATER CONTOUR, ELEVATION IN FT ABOVE MEAN SEA LEVEL, 1-FT INTERVAL
- GROUNDWATER DEPRESSION
- SLURRY WALL

NOTES

1. GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.
2. * INDICATES THAT THE ELEVATION WAS NOT USED IN GENERATING GROUNDWATER CONTOURS.
3. *ITALICIZED VALUES* INDICATES GROUNDWATER ELEVATIONS PROVIDED BY GEOSYNTEC CONSULTANTS (GEOSYNTEC, 2022).
4. POTENTIOMETRIC CONTOURS WERE PROVIDED BY GEOSYNTEC AND REVIEWED BY HALEY & ALDRICH.
5. NA = NOT AVAILABLE

N

0 200 400

SCALE IN FEET

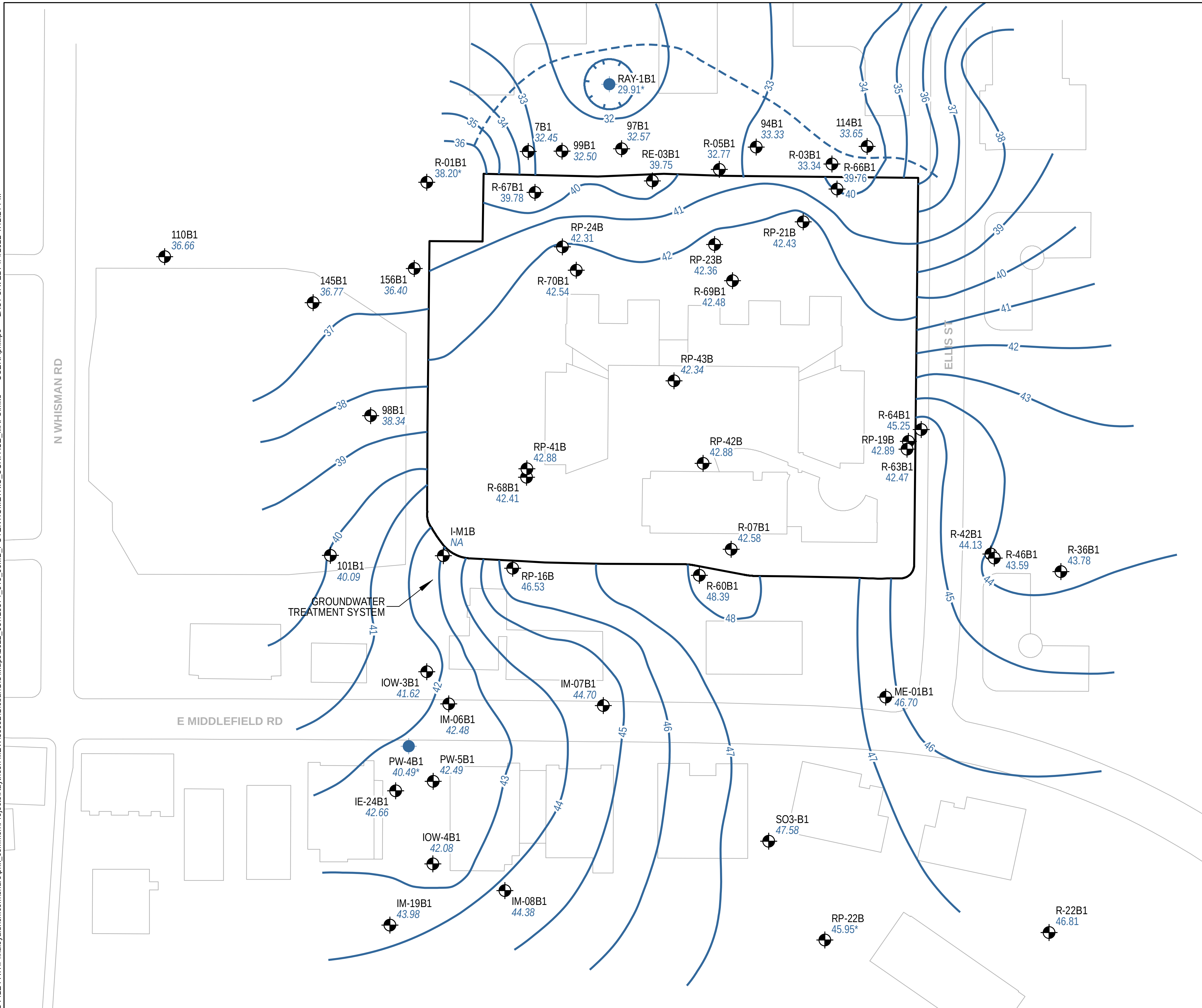
HALEY ALDRICH

350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

POTENTIOMETRIC SURFACE MAP, A ZONE, 16 SEPTEMBER 2021

APRIL 2022

FIGURE 3



LEGEND

GROUNDWATER EXTRACTION WELL

GROUNDWATER MONITORING WELL

RAY-1B1 ESTIMATED CAPTURE ZONE

GROUNDWATER CONTOUR, ELEVATION IN FT ABOVE MEAN SEA LEVEL, 1-FT INTERVAL

GROUNDWATER DEPRESSION

SLURRY WALL

NOTES

1. GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.
2. * INDICATES THAT THE ELEVATION WAS NOT USED IN GENERATING GROUNDWATER CONTOURS.
3. *ITALICIZED VALUES* INDICATE GROUNDWATER ELEVATIONS PROVIDED BY GEOSYNTEC CONSULTANTS (GEOSYNTEC, 2022).
4. POTENTIOMETRIC CONTOURS WERE PROVIDED BY GEOSYNTEC AND REVIEWED BY HALEY & ALDRICH.
5. NA = NOT APPLICABLE

HALEY ALDRICH

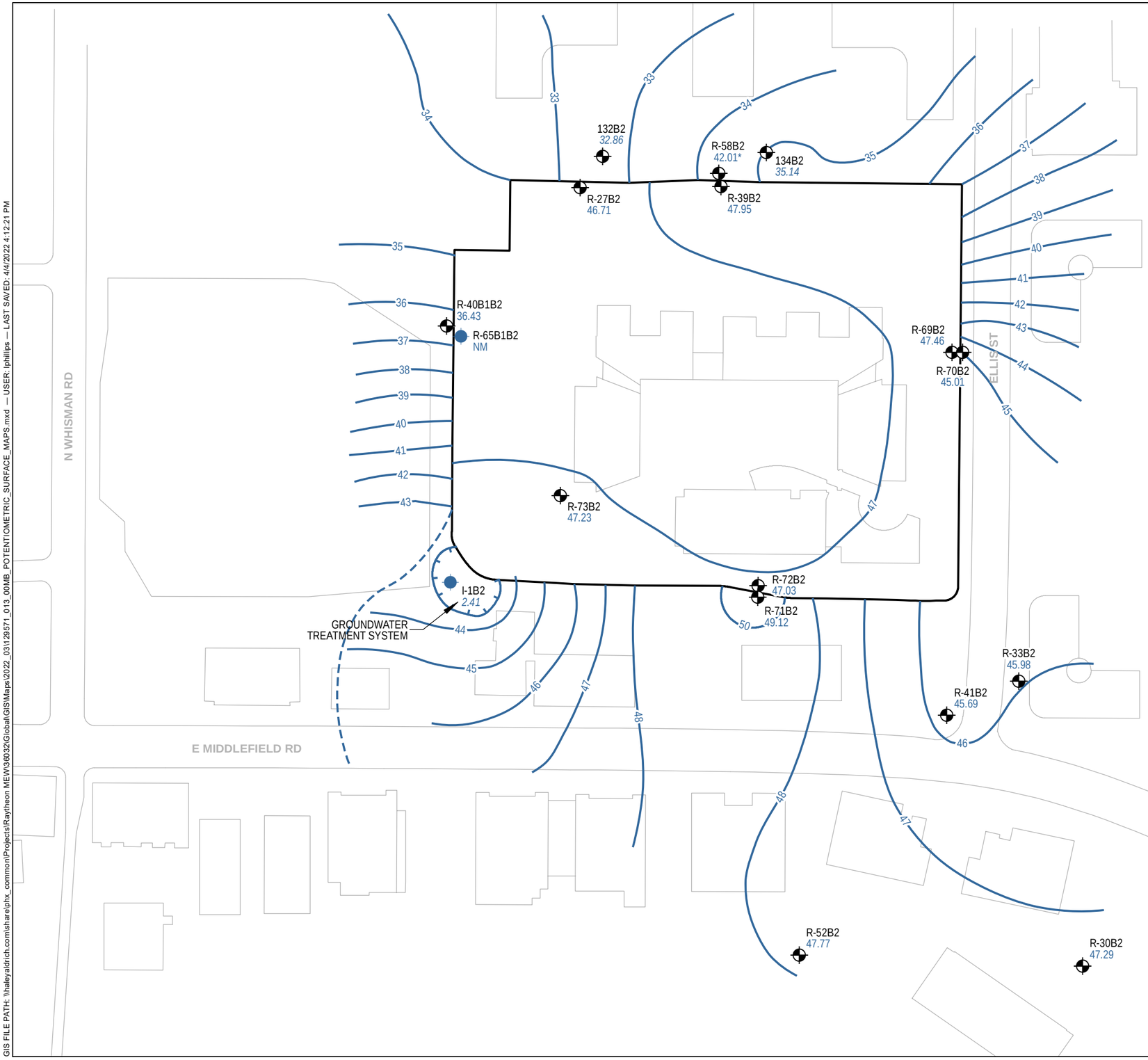
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

POTENTIOMETRIC SURFACE MAP,
B1 ZONE, 16 SEPTEMBER 2021

APRIL 2022

FIGURE 4

GIS FILE PATH: \\haleyaldrich.com\share\phx_common\Projects\Raytheon MEW\36032\Global\GIS\Maps\2022_03\129571_013_00MB_POTENTIOMETRIC_SURFACE_MAPS.mxd — USER: lphillips — LAST SAVED: 4/4/2022 4:12:21 PM



LEGEND

- GROUNDWATER EXTRACTION WELL
- GROUNDWATER MONITORING WELL
- RAY-1B2 ESTIMATED CAPTURE ZONE
- GROUNDWATER CONTOUR, ELEVATION IN FT ABOVE MEAN SEA LEVEL, 1-FT INTERVAL
- GROUNDWATER DEPRESSION
- SLURRY WALL

NOTES

1. GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.
2. * INDICATES THAT THE ELEVATION WAS NOT USED IN GENERATING GROUNDWATER CONTOURS.
3. *ITALICIZED VALUES* INDICATE GROUNDWATER ELEVATIONS PROVIDED BY GEOSYNTEC CONSULTANTS (GEOSYNTEC, 2022).
4. POTENTIOMETRIC CONTOURS WERE PROVIDED BY GEOSYNTEC AND REVIEWED BY HALEY & ALDRICH.
5. NM = NOT MEASURED

N

0 200 400
SCALE IN FEET

HALEY ALDRICH

350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

POTENTIOMETRIC SURFACE MAP, UPPER B2 ZONE, 16 SEPTEMBER 2021

APRIL 2022

FIGURE 5

GIS FILE PATH: \\haleyaldrich.com\share\phx_common\Projects\Raytheon MEW\36032\Global\GIS\Maps\2022_03\129571_013_00MB_POTENTIOMETRIC_SURFACE_MAPS.mxd — USER: lphillips — LAST SAVED: 4/4/2022 4:12:21 PM

N WHISMAN RD

ELLIS ST

E MIDDLEFIELD RD

R-05B2
48.85*

R-59B2
49.93*

RE-1B2
47.96

R-68B2
54.51*

I-1B2
2.41

R-17B2
41.98

GROUNDWATER
TREATMENT SYSTEM

R-62B2
50.90

R-28B2
50.99

R-53B2
56.57

47
48
49
50
51
52
53
54
55
56

LEGEND

- GROUNDWATER EXTRACTION WELL
- GROUNDWATER MONITORING WELL
- GROUNDWATER CONTOUR, ELEVATION IN FT ABOVE MEAN SEA LEVEL, 1-FT INTERVAL
- GROUNDWATER DEPRESSION

NOTES

1. GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.

2. * INDICATES THAT THE ELEVATION WAS NOT USED IN GENERATING GROUNDWATER CONTOURS.

N

0 200 400
SCALE IN FEET

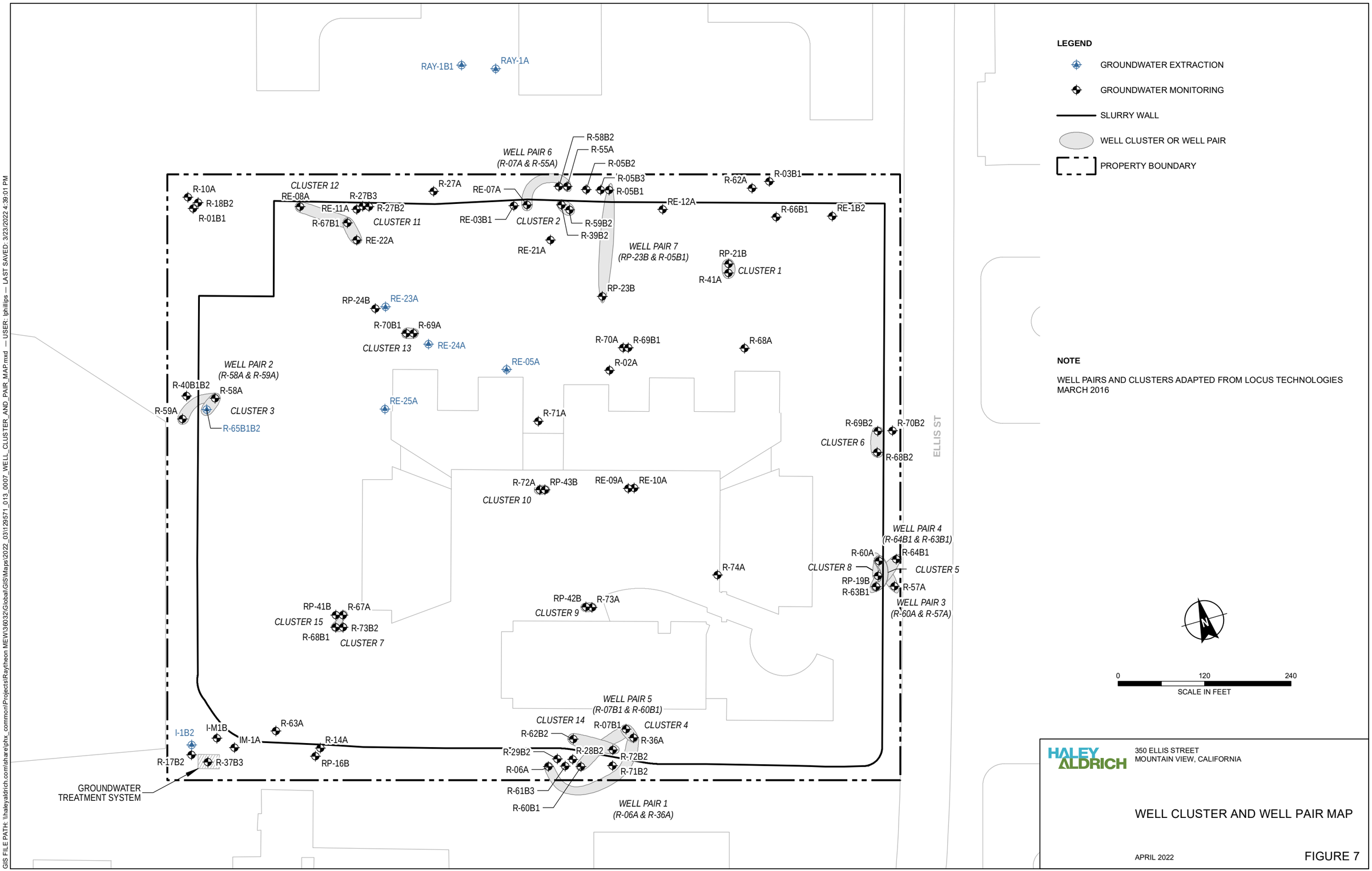
HALEY ALDRICH

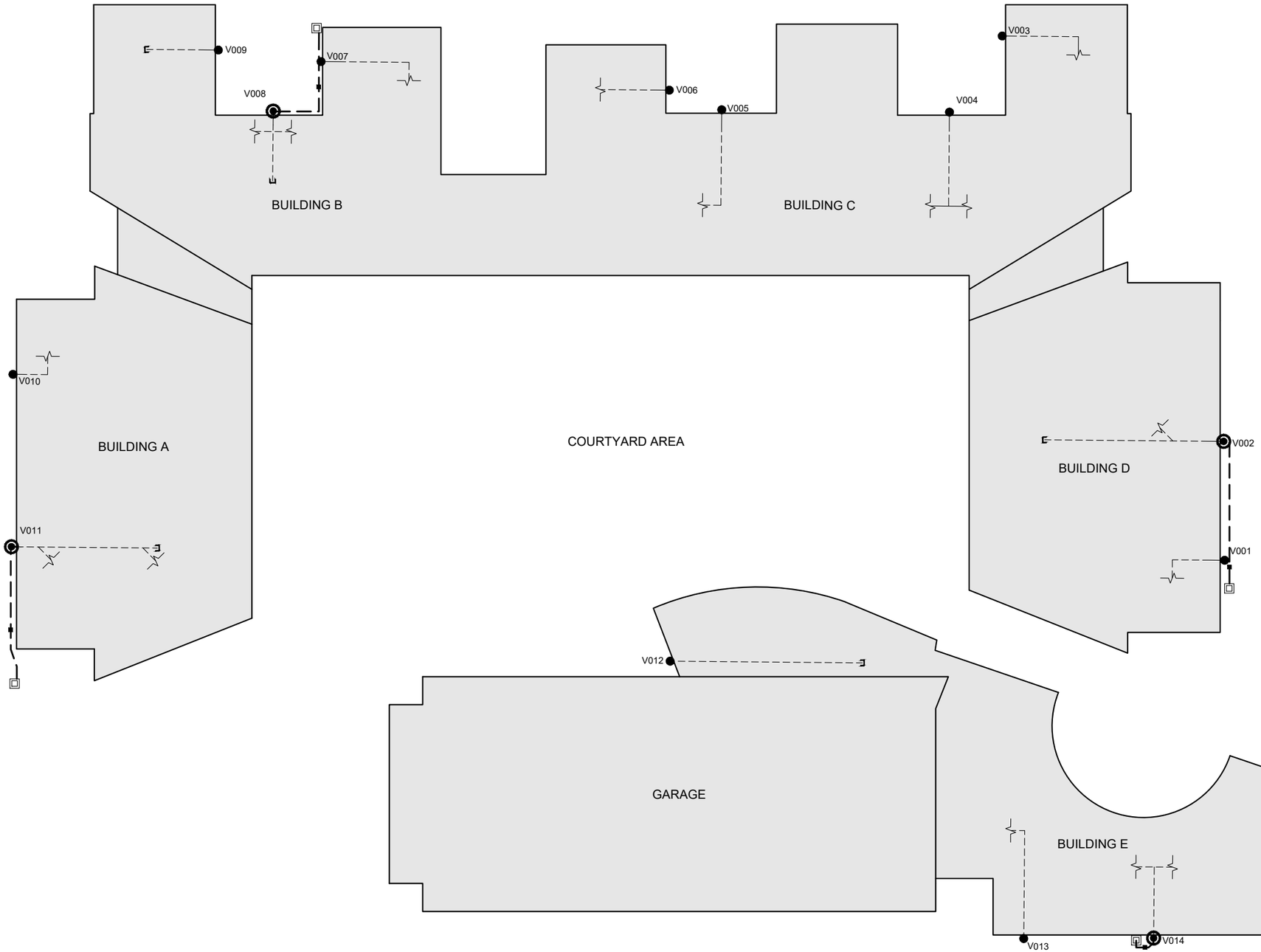
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

POTENTIOMETRIC SURFACE MAP, LOWER B2 ZONE, 16 SEPTEMBER 2021

APRIL 2022

FIGURE 6


LEGEND
GROUNDWATER EXTRACTION
GROUNDWATER MONITORING
SLURRY WALL
WELL CLUSTER OR WELL PAIR
PROPERTY BOUNDARY
NOTE
WELL PAIRS AND CLUSTERS ADAPTED FROM LOCUS TECHNOLOGIES MARCH 2016
RAY-1B1
RAY-1A
WELL PAIR 6 (R-07A & R-55A)
R-58B2
R-55A
R-05B2
R-05B3
R-05B1
R-10A
R-18B2
R-01B1
CLUSTER 12
RE-08A
R-27B3
RE-11A
R-27B2
R-67B1
CLUSTER 11
RE-22A
R-27A
RE-07A
RE-03B1
CLUSTER 2
R-59B2
R-39B2
RE-21A
RE-12A
R-62A
R-03B1
R-66B1
RE-1B2
WELL PAIR 7 (RP-23B & R-05B1)
RP-21B
CLUSTER 1
R-41A
RP-23B
RP-24B
RE-23A
R-70B1
R-69A
CLUSTER 13
RE-24A
R-70A
R-69B1
R-68A
R-02A
RE-05A
WELL PAIR 2 (R-58A & R-59A)
R-40B1B2
R-58A
R-59A
CLUSTER 3
R-65B1B2
RE-25A
R-71A
R-69B2
R-70B2
CLUSTER 6
R-68B2
ELLIS ST
R-72A
RP-43B
RE-09A
RE-10A
CLUSTER 10
WELL PAIR 4 (R-64B1 & R-63B1)
R-60A
R-64B1
CLUSTER 8
CLUSTER 5
RP-19B
R-63B1
R-57A
WELL PAIR 3 (R-60A & R-57A)
R-74A
RP-42B
R-73A
CLUSTER 9
RP-41B
R-67A
CLUSTER 15
R-73B2
R-68B1
CLUSTER 7
WELL PAIR 5 (R-07B1 & R-60B1)
CLUSTER 14
R-07B1
CLUSTER 4
R-62B2
R-36A
R-29B2
R-28B2
R-72B2
R-06A
R-71B2
R-61B3
R-60B1
WELL PAIR 1 (R-06A & R-36A)
I-1B2
I-M1B
IM-1A
R-63A
R-14A
R-17B2
R-37B3
RP-16B
GROUNDWATER TREATMENT SYSTEM
0
120
240
SCALE IN FEET
N
HALEY ALDRICH
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA
WELL CLUSTER AND WELL PAIR MAP
APRIL 2022
FIGURE 7
GIS FILE PATH: \\haleyaldrich.com\share\phx_common\Projects\Raytheon MEW\36032\Global\GIS\Maps\2022_0311\29571_013_0007_WELL_CLUSTER_AND_PAIR_MAP.mxd — USER: lphillips — LAST SAVED: 3/23/2022 4:39:01 PM



LEGEND

- BUILDING
- SUB-SLAB 3" Ø PVC PIPING
- SUB-SLAB 3" Ø SLOTTED PVC PIPING
- CONVEYANCE PIPE TRENCH
- END CAP
- DENOTES UNKNOWN TERMINATION POINT
- V003 PRESSURE MONITORING POINT
- V014 EXTRACTION POINT
- EQUIPMENT ENCLOSURE
- DRAINAGE VAULT

NOTES

1. THIS BASE PLAN WAS PREPARED BY DIGITIZING EXPLORATION LOCATIONS FROM A PLAN OF THE SITE, ENTITLED BASE MAP (350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA) BY LOCUS TECHNOLOGIES. AS SUCH, ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. LOCATIONS OF SUB-SLAB PIPES ARE BASED ON VIDEO SURVEYS CONDUCTED 6 NOVEMBER 2012 AND 25 MARCH 2013.

N

0 60 120

SCALE IN FEET

HALEY ALDRICH

350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

SUB-SLAB DEPRESSURIZATION SYSTEM

SCALE: AS SHOWN
APRIL 2022

FIGURE 8

APPENDIX A

2021 Annual Report Remedy Performance Checklist

2021 Annual Report Remedy Performance Checklist

I. GENERAL SITE INFORMATION

Facility Name: *Raytheon Mountain View*

Facility Address, City, State: 350 Ellis Street, Mountain View, California

Checklist completion date: 3 March 2022 | EPA Site ID: CAD09205097

Site Lead: ☐ Fund ☐ PRP ☐ State ☐ State Enforcement ☐ Federal Facility
■ Other, specify: U.S. EPA, Region IX

Site Remedy Components (Include Other Reference Documents for More Information, as appropriate):

Groundwater pump-and-treat system;
Groundwater containment;
Vertical barrier walls (slurry wall is 100 feet deep and extends into the B2 Zone)
Vapor Barrier and sub-slab depressurization system

II. CONTACTS

List important personnel associated with the Site: Name, title, phone number, e-mail address:

PRP / Facility Representatives:
Robert (Bob) Luhrs, Raytheon Company
Senior Environmental Manager
(978) 858-9423
Robert_C_Luhrs@raytheon.com

PRP Contractor/ Consultant:
Elie Haddad, Haley & Aldrich
Principal Consultant
(408) 961-4806
ehaddad@haleyaldrich.com

III. O&M COSTS (OPTIONAL) - CONFIDENTIAL

Total O&M costs include (1) report preparation for agencies (RWQCB, EPA), (2) sampling, analysis, data review (groundwater level monitoring, water quality sampling), (3) groundwater treatment system O&M (routine tasks for operations and maintenance of the treatment system), (4) SSD system O&M, and (5) utilities & fees.

What is your annual O&M cost total for the reporting year?
Breakout your annual O&M cost total into the following categories (use either dollars or %):

- Analytical (e.g., lab costs): _____
- Labor (e.g., site maintenance, sampling): _____
- Materials (e.g., treatment chemicals): _____
- Oversight (e.g., project management): _____
- Utilities (e.g., electric, gas, phone, water): _____
- Reporting (e.g., NPDES, progress): _____

Other (e.g., capital improvements):

Describe unanticipated/unusually high or low O&M costs (go to section [fill in] to recommend optimization methods):

2021 Annual Report Remedy Performance Checklist

IV. ON-SITE DOCUMENTS AND RECORDS (Check all that apply)

■ O&M Manual ☐ O&M Maintenance Logs ■ O&M As-built drawings – *Part of O&M Manual*
☐ O&M reports
☐ Daily access/Security logs
■ Site-Specific Health & Safety Plan ■ Contingency/Emergency Response Plan
■ O&M/OSHA Training Records ☐ Settlement Monument Records
☐ Gas Generation Records ■ Groundwater monitoring records ☐ Leachate extraction records
■ Discharge Compliance Records
■ Air discharge permit ■ Effluent discharge permit ☐ Waste disposal, POTW permit

Are these documents currently readily available? ■ Yes ☐ No If no, where are records kept?

O&M Manual, Site Health & Safety Plan, discharge records and permits are kept on Site; training records are available at Field Solutions, Inc.'s office in San Jose; groundwater monitoring records, O&M reports and maintenance logs are available at Haley & Aldrich, Inc.'s office in San Jose; and groundwater monitoring records are available at both Field Solutions, Inc.'s office and Haley & Aldrich, Inc.'s office.

V. INSTITUTIONAL CONTROLS (as applicable)

List institutional controls called for (and from what enforcement document):

Governmental controls (zoning, local permits, state codes);
Environmental agreements with property owner (proprietary controls);
Informational devices (fact sheets, public meetings)

Consent Degree, Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View, California 9 May 1991.
Record of Decision, Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View, California, 9 June 1989.
Record of Decision Amendment for Vapor Intrusion Pathway, Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View and Moffett Field, California, 16 August 2010.
Interim Final Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites, OSWER 9355.0-89 EPA-540-R-09-001, November 2010.

Status of their implementation:

Where are the ICs documented and/or reported?

City of Mountain View, Santa Clara Country Recorder, Environmental Protection Agency, Raytheon implements the requirements of the Consent Decree, including those of the vapor intrusion work, under a signed access agreement with the property owner.

ICs are being properly implemented and enforced? ■ Yes ☐ No, elaborate below
ICs are adequate for site protection? ■ Yes ☐ No, elaborate below

Additional remarks regarding ICs:

VI. SIGNIFICANT SITE EVENTS
Check all Significant Site events Since the Last Checklist that Affects or May Affect Remedy Performance

☐ Community Issues
☐ Vandalism
☐ Maintenance Issues:

☐ Other

Please elaborate on Significant Site Events:

2021 Annual Report Remedy Performance Checklist

VII. REDEVELOPMENT

Is redevelopment on property planned? ☐ Yes ■ No

If yes, what is planned? Please describe below.

Is redevelopment plan complete ☐ Yes, date: _____; ☐ No ? ■ Not Applicable

Redevelopment proposal in progress? ☐ Yes, elaborate below
■ No; If no, is a proposal anticipated? ☐ Yes ■ No

☐ Is the redevelopment proposal compatible with remedy performance? ☐ Yes ☐ No

Elaborate on redevelopment proposal and how it affects remedy performance:

VIII. GROUNDWATER REMEDY (reference isoconcentration, capture zone maps, trend analysis, and other documentation to support analysis)

Groundwater Quality Data

List the types of data that are available:	What is the source report?
Biennial Site-specific monitoring well data	2020 Annual Report (dated 15 April 2021)
Five-Year Site-specific monitoring well data	2020 Annual Report (dated 15 April 2021)
TCE isoconcentration maps	2020 Annual Report (dated 15 April 2021)
PCE isoconcentration maps	2020 Annual Report (dated 15 April 2021)
cis-1,2-DCE isoconcentration maps	2020 Annual Report (dated 15 April 2021)
Vinyl chloride isoconcentration maps	2020 Annual Report (dated 15 April 2021)

■ Contaminant trend(s) tracked during O&M (i.e., temporal analysis of groundwater contaminant trends).
☐ Groundwater data tracked with software for temporal analyses.
☐ Reviewed MNA parameters to ensure health of substrate (e.g., DO, pH, temperature), if appropriate?

Groundwater Pump & Treat Extraction Well and Treatment System Data

List the types of data that are available:	What is the source report?
Monthly groundwater treatment system data, influent and effluent	Annual Report Tables 1 and 2; Semi-annual
Average extraction well flow rates	NPDES report Table 2; Annual NPDES Report Table 1 .

■ The system is functioning adequately.
☐ The system has been shut down for significant periods of time in the past year. Please elaborate below.

Discharge Data

List the types of data that are available:	What is the source report?
Monthly data on treatment system effluent	NPDES report Tables 1 or 2; Annual Report, Table 2

■ The system is in compliance with discharge permits.

Slurry Wall Data

List the types of data that are available:	What is the source report?
Semi-annual water level monitoring data from monitoring well pairs	Annual Report, Tables 5 and 6
Capture zone maps	Annual Report, Figures 3, 4, 5, and 6

Is slurry wall operating as designed? ■ Yes ☐ No

If not, what is being done to correct the situation?

2021 Annual Report Remedy Performance Checklist

Elaborate on technical data and/or other comments

In 2021, horizontal gradients across two sides of the slurry wall were inward, and horizontal gradients across the northern and eastern slurry walls were outward. However, these gradients do not have a significant impact on remediation because: 1) Raytheon installed two recovery wells in the "A" and "B1" aquifers immediately downgradient of the slurry wall that provides an adequate capture of the area immediately downgradient of the slurry wall, and 2) the slurry wall is a low-permeability wall that allows only minimal chemical migration across its walls even if the gradient is outward. That, combined with the fact that chemicals tend to take the easier pathway and migrate towards recovery wells within the wall enclosure, rather than across the low-permeability wall, would minimize outward chemical migration. Therefore, the slurry wall and the pumping activities within its enclosure physically contain chemicals. If a small flux of chemicals migrates through the slurry wall, it is captured immediately downgradient of the wall.

IX. AIR MONITORING/VAPOR INTRUSION PATHWAY EVALUATION (Include in Annual Progress Report and reference document)

Walkthroughs/Surveys: Quarterly inspections were conducted for the air purification units in Utility Rooms A1034, A1015, B1038, C110, and D106. In 2021, the active sub-slab depressurization (SSD) system beneath Buildings A, B, C, D, and E, was monitored quarterly in accordance with the "Property-specific Vapor Intrusion Response Action Implementation Report, Former Raytheon Facilities, 350 Ellis Street, Mountain View, California," submitted to EPA on 10 March 2016.

Air testing/monitoring conducted: Indoor Air sampling was completed in 2019.

Summary of Results: Tables 12 and 13 of the Annual Report present SSD system operational data and emissions monitoring results, respectively. The 2019 Annual Report presents historical indoor air sampling results.

Problems Encountered: None.

Recommendations/Next Steps: Continue operating the SSD system as described in the "Property-specific Long-Term Vapor Intrusion Operations, Maintenance, and Monitoring (OM&M) Plan" (Haley & Aldrich, 21 July 2015).

Schedule: Ongoing.

X. REMEDY PERFORMANCE ASSESSMENT

A. Groundwater Remedies

What are the remedial goals for groundwater? ■ Plume containment (prevent plume migration); ■ Plume restoration (attain ROD-specific cleanup levels in aquifer); ☐ Other goals, please explain:_____

Have you done a trend analysis? ■ Yes ☐ No; If Yes, what does it show?

Appendix B of the Annual Report provides a comparison of the average TCE concentration for each aquifer at different time periods. The concentrations have decreased significantly.

(Is it inconclusive due to inadequate data? Are the concentrations increasing or decreasing?) Explain and provide source document reference _____

2021 Annual Report Remedy Performance Checklist

If plume containment is a remedial goal, check all that apply:
■ Plume migration is under control (explain basis below)
☐ Plume migration is not under control (explain basis below)
☐ Insufficient data to determine plume stability (explain below)
(Include attachments that substantiate your answers, e.g., reference plume, trend analysis, and capture zone maps in source document)

Elaborate on basis for determining that plume containment goal is being met or not being met:

The plume is not expanding, and capture is adequate.

If plume restoration is a cleanup objective, check all that apply:
■ Progress is being made toward reaching cleanup levels (explain basis below)
☐ Progress is not being made toward reaching cleanup levels (explain basis below)
☐ Insufficient data to determine progress toward restoration goal (explain below)

Elaborate on basis for determining progress or lack of progress toward restoration goal:

As explained above, concentrations have decreased significantly since remedial measures begun.

B. Vertical Migration

Have you done an assessment of vertical gradients? ■ Yes ☐ No; If Yes, what does it show? (Is it inconclusive due to inadequate data? Are the concentrations increasing or decreasing? Explain and provide source document reference.)

In 2021, upward gradients were consistently observed in five of the eleven well pairs used to monitor the direction of the vertical hydraulic gradient across of the A/B1 Aquitard. Slight downward gradients were observed in six well pairs during at least half of the year. The gradient direction across the B1/B2 Aquitard and Upper and Lower B2 Zones was consistently upward throughout 2020, demonstrating proper vertical hydraulic gradients near the bottom of the slurry wall enclosure.

C. Source Control Remedies

What are the remedial goals for source control?

The remedial goals are to capture former source areas in the upper groundwater zones.

Elaborate on basis for determining progress or lack of progress toward these goals:

Capture zone analysis in the 2021 Annual Progress Report indicate containment of target capture areas.

XI. PROJECTIONS

Administrative Issues

None.

2021 Annual Report Remedy Performance Checklist

A. Groundwater Remedies - Projections for the upcoming year and long-term (Check all that apply)

Remedy Projections for **the upcoming year (2022)**

■ No significant changes projected.
☐ Groundwater remedy will be converted to monitored natural attenuation. Target date:
☐ Groundwater Pump & Treat will be shut down. Target date:
☐ Groundwater cleanup standards to be modified. Target date:
☐ PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in the number and/or types of analytes being analyzed. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in groundwater extraction system. Expansion or minimization (i.e., number of extraction wells and/or pumping rate)? Target date:
☐ Modification on groundwater treatment? Elaborate below. Target date:
☐ Change in discharge location. Target date:
☐ Other modification(s) anticipated: _____ Elaborate below. Target date:

Elaborate on Remedy Projections:

Remedy Projections for **the long-term** (Check all that apply)

■ No significant changes projected.
☐ Groundwater remedy will be converted to monitored natural attenuation. Target date:
☐ Groundwater Pump & Treat will be shut down. Target date:
☐ Groundwater cleanup standards to be modified. Target date:
☐ PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in the number and/or types of analytes being analyzed. ☐ Increasing or ☐ decreasing? Target date:
☐ Change in groundwater extraction system. Expansion or minimization (i.e., number of extraction wells and/or pumping rate)? Target date:
☐ Modification on groundwater treatment? Elaborate below. Target date:
☐ Change in discharge location. Target date:
☐ Other modification(s) anticipated: _____ Elaborate below. Target date:

Elaborate on Remedy Projections:

B. Projections – Slurry Walls (Check all that apply)

Remedy Projections for **the upcoming year**

■ No significant changes projected.
☐ PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐ Other modification(s) anticipated: _____ Elaborate below. Target date:

Elaborate on Remedy Projections:

Remedy Projections for **the long-term**

■ No significant changes projected.
☐ PRP will request remedy modification. Target date of request:
☐ Change in the number of monitoring wells. ☐ Increasing or ☐ decreasing? Target date:
☐ Other modification(s) anticipated: _____ Elaborate below. Target date:

Elaborate on Remedy Projections:

2021 Annual Report Remedy Performance Checklist

C. Projections – Other Remedial Options Being Reviewed to Enhance Cleanup

Progress implementing recommendations from last report or Five-Year Review
Has optimization study been implemented or scheduled? ■ Yes; ☐ No; If Yes, please elaborate.

A work plan for additional subsurface characterization was submitted to and approved by EPA in 2013. The investigation was completed in 2013 and a report summarizing the results was submitted to EPA in April 2014. The investigation will be used to finalize a plan for optimizing the existing treatment system, but the optimization has been delayed pending property use by the owner.

XII. ADMINISTRATIVE ISSUES
Check all that apply:

☐ Explanation of Significant Differences in progress ☐ ROD Amendment in progress
☐ Site in operational and functional ("shake down") period;
☐ Notice of Intent to Delete in progress ☐ Partial site deletion in progress ☐ TI Waivers
■ Other administrative issues:

Date of Next EPA Five-Year Review: September 2025

XII. RECOMMENDATIONS

No additional recommendations at this time.

APPENDIX B

Cumulative Groundwater VOC Removal Data Since 1986

APPENDIX B

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
1986	10/17/1986	12.37	2,473,490	0	0
	10/27/1986	6.15	2,473,490	41.73	42
	10/28/1986	4.59	2,473,490	3.11	45
	10/29/1986	5.10	2,473,490	3.46	48
	11/5/1986	5.05	3,452,400	33.46	82
	11/12/1986	5.39	3,452,400	35.74	118
	12/1/1986	5.00	2,787,540	72.64	190
	12/29/1986	9.51	2,787,540	203.52	394
	12/31/1986	6.36	2,787,540	9.72	403
1987	1/19/1987	6.52	1,930,153	65.58	469
	1/28/1987	7.16	1,930,153	34.09	503
	2/23/1987	21.70	1,206,884	186.70	690
	3/2/1987	13.24	3,775,862	95.95	786
	3/13/1987	9.49	3,775,862	108.07	894
	4/9/1987	9.25	3,078,120	210.78	1105
	4/22/1987	8.56	3,078,120	93.92	1198
	5/8/1987	4.88	1,837,494	39.34	1238
	5/28/1987	4.02	1,837,494	40.51	1278
	6/3/1987	4.19	2,527,500	17.42	1296
	6/8/1987	4.71	2,527,500	16.32	1312
	6/17/1987	5.42	2,527,500	33.80	1346
	6/25/1987	5.69	2,527,500	31.55	1377
	7/13/1987	4.16	3,866,196	79.38	1457
	7/31/1987	5.12	3,866,196	97.69	1554
	8/13/1987	3.86	3,740,305	51.46	1606
	8/27/1987	4.95	3,740,305	71.07	1677
1988	5/20/1988	4.10	217,000	65.13	1742
	6/7/1988	2.90	210,000	3.01	1745
	6/28/1988	2.80	210,000	3.39	1749
	10/3/1988	3.33	442,835	39.22	1788
	12/22/1988	2.80	442,835	27.20	1815
1989	3/28/1989	2.40	378,200	23.89	1839
	6/20/1989	2.80	474,000	30.57	1869
	9/21/1989	2.90	447,000	33.05	1902
	12/15/1989	2.00	461,900	21.53	1924

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
1990	3/30/1990	1.90	162,967	8.91	1933
	6/29/1990	1.80	438,000	19.67	1953
	9/28/1990	2.80	213,720	14.93	1967
	12/7/1990	1.05	1,116,000	22.49	1990
1991	3/28/1991	0.80	1,054,000	25.73	2016
	6/18/1991	0.66	733,740	10.89	2027
	9/16/1991	0.95	673,560	15.71	2042
	12/19/1991	0.63	737,862	11.98	2054
1992	3/26/1992	0.36	794,437	7.77	2062
	6/26/1992	0.48	747,060	8.97	2071
	9/24/1992	4.24	706,860	73.96	2145
	12/8/1992	8.39	846,920	146.07	2291
1993	2/18/1993	5.93	1,011,164	118.37	2409
	3/11/1993	5.64	1,358,947	44.13	2454
	4/14/1993	4.66	1,460,100	63.43	2517
	5/25/1993	4.55	1,154,874	59.07	2576
	6/23/1993	5.24	1,353,270	56.38	2632
	7/22/1993	5.55	1,215,572	53.64	2686
	8/24/1993	6.04	1,085,279	59.31	2745
	9/23/1993	5.69	879,840	41.18	2787
	10/28/1993	6.00	877,021	50.50	2837
	11/24/1993	6.78	772,680	38.78	2876
	12/26/1993	7.48	822,988	54.01	2930
1994	1/13/1994	7.61	1,020,985	38.35	2968
	2/4/1994	7.47	804,160	36.23	3004
	3/4/1994	6.82	1,099,353	57.56	3062
	4/14/1994	7.19	1,035,300	83.68	3146
	5/12/1994	7.10	942,555	51.38	3197
	6/9/1994	7.11	911,880	49.77	3247
	7/14/1994	7.08	956,877	65.01	3312
	8/11/1994	5.28	1,098,640	44.53	3356
	9/15/1994	5.59	779,940	41.84	3398
	10/12/1994	5.33	877,393	34.62	3433
	11/10/1994	3.89	706,080	21.84	3455
	12/15/1994	6.10	791,926	46.36	3501

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
1995	1/6/1995	5.35	809,007	26.11	3527
	2/9/1995	4.55	975,912	41.39	3569
	3/9/1995	5.16	1,080,226	42.79	3611
	4/6/1995	5.13	967,170	38.09	3649
	5/15/1995	4.39	997,425	46.82	3696
	6/15/1995	5.04	966,390	41.40	3738
	7/13/1995	4.79	1,130,350	41.57	3779
	8/10/1995	5.54	906,720	38.56	3818
	9/18/1995	5.08	886,970	48.18	3866
	10/12/1995	5.58	830,380	30.49	3896
	11/9/1995	4.98	796,640	30.46	3927
	12/4/1995	6.23	826,780	35.31	3962
1996	1/31/1996	4.72	626,360	47.01	4009
	2/29/1996	5.65	705,320	31.69	4041
	3/31/1996	5.33	721,450	32.68	4074
	4/30/1996	5.56	827,560	37.85	4111
	5/23/1996	6.49	856,930	35.07	4147
	6/14/1996	4.88	1,299,060	38.24	4185
	7/11/1996	3.98	1,577,150	46.47	4231
	8/8/1996	4.43	1,068,297	36.33	4268
	9/27/1996	8.94	1,739,434	213.18	4481
	10/17/1996	6.01	2,309,683	76.12	4557
	11/17/1996	4.92	1,976,504	82.65	4640
	12/17/1996	4.33	1,704,181	60.70	4700
1997	1/24/1997	4.64	1,874,988	236.15	4793
	2/13/1997	4.53	2,001,712	49.72	4843
	3/18/1997	4.76	2,428,607	104.60	4947
	4/16/1997	4.16	2,136,780	70.68	5018
	5/14/1997	4.57	2,280,782	80.02	5098
	6/19/1997	4.79	2,065,358	97.65	5196
	7/16/1997	5.21	2,294,318	88.49	5284
	8/20/1997	3.15	2,117,259	64.00	5348
	9/8/1997	7.11	2,382,011	88.23	5436
	10/2/1997	5.41	2,583,099	91.96	5528
	11/12/1997	4.91	2,059,288	113.66	5642
	12/11/1997	5.43	2,335,012	100.82	5743

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
1998	1/16/1998	4.34	2,320,835	99.42	5842
	2/25/1998	4.54	2,322,241	115.63	5958
	3/25/1998	4.38	2,322,667	78.10	6036
	4/10/1998	5.92	2,125,955	55.21	6091
	5/11/1998	6.66	2,181,943	123.51	6215
	6/8/1998	5.95	2,192,143	100.13	6315
	7/9/1998	2.96	2,187,687	55.04	6370
	8/4/1998	5.65	1,909,016	76.89	6447
	9/10/1998	6.31	1,837,103	117.60	6564
	10/30/1998	5.09	2,168,118	151.29	6716
	11/3/1998	5.23	2,050,814	11.76	6727
	12/3/1998	6.37	2,036,071	106.68	6834
1999	1/6/1999	9.38	2,371,413	207.36	7041
	2/1/1999	8.70	1,425,421	88.40	7130
	3/3/1999	6.00	1,657,431	81.80	7212
	4/6/1999	9.90	2,160,686	199.41	7411
	5/4/1999	6.34	2,113,299	102.86	7514
	6/9/1999	4.37	2,268,609	97.85	7612
	7/6/1999	6.00	1,961,659	87.13	7699
	8/3/1999	6.00	1,934,139	89.09	7788
	9/9/1999	6.00	2,474,267	150.60	7939
	10/4/1999	6.00	1,813,012	74.56	8013
	11/2/1999	6.00	1,845,816	88.06	8101
	12/6/1999	6.00	2,262,708	126.56	8228
2000	1/1/2000	6.00	1,539,993	65.87	8294
	3/3/2000	1.26	1,095,810	23.42	8317
	3/8/2000	1.61	1,095,810	2.42	8320
	3/22/2000	2.56	1,095,810	10.77	8330
	3/28/2000	0.84	1,095,810	1.51	8332
	5/9/2000	1.56	1,726,160	30.93	8363
	6/5/2000	1.02	838,365	6.35	8369
	6/21/2000	1.80	838,365	6.61	8376
	8/1/2000	1.52	838,365	14.31	8390
	9/5/2000	2.82	1,619,800	43.77	8434
	10/10/2000	1.35	1,947,460	25.23	8459
	11/6/2000	8.69	1,574,200	101.24	8560
	12/1/2000	10.00	1,411,950	96.80	8657

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
2001	1/1/2001	3.80	1,080,750	34.31	8691
	2/1/2001	9.46	970,100	76.60	8768
	3/1/2001	8.01	1,182,000	79.04	8847
	4/1/2001	14.28	1,504,700	179.32	9026
	5/1/2001	9.90	937,150	77.43	9104
	6/1/2001	6.14	913,450	46.81	9151
	7/1/2001	6.80	575,185	32.64	9183
	8/1/2001	10.40	1,142,485	99.16	9282
	9/1/2001	10.00	1,107,530	92.43	9375
	10/1/2001	7.49	1,755,400	109.72	9484
	11/1/2001	7.35	1,453,700	89.17	9574
	12/1/2001	7.39	1,452,270	89.57	9663
2002	1/1/2002	7.48	1,706,930	106.55	9770
	2/1/2002	7.88	943,350	62.04	9832
	3/1/2002	5.95	1,039,650	51.58	9883
	4/1/2002	8.10	1,030,550	69.64	9953
	5/1/2002	7.86	1,395,950	91.57	10045
	6/1/2002	8.66	1,530,800	110.68	10155
	7/1/2002	9.55	957,600	76.32	10232
	8/1/2002	5.29	1,216,500	53.71	10285
	9/1/2002	6.21	1,310,900	67.94	10353
	10/1/2002	5.75	1,157,100	55.52	10409
	11/1/2002	8.05	1,086,575	73.00	10482
	12/1/2002	10.92	1,128,975	102.89	10585
2003	1/1/2003	9.99	1,355,675	113.03	10698
	2/1/2003	11.67	1,288,075	125.48	10823
	3/1/2003	11.07	1,434,490	132.55	10956
	4/1/2003	11.62	1,123,510	108.91	11065
	5/1/2003	8.48	663,730	46.95	11112
	6/1/2003	11.66	1,100,130	107.06	11219
	7/1/2003	10.78	993,850	89.41	11308
	8/1/2003	10.65	782,000	69.50	11378
	9/1/2003	4.14	1,208,490	41.75	11419
	10/1/2003	5.04	817,220	34.37	11454
	11/1/2003		0	-	11497
	12/1/2003	7.92	514,730	34.00	11531

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
2004	1/19/2004	7.17	896,910	53.67	11585
	2/24/2004	7.69	897,850	57.62	11642
	3/15/2004	7.52	922,240	57.88	11700
	4/26/2004	6.57	1,209,520	66.32	11766
	5/17/2004	7.02	1,024,285	60.01	11826
	6/21/2004	5.91	816,920	40.32	11867
	7/19/2004	3.35	586,065	16.40	11883
	8/17/2004	6.60	1,387,020	76.43	11960
	9/21/2004	6.24	1,751,543	91.15	12051
	10/19/2004	5.89	1,662,937	81.70	12133
	11/15/2004	4.10	1,343,380	46.01	12179
	12/20/2004	3.86	1,810,315	58.24	12237
2005	1/19/2005	5.13	1,131,215	43.96	12281
	2/23/2005	4.29	1,283,835	52.75	12333
	3/21/2005	4.99	1,593,115	60.55	12394
	4/18/2005	4.95	1,672,165	69.33	12463
	5/16/2005	4.66	1,721,575	68.65	12532
	6/20/2005	4.78	1,540,810	60.53	12593
	7/18/2005	4.53	1,480,250	57.84	12650
	8/15/2005	4.43	1,801,230	67.17	12718
	9/19/2005	4.21	1,444,838	52.27	12770
	10/19/2005	4.72	1,463,479	53.23	12823
	11/21/2005	4.19	1,603,611	60.49	12884
	12/20/2005	3.81	1,377,038	46.41	12930
2006	1/16/2006	3.44	1,523,394	45.77	12976
	2/7/2006	3.76	1,348,990	41.69	13017
	3/15/2006	3.49	1,074,920	32.57	13050
	4/18/2006	3.22	1,328,115	37.74	13088
	5/16/2006	5.55	1,775,355	65.85	13154
	6/27/2006	5.44	1,445,663	66.78	13220
	7/20/2006	5.35	1,806,782	66.97	13287
	8/23/2006	4.70	1,262,105	68.57	13356
	9/22/2006	5.67	1,163,583	47.35	13403
	10/19/2006	5.63	1,815,987	85.61	13489
	11/15/2006	5.82	1,617,622	77.39	13566
	12/18/2006	5.33	1,649,200	77.35	13644

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
2007	1/15/2007	4.34	1,460,498	71.85	13715
	2/21/2007	4.11	1,494,310	67.55	13783
	3/20/2007	4.11	1,650,136	69.36	13852
	4/19/2007	4.44	1,427,088	71.49	13924
	5/21/2007	4.33	1,496,597	54.85	13979
	6/21/2007	4.35	1,036,802	37.46	14016
	7/18/2007	4.04	1,166,521	41.23	14057
	8/16/2007	3.38	1,658,509	52.08	14109
	9/17/2007	4.37	1,105,795	34.99	14144
	10/15/2007	4.11	1,554,429	54.95	14199
	11/21/2007	3.99	524,276	17.95	14217
	12/26/2007	3.92	145,473	4.84	14222
2008	1/21/2008	5.04	1,095,626	40.15	14262
	2/18/2008	4.06	991,811	39.71	14302
	3/17/2008	4.42	1,185,466	41.53	14344
	4/16/2008	4.08	1,529,220	54.31	14398
	5/20/2008	3.79	1,074,870	35.56	14433
	6/16/2008	3.64	1,185,285	32.75	14466
	7/9/2008	3.64	507,936	15.42	14482
	9/24/2008	0.59	247,343	0.19	14482
	10/15/2008	4.47	1,387,745	40.00	14522
	11/17/2008	6.13	1,086,198	49.00	14571
	12/17/2008	3.94	1,164,878	25.00	14596
2009	1/20/2009	4.28	1,486,450	53.04	14649
	2/18/2009	5.96	1,088,423	54.08	14703
	3/16/2009	4.69	1,074,739	42.02	14745
	4/20/2009	4.17	1,063,959	36.99	14782
	5/18/2009	2.66	1,385,381	30.72	14813
	6/15/2009	4.47	1,049,972	39.13	14852
	7/20/2009	2.38	1,226,349	24.33	14876
	8/17/2009	2.30	1,064,645	20.41	14897
	9/21/2009	2.30	1,024,120	19.64	14916
	10/19/2009	2.40	1,179,441	23.60	14940
	11/16/2009	2.20	932,094	17.10	14957
	12/21/2009	3.08	1,197,182	30.74	14970

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
2010	1/18/2010	2.48	868,448	17.96	15006
	2/15/2010	2.07	882,502	15.22	15021
	3/15/2010	3.50	658,716	19.22	15040
	4/19/2010	1.68	977,397	13.72	15054
	5/17/2010	3.68	1,044,433	32.05	15086
	6/21/2010	2.89	1,176,812	28.32	15114
	7/19/2010	2.88	856,039	20.52	15135
	8/16/2010	2.15	607,092	10.90	15146
	9/20/2010	2.15	1,211,204	21.68	15167
	10/18/2010	2.64	1,386,567	30.51	15198
	11/15/2010	2.79	812,678	18.88	15217
	12/22/2010	2.80	1,392,139	32.45	15249
2011	1/21/2011	2.51	812,897	17.01	15266
	2/25/2011	4.79	1,102,459	44.01	15310
	3/25/2011	2.97	1,063,813	26.36	15336
	4/29/2011	3.05	1,231,474	31.35	15368
	5/27/2011	2.67	1,036,610	23.11	15391
	6/24/2011	2.46	978,064	20.03	15411
	7/29/2011	3.34	1,173,957	32.65	15444
	8/26/2011	1.85	765,901	11.82	15455
	9/30/2011	1.90	1,262,176	19.94	15475
	10/28/2011	1.73	1,361,315	19.61	15495
	11/25/2011	1.88	1,032,800	16.18	15511
	12/30/2011	2.23	2,531,761	46.96	15558
2012	1/27/2012	2.20	1,607,164	29.44	15587
	2/24/2012	2.39	1,230,684	24.48	15612
	3/30/2012	2.38	1,599,189	31.69	15644
	4/27/2012	3.46	1,278,997	36.84	15680
	5/25/2012	2.33	1,334,211	25.95	15706
	6/29/2012	2.21	1,661,511	30.59	15737
	7/27/2012	2.49	1,303,197	27.06	15764
	8/31/2012	2.50	1,593,126	33.14	15797
	9/28/2012	2.14	1,379,885	24.65	15822
	10/26/2012	2.18	1,260,645	22.90	15845
	11/30/2012	2.31	1,516,420	29.25	15874
	12/29/2012	2.78	1,651,015	38.32	15912

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
2013	1/25/2013	1.76	1,122,690	16.48	15929
	2/22/2013	4.03	1,150,460	38.61	15967
	3/29/2013	3.59	1,577,390	47.22	16015
	4/26/2013	3.25	1,874,160	50.84	16066
	5/31/2013	2.81	1,888,820	44.20	16110
	6/28/2013	2.91	1,816,240	44.00	16154
	7/26/2013	2.83	1,846,630	43.51	16197
	8/30/2013	2.61	2,370,440	51.57	16249
	9/27/2013	2.95	1,783,900	43.83	16293
	10/25/2013	3.02	1,550,780	38.98	16332
	11/27/2013	2.60	1,948,870	42.28	16374
	12/27/2013	3.70	1,792,270	55.29	16429
2014	1/31/2014	2.72	1,945,950	44.16	16473
	2/28/2014	2.51	1,723,890	36.05	16509
	3/28/2014	2.42	1,578,790	31.91	16541
	4/25/2014	2.26	1,571,080	29.59	16571
	5/30/2014	2.41	1,504,590	30.17	16601
	6/27/2014	2.30	1,345,660	25.84	16627
	7/25/2014	2.26	1,036,270	19.48	16646
	8/29/2014	1.85	1,492,240	22.95	16669
	9/26/2014	3.74	823,480	25.68	16695
	10/31/2014	3.00	2,007,480	50.21	16745
	11/26/2014	3.70	1,733,930	53.43	16799
	12/24/2014	3.64	1,838,410	55.79	16854
2015	1/20/2015	3.18	2,418,320	64.15	16919
	2/13/2015	3.14	1,728,540	45.28	16964
	3/16/2015	3.10	1,591,510	41.15	17005
	4/20/2015	3.05	1,420,630	36.12	17041
	5/19/2015	2.59	2,109,620	45.59	17087
	6/16/2015	3.57	1,691,320	50.28	17137
	7/20/2015	2.81	2,097,640	49.09	17186
	8/17/2015	2.92	1,259,120	30.68	17217
	9/8/2015	3.29	1,665,900	45.74	17263
	10/16/2015	4.67	1,206,470	47.00	17310
	11/19/2015	6.27	1,192,380	62.34	17372
	12/14/2015	3.41	1,688,530	47.96	17420

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
2016	1/19/2016	3.37	1,272,590	35.74	17456
	2/16/2016	3.42	1,052,055	29.96	17486
	3/22/2016	3.38	1,259,865	35.47	17521
	4/12/2016	4.51	1,164,935	43.71	17565
	5/24/2016	4.49	1,554,370	58.15	17623
	6/21/2016	4.19	1,247,220	43.56	17666
	7/19/2016	4.29	1,237,680	44.20	17711
	8/9/2016	4.02	1,547,340	51.80	17762
	9/27/2016	4.40	1,118,656	40.97	17803
	10/25/2016	4.07	1,335,373	45.30	17849
	11/15/2016	4.03	1,188,321	39.91	17889
	12/13/2016	5.27	1,293,900	56.77	17945
2017	1/17/2017	4.51	1,177,370	44.20	17989
	2/14/2017	4.28	1,190,540	42.43	18032
	3/7/2017	3.96	1,072,815	35.38	18067
	4/11/2017	3.86	1,147,090	36.85	18104
	5/16/2017	3.87	1,369,375	44.14	18148
	6/6/2017	3.98	1,023,450	33.94	18182
	7/25/2017	3.99	1,090,220	36.26	18218
	8/15/2017	4.36	1,447,135	52.54	18271
	9/19/2017	4.29	1,154,205	41.26	18312
	10/31/2017	4.02	1,356,373	45.44	18357
	11/14/2017	3.77	1,147,922	36.03	18394
	12/19/2017	3.02	1,079,625	27.19	18421
2018	1/16/2018	4.51	1,177,370	42.81	18464
	2/13/2018	4.28	1,190,540	44.06	18508
	3/13/2018	3.96	1,072,815	37.82	18545
	4/10/2018	2.75	1,260,005	25.41	18571
	5/15/2018	2.30	892,960	18.25	18589
	6/12/2018	2.02	1,024,854	17.89	18607
	7/3/2018	2.65	1,186,196	23.88	18631
	8/7/2018	2.26	935,560	19.52	18650
	9/19/2018	3.91	932,350	32.61	18683
	10/9/2018	5.43	1,377,230	55.25	18738
	11/13/2018	4.81	1,171,360	47.21	18785
	12/18/2018	4.81	1,203,340	53.44	18839

APPENDIX B

CUMULATIVE GROUNDWATER VOC REMOVAL DATA SINCE 1986
350 ELLIS STREET
MOUNTAIN VIEW, CALIFORNIA

Year	Date	VOC Concentration (mg/L)	Total Flow (gal/month)	Mass Removed (lbs)	Cumulative Mass Removed (lbs)
2019	1/15/2019	3.55	1,375,260	40.68	18880
	2/5/2019	3.64	1,175,400	35.62	18915
	3/5/2019	18.3	1,236,300	188.8	19104
	4/2/2019	3.51	1,530,300	44.71	19149
	5/7/2019	3.14	1,106,400	28.93	19178
	6/11/2019	3.03	1,197,150	30.16	19208
	7/2/2019	2.92	1,548,145	37.69	19245
	8/6/2019	3.27	1,129,110	30.79	19276
	9/3/2019	2.46	1,165,394	23.86	19300
	10/15/2019	3.01	1,317,596	33.02	19333
	11/5/2019	3.36	1,139,957	31.94	19365
	12/10/2019	3.58	909,313	27.09	19392
2020	1/28/2020	2.62	1,075,005	23.44	19416
	2/11/2020	3.14	1,001,080	26.19	19442
	3/3/2020	2.93	1,301,145	31.75	19474
	4/14/2020	2.65	991,510	21.91	19495
	5/5/2020	2.75	1,134,135	25.97	19521
	6/2/2020	2.89	1,176,100	28.29	19550
	7/17/2020	0.21	1,070,985	1.85	19552
	8/4/2020	2.57	918,410	19.67	19571
	9/1/2020	2.89	1,254,890	30.18	19601
	10/6/2020	2.74	990,025	22.62	19624
	11/23/2020	3.38	951,765	26.80	19651
	12/15/2020	3.18	1,248,930	33.02	19684
2021	01/10/2021	2.812	1,002,875	23.49	19707
	02/25/2021	2.832/2.683	975,380	21.79	19729
	03/12/2021	0.400	1,249,750	4.16	19733
	04/07/2021	2.632	808,680	17.73	19751
	05/18/2021	2.432/2.423	1,095,117	22.10	19773
	06/05/2021	2.225	961,153	17.81	19791
	07/09/2021	2.502	1,094,895	22.81	19814
	08/24/2021	2.336	1,014,215	19.73	19834
	09/12/2021	3.268	983,095	26.76	19860
	10/28/2021	1.944	573,805	9.29	19870
	11/19/2021	2.266/2.250	866,015	16.23	19886
	12/07/2021	2.300	851,820	16.32	19902

Notes:

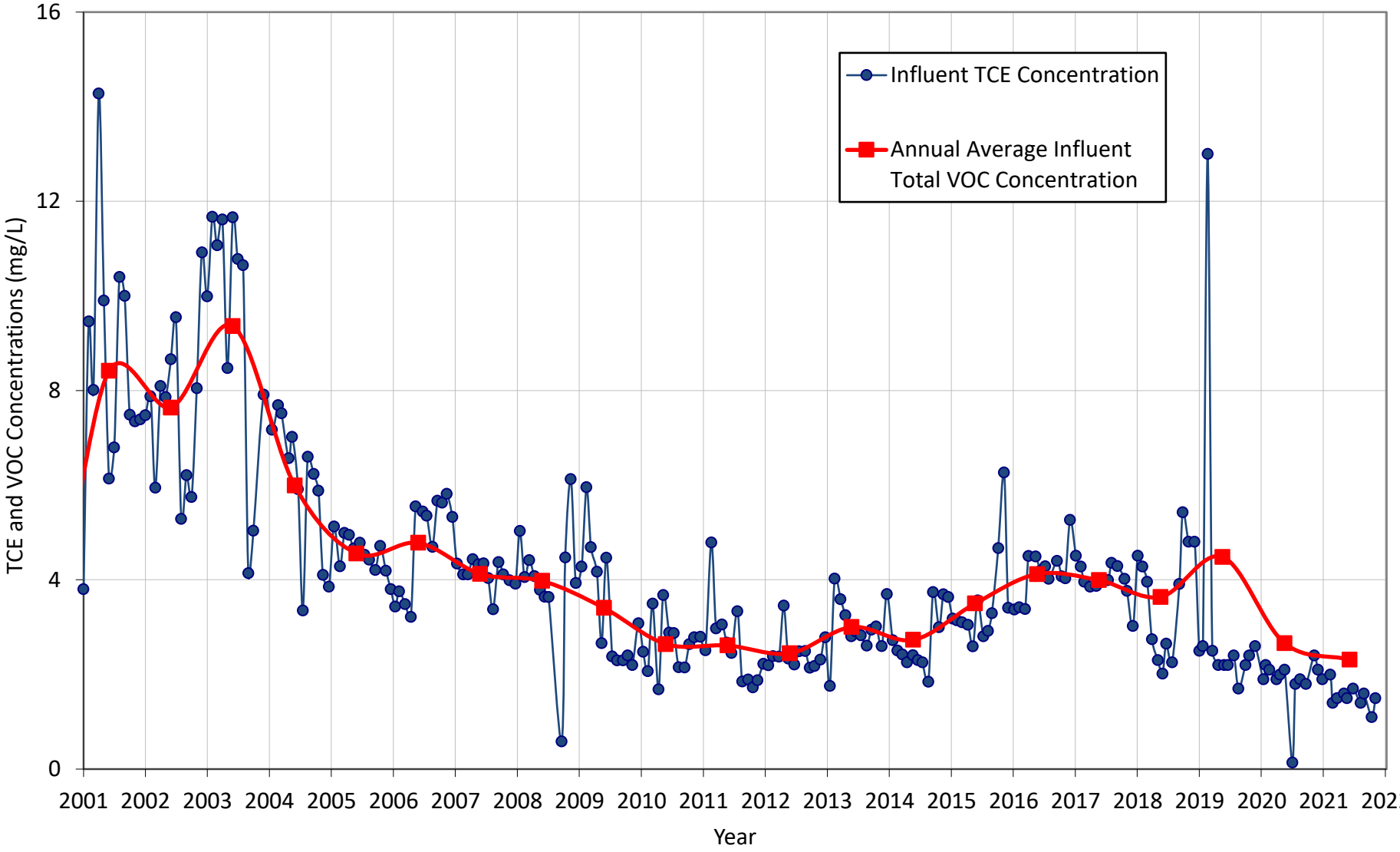
mg/L - milligrams per liter

gal/month - gallons per month

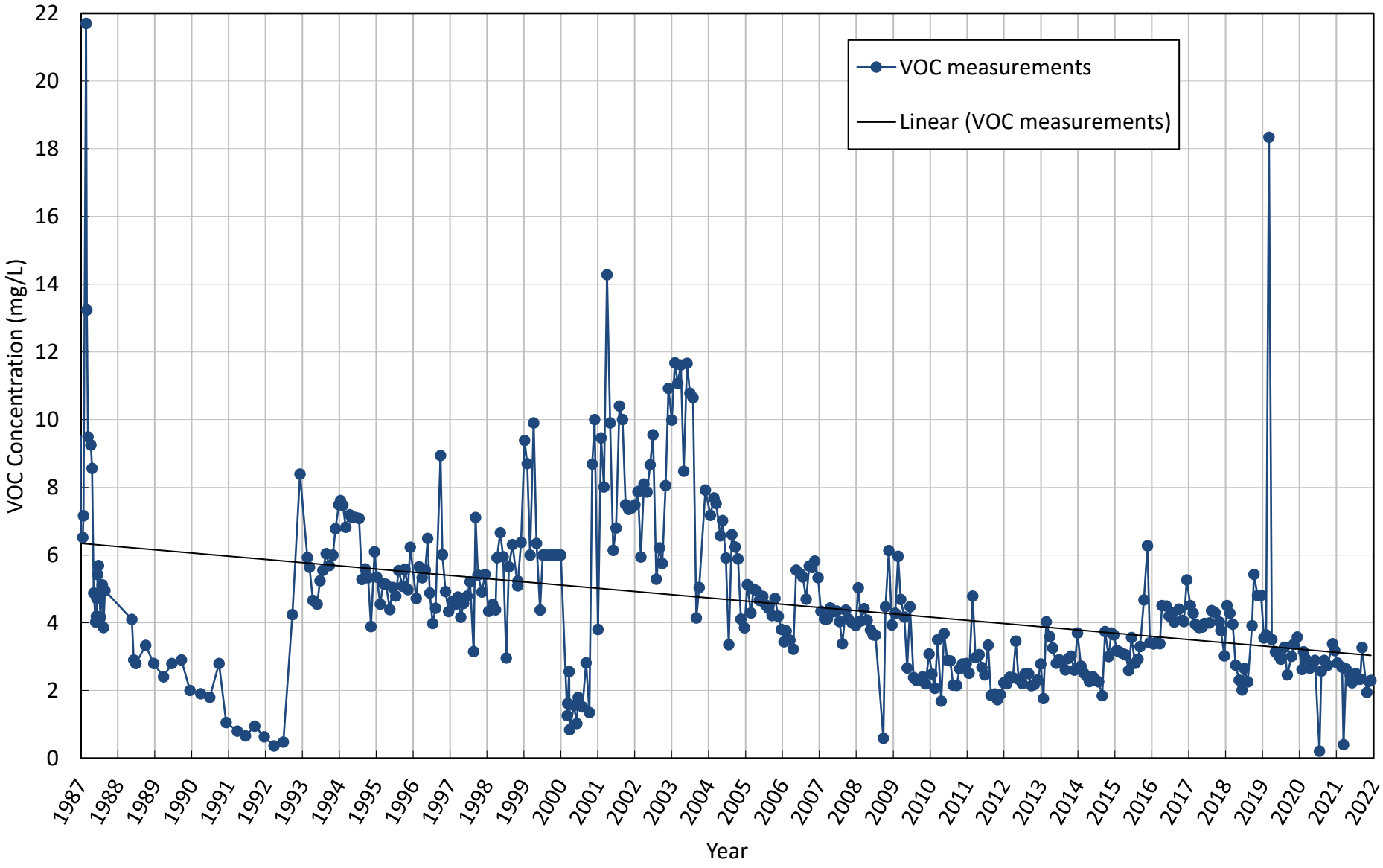
lbs - pounds

Raytheon started groundwater extraction at the site in 1982; however, data to calculate the VOC removal rate between 1982 and October 1986 are not available.

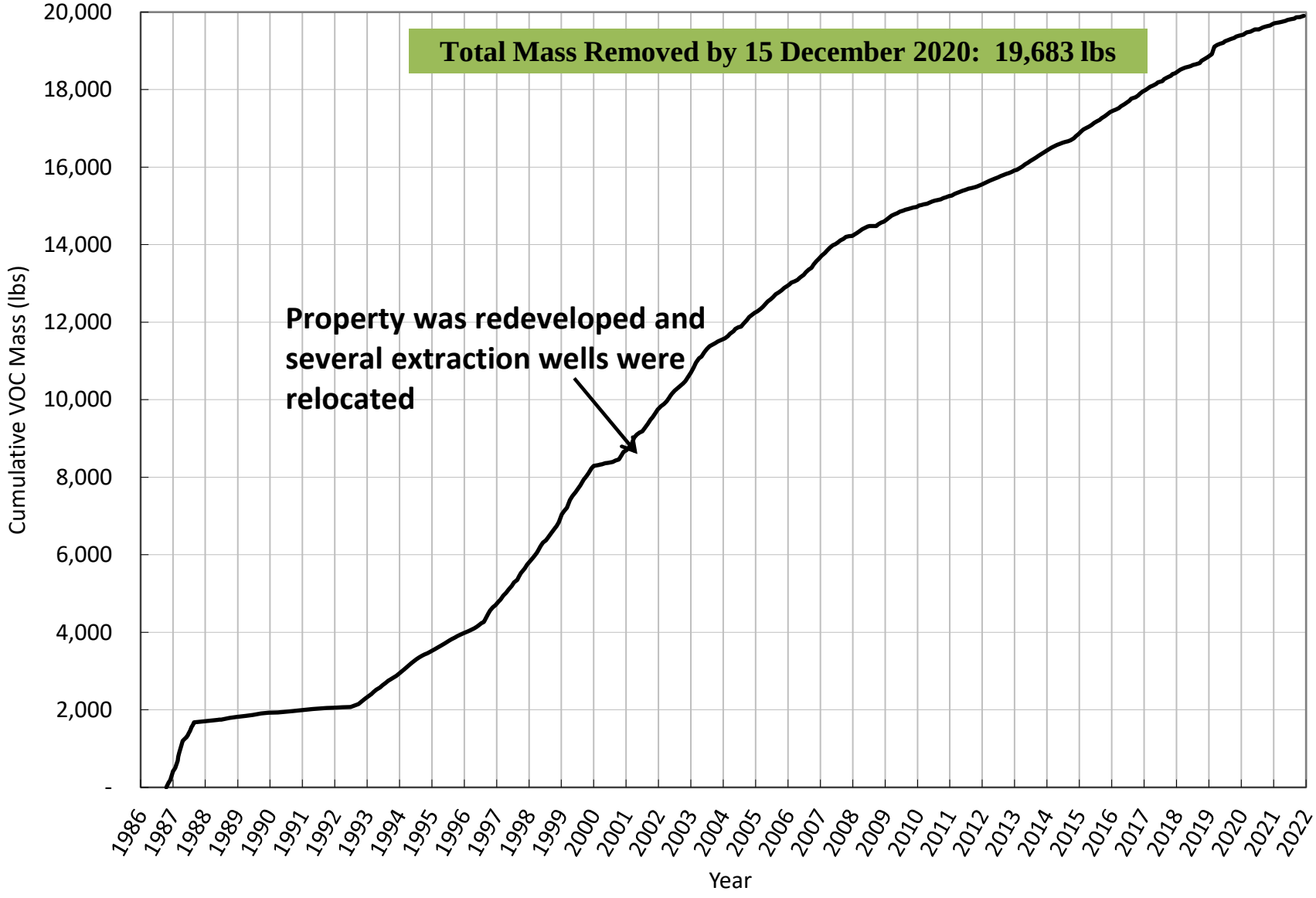
APPENDIX B-1
TCE CONCENTRATIONS IN GROUNDWATER TREATMENT SYSTEM INFLUENT SINCE 2001
350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA



APPENDIX B-2
TOTAL VOC INFLUENT GROUNDWATER CONCENTRATIONS
350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA



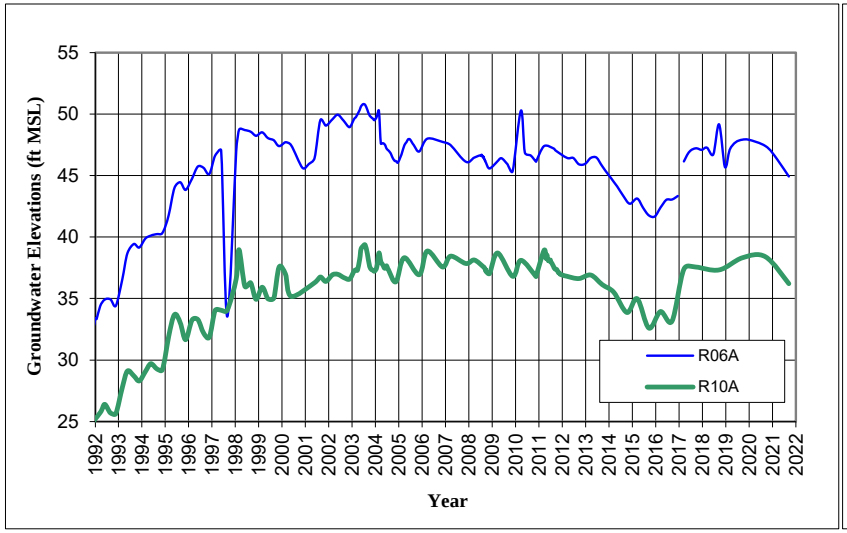
APPENDIX B-3
CUMULATIVE VOC MASS REMOVAL
350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA

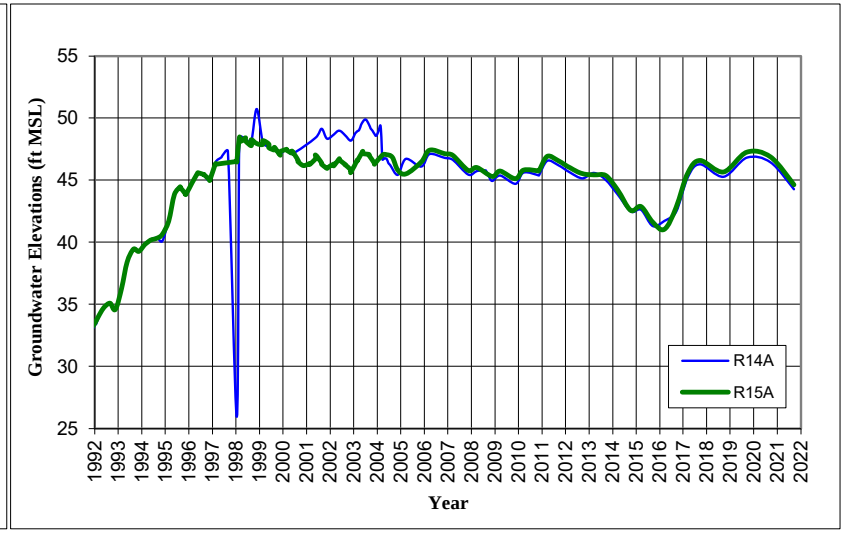


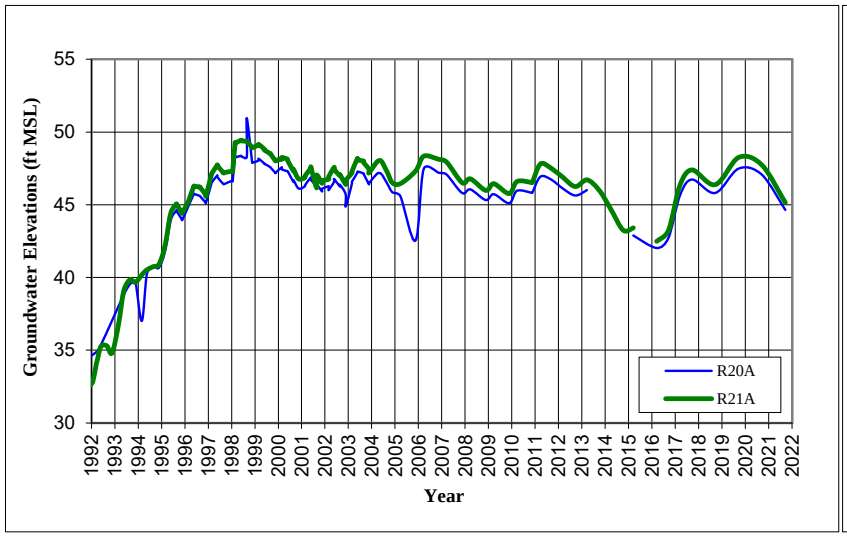
APPENDIX C

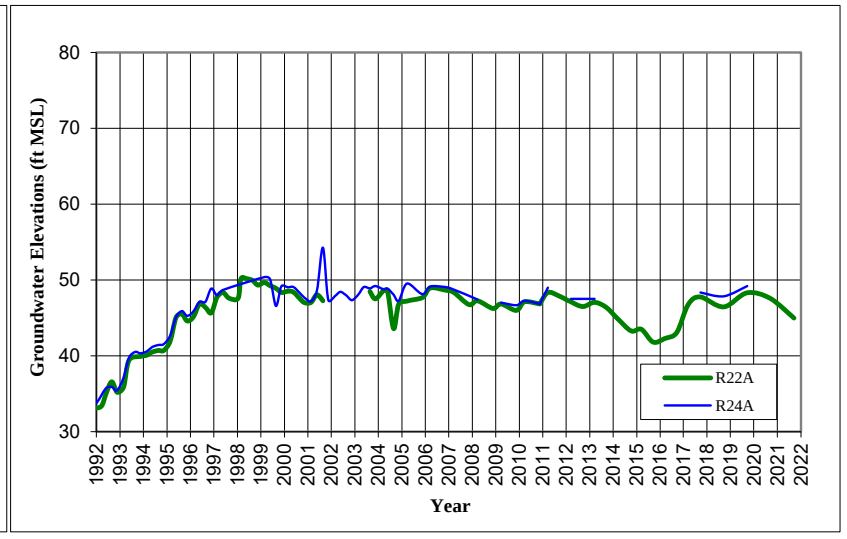
Historical Groundwater Hydrographs

APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN A ZONE WELLS

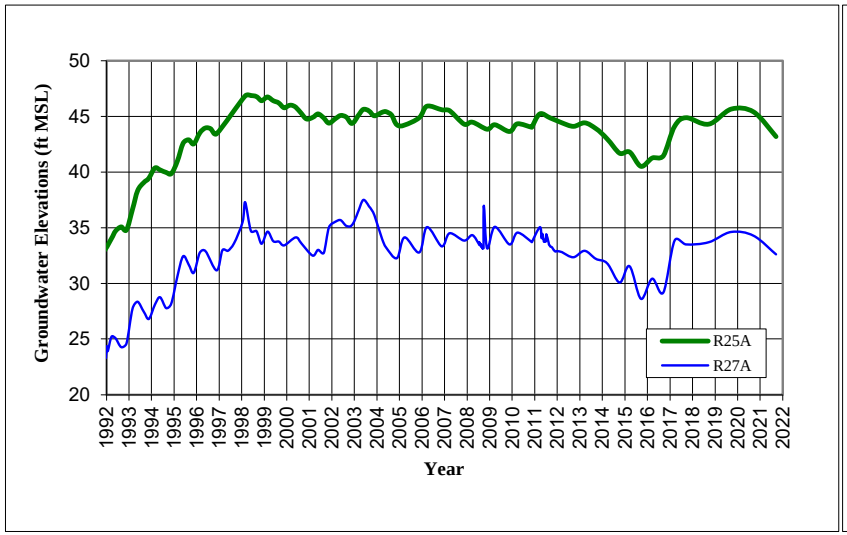


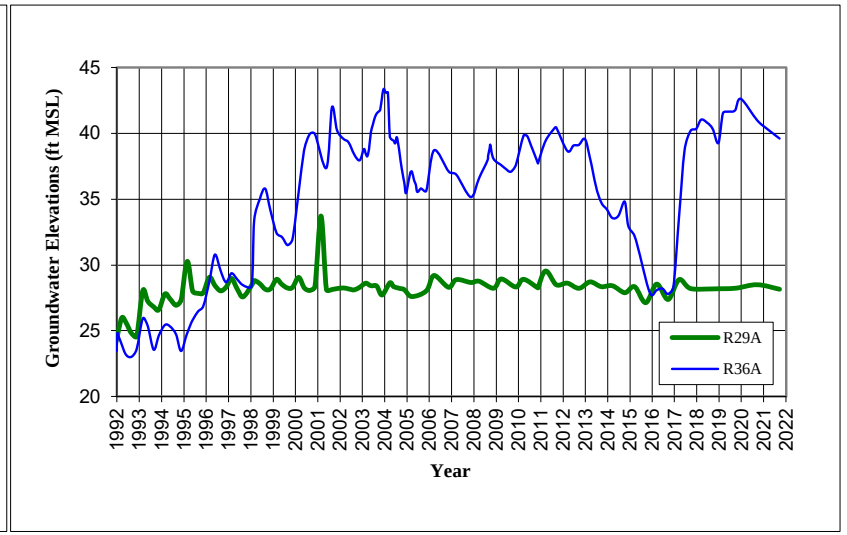


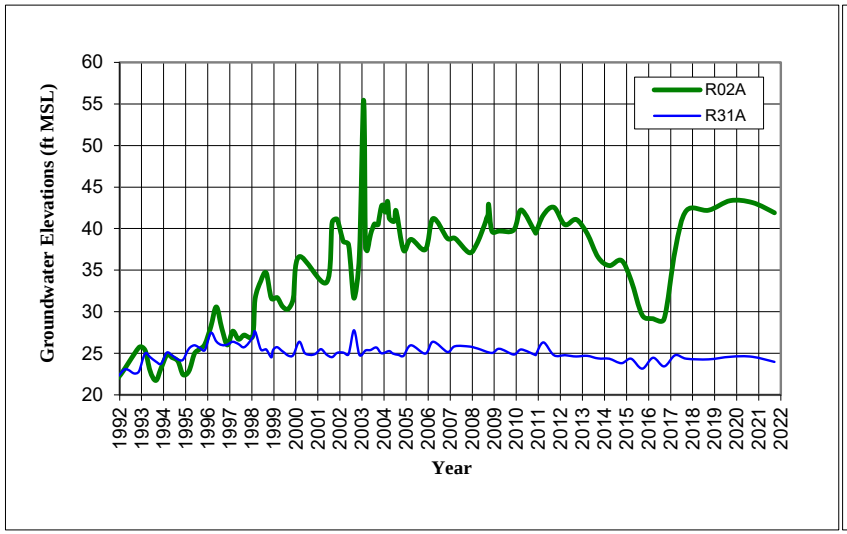


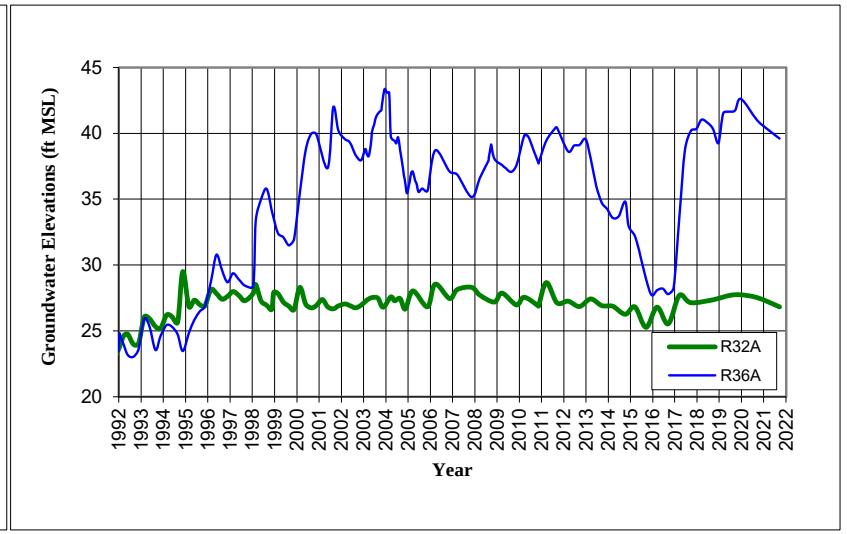


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN A ZONE WELLS

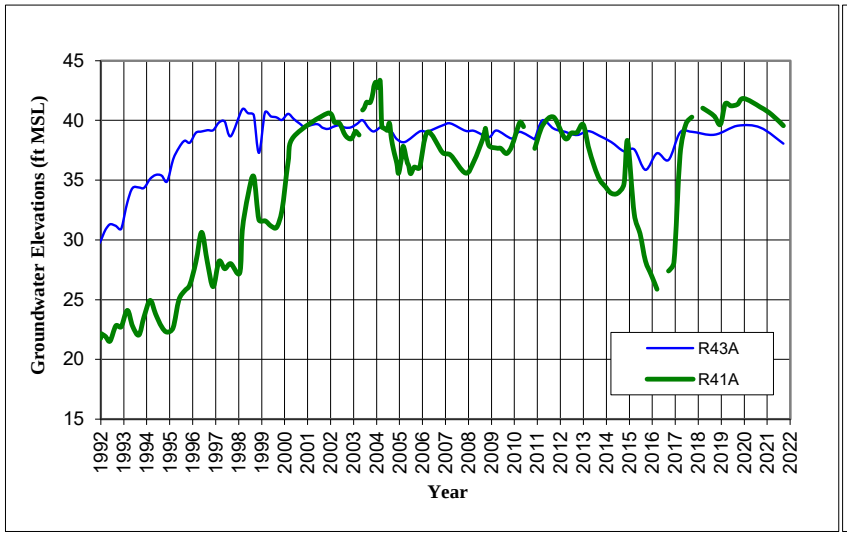


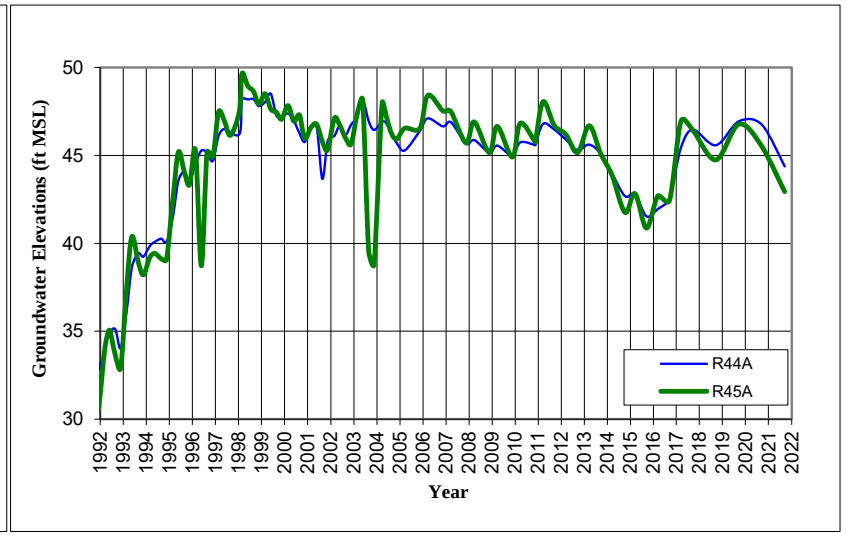


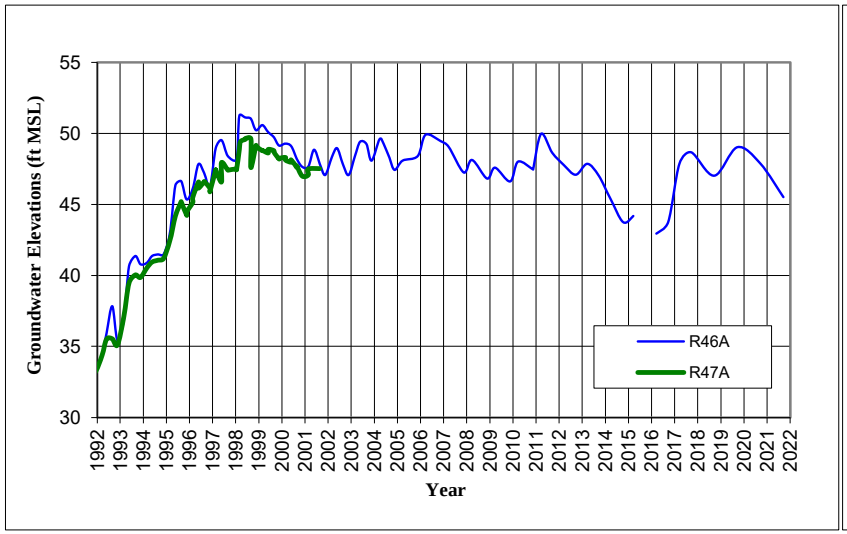


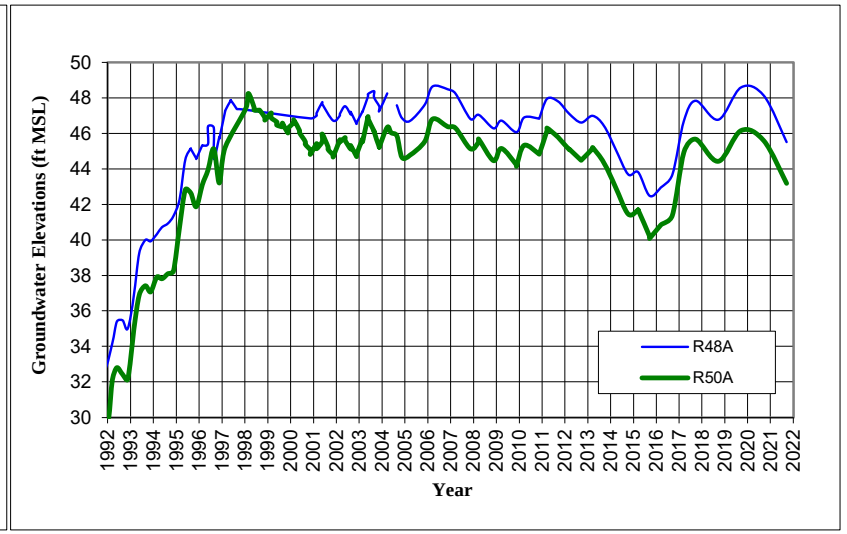


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN A ZONE WELLS

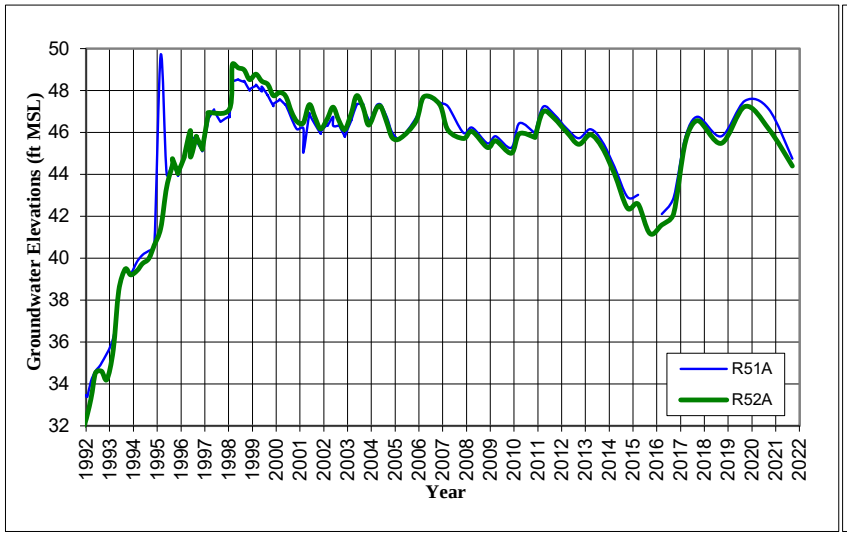


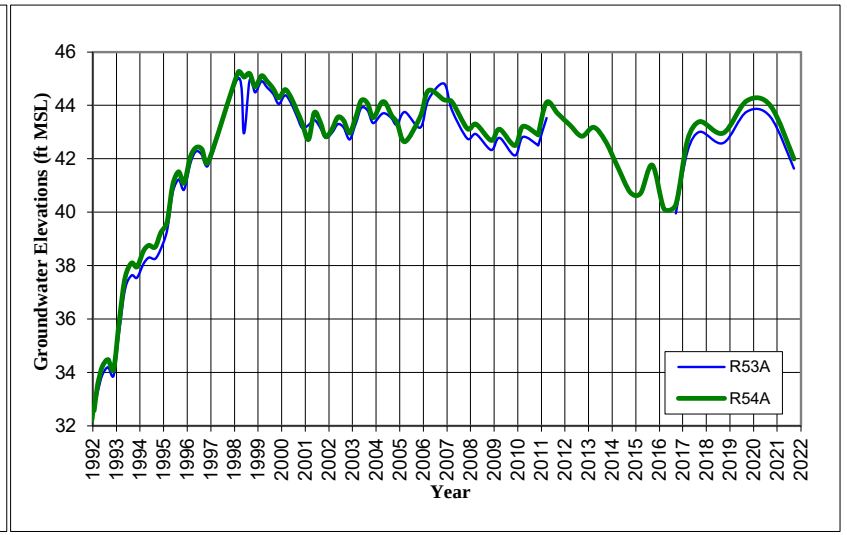


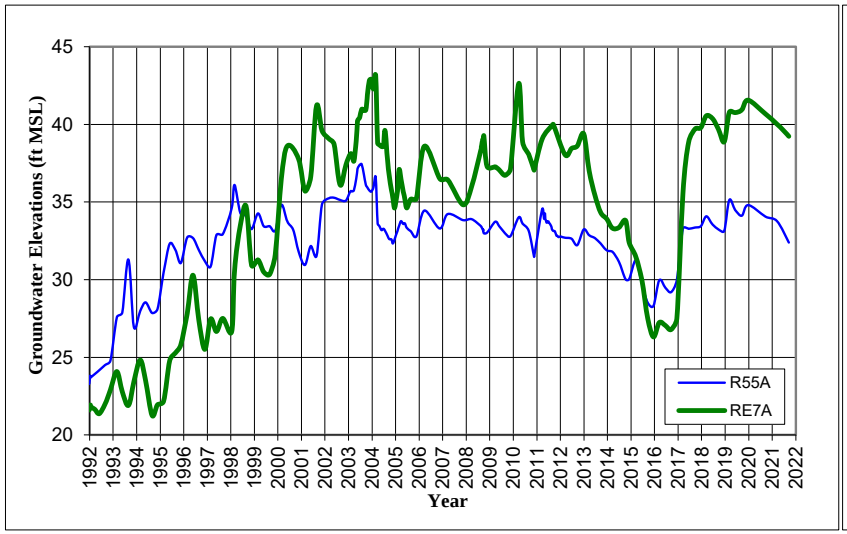


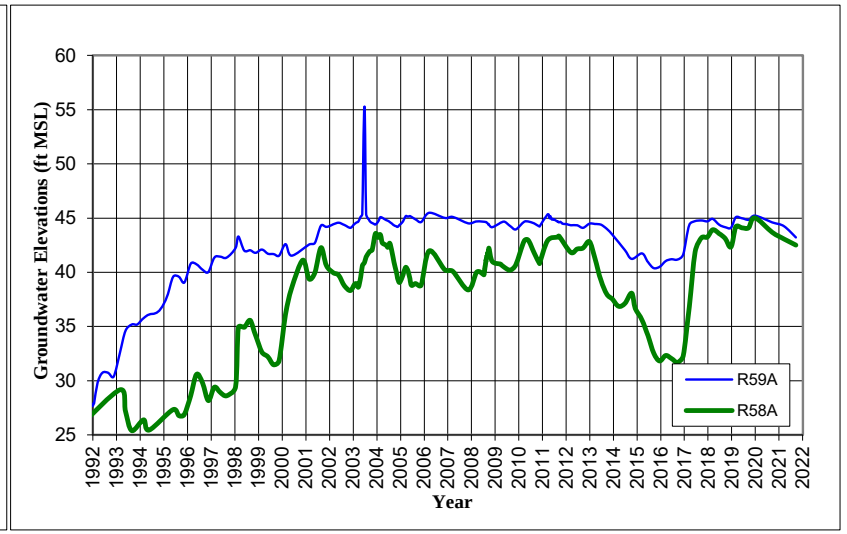


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN A ZONE WELLS

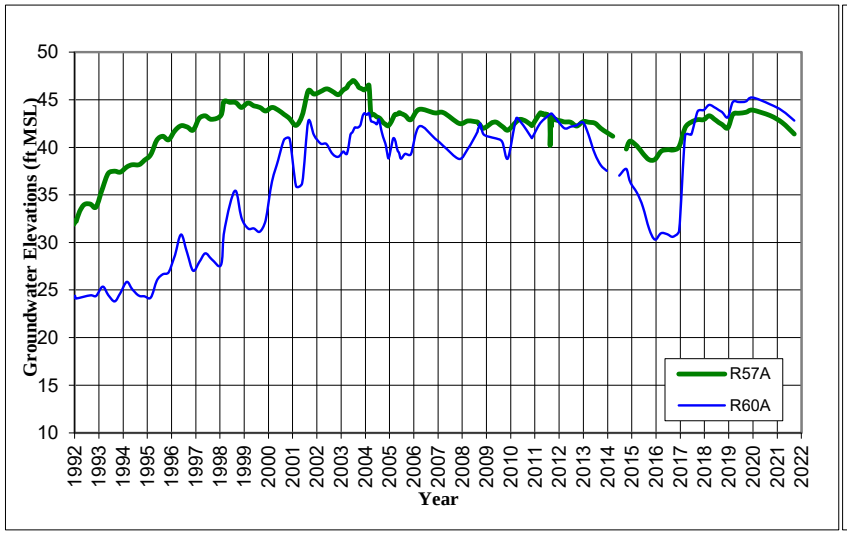


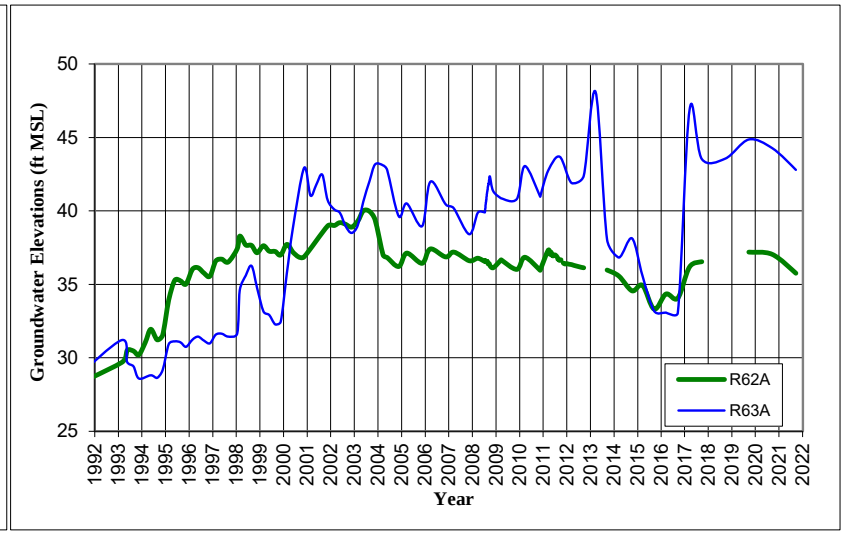


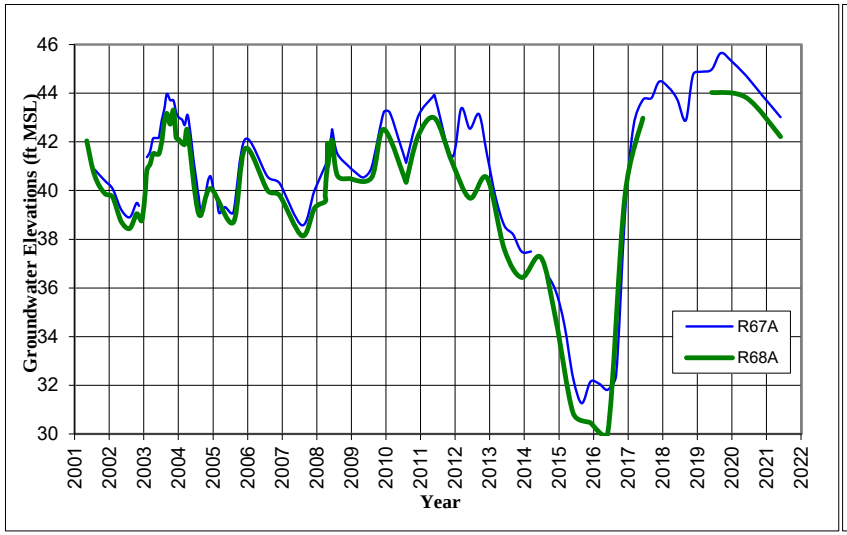


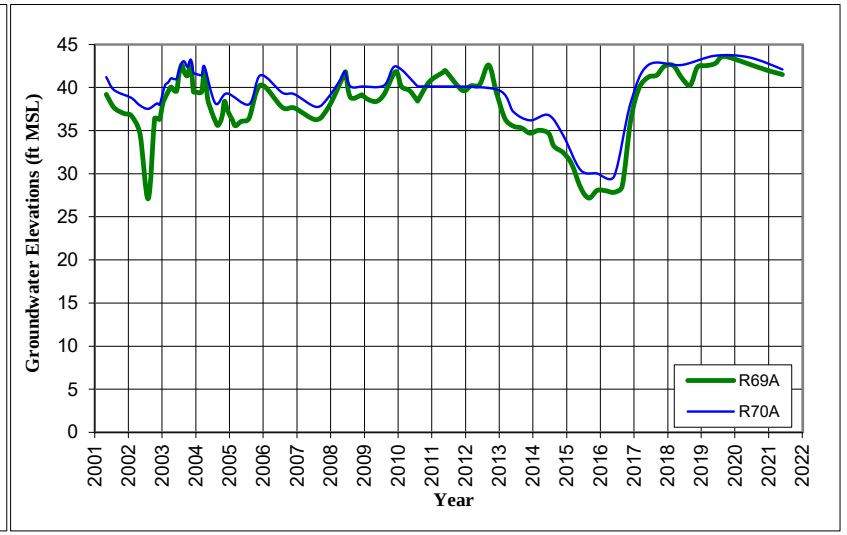


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN A ZONE WELLS

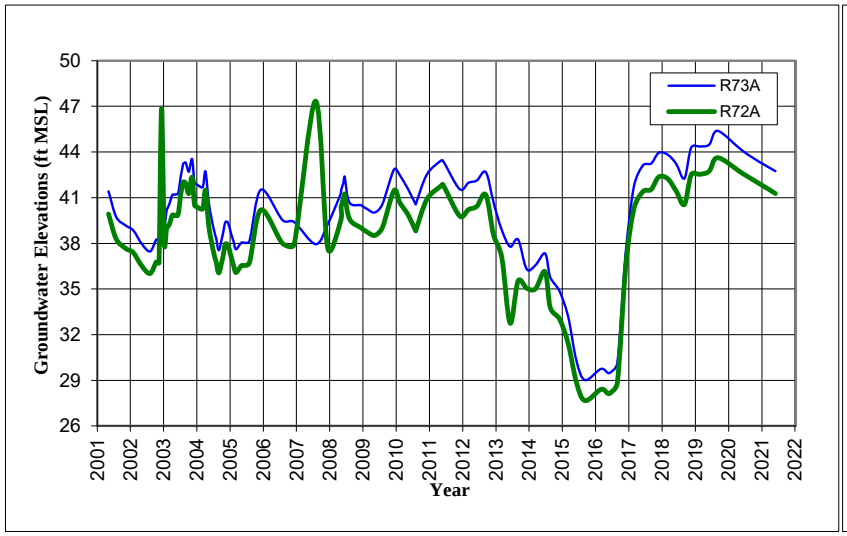


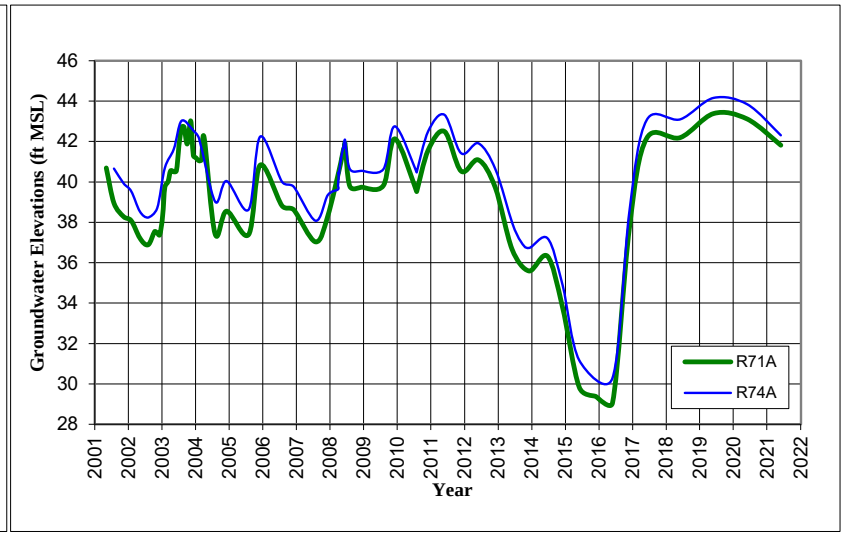


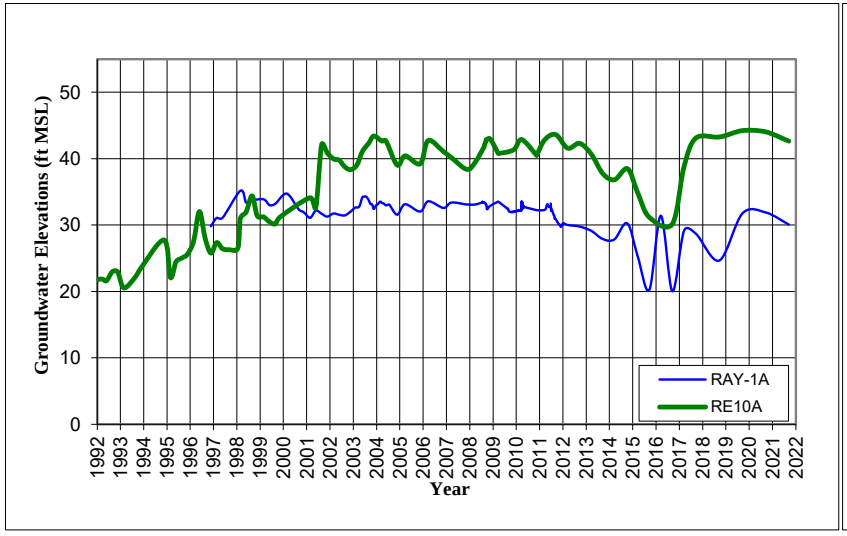


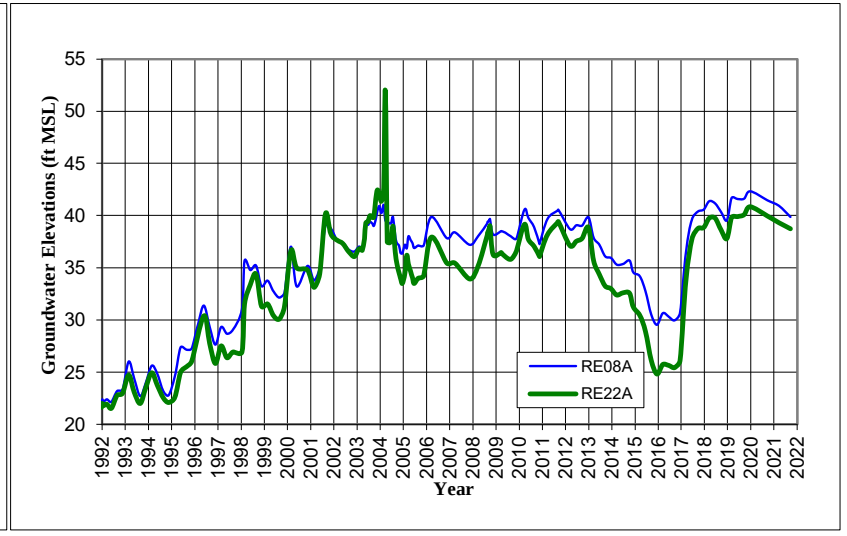


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN A ZONE WELLS

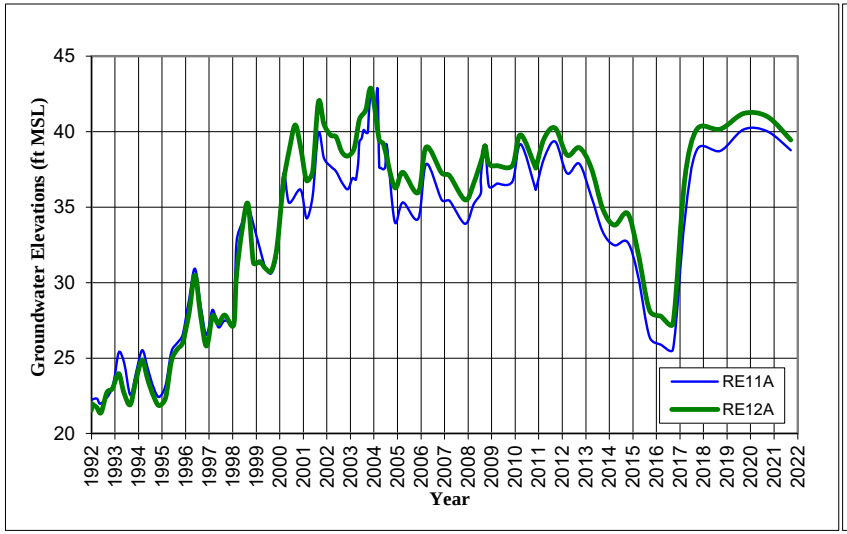


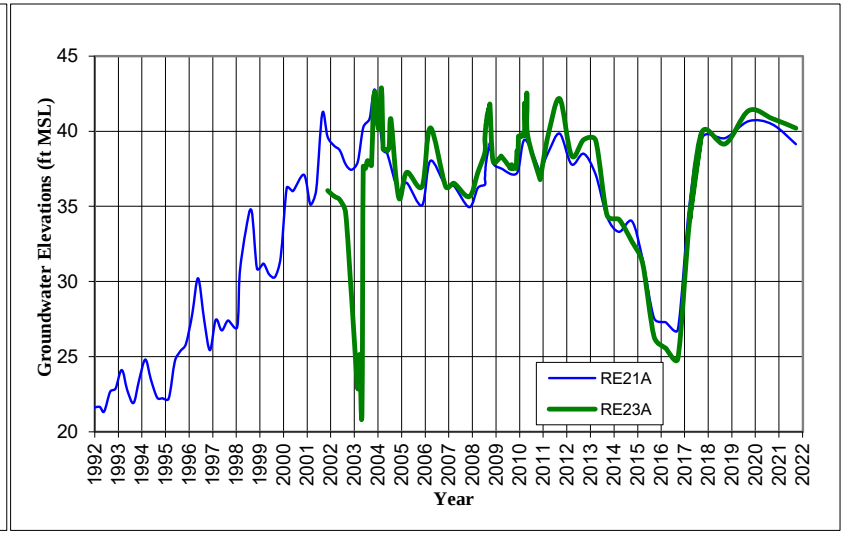


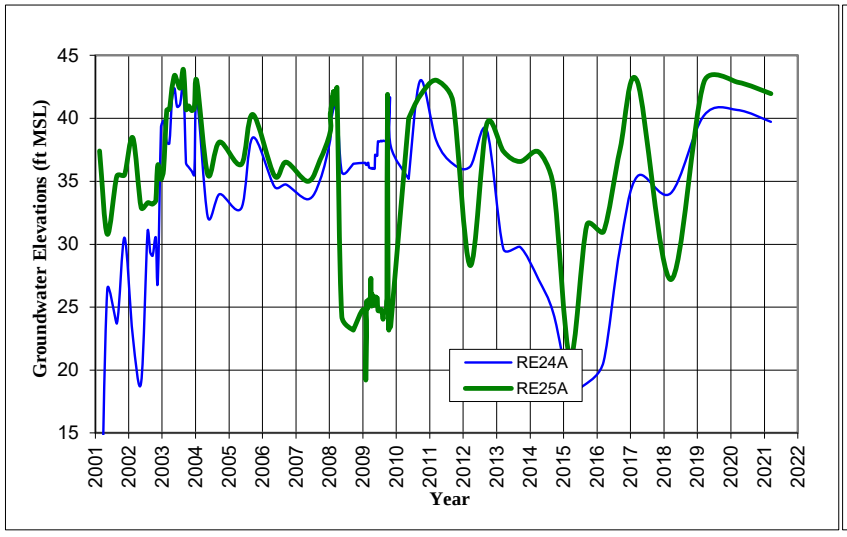


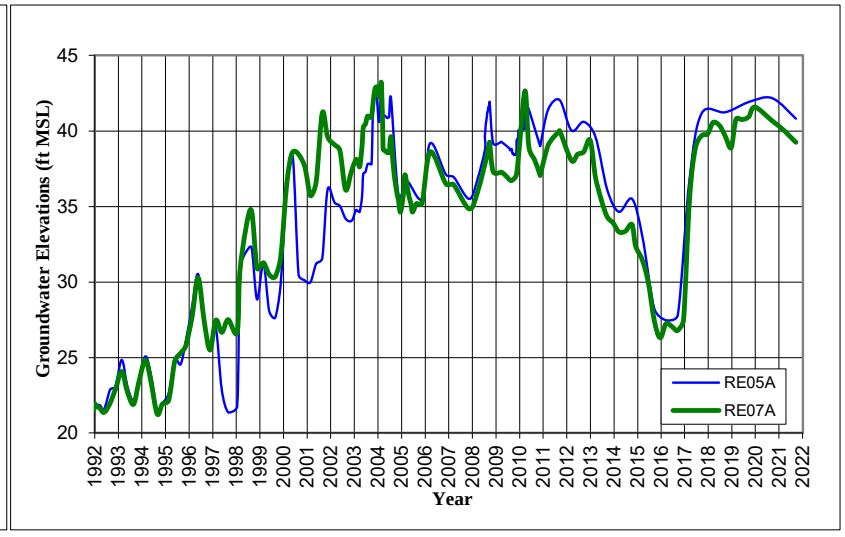


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN A ZONE WELLS

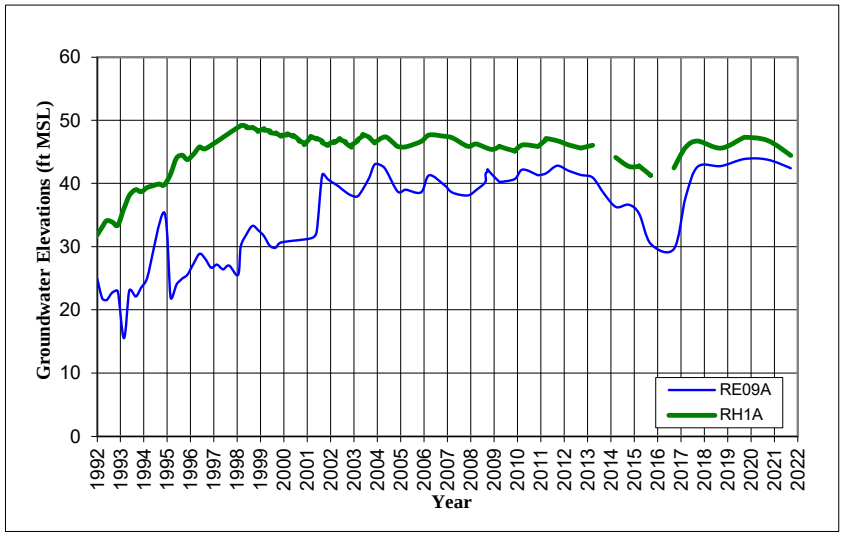




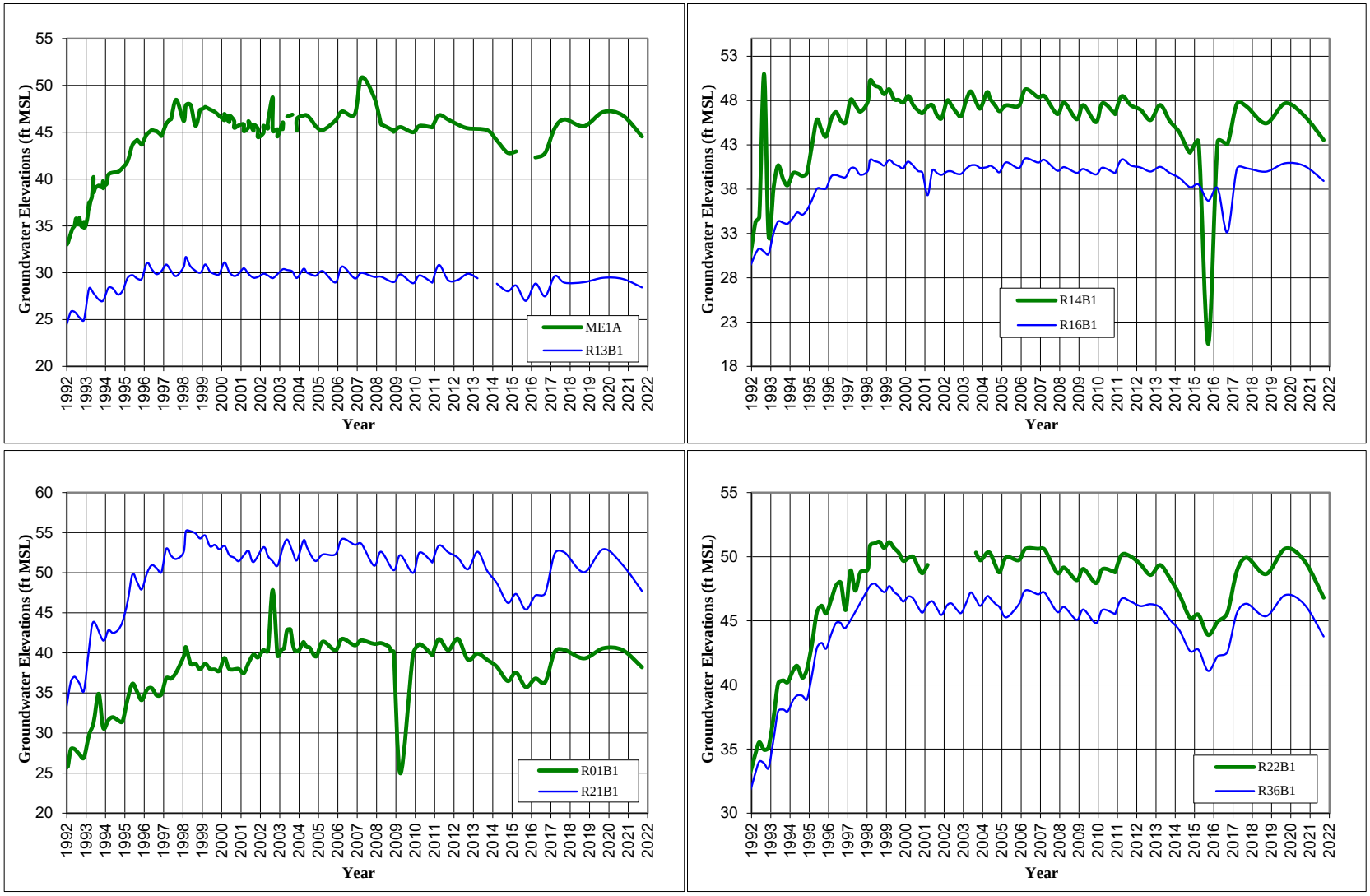




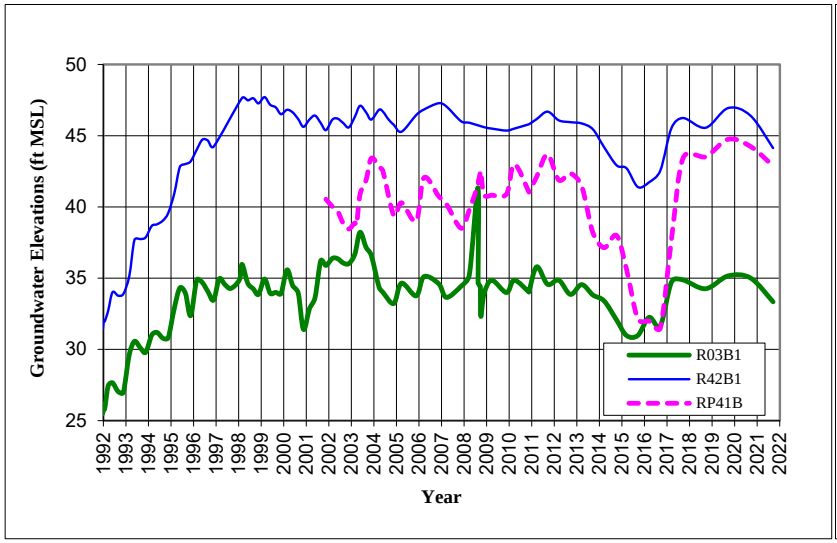
APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN A ZONE WELLS

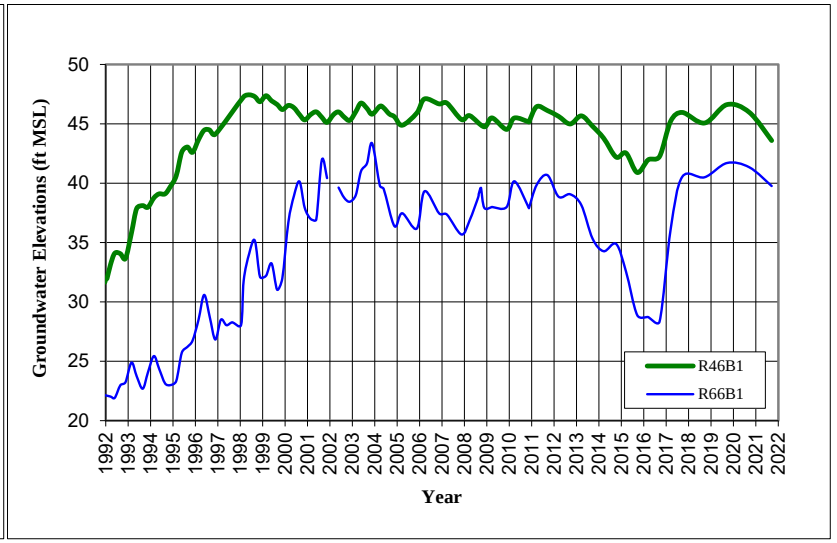


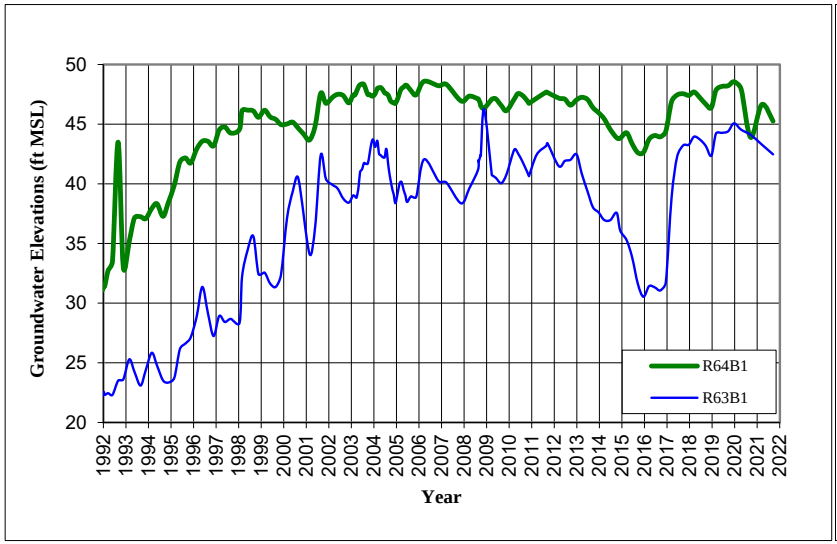
APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B1 ZONE WELLS

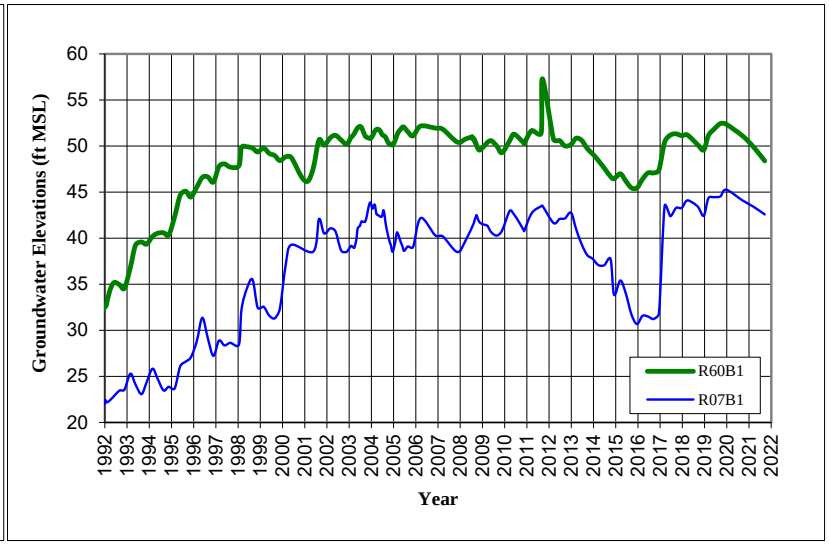


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B1 ZONE WELLS

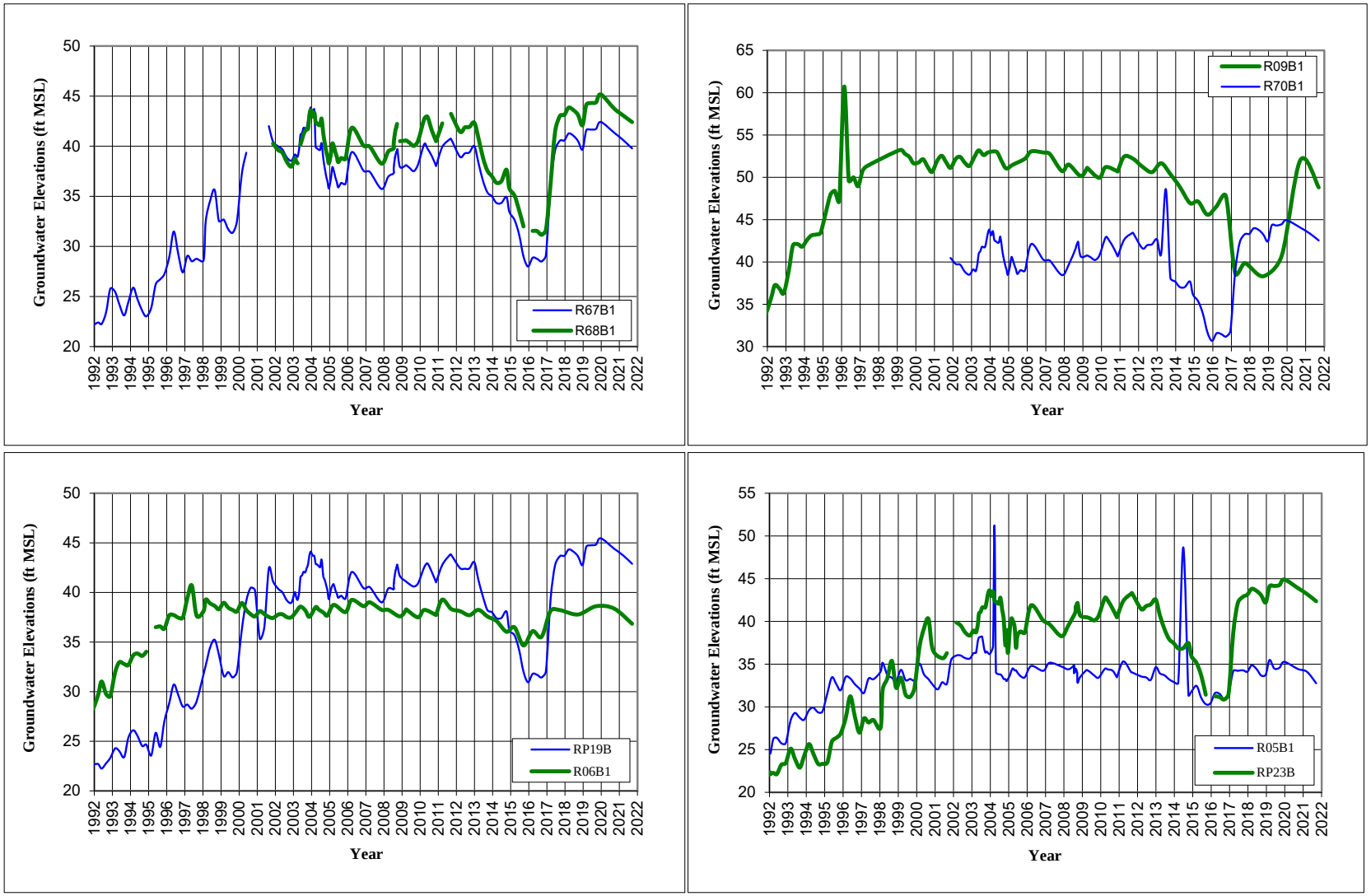






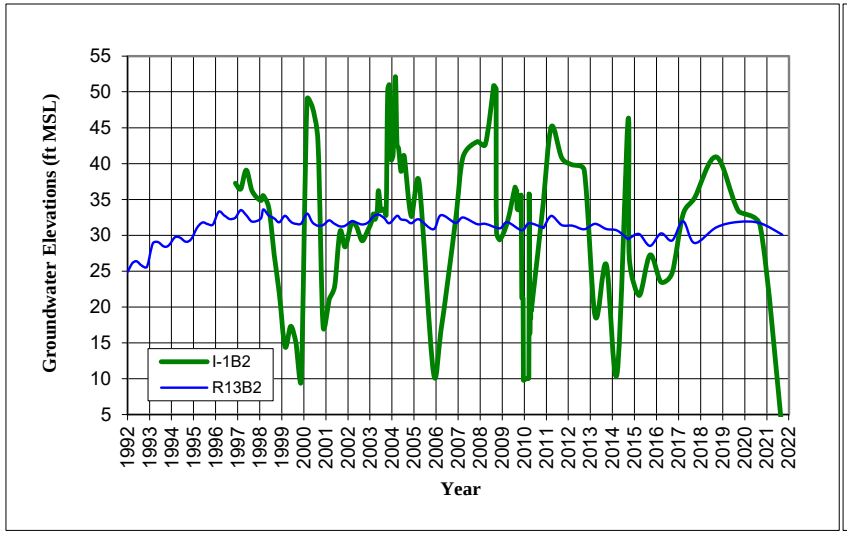


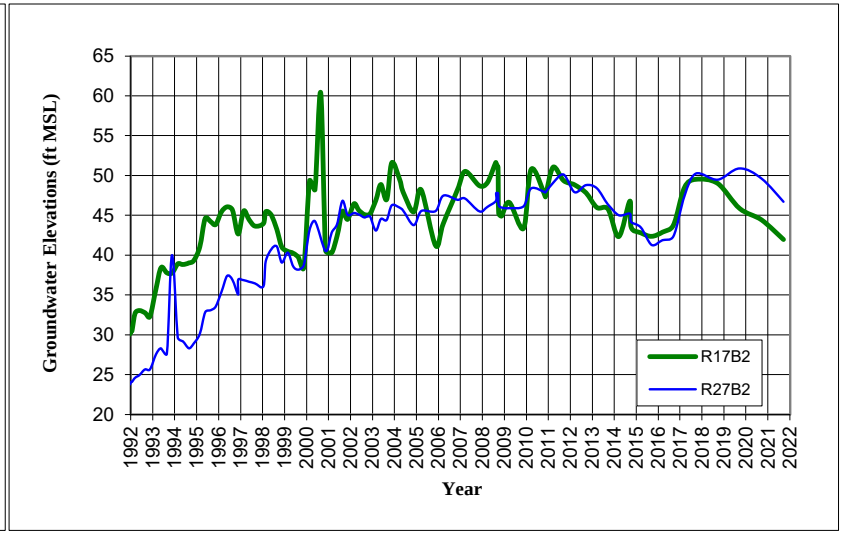
APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B1 ZONE WELLS

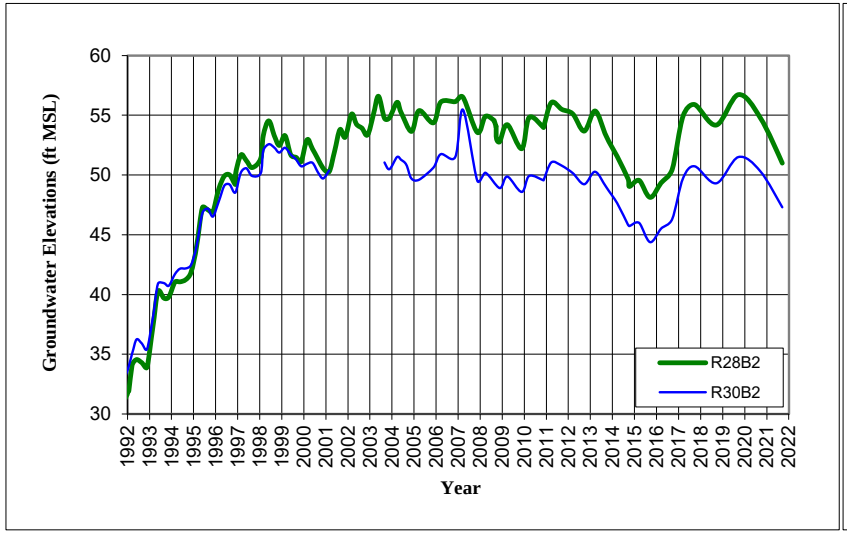


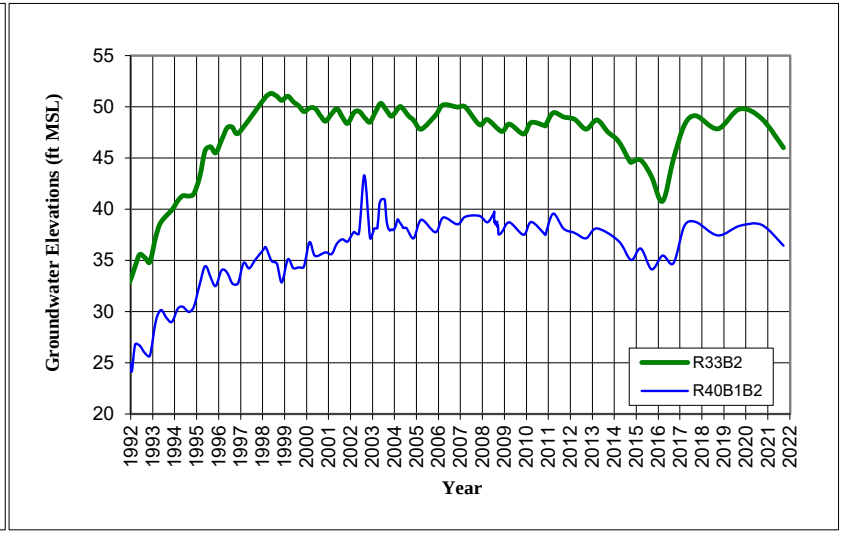
APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B1 ZONE WELLS

APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B2 ZONE WELLS

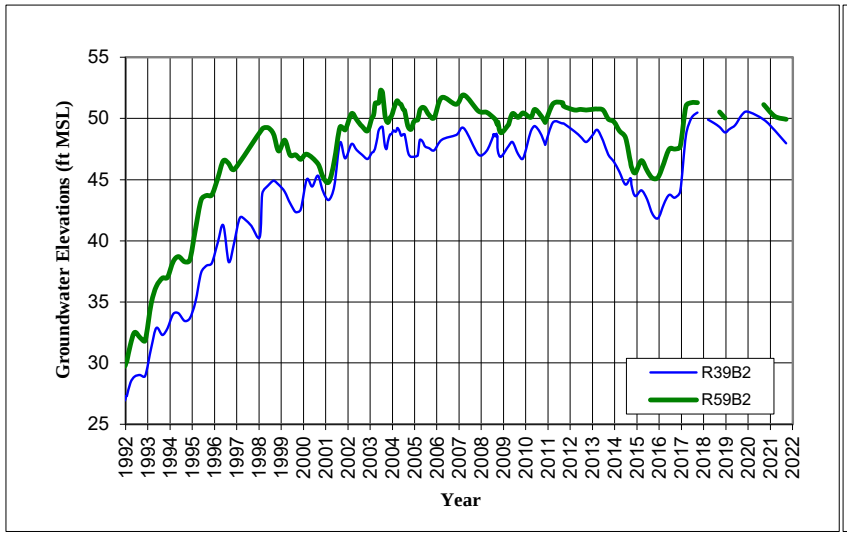


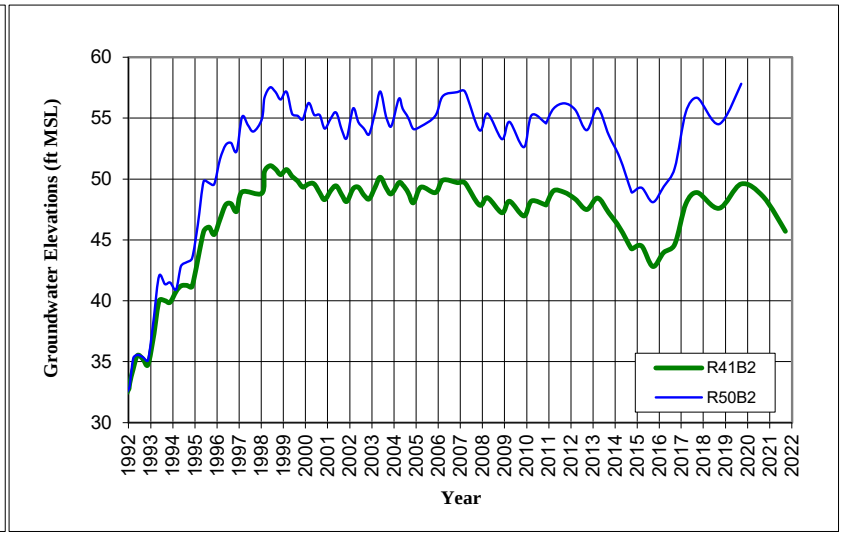


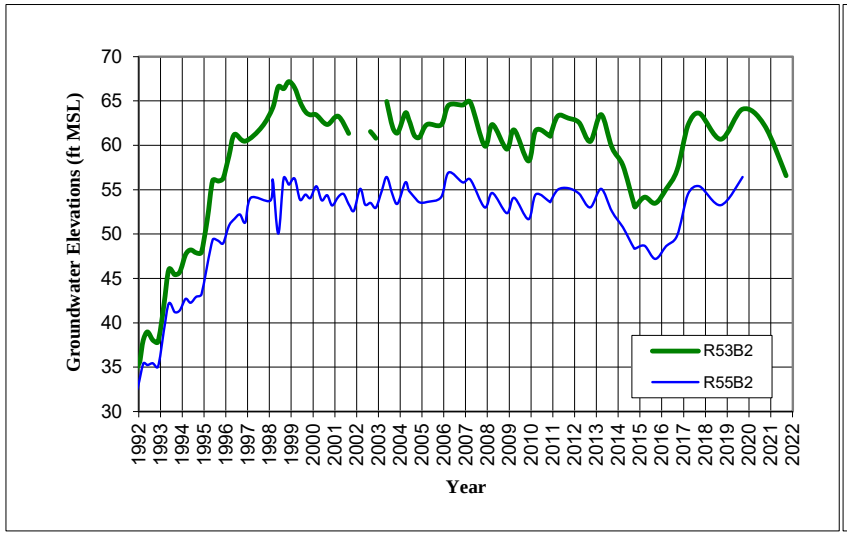


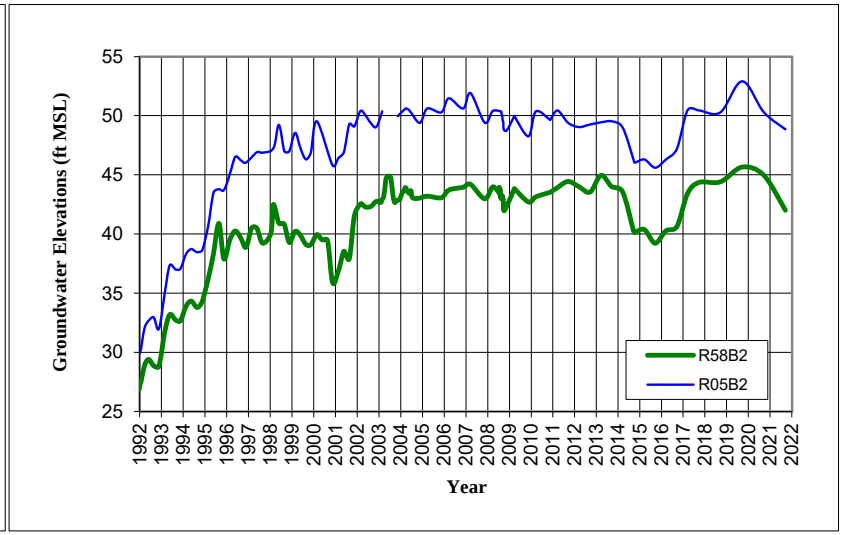


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B2 ZONE WELLS

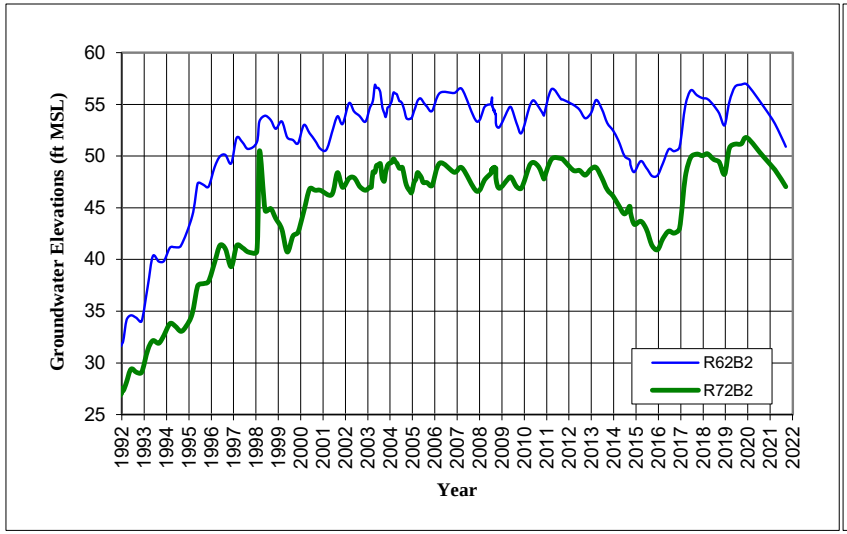


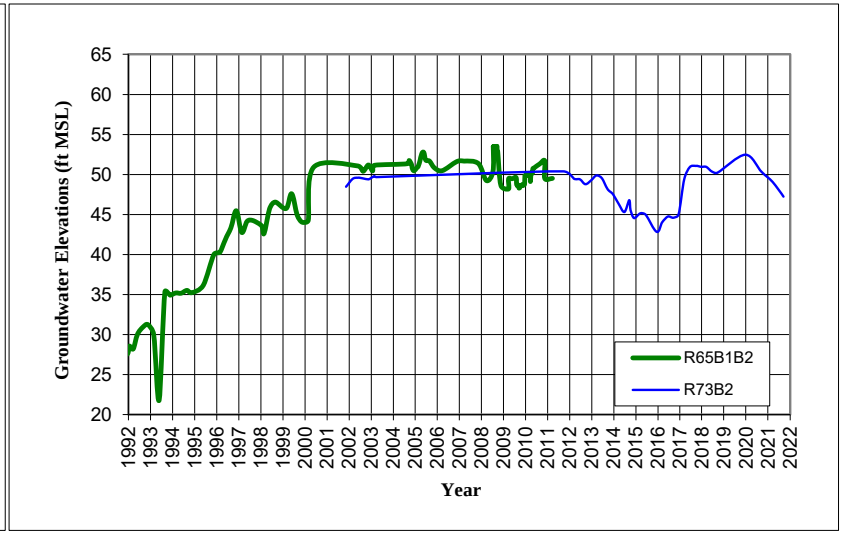


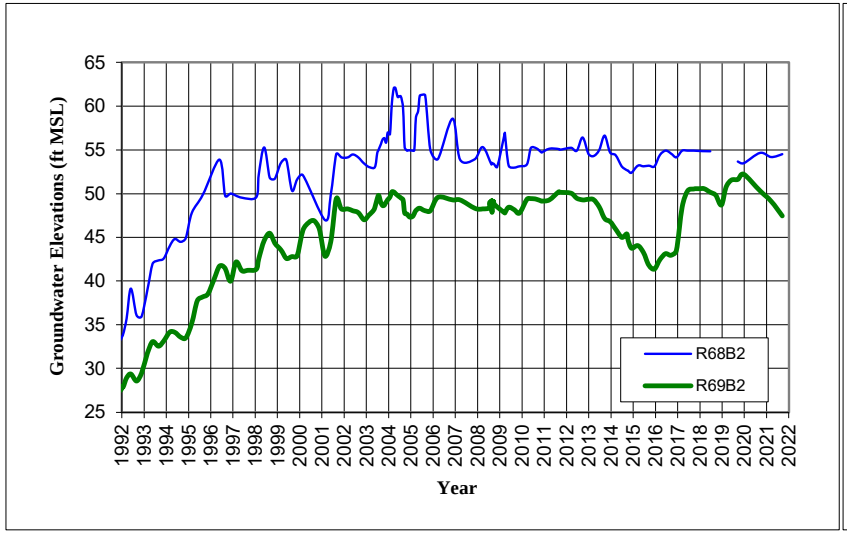


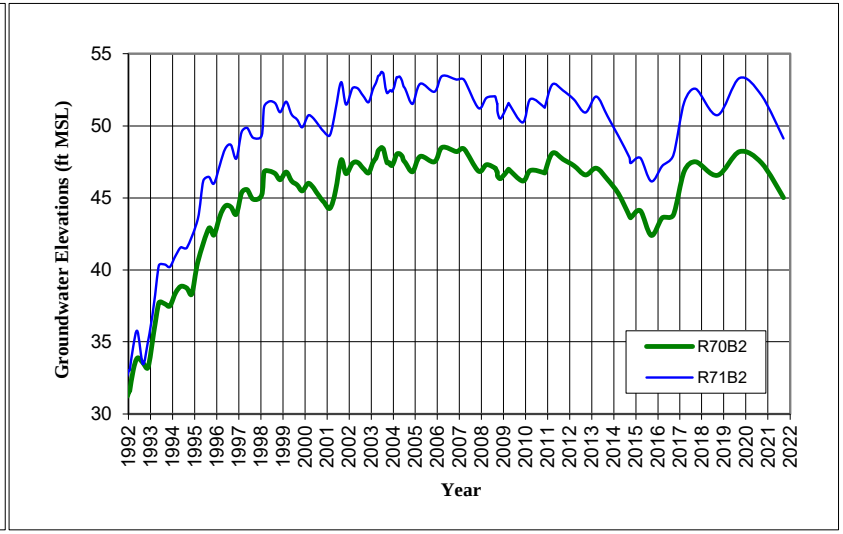


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B2 ZONE WELLS

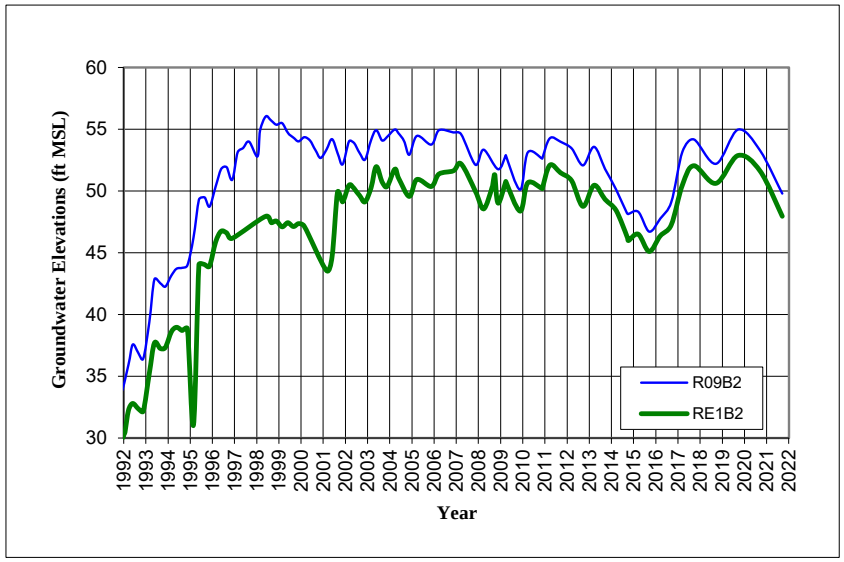




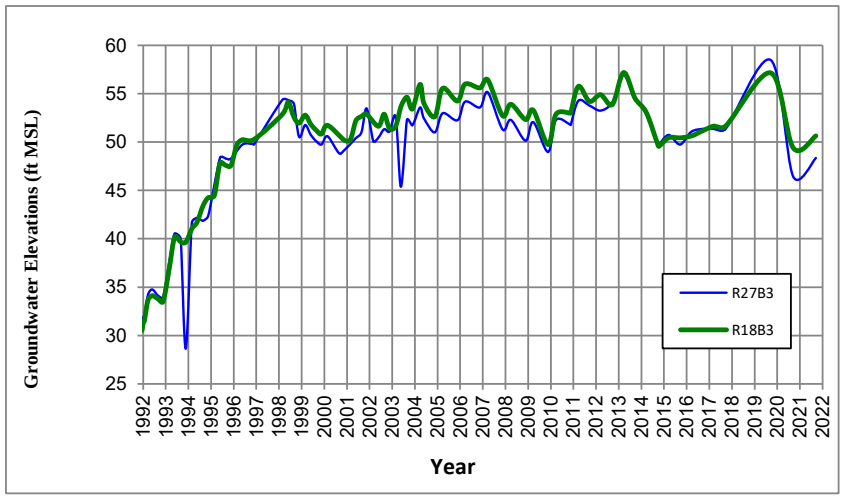


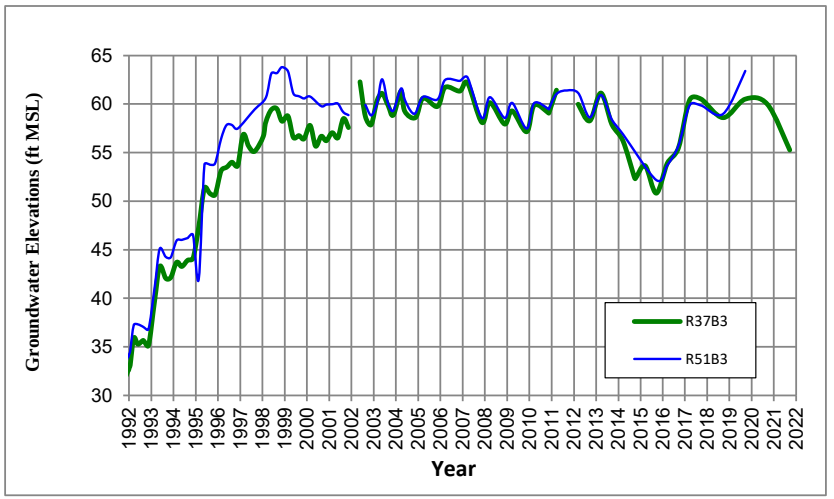


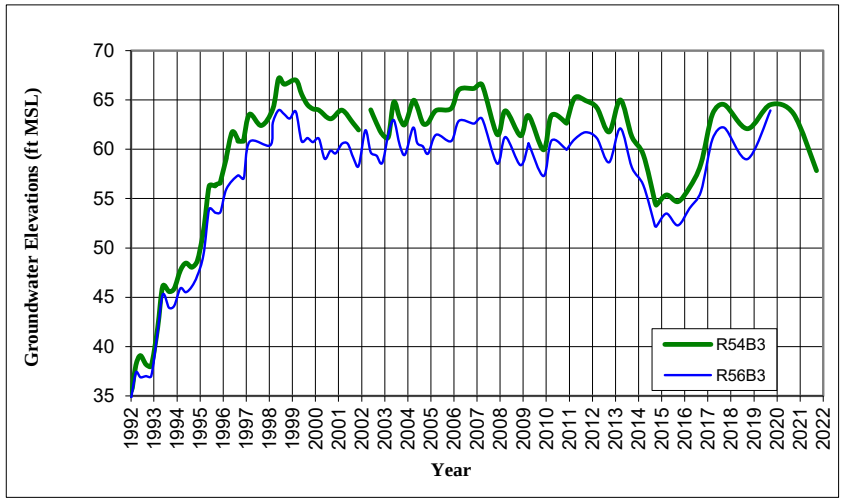
APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B2 ZONE WELLS

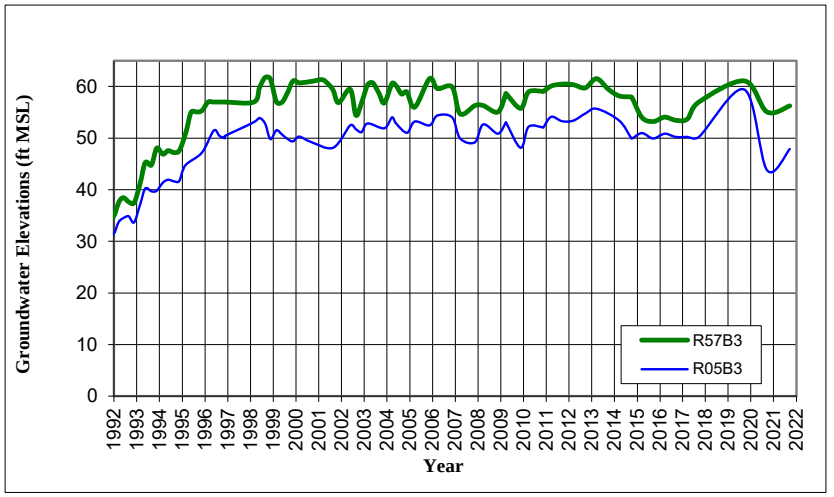


APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B3 ZONE WELLS

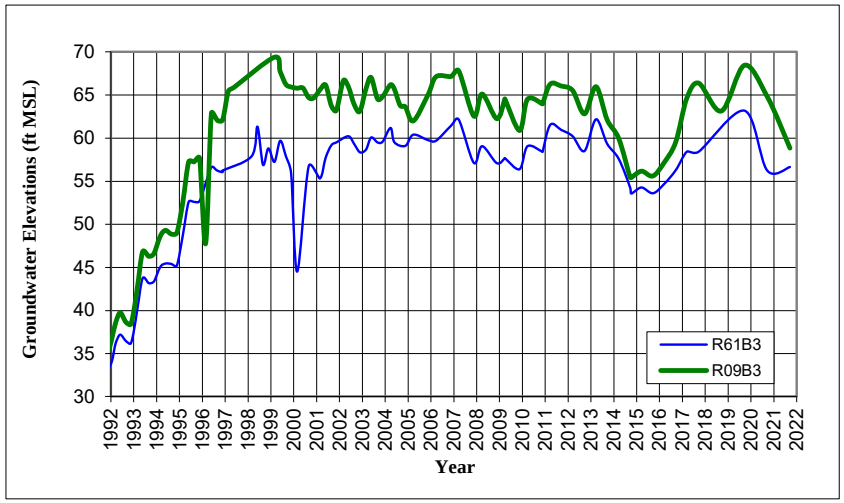








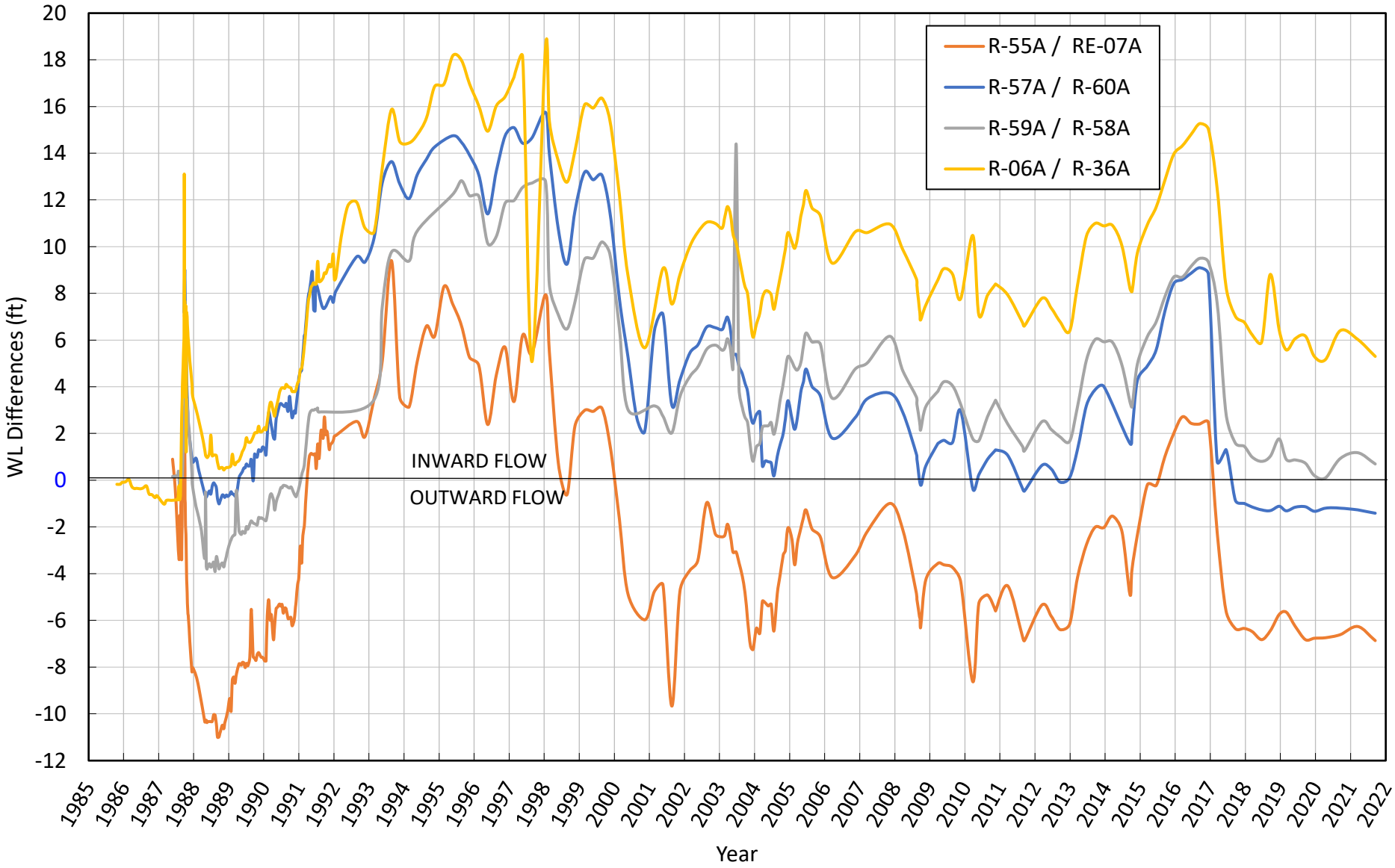
APPENDIX C
HISTORICAL GROUNDWATER ELEVATIONS IN B3 ZONE WELLS



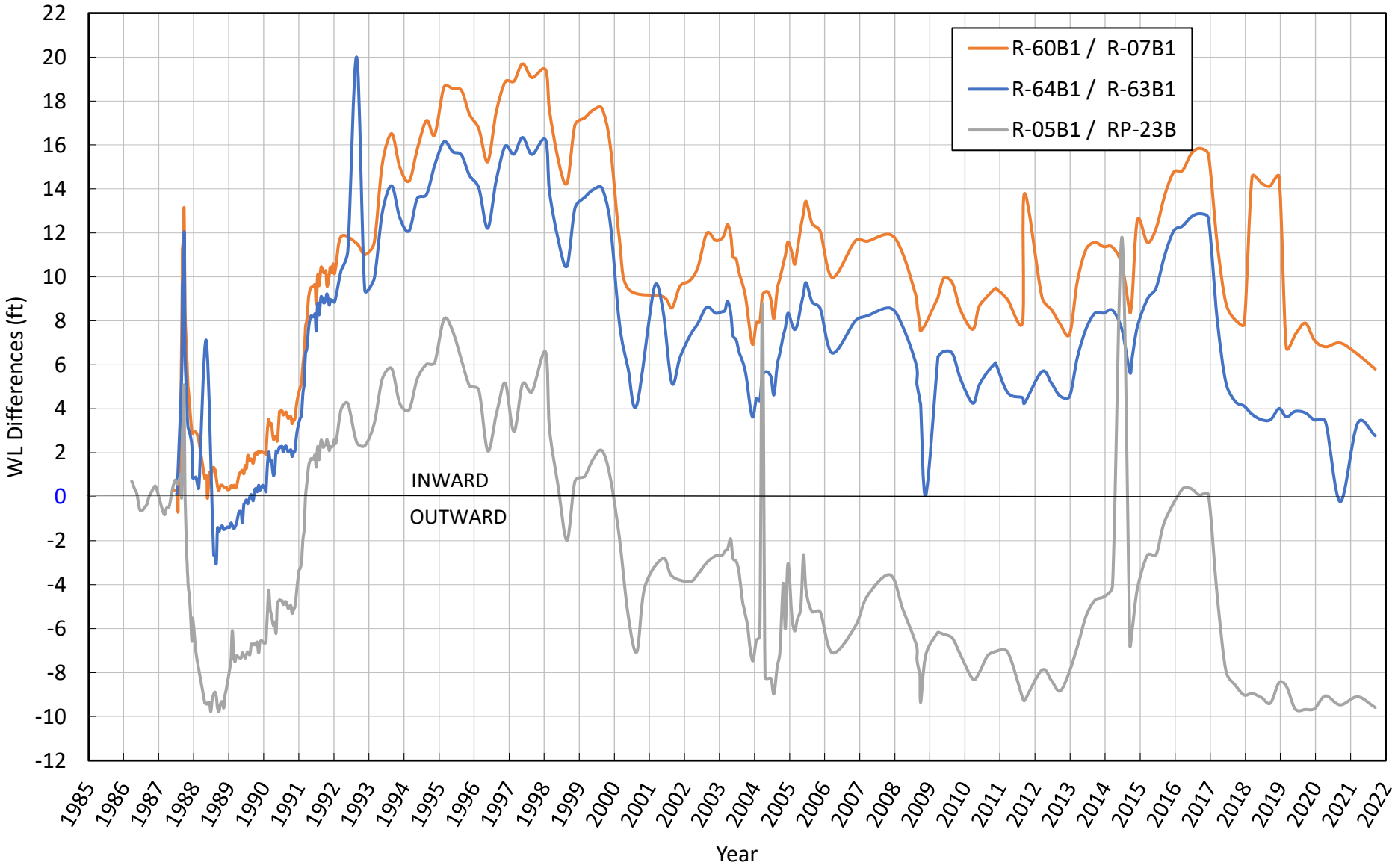
APPENDIX D

Groundwater Level Differences Across the Slurry Wall and Water-Bearing Zones

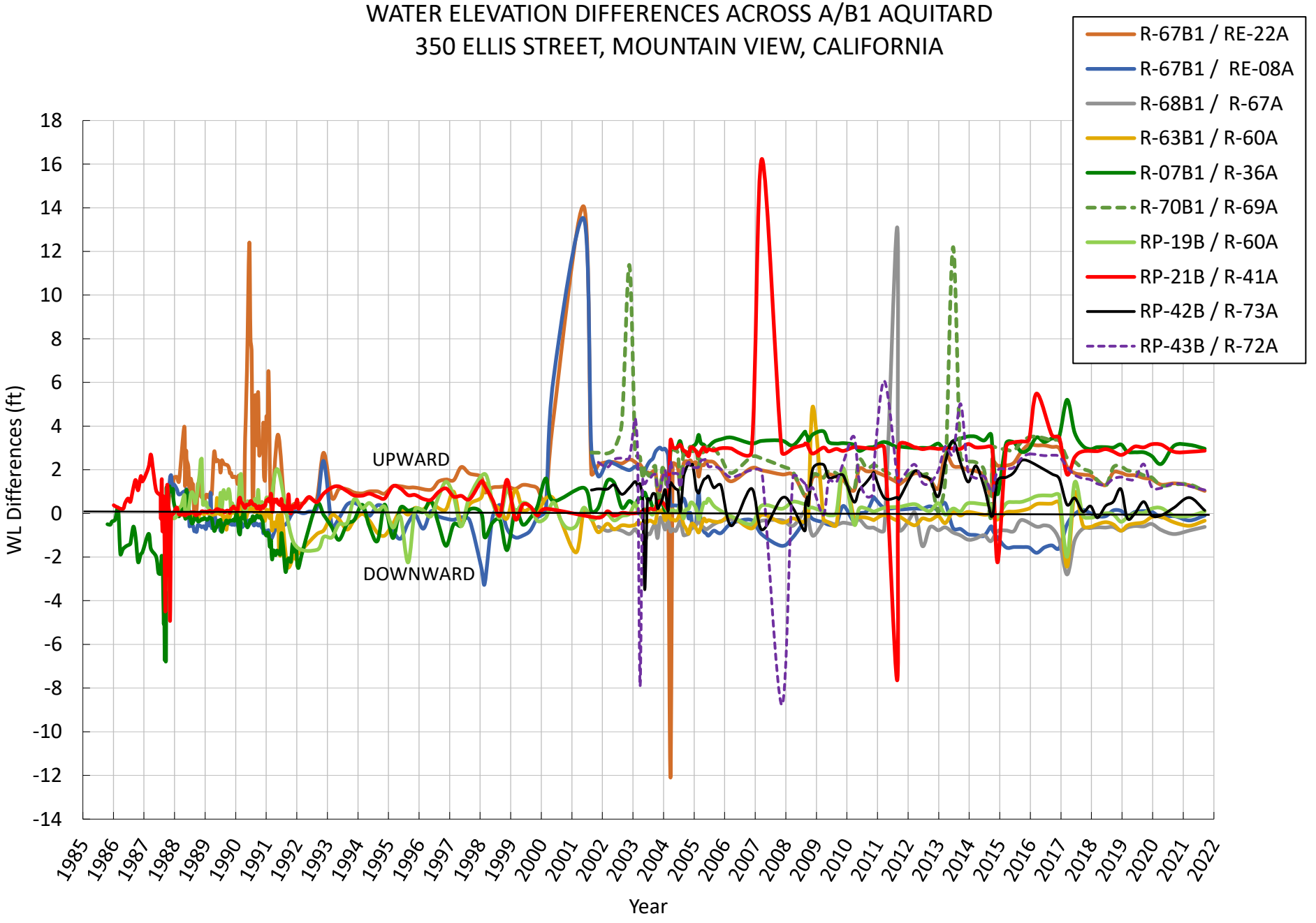
APPENDIX D
WATER ELEVATION DIFFERENCES ACROSS THE SLURRY WALL IN THE A ZONE
350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA



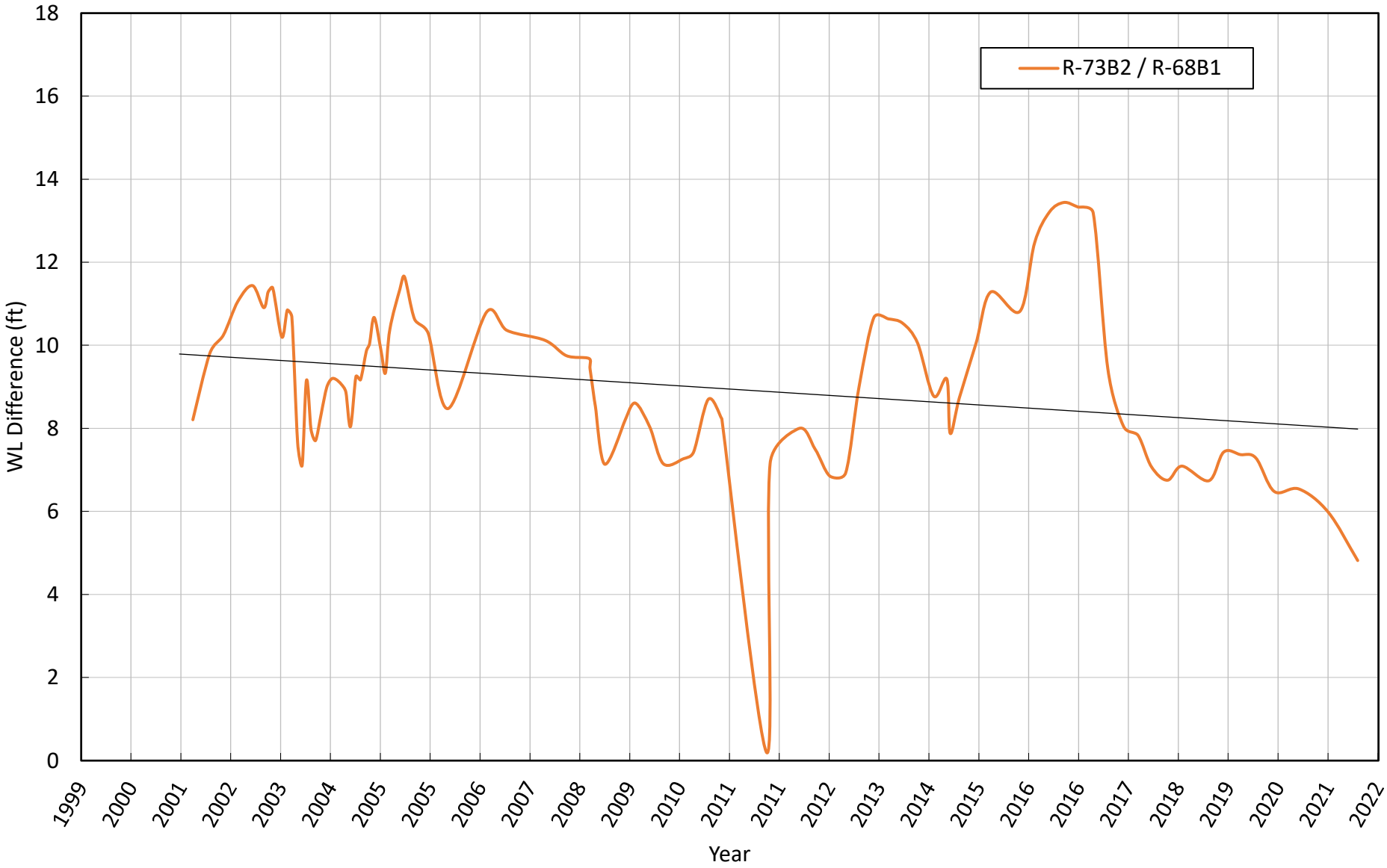
APPENDIX D
WATER ELEVATION DIFFERENCES ACROSS THE SLURRY WALL IN THE B1 ZONE
350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA



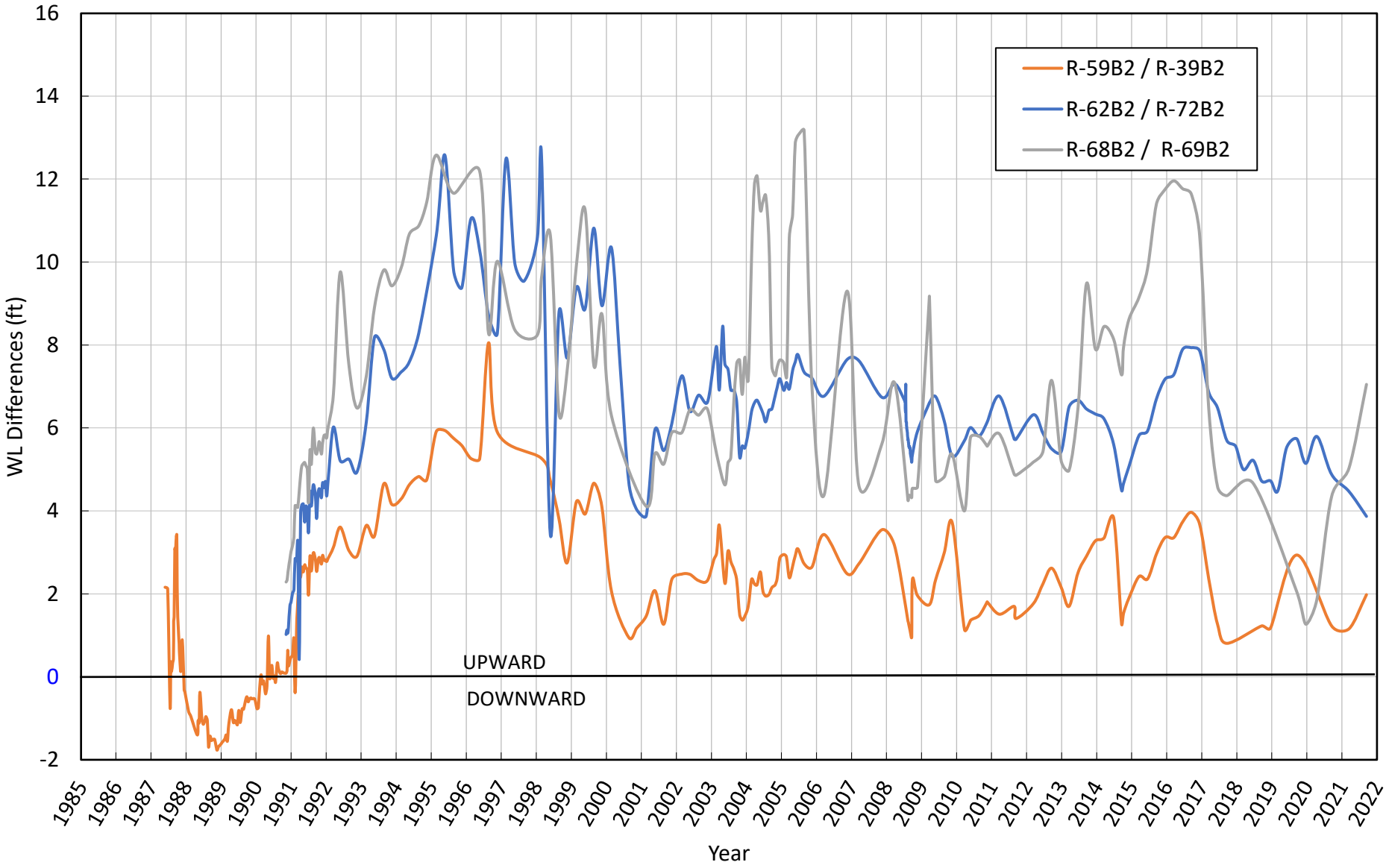
APPENDIX D
WATER ELEVATION DIFFERENCES ACROSS A/B1 AQUITARD
350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA



APPENDIX D
WATER ELEVATION DIFFERENCE ACROSS B1/B2 AQUITARD
350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA



APPENDIX D
WATER ELEVATION DIFFERENCES BETWEEN UPPER AND LOWER B2 ZONE
350 ELLIS STREET, MOUNTAIN VIEW, CALIFORNIA



APPENDIX E

2021 Quality Assurance/Quality Control Reports

Haley & Aldrich, Inc.
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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View, CA

Project Description: NPDES Monthly Groundwater

Sample Date(s): 5 January 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 14 January 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-68490-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review.*

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-68490-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-68490-1, dated 14 January 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- The lab report was revised to include a Detection Summary form.
- Samples were analyzed at the TestAmerica Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-010521	TB	320-68490-1	1/5/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days unpreserved, 14 days preserved
RAY350-EFT-010521	N	320-68490-2	1/5/2021	Groundwater		
RAY350-MID1-010521	N	320-68490-3	1/5/2021	Groundwater		
RAY350-INF-010521	N	320-68490-4	1/5/2021	Groundwater		

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

Cooler temperature on arrival to the laboratory was: 1.1, 1.0 degrees Celsius.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Only detected analytes were reported from a dilution.

1.4 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.5 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS/LCSD	EPA 8260B	347634	Acetone	184%/173%	NA	None, samples ND.
LCSD			1,2-Dibromo-3-Chloropropane	RPD=19%	NA	None, samples ND.
LCSD		347739	Chloromethane	RPD=20%	NA	None, samples ND.

1.6 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.7 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred with the following exceptions:

Blank Type	Batch ID	Analyte Detected in Blank	Concentration	Qualifier	Affected Samples
Method Blank	347634	Acetone	15.6 ug/L	NA	None, samples all ND.

The analysis of the blank samples for field quality control was free of target compounds.

1.8 LABORATORY AND FIELD DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. No client samples were used for laboratory duplicate analysis in this SDG.

No field duplicates were collected in this data set.

1.9 PRECISION AND ACCURACY

Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample. Some measurement of analytical precision was reported with the site samples.

Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries. Some measurement of analytical accuracy was reported with the site samples.

1.10 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objects for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.1 Reporting Basis (Wet/Dry)
  - Soil samples can be reported on either a wet (as received) or dry weight basis. Dry weight data indicate calculations were made to compensate for the moisture content of the soil sample.
  - Percent (%) solids should be appropriately considered when evaluating analytical results for non-aqueous samples. Sediments with high moisture content may or may not be successfully analyzed by routine analytical methods. Samples should have ≥ 30% solids to be appropriately quantified.
- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
  - For inorganic methods, when a matrix spike recovery falls outside of the control limits and the sample result is less than four times the spike added, a post digestion spike (PDS) is performed.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Analysis of PFAS compliant with QSM 5.3 Table B-15 requires instrument blanks that are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess contamination that could occur in the LC/MS/MS instrument.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/cm3 microgram per centimeter cubed
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW Groundwater
  - IA Indoor Air
  - SE Sediment
  - SO Soil
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph
  - GPC Gel Permeation Chromatography
  - ICAL Initial Calibration
  - ICB Initial Calibration Blank
  - ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
  - ICV Initial Calibration Verification
  - ICVL Initial Calibration Verification Low

- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.

References

1. United States Environmental Protection Agency, 2017c. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-2017-002. January.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View, CA

Project Description: NPDES GWET Optimization

Sample Date(s): 23 February 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 3 March 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-70399-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review.*

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-70399-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-70399-1, dated 28 February 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples were analyzed for VOCs at the TestAmerica Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
RAY350-MID1-15-1-022321	N	320-70399-1	2/23/2021	Groundwater	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days unpreserved; 14 days preserved
RAY350-MID1-15-2-022321	N	320-70399-2	2/23/2021	Groundwater		
RAY350-MID1-25-1-022321	N	320-70399-3	2/23/2021	Groundwater		
RAY350-MID1-25-2-022321	N	320-70399-4	2/23/2021	Groundwater		

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The CCV recovered above the upper control limit for Dichlorodifluoromethane. The samples associated with this CCV were non-detects for the affected analyte; therefore, the data have been reported.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol with the following exceptions:

- Samples were received above recommended temperature. As samples were delivered same day as collection and there is evidence chilling had begun, no action is required.

Cooler temperature on arrival to the laboratory was: **11.5**; 2.1 degrees Celsius.

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

No dilutions were performed for the analysis of the samples in this report.

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS	EPA 8260B	350640	1,3-Dichloropropane	124%	NA	None, samples ND.
LCS/LCSD			Dichlorodifluoromethane	191%/207%	NA	None, samples ND.

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred with the following exceptions:

Blank Type	Batch ID	Analyte Detected in Blank	Concentration (ug/L)	Qualifier	Affected Samples
Method Blank	350640	1,2,4-Trimethylbenzene	0.0930 J	**RL U**	**320-70399-1, 2, 3**
		n-Propylbenzene	0.105 J	**RL U**	**320-70399-1**
		Vinyl acetate	0.725 J	NA	None, samples ND.

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.10 PRECISION AND ACCURACY

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.11 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
RAY350-MID1-15-1-022321	n-Propylbenzene	0.10 JB	0.30 U	Method Blank Contamination
RAY350-MID1-15-1-022321	1,2,4-Trimethylbenzene	0.092 JB	0.30 U	
RAY350-MID1-15-2-022321		0.092 JB	0.30 U	
RAY350-MID1-25-1-022321		0.092 JB	0.30 U	

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/cm3 microgram per centimeter cubed
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW Groundwater
  - IA Indoor Air
  - SE Sediment
  - SO Soil
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph
  - GPC Gel Permeation Chromatography
  - ICAL Initial Calibration
  - ICB Initial Calibration Blank
  - ICP/MS Inductively Coupled Plasma/ Mass Spectrometry

- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.

References

1. United States Environmental Protection Agency, 2017c. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-2017-002. January.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View, CA

Project Description: Groundwater NPDES Samples

Sample Date(s): 23 February 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 26 Febraury 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-70401-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-70401-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-70401-1, dated 26 February 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- All samples were analyzed at the TestAmerica Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-022321	TB	320-70401-1	2/23/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days un-preserved; 14 days preserved
RAY350-EFT-022321	N	320-70401-2	2/23/2021	Groundwater		
RAY350-MID1-022321	N	320-70401-3	2/23/2021	Groundwater		
RAY350-INF-022321	N	320-70401-4	2/23/2021	Groundwater		
RAY350-DUP-1-022321	FD	320-70401-5	2/23/2021	Groundwater		

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The continuing calibration verification (CCV) recovered above the upper control limit for Dichlorodifluoromethane. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol with the following exceptions:

- The cooler arrived above temperature. As samples were received the same day as sample collection and there is evidence chilling had begun, no action is required.
- All samples were received unpreserved and presented a pH between 5-8. All samples were analyzed within the 7-day unpreserved holding time; therefore, no action is required.

Cooler temperature on arrival to the laboratory was: **11.5,** 2.1 **degrees Celsius.**

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Only detected analytes were reported from a dilution.

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS	EPA 8260B	350472	Dichlorobromomethane	122%	NA	None, samples ND
LCS/LCSD			1,3-Dichloropropane	130%/135%	NA	None, samples ND
LCS/LCSD			Ethylene dibromide	128%/133%	NA	None, samples ND
LCS/LCSD			Dichlorodifluoromethane	207%/187%	NA	None, samples ND
LCS/LCSD			cis-1,3-Dichloropropene	121%/122%	NA	None, samples ND
LCSD			2-Butanone (MEK)	RPD=31	NA	None, samples ND
LCSD			trans-1,3-Dichloropropene	129%	NA	None, samples ND
LCSD			1,1,2,2-Tetrachloroethane	129%	NA	None, samples ND
LCSD			1,1,2-Trichloroethane	129%	NA	None, samples ND
LCS		350640	1,3-Dichloropropane	124%	NA	None, samples ND
LCS/LCSD			Dichlorodifluoromethane	191%/207%	NA	None, samples ND

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred with the following exceptions:

Blank Type	Batch ID	Analyte Detected in Blank	Concentration (ug/L)	Qualifier	Affected Samples
Method Blank	350472	Trichloroethene	0.127 J	**RL U**	**320-70401-1**
		N-Propylbenzene	0.105 J	**RL U**	**320-70401-1**
		1,2,4-Trimethylbenzene	0.0923 J	NA	None, sample ND.
	350640	N-Propylbenzene	0.105 J	**RL U**	**320-70401-2, 3, 4, 5**
		1,2,4-Trimethylbenzene	0.0930 J	**RL U**	**320-70401-2, 3, 4, 5**
		Vinyl acetate	0.725 J	NA	None, samples ND.
	350652	Trichloroethene	0.0957 J	NA	None, samples >10x blank.

The analysis of the blank samples for field quality control was free of target compounds, with the following exceptions:

Blank Type	Date of Blank	Analyte Detected in Blank	Concentration (ug/L)	Qualifier	Affected Samples
Trip Blank	2/23/2021	n-Propylbenzene	0.10 JB	NA	None, qualified ND by MB
		Trichloroethene	0.11 JB	NA	None, qualified ND by MB

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP.

The following sample(s) were used for field duplicate analysis. The RPD comparison for detections in either the parent or duplicate sample(s) is shown below. RPDs were all below 35 percent for water (or the absolute difference rule was satisfied if detects were less than 5x the RL). Any exceptions are noted below and qualified.

Field Duplicate RPD Calculations:

Method(s): EPA 8260B				
Analyte (µg/L)	**Primary Sample ID**	**Duplicate Sample ID**	**% RPD**	**Qualification**
	RAY350-INF-022321	**RAY350-DUP-1-022321**		
1,1,1-Trichloroethane	**0.83**	**0.85**	NA	None, Abs. Diff. < RL
1,1,2-Trichloroethane	**0.28**	**0.27**	NA	None, Abs. Diff. < RL
1,1-Dichloroethane	**4.6**	**4.7**	2	None, RPD < 35%
1,1-Dichloroethene	**6.4**	**6.6**	3	None, RPD < 35%
1,2,4-Trimethylbenzene	0.092 JB*	0.092 JB*	NA	None, Both ND
1,2-Dichlorobenzene	**2.6**	**2.7**	4	None, RPD < 35%
1,2-Dichloroethane	0.20 U	**0.071 J**	NA	None, Abs. Diff. < RL
1,3-Dichlorobenzene	**0.26 J**	**0.25 J**	NA	None, Abs. Diff. < RL
2-Butanone	**120**	10 U	NA	**J/UJ, Abs Diff > RL**
Benzene	**0.069 J**	**0.067 J**	NA	None, Abs. Diff. < RL
Chloroform	**0.57**	**0.62**	NA	None, Abs. Diff. < RL
cis-1,2-Dichloroethene	**610**	**580**	5	None, RPD < 35%
n-Propylbenzene	0.10 JB*	0.10 JB*	NA	None, Both ND
Tetrachloroethene	**2.3**	**2.4**	NA	None, Abs. Diff. < RL
trans-1,2-Dichloroethene	**53**	**53**	0	None, RPD < 35%
Trichloroethene	**2000**	**2000**	0	None, RPD < 35%
Trifluorotrichloroethane	**15**	**15**	0	None, RPD < 35%
Vinyl chloride	**17**	**17**	0	None, RPD < 35%
All Remaining VOCs	ND U	ND U	NA	None, Both ND

** Qualified non-detect (ND) based on method blank contamination.*

1.10 PRECISION AND ACCURACY

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.11 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
RAY350-EFT-022321	1,2,4-Trimethylbenzene	0.091 JB	0.30 U	Method Blank Contamination
RAY350-MID1-022321		0.091 JB	0.30 U	
RAY350-INF-022321		0.092 JB	0.30 U	
RAY350-DUP-1-022321		0.092 JB	0.30 U	
TRIPBLANK-022321	n-Propylbenzene	0.10 JB	0.30 U	
RAY350-EFT-022321		0.10 JB	0.30 U	
RAY350-MID1-022321		0.10 JB	0.30 U	
RAY350-INF-022321		0.10 JB	0.30 U	
RAY350-DUP-1-022321		0.10 JB	0.30 U	
TRIPBLANK-022321	Trichloroethene	0.11 JB	0.20 U	
RAY350-INF-022321	2-Butanone (MEK)	120	120 J	Field Duplicate Absolute Difference
RAY350-DUP-1-022321		10 U	10 UJ	

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
  - For inorganic methods, when a matrix spike recovery falls outside of the control limits and the sample result is less than four times the spike added, a post digestion spike (PDS) is performed.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Analysis of PFAS compliant with QSM 5.3 Table B-15 requires instrument blanks that are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess contamination that could occur in the LC/MS/MS instrument.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent

recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/cm3 microgram per centimeter cubed
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW Groundwater
  - IA Indoor Air
  - SE Sediment
  - SO Soil
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph
  - GPC Gel Permeation Chromatography
  - ICAL Initial Calibration
  - ICB Initial Calibration Blank
  - ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
  - ICV Initial Calibration Verification

- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.

References

1. United States Environmental Protection Agency, 2017c. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-2017-002. January.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View CA (Raytheon)

Project Description: NPDES Groundwater Samples

Sample Date(s): 9 March 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 30 July 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-70961-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-70961-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-70961-1, dated 30 July 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples were analyzed at the TestAmerica Seattle facility.
- The low detection for Trichloroethene (TCE) in the Influent sample (320-70961-4), reported at 33 ug/L from the 100x dilution, did not agree with historical data. Upon inquiry, the laboratory investigated and found the concentration exceeded the calibration range for the 1x (at 268 ug/L) and 10x (1400 ug/L) dilutions and was therefore reported from the 100x dilution (33 ug/L). The concentration from the 10x dilution aligned better with historical concentrations; therefore, the laboratory revised the lab report to report the result from both the 10x and 100x dilutions. The result from the 10x dilution was "E" flagged, indicating the concentration exceeded the calibration range. **The result should be qualified estimated "J".**

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-030921	TB	320-70961-1	3/9/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days unpreserved; 14 days preserved
RAY350-EFT-030921	N	320-70961-2	3/9/2021	Groundwater		
RAY350-MID1-030921	N	320-70961-3	3/9/2021	Groundwater		
RAY350-INF-030921	N	320-70961-4	3/9/2021	Groundwater		

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol with the following exceptions:

- All samples were received unpreserved and presented a pH between 5-8. All samples were analyzed within the 7-day unpreserved holding time; therefore, no action is required.

Cooler temperature on arrival to the laboratory was: 5.9; 3.0/3.4 degrees Celsius.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below.

Sample ID	Lab ID	Analyte/ Method	Dilution Factor	Issue/Explanation
RAY350-INF-030921	320-70961-4	Methylene chloride	100x	Dilution required to bring the concentration of target analytes within the calibration range.
		Most VOCs	1x	This sample was analyzed at a reduced volume due to high concentrations. An initial volume adjustment was used rather than a dilution. Elevated limits are reported.

1.4 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.5 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS/LCSD	EPA 8260B	351817	Methylene chloride	56%/60%	**UJ**	**320-70961-1**

1.6 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.7 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred. The analysis of the blank samples for field quality control was free of target compounds.

1.8 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.9 PRECISION AND ACCURACY

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.10 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
RAY350-INF-030921	Trichloroethene	1400 E	1400 J	Exceeds Calibration Range
TRIPBLANK-030921	Methylene Chloride	ND U	ND UJ	Low Laboratory Control Sample Recovery

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/cm3 microgram per centimeter cubed
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW Groundwater
  - IA Indoor Air
  - SE Sediment
  - SO Soil
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph
  - GPC Gel Permeation Chromatography
  - ICAL Initial Calibration
  - ICB Initial Calibration Blank
  - ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
  - ICV Initial Calibration Verification

- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.

References

1. United States Environmental Protection Agency, 2017c. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-2017-002. January.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View CA (Raytheon)

Project Description: NPDES Groundwater Samples

Sample Date(s): 5 April 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 30 July 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-72085-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-72085-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-72085-1, dated 30 July 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples were analyzed at the TestAmerica Seattle facility.
- The ND result for Trichloroethene (TCE) in the Influent sample (320-72085-4) did not agree with historical data. Upon inquiry, the laboratory investigated and found TCE was detected at a very high concentration that exceeded the calibration range but was incorrectly integrated by the analyst. The lab report was revised to properly report the TCE result at a concentration of 1500 ug/L (from the 100x dilution).

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Date	Matrix	Methods	Holding Time
TRIPBLANK-040521	TB	320-72085-1	4/5/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days un-preserved; 14 days preserved
RAY350-EFT-040521	N	320-72085-2	4/5/2021	Groundwater		
RAY350-MID1-040521	N	320-72085-3	4/5/2021	Groundwater		
RAY350-INF-040521	N	320-72085-4	4/5/2021	Groundwater		

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol with the following exceptions:

Method	Matrix	Holding Time	Preservation	Sample ID, Violation, Qualification
EPA 8260B	Water	7 days unpreserved; 14 days preserved	Cool to ≤ 6 °C; pH < 2 with Hydrochloric Acid (HCl); No Headspace	All samples were received unpreserved and presented a pH between 5-8. Analysis was performed within 7 days per EPA recommendation. No action required.

Cooler temperature on arrival to the laboratory was: 3.4, 1.6 degrees Celsius.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Only detected analytes were reported from a dilution.

1.4 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.5 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R/RPD	Qualifier	Affected Samples
LCSD	EPA 8260B	353797	Most VOCs	High RPD	NA	None, sample ND.
LCSD			1,1,1-Trichloroethane	RPD=18%	**J**	**320-72085-4**
LCSD			1,1-Dichloroethane	RPD=18%	**J**	**320-72085-4**
LCSD			1,2-Dichlorobenzene	RPD=22%	**J**	**320-72085-4**
LCSD			1,3-Dichlorobenzene	RPD=23%	**J**	**320-72085-4**
LCSD			1,4-Dichlorobenzene	RPD=24%	**J**	**320-72085-4**
LCSD			Benzene	RPD=21%	**J**	**320-72085-4**
LCSD			Chloroform	RPD=18%	**J**	**320-72085-4**
LCSD			Tetrachloroethene	RPD=21%	**J**	**320-72085-4**
LCSD			Toluene	RPD=22%	**J**	**320-72085-4**
LCSD		354155	cis-1,2-Dichloroethene	RPD=25%	**J**	**320-72085-4**
LCSD			Trichloroethene	RPD=22%	**J**	**320-72085-4**

1.6 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.7 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred with the following exceptions:

Blank Type	Batch ID	Analyte Detected in Blank	Concentration	Qualifier	Affected Samples
Method Blank	353797	Ethylbenzene	0.0341 J ug/L	**RL U**	**320-72085-4**
	353890	Ethylbenzene	0.0413 J ug/L	**RL U**	**320-72085-1, 2, 3**

The analysis of the blank samples for field quality control was free of target compounds, with the following exceptions:

Blank Type	Date of Blank	Analyte Detected in Blank	Concentration	Qualifier	Affected Samples
Trip Blank	4/5/2021	Ethylbenzene	0.041 JB ug/L	NA	None, qualified ND by MB

1.8 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.9 PRECISION AND ACCURACY

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.10 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
TRIPBLANK-040521	Ethylbenzene	0.041 JB	0.20 U	Method Blank Contamination
RAY350-EFT-040521		0.037 JB	0.20 U	
RAY350-MID1-040521		0.037 JB	0.20 U	
RAY350-INF-040521		0.061 JB	0.20 U	
RAY350-INF-040521	1,1,1-Trichloroethane	0.96	0.96 J	Laboratory Control Sample RPD Exceedance
	1,1-Dichloroethane	6.0	6.0 J	
	1,2-Dichlorobenzene	12	12 J	
	1,3-Dichlorobenzene	0.13 J	0.13 J	
	1,4-Dichlorobenzene	2.1	2.1 J	
	Benzene	0.055 J	0.055 J	
	Chloroform	0.43	0.43 J	
	cis-1,2-Dichloroethene	790	790 J	
	Tetrachloroethene	2.6	2.6 J	
	Trichloroethene	1500	1500 J	
	Toluene	0.22	0.22 J	

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/cm3 microgram per centimeter cubed
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW Groundwater
  - IA Indoor Air
  - SE Sediment
  - SO Soil
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph
  - GPC Gel Permeation Chromatography
  - ICAL Initial Calibration
  - ICB Initial Calibration Blank
  - ICP/MS Inductively Coupled Plasma/ Mass Spectrometry

- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View CA (Raytheon)

Project Description: Groundwater Samples

Sample Date(s): 14 May 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 20 May 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-73700-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-73700-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-73700-1, dated 20 May 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples were analyzed at the Eurofins FGS Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-051421	TB	320-73700-1	5/14/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days unpreserved; 14 days preserved
RAY350-EFT-051421	N	320-73700-2	5/14/2021	Groundwater		
RAY350-MID1-051421	N	320-73700-3	5/14/2021	Groundwater		
RAY350-INF-051421	N	320-73700-4	5/14/2021	Groundwater		
RAY350-DUP-1-051421	FD	320-73700-5	5/14/2021	Groundwater		

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The CCV recovered above the upper control limit for Carbon tetrachloride, Vinyl chloride, Dichlorodifluoromethane, Chlorodibromomethane, Bromoform and 1,2-Dibromo-3-Chloropropane, 1,1-Dichloroethene and Vinyl chloride.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

Cooler temperature on arrival to the laboratory was: 3.6; 3.1/2.9 degrees Celsius.

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below.

Sample ID	Lab ID	Analyte/Method	Dilution Factor	Issue/Explanation
RAY350-INF-051421	320-73700-4	1,1-Dichloroethene	250x	Dilution required due to high target analyte concentrations.
RAY350-DUP-1-051421	320-73700-5			
RAY350-INF-051421	320-73700-4	All Other VOCs	25x	
RAY350-DUP-1-051421	320-73700-5			

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qual.	Affected Samples
LCS/LCSD	EPA 8260B	356712	Carbon disulfide	136%/135%	NA	None, samples ND
LCS/LCSD			Carbon tetrachloride	128%/126%	NA	None, samples ND
LCS			Chlorodibromomethane	130%	NA	None, samples ND
LCS/LCSD			Dichlorodifluoromethane	146%/138%	NA	None, samples ND
LCS			1,1-Dichloroethene	126%	NA	None, samples ND
LCS			Trichlorotrifluoroethane	132%	NA	None, samples ND
LCS			Bromoform	133%	NA	None, samples ND
LCS			Trichlorofluoromethane	124%	NA	None, samples ND
LCS/LCSD		356790	Bromoform	142%/137%	NA	None, samples ND
LCS/LCSD			Carbon disulfide	139%/140%	NA	None, samples ND
LCS/LCSD			Carbon tetrachloride	131%/127%	NA	None, samples ND
LCS/LCSD			Chlorodibromomethane	136%/133%	NA	None, samples ND
LCS/LCSD			1,2-Dibromo-3-Chloropropane	128%/126%	NA	None, samples ND
LCS/LCSD			Dichlorodifluoromethane	137%/130%	NA	None, samples ND
LCS			1,1-Dichloroethene	121%	NA	None, samples ND
LCS			Trichlorofluoromethane	125%	NA	None, samples ND
LCS		356985	Carbon tetrachloride	129%	NA	None, not associated
LCS			Chlorodibromomethane	127%	NA	
LCSD			Various VOCs	RPD=High	NA	

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred with the following exceptions:

Blank Type	Batch ID	Analyte Detected in Blank	Concentration (µg/L)	Qualifier	Affected Samples
Method Blank	356712	Dichlorobromomethane	0.104 J	**RL U**	**320-73700-1**
		trans-1,3-Dichloropropene	0.116 J	**RL U**	**320-73700-1, 2**
	356790	trans-1,3-Dichloropropene	0.116 J	**RL U**	**320-73700-4**
	356985	Dichlorobromomethane	0.104 J	NA	None, not reported.
		trans-1,3-Dichloropropene	0.117 J	NA	None, not reported.

The analysis of the blank samples for field quality control was free of target compounds, with the following exceptions:

Blank Type	Date of Blank	Analyte Detected in Blank	Concentration (µg/L)	Qualifier	Affected Samples
Trip Blank	5/14/21	Dichlorobromomethane	0.11 JB	NA	None, qualified ND by MB
		trans-1,3-Dichloropropene	0.12 JB	NA	None, qualified ND by MB

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP.

The following sample(s) were used for field duplicate analysis. The RPD comparison for detections in either the parent or duplicate sample(s) is shown below. RPDs were all below 35 percent for water (or the absolute difference rule was satisfied if detects were less than 5x the RL).

Field Duplicate RPD Calculations:

Method(s): EPA 8260B				
Analyte (µg/L)	**Primary Sample ID**	**Duplicate Sample ID**	**% RPD**	**Qualification**
	RAY350-INF-051421	**RAY350-DUP-1-051421**		
1,1,1-Trichloroethane	**0.97 J**	**0.91 J**	NA	None, Abs. Diff. < RL
1,1-Dichloroethane	**5.4**	**5.6**	NA	None, Abs. Diff. < RL
1,2-Dichlorobenzene	**7.9**	**7.8**	NA	None, Abs. Diff. < RL
Bromodichloromethane	5.0 U	**2.6 J**	NA	None, Abs. Diff. < RL
cis-1,2-Dichloroethene	**710**	**700**	1	None, RPD < 35%
Tetrachloroethene	**2.5 J**	**2.6 J**	NA	None, Abs. Diff. < RL
trans-1,2-Dichloroethene	**62**	**64**	3	None, RPD < 35%
trans-1,3-Dichloropropene	**2.9 J***	5.0 U	NA	None, Both ND
Trichloroethene	**1600**	**1600**	0	None, RPD < 35%
Trifluorotrichloroethane	**16**	**17**	NA	None, Abs. Diff. < RL
Vinyl chloride	**28**	**23**	NA	None, Abs. Diff. < RL
All Remaining VOCs	ND U	ND U	NA	None, Both ND

**** Qualified non-detect (ND) based on method blank contamination.***

1.10 PRECISION AND ACCURACY

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.11 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
TRIPBLANK-051421	Bromodichloromethane	0.11 JB	0.20 U	Method Blank Contamination
TRIPBLANK-051421	trans-1,3-Dichloropropene	0.12 JB	0.20 U	
RAY350-EFT-051421		0.11 JB	0.20 U	
RAY350-INF-051421		2.9 JB	5.0 U	

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/cm3 microgram per centimeter cubed
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View, CA

Project Description: Groundwater NPDES Samples

Sample Date(s): 3 June 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 10 June 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-74507-1
2. Precision and Accuracy [for SDG(s) above]

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-74507-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-74507-1, dated 8 June 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples were analyzed at the Eurofins FGS, Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-060321	TB	320-74507-1	6/3/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days un-preserved, 14 days preserved
RAY350-EFT-060321	N	320-74507-2	6/3/2021	Groundwater		
RAY350-MID1-060321	N	320-74507-3	6/3/2021	Groundwater		
RAY350-INF-060321	N	320-74507-4	6/3/2021	Groundwater		

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

Cooler temperature on arrival to the laboratory was: 5.7; 0.1 degrees Celsius.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Only detected analytes were reported from a dilution.

1.4 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.5 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS/LCSD	EPA 8260B	358354	Bromoform	134%/133%	NA	None, samples ND.
LCS/LCSD			1,2-Dibromo-3-Chloropropane	136%/127%	NA	None, samples ND.
LCS			Naphthalene	125%	NA	None, samples ND.
LCSD			2,2-Dichloropropane	RPD=20%	NA	None, samples ND.

1.6 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.7 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred. The analysis of the blank samples for field quality control was free of target compounds.

1.8 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.9 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

2. Precision and Accuracy [for SDG(s) above]

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
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- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: 350 Ellis St. – MEW

Project Description: Groundwater NPDES Samples

Sample Date(s): 6 July 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 13 September 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-75779-1
2. Precision and Accuracy [for SDG(s) above]

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-75779-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-75779-1, dated 15 July 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples were analyzed in the Eurofins Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-070621	TB	320-75779-1	7/6/2021	Groundwater	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days unpreserved; 14 days preserved
RAY350-EFT-070621	N	320-75779-2	7/6/2021	Groundwater		
RAY350-MID1-070621	N	320-75779-3	7/6/2021	Groundwater		
RAY350-INF-070621	N	320-75779-4	7/6/2021	Groundwater		

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The ICV recovered above the upper control limit for various VOCs. The associated samples were ND for the affected analytes; therefore, the data was reported.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

Cooler(s) temperature on arrival to the laboratory was: 5.3; 0.9 degrees Celsius.

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Only detected analytes were reported from a dilution.

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS	EPA 8260B	361484	Vinyl acetate	142%	NA	None, samples ND.

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred with the following exceptions:

Blank Type	Batch ID	Analyte Detected in Blank	Concentration (µg/L)	Qualifier	Affected Samples
Method Blank	361484	Hexachlorobutadiene	0.0677 J	NA	None, samples ND.

The analysis of the blank samples for field quality control was free of target compounds.

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.10 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

2. Precision and Accuracy [for SDG(s) above]

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
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  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- Ra-226 Radium-226
- Ra-228 Radium-228
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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520.289.8621

Data Usability Summary Report

Project Name: 350 Ellis St. – MEW

Project Description: Groundwater NPDES Samples

Sample Date(s): 19 August 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 13 September 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-77845-1
2. Precision and Accuracy [for SDG(s) above]

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-77845-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-77845-1, dated 27 August 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples were analyzed at the Eurofins Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-081921	TB	320-77845-1	8/19/2021	Groundwater	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days unpreserved; 14 days preserved
RAY350-EFT-081921	N	320-77845-2	8/19/2021	Groundwater		
RAY350-MID1-081921	N	320-77845-3	8/19/2021	Groundwater		
RAY350-INF-081921	N	320-77845-4	8/19/2021	Groundwater		

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The CCV recovered above the upper control limit for Dichlorodifluoromethane. Since the associated samples were ND for this analyte, the data have been reported.
- The CCV recovered below the lower control limit for 1,1-Dichloroethene. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were ND for this analyte, the data have been reported.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

Cooler(s) temperature on arrival to the laboratory was: 3.1; 0.7 degrees Celsius.

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Only detected analytes were reported from a dilution.

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS/LCSD	EPA 8260B	365858	Dichlorodifluoromethane	215%/192%	NA	None, samples ND.
LCSD			Methylene chloride	143%	NA	None, samples ND.

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred. The analysis of the blank samples for field quality control was free of target compounds.

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.10 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

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  - FB Field Blank Sample
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  - ppb v/v parts per billion volume/volume
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  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration

- GC Gas Chromatograph
- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- Ra-226 Radium-226
- Ra-228 Radium-228
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View CA (Raytheon)

Project Description: NPDES Groundwater Samples

Sample Date(s): 9 September 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 8 November 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-78636-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-78636-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-78636-1, dated 16 September 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- The samples were analyzed at the TestAmerica Eurofins FGS, Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-090921	TB	320-78636-1	9/9/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days unpreserved; 14 days unpreserved
RAY350-EFT-090921	N	320-78636-2	9/9/2021	Groundwater		
RAY350-MID1-090921	N	320-78636-3	9/9/2021	Groundwater		
RAY350-INF-090921	N	320-78636-4	9/9/2021	Groundwater		

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The CCV recovered low for 1,1-Dichloroethene. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were ND for this analyte, the data have been reported.
- The CCV recovered high for Dichlorodifluoromethane. The samples were NDs for this analyte; therefore, the data have been reported.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

Cooler(s) temperature on arrival to the laboratory was: 3.0; 2.4/2.6 degrees Celsius.

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below.

Sample ID	Lab ID	Analyte/ Method	Dilution Factor	Issue/Explanation
RAY350-INF-090921	320-78636-4	1,1-Dichloroethene	200x	Dilution required to bring the concentration of target analytes within the calibration range.
		Remaining VOCs	10x	

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS/LCSD	EPA 8260B	367601	Dichlorodifluoromethane	216%/214%	NA	None, samples ND.

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred.

The analysis of the blank samples for field quality control was free of target compounds, with the following exceptions:

Blank Type	Date of Blank	Analyte Detected in Blank	Concentration	Qualifier	Affected Samples
Trip Blank	9/9/2021	Benzene	0.11 J ug/L	**RL U**	**320-78636-2, -4**

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.10 PRECISION AND ACCURACY

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.11 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
RAY350-EFT-090921	Benzene	0.072 J	0.20 U	Trip Blank Contamination
RAY350-INF-090921		0.89 J	2.0 U	

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- Ra-226 Radium-226
- Ra-228 Radium-228
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View CA (Raytheon)

Project Description: NPDES Groundwater Samples

Sample Date(s): 22 October 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 8 November 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-80679-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-80679-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-80679-1, dated 1 November 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples were analyzed at the TestAmerica Eurofins FGS, Seattle facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
TRIPBLANK-102221	TB	320-80679-1	10/22/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days unpreserved; 14 days unpreserved
RAY350-EFT-102221	N	320-80679-2	10/22/2021	Groundwater		
RAY350-MID2-102221	N	320-80679-3	10/22/2021	Groundwater		
RAY350-MID1-102221	N	320-80679-4	10/22/2021	Groundwater		
RAY350-INF-102221	N	320-80679-5	10/22/2021	Groundwater		

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The CCV recovered above the upper control limits for vinyl acetate. The associated samples were ND for this analyte; therefore, the data have been reported.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

Cooler(s) temperature on arrival to the laboratory was: 1.0; 1.3/1.6 degrees Celsius.

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below.

Sample ID	Lab ID	Analyte/ Method	Dilution Factor	Issue/Explanation
RAY350-INF-102221	320-80679-5	VOCs	200x	Dilution required to bring the concentration of target analytes within the calibration range.

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS/LCSD	EPA 8260B	371810	Vinyl acetate	173%/163%	NA	None, samples ND.

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred. The analysis of the blank samples for field quality control was free of target compounds.

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.10 PRECISION AND ACCURACY

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.11 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- Ra-226 Radium-226
- Ra-228 Radium-228
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View CA – Raytheon

Project Description: NPDES Groundwater Samples

Sample Date(s): 15 November 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 11 December 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-81743-1,2,3

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Inorganic Data Review* and *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory reporting limit (RL) for Mercury and to the laboratory method detection limit (MDL) for all remaining parameters. Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-81743-1,2,3

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG numbers 320-81743-1, 2, and 3, dated 29 November, 8 December, and 3 December 2021, respectively. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- VOCs were analyzed at the TestAmerica Eurofins FGS facility in Seattle, WA.
- Metals were analyzed at the TestAmerica Irvine facility in Irvine, CA.
- Cyanide was analyzed at the Eurofins Calscience facility in Garden Grove, CA.
- Low Level Mercury by EPA 1631E was analyzed at the TestAmerica Eurofins FGS facility in Seattle, WA and is reported in the sister report 320-81743-2.
- The 96 Hour Fish Bioassay was subbed to McCampbell Analytical, Inc. of Pittsburgh, CA, and is reported in the sister report 320-81743-3.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods
TRIP BLANK 111521	TB	320-81743-1	11/15/2021	Groundwater	F
RAY350-EFT-111521	N	320-81743-2	11/15/2021	Groundwater	A, B, C, D, E, F, G
RAY350-MID1-111521	N	320-81743-3	11/15/2021	Groundwater	F
RAY350-INF-111521	N	320-81743-4	11/15/2021	Groundwater	A, B, D, E, F
RAY350-DUP-1-111521	FD	320-81743-5	11/15/2021	Groundwater	F

Method Holding Time			
A.	EPA 1631E	Total Mercury (Low Level)	28 days
B.	EPA 200.8	Total Metals	180 days
C.	EPA 300.0	Sulfate	28 days
D.	SM4500-CN-E	Cyanide	14 days
E.	EPA 7199	Dissolved Chromium VI (Hexavalent)	24 hours
F.	EPA 8260B	Volatile Organic Compounds (VOCs)	7 days preserved; 14 days unpreserved
G.	EPA 821-R-02-012	96 Hour Fish Bioassay	36 hours

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The CCV recovered high for Carbon tetrachloride and Beryllium. The samples associated with this CCV were ND for the affected analyte; therefore, the data have been reported.
- The CCV recovered low for Vinyl chloride. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were ND for this compound, the data was reported.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol with the following exceptions:

- Samples arrived above the recommended temperature directly from the field. As samples were received within 3 hours of collection, on ice, and there was evidence chilling had begun, no action is required.

Cooler(s) temperature on arrival to the laboratory was: **11.3, 12.8**; 0.3; 2.0; 3.0; 3.2; 0.0; 0.4 degrees Celsius.

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Only detected analytes were reported from a dilution.

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS	EPA 8260B	373713	Carbon tetrachloride	135%	NA	None, samples ND
LCS/LCSD		373817	Bromoform	132%/131%	NA	None, samples ND
LCSD			Carbon tetrachloride	152%	NA	None, samples ND

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. The sample(s) below were used for matrix spike/matrix spike duplicate (MS/MSD):

Lab Sample Number	Matrix Spike/ Matrix Spike Duplicate Sample Client ID	Method(s)
320-81743-4	RAY350-INF-111521	Hexavalent Chromium

The MS/MSD recoveries and the RPD between the MS and MSD results were within the specified limits.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred with the following exceptions:

Blank Type	Batch ID	Analyte Detected in Blank	Concentration	Qualifier	Affected Samples
Method Blank	373713	1,2,4-Trimethylbenzene	0.111 J ug/L	NA	None, samples ND
	373817	cis-1,2-Dichloroethene	0.0696 J ug/L	NA	None, sample ND
		Trichloroethene	0.156 J ug/L	**RL U**	**320-81743-3**
		1,2,4-Trimethylbenzene	0.111 J ug/L	**RL U**	**320-81743-3, 4**

The analysis of the blank samples for field quality control was free of target compounds.

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP.

The following sample(s) were used for field duplicate analysis. The RPD comparison for detections in either the parent or duplicate sample(s) is shown below. RPDs were all below 35 percent (or the absolute difference rule was satisfied if detects were less than 5x the RL).

Field Duplicate RPD Calculations:

Method(s): EPA 8260B				
Analyte (µg/L)	**Primary Sample ID**	**Duplicate Sample ID**	**% RPD**	**Qualification**
	RAY350-INF	**RAY350-DUP-1**		
1,1,1-Trichloroethane	**0.94**	**0.89**	NA	None, Abs. Diff. < RL
1,1,2-Trichloroethane	**0.15 J**	**0.15 J**	NA	None, Abs. Diff. < RL
1,1-Dichloroethane	**4.4**	**4.4**	0	None, RPD < 35%
1,1-Dichloroethene	**5.5**	**5.9**	7	None, RPD < 35%
1,2,4-Trimethylbenzene	0.11 J*	ND U	NA	None, Both ND
1,2-Dichlorobenzene	**7.6**	**7.0**	8	None, RPD < 35%
1,3-Dichlorobenzene	**0.24 J**	**0.23 J**	NA	None, Abs. Diff. < RL
1,4-Dichlorobenzene	**2.1**	**2.1**	0	None, RPD < 35%
2-Butanone	**87**	**85**	2	None, RPD < 35%
Benzene	**0.059 J**	**0.058 J**	NA	None, Abs. Diff. < RL
Chlorobenzene	**0.030 J**	**0.032 J**	NA	None, Abs. Diff. < RL
Chloroform	**0.42**	**0.42**	NA	None, Abs. Diff. < RL
cis-1,2-Dichloroethene	**560**	**550**	2	None, RPD < 35%
Tetrachloroethene	**2.6**	**2.6**	0	None, RPD < 35%
trans-1,2-Dichloroethene	**46**	**46**	0	None, RPD < 35%
Trichloroethene	**1500**	**1500**	0	None, RPD < 35%
Trifluorotrichloroethane	**16**	**17**	6	None, RPD < 35%
Vinyl chloride	**33**	**29**	13	None, RPD < 35%
All Remaining VOCs	ND U	ND U	NA	None, Both ND

**** Qualified non-detect (ND) based on method blank contamination.***

1.10 PRECISION AND ACCURACY

Refer to section E 1.7. Where required by the method, some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.11 CALCULATION ACCURACY

Total chromium was greater than hexavalent chromium.

1.12 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
RAY350-MID1-111521	1,2,4-Trimethylbenzene	0.11 J	0.30 U	Method Blank Contamination
	Trichloroethene	0.12 J	0.20 U	
RAY350-INF-111521	1,2,4-Trimethylbenzene	0.11 J	0.30 U	

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
  - For inorganic methods, when a matrix spike recovery falls outside of the control limits and the sample result is less than four times the spike added, a post digestion spike (PDS) is performed.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.

- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- Ra-226 Radium-226
- Ra-228 Radium-228
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020a. National Functional Guidelines for Inorganic Superfund Methods Data Review. EPA-542-R-20-006. November.
2. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View CA (Raytheon)

Project Description: NPDES Groundwater Samples

Sample Date(s): 2 December 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 20 December 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-82421-1

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory method detection limit (MDL). Results found between the MDL and RL are flagged "J" as estimated.

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-82421-1

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-82421-1, dated 13 December 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- Custody seals were not used on the sample cooler(s).
- Samples analyzed at the Eurofins FGS Seattle, Washington facility.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Date	Matrix	Methods	Holding Time
TRIPBLANK-120221	TB	320-82421-1	12/2/2021	Blank	Volatile Organic Compounds (VOCs) by EPA 8260B	7 days un-preserved; 14 days preserved
RAY350-EFT-120221	N	320-82421-2	12/2/2021	Groundwater		
RAY350-MID2-120221	N	320-82421-3	12/2/2021	Groundwater		
RAY350-MID1-120221	N	320-82421-4	12/2/2021	Groundwater		
RAY350-INF-120221	N	320-82421-5	12/2/2021	Groundwater		

1.2 CASE NARRATIVE

The laboratory report case narrative lists various additional quality control issues such as internal standard exceedances and initial calibration verification (ICV) and/or continuing calibration verification (CCV) exceedances. Since these additional quality control issues were not required for the project's data quality objectives, these quality control issues were not reviewed.

- The CCV recovered above the upper control limit for 2,2-Dichloropropane and Carbon tetrachloride. The samples associated with this CCV were ND for the affected analytes; therefore, the data have been reported.
- The CCV recovered above the upper control limit for Vinyl chloride. The influent sample had a detection for this compound and was therefore reanalyzed outside of holding time.

1.3 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol with the following exceptions:

Method	Matrix	Holding Time	Preservation	Sample ID, Violation, Qualification
EPA 8260B	Water	7 days unpreserved; 14 days preserved	Cool to ≤ 6 °C; pH < 2 with Hydrochloric Acid (HCl); No Headspace	Vinyl chloride was reanalyzed for sample 320-82421-5 due to failing CCV recovery outside the unpreserved holding time. **Qualify this data point estimated "J".**

Cooler(s) temperature on arrival to the laboratory was: 1.4; 1.9; 0.0 degrees Celsius.

1.4 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below.

Sample ID	Lab ID	Analyte/ Method	Dilution Factor	Issue/Explanation
RAY350-INF-120221	320-82421-5	1,1,1-Trichloroethane	50x	Dilution required to bring the concentration of target analytes within the calibration range.

1.5 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.6 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCS	EPA 8260B	375168	1,1,1-Trichloroethane	123%	NA	None, samples ND.
LCS			1,2-Dibromo-3-Chloropropane	137%	NA	None, samples ND.
LCS			1,3,5-Trimethylbenzene	126%	NA	None, samples ND.
LCSD			1,3-Dichloropropane	RPD=20	NA	None, samples ND.
LCS/LCSD			2,2-Dichloropropane	175%/174%	NA	None, samples ND.
LCS/LCSD			Bromoform	158%/141%	NA	None, samples ND.
LCS/LCSD			Carbon tetrachloride	168%/152%	NA	None, samples ND.
LCS			Ethylbenzene	125%	NA	None, samples ND.
LCS			Methyl tert-butyl ether	132%	NA	None, samples ND.
LCS			Vinyl acetate	151%	NA	None, samples ND.

1.7 MATRIX SPIKE SAMPLES

Refer to section E 1.4. No client samples were used for matrix spike/matrix spike duplicate (MS/MSD) analysis in this SDG.

1.8 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred. The analysis of the blank samples for field quality control was free of target compounds.

1.9 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.10 PRECISION AND ACCURACY

Refer to section E 1.7. Where required by the method, some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.11 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
RAY350-INF-120221	Vinyl chloride	50 H	50 J	Holding Time Exceedance

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.4 Matrix Spike Samples
  - Matrix spike/matrix spike duplicate (MS/MSD) data are used to assess the precision and accuracy of the analytical method and evaluate the effects of the sample matrix on the sample preparation procedures and measurement methodologies.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
  - Field blanks are prepared to identify contamination that may have been introduced during field activity. Equipment blanks are prepared to identify contamination that may have been introduced while decontaminating sampling equipment. Trip blanks are prepared when volatile analysis is requested to identify contamination that may have been introduced during transport.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- Ra-226 Radium-226
- Ra-228 Radium-228
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: MEW / 350 Ellis St.

Project Description: SSD Samples

Sample Date(s): 18 February 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 17 March 2017

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-70405-1 (2102483)

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15* and *National Functional Guidelines (NFG) for Organic Data Review*.

Data reported in this sampling event were reported to the laboratory reporting limit (RL).

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-70405-1 (2102483)

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-70405-1, dated 8 March 2021, which contains the subcontract report, 2102483, dated 4 March 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC.

- Samples were shipped directly from the client to the subcontract laboratory.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
350-V002-INF-021821	N	2102483-01A	2/18/2021	Soil Gas	Volatile Organic Compounds (VOCs) by TO-15	30 days
350-V002-EFF-021821	N	2102483-02A	2/18/2021	Soil Gas		
350-V008-INF-021821	N	2102483-03A	2/18/2021	Soil Gas		
350-V008-EFF-021821	N	2102483-04A	2/18/2021	Soil Gas		
350-V011-INF-021821	N	2102483-05A	2/18/2021	Soil Gas		
350-V011-EFF-021821	N	2102483-06A	2/18/2021	Soil Gas		
350-V014-INF-021821	N	2102483-07A	2/18/2021	Soil Gas		
350-V014-EFF-021821	N	2102483-08A	2/18/2021	Soil Gas		

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below. Samples collected in summa canisters are pressurized by the laboratory, resulting in a ~2x dilution.

Sample ID	Lab ID	Analyte/ Method	Dilution Factor	Issue/Explanation
350-V002-INF-021821	2102483-01A	VOCs by TO-15	~4.15x	Dilution required due to the presence of high level target species.
350-V008-INF-021821	2102483-03A		~5.15x	

1.4 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.5 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits.

- The laboratory does not report RPDs. As spike concentrations are also not provided, the RPD could not be calculated by the reviewer. Precision was estimated by comparing the recoveries of the LCS and LCSD.

1.6 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred.

1.7 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.8 PRECISION AND ACCURACY

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.9 CLEAN CANISTER CERTIFICATION

The canisters used for the TO-15 sample collection were certified clean by batch can analysis prior to sampling to ensure that no target analytes were present. These analysis sheets were reviewed, and no target analytes were detected in the laboratory-provided canisters.

1.10 INITIAL AND CONTINUING CALIBRATION VERIFICATION

Refer to section E 1.21. Percent Recovery (%R) were within the specified limits with the following exceptions:

Type	Instrument	Date	Time	Analyte	%R	Action
CCV	Unknown	2/26/2021	9:46	Acetone	68%	**Qualify data J/UJ.**

1.11 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. A summary of qualifiers applied to this SDG are shown below.

Sample ID	Analyte	Reported Result	Validated Result	Reason for Qualifier
350-V011-EFF-021821	Acetone	ND U	ND UJ	Continuing Calibration Exceedance
350-V014-INF-021821		ND U	ND UJ	
350-V014-EFF-021821		ND U	ND UJ	

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.
- E 1.21 Initial and Continuing Calibration Verification
  - Organic methods require an additional ICV and CCV to ensure that the instrument continues to meet the sensitivity and linearity criteria to produce acceptable qualitative and quantitative data throughout each analytical sequence. CCVs must be run at the beginning and end of every 12-hour period of operation.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/cm3 microgram per centimeter cubed
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW Groundwater
  - IA Indoor Air
  - SE Sediment
  - SO Soil
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph
  - GPC Gel Permeation Chromatography
  - ICAL Initial Calibration
  - ICB Initial Calibration Blank
  - ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
  - ICV Initial Calibration Verification

- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.

References

1. United States Environmental Protection Agency, 2014a. Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15, SOP NO. HW-31, Revision 6. June.

2. United States Environmental Protection Agency, 2017c. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-2017-002. January.

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Data Usability Summary Report

Project Name: MEW / 350 Ellis St.

Project Description: SSD INF/EFF

Sample Date(s): 24 May 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 22 June 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-74456-1 (2106029)
2. Precision and Accuracy [for SDG(s) above]

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review* and *Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15.*

Data reported in this sampling event were reported to the laboratory reporting limit (RL).

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-74456-1 (2106029)

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-74456-1, dated 21 June 2021, which contains the subcontract report 2106029, dated 11 June 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC. Issues noted with sample management are listed below:

- The COC contained incorrect methods information. The lab proceeded with analysis as per the original contract/verbal agreement.
- The lab report was revised to include the clean canister certifications.
- Samples were shipped directly to the Eurofins Air Toxics facility for analysis.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
350-V002-INF-052421	N	2106029-01A	5/24/2021	Soil Gas	Volatile Organic Compounds (VOCs) by TO-15	30 days
350-V002-EFF-052421	N	2106029-02A	5/24/2021	Soil Gas		
350-V008-INF-052421	N	2106029-03A	5/24/2021	Soil Gas		
350-V008-EFF-052421	N	2106029-04A	5/24/2021	Soil Gas		
350-V011-INF-052421	N	2106029-05A	5/24/2021	Soil Gas		
350-V011-EFF-052421	N	2106029-06A	5/24/2021	Soil Gas		
350-V014-INF-052421	N	2106029-07A	5/24/2021	Soil Gas		
350-V014-EFF-052421	N	2106029-08A	5/24/2021	Soil Gas		

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below. Samples collected in summa canisters are pressurized by the laboratory, resulting in a ~2x dilution.

Sample ID	Lab ID	Analyte/ Method	Dilution Factor	Issue/Explanation
350-V008-INF-052421	2106029-03A	VOCs by TO-15	~5.1x	Dilution required due to the presence of high-level target species.
350-V002-INF-052421	2106029-01A		~3.8x	

1.4 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.5 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits with the following exceptions:

- The laboratory does not report RPDs. As spike concentrations are also not provided, the RPD could not be calculated by the reviewer. Precision was estimated by comparing the recoveries of the LCS and LCSD.

Sample Type	Method	Batch ID	Analyte	%R	Qualifier	Affected Samples
LCSD	TO-15	6/8	Hexachlorobutadiene	133%	NA	None, samples all ND.

1.6 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred.

1.7 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.8 CLEAN CANISTER CERTIFICATION

The canisters used for the TO-15 sample collection were certified clean by batch can analysis prior to sampling to ensure that no target analytes were present. These analysis sheets were reviewed, and no target analytes were detected in the laboratory-provided canisters.

1.9 INITIAL AND CONTINUING CALIBRATION VERIFICATION

Refer to section E 1.21. Percent Recoveries (%R) were within the specified limits.

1.10 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

2. Precision and Accuracy [for SDG(s) above]

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.
- E 1.21 Initial and Continuing Calibration Verification
  - Organic methods require an additional ICV and CCV to ensure that the instrument continues to meet the sensitivity and linearity criteria to produce acceptable qualitative and quantitative data throughout each analytical sequence. CCVs must be run at the beginning and end of every 12-hour period of operation.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2014a. Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15, SOP NO. HW-31, Revision 6. June.

2. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: MEW – 350 Ellis Street

Project Description: SSD Samples

Sample Date(s): 20 August 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 24 September 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-78421-1 (2109029)
2. Precision and Accuracy [for SDG(s) above]

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review* and *Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15*.

Data reported in this sampling event were reported to the laboratory reporting limit (RL).

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-78421-1 (2109029)

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-78421-1, dated 16 September 2021, which contains the subcontract report 2109029, dated 14 September 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC.

- Samples were shipped directly to the subcontract laboratory: Eurofins Air Toxics of Folsom, CA.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
350-V002-INF-082021	N	2109029-01A	8/20/2021	Soil Gas	Volatile Organic Compounds (VOCs) by TO-15	30 days
350-V002-EFF-082021	N	2109029-02A	8/20/2021	Soil Gas		
350-V008-INF-082021	N	2109029-03A	8/20/2021	Soil Gas		
350-V008-EFF-082021	N	2109029-04A	8/20/2021	Soil Gas		
350-V011-INF-082021	N	2109029-05A	8/20/2021	Soil Gas		
350-V011-EFF-082021	N	2109029-06A	8/20/2021	Soil Gas		
350-V014-INF-082021	N	2109029-07A	8/20/2021	Soil Gas		
350-V014-EFF-082021	N	2109029-08A	8/20/2021	Soil Gas		

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below. Samples collected in summa canisters are pressurized by the laboratory, resulting in a ~2x dilution.

Sample ID	Lab ID	Analyte/ Method	Dilution Factor	Issue/Explanation
350-V008-INF-082021	2109029-03A	VOCs	8.85x	Dilution required to bring the concentration of target analytes within the calibration range
350-V002-INF-082021	2109029-01A		4.41x	

1.4 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.5 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits.

- The laboratory does not report RPDs. As spike concentrations are also not provided, the RPD could not be calculated by the reviewer. Precision was estimated by comparing the recoveries of the LCS and LCSD.

1.6 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred.

1.7 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.8 CLEAN CANISTER CERTIFICATION

The canisters used for the TO-15 sample collection were certified clean by batch can analysis prior to sampling to ensure that no target analytes were present. These analysis sheets were reviewed, and no target analytes were detected in the laboratory-provided canisters.

1.9 INITIAL AND CONTINUING CALIBRATION VERIFICATION

Refer to section E 1.21. Percent Recoveries (%R) were within the specified limits.

1.10 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

2. Precision and Accuracy [for SDG(s) above]

Refer to section E 1.7. Some measurement of analytical accuracy and precision was reported for each method with the site samples.

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.
- E 1.21 Initial and Continuing Calibration Verification
  - Organic methods require an additional ICV and CCV to ensure that the instrument continues to meet the sensitivity and linearity criteria to produce acceptable qualitative and quantitative data throughout each analytical sequence.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
- ICB Initial Calibration Blank
- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
- ICV Initial Calibration Verification
- ICVL Initial Calibration Verification Low
- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- Ra-226 Radium-226
- Ra-228 Radium-228
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
- USEPA U.S. Environmental Protection Agency

Qualifiers

The qualifiers below are from the USEPA National Functional Guidelines and the data in the DUSR may contain these qualifiers:

- Concentration (C) Qualifiers:
  - U The compound was analyzed for but not detected. The associated value is either the compound quantitation limit if not detected by the analytical instrument or could be the reported or blank concentration if qualified by blank contamination. This can also be displayed as less than the associated compound quantitation limit (<RL or <MDL), or "ND".
  - B The compound was found in the sample and its associated blank. Its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers:
  - E The compound was quantitated above the calibration range.
  - D The concentration is based on a diluted sample analysis.
- Validation Qualifiers:
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - J+ The result is an estimated quantity, but the result may be biased high.
  - J- The result is an estimated quantity, but the result may be biased low.
  - UJ The compound was not detected above the reported sample quantitation limit; however, the reported limit is estimated and may or may not represent the actual limit of quantitation.
  - NJ The analysis indicated the presence of a compound for which there is presumptive evidence to make a tentative identification; the associated numerical value is an estimated concentration only.
  - R The sample results were rejected as unusable; the compound may or may not be present in the sample.
  - S Result is suspect. See DUSR for details.

References

1. United States Environmental Protection Agency, 2014a. Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15, SOP NO. HW-31, Revision 6. June.

2. United States Environmental Protection Agency, 2020b. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-20-005. November.

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Data Usability Summary Report

Project Name: 350 Ellis St. Mountain View CA (Raytheon)

Project Description: SSD Samples

Sample Date(s): 18 November 2021

Analytical Laboratory: Eurofins TestAmerica Laboratories, Inc. – West Sacramento, CA

Validation Performed by: Vanessa Godard

Validation Reviewed by: Katherine Miller

Validation Date: 16 December 2021

Haley & Aldrich, Inc. prepared this Data Usability Summary Report (DUSR) to summarize the review and validation of the samples described above. The analytical results for Sample Delivery Group(s) (SDG) listed below were reviewed to determine the data's usability:

1. Sample Delivery Group Number 320-82266-1 (2111661)

This data validation and usability assessment was performed per the guidance and requirements established by the U.S. Environmental Protection Agency's (USEPA) *National Functional Guidelines (NFG) for Organic Data Review* and *Analysis of Volatile Organic Compounds in Air Contained in Canisters by Method TO-15*.

Data reported in this sampling event were reported to the laboratory reporting limit (RL).

Sample data were qualified in accordance with laboratory's standard operating procedures (SOP). The results presented in each laboratory report were found to be compliant with the data quality objectives for the project and therefore usable; any exceptions are noted in the following pages.

For more detailed quality control (QC) information see Explanations section.

1. Sample Delivery Group Number 320-82266-1 (2111661)

1.1 SAMPLE MANAGEMENT

This DUSR summarizes the review of SDG number 320-82266-1, dated 9 December 2021, which contains the subcontract report 2111661, dated 8 December 2021. Samples were collected, preserved, and shipped following standard chain of custody (COC) protocol. Samples were also received appropriately, identified correctly, and analyzed according to the COC.

- Samples were shipped directly from the client to the subcontract laboratory, Eurofins Air Toxics LLC of Folsom, CA.

Analyses were performed on the following samples:

Sample ID	Sample Type	Lab ID	Sample Collection Date	Matrix	Methods	Holding Time
350-V002-INF-111821	N	2111661-01A	11/18/2021	Soil Gas	Volatile Organic Compounds (VOCs) by TO-15	30 days
350-V002-EFF-111821	N	2111661-02A	11/18/2021	Soil Gas		
350-V008-INF-111821	N	2111661-03A	11/18/2021	Soil Gas		
350-V008-EFF-111821	N	2111661-04A	11/18/2021	Soil Gas		
350-V011-INF-111821	N	2111661-05A	11/18/2021	Soil Gas		
350-V011-EFF-111821	N	2111661-06A	11/18/2021	Soil Gas		
350-V014-INF-111821	N	2111661-07A	11/18/2021	Soil Gas		
350-V014-EFF-111821	N	2111661-08A	11/18/2021	Soil Gas		

1.2 HOLDING TIMES/PRESERVATION

The samples arrived at the laboratory at the proper temperature and were prepared and analyzed within the holding time and preservation criteria specified per method protocol.

1.3 REPORTING LIMITS AND SAMPLE DILUTIONS

All dilutions were reviewed and found to be justified. Any non-detects with elevated reported limits are noted and explained below. Samples collected in summa canisters are pressurized by the laboratory, resulting in a ~2x dilution.

Sample ID	Lab ID	Analyte/ Method	Dilution Factor	Issue/Explanation
350-V008-INF-111821	2111661-03A	VOCs	~11.2x	Dilution required to bring the concentration of target analytes within the calibration range.
350-V002-INF-111821	2111661-01A		~5.8x	
350-V008-EFF-111821	2111661-04A		~3.4x	

1.4 SURROGATE RECOVERY COMPLIANCE

Refer to section E 1.2. The percent recovery (%R) for each surrogate compound added to each project sample were determined to be within the laboratory specified QC limits.

1.5 LABORATORY CONTROL SAMPLES

Refer to section E 1.3. Compounds associated with the laboratory control samples/laboratory control sample duplicates (LCS/LCSD) analyses exhibited recoveries and RPDs within the specified limits.

- The laboratory does not report RPDs. As spike concentrations are also not provided, the RPD could not be calculated by the reviewer. Precision was estimated by comparing the recoveries of the LCS and LCSD.

1.6 BLANK SAMPLE ANALYSIS

Refer to section E 1.5. Method blank samples had no detections, indicating that no contamination from laboratory activities occurred.

1.7 DUPLICATE SAMPLE ANALYSIS

Refer to section E 1.6. The laboratory did not analyze any laboratory duplicates in this SDG as per the method or laboratory SOP. No field duplicates were collected in this data set.

1.8 PRECISION AND ACCURACY

Refer to section E 1.7. Where required by the method, some measurement of analytical accuracy and precision was reported for each method with the site samples.

1.9 CLEAN CANISTER CERTIFICATION

The canisters used for the TO-15 sample collection were certified clean by batch can analysis prior to sampling to ensure that no target analytes were present. These analysis sheets were reviewed, and no target analytes were detected in the laboratory-provided canisters.

1.10 INITIAL AND CONTINUING CALIBRATION VERIFICATION

Refer to section E 1.21. Percent Recoveries (%R) were within the specified limits.

1.11 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

The results presented in this report were found to comply with the data quality objectives for the project and the guidelines specified by the analytical method. Based on the review of this report, the data are useable and acceptable as no data was rejected. No qualifiers were applied to any data in this report.

Explanations

The following explanations include more detailed information regarding each of the sections in the DUSR above. Not all sections in the Explanations are represented:

- E 1.2 Surrogate Recovery Compliance
  - Surrogates, also known as system monitoring compounds, are compounds added to each sample prior to sample preparation to determining the efficiency of the extraction procedure by evaluating the percent recovery (%R) of the compounds.
- E 1.3 Laboratory Control Samples
  - The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses are used to assess the precision and accuracy of the analytical method independent of matrix interferences.
- E 1.5 Blank Sample Analysis
  - Method blanks are prepared by the analytical laboratory and analyzed concurrently with the project samples to assess possible laboratory contamination.
- E 1.6 Laboratory and Field Duplicate Sample Analysis
  - The laboratory duplicate sample analysis is used by the laboratory at the time of the analysis to demonstrate acceptable method precision. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
  - The field duplicate sample analysis is used to assess the precision of the field sampling procedures and analytical method. The RPD or absolute difference was evaluated for each duplicate sample pair to monitor the reproducibility of the data.
- E 1.7 Precision and Accuracy
  - Precision measures the reproducibility of repetitive measurements. In a laboratory environment, this will be measured by determining the relative percent difference (%RPD) found between a primary and a duplicate sample. This can be an LCS/LCSD pair, a MS/MSD pair, a laboratory duplicate performed on a site sample, or a field duplicate collected and analyzed concurrently with a site sample.
  - Accuracy is a statistical measurement of the correctness of a measured value and includes components of random error (variability caused by imprecision) and systematic error. In a laboratory environment, this will be measured by determining the percent recovery (%Rec) of certain spiked compounds. This can be assessed using LCS, BS, MS, and/or surrogate recoveries.
- E 1.21 Initial and Continuing Calibration Verification
  - Organic methods require an additional ICV and CCV to ensure that the instrument continues to meet the sensitivity and linearity criteria to produce acceptable qualitative and quantitative data throughout each analytical sequence. CCVs must be run at the beginning and end of every 12-hour period of operation.

Glossary

Not all of the following symbols, acronyms, or qualifiers occur in this document.

- Sample Types:
  - EB Equipment Blank Sample
  - FB Field Blank Sample
  - FD Field Duplicate Sample
  - N Primary Sample
  - TB Trip Blank Sample
- Units:
  - µg/kg microgram per kilogram
  - µg/L microgram per liter
  - µg/m3 microgram per cubic meter
  - mg/kg milligram per kilogram
  - mg/L milligram per liter
  - ppb v/v parts per billion volume/volume
  - pCi/L picocuries per liter
- Matrices:
  - AA Ambient Air
  - GS Soil Gas
  - GW/WG Groundwater
  - QW Water Quality
  - IA Indoor Air
  - SE Sediment
  - SO Soil
  - WQ Water Quality control matrix
- Table Footnotes
  - NA Not applicable
  - ND Non-detect
  - NR Not reported
- Abbreviations
  - %D Percent Difference
  - %R Percent Recovery
  - %RSD Percent Relative Standard Deviation
  - Abs Diff Absolute Difference
  - VOC Volatile Organic Compounds
  - SVOC Semi-Volatile Organic Compounds
  - BPJ Best Professional Judgement
  - CCB Continuing Calibration Blank
  - CCV Continuing Calibration Verification
  - CCVL Continuing Calibration Verification Low
  - COC Chain of Custody
  - CRI Collision Reaction Interface
  - DUSR Data Usability Summary Report
  - EMPC Estimated Maximum Possible Concentration
  - GC Gas Chromatograph

- GPC Gel Permeation Chromatography
- ICAL Initial Calibration
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- ICP/MS Inductively Coupled Plasma/ Mass Spectrometry
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- IPA Isopropyl Alcohol
- LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
- MDL Laboratory Method Detection Limit
- MS/MSD Matrix Spike/Matrix Spike Duplicate
- ND Non-Detect
- NFG National Functional Guidelines
- GC/MS Gas Chromatography/Mass Spectrometry
- BS Blank Spike
- TIC Tentatively Identified Compound
- PCB Polychlorinated Biphenyl
- PDS Post Digestion Spike
- PEM Performance Evaluation Mixture
- PFAS Per- and Polyfluoroalkyl Substances
- QAPP Quality Assurance Project Plan
- QC Quality Control
- Ra-226 Radium-226
- Ra-228 Radium-228
- RL Laboratory Reporting Limit
- RPD Relative Percent Difference
- TPU Total Propagated Uncertainty
- RT Retention Time
- RRF Relative Response Factors
- SDG Sample Delivery Group
- SOP Laboratory Standard Operating Procedures
- SPE Solid Phase Extraction
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APPENDIX F

2021 Laboratory Analytical Reports
(redacted due to file size – included only in CD copy)