

**Timber Dell Properties, LLC**  
**1255 Sherman St.**  
**Alameda, California**

**RECEIVED**

9:21 am, Jan 11, 2010

Alameda County  
Environmental Health

January 7, 2010

Mr. Jerry Wickham  
Hazardous Materials Specialist  
Alameda County Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577

Re: **Perjury Statement-**  
***Sub-Slab Attenuation Factor Determination Work Plan***  
Searway Property (SLIC Case No. RO0002584)  
649 Pacific Avenue  
Alameda, California

Dear Mr. Jerry Wickham,

"I declare under perjury, that the information and / or recommendations contained in the attached document or report is true and correct to the best of my knowledge."

Timber Dell Properties, LLC



Donald W. Lindsey, member



January 8, 2010  
Project 103.001.001

Mr. Jerry Wickham  
Hazardous Materials Specialist  
Alameda County Environmental Health Department  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-5577

Re: *Sub-Slab Attenuation Factor Determination Work Plan*  
Searway Property  
649 Pacific Avenue  
Alameda, California

Dear Mr. Wickham:

This letter, prepared by Trinity Source Group, Inc. (Trinity) on behalf of Timber Del Properties, LLC, presents a work plan to determine a site-specific attenuation factor for the slab foundation of the building at 649 Pacific Avenue in Alameda, California (Figures 1 and 2). The attenuation factor is used to evaluate vapor intrusion pathways from sub-slab materials to indoor air.

Radon gas measurements will be used to determine the site-specific attenuation factor (AF), following the methods described by McHugh, et al. (2008).<sup>1</sup> This reference article notes that many studies indicate that radon is a sensitive tracer for the movement of soil gas across a building foundation.

## **BACKGROUND**

A Sub-Slab Vapor Depressurization System (SSVD) was installed and operated at the subject site following sub-slab vapor testing performed during 2007, which indicated elevated concentrations of volatile organic compounds (VOCs) in the sub-slab vapor. The SSVD was designed, permitted and installed during July and August 2008, and started operation in September 2008. The site layout and SSVD components are shown on Figure 2.

The SSVD system includes two horizontal sub-slab extraction wells, with pipe runs trenched to nearby walls. The pipe runs continue up to the first floor ceiling, where they are manifolded together and connected to an exhaust fan equipped with a flow meter then discharged through the roof and a 3-foot stack.

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<sup>1</sup> McHugh, Thomas E., Hammond, Douglas E., Nickels, Tim, and Hartman, Blayne, "Use of Radon Measurements for Evaluation of Volatile Organic Compound (VOC) Vapor Intrusion," *Environmental Forensics*, 9:107-114, 2008. <http://dx.doi.org/10.1080/15275920801888491>

The SSVD has discharged a total of approximately 3.65 pounds of VOCs from start-up through August 20, 2009 after 331 days of operation. The VOC removal rate for 2009 ranged from 0.0053 pound per day to 0.01845 pounds per day.

The SSVD is performing as expected with the removal of VOCs and depressurization of the sub-slab area.

In order to terminate the SSVD operation and pursue site closure, indoor air VOC concentrations must be below applicable indoor air screening levels<sup>2</sup>. The indoor air concentrations are determined by multiplying the sub-slab concentrations of specific VOCs by an AF. The default AF prescribed by the California Department of Toxic Substances (DTSC) is 0.01.

### **DETERMINATION OF SITE-SPECIFIC AF USING RADON**

A site-specific AF can be determined by comparing sub-slab and indoor concentrations of a tracer gas. Radon has been used as such a tracer gas, because it is naturally-occurring, detectable in most locations, and indoor sources of radon are typically not present.

As described by McHugh, et al., in the previously-referenced article, the AF is determined "as the ratio of the measured concentration of the chemical of concern in indoor air (Cb; corrected by subtracting the ambient air concentration) divided by the measured concentration of the chemical in soil gas (Cs; i.e.,  $AF=Cb/Cs$ )."

Accordingly, the following scope of work calls for collecting and analyzing samples of sub-slab gas, indoor air, and ambient air, in order to determine Cb and Cs. These results will be used to calculate the site-specific AF.

### **SCOPE OF WORK**

The scope of work to be performed will consist of the following work tasks:

- Trinity will turn off the SSVD seven days prior to sub-slab and indoor air vapor testing to allow sub-slab and indoor radon concentrations to equilibrate.
- Trinity will notify the site tenants (Kelly Moore Paints) at least 48 hours before sampling.
- Seven days after SSVD shutdown, three sub-slab vapor points (VS-5, VS-19 and VS-3) will be sampled for radon, VOCs and Stoddard Solvent. These locations were selected because they have historically high VOC concentrations.
- During the same sampling event, one indoor air sample will be collected near VS-6 and analyzed for radon. This sample location was selected because it is adjacent to the highest subsurface concentrations yet out of the walkway and pathway of the air current blowing between doorways.
- During the same event, an outdoor ambient air sample will be collected for radon analysis.

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<sup>2</sup> Screening for Environmental Concerns at Sites With Contaminated Soil and Groundwater (November 2007, updated May 2008), San Francisco Bay Regional Water Quality Control Board, California EPA, <http://www.waterboards.ca.gov/sanfranciscobay/esl.htm>.

- Collected samples for VOC analysis will be shipped to H&P Mobile Geochemistry or another qualified laboratory, and samples for radon analysis will be shipped to the University of Southern California Department of Geosciences laboratory.
- The SSVD system will be restarted after sample collection.
- The AF will be calculated using the radon analytical results as follows:
  - The three sub-slab sample results will be averaged to determine the  $C_s$ , soil gas radon concentration.
  - The ambient sample result will be subtracted from the indoor sample result, to determine the  $C_b$ , the corrected indoor air radon concentration.
  - The AF will be determined by dividing  $C_b$  by  $C_s$ ;  $AF = C_b/C_s$
- The site-specific AF will be applied to the concentrations of VOCs and Stoddard Solvent detected from sample locations of VS-5, VS-19 and VS-3 to determine whether calculated indoor air concentrations of VOCs exceed applicable limits.
- A report describing the procedures and results of the sampling event and calculations, along with site closure considerations, will be prepared.

## **SAMPLING PROCEDURES**

The sampling procedures are described below:

- Three sub-slab gas probes (VS-5, VS-19 and VS-3) will be sampled in 500-milliliter (ml) Tedlar bags with laboratory-supplied, dedicated disposable syringes and three-way valves appropriate for soil gas collection. Sample bags will be filled by quickly fitting the syringes to the Swagelok fitting of each vapor point. Sub-slab air will be collected by expanding the syringe plunger drawing air from below the foundation slab into the syringe. The three-way valve will then be turned and syringe depressed expelling the air into the sample bag. This process will continue, approximately 4 times, until the 500-ml Tedlar bag is approximately 80% full. The sample bag's valve will then be closed and the sample labeled and packaged for shipment. Two sample bags will be collected at each sub-slab probe, so that one sample bag from each location can be sent to the two laboratories performing the analyses.
- The indoor air sample will be collected just above the floor surface near VS-6, using the same type of syringe as described above. The sample will be drawn and placed into the Tedlar bag as described above. The sample bag valve will be closed and the sample labeled and package for shipment.
- The outdoor ambient air sample will be collected outside in the parking lot, following the procedures described above.
- The samples will be logged onto chain-of-custody documents and packaged in a rigid container for overnight shipment to the laboratory.

## LABORATORY METHODS

The laboratory methods are listed below:

- The three sub-slab vapor samples and the indoor and ambient air samples will be analyzed for radon using an alpha-scintillation counting method. The analysis will be performed by the University of Southern California Department of Geosciences laboratory.
- The three sub-slab samples will also be analyzed for VOCs using EPA Method 8260 and for Stoddard Solvent by a Modified EPA Method 8015. These analyses will be performed by H&P Mobile Geochemistry.

## REPORTING

Following receipt of initial sampling analytical results, Trinity will prepare a summary report of the procedures and findings of this soil vapor assessment. The report will include a map showing sample collection locations, field sampling data, and analytical data, along with certified analytical reports and chain of custody documentation.

The findings will include the AF calculation and the application of the AF to sub-slab VOC concentrations. The predicted indoor air concentrations will be calculated and compared to ESLs. Recommendations regarding the future operation of the SSVD and site closure will be provided.

## DISTRIBUTION

A copy of this letter has been forwarded to:

Mr. Don Lindsey  
Timber Del Properties, LLC  
2424 Central Avenue  
Alameda, CA 94501

Ms. Georgia Turner  
The Mechanics Bank  
1999 Harrison St., Suite 100  
Oakland, CA 94612

Please call Trinity at (831) 426-5600 with any questions regarding this letter.

Sincerely,

**TRINITY SOURCE GROUP, INC.**



David A. Reinsma, PG  
President and Principal Geologist



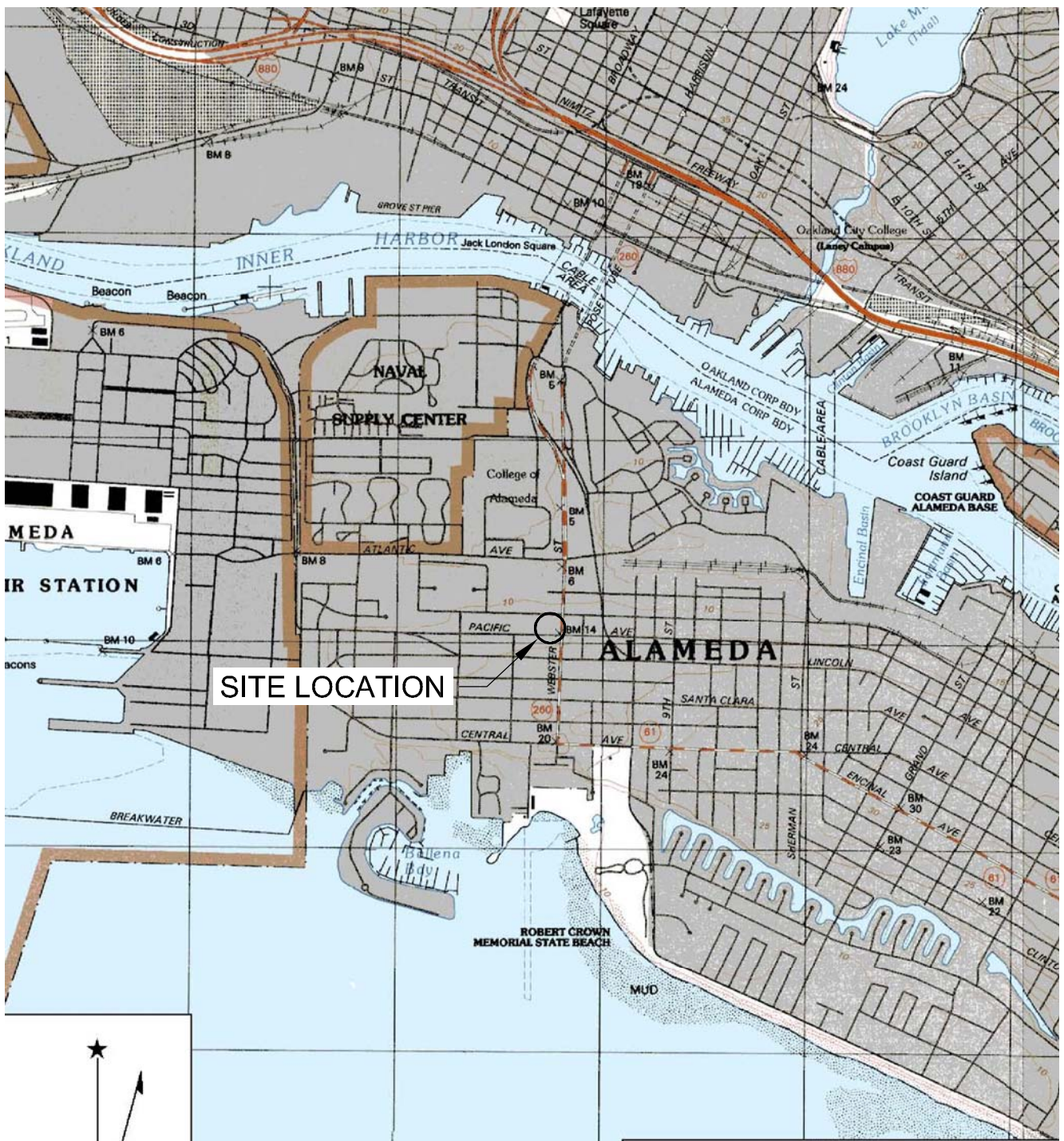
Daniel J. Birch  
Project Geologist

Attachments:

Figure 1 – Site Location Map

Figure 2 – Site Layout

# FIGURES



Name: OAKLAND WEST  
Date: 5/4/2006

Location: 037° 46' 34.86" N 122° 16' 37.65" W NAD 27  
Caption: San Francisco Bay, Oakland West Quadrangle - 1:24,000

REF. 103\_002\SLM.DWG  
BASEMAP FROM MAPTECH, INC.

PREPARED BY



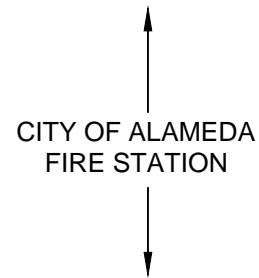
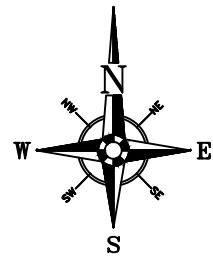
Tel: (831) 426-6600 Fax: (831) 426-6602

### SITE LOCATION MAP

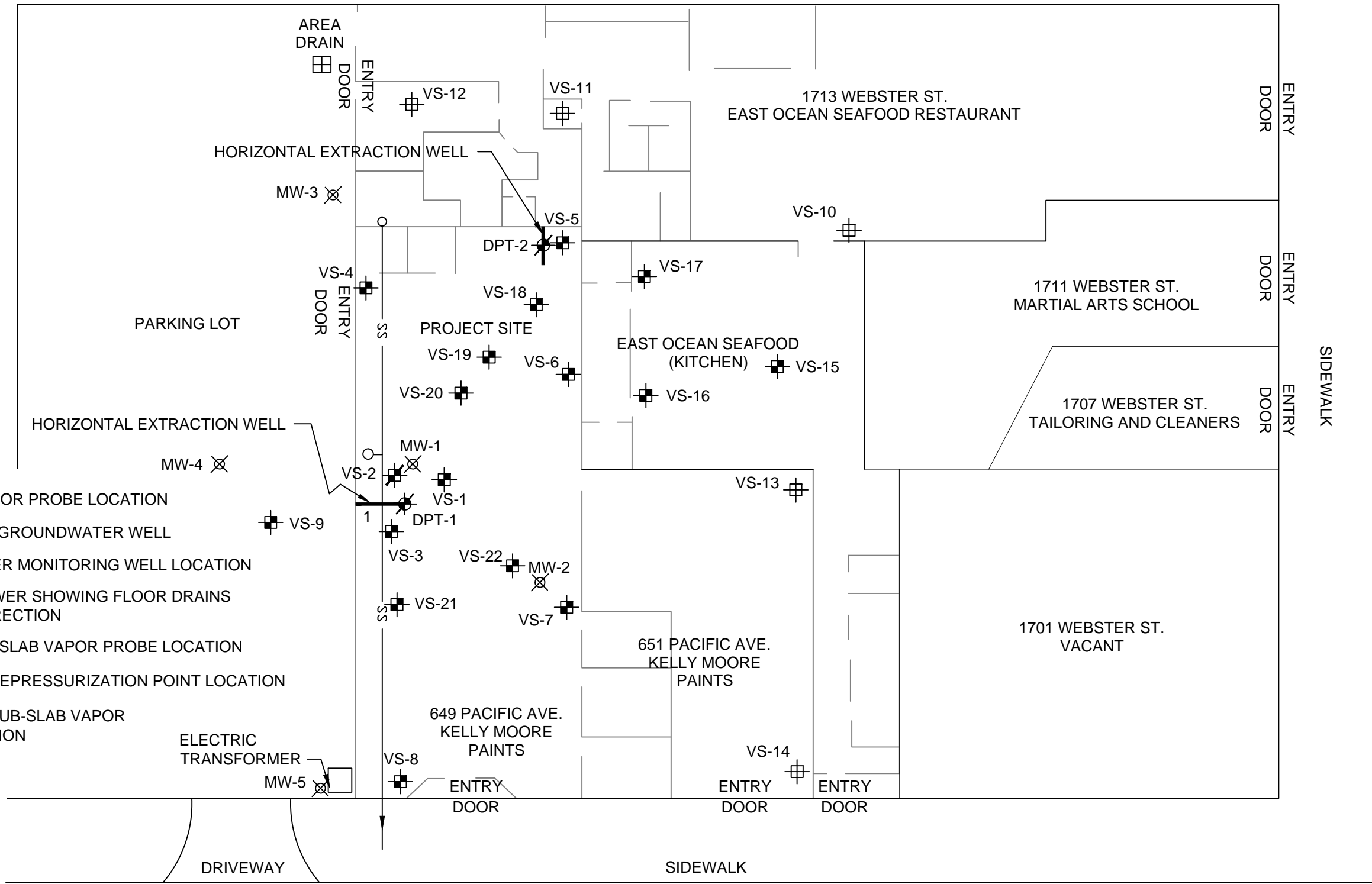
Searway Property  
649 Pacific Avenue  
Alameda, California

PROJECT:  
103.001.001

FIGURE:  
1



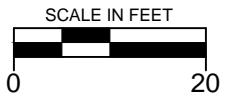
COURTYARD AND ASSISTED LIVING



- LEGEND**
- VS-1 [Symbol] SUB-SLAB VAPOR PROBE LOCATION
  - MW-6 [Symbol] VICINITY SITE GROUNDWATER WELL
  - MW-1 [Symbol] GROUNDWATER MONITORING WELL LOCATION
  - ss— [Symbol] SANITARY SEWER SHOWING FLOOR DRAINS AND FLOW DIRECTION
  - [Symbol] PHASE III SUB-SLAB VAPOR PROBE LOCATION
  - DPT-1 [Symbol] DESTROYED DEPRESSURIZATION POINT LOCATION
  - VS-2 [Symbol] DESTROYED SUB-SLAB VAPOR PROBE LOCATION

WEBSTER STREET

PACIFIC AVENUE



REF. 103\_002\103.001.001 fig2.DWG  
BASEMAP FROM RRM, INC.

PREPARED BY

**TRINITY**  
source group, inc.  
Environmental Consultants

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**SITE LAYOUT**  
Searway Property  
649 Pacific Avenue  
Alameda, California

PROJECT:  
103.001.001  
FIGURE:  
2