

**Thermo Fisher Scientific, Inc.**

**Soil Vapor Extraction System  
Construction Completion Report  
and Operations and Maintenance  
Schedule**

Former Spectra-Physics Site  
1245 Terra Bella Avenue  
Mountain View, California

May 22, 2015



---

C. Colin Hollister  
Environmental Engineer

---

Srinivasa Varadhan Ph.D  
Environmental Remediation Specialist

---

Lucas Goldstein P.E  
Principal Engineer PG-CA, #7035; PE-CA, #C72455

**Soil Vapor Extraction System  
Construction Completion  
Report and Operations and  
Maintenance Schedule**

Former Spectra-Physics Site  
1245 Terra Bella Avenue  
Mountain View, California

Prepared for:

Thermo Fisher Scientific, Inc., regarding  
the former Spectra-Physics Lasers, Inc.,  
Site

Prepared by:

ARCADIS U.S., Inc.

100 Smith Ranch Road  
Suite 329  
San Rafael  
California 94903  
Tel 415 491 4530  
Fax 415 491 4532

Our Ref.:

EM001727.0076

Date:

May 22, 2015

<b>1. Introduction</b>	<b>3</b>
<b>2. Site Background</b>	<b>5</b>
2.1 Release History and Previous Remediation Systems	5
2.2 Recent Site Investigations Prior to System Installation	5
2.3 SVE Well Installation and Pilot Testing Summary	7
<b>3. SVE Well Installation Summary</b>	<b>8</b>
3.1 SVE Well Installation Activities	8
3.1.1 Subsurface Utility Clearance	8
3.1.2 SVE Well Installation	8
3.1.3 Sub-Slab Monitoring Point Installation	9
<b>4. SVE System Construction and Installation</b>	<b>10</b>
4.1 Conveyance Piping	10
4.1.1 Interior Trenching	10
4.1.2 Exterior Trenching	11
4.2 Surface Restoration and Completion Activities	12
4.3 SVE System Components Summary	12
4.3.1 Extraction Blower Specifications	12
4.3.2 Equipment Specifications and Controls	13
4.4 Waste Management	13
<b>5. SVE System Startup and Shakedown</b>	<b>14</b>
<b>6. System Performance Testing</b>	<b>15</b>
6.1 Results	16
6.2 Conclusion	16
<b>7. System Operation, Maintenance, and Monitoring Schedule</b>	<b>17</b>
7.1 System Operation and Maintenance	17
<b>8. Shutdown Criteria</b>	<b>19</b>
<b>9. References</b>	<b>20</b>

**Tables**

Table 1 System Influent and Effluent Sampling Results

Table 2 Indoor Air Sampling Results

**Figures**

Figure 1 Site Location Map

Figure 2 2014-2015 Indoor Air and Soil Gas Sample Locations

**Appendices**

A SVE System As-Built Drawings and Construction Photos

B Vapor Extraction Well Boring Logs

C SVE System Startup Performance Monitoring Data

D SVE Construction Photo Log

E SVE O&M Logs



# Soil Vapor Extraction System Construction Completion Report and Operations and Maintenance Schedule

Former Spectra-Physics Lasers Site  
1245 Terra Bella Avenue  
Mountain View, California

## 1. Introduction

ARCADIS U.S., Inc. (ARCADIS), on behalf of Thermo Fisher Scientific, Inc. (Thermo Fisher) has prepared this Soil Vapor Extraction (SVE) System Construction Completion Report and Operations and Maintenance (O&M) Plan to describe the installation, startup, and O&M Plan for the SVE system installed at the former Spectra-Physics Lasers, Inc. (Spectra-Physics) building (Building) located at 1245 Terra Bella Avenue, Mountain View, California (Site; Figure 1). The SVE system design and construction details were presented in the Vapor Intrusion Mitigation (VIM) System Work Plan (ARCADIS 2014a). The goals of the SVE system are: (1) to depressurize the soil vadose zone beneath the Building to prevent soil vapor intrusion into the Building; and (2) to remove residual volatile organic compound (VOC) mass present in the vadose zone at the Site. This work was completed voluntarily by Thermo Fisher, with approval from the San Francisco Bay Regional Water Quality Control Board (RWQCB).

The SVE System Construction Completion Report and O&M Plan is organized into the following sections:

- Section 2 summarizes the Site background, including previous investigations, and SVE well installation and pilot testing activities completed in 2014.
- Section 3 describes the SVE well and sub-slab monitoring point installation and construction details.
- Section 4 describes the design, construction, and installation details of the SVE system, and documents modifications to the design in response to unanticipated field conditions.
- Section 5 details startup of the SVE system.
- Section 6 summarizes SVE system performance, including system flow rate and vacuum readings, sub-slab depressurization, and analytical results of indoor air samples.
- Section 7 outlines the O&M schedule for the SVE system.
- Section 8 describes proposed shutdown criteria for the SVE system.
- Section 9 lists cited references.

In addition, Appendix A presents the as-built construction drawings, Appendix B presents well construction logs for the SVE wells, Appendix C presents SVE startup performance monitoring data, Appendix D presents a photo log documenting SVE



**Soil Vapor Extraction System  
Construction Completion Report  
and Operations and Maintenance  
Schedule**

Former Spectra-Physics Lasers Site  
1245 Terra Bella Avenue  
Mountain View, California

construction activities and Appendix E presents the SVE Operation and Maintenance Logs.

## **2. Site Background**

### **2.1 Release History and Previous Remediation Systems**

The 1245 Terra Bella Avenue Building is one of nine buildings that comprised the former Spectra-Physics facility (Facility). Spectra-Physics began manufacturing lasers and associated components at the Facility in 1961. Liquid waste generated during the manufacturing process was discharged to the sanitary sewer system after settling in equalization sumps. Five sumps utilized by the Facility were removed in 1987 (LFR Levine-Fricke [LFR] 1999).

Soil and groundwater investigations were conducted over several years starting in 1987 and VOCs were identified as being present in shallow soils and shallow groundwater. Two SVE systems were installed at the Spectra-Physics facility to remediate shallow soil: the first system was installed at a neighboring property located at 1250 West Middlefield Road in 1989; and the second system was installed near the Building in 1991. The location of the former SVE conveyance lines are shown on Figure 2. The systems operated between 1989 and 1999 and removed an estimated 1,155 pounds of VOCs from shallow soil. The 1250 West Middlefield Road SVE system was shut down in 1995 and the SVE installed at the Site was shut down in 1999. The systems were shut down based on asymptotic mass removal rates and achievement of soil remedial action objectives.

### **2.2 Recent Site Investigations Prior to System Installation**

In October 2013, IRIS Environmental (IRIS) conducted a soil and soil vapor investigation in support of a potential property transfer. Soil, soil vapor, and groundwater samples were analyzed for VOCs (IRIS 2013). Trichloroethene (TCE) in soil, soil gas, and groundwater was primarily detected in the southern and southwestern portions of the Site.

ARCADIS conducted a subsequent indoor air evaluation between May and July 2014. Indoor air samples were collected both with the heating, ventilation, and air conditioning (HVAC) system turned off (May 22, 2014), and subsequently with the HVAC turned on (July 9, 2014). Breathing zone (air inside the building) and soil gas to indoor air pathway air samples (air migrating from the sub-slab to indoor air) were collected during the evaluation. To further assess potential sources of vapor intrusion in the Building, ARCADIS conducted a pathway evaluation on June 24, 2014 using a portable gas chromatograph/mass spectrometer (GC/MS). Using the GC/MS,

ARCADIS was able to collect measurements of VOCs from potential preferential pathways to get a better understanding of specifically where vapor intrusion was occurring into the Building.

Results from the indoor air sampling events are assessed using a tiered approach, as defined below and presented in Table 2:

- Tier 1: Indoor air sample results are compared to outdoor air concentrations to evaluate whether indoor air quality may be affected by sources unassociated with vapor intrusion.
- Tier 2: Indoor air sample results are compared to long-term screening criteria (United States Environmental Protection Agency [USEPA] Regional Screening Levels [RSLs] for industrial air, with an exception for tetrachloroethene [PCE] as noted in Table 2; USEPA 2015, RWQCB 2013).
- Tier 3: Indoor air sample results are compared to short-term screening criteria (Agency for Toxic Substances and Disease Registry [ASTDR] Minimal Risk Levels [MRLs] and USEPA Region 9 guidelines; ATSDR 2013, USEPA 2014)

As shown on Table 2, TCE was not detected above Tier 2 or Tier 3 screening criteria in the breathing zone samples collected during the May 2014 HVAC off sampling event or the July 2014 HVAC on sampling event. Additionally, TCE was not detected above Tier 2 or Tier 3 screening criteria in the pathway samples collected during the HVAC on sampling event. However, TCE was detected above the Tier 2 and Tier 3 screening criteria ( $3 \mu\text{g}/\text{m}^3$  and  $7 \mu\text{g}/\text{m}^3$ , respectively) in the men's shower room ( $8.4 \mu\text{g}/\text{m}^3$ ), and was detected above the Tier 2 screening criteria in the receiving room ( $6.0 \mu\text{g}/\text{m}^3$ ). Results also indicated an exceedance of the chloroform Tier 2 screening criteria ( $0.53 \mu\text{g}/\text{m}^3$ ) in the men's shower room ( $7.5 \mu\text{g}/\text{m}^3$ ).

The May and July 2014 sample events indicated that there were no unacceptable risks to building occupants (ARCADIS 2014b). Because the samples with elevated results were collected from pathway locations with the HVAC system off, and TCE was not detected above criteria in breathing zone samples, the elevated results were not representative of actual exposure conditions. However, in response to the property owner's request, Thermo Fisher voluntarily agreed to install a SVE system under the building to enhance mass removal from soils located in the southwest corner of the building and to further mitigate the risk of intrusion of sub-slab air into the building.

### **2.3 SVE Well Installation and Pilot Testing Summary**

To support the design of the full-scale SVE system, a SVE and sub slab depressurization (SSD) pilot study was implemented in July 2014. The pilot study consisted of extraction vapor from two SVE wells (SVE-1 and SVE-2) located in the southern portion of the Building and monitoring three sub-slab depressurization points (SSD-1 through SSD-3) distributed throughout the Building and five vapor monitoring probes (VMP-1 through VMP-5) distributed throughout the Site. The general objective of the pilot study was to evaluate the radius of influence (ROI) and to estimate extraction flow and mass removal rates at various applied vacuums (measured as inches of water column [WC] or mercury [Hg]). Pilot test implementation details are documented in the VIM System Work Plan (ARCADIS 2014a).

SVE pilot test results demonstrated that the SVE wells were effective at propagating an effective vacuum ROI both within the vadose zone where the extraction wells were screened and also below the concrete slab in the southern portion of the building. After the completion of the initial test at SSD-1 [south end of building], step tests were conducted at SSD-2 (north end of the Building) and SSD-3 (middle of the Building) using the same methodology. The test results from SSD-2 and SSD-3 were not consistent with observations recorded during the test at SSD-1, which was likely due to the short circuiting at nearby shallow utility lines with high conductivity sand or gravel bedding, in addition to proximity to subsurface obstructions (load-bearing shear walls) at SSD-2. Significant influence was observed at the nearby sewer cleanout during extraction at SSD-3, indicating that the subsurface sewer lateral migration pathway is accessed during extraction at this location. Overall, the results from SSD-2 and SSD-3 extraction locations demonstrated that these observed ROIs vary across the Site due to near-slab heterogeneities such as shallow utility trenches and structural footings that extend below the slab. Based on these results, ARCADIS concluded that operation of a SVE system would provide the most effective means of reducing the potential for vapor intrusion into the Building (ARCADIS 2014a).

### **3. SVE Well Installation Summary**

Following completion of pilot testing activities, SSD points (SSD-1 through SSD-3) and VMPs (VMP-1 through VMP-5) were abandoned. The two SVE wells included in the pilot test (SVE-1 and SVE-2) were incorporated into the full scale SVE system as vapor extraction (VE) wells VE-1 and VE-2 (Figure 2).

In September 2014, four additional VE wells were installed (VE-3 through VE-6). Wells VE-3 and VE-4 were installed in the central and northern portions of the Building, respectively. Wells VE-5 and VE-6 were installed outside of the Building, directly adjacent to the southwestern corner of the Building where residual VOC mass was believed to be present in the vadose zone.

#### **3.1 SVE Well Installation Activities**

The following section describes the SVE well installation activities at the site.

##### **3.1.1 Subsurface Utility Clearance**

Prior to the commencement of intrusive fieldwork, USA Alert was contacted. In addition, 1st Call Utility Locating was hired to identify possible subsurface obstructions and utilities using a combination of GPR and an appropriate pipe/cable locating system.

##### **3.1.2 SVE Well Installation**

The two SVE wells VE-1 and VE-2 (formerly SVE-1 and SVE-2 during the pilot study), and the new soil vapor monitoring wells (VE-3 through 6) were installed by hand augering down to 8 feet below ground surface (bgs). Soil lithology was logged during installation of each boring. Following completion of the boring, all SVE wells (VE-1 through VE-6) were constructed of 2-inch-diameter white polyvinyl chloride (PVC) riser pipe with 0.020-inch stainless steel wire-wrapped screen located from 3 to 8 feet bgs. The annular space around the well screen and casing was filled with No. 3 sand from 3 to 8 feet bgs, and sealed with hydrated bentonite from 2 to 3 feet bgs and then cement grout to 2 inches below the point where the conveyance line connects to the well casing. Each of the SVE wells were connected to the SVE remediation compound via conveyance lines during full scale construction activities in February 2015. As-built well construction details are presented in Drawing C-2 in Appendix A, and well boring logs are presented in Appendix B.



**Soil Vapor Extraction System  
Construction Completion Report  
and Operations and Maintenance  
Schedule**

Former Spectra-Physics Lasers Site  
1245 Terra Bella Avenue  
Mountain View, California

3.1.3 Sub-Slab Monitoring Point Installation

The sub-slab monitoring point (SSMP) construction details are provided on Figure C-2 of Appendix A. For each SSMP, a hammer-drill equipped with a 3/8-inch masonry bit was advanced below the slab until native material was encountered. Drill cuttings were evacuated with a low pressure air pump, and the SSMP was completed with 1/4-inch stainless steel tubing and sealed in accordance with the details shown on Figure C-2 of Appendix A.

#### **4. SVE System Construction and Installation**

The SVE system was constructed between February 9 and March 5, 2015 by ARCADIS and its subcontractor Cornerstone Environmental Contractors Inc. (Cornerstone). The system consists of a skid mounted positive displacement blower and the extracted vapor is treated through a vapor phase granular activated carbon (VGAC) system. VOCs contained within the extracted soil vapor are removed via two 1000-lb carbon vessels prior to atmospheric discharge. The entire treatment system is located within a fenced enclosure at the southeastern portion of the Site. Soil vapors are extracted through a network of conveyance piping installed both interior and exterior of the Building.

##### **4.1 Conveyance Piping**

SVE conveyance piping was constructed using two inch diameter Schedule 40 PVC (Appendix A). Conveyance lines for VE-1 through VE-4 were installed at depths ranging from 15 to 21 inches below the floor surface, laid in sand bedding in trenches constructed under the Building slab (Appendix A, Figure C-3). Piping from exterior vapor extraction points VE-5 and VE-6 runs along the south side of the Building at depths ranging from 12 to 18 inches below asphalt and join the trench for conveyance lines VE-1 through VE-4 on their way to the SVE remediation compound. The SVE system manifold is constructed of Schedule 80 PVC, where individual conveyance lines connect to the remediation system above ground surface (See Drawing P-1 in Appendix A). Each individual line connecting to the SVE manifold consists of a vacuum indicator, flow meter and a sample port for collecting performance parameters.

To facilitate locating the conveyance lines in the future, tracer wire was placed on top of the conveyance lines, which extends from each well and follows the trenches to the system manifold at the remediation compound. Warning tape was also placed on top of the controlled density backfill, immediately below the concrete or asphalt. Individual details for trench construction are provided on Figure C-3 of Appendix A.

###### **4.1.1 Interior Trenching**

Trenching within the building was completed by saw cutting the concrete slab, then hand digging the trenches to depth. All existing laboratory drains and water drains encountered during trenching were exposed by hand prior to placement of conveyance lines. Due to the close proximity between the bottom of slab and the top of the drain



## Soil Vapor Extraction System Construction Completion Report and Operations and Maintenance Schedule

Former Spectra-Physics Lasers Site  
1245 Terra Bella Avenue  
Mountain View, California

laterals, the conveyance lines were placed several inches deeper than illustrated in the original building drawings (ARCADIS 2014a).

The trenching layout to VE-4, located in the northern portion of the building was modified based on observed field conditions. The trench to VE-4 was proposed to pass through the west hallway, but had to be rerouted to the east hallway based on the presence of a structural footing. To reach the second hallway on the east side of the building, the trench was constructed under two non-load bearing walls to avoid several additional structural footings. As Cornerstone continued to dig the VE-4 trench down the east hallway, an unexpected concrete feature was encountered that was not included in the structural drawings. This feature required a concrete corer to horizontally drill through about 4.5 feet of concrete in order to pass the conveyance line through and connect it to the SVE remediation compound (Appendix D).

A perimeter foundation was expected where the trench exits the southern side of the building, however no structural feature was observed. Therefore, the additional construction details associated with providing additional space between the pipes as they exited the building was no longer necessary.

The highest point of the interior conveyance piping is located at 15 inches below floor surface and slopes towards individual wells within the building (VE-1 through VE-4) and to the exterior SVE remediation compound at a minimum slope of 1%.

### 4.1.2 Exterior Trenching

Due to the proximity of the trench to underground utilities in the parking lot along the south side of the Building, hand digging to total trench depth was required to a minimum of 32 inches on either side of each utility marking (Drawing C-1). A total of nine marked utilities crossed the trench, requiring hand excavation of over 30 feet of trench length to a depth of around 2 feet below ground surface. Two unmarked utilities were discovered on the exterior of the building by the rear door: one 1-inch PVC and one 2-inch steel pipe. The SVE conveyance lines were eventually installed under a pair of 4 inch conduits labeled as electrical utility, however the utility owner was not identified therefore it was marked by ARCADIS' private utility contractor as an unknown utility.

Approximately 50 feet of the exterior trench included placement of the remediation system electrical conduit below the SVE conveyance lines. For this section of the

trench, sand backfill extended from the bottom of the electrical conduit to the top of the SVE conveyance lines.

The conveyance lines for VE-5 and VE-6 slope towards the respective wells until these conveyance lines connect with the exterior conveyance lines from VE-1 through VE-4, from which point the lines slope towards the remediation compound. To the maximum extent feasible, during construction, it was ensured that the conveyance lines sloped towards the respective wells to enhance drainage of entrained water that may accumulate in the lines during SVE operation.

#### **4.2 Surface Restoration and Completion Activities**

Controlled density fill (CDF) was used to backfill the trenches from the top of the conveyance piping up to the bottom of slab or asphalt. Well boxes for the SVE wells were set in concrete, and grout was used to seal the annular space between the well box skirt and well casing in all wells to seal the well boxes around the slab. Where trenching had occurred on the exterior of the building, the surface was restored by placement of asphalt over the CDF to match existing grade.

In the interior of the building, in locations where trenching had occurred, the controlled density fill was overlain by 6 inches of reinforced concrete to match existing grade, with alternating rebar dowels placed every 12 inches along the trench line. Wire mesh sheets were placed on top of the rebar to create a grid-type reinforcement system (Appendix A, figure C-3).

No building perimeter foundation was encountered during the installation, and therefore no related changes were made during surface restoration following installation.

#### **4.3 SVE System Components Summary**

The following section summarizes the components of the SVE remediation compound. Appendix A contains the SVE system as-built drawings.

##### **4.3.1 Extraction Blower Specifications**

ARCADIS evaluated the extraction requirements for the SVE system based on the results of the SVE pilot study and prior engineering experience from similar sites. As discussed previously, average extraction flow rates of approximately 50 standard cubic

feet per minute (scfm) per extraction point were recorded during the pilot study achieving 0.1 inch WC or greater vacuum influence under the slab within the extraction ROI at an applied vacuum of 4 inches Hg. Therefore, a Roots Model 56 Universal RAI positive displacement blower powered by a 3-phase 10-horsepower (hp), 208volt alternative current motor was installed for the system. The blower is capable of 300scfm blower at 4 inches Hg vacuum rating. .

#### 4.3.2 Equipment Specifications and Controls

Ancillary equipment associated with the vacuum blower includes a valve manifold with flow indicators, moisture separator, vacuum and pressure gauges, a vacuum relief valve, and an effluent silencer. The low and high pressure switches are connected to the control panel to trigger a system shut-down in the event of a high pressure or low pressure condition. The high-high level switch is a critical alarm which would shut down the system in the event the moisture separator tank is full of condensate.

Figure P-1 of Appendix A presents the piping and instrumentation diagram for the SVE system. The system is designed to call out to designated field personnel using an auto-dialer connected to a cellular modem if an alarm condition occurs or due to power outage.

The electrical source for the system is the existing on-site power supply, located at the southern extent of the Building. A 3-pole 100 ampere (amp) breaker was installed for the power supply. The electrical lines feeding power to the system were pulled through buried conduits placed in the trench during system installation. All electrical connections associated with the SVE system installation were completed to National Electrical Code (NEC®) requirements.

Additionally, a submeter was installed to track power usage for the SVE system separately from the rest of the site, and the cost associated with the extra power supplied to the remediation system will be reimbursed to the current property owner.

#### 4.4 Waste Management

Soil cuttings and spoils generated from the installation of the SVE wells, SSMPs and installation of the SVE system was characterized and then transportation and off-site disposal was coordinated by Cornerstone. All other construction debris (concrete, asphalt and steel) was segregated and transportation to a recycling facility was coordinated by Cornerstone.



## **Soil Vapor Extraction System Construction Completion Report and Operations and Maintenance Schedule**

Former Spectra-Physics Lasers Site  
1245 Terra Bella Avenue  
Mountain View, California

### **5. SVE System Startup and Shakedown**

Startup and shakedown activities were conducted between March 5, 2015 and April 3, 2015. Prior to connecting the blower system to the SVE conveyance lines, the blower, electrical components, and safety interlocks were tested to ensure all automation and safety controls were fully functional. System startup and shakedown activities included the following:

- Pre-startup safety review of critical devices.
- Inspection of system piping and components.
- Electrical connectivity and amperage inspection
- Blower motor maintenance, including checking for proper rotation, and oil change-out and blower alignment.
- Calibration and verification of monitoring instruments.
- Proper placement of valves prior to system startup.

## **6. System Performance Testing**

After completion of construction, ARCADIS initiated a start-up test of sufficient duration to verify that the performance specifications of the equipment were met. In addition, a system start-up period was then initiated to optimize system operations. The objective of the start-up period was to make the operational adjustments necessary to optimize mass removal efficiency, maximize system uptime, maximize sub-slab depressurization and vacuum influence and ensure proper vapor abatement from system effluent. Vacuum measurements were also collected at SSMPs to measure the induced subsurface vacuum and evaluate the overall ROI of the system. Adjustments to system flow rates and applied wellhead vacuums were made as necessary to optimize the extraction and treatment system efficiency.

On April 8, 2015, system influent and effluent air samples were collected using SUMMA canisters analyzed for VOCs using EPA Method TO-15 to evaluate the removal efficiency of the VGAC units. Results from the system sampling event are provided in Table 1.

Additionally, on April 8, 2015, indoor air samples were collected from three locations that were sampled in 2014, prior to SVE installation, and from one new location. Samples were collected using SUMMA canisters and were deployed for approximately 10 hours. For this round of sampling, ARCADIS confirmed with the property owner that the HVAC system was turned off for a minimum of 36 hours prior to the sampling event. The HVAC remained off throughout the duration of the sampling to confirm that SVE system operation is successful at mitigating vapor intrusion into the Building (Figure 2). (Note that, based on conversations with the property owners, it is our understanding that the HVAC system had been turned off since SVE system construction began in February 2015.) Breathing zone samples placed approximately 3-5 feet off the ground were collected from the northwest corner of the Building in Room 116 near SSMP-6 (SPCB-13-BZ-25) and from the break room near SSMP-5 (SPCB-13-BZ-26). Pathway samples were collected from previously identified potential vapor intrusion pathway locations. The pathway samples were collected adjacent to the men's shower floor drain (SPCB-13-PW-27) and adjacent to the janitorial floor drain in Room 124 (SPCB-13-PW-28). Results from the indoor air sampling event are provided in Table 2.

## **6.1 Results**

Constituents of concern were not detected above laboratory reporting limits in the samples collected on April 8, 2015. Chloroform and Freon-113, which are not constituents of concern, were detected at concentrations below Tier 2 and Tier 3 screening criteria (Table 2).

As noted in Section 2.2, during the May 2014 HVAC system off sampling event (prior to SVE system installation) TCE was detected above screening criteria in the men's shower room and the receiving room. However, since installation of the SVE system, TCE was not detected in these locations (Table 2).

Vacuum readings obtained at the SSMPs on April 3, 2015 indicated that the SVE system achieved the design goals of greater than 0.1 inch WC at all SSMPs with the exception of SSMP-5 and SSMP-6. The northern end of the building, where SSMP-5 and SSMP-6 are located, is furthest from the suspected source of contaminants at the Site, and no pathway or breathing zone air samples collected in this area exhibited constituents of concern above Tier 2 screening criteria during the 2014 and 2015 sampling events (Table 2). The diminished sub slab depressurization observed at SSMP-5 and SSMP-6 is likely due to short circuiting—potentially through bedding material for underground utilities (such as the sanitary sewer); or by subsurface obstructions such as structural footings.

The April 8, 2015 results from the SVE system effluent demonstrate 99.9% or greater abatement of constituents detected in the influent, including: TCE, 1,1,1-trichloroethane, cis-1,2-dichloroethene, tetrachloroethene, and chloroform (Table 1).

## **6.2 Conclusion**

The SVE system has demonstrated successful mitigation of VOC intrusion into the Building by extracting and treating VOCs from the vadose zone beneath the slab and also where residual mass may be present. Indoor air sampling results collected on April 8, 2015 confirm that concentrations of constituents of concern have decreased to levels below Tier 2 and Tier 3 screening criteria.

## **7. System Operation, Maintenance, and Monitoring Schedule**

ARCADIS began the system O&M and monitoring program upon completion of start-up activities and will continue O&M and monitoring during operation of the SVE system. Preventive and corrective maintenance will be completed as required to keep the system operating efficiently and within design criteria. In addition, an O&M manual will be prepared for use by ARCADIS, as the designated SVE system operator. The sections below summarize the anticipated routine O&M and monitoring tasks and schedule associated with the SVE system. Appendix E presents the O&M Logs for the SVE system.

### **7.1 System Operation and Maintenance**

Routine O&M activities will occur on a monthly basis. Listed below are preventive O&M activities for the SVE system that are typically completed on a monthly frequency or as per manufacturer requirements:

- Vacuum, flow, discharge pressure, and temperature readings at the inlet header and at the VGAC discharge will be recorded to evaluate effective mass removal rates.
- The extraction blower motors, belts, and pulleys will be periodically inspected and adjusted for proper operation.
- The pre-VGAC, mid-VGAC, and post-VGAC vapor streams will be monitored with a PID for evidence of chemical breakthrough.
- The temperature at the discharge stack will be measured and recorded.
- The vacuum blower fail-safe mechanisms such as high and low pressure switches and temperature switch will be inspected for proper operation.
- The moisture separator will be inspected and emptied of its contents as needed and the level switches and the drain pump operation shall be periodically evaluated.
- System adjustments will be made when necessary to optimize system performance.



**Soil Vapor Extraction System  
Construction Completion Report  
and Operations and Maintenance  
Schedule**

Former Spectra-Physics Lasers Site  
1245 Terra Bella Avenue  
Mountain View, California

- Annually, or if the property owner penetrates the slab or a significant change in SVE system operation occurs, access to the Building will be required to measure the pressure differential at each of the eight SSMPs.

## **8. Shutdown Criteria**

The SVE system will continue to operate with periodic monitoring. There are two basic conditions under which the system may be proposed for shutdown, as follows:

- As summarized in Section 2.2, the SVE system was installed voluntarily, and the historical data indicates that with the HVAC system off, breathing zone sample locations are below levels of concern. Therefore, the property owner may propose to petition system shutdown at their will and an SVE shutdown work plan will be submitted for RWQCB review and approval.
- Alternatively, when removal rates for VOCs indicate an asymptotic trend (as measured by influent PID concentrations tracked on a monthly basis), influent SVE system samples will be collected for laboratory analysis to confirm that the constituents of concern have decreased as a result of SVE system operation. If the influent concentrations confirm significant reduction in residual VOC concentrations, an SVE system shutdown work plan will be submitted for RWQCB review and approval.

Conceptually, the SVE system shutdown work plan will include SVE system shutdown for a period of 3 months for rebound testing. During the shutdown period additional soil vapor samples may be collected to confirm observations in the vicinity of the evaluation area (conceptually, from VE-5 and VE-6). Concurrently, indoor air samples will be collected during the shutdown period to confirm sample locations do not exhibit an increase in concentrations following system shutdown (conceptually, 2 pathway samples and 2 breathing zone samples). This will include one indoor air monitoring event approximately 36 hours after system shutdown and a second event approximately three months after system shutdown. The results from indoor air and soil gas sample events will be evaluated and if necessary, the system will be restarted. If not, the system will remain off and periodic monitoring will be conducted for approximately one year to confirm that stable conditions persist following system shutdown.

## 9. References

- ATSDR. 2013. Minimal Risk Levels. July. Available at:  
<http://www.atsdr.cdc.gov/mrls/mrlist.asp>
- ARCADIS. 2014a. Vapor Intrusion Mitigation System Work Plan, Former Spectra-Physics Facility, 1245 Terra Bella Avenue, Mountain View, California. September 2014.
- ARCADIS. 2014b. Vapor Intrusion Evaluation Summary of 1245 Terra Bella Avenue, Former Teledyne Semiconductor and Spectra-Physics Lasers, Inc., Sites, Mountain View, California. September 8.
- ARCADIS and Fishbeck, Thompson, Carr & Huber. 2013. Focused Feasibility Study, Former Spectra-Physics Lasers, Inc., and Former Teledyne Semiconductor Facilities, Mountain View, California. April 4.
- IRIS. 2013. Informal deliverable - October/November investigation results data transmitted to ARCADIS electronically via email.
- LFR. 1999. Soil Vapor Extraction and Treatment System Number 2, Effectiveness Evaluation Report, Spectra-Physics Lasers, Mountain View, California. July 26.
- RWQCB. 2013. Memo from USEPA to Stephen Hill. "EPA Region 9 Guidelines and Supplemental Information Needed for Vapor Intrusion Evaluations at the South Bay National Priorities List (NPL) Sites." December 3.
- USEPA. 2008. Engineering Issue: Indoor Air Vapor Mitigation Approaches. EPA/600/R-08/115. October.
- USEPA. 2014. Memo from USEPA to Region 9 Superfund Division Staff and Management. "EPA Region 9 Response Action Levels and Recommendations to Address Near-Term Inhalation Exposures to TCE in Air from Subsurface Vapor Intrusion". July 9.
- USEPA. 2015. Regional Screening Levels. January. Available at:  
<http://www.epa.gov/region9/superfund/prg/>

**Tables**

**Table 1**  
**System Influent and Effluent Sampling Results**  
**Former Spectra-Physics Lasers Site**  
**1245 Terra Bella Avenue, Mountain View, CA**

*(concentrations reported in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) at 25° Celsius and 1 atmosphere)*

Sample ID	Sample Date	TCE	cis-1,2-DCE	VC	PCE	trans-1,2-DCE	1,1-DCA	1,2-DCB	1,1,1-TCA	Chloroform	Freon 113
SPCB-13-SVE/SSD-Influent-1	4/8/2015	1300	120	<2.0	7.8	<3.1	<3.2	<4.7	5.4	5.5	<6.0
SPCB-13-SVE/SSD-Effluent-1	4/8/2015	1.3	<0.91	<0.58	<1.6	<0.91	<0.93	<1.4	<1.2	<1.1	6.7

**Notes:**

< = Not detected above laboratory reporting limit

1,2-DCB = 1,2-dichlorobenzene

1,1-DCA = 1,1-dichloroethane

cis-1,2-DCE = cis-1,2-dichloroethene

trans-1,2-DCE = trans-1,2-dichloroethene

PCE = tetrachloroethene

1,1,1-TCA = 1,1,1-trichloroethane

TCE = trichloroethene

VC = vinyl chloride

**Table 2**  
**Indoor Air Sampling Results**  
**Former Spectra-Physics Lasers Site**  
**1245 Terra Bella Avenue, Mountain View, CA**

*(concentrations reported in micrograms per cubic meter (µg/m<sup>3</sup>) at 25° Celsius and 1 atmosphere)*

Sample ID	HVAC Status	Sample Date	Sample Type	TCE	cis-1,2-DCE	VC	PCE	trans-1,2-DCE	1,1-DCA	1,2-DCB	1,1,1-TCA	Chloroform	Freon 113
<b>Tier 1 - Comparison to Background/Outdoor Ambient Air</b>													
SPCB-13-OA-12	--	5/22/2014	OA	<0.19	<0.14	<0.045	<0.24	<0.70	<0.14	<0.21	<0.19	<0.17	0.59
SPCB-13-OA-24	--	7/9/2014	OA	<0.18	<0.13	<0.043	<0.23	<0.67	<0.14	<0.20	<0.18	<0.16	0.55
SPCB-13-OA-29	--	4/8/2015	OA	<0.18	<0.13	<0.042	<0.22	<0.65	<0.13	<0.20	<0.18	<0.16	0.48
<b>Tier 2 - Comparison to Long-Term Health Risk-Based Screening Criteria</b>													
Industrial/Commercial Screening Level (January 2015) <sup>1,4</sup>				3	NA	2.8	2	NA	7.7	880	22,000	0.53	130,000
<b>Tier 3 - Comparison to Short-Term Health Risk-Based Screening Criteria</b>													
Acute Screening Level (July 2013) <sup>2</sup>				NA	793*	1,278	1,357	793	NA	NA	10,914	488	NA
Short-Term Screening Levels (July 2013) <sup>2</sup>				NA	793*	77	NA	793	NA	NA	3,820	244	NA
Interim Indoor Short-Term Response Action Levels <sup>3</sup>				7**	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>May 22, 2014 - HVAC OFF Sampling Event - Prior to SVE System Installation</b>													
SPCB-13-BZ-2	HVAC OFF	5/22/2014	BZ	1.3	<0.13	<0.042	<0.22	<0.65	<0.13	<0.20	<0.18	0.17	0.62
SPCB-13-BZ-6	HVAC OFF	5/22/2014	BZ	0.29	<0.14	<0.044	<0.23	<0.68	<0.14	<0.20	<0.19	0.17	0.60
SPCB-13-BZ-8	HVAC OFF	5/22/2014	BZ	0.36	<0.13	<0.041	<0.22	<0.64	<0.13	<0.19	<0.18	0.17	0.60
SPCB-13-BZ-9	HVAC OFF	5/22/2014	BZ	1.8	<0.13	<0.042	<0.22	<0.66	<0.13	<0.20	<0.18	0.17	0.73
SPCB-13-BZ-10	HVAC OFF	5/22/2014	BZ	0.34	<0.13	<0.042	<0.22	<0.65	<0.13	<0.20	<0.18	0.16	0.61
SPCB-13-BZ-11 (duplicate to BZ-8)	HVAC OFF	5/22/2014	BZ	0.39	<0.14	<0.044	<0.23	<0.68	<0.14	<0.21	<0.19	<0.17	0.58
SPCB-13-PW-1	HVAC OFF	5/22/2014	PW	<0.17	<0.13	<0.041	<0.22	<0.64	<0.13	<0.19	<0.18	0.30	0.60
SPCB-13-PW-3	HVAC OFF	5/22/2014	PW	8.4	2.0	0.14	1.2	<0.63	<0.13	<0.19	<0.17	7.5	0.91
SPCB-13-PW-4	HVAC OFF	5/22/2014	PW	0.86	<0.13	<0.042	<0.22	<0.65	<0.13	<0.20	<0.18	0.37	0.6
SPCB-13-PW-5	HVAC OFF	5/22/2014	PW	0.58	<0.13	<0.042	<0.22	<0.65	<0.13	<0.20	<0.18	0.17	0.66
SPCB-13-PW-7	HVAC OFF	5/22/2014	PW	6.0	<0.13	<0.041	<0.22	<0.64	<0.13	<0.19	<0.18	0.18	1.2
<b>July 9, 2014 - HVAC ON Sampling Event - Prior to SVE System Installation</b>													
SPCB-13-BZ-14	HVAC ON	7/9/2014	BZ	<0.18	<0.13	<0.042	<0.22	<0.65	<0.13	<0.20	<0.18	<0.16	0.59
SPCB-13-BZ-18	HVAC ON	7/9/2014	BZ	<0.17	<0.12	<0.040	<0.21	<0.63	<0.13	<0.19	<0.17	0.16	0.6
SPCB-13-BZ-20	HVAC ON	7/9/2014	BZ	<0.18	<0.13	<0.043	<0.23	<0.67	<0.14	<0.20	<0.18	<0.16	0.6
SPCB-13-BZ-21	HVAC ON	7/9/2014	BZ	<0.18	<0.13	<0.043	<0.23	<0.67	<0.14	0.41	<0.18	<0.17	0.55
SPCB-13-BZ-22	HVAC ON	7/9/2014	BZ	<0.17	<0.13	<0.041	<0.22	<0.64	<0.13	<0.19	<0.18	<0.16	0.54
SPCB-13-BZ-23 (duplicate to BZ-20)	HVAC ON	7/9/2014	BZ	<0.18	<0.13	<0.043	<0.23	<0.67	<0.14	<0.20	<0.18	<0.16	0.54
SPCB-13-PW-13	HVAC ON	7/9/2014	PW	<0.17	<0.13	<0.041	<0.22	<0.63	<0.13	<0.19	<0.17	0.17	0.62
SPCB-13-PW-15	HVAC ON	7/9/2014	PW	0.19	<0.13	<0.042	<0.22	<0.65	<0.13	<0.20	<0.18	0.32	0.62
SPCB-13-PW-16	HVAC ON	7/9/2014	PW	0.39	<0.13	<0.041	<0.22	<0.64	<0.13	<0.19	<0.18	0.23	0.63
SPCB-13-PW-17	HVAC ON	7/9/2014	PW	<0.17	<0.13	<0.041	<0.22	<0.63	<0.13	<0.19	<0.17	0.19	0.58
SPCB-13-PW-19	HVAC ON	7/9/2014	PW	<0.18	<0.13	<0.042	<0.22	<0.66	<0.13	<0.20	<0.18	0.23	0.61

**Table 2**  
**Indoor Air Sampling Results**  
**Former Spectra-Physics Lasers Site**  
**1245 Terra Bella Avenue, Mountain View, CA**

*(concentrations reported in micrograms per cubic meter (µg/m<sup>3</sup>) at 25° Celsius and 1 atmosphere)*

Sample ID	HVAC Status	Sample Date	Sample Type	TCE	cis-1,2-DCE	VC	PCE	trans-1,2-DCE	1,1-DCA	1,2-DCB	1,1,1-TCA	Chloroform	Freon 113
<b>April 8, 2015 - HVAC OFF Sampling Event - With SVE System Operating</b>													
SPCB-13-BZ-25	HVAC OFF	4/8/2015	BZ	<0.16	<0.12	<0.039	<0.21	<0.60	<0.12	<0.18	<0.16	<0.15	0.47
SPCB-13-BZ-26	HVAC OFF	4/8/2015	BZ	<0.16	<0.12	<0.038	<0.20	<0.59	<0.12	<0.18	<0.16	<0.14	0.47
SPCB-13-PW-27	HVAC OFF	4/8/2015	PW	<0.16	<0.12	<0.038	<0.20	<0.59	<0.12	<0.18	<0.16	0.22 M	0.47
SPCB-13-PW-28	HVAC OFF	4/8/2015	PW	<0.17	<0.12	<0.040	<0.21	<0.61	<0.12	<0.19	<0.17	<0.15	0.46

**Notes:**

\* = trans-1,2-DCE MRLs and RSLs are used for cis-1,2-DCE

\*\* = based on a 10-hour workday, as recommended by USEPA for South Bay Sites; 8-hour workday scenario screening level is 8 µg/m<sup>3</sup>.

< = Not detected above laboratory reporting limit

1. USEPA RSLs, revised January 2015. Available at: <http://www.epa.gov/region9/superfund/prg/>

Industrial Air RSLs are derived for exposure durations of 8 hours per day, 250 days per year for 25 years.

2. Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), revised July 2013. Available at: <http://www.atsdr.cdc.gov/mrls/mrlist.asp>

Acute MRLs are derived for exposure durations of 1 to 14 days. Short-term (intermediate) MRLs are derived for exposure durations of >14 to 364 days.

3. USEPA Interim Indoor Air Short-Term Response Action Levels for TCE (7 µg/m<sup>3</sup>) from memo from USEPA to Region 9 Superfund Division Staff and Management (USEPA 2014). "EPA Region 9 Response Action Levels and Recommendations to Address Near-Term Inhalation Exposures to TCE in Air from Subsurface Vapor Intrusion". July 9.

4. California-modified indoor air screening level for PCE (2 µg/m<sup>3</sup>) from memo from USEPA to Stephen Hill (RWQCB 2013). "EPA Region 9 Guidelines and Supplemental Information Needed for Vapor Intrusion Evaluations at the South Bay National Priorities List (NPL) Sites." December 3.

1,2-DCB = 1,2-dichlorobenzene

BZ = breathing zone sample location

ATSDR = Agency for Toxic Substances and Disease Registry

HVAC = heating, ventilation and air conditioning

1,1-DCA = 1,1-dichloroethane

PW = pathway sample location

USEPA = United States Environmental Protection Agency

SVE = soil vapor extraction

cis-1,2-DCE = cis-1,2-dichloroethene

M = Reported value may be biased due to apparent matrix interferences.

RSLs = Regional Screening Levels

trans-1,2-DCE = trans-1,2-dichloroethene

NA = Not available

RWQCB = Regional Water Quality Control Board

PCE = tetrachloroethene

-- = Not applicable

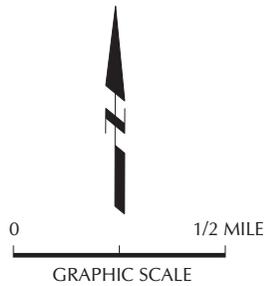
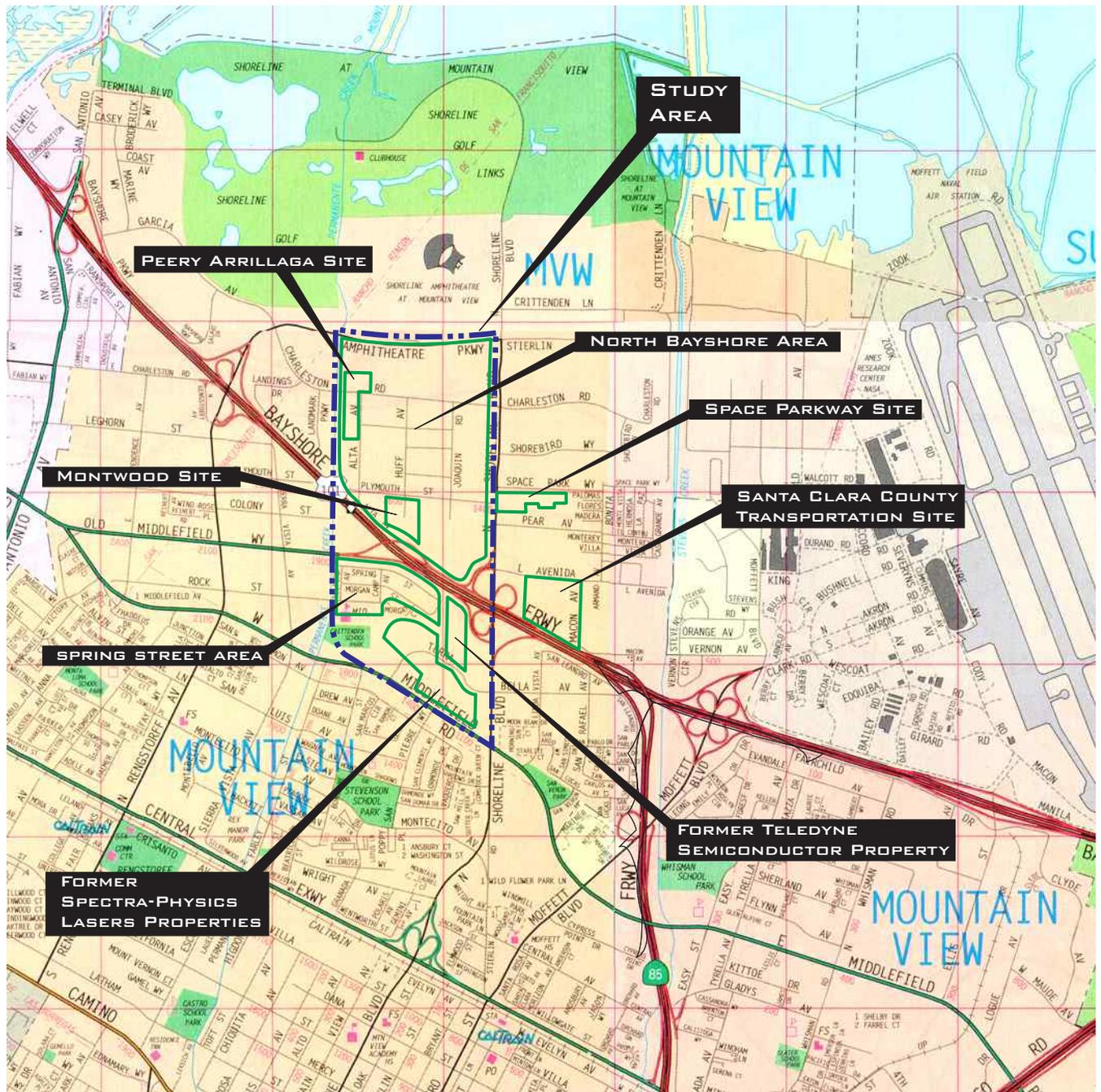
MRLs = Minimal Risk Levels

1,1,1-TCA = 1,1,1-trichloroethane

TCE = trichloroethene

VC = vinyl chloride

## Figures



FORMER SPECTRA-PHYSICS LASERS SITE  
MOUNTAIN VIEW, CALIFORNIA

---

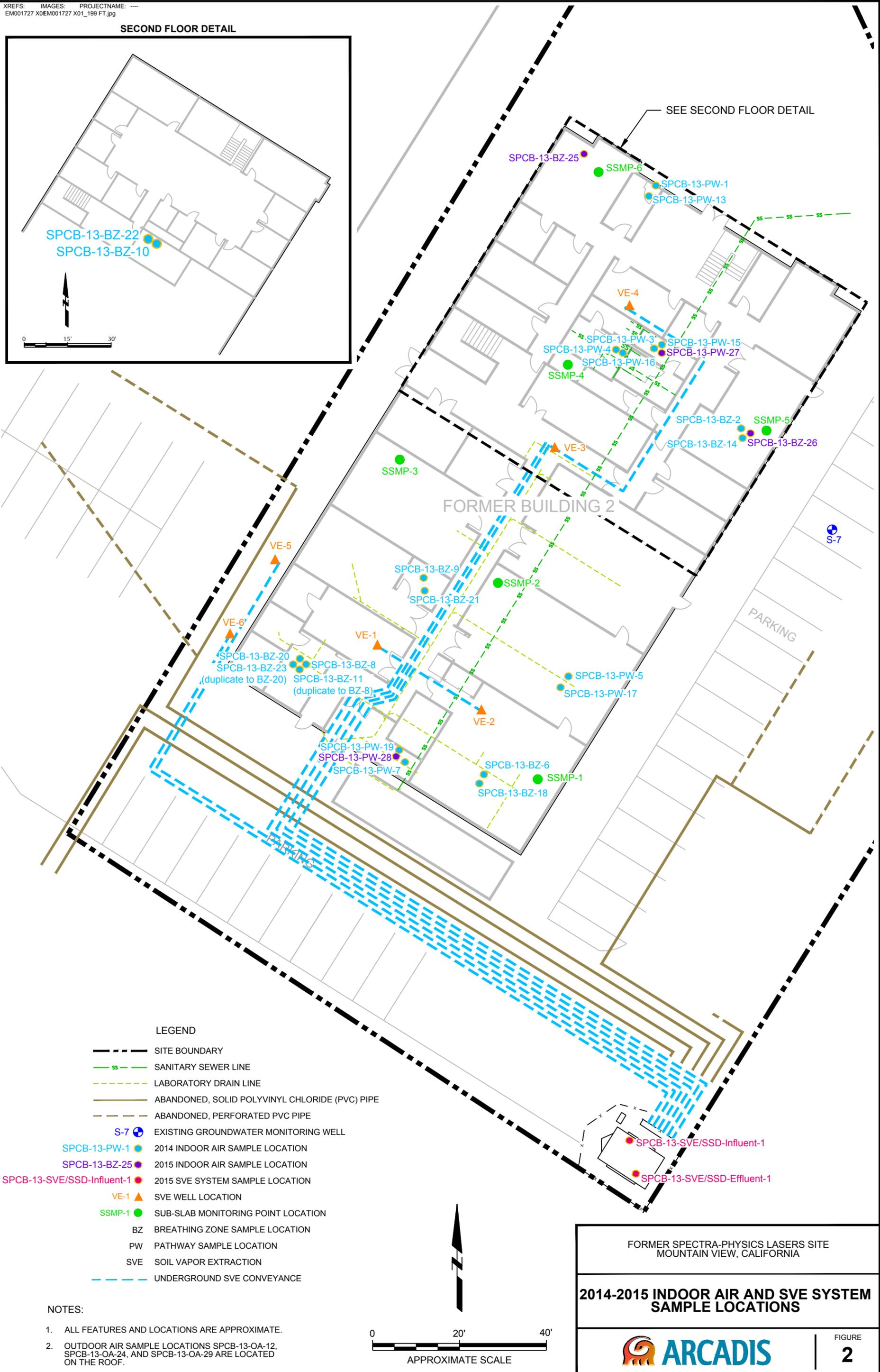
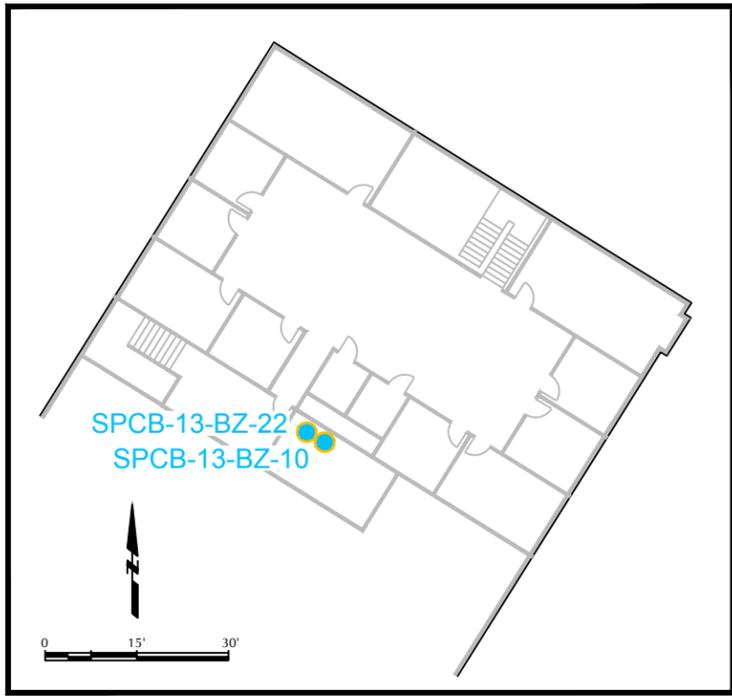
**SITE VICINITY MAP AND  
PROPERTY LOCATIONS**

---

 **ARCADIS**

FIGURE  
**1**

SECOND FLOOR DETAIL

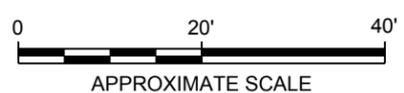


LEGEND

- SITE BOUNDARY
- ss --- SANITARY SEWER LINE
- LABORATORY DRAIN LINE
- ABANDONED, SOLID POLYVINYL CHLORIDE (PVC) PIPE
- ABANDONED, PERFORATED PVC PIPE
- S-7 Ⓢ EXISTING GROUNDWATER MONITORING WELL
- SPCB-13-PW-1 ● 2014 INDOOR AIR SAMPLE LOCATION
- SPCB-13-BZ-25 ● 2015 INDOOR AIR SAMPLE LOCATION
- SPCB-13-SVE/SSD-Influent-1 ● 2015 SVE SYSTEM SAMPLE LOCATION
- VE-1 ▲ SVE WELL LOCATION
- SSMP-1 ● SUB-SLAB MONITORING POINT LOCATION
- BZ BREATHING ZONE SAMPLE LOCATION
- PW PATHWAY SAMPLE LOCATION
- SVE SOIL VAPOR EXTRACTION
- UNDERGROUND SVE CONVEYANCE

NOTES:

1. ALL FEATURES AND LOCATIONS ARE APPROXIMATE.
2. OUTDOOR AIR SAMPLE LOCATIONS SPCB-13-OA-12, SPCB-13-OA-24, AND SPCB-13-OA-29 ARE LOCATED ON THE ROOF.



FORMER SPECTRA-PHYSICS LASERS SITE  
MOUNTAIN VIEW, CALIFORNIA

**2014-2015 INDOOR AIR AND SVE SYSTEM  
SAMPLE LOCATIONS**



FIGURE  
**2**



## Appendix A

SVE System As-Built Drawings and  
Construction Photos

# AS-BUILT DRAWINGS FOR

# SOIL VAPOR EXTRACTION TREATMENT SYSTEM

MARCH 2015



**FORMER SPECTRA-PHYSICS FACILITY BUILDING  
1245 TERRA BELLA AVENUE  
MOUNTAIN VIEW, CALIFORNIA**

### KEY CONTACTS:

**ENGINEERS:**  
ARCADIS U.S., INC.  
2000 POWELL STREET  
SUITE 700  
EMERYVILLE, CALIFORNIA 94608  
TELEPHONE: 510-596-9535  
CONTACT: LUCAS GOLDSTEIN

**PROPERTY OWNER:**  
GOOGLE  
1800 AMPITHEATRE PARKWAY  
MOUNTAIN VIEW, CALIFORNIA 94043  
CONTACT: TIM SWEENEY  
MELISSA PARNELL

ARCADIS U.S., INC.  
44 SOUTH BROADWAY  
15TH FLOOR  
WHITE PLAINS, NEW YORK 10601  
TELEPHONE: 914-641-2830  
CONTACT: LAWRENCE TABAT

ARCADIS U.S., INC.  
222 SOUTH MAIN STREET  
SUITE 300  
AKRON, OHIO 44308  
TELEPHONE: 330-55-5682  
CONTACT: JOHN SIDOTI

### INDEX TO DRAWINGS

- |                     |   |
|---------------------|---|
| <b>CONSTRUCTION</b> |   |
| C-1                 | PROPOSED SOIL VAPOR EXTRACTION SYSTEM LAYOUT                        |
| C-2                 | SOIL VAPOR PROBE AND EXTRACTION WELL CONSTRUCTION AND RISER DETAILS |
| C-3                 | TRENCHING DETAILS   |
| <b>ELECTRICAL</b>   |   |
| E-1                 | ELECTRICAL LEGEND AND NOTES   |
| E-2                 | SINGLE LINE DIAGRAM   |
| <b>PROCESS</b>      |   |
| P-1                 | PROCESS AND INSTRUMENTATION DIAGRAM                                 |

NOTE: DESIGN PURSUANT TO: ACI 301, ACI 318-11, SECTION 6.3.3, SECTION 6.3.5.2, NEC 501.15, NEC TABLE 344.30(B) (2), NEC ARTICLE 250, NEC 250.30, NEC 250.122, NEMA TC-2, NEMA TC-3, WF406, VL360, UL 514B, ANSI C80.1, AND ANSI C80.4



REFERENCE: BASE MAP USGS 7.5 MIN. TOPO. QUAD., MOUNTAIN VIEW, CALIFORNIA, 2012.



**LOCATION MAP**  
SCALE: 1" = 2000'

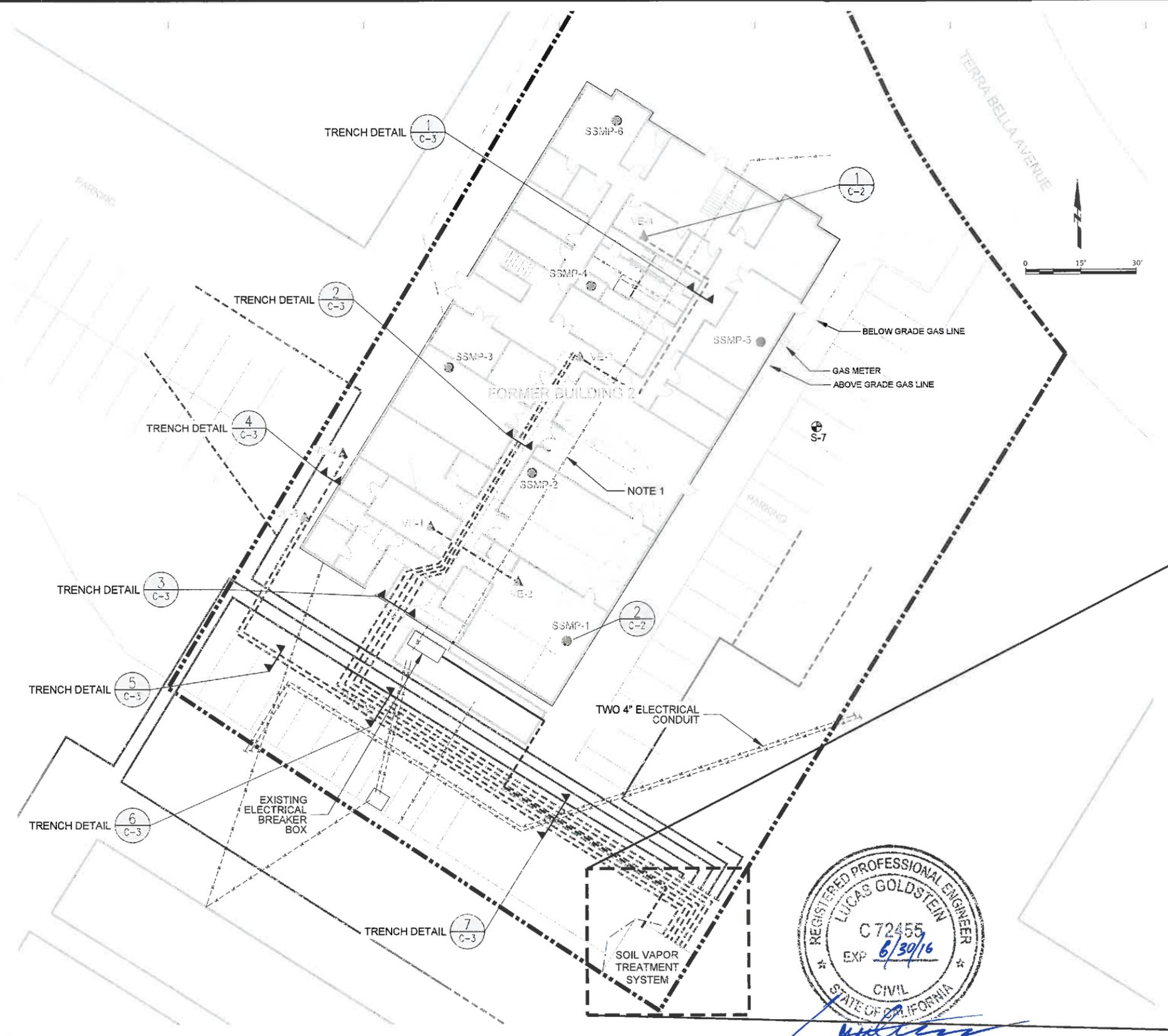


CALIFORNIA



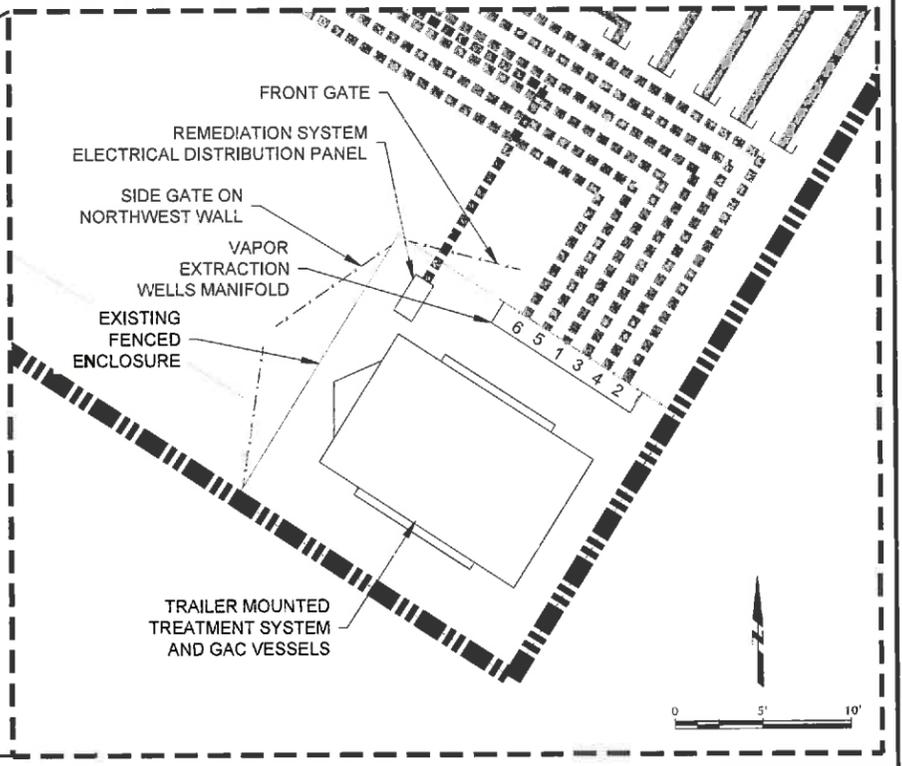
ARCADIS U.S., INC.

CITY: EMERYVILLE, CA DIV: GROUP: ENVCAD DB: A. REYES, J. HARRIS LAYOUT: C-1 SAVED: 4/12/2015 11:23 AM ACADUSER: 18.18 (LMS TECH) PAGES: 177 IMAGES: PROJECTNAME: EM001727 XREFS: EM001727 XREF: EM001727 X01\_199.rvt



- LEGEND**
- SITE BOUNDARY
  - SANITARY SEWER LINE
  - LABORATORY DRAIN LINE
  - TELECOM LINE
  - GAS LINE
  - EXISTING UNDERGROUND ELECTRICAL
  - ABOVEGROUND ELECTRICAL FEED FOR REMEDIATION SYSTEM
  - UNDERGROUND ELECTRICAL FEED FOR REMEDIATION SYSTEM
  - ABANDONED IN PLACE, FORMER REMEDIATION SYSTEM CONVEYANCE PIPING
  - ABANDONED IN PLACE, FORMER REMEDIATION SYSTEM HORIZONTAL EXTRACTION TRENCH
  - S-7 ◉ EXISTING GROUNDWATER MONITORING WELL
  - VE-1 ▲ SOIL VAPOR EXTRACTION WELL LOCATION
  - SSMP-1 ● SUB-SLAB MONITORING POINT LOCATION
  - UNDERGROUND SVE CONVEYANCE

- NOTES**
1. ALL FEATURES AND LOCATIONS ARE APPROXIMATE.
  2. ACTUAL WIDTH OF TRENCH VARIES. SEE DETAILS ON C-4.
  3. FOR WELL CONSTRUCTION DETAILS SEE C-2.
  4. ALL WATER LINES ARE ABOVE GRADE AND ARE NOT SHOWN.
  5. LOT: 36,895 SQUARE FEET, BUILDING: 15,680 SQUARE FEET.



SCALE(S) AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING

USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
2	3/31/15	AS-BUILTS	CH	LG
1	9/26/14	DESIGN REVISIONS	EM	LG
1	8/27/14	DRAFT DESIGN	EM	LG

Professional Engineer's Name  
**LUCAS GOLDSTEIN**

Professional Engineer's No.  
021115

State  
CA

Date Signed  
4/2/15

Project Mgr.  
EK

Designed by  
EM

Drawn by  
ASR

Checked by  
LG



FORMER SPECTRA-PHYSICS FACILITY BUILDING, 1245 TERRA BELLA AVENUE, MOUNTAIN VIEW, CALIFORNIA

**AS-BUILT VAPOR EXTRACTION SYSTEM LAYOUT**

CONSTRUCTION

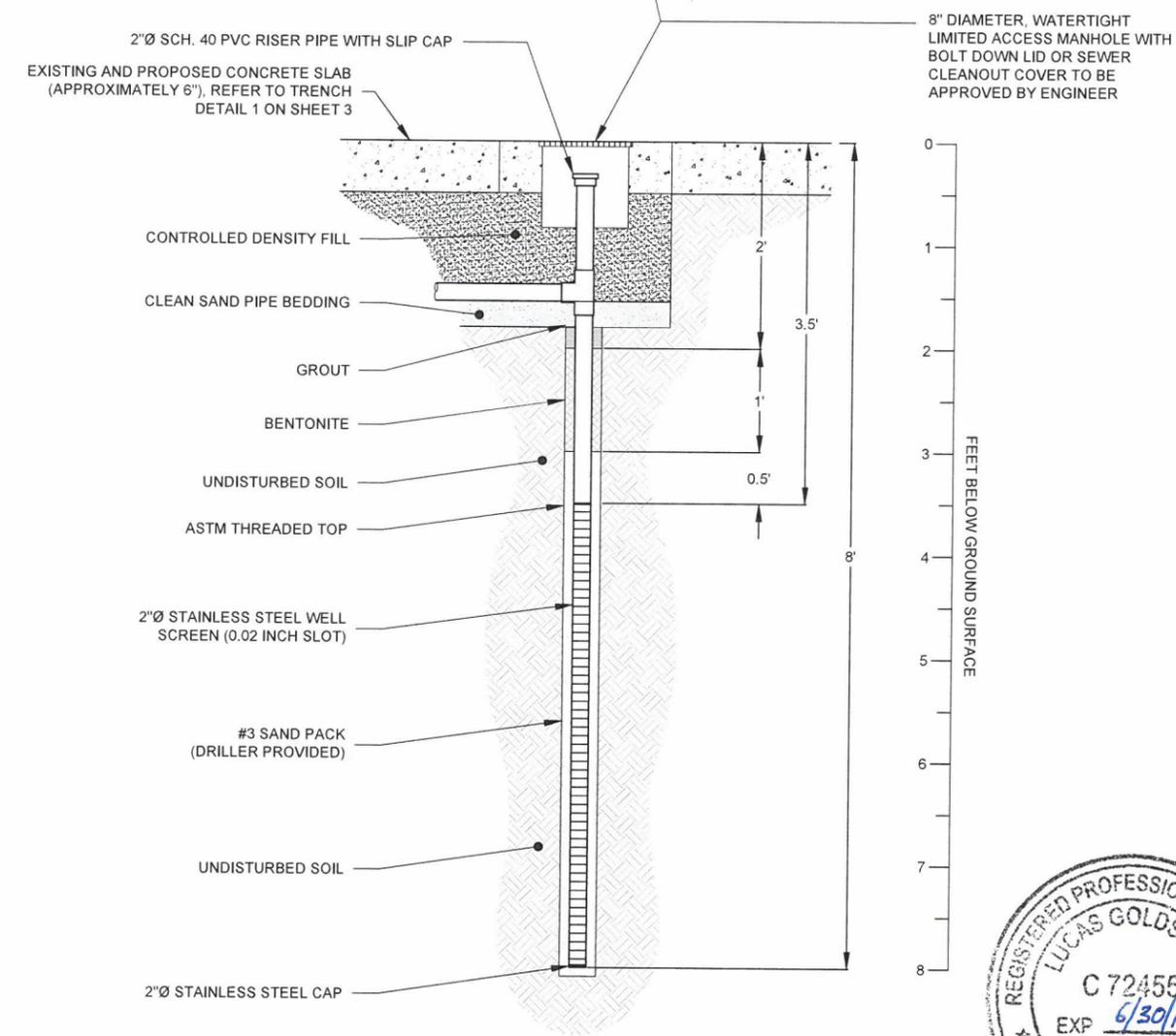
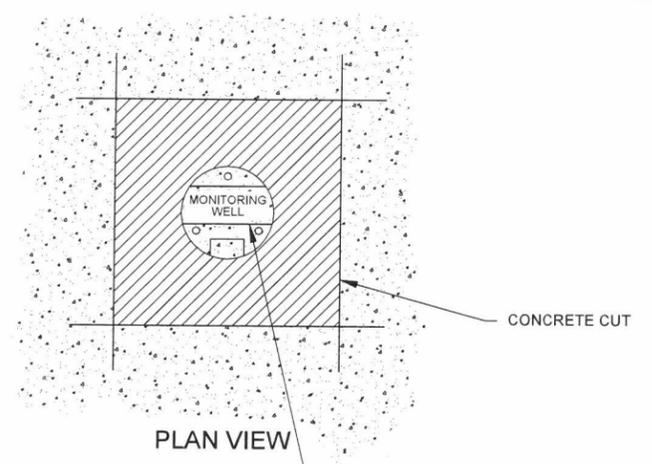
ARCADIS Project No.  
EM001217.0073.00005

Date  
MARCH 2015

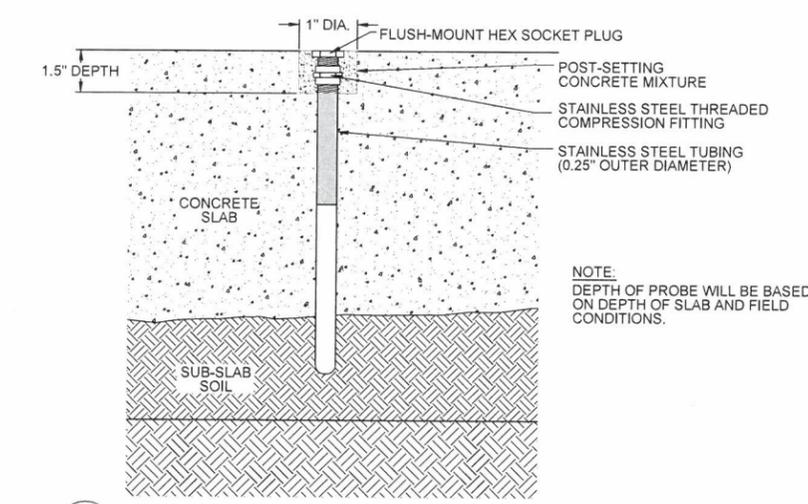
ARCADIS, U.S., INC.  
100 SMITH RANCH ROAD  
Suite 329  
SAN RAFAEL, CALIFORNIA  
TEL. 415.481.4530

**C-1**

CITY: EMERYVILLE, CA DIV: GROUP: ENVCAD DB: A. REYES, J. HARRIS  
 G:\ENVCAD\Emeryville\ACT\EM001727\007300008\AS-BUILT\SDWG\EM001727 C-2.dwg LAYOUT: C-2  
 PAGES: EN001727 X00  
 PROJECT NAME: EM001727 X00  
 ACADVER: 19 IS (LMS TECH) PAGES: 19 IS (LMS TECH) PAGES: 19 IS (LMS TECH)  
 PLOTTED: 4/29/2015 3:05 PM BY: REYES, ALEC



1  
C-2  
**PROPOSED SOIL-VAPOR EXTRACTION WELL DETAIL**  
NOT TO SCALE



2  
C-2  
**SUB-SLAB VAPOR PROBE DETAIL**  
NOT TO SCALE

NOTE:  
DEPTH OF PROBE WILL BE BASED ON DEPTH OF SLAB AND FIELD CONDITIONS.



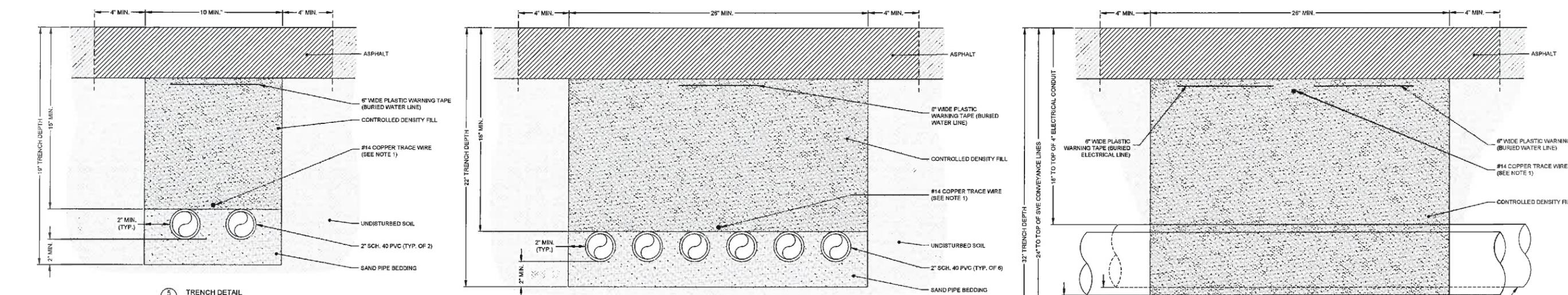
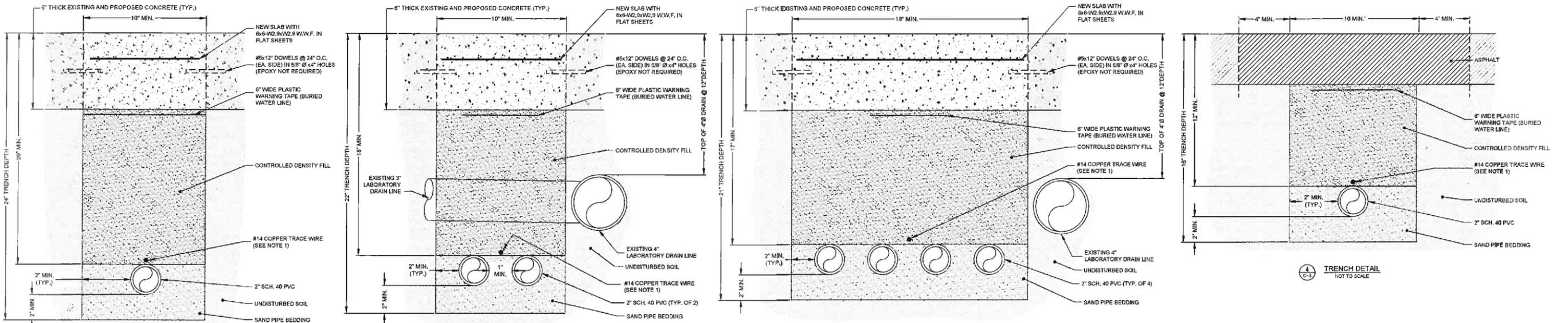
FORMER SPECTRA-PHYSICS FACILITY BUILDING, 1245 TERRA BELLA AVENUE, MOUNTAIN VIEW, CALIFORNIA  
**AS-BUILT SOIL-VAPOR PROBE AND EXTRACTION WELL CONSTRUCTION AND RISER DETAILS**  
 CONSTRUCTION

ARCADIS Project No. EM001217.0073.00005  
 Date MARCH 2015  
 ARCADIS, U.S., INC.  
 100 SMITH RANCH ROAD  
 Suite 329  
 SAN RAFAEL, CALIFORNIA  
 TEL. 415.491.4530

**C-2**

SCALE(S) AS INDICATED		Professional Engineer's Name <b>LUCAS GOLDSTEIN</b>	
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.		Professional Engineer's No. 021115	
USE TO VERIFY FIGURE REPRODUCTION SCALE		State CA	
THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.		Date Signed 4/2/15	
		Project Mgr. EK	
		Designed by EM	
		Drawn by ASR	
		Checked by LG	

CITY: EMERYVILLE, CA DIV: GROUP: ENVCAD, DB: A. REYES, J. HARRIS  
 DATE: 4/2/2015 11:41 AM BY: REYES, ALEC  
 PLOTT: STYLE: TABLE  
 LAYOUT: C-3  
 SAVED: 4/2/2015 11:24 AM  
 ACADVER: 18.18 (LMS TECH)  
 PAGESETUP: PAGESHEET: C-3  
 PROJECTNAME: EM001727.XD  
 XREFS: EM001727.XD  
 IMAGES:



- NOTES:**
- TRACER WIRE IS #14 AWG COPPER AND HAS YELLOW (GAS) 30 ML POLYETHYLENE INSULATION OR APPROVED EQUAL TRACER WIRE PLACED DIRECTLY ABOVE THE CENTER MOST PIPE IN THE TRENCH. TRACER WIRE HAS ONLY ONE TRACER LINE PER TRENCH, AND IS CONNECTED WITH CONDUCTIVE LUGS (OR EQUIVALENTS) AT TRENCH JUNCTIONS. TRACER WIRE IS DAY-LIGHTED AT THE WELLHEAD AND ALL WALLS TO FACILITATE EMERGING BY UTILITY LOCATORS.
  - A MINIMUM OF TWO INCHES OF PIPE BEDDING WAS MAINTAINED BETWEEN CONVEYANCE PIPING AND THE TRENCH EXTENTS. ADDITIONALLY, A MINIMUM OF TWO INCHES OF PIPE BEDDING WAS PLACED BETWEEN ADJACENT PIPES.
  - SVE CONVEYANCE PIPE WAS SLOPED AT 1" PER 100' OR TO THE EXTENT PRACTICAL TO THE WELL OR COLLECTION POINT WITH MINIMAL DIPS OR LOW SPOTS, TO FACILITATE DRAINAGE OF ANY ENTRAINED WATER.
  - CONCRETE MEETS THE REQUIREMENTS OF ACI 301, SPECIFICATIONS FOR STRUCTURAL CONCRETE, AS MODIFIED HEREIN.  
 A. COMPRESSIVE STRENGTH AT 28 DAYS = 4,000 PSI  
 B. MAXIMUM W/C = 0.45  
 C. AGGREGATE: ASTM C33, SIZE #6  
 D. CEMENT: ASTM C150, TYPE I  
 E. SLAB FINISH: MATCH EXISTING
  - CONTROLLED DENSITY FILL IS A UNIFORM MIXTURE OF ASTM C33 FINE AGGREGATE, ASTM C150 TYPE I PORTLAND CEMENT, ASTM 3618 TYPE F FLY ASH, ADMIXTURES, AND WATER. DESIGN MIX TO BE FLOWABLE WITH NO BLEED WATER. MAXIMUM COMPRESSIVE STRENGTH OF 150 PSI AT 56 DAYS. CURED MATERIAL SHALL BE EXCAVATABLE WITH A MAXIMUM DRY UNIT WEIGHT OF 110 PCF.
  - DESIGN PURSUANT TO ACI 318-08, SECTION 6.3.3 AND SECTION 6.3.5.2
  - NO PERIMETER FOUNDATION WAS ENCOUNTERED WHERE THE SVE CONVEYANCE LINES EXIT THE BUILDING. PERIMETER FOUNDATION PENETRATION DETAILS PROVIDED IN CONSTRUCTION DRAWING SET WERE NOT APPLICABLE.



ARCADIS U.S., INC.

FORMER SPECTRA-PHYSICS FACILITY BUILDING, 1245 TERRA BELLA AVENUE, MOUNTAIN VIEW, CALIFORNIA

## AS-BUILT TRENCHING DETAILS

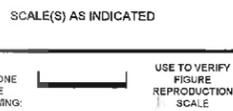
CONSTRUCTION

ARCADIS Project No.  
 EM001217.0073.00005  
 Date  
 MARCH 2015  
 ARCADIS, U.S., INC.  
 100 SMITH RANCH ROAD  
 Suite 328  
 SAN RAFAEL, CALIFORNIA  
 TEL. 415.491.4530

C-3

No.	Date	Revisions	By	Chkd
2	3/31/15	AS-BUILTS	CH	LG
1	9/26/14	DESIGN REVISIONS	EM	LG
1	8/27/14	DRAFT DESIGN	EM	LG

Professional Engineer's Name  
**LUCAS GOLDSTEIN**  
 Professional Engineer's No.  
 021115  
 State  
 CA  
 Date Signed  
 4/2/15  
 Project Mgr.  
 EK  
 Designed by  
 EM  
 Drawn by  
 ASR  
 Checked by  
 LG



THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

CITY: EMERYVILLE, CA DIV: GROUP: ENVCAD DB: A. REYES, J. HARRIS  
 G:\ENVCAD\emeryville\ARCAS-BUILT\EM001217\E-1.dwg LAYOUT: E-1 SAVED: 4/12/2015 10:57 AM ACADVER: 18 IS (LMS TECH) PAGESETUP: PLOTSTYLETABLE: PLOTTED: 4/22/2015 11:51 AM BY: REYES, ALEC  
 XREFS: EM001217.X00.ELEC  
 IMAGES: PROJECTNAME:

**ELECTRICAL SPECIFICATIONS:**

**GENERAL**

1. ALL ELECTRICAL EQUIPMENT SHALL BE U.L. LISTED AND LABELED.
2. ALL ELECTRICAL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND LOCAL AND STATE CODES.
3. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE APPROXIMATE LOCATIONS OF OUTLETS, CONDUIT, JUNCTION BOXES, EQUIPMENT, ETC. DIMENSIONS PRESENTED ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS AND ALL DIMENSIONS, WHETHER SHOWN ON THE DRAWINGS OR SCALED, SHALL BE VERIFIED IN THE FIELD.
4. THE CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACTIVITIES WITH ARCADIS PRIOR TO COMMENCING ONSITE ACTIVITIES.
5. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD.
6. THE CONTRACTOR SHALL INSTALL COMPONENTS IN NEAT AND WORKMANLIKE MANNER; ALIGN, LEVEL AND ADJUST FOR SATISFACTORY OPERATION; AND INSTALL SO THAT PARTS ARE EASILY ACCESSIBLE FOR INSPECTION, OPERATION, MAINTENANCE, AND REPAIR. DEVIATIONS FROM INDICATED ARRANGEMENTS ARE SUBJECT TO REVIEW AND APPROVAL BY ARCADIS PRIOR TO INSTALLATION AND/OR OPERATION.
7. CONTRACTOR SHALL HANDLE ALL SPOIL MATERIAL AS DIRECTED BY ARCADIS.
8. THE CONTRACTOR SHALL UNDERTAKE MEASURES TO LOCATE UTILITIES KNOWN AND UNKNOWN IN THE FIELD PRIOR TO INITIATING WORK. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES CAUSED BY HIS WORK ACTIVITIES.
9. THE CONTRACTOR SHALL RESTORE ALL SURFACES DAMAGED OR DESTROYED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT TO THEIR PRE-CONSTRUCTION CONDITION.
10. THE CONTRACTOR SHALL NOTIFY ARCADIS IMMEDIATELY WHEN CONFLICTS BETWEEN THE DRAWINGS AND ACTUAL CONDITIONS ARE DISCOVERED.
11. THE CONTRACTOR SHALL PREPARE RED-LINE AS-BUILT DRAWINGS UPON COMPLETION OF CONSTRUCTION ACTIVITIES, INDICATE ALL BURIED OR OTHERWISE CONCEALED CONDUIT WHERE ROUTING DIFFERS FROM OR IS NOT INDICATED ON PLANS.
12. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THIS PROJECT. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS FOR THE SAFETY OF, AND SHALL PROVIDE THE NECESSARY PROTECTION TO PREVENT DAMAGE, INJURY, OR LOSS TO ALL EMPLOYEES ON THE WORK AND ANY OTHER PERSONS WHO MAY BE AFFECTED THEREBY.

**RIGID METAL CONDUIT (RGS)**

1. GALVANIZED STEEL, HOT-DIPPED ZINC, ANSI STANDARD C80.1 AND C80.4.
2. MANUFACTURER SHALL BE ALLIED TUBE & CONDUIT CORPORATION, TRIANGLE WIRE AND CABLE INC., OR EQUAL.
3. PROVIDE CONDUIT SEAL-OFF FITTING IN CONDUIT RUN AS REQUIRED TO COMPLY WITH NEC 501.15. CONDUIT SEAL SHALL PREVENT PASSAGE OF GASES, VAPORS, OR FLAMES FROM ONE PORTION OF THE ELECTRICAL INSTALLATION TO ANOTHER.
4. CONDUITS INSTALLED ABOVE GROUND SHALL BE SUPPORTED IN ACCORDANCE WITH TABLE 344.30(B)(2) OF THE NEC.

**NONMETALLIC (PVC) CONDUIT**

1. NONMETALLIC RIGID CONDUIT AND FITTINGS SHALL BE SCHEDULE 40, POLYVINYL CHLORIDE AND SHALL BE RESISTANT TO CORROSION.
2. CONDUIT AND FITTINGS SHALL BE IN ACCORDANCE WITH NEMA STANDARD TC-2 AND TC-3, LATEST REVISION.
3. MANUFACTURER SHALL BE CARLON ELECTRIC CONDUIT CO., TRIANGLE PWC CO., OR EQUAL.

**LIQUID-TIGHT FLEXIBLE METAL CONDUIT**

1. INTERLOCKED FLEXIBLE GALVANIZED STEEL CONSTRUCTION WITH LIQUID-TIGHT PVC JACKET, CONFORMING TO FEDERAL SPECIFICATION WF406 AND UL 360.
2. FITTING: MALLEABLE IRON, CADMIUM-PLATED FITTINGS WITH COMPRESSION TYPE STEEL FERRULE AND NEOPRENE GASKET SEALING RINGS WITH INSULATED THROAT, CONFORMING TO UL514B.
3. MANUFACTURER SHALL BE AMERICAN BRASS COMPANY, ELECTRI-FLEX, OR EQUAL.
4. USE FOR TERMINATIONS TO MOTOR, TRANSFORMERS, AND VIBRATING EQUIPMENT, WITH LENGTH NOT TO EXCEED 4 FEET.

**ELECTRICAL CONDUIT**

1. ALL ELECTRICAL JUNCTION BOXES OVER 6"X6" SHALL BE METALLIC NEMA 4 HINGED ENCLOSURES, SIZES VARY AND BASED ON WIRING REQUIREMENT PER NEC.
2. ALL UNDERGROUND ELECTRICAL CONDUITS SHALL BE PVC SCHEDULE 80. ALL CONDUIT CONNECTIONS TO BE GLUED USING APPLICABLE FITTINGS.
3. RIGID GALVANIZED STEEL (RGS) TO BE HOT-DIPPED ZINC, ANSI STANDARD C80.1 AND C80.4 FOR ALL ABOVE GROUND APPLICATIONS. ALL CONDUIT CONNECTIONS TO BE THREADED.
4. FOR ALL ABOVE GROUND TO UNDERGROUND TRANSITIONS, RGS TO PENETRATE 6-INCHES BELOW GROUND SURFACE PRIOR TO TRANSITIONING TO PVC. ALL RGS CONDUIT INSTALLED BELOW GROUND SURFACE TO BE WRAPPED IN PVC TAPE.
5. CONDUITS INSTALLED ABOVE GROUND SHALL BE SUPPORTED IN ACCORDANCE WITH TABLE 344.30(B)(2) OF THE NEC.

**WIRES AND CABLES GENERAL**

1. CONDUCTORS: ALL CONDUCTORS, UNLESS OTHERWISE NOTED, SHALL BE STRANDED COPPER, CONSTRUCTED OF SOFT DRAWN OR ANNEALED COPPER, XHHW INSULATION.
2. CONDUCTORS INSULATION: SHALL BE COLOR CODED, WITH COLOR OF INSULATION ONE COLOR THROUGHOUT THE ENTIRE RUN.
3. LOW VOLTAGE CONDUCTORS:
  - A. ALL CONDUCTORS FOR POWER, LIGHTING AND 120 VAC CONTROL SHALL BE RATED A MINIMUM 600 VAC.
  - B. CONDUCTORS SHALL BE CONSTRUCTED OF UNCOATED CLASS C COPPER CONCENTRIC-LAY-STRANDED WIRES.
  - C. POWER AND LIGHTING CONDUCTORS SHALL BE TYPE XHHW.
  - D. NON-LINEAR MOTOR LOAD WIRING: PROVIDE POWER CONDUCTORS WITH XHHW.
4. 24VDC INSTRUMENTATION CABLES: SHALL BE TWISTED SHIELDED SINGLE PAIR OR MULTIPLE CONDUCTORS (UP TO FOUR PAIRS PER CABLE) OF NO. 16 AWG TINNED COATED CLASS C COPPER CONCENTRIC LAY STRANDED WIRES WITH AN 100% ALUMINUM POLYESTER SHIELD AND COPPER DRAIN. RATED FOR 600V AND COLOR COATED PVC OUTER JACKET.
5. CONNECTORS:
  - A. PIGTAIL SPLICING #10 AND SMALLER, USE TAPERED SPRING WIRE NUTS. MANUFACTURER SHALL BE IDEAL WING NUT, BUCHANAN B-CAP, T&B PIGGIES, OR APPROVED EQUAL. WIRE NUTS ARE NOT ACCEPTABLE FOR PROCESS CONNECTIONS, BUT WIRE NUTS CAN BE USED FOR LIGHTING CONNECTIONS.
  - B. FOR TERMINATION OF #14 CONTROL WIRES TO TERMINALS, USE INSULATED COMPRESSION SPADE TYPE CONNECTORS. MANUFACTURER SHALL BE BURNDY HYDENT, T&B STA-KON, OR EQUAL.
  - C. SPLICES AND TERMINALS FOR #8 AND LARGER SHALL BE COPPER COMPRESSION TYPE. MANUFACTURER SHALL BE BURNDY HYDENT OR HYLUG, T&B, STA-CON, OR EQUAL.
  - D. FIXTURE CONNECTIONS MANUFACTURER SHALL BE T&B STA-KON SERIES PT-66M, IDEAL CRIMP SLEEVE NO. 410 WITH LONG BARREL, OR EQUAL.
  - E. SPLICING IS NOT ALLOWED UNLESS APPROVED BY ENGINEER.
  - F. ALL BELOW GRADE CONNECTIONS SHALL BE UL LISTED WATERPROOF TYPE OR MADE INSIDE A WATERPROOF ENCLOSURE.

**GROUNDING**

1. ELECTRICAL SYSTEM AND EQUIPMENT GROUNDING SHALL MEET THE REQUIREMENTS OF THE NEC ARTICLE 250 OR SHALL EXCEED ARTICLE 250 AS HEREIN SPECIFIED.
2. GROUND RESISTANCE SHALL BE MEASURED AND ADDITIONAL GROUNDING RODS SHALL BE INSTALLED IF RESISTANCE IS GREATER THAN 25-OHMS PER NEC REQUIREMENTS. GROUND RESISTANCE TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. GROUNDING AND BONDING SYSTEM SHALL INCLUDE THE FOLLOWING:
  - BUILDING GROUNDING, EXTERIOR AND INTERIOR, INCLUDING UFER GROUNDS.
  - ELECTRIC SERVICE GROUNDING,
  - PIPING SYSTEM,
  - ABOVE GROUND STEEL TANKS,
  - SERVICE EQUIPMENT BONDING,
  - ENCLOSURE BONDING,
  - PIPING SYSTEM AND EXPOSED STRUCTURAL STEEL BONDING.
  - SERVICE EQUIPMENT BONDING, INCLUDING THE BONDING NEUTRAL JUMPER SIZED PER NEC 250.30

3. ALL CONDUITS SHALL HAVE AN INTERNAL EQUIPMENT GROUNDING CONDUCTOR. THIS EQUIPMENT GROUND CONDUCTOR SHALL BE PROVIDED (SIZED PER NEC 250.122) ALTHOUGH IT MAY NOT BE SHOWN OR SCHEDULED ON THE DRAWINGS.
4. GROUND RODS SHALL BE 3/4" DIAMETER, 10 FEET LONG, STEEL CORE WITH COPPER MOLTEN WELDED OR ELECTROLYTICALLY BONDED TO EXTERIOR.
5. ALL BELOW GRADE CONNECTIONS IN THE GROUNDING SYSTEM SHALL BE BY EXOTHERMIC CONNECTION, CADWELD OR SIMILAR.

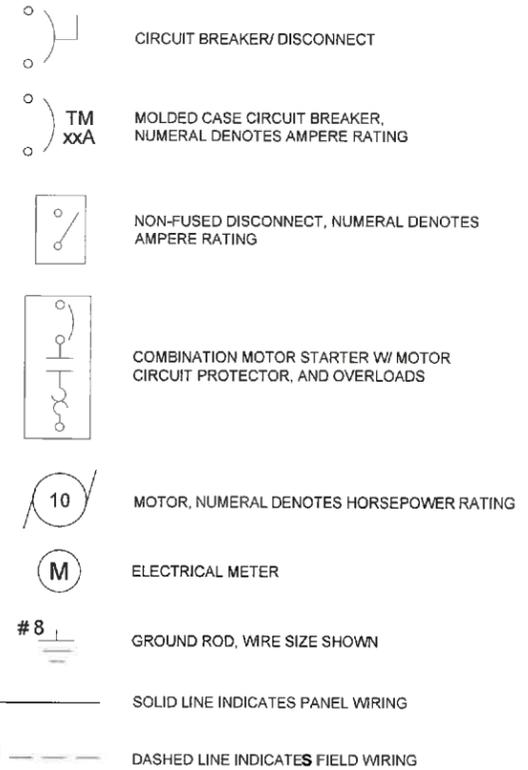
**ENCLOSURE & JUNCTION BOXES**

1. ENCLOSURES SHALL BE MINIMUM NEMA 4 RATED FOR OUTDOOR LOCATIONS UNLESS OTHERWISE NOTED.
2. ENCLOSURES SHALL HAVE NAMEPLATE ON THE EXTERIOR IDENTIFYING THE APPLICATION FUNCTION OF THE EQUIPMENT ENCLOSED.
3. WATERTIGHT HUB FITTINGS SHALL BE USED WHERE CONDUITS ENTER SHEET METAL ENCLOSURES.

**COMBINATION MOTOR STARTERS**

1. COMBINE MOTOR CONTROLLERS, OVERCURRENT PROTECTION DEVICE, AND DISCONNECT IN COMMON ENCLOSURE.
2. OVERCURRENT PROTECTION DEVICES:
  - A. MOTOR CIRCUIT PROTECTOR (MCP): NEMA AB1, INTEGRAL INSTANTANEOUS MAGNETIC TRIP IN EACH POLE, PROVIDE MANUAL INSTANTANEOUS TRIP ADJUSTMENT FROM 400 TO 1,000% OF MOTOR STARTING CURRENT.

**LEGEND:**



SCALE(S) AS INDICATED	Professional Engineer's Name <b>LUCAS GOLDSTEIN</b>		Professional Engineer's No. 021115		 ARCADIS U.S., INC.	<b>AS-BUILT ELECTRICAL LEGEND AND NOTES</b> ELECTRICAL	ARCADIS Project No. EM001217.0073.0005	<b>E-1</b>
	Date Signed 4/2/15		Project Mgr. EK				Date MARCH 2015	
	THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.		Drawn by JH				Checked by JS	

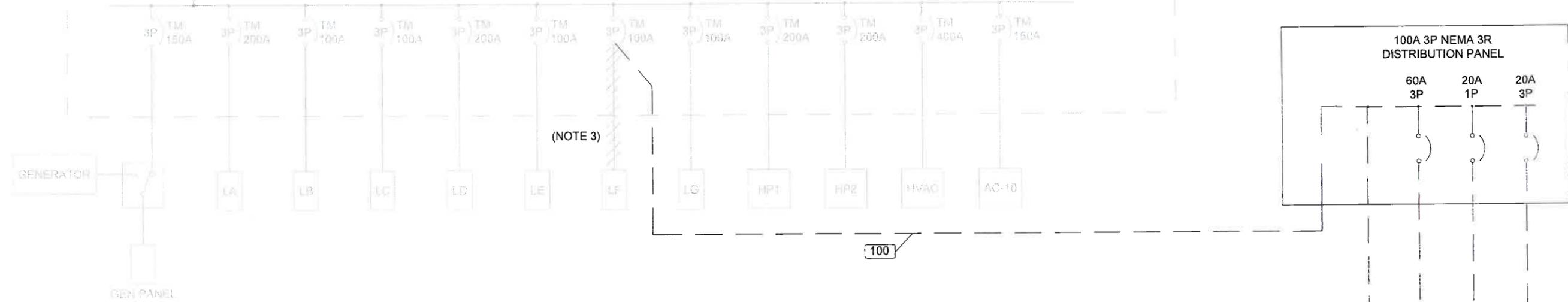
CITY: EMERYVILLE, CA DIV/GROUP: ENVCAD DB: A. REYES, J. HARRIS  
 G:\ENVCAD\emeryville\11001727\00000808\AS-BUILT\1510\EM01727 E-2.dwg LAYOUT: E-2 SAVED: 4/1/2015 11:26 AM ACADVER: 18.1S (LMS TECH) PAGES: 10 PLOTTED: 4/2/2015 11:54 AM BY: REYES, ALEC  
 XREFS: IMAGES: PROJECTNAME: EM01727\_X00\_ELEC

SOURCE: P&E PROVIDED TRANSFORMER  
 120/208V, 3PH

BUILDING MAIN SWITCHGEAR: 1500A, 120/208V, 3PH, 4W

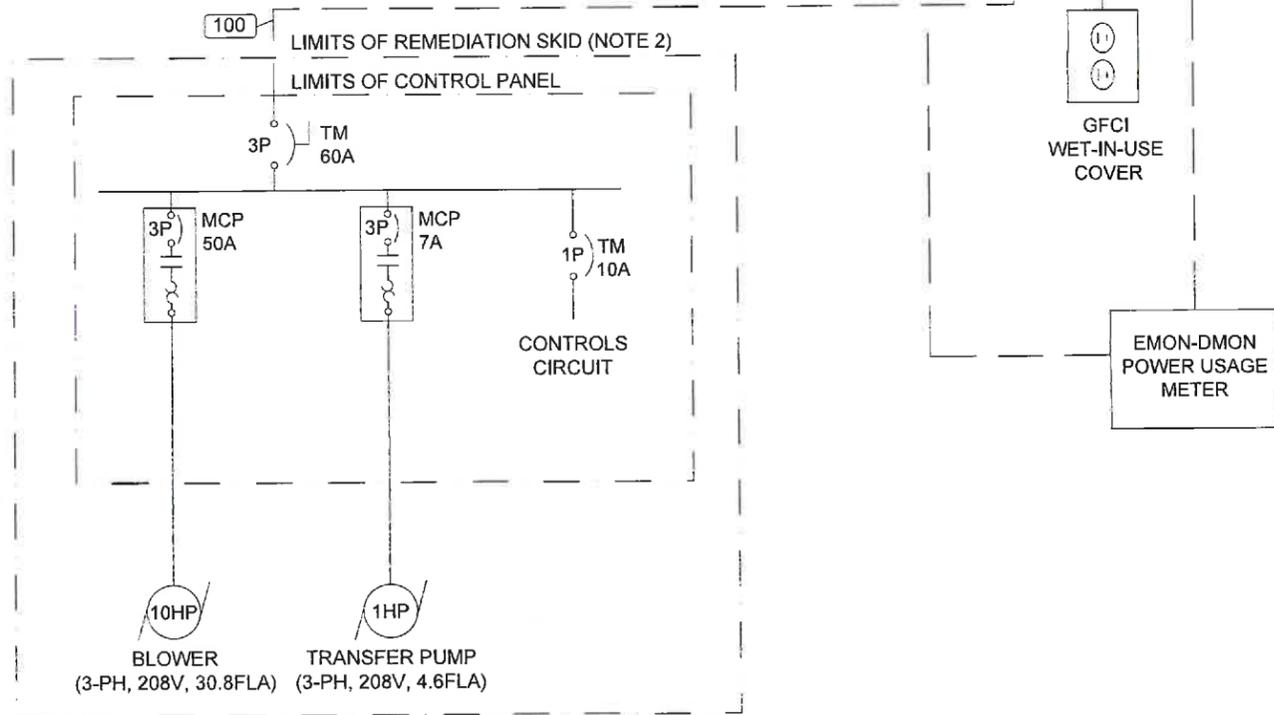
NOTES:

- REFER TO SHEET E-1 FOR ELECTRICAL LEGEND AND GENERAL NOTES.
- REMEDICATION SKID PROVIDED BY FABRICATOR. SKID IS LOCATED APPROXIMATELY 150 FEET FROM EXISTING SWITCHGEAR WITHIN REMEDIATION SYSTEM COMPOUND. ALL EQUIPMENT RATED FOR OUTDOOR USE. ALL EQUIPMENT ON SKID IS PRE-WIRED.
- CONTRACTOR DISCONNECTED AND REMOVED 100A FEED FROM 100A/3P CIRCUIT BREAKER IN MAIN SWITCHBOARD TO EXISTING PANEL "LF". LABEL PANEL "LF" WITH "ABANDONED-NO LONGER IN SERVICE". REUSE 100A/3P CIRCUIT BREAKER FOR NEW FEED TO REMEDIATION SKID. NEW 100A FEED RUNS OVERHEAD IN ELECTRIC ROOM, DOWN EXTERIOR WALL OF BUILDING, AND UNDERGROUND TO REMEDIATION SKID.



120/208V, 3-PH, 4W, PROPOSED REMEDIATION SYSTEM LOAD SCHEDULE								
DEVICE	VOLTAGE	PHASE	HP	BREAKER SIZE (AMPS)	CONNECT LOAD - 120V (AMPS)	CONNECT LOAD - 208V (AMPS)*	KVA	
BLOWER	208	3	10.00	50	—	30.80	11.10	
TRANSFER PUMP	208	3	1.00	10	—	4.60	1.66	
GFCI RECEPTACLE	120	1	—	20	5.00	—	0.60	
EMON DMON POWER METER	208	3	—	20	—	0.50	0.18	
CONTROL CIRCUIT	120	1	—	10	5.00	—	0.60	
SUBTOTALS:					10	36	14.14	
*VALUES TAKEN FROM 2014 NEC							36	CONNECTED AMPS
MAIN BREAKER INFORMATION							44	MINIMUM BREAKER SIZE
							100	MAIN BREAKER

CONDUIT SCHEDULE					
SYMBOL	WIRE QUANTITY	TYPE AWG	SIZE	GROUND	CONDUIT
100	4	THHN/THWN	#1	(1) #6	2"



SCALE(S) AS INDICATED

Professional Engineer's Name <b>LUCAS GOLDSTEIN</b>		Professional Engineer's No. 021115	
No.	Date	Revisions	By
2	3/30/15	AS-BUILTS	MM
1	8/27/14	DRAFT DESIGN	MM



ARCADIS U.S., INC.

FORMER SPECTRA-PHYSICS FACILITY BUILDING, 1245 TERRA BELLA AVENUE, MOUNTAIN VIEW, CALIFORNIA

**AS-BUILT SINGLE LINE DIAGRAM**

ELECTRICAL

ARCADIS Project No. EM001217.0073.00005
Date MARCH 2015
ARCADIS, U.S., INC. 100 SMITH RANCH ROAD Suite 329 SAN RAFAEL, CALIFORNIA TEL. 415.491.4530

**E-2**





## Appendix B

Vapor Extraction Well Boring Logs

\*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

# Well Completion Report

Refer to Instruction Pamphlet  
No. e0227691

Page 1 of \_\_\_\_\_  
 Owner's Well Number VE-1  
 Date Work Began 7/24/14 Date Work Ended 7/25/14  
 Local Permit Agency SCVWD  
 Permit Number 14W00363 Permit Date 8/29/14

DWR Use Only - Do Not Fill In

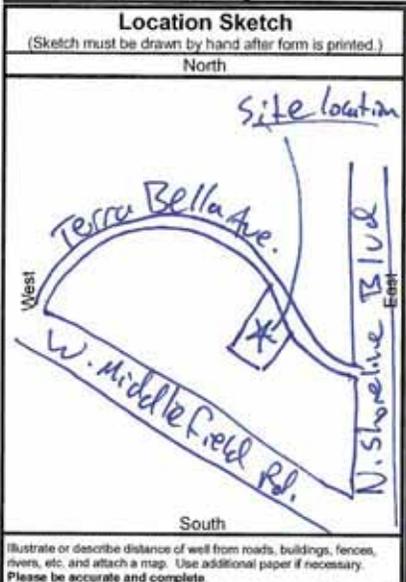
State Well Number/Site Number			
Latitude		Longitude	
APN/TRS/Other			

Geologic Log		
Orientation <input checked="" type="radio"/> Vertical <input type="radio"/> Horizontal <input type="radio"/> Angle Specify _____		
Drilling Method <u>Hand Auger</u> Drilling Fluid <u>None</u>		
Depth from Surface		Description
Feet	to Feet	Describe material, grain size, color, etc
0	1	Concrete foundation and gravel
1	2	Black, clayey
2	3	Black, clayey
3	4	Black, clayey
4	5	gray, clayey, silt
5	6	gray, clayey, silt
6	7	gray, clayey
7	8	brown + black, clayey
Total Depth of Boring <u>8</u> Feet		
Total Depth of Completed Well <u>8</u> Feet		

Well Owner	
Name	<u>Thermo Fisher Scientific, Inc.</u>
Mailing Address	<u>81 Waltham St.</u>
City	<u>Waltham</u> State <u>MA</u> Zip <u>02451</u>

Well Location	
Address	<u>1245 Terra Bella Ave.</u>
City	<u>Mountain View</u> County <u>Santa Clara</u>
Latitude	____ N Longitude ____ W
Datum	Dec. Lat. ____ Dec. Long. ____
APN Book	Page ____ Parcel ____
Township	Range ____ Section ____



Activity	
<input checked="" type="radio"/> New Well	
<input type="radio"/> Modification/Repair	<input type="radio"/> Deepen
<input type="radio"/> Other	<input type="radio"/> Destroy
Describe procedures and materials under "GEOLOGIC LOG"	

Planned Uses	
<input type="radio"/> Water Supply	<input type="checkbox"/> Domestic <input type="checkbox"/> Public
<input type="checkbox"/> Irrigation	<input type="checkbox"/> Industrial
<input type="radio"/> Cathodic Protection	<input type="radio"/> Dewatering
<input type="radio"/> Heat Exchange	<input type="radio"/> Injection
<input type="radio"/> Monitoring	<input checked="" type="radio"/> Remediation
<input type="radio"/> Sparging	<input type="radio"/> Test Well
<input checked="" type="radio"/> Vapor Extraction	<input type="radio"/> Other

Water Level and Yield of Completed Well	
Depth to first water	<u>N/A</u> (Feet below surface)
Depth to Static	
Water Level	<u>N/A</u> (Feet) Date Measured <u>N/A</u>
Estimated Yield *	<u>N/A</u> (GPM) Test Type <u>N/A</u>
Test Length	<u>N/A</u> (Hours) Total Drawdown <u>N/A</u> (Feet)
*May not be representative of a well's long term yield.	

Casings							
Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size
Feet to Feet	(Inches)			(Inches)	(Inches)		(Inches)
0.5	3.5	Blank	PVC	5/8" x .40	2"	N/A	N/A
3.5	8	Screen	Stainless Steel	N/A	2"	S. steel	0.02

Annular Material		
Depth from Surface	Fill	Description
Feet to Feet		
1.5	2	Grout
2	3	Granular bentonite (hydrated)
3	8	#3 filter sand

Attachments	
<input type="checkbox"/> Geologic Log	
<input checked="" type="checkbox"/> Well Construction Diagram	
<input type="checkbox"/> Geophysical Log(s)	
<input type="checkbox"/> Soil/Water Chemical Analyses	
<input checked="" type="checkbox"/> Other <u>Site plan + map</u>	

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name	_____ Person, Firm or Corporation		
Address	City	State	Zip
Signed	_____ C-57 Licensed Water Well Contractor	Date Signed	_____ C-57 License Number

File Original with DWR

State of California  
**Well Completion Report**

Refer to Instruction Pamphlet  
No. e0227692

Page 1 of \_\_\_\_\_  
Owner's Well Number VE-2  
Date Work Began 7/24/14 Date Work Ended 7/25/14  
Local Permit Agency SCVWD  
Permit Number 4W00364 Permit Date 8/29/14

DWR Use Only - Do Not Fill In

State Well Number/Site Number \_\_\_\_\_

Latitude \_\_\_\_\_ N \_\_\_\_\_ W \_\_\_\_\_

Longitude \_\_\_\_\_

APN/TRS/Other \_\_\_\_\_

Geologic Log		
Orientation <input checked="" type="radio"/> Vertical <input type="radio"/> Horizontal <input type="radio"/> Angle Specify _____		
Drilling Method <u>Hand Auger</u> Drilling Fluid <u>none</u>		
Depth from Surface	Feet	Description
Feet to Feet	Feet	Describe material, grain size, color, etc
0	1	Concrete foundation and gravel
1	2	Black, clayey
2	3	Black, clayey
3	4	Black, clayey
4	5	Gray, clayey, silt
5	6	Gray, clayey, silt
6	7	Gray, clayey
7	8	Brown, Black, clayey
Total Depth of Boring <u>8</u> Feet		
Total Depth of Completed Well <u>8</u> Feet		

**Well Owner**

Name Theresa Fisher Scientific, Inc.  
Mailing Address 81 Waltham Street  
City Waltham State MA Zip 02451

**Well Location**

Address 1245 Terra Bella Ave.  
City Mountain View County Santa Clara  
Latitude \_\_\_\_\_ Dec. Min. \_\_\_\_\_ Sec. \_\_\_\_\_ N Longitude \_\_\_\_\_ Dec. Min. \_\_\_\_\_ Sec. \_\_\_\_\_ W  
Datum \_\_\_\_\_ Dec. Lat. \_\_\_\_\_ Dec. Long. \_\_\_\_\_  
APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_  
Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_



**Activity**

New Well  
 Modification/Repair  
 Deepen  
 Other  
 Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

**Planned Uses**

Water Supply  
 Domestic  Public  
 Irrigation  Industrial  
 Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other \_\_\_\_\_

**Water Level and Yield of Completed Well**

Depth to first water N/A (Feet below surface)  
Depth to Static \_\_\_\_\_  
Water Level N/A (Feet) Date Measured N/A  
Estimated Yield \* N/A (GPM) Test Type N/A  
Test Length N/A (Hours) Total Drawdown N/A (Feet)  
\*May not be representative of a well's long term yield.

Casings								Annular Material		
Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size if Any	Depth from Surface	Fill	Description
Feet to Feet	(Inches)			(Inches)	(Inches)		(Inches)	Feet to Feet		
0.5	3.5	Blank	PVC	5/16	2"	N/A	N/A	1.5	2	Grout
3.5	8	Screen	Stainless Steel	N/A	2"	5. Steel	0.02	2	3	Gravel/Bitartrate (hydrated)
								3	8	#3 filter sand

**Attachments**

Geologic Log  
 Well Construction Diagram  
 Geophysical Log(s)  
 Soil/Water Chemical Analyses  
 Other Site Plan + map

Attach additional information, if it exists.

**Certification Statement**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name \_\_\_\_\_  
Person, Firm or Corporation \_\_\_\_\_  
Address \_\_\_\_\_ City \_\_\_\_\_ State CA Zip \_\_\_\_\_  
Signed \_\_\_\_\_ Date Signed \_\_\_\_\_  
C-57 Licensed Water Well Contractor \_\_\_\_\_ C-57 License Number \_\_\_\_\_

File Original with DWR

Page 1 of         
 Owner's Well Number VE-3  
 Date Work Began 9/4/14 Date Work Ended 9/4/14  
 Local Permit Agency SCVWD  
 Permit Number 14W00365 Permit Date 8/29/14

State of California  
**Well Completion Report**  
Refer to Instruction Pamphlet  
 No. **e0227693**

DWR Use Only - Do Not Fill In

State Well Number/Site Number \_\_\_\_\_

Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

APN/TRS/Other \_\_\_\_\_

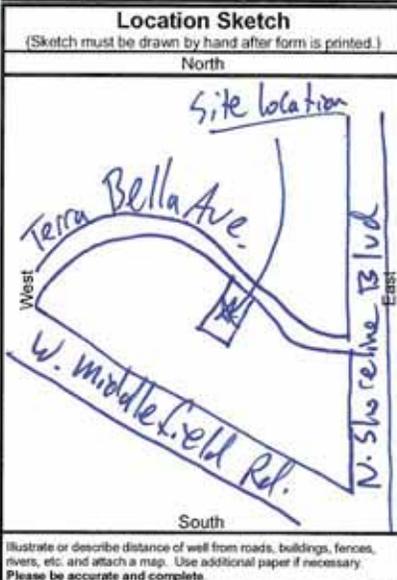
Geologic Log		
Orientation <input checked="" type="radio"/> Vertical <input type="radio"/> Horizontal <input type="radio"/> Angle Specify _____		
Drilling Method <u>Hand Auger</u> Drilling Fluid <u>none</u>		
Depth from Surface		Description
Feet	to Feet	Describe material, grain size, color, etc
0	1	Concrete & gravel
1	3.5	Black Clay
3.5	5	Brown to light brown silt & some clay
5	7.5	light brown silt interbedded orange sand & fine white gravel
7.5	8	Black clay, interbedded light grey clay or silt
Total Depth of Boring _____		Feet
Total Depth of Completed Well _____		Feet

**Well Owner**

Name Theresa Fisher Scantize, Inc.  
 Mailing Address 81 Waltham Street  
 City Waltham State MA Zip 02451

**Well Location**

Address 1245 Terra Bella Ave.  
 City Mountain View County Santa Clara  
 Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
Dec. Min. Sec. Dec. Min. Sec.  
 Datum \_\_\_\_\_ Dec. Lat. \_\_\_\_\_ Dec. Long. \_\_\_\_\_  
 APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_  
 Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_



**Activity**

New Well  
 Modification/Repair  
 Deepen  
 Other \_\_\_\_\_  
 Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

**Planned Uses**

Water Supply  
 Domestic  Public  
 Irrigation  Industrial

Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other \_\_\_\_\_

**Water Level and Yield of Completed Well**

Depth to first water N/A (Feet below surface)  
 Depth to Static \_\_\_\_\_  
 Water Level N/A (Feet) Date Measured N/A  
 Estimated Yield N/A (GPM) Test Type N/A  
 Test Length N/A (Hours) Total Drawdown N/A (Feet)  
 \*May not be representative of a well's long term yield.

Casings							
Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size
Feet to Feet	(Inches)			(Inches)	(Inches)		(Inches)
0.5	3.5	Blank	PVC	Sch. 40	2"	N/A	N/A
3.5	8	Screen	Stainless Steel	N/A	2"	S. steel	0.102

Annular Material		
Depth from Surface	Fill	Description
Feet to Feet		
1.5	2	Grout
2	3	Granular Bentonite (hydrated)
3	8	#3 filter sand

**Attachments**

Geologic Log  
 Well Construction Diagram  
 Geophysical Log(s)  
 Soil/Water Chemical Analyses  
 Other Site plan + Map

Attach additional information, if it exists.

**Certification Statement**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name \_\_\_\_\_  
Person, Firm or Corporation

Address \_\_\_\_\_ City \_\_\_\_\_ State CA Zip \_\_\_\_\_

Signed \_\_\_\_\_  
C-57 Licensed Water Well Contractor

Date Signed \_\_\_\_\_ C-57 License Number \_\_\_\_\_

File Original with DWR

State of California  
**Well Completion Report**

Page 1 of         
 Owner's Well Number VE-4  
 Date Work Began 9/4/14 Date Work Ended 9/4/14  
 Local Permit Agency SCVWD  
 Permit Number 14W00366 Permit Date 8/29/14

Refer to Instruction Pamphlet  
No. **e0229699**

DWR Use Only - Do Not Fill In

State Well Number/Site Number			
Latitude	N	Longitude	W
APN/TRS/Other			

Geologic Log		
Orientation <input checked="" type="radio"/> Vertical <input type="radio"/> Horizontal <input type="radio"/> Angle Specify		
Drilling Method <u>Hand Auger</u> Drilling Fluid <u>None</u>		
Depth from Surface	Feet	Description
Feet	to Feet	Describe material, grain size, color, etc
0	1	Concrete & gravel
1	1.5	Dark grey clay
1.5	3.5	Silt, some clay, Dark Brown
3.5	5	light brown silt, dry
5	7.5	Dark brown silt, light brown sand or fine gravel interbedded, mottles
7.5	8	Grey clay (stiff), interbedded orange sand + fine white gravel
Total Depth of Boring <u>8</u> Feet		
Total Depth of Completed Well <u>8</u> Feet		

**Well Owner**

Name Thermo Fisher Scientific, Inc.  
 Mailing Address 81 Waltham Street  
 City Waltham State MA Zip 02451

**Well Location**

Address 1245 Terra Bella Ave.  
 City Mountain View County Santa Clara  
 Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
 Datum \_\_\_\_\_ Dec. Lat. \_\_\_\_\_ Dec. Long. \_\_\_\_\_  
 APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_  
 Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_



**Activity**

New Well  
 Modification/Repair  
 Deepen  
 Other  
 Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

**Planned Uses**

Water Supply  
 Domestic  Public  
 Irrigation  Industrial  
 Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other

**Water Level and Yield of Completed Well**

Depth to first water N/A (Feet below surface)  
 Depth to Static \_\_\_\_\_  
 Water Level N/A (Feet) Date Measured MA  
 Estimated Yield \* N/A (GPM) Test Type MA  
 Test Length N/A (Hours) Total Drawdown MA (Feet)  
 \*May not be representative of a well's long term yield.

Casings							
Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size
Feet to Feet	(Inches)			(Inches)	(Inches)		(Inches)
0.5	3.5	Blank	PVC	Sch. 40	2"	N/A	N/A
3.5	8	Screen	Stainless Steel	N/A	2"	S. Steel	0.02

Annular Material		
Depth from Surface	Fill	Description
Feet to Feet		
1.5	2	Grout
2	3	Granular Bentonite (hydrated)
3	8	#3 Filter Sand

**Attachments**

Geologic Log  
 Well Construction Diagram  
 Geophysical Log(s)  
 Soil/Water Chemical Analyses  
 Other Site Plan + Map

Attach additional information, if it exists.

**Certification Statement**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name \_\_\_\_\_  
Person, Firm or Corporation

Address \_\_\_\_\_ City \_\_\_\_\_ State CA Zip \_\_\_\_\_

Signed \_\_\_\_\_ Date Signed \_\_\_\_\_  
C-57 Licensed Water Well Contractor C-57 License Number

File Original with DWR

State of California  
**Well Completion Report**

Refer to Instruction Pamphlet  
No. **e0229701**

Page 1 of \_\_\_\_\_  
 Owner's Well Number VE-5  
 Date Work Began 9/4/14 Date Work Ended 9/4/14  
 Local Permit Agency SCVWD  
 Permit Number 14W00368 Permit Date 8/29/14

DWR Use Only - Do Not Fill In

State Well Number/Site Number \_\_\_\_\_

Latitude \_\_\_\_\_ N \_\_\_\_\_ W  
Longitude \_\_\_\_\_

APN/TRS/Other \_\_\_\_\_

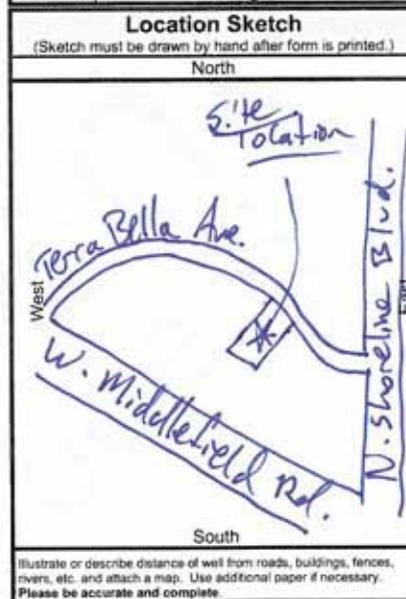
Geologic Log		
Orientation <input checked="" type="radio"/> Vertical <input type="radio"/> Horizontal <input type="radio"/> Angle Specify _____		
Drilling Method <u>Hand Auger</u> Drilling Fluid <u>None</u>		
Depth from Surface		Description
Feet	to Feet	Describe material, grain size, color, etc
0	1	Pavement (asphalt) + gravel
1	3	Black & grey clay
3	7	light grey/brown silty clay
7	8	Light grey to dark grey clay
Total Depth of Boring <u>8</u> Feet		
Total Depth of Completed Well <u>8</u> Feet		

**Well Owner**

Name Thomas Fisher Scientific, Inc.  
 Mailing Address 81 Waltham St.  
 City Waltham State MA Zip 02451

**Well Location**

Address 1245 Terra Bella Ave.  
 City Mountain View County Santa Clara  
 Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
 Datum \_\_\_\_\_ Dec. Lat. \_\_\_\_\_ Dec. Long. \_\_\_\_\_  
 APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_  
 Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_



**Activity**

New Well  
 Modification/Repair  
 Deepen  
 Other  
 Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

**Planned Uses**

Water Supply  
 Domestic  Public  
 Irrigation  Industrial  
 Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other

**Water Level and Yield of Completed Well**

Depth to first water N/A (Feet below surface)  
 Depth to Static \_\_\_\_\_  
 Water Level N/A (Feet) Date Measured N/A  
 Estimated Yield \* N/A (GPM) Test Type N/A  
 Test Length N/A (Hours) Total Drawdown N/A (Feet)  
 \*May not be representative of a well's long term yield.

Casings									Annular Material		
Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size	Depth from Surface	Fill	Description	
Feet to Feet	(Inches)			(Inches)	(Inches)		(Inches)	Feet to Feet			
2.5	3.5	6"	Blank PVC	Sch 40	2"	N/A	N/A	1.5	2	Grout	
3.5	8	6"	Screen Stainless Steel	N/A	2"	S Steel	0.02	2	3	Granular Backfill (hydrated)	
								3	8	#3 Filter Sand	

**Attachments**

Geologic Log  
 Well Construction Diagram  
 Geophysical Log(s)  
 Soil/Water Chemical Analyses  
 Other Site Plan + Map

Attach additional information, if it exists.

**Certification Statement**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name \_\_\_\_\_  
Person, Firm or Corporation

Address \_\_\_\_\_ City \_\_\_\_\_ State CA Zip \_\_\_\_\_

Signed \_\_\_\_\_  
C-57 Licensed Water Well Contractor

Date Signed \_\_\_\_\_ C-57 License Number \_\_\_\_\_

File Original with DWR

State of California  
**Well Completion Report**

Refer to Instruction Pamphlet  
No. **e0229700**

DWR Use Only - Do Not Fill In

State Well Number/Site Number \_\_\_\_\_

Latitude \_\_\_\_\_ N \_\_\_\_\_ W \_\_\_\_\_

Longitude \_\_\_\_\_

APN/TRS/Other \_\_\_\_\_

Page 1 of \_\_\_\_\_  
 Owner's Well Number VE-6  
 Date Work Began 9/4/14 Date Work Ended 9/4/14  
 Local Permit Agency SCWWD  
 Permit Number 14W00367 Permit Date 8/29/14

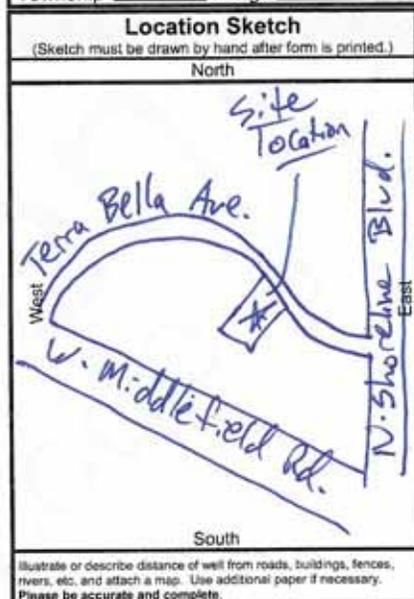
Geologic Log		
Orientation <input checked="" type="radio"/> Vertical <input type="radio"/> Horizontal <input type="radio"/> Angle Specify _____		
Drilling Method <u>Hand Auger</u> Drilling Fluid <u>None</u>		
Depth from Surface		Description
Feet	to Feet	Describe material, grain size, color, etc
0	1	Asphalt + Gravel
1	3	Black Clay
3	6.5	light brown silty clay
6.5	8	Dark grey to black Clay
Total Depth of Boring <u>8</u> Feet		
Total Depth of Completed Well <u>8</u> Feet		

**Well Owner**

Name Thermo Fisher Scientific, Inc.  
 Mailing Address 81 Waltham St.  
 City Waltham State MA Zip 02451

**Well Location**

Address 1245 Terra Bella Ave.  
 City Mountain View County Santa Clara  
 Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
 Datum \_\_\_\_\_ Dec. Lat. \_\_\_\_\_ Dec. Long. \_\_\_\_\_  
 APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_  
 Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_



**Activity**

New Well  
 Modification/Repair  
 Deepen  
 Other \_\_\_\_\_  
 Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

**Planned Uses**

Water Supply  
 Domestic  Public  
 Irrigation  Industrial  
 Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other \_\_\_\_\_

**Water Level and Yield of Completed Well**

Depth to first water N/A (Feet below surface)  
 Depth to Static N/A  
 Water Level N/A (Feet) Date Measured N/A  
 Estimated Yield \* N/A (GPM) Test Type N/A  
 Test Length N/A (Hours) Total Drawdown N/A (Feet)  
 \*May not be representative of a well's long term yield.

Casings							
Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size if Any
Feet to Feet	(Inches)			(Inches)	(Inches)		(Inches)
0.5	3.5	Blank	PVC	3/4	2"	N/A	N/A
3.5	8	Screen	Stainless Steel	N/A	2"	S.Steel	0.02

Annular Material		
Depth from Surface	Fill	Description
Feet to Feet		
1.5	2	Grout
2	3	Granular Bentonite (hydrate)
3	8	#3 filter sand

**Attachments**

Geologic Log  
 Well Construction Diagram  
 Geophysical Log(s)  
 Soil/Water Chemical Analyses  
 Other Site Plan + Map

Attach additional information, if it costs.

**Certification Statement**

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name \_\_\_\_\_  
Person, Firm or Corporation

Address \_\_\_\_\_ City \_\_\_\_\_ State CA Zip \_\_\_\_\_

Signed \_\_\_\_\_ Date Signed \_\_\_\_\_  
C-57 Licensed Water Well Contractor C-57 License Number



## Appendix C

SVE System Startup Performance  
Monitoring Data



SVE SYSTEM STARTUP and SHAKEDOWN LOG

Former Spectra Physics Facility Building,  
1245 Terra Bella Ave., Mountain View, CA

EM001727.0073.0008

Date 3/5/15  
Personnel CH + WC

**Electrical**

	Voltage (V)	Amps	Wired Properly? (Y/N)
SVE Blower	OK 3/4	OK 3/4	Y
KO Pump	OK 3/4	OK 3/4	Y

\*Test running system on dilution air, wells should be closed off

**Electrical Minor**

Outlets Functioning (Y/N)?

Y

(Y/N)

**Mechanical Check**

Equipment and instrumentation consistent with P&ID? (Mark P&ID)

No

Notes: updating P&ID

Equipment and instrumentation labeled?

Yes

Notes: labelled & connected 1-phase to 3-phase sample ports & conveyance lines, pumps, blowers, flow direction OK

Signs of damage?

No

Notes: No rust wear & tear

**Programming/CSD**

**SVE**

	Tested (Y/N)	Functioning (Y/N)	Set Point	Autodialer Acknowledgement? (Y/N)
E-Stop			--	
PS (PAL)	Not installed		-2" Hg	<u>Pending</u>
KO LSHH	Y (3/4)	Y (3/4)	—	<u>Pending</u>
KO LSL	Yes (3/4)	N/A	—	<u>No</u>
KO LSH	Yes (3/4)	No, removed	N/A	<u>Not to be replaced</u>
VRV Mechanical	not	not installed	12" Hg	—

**H&S**

- 1) Slip, trip, and fall hazards marked?
- 2) Hot Pipe Hazards?
- 3) Site cleanliness: Site clear of construction debris?
- 4) Fencing/Compound secure?

Notes:

Hour meter initial = 2241.0

shut up @ 14:40. Had to free up motor pulley, was seized.



**SVE SYSTEM O&M LOG**  
 Former Spectra Physics Facility Building, 1245 Terra Bella Ave., Mountain View, CA  
 EM001727.0073.0008

Date 3/5/15  
 Personnel CH + WC

**System Check**

System Up (upon arrival)? YES or NO  
 System Up (upon departure)? YES or NO  
 Ambient air temperature 72 °F  
 Ventilation fans (upon arrival)? ON or OFF  
 Ventilation fans (upon departure)? ON or OFF  
 System operation hours 2241.0 hours

**SVE Blower**

Vacuum @ KO (V1) 10 in Hg  
 Vacuum at midpoint (post V1) - in Hg  
 Vacuum after V2 (at blower) 13 in Hg  
 Effluent Pressure \_\_\_\_\_ in Hg  
 Pre-dilution pressure differential - in H2O  
 Verified PS Operation YES or NO  
 PID (pre-treatment) 56 ppm  
 PID (mid) 1.6 ppm  
 PID (post treatment, @ blower) 2.2 ppm  
 Pre-treatment Temperature 71.2 °F  
 Estimated liquid in KO tank 0  
 Water in water collection drum? YES or NO gallons

@ Time 1440

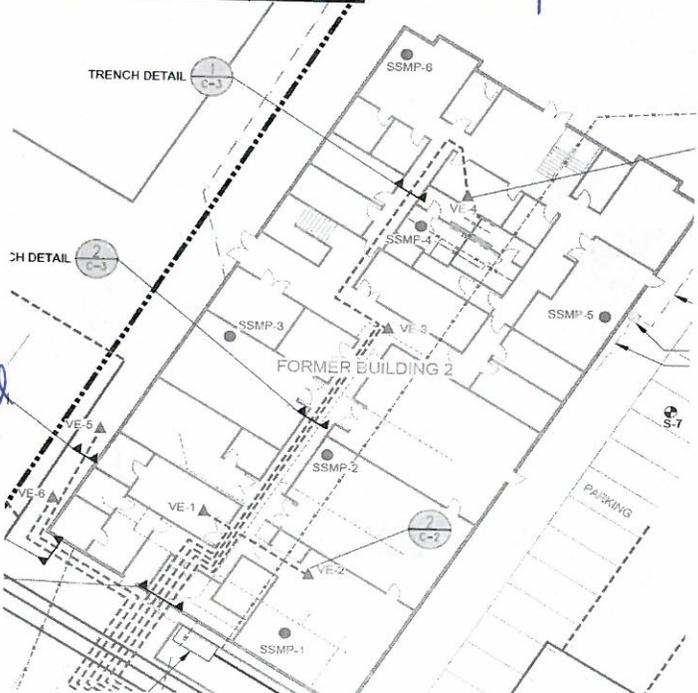
**SVE Monitoring**

Well ID	Time	On/Off	Vacuum Gauge on pipe (in Hg)	Flow (cfm)	PID Reading (ppm) Soil Vapor	% open
VE-1	NM	ON	17	NM	57	15%
VE-2	NM	ON	62	NM	55	15%
VE-3	NM	ON	31	NM	61	15%
VE-4	NM	ON	760"	NM	54	100%
VE-5	NM	ON	42	NM	51	25%
VE-6	NM	ON	30	NM	91	25%

Value @ manifold  
 % open

**VMP Monitoring**

Well ID	Time	Vacuum (In of WC)		Time	Vacuum
		Portable gauge			
SSMP-1	15:56	0.168		16:58	0.198
SSMP-2	15:53	0.585		16:55	0.669
SSMP-3	15:37	0.151		16:41	0.171
SSMP-4	15:51	0.185		16:38	0.274
SSMP-5	15:55	0.000		16:33	0.000
SSMP-6	15:43	0.000		16:30	0.000



**Maintenance**

Dilution air filter changed out YES or NO

all wells 100% open, Dilution air partially open  
 wells adjusted to increase flow to VE-4. Dilution air valve fully closed

**Additional Comments/Notes:**

Started system with all wells @ 100% open. Did not observe any vacuum response @ SSMP-5 or SSMP-6. Redistributed flow so more vent came from VE-4. Minimal vacuum was observed @ SSMP-5 & 6, but was not sustained



## SVE SYSTEM O&amp;M LOG

Former Spectra Physics Facility Building, 1245 Terra Bella Ave., Mountain View, CA

EM001727.0073.0008

Date 4/3/2015  
 Personnel W.Crow

**System Check**

System Up (upon arrival)? **YES** Ventilation fans (upon arrival)? **ON**  
 System Up (upon departure)? **YES** Ventilation fans (upon departure)? **ON**  
 Ambient air temperature 68 °F System operation hours 2936.1 hours  
 @ Time 1630

**SVE Blower**

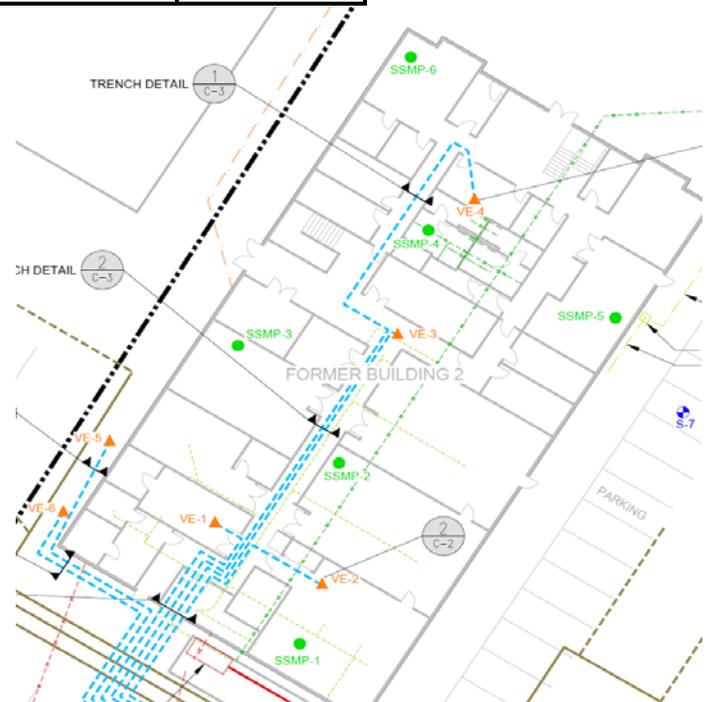
Vacuum @ KO (V1) 5.5 in Hg PID (pre-treatment) 2.4 ppm  
 Vacuum at midpoint (post V1) 6 in Hg PID (mid) 0.4 ppm  
 Vacuum after V2 (at blower) 6 in Hg PID (post treatment, @ blower) 0.4 ppm  
 Effluent Pressure nm in Hg Pre-treatment Temperature 66 °F  
 Pre-dilution pressure differential nm in H<sub>2</sub>O Estimated liquid in KO tank 20 gal (no change)  
 Verified PS Operation **YES or NO** na Water in water collection drum? NA gallons

**SVE Monitoring**

Well ID	Time	% Open	Vacuum (in H <sub>2</sub> O)	Flow (cfm)	PID Reading (ppm) Soil Vapor
VE-1	1640	100	42	38	1.8
VE-2	1640	100	42	15	1.2
VE-3	1640	100	42	60	1.0
VE-4	1640	50	27	50	0.2
VE-5	1640	100	42	20	5.3
VE-6	1640	100	42	20	8.1

**VMP Monitoring**

Well ID	Time	Vacuum (In of WC)
		Portable gauge
SSMP-1	1615	0.192
SSMP-2	1615	0.720
SSMP-3	1615	0.182
SSMP-4	1615	0.105
SSMP-5	1615	0.000
SSMP-6	1615	0.000

**Maintenance**Dilution air filter changed out **NO****Additional Comments/Notes:**

Cornerstone on site to replace VE-3 wellbox and seal inside wellboxes with hydraulic cement

4/24/2015

Ms. Erica Kalve  
Arcadis U.S., Inc.  
2000 Powell St  
7th floor  
Emeryville CA 94608

Project Name: SP/TDY Mtn View

Project #: EM001727.0073

Workorder #: 1504224

Dear Ms. Erica Kalve

The following report includes the data for the above referenced project for sample(s) received on 4/12/2015 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Kyle Vagadori  
Project Manager

**WORK ORDER #: 1504224**

Work Order Summary

<b>CLIENT:</b>	Ms. Erica Kalve Arcadis U.S., Inc. 2000 Powell St 7th floor Emeryville, CA 94608	<b>BILL TO:</b>	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
<b>PHONE:</b>	510-652-4500	<b>P.O. #</b>	EM001727.0063
<b>FAX:</b>	510-652-2246	<b>PROJECT #</b>	EM001727.0073 SP/TDY Mtn View
<b>DATE RECEIVED:</b>	04/12/2015	<b>CONTACT:</b>	Kyle Vagadori
<b>DATE COMPLETED:</b>	04/24/2015		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SPBC-13-BZ-25	Modified TO-15 SIM	3.5 "Hg	5 psi
02A	SPBC-13-BZ-26	Modified TO-15 SIM	3.0 "Hg	5 psi
03A	SPBC-13-PW-27	Modified TO-15 SIM	3.0 "Hg	5 psi
04A	SPBC-13-PW-28	Modified TO-15 SIM	4.0 "Hg	5 psi
05A	SPBC-13-OA-29	Modified TO-15 SIM	5.5 "Hg	5 psi
06A	Lab Blank	Modified TO-15 SIM	NA	NA
07A	CCV	Modified TO-15 SIM	NA	NA
08A	LCS	Modified TO-15 SIM	NA	NA
08AA	LCSD	Modified TO-15 SIM	NA	NA

CERTIFIED BY: 

Technical Director

DATE: 04/24/15

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,  
TX NELAP - T104704343-14-7, UT NELAP CA009332014-5, VA NELAP - 460197, WA NELAP - C935  
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)  
Accreditation number: CA300005, Effective date: 10/18/2014, Expiration date: 10/17/2015.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563  
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE**  
**Modified TO-15 SIM**  
**Arcadis U.S., Inc.**  
**Workorder# 1504224**

Five 6 Liter Summa Canister (SIM Certified) samples were received on April 12, 2015. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
ICAL %RSD acceptance criteria	$\leq 30\%$ RSD with 2 compounds allowed out to $< 40\%$ RSD	Project specific; default criteria is $\leq 30\%$ RSD with 10% of compounds allowed out to $< 40\%$ RSD
Daily Calibration	$\pm 30\%$ Difference	Project specific; default criteria is $\leq 30\%$ Difference with 10% of compounds allowed out up to $\leq 40\%$ .; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

### **Receiving Notes**

There were no receiving discrepancies.

### **Analytical Notes**

An interfering peak eluted near the retention time of Chloroform in the set of field samples. Sample results for which the interfering peak could not be separated from Chloroform were M-flagged to indicate matrix interference.

### **Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

**Summary of Detected Compounds  
MODIFIED EPA METHOD TO-15 GC/MS SIM**

**Client Sample ID: SPBC-13-BZ-25**

**Lab ID#: 1504224-01A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Freon 113	0.030	0.062	0.23	0.47

**Client Sample ID: SPBC-13-BZ-26**

**Lab ID#: 1504224-02A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Freon 113	0.030	0.061	0.23	0.47

**Client Sample ID: SPBC-13-PW-27**

**Lab ID#: 1504224-03A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Chloroform	0.030	0.045 M	0.14	0.22 M
Freon 113	0.030	0.062	0.23	0.47

**Client Sample ID: SPBC-13-PW-28**

**Lab ID#: 1504224-04A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Freon 113	0.031	0.060	0.24	0.46

**Client Sample ID: SPBC-13-OA-29**

**Lab ID#: 1504224-05A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Freon 113	0.033	0.063	0.25	0.48

Client Sample ID: SPBC-13-BZ-25

Lab ID#: 1504224-01A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	20041711sim	<b>Date of Collection:</b> 4/8/15 6:17:00 PM
<b>Dil. Factor:</b>	1.52	<b>Date of Analysis:</b> 4/17/15 12:36 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
1,1,1-Trichloroethane	0.030	Not Detected	0.16	Not Detected
1,1-Dichloroethane	0.030	Not Detected	0.12	Not Detected
Tetrachloroethene	0.030	Not Detected	0.21	Not Detected
trans-1,2-Dichloroethene	0.15	Not Detected	0.60	Not Detected
1,2-Dichlorobenzene	0.030	Not Detected	0.18	Not Detected
Chloroform	0.030	Not Detected	0.15	Not Detected
Freon 113	0.030	0.062	0.23	0.47

**Container Type: 6 Liter Summa Canister (SIM Certified)**

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	122	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	99	70-130



Air Toxics

Client Sample ID: SPBC-13-BZ-26

Lab ID#: 1504224-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	20041712sim	Date of Collection:	4/8/15 5:18:00 PM
Dil. Factor:	1.49	Date of Analysis:	4/17/15 01:17 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.038	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
1,1,1-Trichloroethane	0.030	Not Detected	0.16	Not Detected
1,1-Dichloroethane	0.030	Not Detected	0.12	Not Detected
Tetrachloroethene	0.030	Not Detected	0.20	Not Detected
trans-1,2-Dichloroethene	0.15	Not Detected	0.59	Not Detected
1,2-Dichlorobenzene	0.030	Not Detected	0.18	Not Detected
Chloroform	0.030	Not Detected	0.14	Not Detected
Freon 113	0.030	0.061	0.23	0.47

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	120	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: SPBC-13-PW-27

Lab ID#: 1504224-03A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>20041713sim</b>	<b>Date of Collection:</b> 4/8/15 6:21:00 PM
<b>Dil. Factor:</b>	<b>1.49</b>	<b>Date of Analysis:</b> 4/17/15 01:57 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.038	Not Detected
cis-1,2-Dichloroethene	0.030	Not Detected	0.12	Not Detected
Trichloroethene	0.030	Not Detected	0.16	Not Detected
1,1,1-Trichloroethane	0.030	Not Detected	0.16	Not Detected
1,1-Dichloroethane	0.030	Not Detected	0.12	Not Detected
Tetrachloroethene	0.030	Not Detected	0.20	Not Detected
trans-1,2-Dichloroethene	0.15	Not Detected	0.59	Not Detected
1,2-Dichlorobenzene	0.030	Not Detected	0.18	Not Detected
Chloroform	0.030	0.045 M	0.14	0.22 M
Freon 113	0.030	0.062	0.23	0.47

M = Reported value may be biased due to apparent matrix interferences.

**Container Type: 6 Liter Summa Canister (SIM Certified)**

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	121	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	100	70-130



Air Toxics

Client Sample ID: SPBC-13-PW-28

Lab ID#: 1504224-04A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>20041714sim</b>	<b>Date of Collection:</b> 4/8/15 6:25:00 PM
<b>Dil. Factor:</b>	<b>1.55</b>	<b>Date of Analysis:</b> 4/17/15 03:18 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
cis-1,2-Dichloroethene	0.031	Not Detected	0.12	Not Detected
Trichloroethene	0.031	Not Detected	0.17	Not Detected
1,1,1-Trichloroethane	0.031	Not Detected	0.17	Not Detected
1,1-Dichloroethane	0.031	Not Detected	0.12	Not Detected
Tetrachloroethene	0.031	Not Detected	0.21	Not Detected
trans-1,2-Dichloroethene	0.16	Not Detected	0.61	Not Detected
1,2-Dichlorobenzene	0.031	Not Detected	0.19	Not Detected
Chloroform	0.031	Not Detected	0.15	Not Detected
Freon 113	0.031	0.060	0.24	0.46

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	120	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	101	70-130



Air Toxics

Client Sample ID: SPBC-13-OA-29

Lab ID#: 1504224-05A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>20041715sim</b>	<b>Date of Collection:</b> 4/8/15 6:31:00 PM
<b>Dil. Factor:</b>	<b>1.64</b>	<b>Date of Analysis:</b> 4/17/15 03:59 PM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.016	Not Detected	0.042	Not Detected
cis-1,2-Dichloroethene	0.033	Not Detected	0.13	Not Detected
Trichloroethene	0.033	Not Detected	0.18	Not Detected
1,1,1-Trichloroethane	0.033	Not Detected	0.18	Not Detected
1,1-Dichloroethane	0.033	Not Detected	0.13	Not Detected
Tetrachloroethene	0.033	Not Detected	0.22	Not Detected
trans-1,2-Dichloroethene	0.16	Not Detected	0.65	Not Detected
1,2-Dichlorobenzene	0.033	Not Detected	0.20	Not Detected
Chloroform	0.033	Not Detected	0.16	Not Detected
Freon 113	0.033	0.063	0.25	0.48

**Container Type: 6 Liter Summa Canister (SIM Certified)**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	122	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: Lab Blank

Lab ID#: 1504224-06A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>20041706sim</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 4/17/15 08:51 AM</b>

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
1,2-Dichlorobenzene	0.020	Not Detected	0.12	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected
Freon 113	0.020	Not Detected	0.15	Not Detected

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	121	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	101	70-130



Air Toxics

Client Sample ID: CCV

Lab ID#: 1504224-07A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	20041702sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/15 05:40 AM

Compound	%Recovery
Vinyl Chloride	89
cis-1,2-Dichloroethene	95
Trichloroethene	88
1,1,1-Trichloroethane	94
1,1-Dichloroethane	92
Tetrachloroethene	86
trans-1,2-Dichloroethene	94
1,2-Dichlorobenzene	78
Chloroform	89
Freon 113	93

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	117	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	105	70-130

Client Sample ID: LCS

Lab ID#: 1504224-08A

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

File Name:	20041703sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 4/17/15 06:25 AM

Compound	%Recovery	Method Limits
Vinyl Chloride	92	70-130
cis-1,2-Dichloroethene	105	70-130
Trichloroethene	88	70-130
1,1,1-Trichloroethane	95	70-130
1,1-Dichloroethane	93	70-130
Tetrachloroethene	88	70-130
trans-1,2-Dichloroethene	83	70-130
1,2-Dichlorobenzene	78	70-130
Chloroform	89	70-130
Freon 113	94	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

Client Sample ID: LCSD

Lab ID#: 1504224-08AA

**MODIFIED EPA METHOD TO-15 GC/MS SIM**

<b>File Name:</b>	<b>20041704sim</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 4/17/15 07:05 AM</b>

<b>Compound</b>	<b>%Recovery</b>	<b>Method Limits</b>
Vinyl Chloride	91	70-130
cis-1,2-Dichloroethene	104	70-130
Trichloroethene	88	70-130
1,1,1-Trichloroethane	94	70-130
1,1-Dichloroethane	92	70-130
Tetrachloroethene	87	70-130
trans-1,2-Dichloroethene	83	70-130
1,2-Dichlorobenzene	79	70-130
Chloroform	89	70-130
Freon 113	93	70-130

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	115	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	104	70-130



Air Toxics

**Sample Transportation Notice**

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B  
FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Page 1 of 1

Project Manager Erica Kalve  
 Collected by: (Print and Sign) Hannah Rollins JRollins  
 Company ARCADIS Email Hannah.Rollins@arcadis-us.com  
 Address 100 Montgomery #300 City SF State CA Zip 94104  
 Phone 415-432-0941 Fax \_\_\_\_\_

<b>Project Info:</b> P.O. # _____ Project # <u>EM001727-0073</u> Project Name <u>SP/TOV Mtn View</u>	<b>Turn Around Time:</b> <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush <small>specify</small>	<small>Lab Use Only</small> Pressurized by: Date: Pressurization Gas: N <sub>2</sub> He
---	---	---

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum			
						Initial	Final	Receipt	Final (psi)
<u>01A</u>	<u>SPCB-13-BZ-25</u>	<u>6L0082</u>	<u>4/8/15</u>	<u>1817</u>	<u>TO-15 low level</u>	<u>30+</u>	<u>5.5</u>		
<u>02A</u>	<u>SPCB-13-BZ-26</u>	<u>5683</u>	<u>4/8/15</u>	<u>1718</u>	<u>SIM (site-specific</u>	<u>30+</u>	<u>3.0</u>		
<u>03A</u>	<u>SPCB-13-PW-27</u>	<u>32115</u>	<u>4/8/15</u>	<u>1821</u>	<u>COCs)</u>	<u>30+</u>	<u>4.0</u>		
<u>04A</u>	<u>SPCB-13-PW-28</u>	<u>34311</u>	<u>4/8/15</u>	<u>1825</u>	<u>↓</u>	<u>30+</u>	<u>5.5</u>		
<u>05A</u>	<u>SPCB-13-6A-29</u>	<u>6L0040</u>	<u>4/8/15</u>	<u>1831</u>	<u>↓</u>	<u>30+</u>	<u>7.5</u>		

Relinquished by: (signature) <u>JR Rollins</u> Date/Time <u>4/12/15 11:40</u>	Received by: (signature) <u>Ron [Signature]</u> Date/Time <u>4-12-15 1257</u>	<b>Notes:</b> ① TO-15 SIM for ③ 10-hour samples site specific COCs ② can #6L0082 also tagged as #9913
Relinquished by: (signature) _____ Date/Time _____	Received by: (signature) _____ Date/Time _____	
Relinquished by: (signature) _____ Date/Time _____	Received by: (signature) _____ Date/Time _____	

<b>Lab Use Only</b>	Shipper Name <u>EATC Dropoff/Ron</u>	Air Bill # _____	Temp (°C) <u>NA Good</u>	Condition _____	Custody Seals Intact?	Work Order #
	Yes No None	<u>Yes</u>	<u>1504224</u>			

4/24/2015

Ms. Erica Kalve  
Arcadis U.S., Inc.  
2000 Powell St  
7th floor  
Emeryville CA 94608

Project Name: SP/TDY Mtn View  
Project #: EM001727.0073  
Workorder #: 1504221

Dear Ms. Erica Kalve

The following report includes the data for the above referenced project for sample(s) received on 4/12/2015 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,



Kyle Vagadori  
Project Manager

**WORK ORDER #: 1504221**

Work Order Summary

<b>CLIENT:</b>	Ms. Erica Kalve Arcadis U.S., Inc. 2000 Powell St 7th floor Emeryville, CA 94608	<b>BILL TO:</b>	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
<b>PHONE:</b>	510-652-4500	<b>P.O. #</b>	EM001727.0063
<b>FAX:</b>	510-652-2246	<b>PROJECT #</b>	EM001727.0073 SP/TDY Mtn View
<b>DATE RECEIVED:</b>	04/12/2015	<b>CONTACT:</b>	Kyle Vagadori
<b>DATE COMPLETED:</b>	04/24/2015		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SPCB-13-SVE/SSD-Influent-1	Modified TO-15	4.5 "Hg	14.7 psi
02A	SPCB-13-SVE/SSD-Effluent-1	Modified TO-15	3.7 "Hg	14.8 psi
03A	Lab Blank	Modified TO-15	NA	NA
04A	CCV	Modified TO-15	NA	NA
05A	LCS	Modified TO-15	NA	NA
05AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:   
 \_\_\_\_\_  
 Technical Director

DATE: 04/24/15

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,  
 TX NELAP - T104704343-14-7, UT NELAP CA009332014-5, VA NELAP - 460197, WA NELAP - C935  
 Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)  
 Accreditation number: CA300005, Effective date: 10/18/2014, Expiration date: 10/17/2015.

Eurofins Air Toxics Inc. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563  
 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE**  
**Modified TO-15**  
**Arcadis U.S., Inc.**  
**Workorder# 1504221**

Two 1 Liter Summa Canister (100% Certified) samples were received on April 12, 2015. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>TO-15</i>	<i>ATL Modifications</i>
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

**Receiving Notes**

There were no receiving discrepancies.

**Analytical Notes**

Dilution was performed on sample SPCB-13-SVE/SSD-Influent-1 due to the presence of high level target species.

**Definition of Data Qualifying Flags**

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

- B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
- J - Estimated value.
- E - Exceeds instrument calibration range.
- S - Saturated peak.
- Q - Exceeds quality control limits.
- U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
- UJ- Non-detected compound associated with low bias in the CCV
- N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue

**Summary of Detected Compounds**  
**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

**Client Sample ID: SPCB-13-SVE/SSD-Influent-1**

**Lab ID#: 1504221-01A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
cis-1,2-Dichloroethene	0.78	29	3.1	120
Trichloroethene	0.78	250	4.2	1300
1,1,1-Trichloroethane	0.78	0.99	4.3	5.4
Tetrachloroethene	0.78	1.2	5.3	7.8
Chloroform	0.78	1.1	3.8	5.5

**Client Sample ID: SPCB-13-SVE/SSD-Effluent-1**

**Lab ID#: 1504221-02A**

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Trichloroethene	0.23	0.24	1.2	1.3
Freon 113	0.23	0.87	1.8	6.7



Client Sample ID: SPCB-13-SVE/SSD-Influent-1

Lab ID#: 1504221-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	e041516	Date of Collection:	4/8/15 11:48:00 AM
Dil. Factor:	7.83	Date of Analysis:	4/15/15 08:11 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.78	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.78	29	3.1	120
Trichloroethene	0.78	250	4.2	1300
1,1,1-Trichloroethane	0.78	0.99	4.3	5.4
1,1-Dichloroethane	0.78	Not Detected	3.2	Not Detected
Tetrachloroethene	0.78	1.2	5.3	7.8
trans-1,2-Dichloroethene	0.78	Not Detected	3.1	Not Detected
1,2-Dichlorobenzene	0.78	Not Detected	4.7	Not Detected
Chloroform	0.78	1.1	3.8	5.5
Freon 113	0.78	Not Detected	6.0	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	93	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	98	70-130



Client Sample ID: SPCB-13-SVE/SSD-Effluent-1

Lab ID#: 1504221-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	e041515	Date of Collection:	4/8/15 11:27:00 AM
Dil. Factor:	2.29	Date of Analysis:	4/15/15 06:58 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.23	Not Detected	0.58	Not Detected
cis-1,2-Dichloroethene	0.23	Not Detected	0.91	Not Detected
Trichloroethene	0.23	0.24	1.2	1.3
1,1,1-Trichloroethane	0.23	Not Detected	1.2	Not Detected
1,1-Dichloroethane	0.23	Not Detected	0.93	Not Detected
Tetrachloroethene	0.23	Not Detected	1.6	Not Detected
trans-1,2-Dichloroethene	0.23	Not Detected	0.91	Not Detected
1,2-Dichlorobenzene	0.23	Not Detected	1.4	Not Detected
Chloroform	0.23	Not Detected	1.1	Not Detected
Freon 113	0.23	0.87	1.8	6.7

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	93	70-130
4-Bromofluorobenzene	96	70-130

Client Sample ID: Lab Blank

Lab ID#: 1504221-03A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>e041506</b>	<b>Date of Collection:</b> NA
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis:</b> 4/15/15 11:48 AM

<b>Compound</b>	<b>Rpt. Limit (ppbv)</b>	<b>Amount (ppbv)</b>	<b>Rpt. Limit (ug/m3)</b>	<b>Amount (ug/m3)</b>
Vinyl Chloride	0.10	Not Detected	0.26	Not Detected
cis-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Trichloroethene	0.10	Not Detected	0.54	Not Detected
1,1,1-Trichloroethane	0.10	Not Detected	0.54	Not Detected
1,1-Dichloroethane	0.10	Not Detected	0.40	Not Detected
Tetrachloroethene	0.10	Not Detected	0.68	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
Chloroform	0.10	Not Detected	0.49	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	96	70-130



Air Toxics

Client Sample ID: CCV

Lab ID#: 1504221-04A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>e041502</b>	<b>Date of Collection:</b> NA
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis:</b> 4/15/15 08:22 AM

<b>Compound</b>	<b>%Recovery</b>
Vinyl Chloride	97
cis-1,2-Dichloroethene	100
Trichloroethene	98
1,1,1-Trichloroethane	100
1,1-Dichloroethane	98
Tetrachloroethene	104
trans-1,2-Dichloroethene	97
1,2-Dichlorobenzene	100
Chloroform	94
Freon 113	90

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	100	70-130

Client Sample ID: LCS

Lab ID#: 1504221-05A

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>e041503</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 4/15/15 09:14 AM</b>

<b>Compound</b>	<b>%Recovery</b>	<b>Method Limits</b>
Vinyl Chloride	110	70-130
cis-1,2-Dichloroethene	117	70-130
Trichloroethene	112	70-130
1,1,1-Trichloroethane	106	70-130
1,1-Dichloroethane	104	70-130
Tetrachloroethene	114	70-130
trans-1,2-Dichloroethene	89	70-130
1,2-Dichlorobenzene	111	70-130
Chloroform	102	70-130
Freon 113	98	70-130

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	103	70-130

Client Sample ID: LCSD

Lab ID#: 1504221-05AA

**MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN**

<b>File Name:</b>	<b>e041504</b>	<b>Date of Collection: NA</b>
<b>Dil. Factor:</b>	<b>1.00</b>	<b>Date of Analysis: 4/15/15 09:57 AM</b>

<b>Compound</b>	<b>%Recovery</b>	<b>Method Limits</b>
Vinyl Chloride	108	70-130
cis-1,2-Dichloroethene	118	70-130
Trichloroethene	108	70-130
1,1,1-Trichloroethane	108	70-130
1,1-Dichloroethane	103	70-130
Tetrachloroethene	113	70-130
trans-1,2-Dichloroethene	91	70-130
1,2-Dichlorobenzene	111	70-130
Chloroform	104	70-130
Freon 113	98	70-130

**Container Type: NA - Not Applicable**

<b>Surrogates</b>	<b>%Recovery</b>	<b>Method Limits</b>
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	102	70-130

**Sample Transportation Notice**

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B  
FOLSOM, CA 95630-4719  
(916) 985-1000 FAX (916) 985-1020

Project Manager Erica Kalve  
 Collected by: (Print and Sign) Hannah Rollins  
 Company ARCADIS Email Hannah.Rollins@arcadis-us.com  
 Address 100 Montgomery #300 City SF State CA Zip 94104  
 Phone 415-432-6941 Fax \_\_\_\_\_

<b>Project Info:</b> P.O. # _____ Project # <u>EM001727.0073</u> Project Name <u>SP/TOY Mtn View</u>	<b>Turn Around Time:</b> <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush _____ specify	<b>Lab Use Only</b> Pressurized by: _____ Date: _____ Pressurization Gas: N <sub>2</sub> He
---	--	---

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum			
						Initial	Final	Receipt	Final (psi)
<u>01A</u>	<u>SPCB-13-SVE/SSD-Influent-1</u>	<u>33404</u>	<u>4/8/15</u>	<u>11:48</u>	<u>[see note]</u>	<u>29.5</u>	<u>7</u>		
<u>02A</u>	<u>SPCB-13-SVE/SSD-Effluent-1</u>	<u>12392</u>	<u>4/8/15</u>	<u>11:27</u>	<u>[below]</u>	<u>29</u>	<u>5</u>		

Relinquished by: (signature) <u>H Rollins</u> Date/Time <u>4-13-15 11:40</u>	Received by: (signature) <u>Per [unclear]</u> Date/Time <u>4-13-15 12:57</u>	<b>Notes:</b> ① site specific list of COCs ② Please call Rollins re: regular vs. low-level TO-15 analysis once vacuums are measured upon receipt.
Relinquished by: (signature) _____ Date/Time _____	Received by: (signature) _____ Date/Time _____	
Relinquished by: (signature) _____ Date/Time _____	Received by: (signature) _____ Date/Time _____	

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	<u>ADD OFF-BOX</u>		<u>18</u>	<u>Good</u>	Yes No <u>None</u>	<u>1504221</u>



## Appendix D

SVE Construction Photo Log



Structural footing prevented VE-4 trench from entering west hallway



VE-4 Trench passes under non load bearing walls to east hallway.



Concrete feature encountered in VE-4 trench in the east hallway.



Total depth of concrete feature was about 24 inches below floor, required concrete drill to pass through conveyance line



Concrete drill



Concrete was successfully drilled, making way for VE-4 conveyance line.



Total depth of VE-2 trench is about 21 inches below floor surface.



Total depth of VE-1 trench is about 21 inches below floor surface.



Total depth of trench going to VE-3 and VE-4 is about 21 inches below floor surface, near junction with trenches for VE-1 and VE-2



VE-3

Total depth of trench near VE-3 is about 22 inches below floor surface.



Total depth of VE-4 trench on north side of the drilled concrete feature is about 25 inches below floor surface.



Unknown PVC pipe sits directly on top of VE-1 through VE-4 conveyance lines.

Unknown metal pipe sits directly below conveyance lines.

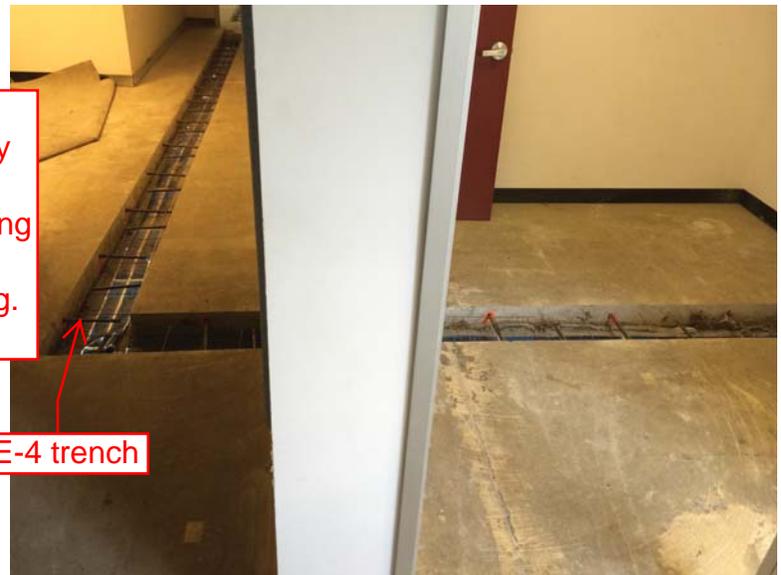


Two 4-inch electrical conduits encountered in back of building. Utility owner unknown.



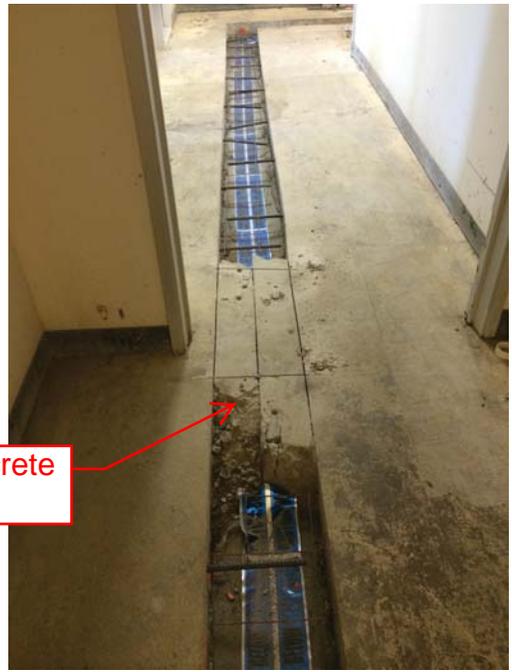
SVE conveyance lines in place in exterior trench.



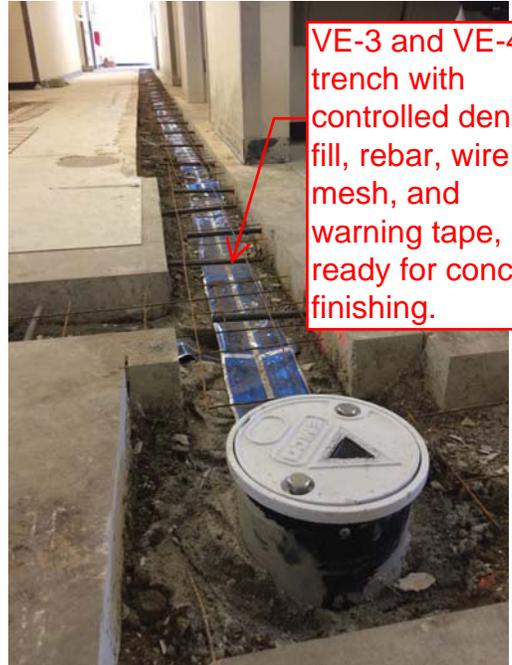




VE-4 trench with controlled density fill, rebar, wire mesh, and warning tape, ready for concrete finishing.



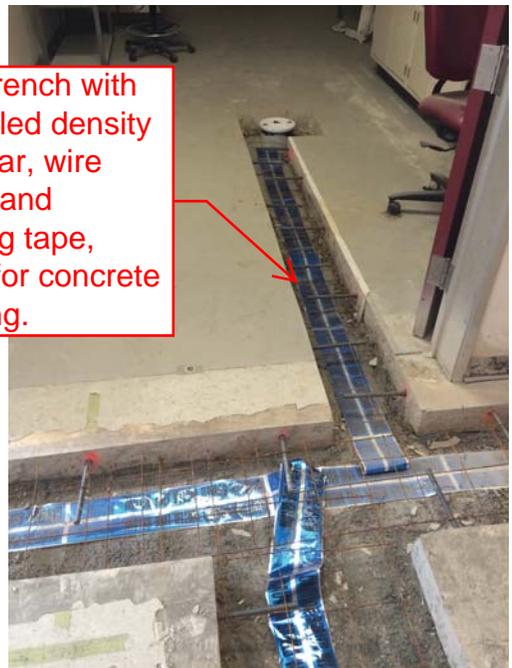
Unknown concrete feature



VE-3 and VE-4 trench with controlled density fill, rebar, wire mesh, and warning tape, ready for concrete finishing.

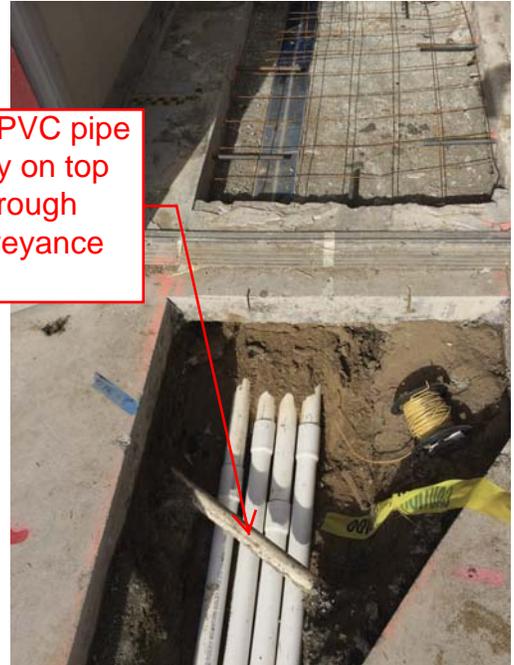


VE-1 trench with controlled density fill, rebar, wire mesh, and warning tape, ready for concrete finishing.





VE-1 trench with controlled density fill, rebar, wire mesh, and warning tape, ready for concrete finishing.



Unknown PVC pipe sits directly on top of VE-1 through VE-4 conveyance lines.



Saw cuts in structural footing repaired.



Concrete finish work for VE-3





## Appendix E

SVE O&M Logs



**SVE SYSTEM O&M LOG**  
 Former Spectra Physics Facility Building, 1245 Terra Bella Ave., Mountain View, CA  
 EM001727.0076.00002

Date \_\_\_\_\_  
 Personnel \_\_\_\_\_

PID Make/Model/Lamp: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ eV

**PID Calibration Details** -- Pre-calibration and post-calibration information. PID is zeroed and calibrated in the field using a single standard gas, i.e. "span calibrated"

Time: \_\_\_\_\_; Standard gas used for PID span calibration: \_\_\_\_\_; Concentration of standard gas: \_\_\_\_\_ ppmv

Pre-calibration "zero" reading: \_\_\_\_\_ ppmv; Pre-calibration standard gas bump check \_\_\_\_\_ ppmv; Is PID result within +/- 10% of [span gas]?: **YES / NO**

How was the PID zeroed prior to calibration (circle one)?: ambient air / ambient air with charcoal filter / zero gas; # of attempts needed for successful calibration?: \_\_\_\_\_

Post-calibration "zero" reading: \_\_\_\_\_ ppmv; Post-calibration standard gas bump check \_\_\_\_\_ ppmv; Is PID result within +/- 10% of [span gas]?: **YES / NO**

**System Check**

**YES / NO** System online upon arrival? System operation hours \_\_\_\_\_ hours  
**YES / NO** System online upon departure? @ Time \_\_\_\_\_  
**ON / OFF** Ventilation fans online upon arrival? Electricity sub-meter \_\_\_\_\_ kwh  
**ON / OFF** Ventilation fans online upon departure?

**SVE Blower**

Estimated liquid in KO tank \_\_\_\_\_ gallons Pre/post dilution pressure differential \_\_\_\_\_ in H2O  
 Water in water collection drum \_\_\_\_\_ gallons Pressure @ KO (V1) \_\_\_\_\_ in H2O  
 Verified PS Operation **YES / NO** Pressure at midpoint (post V1) \_\_\_\_\_ in H2O  
 Pressure after V2 (pre-blower) \_\_\_\_\_ in H2O  
 Effluent pressure \_\_\_\_\_ in H2O

**SVE Monitoring**

SVE Monitoring Point	Time	% Open	Pressure Gauge on pipe (in H2O)	Flow (gauged acfm)	PID Reading (ppmv-[std gas])	Anemometer (ft/min)	Temperature (°F)
1) Ambient							
2) GAC Effluent							
3) GAC Mid							
4) Influent (post dilution)							
5) Influent (pre dilution)							
6) VE-1							
7) VE-2							
8) VE-3							
9) VE-4							
10) VE-5							
11) VE-6							

**VMP Monitoring**

Well ID	Time	Vacuum (in. WC)
SSMP-1		
SSMP-2		
SSMP-3		
SSMP-4		
SSMP-5		
SSMP-6		

**Maintenance**

Dilution air filter changed? **YES / NO**

**Additional Comments/Notes:**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

