Nowell, Keith, Env. Health

From: Roe, Dilan, Env. Health
Sent: Wednesday, May 31, 2017 12:57 PM
To: Michael Harrison
Cc: John R. Till Esq. (jtill@PaladinLaw.com); danbouzos@gmail.com; harrybouzos@yahoo.com; Nowell, Keith, Env. Health
Subject: RE: Red Hanger Kleaners

Hi Michael:

Thank you for sending us a copy of the Screening Subslab Vapor Survey work plan for 6251, 6253 and 6255 College Ave and 305 and 307 63rd Street in Oakland dated May 26, 2017.

We appreciate the cooperative spirit and have provided our comments below on the proposed scope of work for your consideration when implementing the work.

1. Proposed: One vapor pin is proposed in each of the tenant spaces for collection of data to screen subslab soil gas concentrations beneath the foundation. These locations were chosen to be in accessible areas within portions of the foundation segregated by each other by structural grade beams and biased towards the sewer lateral.

   ACDEH Recommendations: ACDEH concurs with the approach however it is unclear where the sewer lines in each of the tenant spaces connect to the sewer and whether they extend beneath the tenant spaces.. ACDEH suggests installation of additional vapor pins within each tenant space as the locations of historic dry cleaning equipment and operations is unknown.

2. Proposed: The stated objectives for data developed during the assessment are to support rapid decision making regarding potential threat to indoor air during the time period where retrofit activities are ongoing and access to the building foundation are maximized. The work plan proposes to use a ppbRAE 3000 to screen soil gas concentration at each of the locations and if screening levels are exceeded consideration will be given to collecting samples from the vapor pin probes for offsite laboratory analysis.

   ACDEH Recommendations: ACDEH recommends laboratory analysis be conducted to evaluate soil gas concentrations. Additionally, ACDEH recommends additional sampling be conducted at a later date to evaluate temporal variations in soil gas collected from all tenant spaces and to evaluate if soil vapor equilibrium has been achieved beneath the newly constructed in foundations in the tenant spaces at 6251, 6253 and 6255 College Ave.

ACDEH looks forward to reviewing the results of your investigation.

Dilan Roe, P.E.
Chief – Land Water Division
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, CA
510.567.6767; Ext. 36767
QIC: 30440
dilan.roe@acgov.org

From: Michael Harrison [mailto:mharrison@enviroassets.com]
Sent: Wednesday, May 31, 2017 8:25 AM
To: Roe, Dilan, Env. Health <Dilan.Roe@acgov.org>
Cc: John R. Till Esq. (jtill@PaladinLaw.com) <jtill@PaladinLaw.com>; danbouzos@gmail.com; harrybouzos@yahoo.com; Nowell, Keith, Env. Health <Keith.Nowell@acgov.org>
Subject: RE: Red Hanger Kleaners

Thanks Dilan:
I'll be in a meeting in San Jose this morning, driving back in the early afternoon so hopefully we can talk then. My cell phone is 510.390.6518.

Sincerely,

Michael Harrison, P.E., QSD/QSP, LEED AP
Principal
EnviroAssets, Inc.
(888) 748-8820
Web: http://www.enviroassets.com/

From: Roe, Dilan, Env. Health [mailto:Dilan.Roe@acgov.org]
Sent: Tuesday, May 30, 2017 7:28 PM
To: Michael Harrison <mharrison@enviroassets.com>
Cc: John R. Till Esq. (jtill@PaladinLaw.com) <jtill@PaladinLaw.com>; danbouzos@gmail.com; harrybouzos@yahoo.com; Nowell, Keith, Env. Health <Keith.Nowell@acgov.org>
Subject: RE: Red Hanger Kleaners

Hi Michael:

Yes lets touch base tomorrow. Let me talk to Keith when I get in first thing tomorrow and we will let you know when we have availability for a phone call so you can sample tomorrow night.

dilan

From: Michael Harrison [mailto:mharrison@enviroassets.com]
Sent: Tuesday, May 30, 2017 5:45 PM
To: Roe, Dilan, Env. Health <Dilan.Roe@acgov.org>
Cc: John R. Till Esq. (jtill@PaladinLaw.com) <jtill@PaladinLaw.com>; danbouzos@gmail.com; harrybouzos@yahoo.com; Nowell, Keith, Env. Health <Keith.Nowell@acgov.org>
Subject: RE: Red Hanger Kleaners

Dear Dilan:
Just checking in as I didn't see an email from you today. Can we talk tomorrow? We are hoping to work tomorrow night at the Bouzos property.

Sincerely,

Michael Harrison, P.E., QSD/QSP, LEED AP
Principal
EnviroAssets, Inc.
(888) 748-8820
Web: http://www.enviroassets.com/

From: Roe, Dilan, Env. Health [mailto:Dilan.Roe@acgov.org]
Sent: Friday, May 26, 2017 6:10 PM
To: Michael Harrison <mharrison@enviroassets.com>
Cc: John R. Till Esq. (jtill@PaladinLaw.com) <jtill@PaladinLaw.com>; danbouzos@gmail.com; harrybouzos@yahoo.com; Nowell, Keith, Env. Health <Keith.Nowell@acgov.org>
Subject: RE: Red Hanger Kleaners

Hi Michael:

Thank you for sending us the work plan. We have a County holiday on Monday however Keith and I will review on Tuesday and provide comment to you then.

Dilan

From: Michael Harrison [mailto:mharrison@enviroassets.com]
Sent: Friday, May 26, 2017 3:22 PM
To: Nowell, Keith, Env. Health <Keith.Nowell@acgov.org>; Roe, Dilan, Env. Health <Dilan.Roe@acgov.org>
Cc: John R. Till Esq. (jtill@PaladinLaw.com) <jtill@PaladinLaw.com>; danbouzos@gmail.com; harrybouzos@yahoo.com
Subject: Red Hanger Kleaners

Dear Ms. Roe and Mr. Nowell:
On behalf of the Bouzoses, attached please a subslab vapor screening workplan for 6251, 6253, and 6255 College Avenue, 305 and 307 63rd Street in Oakland, California, prepared following the meeting with the Alameda County Department of Environmental Health ("ACDEH") and in response to its letter dated May 24, 2017. The purpose of the screening workplan is to provide expedited information regarding the potential of vapor intrusion from chlorinated solvents into the Property building and support rapid decision making regarding potential threat to indoor air during the time period where retrofit activities are ongoing and access to the building foundation is maximized.

This work is planned to be conducted next week, and after normal business hours to accommodate installation and sampling of vapor pins within occupied businesses. Please contact me by email or cell phone at 510.390.6518 to discuss the scope of work and notify me if ACDEH would like to participate during the work.

Sincerely,

Michael Harrison, P.E., QSD/QSP, LEED AP
Principal
EnviroAssets, Inc.
Voice: (510) 346-9500
Fax: (510) 346-9501
Email: mharrison@enviroassets.com
Web: http://www.enviroassets.com/
==========

May 26, 2017

Visilios D. Bouzos and Eleni V. Bouzos, individually and as trustee of the Bouzos Family Living Trust; and Dan Bouzos
c/o John R. Till Esq.
Paladin Law Group, LLP
1176 Boulevard Way, Suite 200
Walnut Creek, CA 94595

RE: Screening Subslab Vapor Survey
6251, 6253, and 6255 College Avenue, 305 and 307 63rd Street
Oakland, California

Dear Messrs. Bouzos:

Following the meeting with the Alameda County Department of Environmental Health ("ACDEH") and in response to its letter dated May 24, 2017, EnviroAssets proposes to conduct a screening level subslab vapor survey of the Bouzos owned property with the above listed addresses ("Property", Figure 1). The Property has been potentially affected by volatile organic compounds, specifically chlorinated solvents ("CVOCs"), from historical dry cleaning operations both on and proximate to the Property.

1.0 BACKGROUND

The Property is an approximately 0.7 acre parcel (APN 48A-7069-7) zoned for mixed use and developed with commercial spaces on the first floor and residential apartments on the second and third floors. Currently, the Property is undergoing a voluntary seismic retrofit that involves structural improvements to foundations and first story framing members. The updated foundation plan is overlain on an aerial photograph in Figures 1 and 2.

Retrofit of 6251 College Avenue has been completed space is occupied by a nail spa business. Retrofit is underway in 6253 and 6255 College Avenue spaces where the perimeter and slab foundations have been retrofit and rough interior work is underway. Approximately 5-inch thick concrete foundations were poured over approximately 4-inches of gravel and two inches of sand with a moisture barrier separating the materials. The moisture barrier was not installed with the intent of serving as a chemical vapor barrier, and is not considered a competent barrier to the migration of chlorinated solvent vapor, if any.

During the retrofit activities, the Property sewer lateral was replaced beneath 6251 and 6253 College Avenue with remaining portions planned for replacement when 307 63rd Street is retrofit beginning in approximately three months. During the sewer replacement work, the Property sewer lateral was observed to be in good condition and constructed of cast iron, at approximately five to six feet below grade and no connections to other properties or sewer piping external to the building were observed. Furthermore, no breaks or penetrations were observed. Please note that

sewer connections for 6253 and 6255 College collect on the west wall and connect to the Property lateral at the southwest wall of 6253 College within the new portion of the sewer lateral.

2.0 PURPOSE AND SCOPE

Concentrations of chlorinated solvents associated with the historical operation of a dry cleaning business (Red Hanger Kleener) have been identified in soil vapor in the sub-surface beneath 6235-6239 College Avenue (College Claremont Property) and the alleyway and parking lot lying behind the building and extending to 63rd Street. Tenants historically operated dry cleaning businesses on portions of the Property. Therefore, the purpose of this screening level subslab vapor assessment is to provide expedited information regarding the potential of vapor intrusion from chlorinated solvents into the Property building.

Subslab vapor screening samples are proposed to be collected from four locations at the Property (Figure 2) using Vapor Pin® subslab soil gas probes following the Cox Colvin standard operating procedures ("SOP", attached). These locations were chosen to be in accessible areas, within portions of the foundation segregated from each other by structural grade beams, and biased towards the sewer lateral. Samples will be collected from retrofit (6251, 6253, and 6255 College) and original (307 63rd Street) locations.

As suggested in the SOP, Property foundations will be penetrated approximately 1-inch into the underlying material to form a void. In 6251, 6253, and 6255 College, this will partially penetrate the sand layer installed beneath retrofit slab foundations. As the slab and base material beneath 307 63rd Street have not been retrofit, the location within that space will penetrate the original slab and based materials that overlie the original sewer lateral. Based on owner knowledge, there are no utilities underneath building slabs except for the sewer lateral and therefore a utility survey will not be conducted prior to Vapor Pin installation.

After two-hours have elapsed following Vapor Pin installation to allow the subsurface to equilibrate, Vapor Pin locations will be screened directly using a portable photoionization detector ppbRAE 3000 from RAE Systems ("PID", spec sheet attached) utilizing a 10.6 ev lamp and with resolution to one ppbv (parts per billion by volume). If the internal PID fan is not sufficient to draw subslab soil vapor through the PID, a vacuum pump and tedlar bags will be utilized to collect screening samples from the Vapor Pins.

3.0 VAPOR SCREENING DISCUSSION

This vapor screening discussion is provided to clarify the objectives of this screening subslab vapor survey vapor assessment workplan.

- The chemicals of concern are CVOCs. These chemicals are by definition volatile, and therefore can be identified through collection of subslab soil vapor samples.

- The objectives for data developed during the assessment are to support rapid decision making regarding potential threat to indoor air during the time period where retrofit activities are ongoing and access to the building foundation is maximized.
- Samples will be compared to subslab soil vapor regulatory guidance levels - Environmental Screening Levels (ESLs) provided by the Regional Water Quality Control Board, Region 2 – for commercial properties according to the following rationale:
    - Conservatively assume for the purposes of this screening assessment that all subslab vapor is tetrachloroethylene or "PCE".
    - The subslab PCE ESL for commercial properties is 2,100 $\mu g/m^3$.
    - The ppbRAE 3000 displays parts per billion by volume which translates to an ESL of 310 ppbv.
    - Using an isobutylene calibration gas and 10.6 ev lamp and assuming that all measured vapor is PCE, the PID conversion factor is 0.57.
    - Using the PID conversion factor of 0.57, the ppbRAE will report the PCE subslab ESL at 544 ppbv.
- Due to our experience with ppbRAE 3000 instruments, they are very sensitive to moisture. Therefore, RAE Systems humidity filtering II tubes (specification sheet attached) will be used during subslab vapor screening.
- Two samples will be conducted from each probe at a minimum interval of 20 minutes to support evaluation of sampling precision and stability of subslab vapor concentrations.

4.0 SCHEDULE

Screening work is proposed for Wednesday or Thursday the week of May 29, 2017.

5.0 DATA EVALUATION AND REPORTING

Should concentrations observed during the subslab vapor screening survey exceed 544 ppbv, consideration will be given to collecting samples from the Vapor Pin probes for off site laboratory analysis by Method TO-15 consistent with the applicable regulatory guidance provided by California Environmental Protection Agency ("Cal/EPA") and the DTSC, including: *Advisory Active Soil Gas Investigations* (July 2015) and the *Guidance For The Evaluation And Mitigation Of Subsurface Vapor Intrusion To Indoor Air (Vapor Intrusion Guidance)* (October 2011).

6.0 HEALTH AND SAFETY PLAN

Prior to the start of fieldwork, EnviroAssets will prepare a site specific Health and Safety plan which will be made available upon request. Onsite personnel are responsible for operating in accordance with all applicable regulations of the Occupational Safety and Health Administration

(OSHA). All onsite personnel shall read the HASP and sign the "Plan Acceptance Form" (Attachment A of the HASP) before starting Site activities.

Limitations

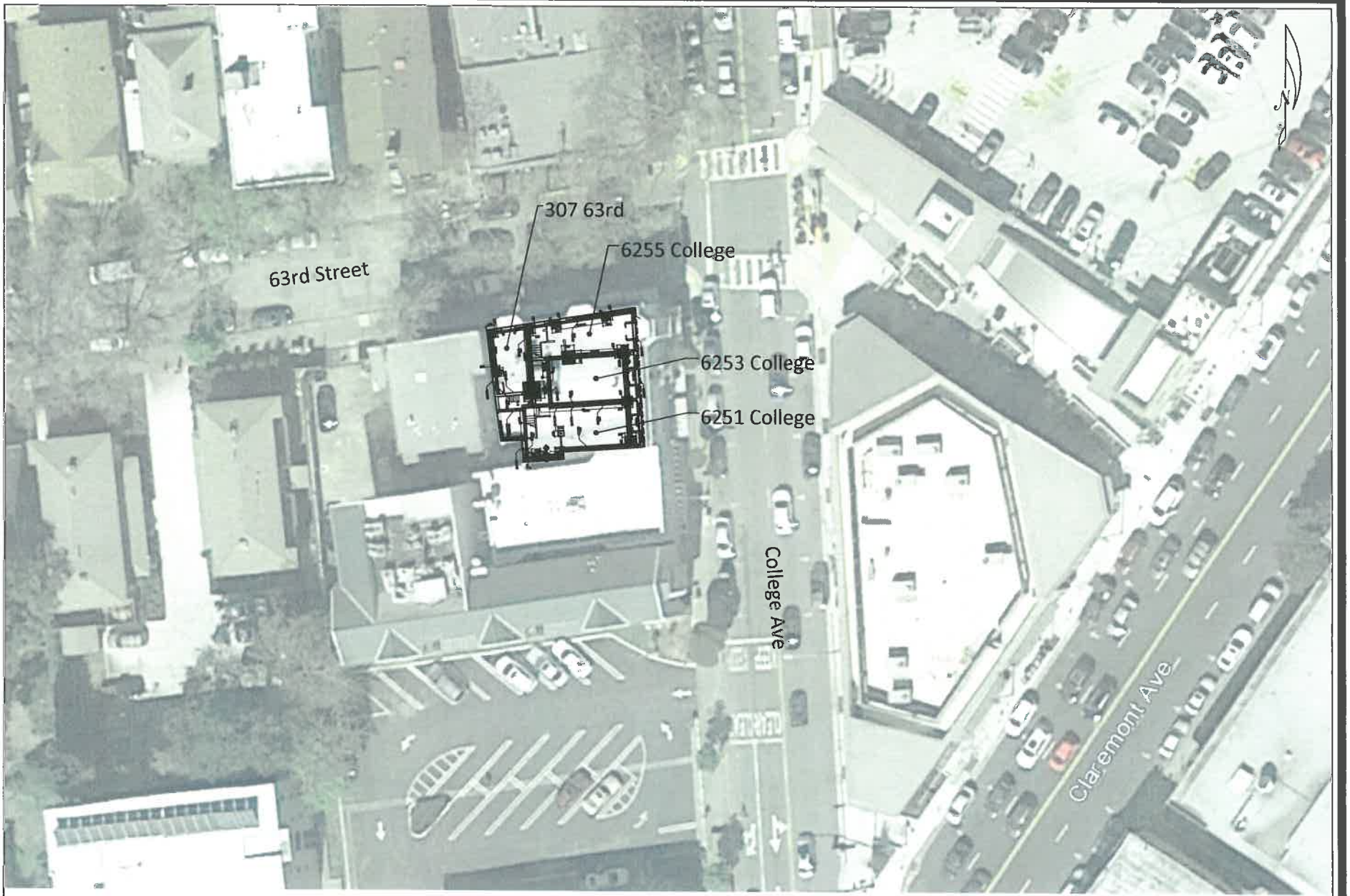
The findings, recommendations, and/or professional opinions presented in this proposal have been prepared in accordance with generally accepted professional environmental practices, and within the scope of the project. There is no other warranty, either express or implied.

Sincerely,

Michael Harrison, P.E.
Principal Engineer

Attach.

CC: John Till, Esq.



Aerial photograph sourced from Google Earth

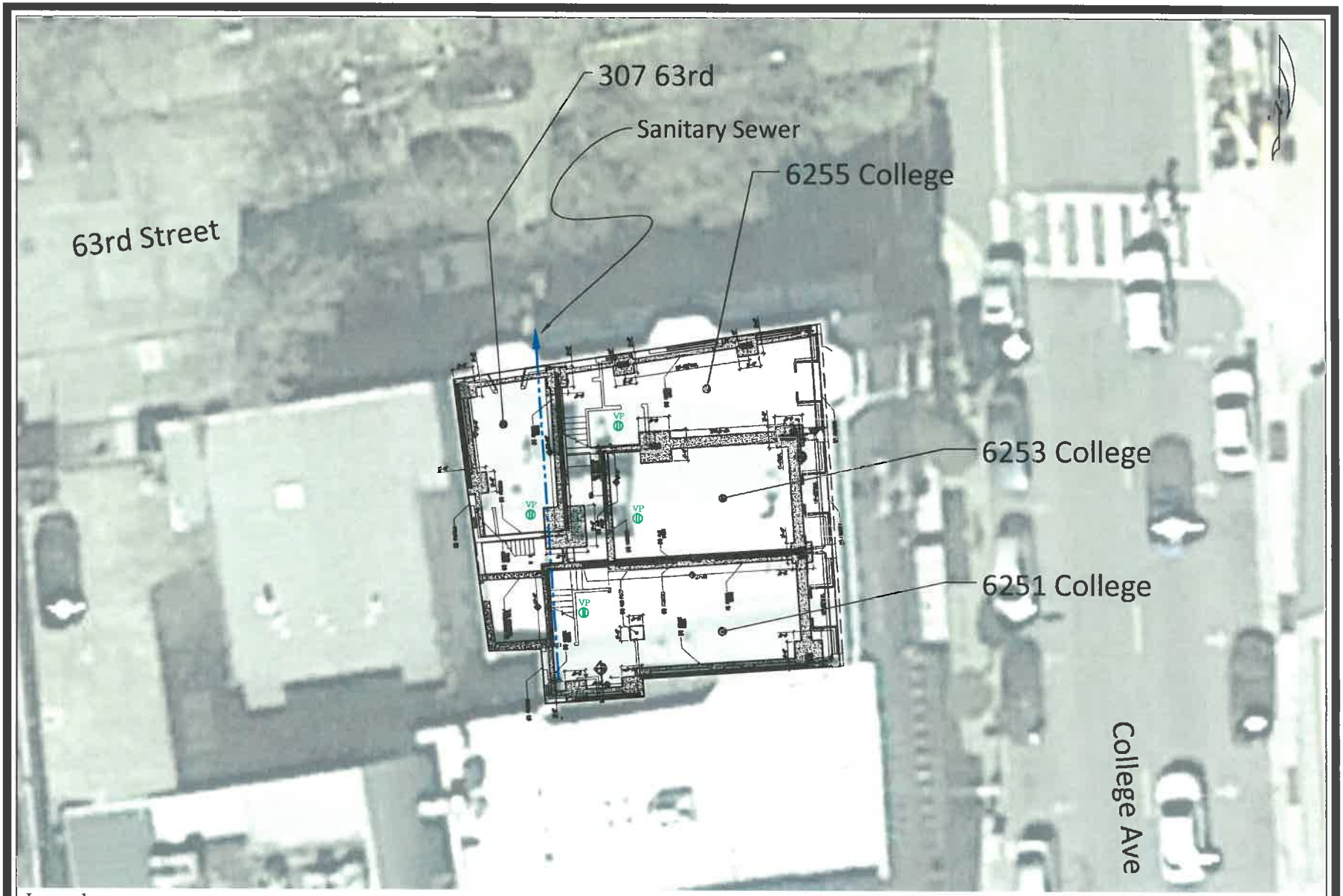
EnviroAssets, Inc.
www.EnviroAssets.com
V: (888) 748-8820
V: (510) 346-9500 F: (510) 346-9501

No.	Date	Revision	Approved

Date:	5/26/2017
Drawn:	MH
File Name:	EA22404-17

PROPERTY VICINITY
6251-6255 College Avenue, 305 & 307 63rd Street
Oakland, California

Figure
1
Project
EA270



Legend

VP Proposed vapor point location (approximate)

Aerial photograph sourced from Google Earth

0 10 20

Scale in Feet

EnviroAssets. Inc.
www.EnviroAssets.com
V: (888) 748-8820
V: (510) 346-9500 F: (510) 346-9501

No.	Date	Revision	Approved

Date:	5/26/2017
Drawn:	MH
File Name:	EA22404-17

SAMPLE LOCATIONS
6251-6255 College Avenue, 305 & 307 63rd Street
Oakland, California

Figure 2

Project EA270

Standard Operating Procedure Installation and Extraction of the Vapor Pin™

Updated April 3, 2015

Scope:

This standard operating procedure describes the installation and extraction of the Vapor Pin™ for use in sub-slab soil-gas sampling.

Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the Vapor Pin™ for the collection of sub-slab soil-gas samples or pressure readings.

Equipment Needed:

- Assembled Vapor Pin™ [Vapor Pin™ and silicone sleeve(Figure 1)]; Because of sharp edges, gloves are recommended for sleeve installation;
- Hammer drill;
- 5/8-inch (16mm) diameter hammer bit (hole **must** be 5/8-inch (16mm) diameter to ensure seal. It is recommended that you use the drill guide). (Hilti™ TE-YX 5/8" x 22" (400 mm) #00206514 or equivalent);
- 1½-inch (38mm) diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch (19mm) diameter bottle brush;
- Wet/Dry vacuum with HEPA filter (optional);
- Vapor Pin™ installation/extraction tool;
- Dead blow hammer;
- Vapor Pin™ flush mount cover, if desired;
- Vapor Pin™ drilling guide, if desired;
- Vapor Pin™ protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel for repairing the hole following the extraction of the Vapor Pin™.

Figure 1. Assembled Vapor Pin™

Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.

2) Set up wet/dry vacuum to collect drill cuttings.

3) If a flush mount installation is required, drill a 1½-inch (38mm) diameter hole at least 1¾-inches (45mm) into the slab. Use of a Vapor Pin™ drilling guide is recommended.

4) Drill a 5/8-inch (16mm) diameter hole through the slab and approximately 1-inch (25mm) into the underlying soil to form a void. Hole **must** be 5/8-inch (16mm) in diameter to ensure seal. It is recommended that you use the drill guide.

5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.

6) Place the lower end of Vapor Pin™ assembly into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the Vapor Pin™ to protect the barb fitting, and tap the Vapor Pin™ into place using a dead blow hammer (Figure 2). Make sure the installation/extraction tool is aligned parallel to the Vapor Pin™ to avoid damaging the barb fitting.

Figure 2. Installing the Vapor Pin™.

During installation, the silicone sleeve will form a slight bulge between the slab and the Vapor Pin™ shoulder. Place the protective cap on Vapor Pin™ to prevent vapor loss prior to sampling (Figure 3).

Figure 3. Installed Vapor Pin™

7) For flush mount installations, cover the Vapor Pin™ with a flush mount cover, using either the plastic cover or the optional stainless-steel Secure Cover (Figure 4).

Figure 4. Secure Cover Installed

8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to re-equilibrate prior to sampling.

9) Remove protective cap and connect sample tubing to the barb fitting of the Vapor Pin™. This connection can be made using a short piece of Tygon™ tubing to join the Vapor Pin™ with the Nylaflow

tubing (Figure 5). Put the Nylaflow tubing as close to the Vapor Pin as possible to minimize contact between soil gas and Tygon™ tubing.

Figure 5. Vapor Pin™ sample connection.

10) Conduct leak tests in accordance with applicable guidance. If the method of leak testing is not specified, an alternative can be the use of a water dam and vacuum pump, as described in SOP Leak Testing the Vapor Pin™ via Mechanical Means (Figure 6). For flush-mount installations, distilled water can be poured directly into the 1 1/2 inch (38mm) hole.

Figure 6. Water dam used for leak detection

11) Collect sub-slab soil gas sample or pressure reading. When finished, replace the protective cap and flush mount cover until the next event. If the sampling is complete, extract the Vapor Pin™.

Extraction Procedure:

1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the Vapor Pin™ (Figure 7). Continue turning the tool clockwise to pull the Vapor Pin™ from the hole into the installation/extraction tool.

2) Fill the void with hydraulic cement and smooth with a trowel or putty knife.

Figure 7. Removing the Vapor Pin™.

3) Prior to reuse, remove the silicone sleeve and protective cap and discard. Decontaminate the Vapor Pin™ in a hot water and Alconox® wash, then heat in an oven to a temperature of 265° F (130° C) for 15 to 30 minutes.

The Vapor Pin™ to designed be used repeatedly, however, replacement parts and supplies will be required periodically. These parts are available on-line at VaporPin.CoxColvin.com.

RAE SYSTEMS by Honeywell

ppbRAE 3000

Portable Handheld VOC Monitor

The compact ppbRAE 3000 is a comprehensive VOC gas monitor and datalogger for hazardous environments. The ppbRAE 3000 is the most advanced handheld VOC monitor available for parts-per-billion detection. This third-generation patented PID device monitors VOCs using a photoionization detector with a 9.8 eV, 10.6 eV UV-discharge lamp.

The built-in wireless modem allows real-time data connectivity with the ProRAE Guardian command center located up to two miles/3 km away (with optional RAELink3 portable modem) from the ppbRAE 3000 detector.

- **Accurate VOC measurement in all operating conditions**
- **Easy access to lamp and sensor in seconds without tools**
- **Patented sensor and lamp auto-cleaning reduces maintenance**
- **Monitors real-time readings and location of people**
- **Low Cost of Ownership: 3-year 10.6 eV lamp Warranty**

KEY FEATURES

Proven PID Technology

- 3-second response time
- Extended range from 1 ppb to 10,000 ppm with best in class linearity
- Humidity compensation with integral humidity and temperature sensors

Integrated

- Real-time wireless data transmission through built-in Bluetooth & RAElink3 link
- Integrated Correction Factors list of 220 compounds—more than any other PID
- Includes flashlight for dark conditions
- Large graphic display presents gas type, Correction Factor and concentration

Durable

- Easy access to battery, lamp and sensor in seconds without tools
- Rugged housing withstands use in harsh environments
- IP-67 waterproof design for easy cleaning and decontamination

APPLICATIONS

- Oil & Gas
- HazMat
- Industrial Safety
- Civil Defense
- Environmental & Indoor Air Quality

Workers can easily measure VOCs and wirelessly transmit readings up to two miles/3 km away.

Wireless AutoRAE Compatible ISO 9001 CERTIFIED ATEX IECEx

ppbRAE 3000

Portable Handheld VOC Monitor

RAE SYSTEMS by Honeywell

Specifications

Detector Specifications

Size	10" L x 3.0" W x 2.5" H (25.5 cm x 7.6 cm x 6.4 cm)
Weight	26 oz (738 g)
Sensors	Photoionization sensor with standard 10.6 eV or optional 9.8 eV lamp
Battery	• Rechargeable, external field-replaceable Lithium-Ion battery pack • Alkaline battery adapter
Operating Hours	16 hours of operation (12 hours with alkaline battery)
Display Graphic	4 lines, 28 x 43 mm, with LED backlight for enhanced display readability
Keypad	1 operation and 2 programming keys, 1 flashlight on/off
Direct Readout	Instantaneous reading • VOCs as ppm by volume or mg/m³ (3 in upper case for cubic) • STEL, TWA and PEAK • Battery and shutdown voltage • Date, time, temperature
Alarms	95 dB (at 12"/30 cm) buzzer and flashing red LED to indicate exceeded preset limits • High: 3 beeps and flashes per second • Low: 2 beeps and flashes per second • STEL and TWA: 1 beep and flash per second • Alarms latching with manual override or automatic reset • Additional alarm for low battery and pump stall
EMI/RFI	Highly resistant to EMI/RFI Compliant with EMC Directive 89/336/EEC
IP Rating	• IP-67 unit off and without flexible probe • IP-65 unit running
Datalogging	Standard 6 months at one-minute intervals
Calibration	Two-point or three-point calibration for zero and span Calibration memory for 8 calibration gases
Sampling Pump	• Internal, integrated flow rate at 500 cc/mn • Sample from 100' (30m) horizontally and vertically
Low Flow Alarm	• Auto pump shutoff at low-flow condition
Communication	• Download data and upload instrument set-up from PC through charging cradle or optional Bluetooth™ • Wireless data transmission through built-in RF modem
Wireless Network	ProRAE Guardian Real-Time Wireless Safety System
Wireless Frequency	ISM license-free bands
Wireless Range (Typical)	ppbRAE 3000 to RAELink3 or RAELink3 Z1 modems ~ 33 feet (10 meters)
Hazard Area Approval	• US and Canada: UL, cUL, Classified as Intrinsically Safe for use in Class I, Division 1 Groups A, B, C, D • Europe: ATEX Ex II 2GEx ia IIC/IIB T4 • IECEx: Ex ia IIC/IIB T4
Temperature	-4° to 113° F (-20° to 50° C)
Humidity	0% to 95% relative humidity (non-condensing)
Attachments	Durable black rubber boot with straps
Warranty	3-year warranty for 10.6 eV lamp, 1 year for pump, battery, and instrument

Specifications are subject to change

Sensor Specifications

Gas Monitor	Range	Resolution	Response Time T90
VOCs	0 to 9999 ppb	1 ppb	< 3 s
	10 to 99 ppm	0.01 ppm	< 3 s
	100 to 99 ppm	0.1 ppm	< 3 s
	1000 to 9999 ppm	1 ppm	< 3 s

Monitor only includes:

- ppbRAE 3000 Monitor, with RAE Systems UV lamp, as specified
- Datalogging with ProRAE Studio II
- Charging/download adapter
- VOC Zeroing Tubes (1 box)
- Tube adapter
- Tedlar® bag for calibration
- Flex-I-Probe™
- External filter
- Rubber boot with straps
- Alkaline battery adapter
- Lamp-cleaning and tool kit
- Operation CDROM
- Operation & Maintenance manual
- Soft leather case

Monitor with accessories kit adds:

- Hard transport case with pre-cut foam padding
- Charging/download cradle
- 5 Porous metal filters and O-rings
- Organic vapor zeroing kit
- Gas outlet port adapter and tubing

Optional calibration kit adds:

- 10 ppm isobutylene calibration gas, 34L
- Calibration regulator and flow controller

Optional Guaranteed Cost of Ownership Program:

- 4-year repair and replacement guarantee
- Annual maintenance service

CORPORATE HEADQUARTERS

RAE Systems by Honeywell
3775 North First Street
San Jose, CA 95134 USA
raesales@raesystems.com

WORLDWIDE SALES OFFICES

USA/Canada 1.877.723.2878
Europe +45.86.52.51.55
Middle East +00971.4.440.5949
China +86.10.5885.8788-3000
Asia Pacific +852.2669.0828

RAE SYSTEMS by Honeywell

Humidity Filtering II Tube

For MiniRAE 3000 and Other Photoionization Detectors

The Humidity Filtering II Tube dries the sample gas entering pumped instruments. It is particularly suited for removing humidity effects on photoionization detectors (PIDs) while making VOC measurements, and typically lasts for about a half hour of continuous readings. The Humidity Filtering II Tube utilizes a solid adsorbent to remove moisture without impacting the detection and measurement of most VOCs.

- **Facilitates quick, on-the-spot measurements of many gases and vapors**
- **Extends the time needed between sensor cleanings**

KEY FEATURES

Accurate

- Enables continuous reading of VOCs under extremely humid conditions for about one half hour (per tube) at room temperature
- Prevents drifting readings at high humidity when the sensor is dirty.
- Caution: Absorbs some compounds such as ammonia and slows the response of heavy compounds, especially at low concentrations or low temperatures. (Check RAE Systems' Technical Note TN-178 for adapter connections or for further details.)

Versatile

- Attaches to the Flex-I-Probe™ inlet with the same adapter used for ppbRAE 3000 VOC zeroing tubes.
- Especially useful for measuring chlorinated solvents and fuels under high humidity conditions as are often encountered during soil and water remediation.
- Can be used with other instruments having a built-in pump such as MiniRAE Lite, ppbRAE 3000, UltraRAE 3000, MultiRAE Lite, MultiRAE and MultiRAE Pro when humidity is an issue, when using a PID or making low-level LEL sensor measurements.

APPLICATIONS

Use with photoionization detectors where humidity effects need to be removed during applications such as:

- Soil and water remediation
- VOCs in landfill sites

ISO 9001 CERTIFIED

Humidity Filtering II Tube

For MiniRAE 3000 and Other Photoionization Detectors

RAE SYSTEMS by Honeywell

SPECIFICATIONS

Table 1. Humidity Filtering Capacity

Temp °C	Temp °F	Relative Humidity (%)	Run time to t_{10} (min @ 500 cc/min)	Run time to t_{20} (min @ 500 cc/min)
45	113	99	12	14
		75	17	18
		50	35	>40
		25	>40	>40
40	104	100	18	20
		75	25	30
		50	40	>40
30	86	100	22	26
		75	28	32
		50	40	>40
20	68	100	23	
		75	34	>40
	50	40		

Note: The contents of the tubes are non-hazardous, but may absorb hazardous components from the sample gas.

Table 1. Effect on VOC Response

Compound	Conc. (ppm)	Temp (°C)	t_{90} (sec)	CF*
Isobutylene	100	22	3	1.0
Isobutylene	10	0	5	1.17
Cyclohexane	10	22	3	1.0
Octane	100	22	3	1.0
Undecane	100	22	60	1.1
Benzene	5	22	3	1.0
Toluene	10	22	3	1.0
Xylene	100	22	10	1.05
Styrene	50	22	10	1.0
Gasoline	100	22	15	1.05
Gasoline	10	22	15	1.0
Gasoline	10	0	28	1.6
Jet Fuel JP-5	10	22	65	1.0
Diesel Fuel	100	22	110	1.3
Vinyl Chloride	10	22	3	1.0
Trichloroethylene	10	22	3	1.0
Trichloroethylene	10	0	5	1.2
Perchloroethylene	10	22	4	1.0
Glutaraldehyde	10	22	NR** (480)	NR** (1.05)
Ethanol	1000	22	3	1.0
Ethanol	100	22	40	1.0
Isopropanol	10	22	90	1.15
Acetone	1000	22	3	1.0
Acetone	100	22	20	1.0
Acetone	10	22	80	1.0
Acetone	10	0	115	1.17
Phenol	20	22	150	1.0
Methyl methacrylate	10	22	150	1.05
Dimethyl sulfide	10	22	3	1.0
Ethyl mercaptan	10	22	4	1.05
Butyl mercaptan	10	22	5	1.05
Hydrogen sulfide	7	22	3	1.0
Ethylamine	high	22	NR**	NR**
Ammonia	50	22	NR**	NR**

* CF = Correction Factor. Multiply by reading to get true concentration to correct from some loss.

** Not recommended because of severe losses.

CORPORATE HEADQUARTERS

RAE Systems by Honeywell
3775 North First Street
San Jose, CA 95134 USA
raesales@raesystems.com

DS-1014-04

WORLDWIDE SALES OFFICES

USA/Canada	1.877.723.2878
Europe	+45.86.52.51.55
Middle East	+00971.4.440.5949
China	+86.10.5885.8788-3000
Asia Pacific	+852.2669.0828