APPENDIX C
Hazardous Materials Documentation

DRAFT REMOVAL ACTION WORKPLAN
SOIL AND SOIL GAS REMEDIATION
VACANT COMMERCIAL PROPERTY WITH FORMER ADDRESSES OF 13872, 13875 AND 13972 N. TUSTIN AVENUE
SANTA ANA, CALIFORNIA
ENVIROSTOR ID 60001948 – SITE CODE 401659

9 December 2015

Prepared for: Hall Family Trust
Santa Ana, California

Prepared by: STECHMANN GEOSCIENCE, INC.
Joshua Tree, California

Stechmann Geoscience, Inc. (SGI) prepared this Removal Action Workplan (RAW) in conformance with the contract between the Hall Family Trust ("the Client") and SGI for property located on the northeast corner of the intersection of 17th Street and Tustin Avenue in Santa Ana, Orange County, California (the "Site").

This RAW has been prepared for the exclusive use of the Client, its representatives, contractors, legal counsel, and authorized agents as it pertains to the Site. The contents of this document may not be used or relied upon by any other party, other than the aforementioned entities, without the express written consent of SGI.

SGI objectively conducted previous site investigations needed to prepare this RAW using that degree of care and skill ordinarily exercised under similar circumstances by professional environmental consultants practicing in this or similar localities. No other warranty, either expressed or implied, is made as to the professional opinions presented in this document.

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EXECUTIVE SUMMARY

Stechmann Geoscience, Inc. (SGI) was retained by the Hall Family Trust that owns a vacant commercial property located on the northeast corner of the intersection of 17th Street and Tustin Avenue in the Santa Ana area of Orange County, California (the "Site"). The Site has a long commercial history from the 1960s until 1997. An ARCO gas station, a dry cleaner, and various other commercial businesses were both previously located on the Site and both the gas station and dry cleaner had documented releases and were investigated and closed under regulatory supervision by the Orange County Health Care Agency (OCHCA).

The ARCO gas station had a gasoline release to soil that was remediated by excavating a large area under the former tanks to a reported depth of 30 feet below ground surface (bgs). The OCHCA issued closure for this case in 1991.

The dry cleaner had a release of tetrachloroethylene (PCE) that was discovered in 1997 during due diligence activities by a former prospective tenant (Rite-Aid). Lower concentrations of trichloroethylene (TCE) were also detected. PCE was detected in all soil samples tested to a depth of 80 feet bgs. Elevated PCE concentrations were also detected in numerous soil gas samples. The OCHCA issued closure for this case in 1997.

SGI completed a Phase II Environmental Site Assessment in August 2013 and a Supplemental Site Investigation in August 2014 and found elevated PCE concentrations in soil gas and groundwater samples collected across the Site. PCE was also detected in soil matrix samples, but in much lower concentrations and below action levels for commercial sites. No gasoline constituents were detected in any of the samples analyzed. Soil on the Site is mostly coarse-grained with some interbedded fine-grained layers. First groundwater beneath the Site was originally encountered around 120 feet bgs, but groundwater levels have dropped almost 30 feet since 2013, most likely due to drought. Groundwater flow appears to be towards the center of the Site near well MW-1. Regional groundwater flow is reportedly to the south.

The PCE concentrations in shallow soil gas samples from depths of 5 and 15 feet exceeded calculated risk-based cleanup levels called California Human Health Screening Levels (CHHSLs) for commercial land use by considerable margins. The maximum PCE soil gas concentration detected at 5 feet below ground surface was 247 milligrams per liter (µg/l) compared to the PCE commercial CHHSL recommended value of 0.603 µg/l.

Current redevelopment plans for the Site include two restaurants on the south side (In-N-Out Burger and Chick-A-fil) and possibly a health club on the north side. The actual tenants that may lease the redeveloped site could change. Previous plans included a bank instead of Chick-A-fil and an apartment building on the north end of the Site. The property owner entered into a voluntary cost recovery agreement with the California Department of Toxic Substances Control (DTSC) in November 2013 to provide regulatory oversight on this project.

The goals of this Removal Action Workplan (RAW) are:

- Minimize or eliminate potential human exposure to PCE and TCE in soil and soil gas on the Site.

- Reduce the human health-based risks associated with PCE and TCE contamination to a level that is acceptable for the proposed commercial land use.

- Ready the Site for commercial redevelopment within 6 months.

As discussed with DTSC, additional characterization of the soil vapor plume will be completed. Three additional nested shallow soil vapor probes will be installed and tested. Further groundwater monitoring will be conducted to evaluate the suitability of monitored natural attenuation for the Site.

The following removal action alternatives were evaluated under this Removal Action Workplan: 1) No further action, 2) Containment / Capping in place, and 3) Soil vapor extraction. No further action and containment were ruled out because the contaminants would still remain. Soil vapor extraction was chosen as the selected remedy because it is a proven technology for sites with coarse-grained soil, easy to implement, and should be able to sufficiently remove chlorinated solvent concentrations in subsurface soil to meet risk-based cleanup goals.

1.0 INTRODUCTION

Stechmann Geoscience, Inc. (SGI) was retained by The Hall Family Trust to provide environmental consulting services for property it owns located on the northeast corner of the intersection of 17th Street and Tustin Avenue in Santa Ana, California (the "Site", see Figure 1). The Site had a long commercial history with former addresses 13872, 13875, and 13892 N. Tustin Avenue. SGI was originally retained in June 2012 to perform environmental due diligence of the Site for In-N-Out Burger, a prospective tenant.

The objective of this removal action workplan (RAW) is to complete necessary assessment and remediation to allow for planned commercial redevelopment of the Site and adjacent parcel to the north. Two restaurants, In-N-Out Burger and Chick-fil-A, are proposed to be constructed on the Site. In addition, a health club is proposed for vacant land north of the Site. The RAW will be conducted under regulatory supervision provided by the California Department of Toxic Substances Control – Cypress office (DTSC).

This RAW was prepared to address soil vapor contaminated with volatile organic compounds (VOCs), specifically tetrachloroethene (PCE) and to a lesser extent trichloroethene (TCE) believed to originate from a former dry cleaner. The objective of the RAW is to evaluate removal action alternatives that will address residual VOC concentrations in soil at the Site and establish the recommended removal alternative.

This RAW also presents previous site assessment data, describes existing site conditions, establishes appropriate removal action objectives (RAOs) for the chemicals of concern (COCs) to protect human health and the environment, and evaluates removal actions that may be effective at the Site. The RAOs presented in this RAW will be the main criteria used for selecting the recommended removal action.

1.1 Removal Action Process

The RAW process, including regulatory background and the RAW objectives, is described in the following sections.

1.1.1 Regulatory Basis for the RAW

A RAW is one of two remedy selection documents that may be prepared for a hazardous substance release site pursuant to California Health and Safety Code (HSC) Section 25356.1, and is appropriate for remedial actions that are projected to cost less than $2,000,000.

California HSC 25323.1 defines a RAW as "a workplan prepared or approved by the Department (DTSC) or a California Regional Water Quality Control Board (RWQCB) which is developed to carry out a removal action, in an effective manner, that is protective of the public health and safety and the environment."

1.1.2 Objectives of the RAW

The objectives of this RAW are to:

- Present and evaluate existing Site conditions;
- Establish appropriate removal action objectives (RAOs) for protection of human health and the environment.
- Evaluate alternatives and identify a final recommendation for a removal action of soil and soil gas at the Site that is protective of human health and the environment.
- Present an implementation strategy for the recommended removal action.

1.1.3 Elements of the RAW

To accomplish the objectives stated in the preceding section, and satisfy regulatory requirements, this RAW includes the following elements:

- A description of the nature and extent of the Chemicals of Concern (COCs) at the Site;
- The goals to be achieved by the removal action;
- An analysis of the alternatives considered and rejected, and the basis for the rejection, including a discussion of effectiveness, implementability, and cost of each alternative;
- A description of the recommended alternative and an implementation plan; and
- Implementation plan for the recommended removal action.

1.2 Site Description and Land Use

The roughly rectangular 4.1-acre Site is a vacant graded earthen lot surrounded by perimeter chain-link fencing with privacy screening (see Figure 2). The Site is bounded by 17th Street on the south, Tustin Avenue on the west, Ponderosa Street on the east, and vacant land (also owned by the Hall Family Trust) to the north. Access to the property is from a double gate off Ponderosa Street. The Site is located in an unincorporated area of Orange County and includes the following Assessor Parcel Numbers (APNs): 396-312-04, 396-312-05, 396-312-07, 396-312-08, and 396-312-09.

The Site is at an elevation of 175 above mean sea level and the ground surface is flat. Regional topography slopes gently towards the south-southeast. There are no nearby water bodies, sensitive habitat, or known cultural resources. The Site is located primarily in a commercial area with retail businesses located to the north, south, east, and west. Several apartment buildings are located within ¼ mile to the north and northeast.

1.2.1 Historic Uses

The Site was previously used for commercial purposes from around 1959 to 1997. All the former buildings were demolished. Former addresses included 13872, 13875, and 13972 N. Tustin Avenue. Past tenants included a dry cleaner, gas station, hardware store, real estate office, and other retail businesses. From 1997 to present, Rite-Aid leased the Site with the intention of constructing a drug store. Construction activities were started twice, but were never completed.

Historically from around 1959 to 1997, a dry cleaner was located at 13875 N. Tustin Avenue in the vicinity of the proposed In-N-Out Burger restaurant. Also from 1955 to 1988, an ARCO gas station was located on the corner at 13972 N. Tustin Avenue (proposed Chase Bank location). Known chemical releases occurred from both of these businesses; however, after environmental work was done by others closure letters were issued by the then lead regulatory agency, Orange County Health Care Agency (OCHCA).

In 1989, a gasoline release to soil was discovered at the former ARCO station. The impacted soil was reportedly excavated and hauled offsite. Because gasoline vapors were reportedly still emanating from the excavation, further work including a geotechnical boring and soil vapor survey were completed. Gasoline constituents were found in both soil matrix and soil vapor samples. The OCHA issued closure for this property in 1991 without requiring groundwater testing.

The dry cleaner was investigated in 1997 by a consultant retained by Rite-Aid. Both soil vapor and soil matrix samples were collected. Detectable concentrations of tetrachloroethene (PCE), a common dry cleaning solvent, were found in both soil vapor and soil matrix samples. The OCHCA issued closure for this property in 1998.

1.3 Site Owner and Project Contact Information

The property has been owned for over 40 years by the Hall family. Current ownership is by John C. Hall and Cindalee P. Hall, Trustees of the Hall Family Trust dated 10 January 2002. The following individuals are involved with this project:

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2.0 SITE CHARACTERIZATION

The Site was characterized in 1989, 1997, 2013, and 2014. A summary of activities and results are discussed in the sections below.

2.1 Previous Reports

SGI identified the following reports prepared for the Site. A brief summary of each is included.

2.1.1 Brown & Caldwell

ARCO Station #1292 was assigned OCHCA Case 88UT91. Brown & Caldwell completed a Phase II ESA of the Site in August 1988, which consisted of six borings drilled to depths of 20 and 40 feet bgs to determine the lateral and vertical extent of gasoline-impacted soil. In March 1989, a large excavation was completed under the former USTs to a depth of 30 feet, and 425 tons of impacted soil were removed and disposed offsite. Prior to backfilling the excavation, gasoline vapors were noted in the bottom of the excavation even though confirmation soil matrix samples did not exhibit detectable concentrations.

In May 1989, a geotechnical boring was drilled on the former ARCO parcel and gasoline odors were noted near the northern property line. Soil samples from depths of 5, 13, and 18 feet were analyzed for total recoverable petroleum hydrocarbons (using EPA Method 418.1) and found to contain 3,105 mg/kg, 1,105 mg/kg, and 345 mg/kg, respectively. Brown & Caldwell returned to the Site and completed some backhoe trenches to further evaluate gasoline odors. Six soil samples were collected and analyzed; no gasoline constituents were detected.

OCHCA issued closure to ARCO on 9 May 1991 after getting concurrence from the RWQCB.

2.1.2 Pacific Southwest Group

Pacific Southwest Group performed a Phase II ESA of the former dry cleaner property in November 1997 for Rite-Aid which was interested in building a drug store. The investigation consisted of 14 soil gas probes set to 6 feet bgs and completion of one soil boring to 80 feet bgs. The dry cleaner was previously demolished and its location was approximated by relative position to existing property lines. PCE, a probable human carcinogen and common dry cleaning solvent, was detected in both soil gas and soil matrix samples. The maximum soil gas concentration detected was 690 micrograms per liter (µg/l) or 690,000 micrograms per cubic meter (µg/m^3). PCE was detected in all 14 soil gas samples and TCE was found in 8 of the 14 samples.

The maximum PCE soil matrix concentration detected was 0.576 milligrams per kilogram (mg/kg) or 576 micrograms per kilogram (µg/kg) in the 60-foot sample. As listed in Table 1, PCE was detected in every soil matrix sample collected from 1 foot to 80 feet.

The log for the 80-foot boring indicated mostly sandy material with gravel and cobbles; however, two fine-grained layers were noted—a sandy clay from 40 to 50 feet bgs and a clayey sand from 60 to 70 feet bgs.

At that time, Pacific Southwest Group stated that the USEPA Preliminary Remediation Goal for PCE on commercial sites was 17,000 µg/kg and quoted a Soil Screening Level of 60 µg/kg, which many of the soil samples exceeded.

The OCHCA reviewed the Phase II ESA report and performed a human health risk assessment of the vapor and matrix concentrations detected using an in-house modeling program. Their calculated cancer risk was $3x10^{-9}$, which is lower than both the acceptable residential risk ($1x10^{-6}$) and commercial risk ($1x10^{-5}$). The OCHCA issued a closure letter for the former dry cleaner on the Site on 22 April 1998.

Mr. Kamron Saremi of the RWQCB was notified on 27 February 2006, most likely in regards to the planned Rite-Aid redevelopment. There was no indication of any further communication, or response from the RWQCB in the file.

2.1.3 Stechmann Geoscience, Inc.

SGI prepared a Phase I ESA (2013a) in accordance with both USEPA and ASTM standards for In-N-Out Burger in June 2013. SGI concluded there was a high likelihood of contamination from the former dry cleaning operations, especially since PCE-impacted soil was detected to 80 feet bgs in 1997. The PCE release was identified as a Recognized Environmental Condition (REC). SGI recommended further Phase II testing.

In August 2013, SGI completed a Phase II ESA consisting of 14 nested soil vapor probes and 2 soil borings to groundwater at the locations shown on Figure 3. Sampling emphasis was placed on the two proposed building footprints where two soil vapor probes and one soil boring to groundwater were drilled. The results of this environmental work were documented in SGI's Phase II ESA Report (2013b).

The soil vapor probes were set at depths of 5 and 15 feet bgs and were constructed and sampled in accordance with the latest CalEPA advisory (2012). The four soil vapor probes within the building footprints (SG-2, SG-3, SG-13, and SG-14) were continuously sampled. No soil matrix samples were collected for analysis.

Two soil borings (SGI-1 and SGI-2) were advanced using a hollow-stem auger drill rig. SGI-1 was completed in the proposed In-N-Out restaurant footprint to a depth of 140 feet bgs and SGI-2 in the proposed bank building footprint to a depth of 115 feet bgs (see Figure 3). The borings were sampled on 5-foot depth intervals. At selected depth intervals, soil matrix samples were collected

for laboratory analysis of volatile organic compounds (VOCs) using EPA Method 5035 sampling techniques. The collected samples were analyzed for VOCs and total petroleum hydrocarbons as gasoline (TPHg) using EPA Method 8260B.

Grab groundwater samples were collected from SGI-1 and SGI-2 using a disposable bailer and submitted for the same analyses of VOCs and TPHg.

Boring logs indicate shallow soil in the upper 15 feet across the Site is largely coarse-grained materials (sand and gravel). Mostly sand was logged in the two deep soil borings, but there are zones of finer grained materials (silts and clays). More fine-grained material was found in Boring SGI-2 near the southern part of the Site. Groundwater was found at approximately 130 feet bgs in Boring SGI-1 and approximately 115 feet bgs in SGI-2.

Thirty-two (32) soil vapor samples were analyzed, and PCE was the primary constituent detected (see Table 2). TCE was detected in 7 of the 32 soil vapor samples. The maximum PCE soil vapor concentration detected was 515 µg/l in SG-5 at 15 feet bgs. The highest PCE concentration detected at 5 feet bgs was 247 µg/l from probe SG-2 completed within the proposed In-N-Out restaurant footprint. The highest TCE soil vapor concentration detected was 3.81 µg/l from probe SG-9 at 5 feet bgs.

Fifteen (15) soil matrix samples were submitted for laboratory testing. Like the soil vapor samples, only PCE and some TCE were detected in the soil matrix samples (see Table 3). The maximum PCE concentration detected was 300 µg/kg from Boring SGI-1 completed in the proposed In-N-Out building footprint. The maximum TCE concentration detected was 6.5 µg/kg in the 60-foot sample from that same boring.

Sample results indicated that groundwater beneath the Site is impacted by PCE and to a lesser degree by TCE in the northern portion of the Site (see Table 3). The PCE concentration detected at the northern end of the Site was 530 µg/l; this decreased to 35.9 µg/l at the southern end. Both of these concentrations exceed the PCE Maximum Contaminant Level (MCL) of 5 µg/l. TCE was detected at 2.4 µg/l in the groundwater sample collected from boring SGI-1, which was less than the 5 µg/l MCL for that compound.

SGI concluded that a PCE release(s) occurred from the dry cleaner sometime during its operation on the Site. This release resulted in contamination of soil vapor, soil matrix, and groundwater on the Site that is still present in concentrations above regulatory guidelines and MCLs.

SGI also completed a Supplemental Site Investigation Report in August 2014. That investigation involved completion of 14 additional nested shallow soil vapor probes, three nested deep soil vapor probes, installation and sampling of four groundwater monitoring wells, and operation of an extended soil vapor extraction (SVE) pilot test on the Site and adjacent parcel to the north.

The nested shallow soil vapor probes were installed at depths of 5 and 15 feet bgs and sampled twice in March and July 2014. Results of the last sampling event are listed in Table 4. Only three

compounds were detected PCE, TCE, and cis-1,2-dichloroethene in concentrations ranging from not detected (less than 0.01 µg/l) to 544 µg/l. The VOC concentrations in the shallow vapor probes decreased substantially from the March to July sampling due to operation of the SVE system during the pilot test.

Three nested deep soil vapor probes were installed to a depth of 125 feet bgs. Soil vapor probes were installed every 10 feet starting at 5 feet bgs. These probes were also sampled in March and July 2014. Only PCE and TCE were detected during the last sampling (see Table 5). PCE was detected in every sample analyzed in concentrations ranging from 18.3 µg/l to 1,380 µg/l. TCE was only detected in 4 of 40 samples analyzed in concentrations ranging from 0.443 µg/l to 2.02 µg/l.

Additional soil matrix samples were collected and analyzed from several borings on the Site (see Table 6). PCE and TCE were the dominant VOCs detected. Minor concentrations of several chlorinated solvent degradation products were detected in probe VP-15. Gasoline degradation compounds were found at depth in the MW-3 boring near the former ARCO gas station. The maximum PCE concentration detected was 1,080 µg/kg at 15 feet in probe VP-15. This sample also contained the maximum TCE concentration detected at 30.4 µg/kg.

Four quarters of groundwater monitoring were completed on the four monitoring wells on the Site (MW-1 through MW-4). Only three VOCs were detected in the 14 groundwater samples collected from the wells – PCE, TCE, and trace amounts of dichlorodifluoromethane (DCDFM) in three wells during the first sampling event in April 2014 (see Table 7). The maximum PCE concentration detected was 354 µg/l from well MW-1 completed closest to the suspected release area. TCE was only detected in one well during one sample event at a concentration of 1.5 µg/l. The maximum DCDFM concentration detected was 1.7 µg/l.

Groundwater levels at the Site dropped 6 to 14 feet over the one year monitoring period. Well MW-1 was dry and unable to be sampled during the October 2014 and February 2015 events.

2.1.4 Geology and Hydrogeology

The Site is located in the Tustin Plain of the coastal plain of Orange County, which is part of the larger Los Angeles Coastal Plain in the Transverse Ranges geomorphic province of southern California (Norris & Webb, 1976). The coastal plain is characterized by a deep structural depression containing a vast accumulation of sediments, in places many thousands of feet thick. The Tustin Plain is a large alluvial fan formed by Santiago Creek.

The Site is located in the Orange County Groundwater Basin that is regulated by the Orange County Water District. The basin contains three aquifer systems referred to as Shallow, Principal, and Deep. The Talbert Aquifer is the main water-bearing unit in the Shallow system (California DWR, 1975).

Based on SGI's site assessments, Site soils were found to be predominantly fine- to medium-grained sand with some gravel layers. Several finer-grained layers were identified interbedded

between the sand and gravel layers across the Site. A competent clay layer beginning at depths from 142 to 157 feet bgs and is believed to be laterally continuous across the Site. First groundwater on the Site was generally found above this clay layer at depths ranging from around 136 to 160 feet bgs.

Groundwater flow appears to converge in the northern portion of the Site near MW-1. North of this well, groundwater flow is to the south. Groundwater flows north south of well MW-1. Regional groundwater flow in measured aquifers used for drinking water is to the south following regional topography.

2.2 Nature and Extent of Contaminants

Based on testing by SGI and others, the primary contaminant at the Site is PCE. A secondary contaminant is TCE, which could result from one of two sources: 1) a degradation product of PCE, or 2) being a trace amount in the PCE dry cleaning solvent (most non-reagent grade PCE solvents can contain up to 5% TCE). Both PCE and TCE were detected in soil vapor, soil matrix, and groundwater samples collected from the Site. There is no continuing contamination source on the Site as the dry cleaner ceased operation over 16 years ago.

2.2.1 Extent and Volume of Contamination

Site assessment data indicated that elevated concentrations of PCE are primarily present in soil vapor and groundwater. Much lower concentrations were detected in soil matrix samples, likely due to the behavior of PCE in coarse-grained soil. Results of the last sampling of the shallow nested vapor probes in July 2014 are depicted on Figures 3 and 4. The maximum PCE concentration at 5 feet bgs was found within the proposed In-N-Out building footprint (52.9 µg/l) in probe VP-15 (see Figure 3). The maximum PCE concentration at 15 feet bgs was 544 µg/l found in probe VP-15 (see Figure 4).

SGI believes the release(s) from the former dry cleaner emanated somewhere near the middle of the Site by well MW-1 and probe DNP-2. Historical aerial photographs confirm this was near the rear of the dry cleaner building.

2.2.2 Health Effects of Contaminants

Both PCE and TCE are believed by the USEPA to be human carcinogens causing leukemia and cancer of the skin, colon, lung, larynx, bladder, and urogenital tract. Short-term exposure to high levels of these chemicals can affect the central nervous system and cause unconsciousness and death. Long-term exposure may also damage the central nervous system, liver, and kidneys; it can also cause respiratory failure, memory loss, confusion, and dry and cracked skin. Long-term exposure by pregnant women may damage a developing fetus (National Library of Medicine, 2013).

The primary exposure pathway on the Site is believed to be inhalation. Secondary pathways are dermal contact and ingestion of impacted soil, which might be an issue during redevelopment construction activities or subsequent excavation for pipe repair or landscape planting.

2.2.3 Targets Potentially Affected by the Site

Primary targets potentially affected would be workers and customers of the proposed businesses on the Site. The soil vapor concentrations may not negatively impact adjacent commercial developments or apartment buildings surrounding the Site. Shallow groundwater in the area is not currently used as a drinking water source.

3.0 ADDITIONAL SITE INVESTIGATION

Three additional nested vapor probes will be installed to further assess the extent of PCE impacts in soil vapor. This scope of work was decided upon following DTSC's review of the Supplement Site Investigation Report (SGI, 2014) and subsequent discussions between DTSC and SGI.

The nested vapor probes, set at 5 and 15 feet bgs, will be constructed and sampled in the same manner as the other 27 soil vapor probes previously completed on the Site and the adjacent parcel to the north. Two of these probes will be completed on Hall Trust property. The third will be installed in the public right-of-way on Ponderosa Street in front of an apartment building across Ponderosa Street. The new soil vapor probe locations are depicted on Figure 5.

After installation, the new soil vapor probes will be sampled by a state-certified mobile laboratory for VOCs using EPA Method 8260B in accordance with the latest Cal-EPA soil gas advisory.

All work will be completed by an SGI Professional Geologist under appropriate OCHCA permit and DTSC approval.

4.0 REMOVAL ACTION GOALS AND OBJECTIVES

Site characterization has revealed the presence of chemicals of potential concern primarily in soil gas at the Site. These chemicals are primarily on the northern portion near the former dry cleaner. Removal Action Objectives (RAOs) were developed based upon the current environmental conditions and reasonably anticipated future uses of the Site.

Based on the RAOs, removal action goals were developed that establish specific concentrations of chemicals in soil and soil vapor that are protective of both human health and the environment. Specific removal action goals were developed for the Site from information obtained during previous investigations and risk management decisions based upon the current and proposed future use of the Site and proximity to sensitive receptors. Information used to develop these removal action goals included laboratory analytical results, hydrogeologic data, and site-specific risk evaluation, as applicable.

In addition, a review of pertinent laws, regulations, and other criteria was performed to identify applicable or relevant and appropriate requirements (ARARs) and to be considered (TBC) criteria for remediating the site. A summary of the potentially applicable ARARs and TBCs is discussed in Section 4.2.

Discussions of regulatory requirements, an assessment of human health risks, and removal action goals developed for the Site are presented below.

4.1 Removal Action Objectives

RAOs have been established that are protective of human health and the environment and reduce the potential for exposure to the COCs in soil and soil gas encountered at the Site. These RAOs are presented below.

- Minimize or eliminate potential human exposure to PCE and TCE in soil and soil gas on the Site.

- Reduce human health-based risks associated with PCE and TCE contamination to a level that is acceptable for the proposed land use.

- Provide for a Site that can be redeveloped for commercial use within a reasonal time frame.

4.2 Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs are federal and state environmental statutes, regulations, and standards that specifically address a hazardous substance, pollutant, contaminant, removal action, or location specific conditions. State requirements are ARARs only if they are more stringent than federal requirements.

In addition to ARARs, this analysis includes an evaluation of other things to be considered (TBCs). TBCs are advisories, criteria, or guidance that may be considered for a particular action or specific issue, as appropriate. TBCs are not ARARs because they are neither promulgated nor enforceable.

The ARARs or TBCs may be: 1) chemical, 2) location, or 3) activity specific. Chemical-specific ARARs or TBCs are usually health- or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in, or discharged to, the environment. Location-specific ARARs or TBCs restrict actions or contaminant concentrations in certain environmentally sensitive areas. Examples of areas regulated under various federal laws include locations where endangered species or historically significant resources are present.

Action-specific ARARs or TBCs are usually technology- or activity-based requirements or limitations on actions or conditions involving specific chemicals of concern. See Table 8 for a listing of ARARs and TBCs for the Site.

4.3 Preliminary Cleanup Goals

SGI proposes use of the USEPA Region IX Regional Screening Levels (RSLs) for soil matrix and indoor air and risk-based calculations for soil vapor in the absence of any other established cleanup goals for the Site. According to the last update (January 2015), the following RSL values for PCE and TCE as modified by DTSC HERO Note 3 are:

Chemical Compound	Residential RSL		Commercial/Industrial RSL	
	Soil (mg/kg)	Indoor Air (µg/m^3)	Soil (mg/kg)	Indoor Air (µg/m^3)
PCE	0.6	0.48	2.7	2.08
TCE	0.94	0.48	6	3

All soil matrix samples collected previously at the Site are below both the residential and commercial RSLs. There are currently no structures, so indoor air sampling is not relevant at this time.

SGI retained Dr. Jill Ryer-Powder, a board-certified toxicologist (Diplomate of the American Board of Toxicology) to calculate risk-based cleanup goals for the Site. These calculations were performed in accordance with applicable guidelines and methods approved by the USEPA, DTSC, and Office of Environmental Health Hazard Assessment. The calculated cleanup goals for PCE and TCE soil gas in shallow soil by depth interval are presented below.

Sample Depth (ft)	Risk-based Soil Vapor Cleanup Goals (µg/m^3) for PCE and TCE			
	PCE Commerical	TCE Commercial	PCE Residential	TCE Residential
5	4,000	3,700	465	430
15	9,500	8,000	1,100	900
25	15,000	12,000	1,670	1,400
35	20,000	16,000	2,275	1,900
45	25,000	20,000	2,880	2,300
55	31,000	25,000	3,470	2,800
65	37,000	28,000	4,082	3,300
75	42,500	33,000	4,692	3,800
85	48,000	38,000	5,271	4,300
95	52,500	42,000	5,860	4,800
105	58,000	46,000	6,510	5,300
115	65,000	49,000	7,100	5,600
125	67,000	53,000	7,657	6,000
135	73,000	58,000	8,322	6,500
145	78,000	63,000	8,950	7,000

5.0 ALTERNATIVE EVALUATION

The purpose of this Section of the RAW is to identify and screen possible removal action alternatives that may best achieve the RAOs discussed in Section 4.0. The removal action alternatives were screened and evaluated on the basis of their effectiveness, implementability, and cost.

5.1 Identification and Analysis of Removal Action Alternatives

The response actions to address PCE and TCE in soil and soil gas include: no further action, containment/capping in place, excavation and offsite disposal, institutional controls, and soil vapor extraction. These response actions have been assembled into candidate removal alternatives for the Site. Screening of several technology types using the above criteria was conducted to select removal actions for further evaluation. Based on this screening, the three removal actions identified and developed are:

- Alternative 1 – No further action
- Alternative 2 – Containment/capping-in-place
- Alternative 3 – Soil vapor extraction

Excavation and offsite disposal was eliminated because the chlorinated solvent impacts at the Site reside in soil vapor and extend to considerable depth. As a result, this removal action method was deemed ineffective and impractical. Institutional controls alone will not be a viable option because they would do nothing to mitigate the residual chlorinated solvent impact. However, institutional controls may be a part of the alternative if any contaminants in concentrations above the cleanup goals would be left in place under the selected alternative.

5.1.1 Alternative 1 – No Further Action

The No Further Action (NFA) alternative has been included to provide a baseline for comparisons among other removal alternatives. The NFA alternative would not require implementing any measures at the Site, and no costs would be incurred. This action includes no institutional controls, no treatment of soil, and no monitoring.

5.1.2 Alternative 2 – Soil Containment/Capping-in-Place

This alternative would consist of capping the surface of the impacted areas with concrete building slabs and asphalt parking areas. An engineered passive vapor barrier would be installed under any occupied structures built on the Site. The cap would be used to minimize the potential contact with Site contaminants. To achieve the RAOs, it has been determined that soil over 95 percent of the Site will be capped. The only uncapped areas will be landscaped areas. A land use restriction will be executed between DTSC and the property owner and recorded to ensure that the cap is operated and maintained and that future uses of the property are consistent with the operation and maintenance of the cap. An operation and maintenance (O&M) plan would be required as part of this alternative. An O&M agreement would have to be signed with DTSC specifying the operation and maintenance requirements and providing financial assurance for future operation and maintenance of the cap.

5.1.3 Alternative 3 – Soil Vapor Extraction

The soil vapor extraction (SVE) alternative would consist of installation of a nested SVE well and connecting an electric blower to extract soil gas from the subsurface. The extracted soil gas would be passed through two granular activated carbon (GAC) vessels to remove any VOCs prior to discharge to the atmosphere. To achieve the RAOs, a series of SVE extraction wells will be installed across the Site (see Figure 6).

If operation of the SVE system does not achieve the cleanup goals listed in Section 4.3 for the specific land use, a land use covenant and other engineering controls will be required.

5.2 Evaluation Criteria

Each removal action alternative was independently analyzed without consideration to the other alternatives. Each of the removal action alternatives is screened based on effectiveness, implementability, and cost.

5.2.1 Effectiveness

In the effectiveness evaluation, the following factors are considered:

- *Overall Protection of Human Health and the Environment* – This criterion evaluates whether the removal alternative provides adequate protection to human health and the environment and is able to meet the Site's RAOs.

- *Compliance with ARARs/TBCs* – This criterion evaluates the ability of the removal alternative to comply with ARARs and TBCs.

- *Short-Term Effectiveness* – This criterion evaluates the effects of the removal alternative during the construction and implementation phase until removal objectives are met. It accounts for the protection of workers and the community during removal activities and environmental impacts from implementing the removal action.

- *Long-Term Effectiveness and Permanence* – This criterion addresses issues related to the management of residual risk remaining on site after a removal action has been performed and has met it objectives. The primary focus is on the controls that may be required to manage risk posed by treatment residuals and/or untreated wastes.

- *Reduction of Toxicity, Mobility, or Volume* – This criterion evaluates whether the removal technology employed results in significant reduction in toxicity, mobility, or volume of the hazardous substances.

5.2.2 Implementability

This criterion evaluates the technical and administrative feasibility of implementing the alternative, as well as the availability of the necessary equipment and services. This includes the ability to design and perform a removal alternative, ability to obtain services and equipment, ability to monitor the performance and effectiveness of technologies, and the ability to obtain necessary permits and approvals from agencies, and acceptance by the State and the community.

5.2.3 Cost

This criterion assesses the relative cost of each technology based on estimated fixed capital for construction or initial implementation and ongoing operational and maintenance costs. The actual

costs will depend on true labor and material cost, competitive market conditions, final project scope, and the implementation schedule.

5.3 Analysis of Removal Action Alternatives

Each alternative is discussed in the following sections.

5.3.1 Alternative 1 – No Further Action (NFA)

The NFA alternative would not require implementing any measures at the Site, and no costs would be incurred. Under the NFA alternative, impacts from residual concentrations of PCE and TCE in soil gas would not be addressed and there would be no reduction in the potential risks. This alternative, therefore, does not meet the effectiveness criterion and the planned redevelopment could not be done safely.

5.3.2 Alternative 2 – Soil Containment/Capping-in-Place

Effectiveness

The containment/capping-in-place alternative would involve little to no disturbance of the impacted soil; therefore, there would be very little exposure to the COCs and short-term risks would be low. The installation of a surface cap would require long-term inspection and maintenance to meet ARARs and provide long-term effectiveness.

Periodic inspections would be required for settlement, cracking, ponding of liquids, erosion, and naturally occurring invasion by deep-rooted vegetation. Additionally, precautions would have to be taken to ensure that the integrity of the cap is not compromised by land use activities.

Containment through surface capping would not lessen toxicity or volume of the COC, but would limit mobility, specifically the prevention of surface water infiltration and thus, the potential downward migration of contaminants.

Implementability

Containment is a relatively simple technology that is easily implemented and can be quickly installed. As PCE and TCE would remain on site, obtaining permits and regulatory approval could be more involved. In addition, community acceptance for this alternative may be more difficult since the contaminants would remain on site.

Cost

Containment technologies typically involve low to moderate costs. Industry costs are approximately $5-10 per square foot for a passive engineered vapor barrier (depending on building size) and $3-6 per square foot for a 4-inch thick asphalt parking lot.

5.3.3 Alternative 3 – Soil Vapor Extraction (SVE)

Effectiveness

Potential short-term risks to on-site workers, public health, and the environment could result from dust or particulates that may be generated during well drilling activities. These risks could be mitigated using personal protective equipment for on-site workers and engineering controls, such as dust suppression for protection of the surrounding community and to meet all ARARs. SVE should remove the majority of PCE and TCE from the Site, and therefore, eliminates long-term risks and accomplishes the RAOs.

Implementability

SVE is a well-proven, readily implementable technology that is a common method for cleaning up sites with coarse-grained soil impacted by VOCs. It is a relatively simple process, with proven results. Equipment and labor required to implement this alternative are uncomplicated and readily available. It is anticipated that regulatory approval would be granted since it is a proven and permanent technology. Acceptance by the State and the community for this alternative is considered high.

Cost

The estimated cost for installation and 6-month operation of an SVE system is approximately $180,000. This estimate includes permitting, equipment rental, and GAC disposal at an approved off-site disposal facility.

5.4 Comparative Analysis of Removal Action Alternatives

A comparative analysis was conducted to identify the advantages and disadvantages of each removal alternative. The comparative analysis of the removal alternatives was conducted to address the criteria listed in Section 5.2.

5.4.1 Effectiveness

Under the NFA alternative, the impacts associated with the site-specific COC would not be addressed. Consequently, there would be no reduction in the potential risks and the RAOs would not be achieved. The no further action and containment/capping-in-place alternatives do not involve activities that would disturb the impacted soil. Therefore, there would be no short-term risks to on-site workers or the community as a result of implementing these alternatives. The SVE alternative would have only slightly higher short-term exposure risks. However, it is expected that these risks can be sufficiently mitigated through site control measures.

The containment/capping-in-place and SVE alternatives reduce or eliminate, respectively, potential exposure to COCs, and therefore, accomplish the RAOs. Once implemented, the containment/capping-in-place alternative would require long-term monitoring to ensure its effectiveness. In addition, future changes in land use could disturb the soil. The SVE alternative would remove the COC from the site, and would not require any further management or site controls once the COC has been completely removed.

Based upon this evaluation, the SVE alternative is favored under this criterion.

5.4.2 Implementability

No measures would be implemented for the no further action alternative. The containment/capping-in-place and SVE alternatives are both well-proven, readily implementable technologies. However, SVE will require less coordination or integration with future development, e.g. building construction or parking lot pavement.. Accordingly, the SVE alternative is favored by this criterion.

5.4.3 Cost Effectiveness

A summary of estimated costs to implement the proposed alternatives is presented in the table below. Costs are based on containment/capping-in-place of 2.3 acres of the site or operation of an SVE system for 6 months. Cost of the asphalt pavement in Alternative 2 was not included in the RAO calculation because this was part of the planned redevelopment of the Site, with additional requirement as a cap.

ESTIMATED COSTS FOR REMOVAL ALTERNATIVES

SUMMARY OF ESTIMATED COSTS			
Costs	**Removal Action Alternative**		
	Alternative 1 No Further Action	**Alternative 2 Containment / Cap in Place**	**Alternative 3 Soil Vapor Extraction**
Direct Capital Costs			
Equipment Costs	$0	$12,000	$61,000
Material Costs	$0	$30,000	$47,000
Disposal &Transport Costs	$0	$0	$19,000
Indirect Capital Costs			
Engineering and Design Expenses	$0	$7,500	$50,500
License and Permit Costs	$0	$1,000	$2,500
Annual Post Removal Action Site Control Costs			
Operational Costs	$0	$0	$0
Maintenance Costs	$0	$1,000	$0
Auxiliary Materials	$0	$0	$0
Total	**$0**	**$51,500**	**$180,000**

5.5 Recommended Removal Action Alternative

Based on the comparative analysis described in Section 5.4, the SVE alternative is the preferred and recommended removal action alternative for addressing the soil and soil gas contaminants at the Site. This alternative was selected for the following reasons:

1. PCE and TCE in soil and soil gas can be safely and permanently removed from the Site.
2. This option removes the health risk to future workers and customers for the future development on the Site.
3. The property owner and tenants do not wish for the contaminants to remain on the Site.

6.0 REMOVAL ACTION IMPLEMENTATION

Implementation of the removal action consists of a series of separate tasks. Each task and the activities of which they consist are discussed in the following sections discuss each task and the activities of which they consist: set-up and permitting (Section 6.1); SVE well installation (Section 6.2); SVE system operation (Section 6.3); confirmation sampling (Section 6.4); SVE decommissioning (Section 6.5); and field variances (Section 6.6).

6.1 Set-Up and Permitting

A temporary electrical power pole was already permitted and installed on the Site for use during the SVE pilot test. Bids will be obtained from SVE contractors for equipment that has a valid various locations permit issued by the South Coast Air Quality Management District (SCAQMD). Work discussed in this section will be completed after the final RAW is approved. Underground service alert will be contacted as required by law at least 48 hours prior to any drilling or excavation work.

6.2 SVE Well Installation

Ten additional SVE wells (SVE-3 through SVE-12, as shown on Figure 6) are proposed to be installed on the Site under OCHCA permit. The wells will be constructed using 2-inch PVC Sch 40 pipe and 0.020-inch slotted screen. Monterey sand (#3) will be used as the filter pack. The new wells will be screened from 5 to 30 feet bgs. The wells will be connected to the SVE unit using 2-inch PVC piping. Appropriate valves and monitoring ports will be installed at each well head.

6.3 SVE System Operation

The SVE system will be operated in accordance with the manufacturer's recommendations. A 500 cubic foot per minute (cfm) or larger system will be adequate for the proposed SVE extraction network. Two 1,000-pound or larger GAC vessels will be used to treat soil vapor extracted from the subsurface prior to release into the atmosphere. All the 13 SVE wells will be run simultaneously as possible. Vacuum measurements will be made and the system optimized after SVE operations begin. A radius of influence of about 100 feet was estimated based on the SVE pilot test data.

SVE discharge monitoring is part of the SCAQMD various locations permit requirements and will be sampled in accordance with the permit issued for the SVE system. Periodic vapor monitoring will be done to determine the effectiveness of the SVE system. Samples will be collected and analyzed for the permit parameters and for both PCE and TCE using EPA Method 8260B or TO-15.

6.4 Confirmation Sampling

A minimum of 2 weeks after the conclusion of the SVE system operation, soil vapor samples will be collected from selected vapor probes to measure any "rebound" of VOC concentrations. No additional soil matrix sampling is necessary since previous sampling indicated that the VOCs are primarily in the vapor phase in the subsurface.

6.5 SVE Decommissioning

After concurrence from DTSC, the SVE wells and any vapor probes will be properly destroyed by either pressure grouting or over-drilling under OCHCA permit. The used GAC will be transported offsite for thermal destruction and recycling.

6.6 Field Variances

Variances from the work plan will be discussed with DTSC prior to any action being taken except for emergencies (when an immediate response is required). The DTSC will be notified if an emergency response is implemented. The field variances will be documented in the Removal Action Completion Report prepared for the project.

7.0 SAMPLING AND ANALYSIS PLAN

The proposed removal action will require collection and analysis of soil vapor samples to optimize and confirm performance of the SVE system. All sampling will be conducted in general accordance with the accepted field procedures and QA/QC protocols.

Appropriate written documentation will be maintained of all removal action activities in the form of daily logs, boring logs, well development and sampling logs, chain-of-custody records, and disposal manifests. These documents will be incorporated into the removal action completion report.

SGI anticipates that soil vapor will be collected and analyzed for VOCs using EPA Method 8260B. Soil vapor samples will be collected either in laboratory-supplied Summa canisters or with a glass syringe and analyzed in the field by a mobile laboratory.

8.0 HEALTH AND SAFETY PLAN (HASP)

All contractors will be responsible for operating in accordance with the most current requirements of State and Federal Standards for Hazardous Waste Operations and Emergency Response (California Code Regulations, Title 8, Section 5192; 29 CFR 1910.120). Onsite personnel are responsible for operating in accordance with all applicable regulations of the Occupational Safety and Health Administration (OSHA) outlined in the State General Industry and Construction Safety Orders (California Code Regulations, Title 8) and Federal Construction Industry Standards (29 CFR 1910 and 29 CFR 1926), as well as other applicable federal, state and local laws and regulations. All personnel shall operate in compliance with all California OSHA requirements.

A site-specific HASP will be prepared for the Site in accordance with current health and safety standards as specified by the federal and California OSHAs and submitted to DTSC prior to initiation of field work.

The provisions of the HASP are mandatory for all personnel and contractors who are at the Site. Each contractor and subcontractor doing fieldwork in association with this RAW will either adopt and abide by the HASP or shall develop their own safety plans which, at a minimum, meet the

requirements of the HASP. All onsite personnel shall read the HASP and sign the "Plan Acceptance Form" before starting Site activities.

9.0 PUBLIC PARTICIPATION

The public participation requirements for the RAW process include: (1) the development of a community profile, (2) publishing a notice of the availability of the RAW for public review and comment, (3) making the RAW and other supporting documents available at DTSC's office and in the local information repository, and (4) responding to public comments received on the RAW and California Environmental Quality Act (CEQA) documents.

In accordance with the Community Profile prepared for this site, the following additional activities will be conducted: 1) a fact sheet will also be sent out to the site mailing list describing the site and the proposed removal action; 2) the length of the public review and comment period will be 30-days; 3) a public meeting or workshop will be held if there is sufficient community interest; and 4) site documents will be available in electronic format on DTSC's publicly-accessible EnviroStor database.

Once the public comment period is completed, DTSC will review and respond to the comments received. The RAW will be revised, as necessary, to address the comments received. If significant changes to the RAW are required, the RAW will be revised and be resubmitted for public review and comment. If significant changes are not required, the RAW will be modified and DTSC will approve the modified RAW for implementation.

10.0 CEQA DOCUMENTATION

CEQA, modeled after the National Environmental Policy Act (NEPA) of 1969, was enacted in 1970 as a system of checks and balances for land-use development and management decisions in California. It is an administrative procedure to ensure comprehensive environmental review of cumulative impacts prior to project approval. It has no agency enforcement tool, but allows challenge in courts.

A CEQA project is a project that has a potential for resulting in a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment. CEQA applies to all discretionary projects proposed to be carried out or approved by California public agencies, unless an exemption applies

The appropriate CEQA document(s) will be prepared to ensure that CEQA requirements have been satisfied.

11.0 PROJECT SCHEDULE AND REPORT OF COMPLETION

Redevelopment of the Site is to be completed as quickly as possible. SGI is prepared to initiate

removal action activities in the following estimated timeline:

Submittal of Draft RAW	8 May 2015
DTSC approval of Revised RAW	7 December 2015
Public comment period	4 January – 2 February 2016
Installation of wells & probes	Week of 8 February 2016
Operation of SVE system	15 February through 15 August 2016
Confirmation sampling	31 August 2016
Completion report submittal	15 September 2016
DTSC final approval	15 October 2016

A removal action completion report will be prepared when all actions are completed.

12.0 REFERENCES

Brown & Caldwell. 1989. Various reports regarding the ARCO station gasoline release submitted to the OCHCA.

California Environmental Protection Agency (Cal EPA) et al. April 12, 2012. *Advisory – Active Soil Gas Investigations.*

_____. Office of Human and Ecological Risk. 14 July 2014. *Human Health Risk Assessment (HHRA) Note Number 3.*

California Department of Water Resources (DWR). June 1961. *Planned Utilization of Ground Water Basins of the Coastal Plain of Los Angeles County, Appendix A, Ground Water Geology. Bulletin 118.* Reprinted May 1990.

California Regional Water Quality Control Board – San Francisco Bay Region. 31 July 2009. *Draft Final Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites.*

In-N-Out Burger, 31 July 2012. *Preliminary Site Plan-6 (NEC 17th St & Tustin Ave) Santa Ana, CA*

National Library of Medicine. 2013. *Tox Town* web site

Norris & Webb. 1977. *Geology of California.*

Pacific Southwest Group. 10 November 1997. *Soil Vapor Investigation, NEC 17th Street & Tustin Avenue, Santa Ana, CA.* Prepared for Thrifty PayLess, Inc./Rite Aid.

Stechmann Geoscience, Inc. 7 June 2013(a). *Phase I Environmental Site Assessment, Vacant Commercial Property with Former Addresses of 13872, 13875, and 13972 N. Tustin Avenue, Santa Ana, California* prepared for In-N-Out Burger.

_____. 5 August 2013(b). *Phase II Environmental Site Assessment, Vacant Commercial Property with Former Addresses of 13872, 13875, and 13972 N. Tustin Avenue, Santa Ana, California* prepared for In-N-Out Burger.

_____. 27 August 2014. *Supplemental Site Investigation Report, Vacant Commercial Property with Former Addresses of 13872, 13875, and 13972 N. Tustin Avenue, Santa Ana, California* prepared for Hall Family Trust.

U.S. Environmental Protection Agency. January 2015. *Regional Screening Level Summary Table*

TABLES

TABLE 1
PCE CONCENTRATIONS OF 1997 SOIL MATRIX SAMPLES
HALL PROPERTY – SANTA ANA

Sample Depth (ft)	PCE Concentration (µg/kg)
1	160
3	89
7	182
10	104
20	140
30	196
40	195
45	118
50	83
60	576
70	96
80	464

Source: Pacific Southwest Group, 1997

TABLE 2
2013 SOIL VAPOR PROBE VOC CONCENTRATIONS
HALL PROPERTY – SANTA ANA

Soil Vapor Probe Number	Depth (in feet)	PCE Concentration (µg/l)	TCE Concentration (µg/l)
SG-1	5	1 purge **185**	ND
	5	3 purge **183**	ND
	5	10 purge **168**	ND
	15	**203**	ND
SG-2	5	**247**	ND
	15	**386**	**3.71**
SG-3	5	**170**	ND
	15	**460**	**2.92**
SG-4	5	**123**	ND
	5	Duplicate **121**	ND
	15	**244**	0.79
SG-5	5	**34.1**	1.19
	15	**515**	**2.64**
SG-6	5	**10.9**	1.34
	15	**134**	ND
SG-7	5	**84.4**	ND
	15	**93.9**	ND
SG-8	5	**8.31**	ND
	15	**144**	ND
	15	Duplicate **168**	ND
SG-9	5	**7.53**	**3.81**
	15	**141**	ND
SG-10	5	**14**	ND
	15	**29.9**	ND
SG-11	5	**20.4**	ND
	15	**55.7**	ND
SG-12	5	**13.2**	ND
	15	**9.62**	ND
SG-13	5	0.554	ND
	15	0.318	ND
SG-14	5	0.404	ND
	15	0.124	ND
Practical Quantitation Limit		**0.010**	**0.010**

Source: SGI, 2013b

TABLE 3
2013 TPH AND VOC CONCENTRATIONS IN SOIL AND GROUNDWATER SAMPLES
HALL PROPERTY – SANTA ANA

Boring	Depth	TPH (mg/kg or µg/l)	PCE (µg/kg or µg/l)	TCE (µg/kg or µg/l)
1 (In-N-Out)	5	ND	300	ND
	10	ND	91.8	ND
	20	ND	192	3.9
	40	ND	68.8	1.8
	60	ND	254	6.5
	80	ND	198	3.8
	105	ND	132	3.4
	120	ND	134	1.7
	Groundwater	ND	**530**	2.4
2 (Bank)	5	ND	ND	ND
	10	ND	ND	ND
	20	ND	ND	ND
	40	ND	1.0	ND
	60	ND	ND	ND
	80	ND	2.2	ND
	100	ND	ND	ND
	Groundwater	ND	**35.9**	ND
Practical Quantitation Limit		**0.2**	**1 and 0.5**	**1 and 0.5**
USEPA Commercial RSL		**--**	**41,000**	**2,000**
Groundwater SSL		**--**	**2.3**	**1.8**
Drinking Water MCL		**--**	**5**	**5**

Notes:

1. ND – not detected
2. -- - none established
3. Practical Quantitation Limit for soil listed first, groundwater second (if applicable)

Source: SGI, 2013b

TABLE 4
SHALLOW SOIL VAPOR PROBE VOC CONCENTRATIONS – JULY 2014
HALL PROPERTY – SANTA ANA

Soil Vapor Probe	Depth (feet)	PCE (µg/L)	TCE (µg/L)	Other VOCs Detected (µg/L)
VP-8A	5	**12.1**	ND	ND
	15	**37.8**	ND	ND
	15 DUP	**50.0**	ND	ND
VP-15	5	**52.9**	ND	0 ND
	15	***544**	**28.6**	30.2 cis-1,2-Dichloroethene
VP-16	5	**16.6**	ND	ND
	15	**33.3**	ND	ND
VP-17	5	**4.97**	ND	ND
	5 REP	**6.18**	ND	ND
	15	**11.0**	ND	ND
VP-18	5	**10.9**	ND	ND
	15	**23.0**	ND	ND
VP-19	5	**44.6**	ND	ND
	5 REP	**45.3**	ND	ND
	15	**66.6**	ND	ND
VP-20	5	1.40	ND	ND
	15	3.16	ND	ND
VP-21	5	**47.3**	ND	ND
	15	**39.4**	ND	ND
VP-22	5	**11.4**	ND	ND
	15	**26.4**	ND	ND
VP-23	5	2.81	ND	ND
	15	**8.66**	ND	ND
VP-24	5	0.284	ND	ND
	15	0.284	ND	ND
	15 REP	0.204	ND	ND
VP-25	5	2.58	ND	ND
	15	**5.44**	ND	ND
VP-26	5	0.550	ND	ND
	15	0.957	ND	ND
VP-27	5	ND	ND	ND
	15	0.204	ND	ND
Practical Quantitation Limit		0.010	0.010	0.020 VOCs
DTSC Modified Industrial RSL				
Cancer		**4.16**	**6****	
Non-Cancer		**300**	**17.6****	**62** cis-1,2-Dichloroethene

Notes:

1. PCE – tetrachloroethylene
2. TCE – trichloroethylene
3. VOCs – volatile organic compounds
4. µg/L – micrograms per liter
5. * -- laboratory dilution
6. ND – not detected
7. RSL – Regional Screening Level
8. ** -- USEPA Region IX Commercial RSL, as no DTSC Modified Industrial RSL established

Source: SGI, 2014

TABLE 5
DEEP SOIL VAPOR PROBE VOC CONCENTRATIONS – JULY 2014
HALL PROPERTY – SANTA ANA, CA

Soil Vapor Probe	Depth (ft)	PCE (µg/L)	TCE (µg/L)	Other VOCs Detected (µg/L)
DNP-1	5	**33.9**	ND	ND
	15	**31.3**	ND	ND
	25	**95.0**	ND	ND
	35	**67.7**	ND	ND
	45	**144**	ND	ND
	55	**34.0**	ND	ND
	65	--	--	ND
	75	--	--	ND
	85	***314**	ND	ND
	95	***190**	0.443	ND
	105	**101**	ND	ND
	105 DUP	**107**	ND	ND
	115	**43.9**	ND	ND
	125	**59.2**	ND	ND
DNP-2	5	**16.8**	ND	ND
	15	**102**	ND	ND
	25	**366**	ND	ND
	25 REP	**408**	ND	ND
	35	**253**	ND	ND
	45	**212**	ND	ND
	55	--	ND	ND
	65	***716**	1.62	ND
	75	**905**	ND	ND
	85	**1380**	ND	ND
	95	**1150**	ND	ND
	105	**702**	ND	ND
	115	**69.4**	ND	ND
	125	**180**	ND	ND
DNP-3	5	**18.3**	ND	ND
	15	**46.9**	ND	ND
	25	**43.8**	ND	ND
	35	**43.0**	ND	ND
	35 REP	**49.4**	ND	ND
	45	***243**	2.00	ND
	55	**51.8**	ND	ND
	65	**51.1**	ND	ND
	75	**31.0**	ND	ND
	85	***553**	ND	ND
	95	***573**	2.02	ND
	105	***478**	ND	ND

Soil Vapor Probe	Depth (ft)	PCE (µg/L)	TCE (µg/L)	Other VOCs Detected (µg/L)
	115	**213**	ND	ND
	125	**77.2**	ND	ND
Practical Quantitation Limit		0.010	0.010	0.020 VOCs
DTSC Modified Industrial RSL				
Cancer		**4.16**	**6****	
Non-Cancer		**300**	**17.6****	

Notes:

1. PCE – tetrachloroethylene
2. TCE – trichloroethylene
3. VOCs – volatile organic compounds
4. µg/L – micrograms per liter
5. * -- laboratory dilution
6. -- -- not analyzed due to no flow
7. ND – not detected
8. DTSC – Department of Toxic Substances Control
9. RSL – Regional Screening Level
10. ** -- USEPA Region IX Commercial RSL, as no DTSC Modified Industrial RSL establish

Source: SGI, 2014

TABLE 6
VOC CONCENTRATIONS IN SOIL MATRIX SAMPLES – MARCH 2014
HALL PROPERTY – SANTA ANA

Borehole	Depth (feet)	PCE (µg/kg)	TCE (µg/kg)	Other VOCs Detected (µg/kg)
VP-15	5	902	22.6	38.9 cis-1,2-Dichloroethene 2.1 trans-1,2-Dichloroethene 1.6 Toluene
	10	382	9.7	16.4 cis-1,2-Dichloroethene
	15	1,080	30.4	54.2 cis-1,2-Dichloroethene 4.2 trans-1,2-Dichloroethene 1.6 Toluene 6.1 1,1,2-Trichloroethane
VP-16	5	185	4.5	1.4 Toluene 5.3 1,1,2-Trichloroethane
	10	87.1	3.1	ND
	15	150	5.0	1.6 Toluene
MW-1	5	260	ND	6.5 1,1,1-Trichloroethane
	10	60.3	ND	4.2 1,1,1-Trichloroethane
	15	133	ND	6.4 1,1,1-Trichloroethane
	40	57.8	ND	4.0 1,1,1-Trichloroethane
	60	110	ND	5.9 1,1,1-Trichloroethane
	80	283	3.6	3.6 1,1,1-Trichloroethane
	100	142	ND	5.5 1,1,1-Trichloroethane
	120	116	ND	3.7 1,1,1-Trichloroethane
	150	11.5	ND	4.2 1,1,1-Trichloroethane
MW-2	10	28.1	ND	ND
	30	48.7	ND	ND
	50	36.5	ND	ND
	70	87.5	ND	ND
	90	93.1	ND	ND
	110	55.9	ND	ND
	130	96.8	ND	ND
	157	2.9	ND	ND
MW-3	5	ND	ND	ND
	25	ND	ND	ND
	45	ND	ND	ND
	65	ND	ND	5.6 Sec-Butylbenzene 26.6 Ethylbenzene 6.3 Isopropylbenzene 6.2 4-Isopropyltoluene 7.3 Naphthalene 5.3 n-Propylbenzene 45.6 1,2,4-Trimethylbenzene 12.9 1,3,5-Trimethylbenzene

Borehole	Depth (feet)	PCE (µg/kg)	TCE (µg/kg)	Other VOCs Detected (µg/kg)
MW-3 (cont'd)	65 (cont'd)			31.8 Xylenes 0.57 TPH (gasoline)
	85	ND	ND	106 Benzene 5.6 Butylbenzene 6.6 sec-Butylbenzene 7.2 tert-Butylbenzene 227 Ethylbenzene 16.5 Isopropylbenzene 7.5 4-Isopropyltoluene 23.2 Naphthalene 38.8 n-Propylbenzene 18.6 1,2,4-Trimethylbenzene 24.9 1,3,5-Trimethylbenzene 144 Xylenes 1.18 TPH (gasoline)
	105	15.5	ND	ND
	125	46.1	ND	ND
	145	ND	ND	ND
MW-4	157	5.4	ND	1.4 Dichlorofluoromethane
Practical Quantitation Limit		1.0	1.0	1.0 VOCs 0.20 TPH (gasoline)
USEPA Region IX Commercial Regional Screening Level (RSL)		**100,000**	**6,000**	**5,000** - **120,000,000** (no results exceeded)

Notes:

1. PCE – tetrachloroethylene
2. TCE – trichloroethylene
3. VOCs – volatile organic compounds
4. TPH – total petroleum hydrocarbons
5. µg/kg – micrograms per kilogram
6. ND – not detected
7. Well MW-4 (originally named MW-1R) was completed near previous boring SGI-1, so only a deep soil sample was collected and analyzed.

Source: SGI, 2014

TABLE 7
SUMMARY OF FOUR QUARTERS OF GROUNDWATER MONITORING RESULTS
HALL PROPERTY – SANTA ANA

Monitoring Well	Date	Chemical Concentration (µg/l)				Depth to Water (ft)
		PCE	TCE	Other VOCs	TPH -G	
MW-1	4/10/14	62.1	1.5	ND	ND	144.0
	7/16/14	354	ND	ND	ND	149.0
	10/15/14	--	--	--	--	Dry
	2/10/15	--	--	--	--	Dry
MW-2	4/10/14	203	ND	1.7 DCDFM	ND	141.95
	7/16/14	207	ND	ND	ND	145.56
	10/15/14	211	ND	ND	ND	148.39
	2/10/15	26.4	ND	ND	ND	150.76
MW-3	4/10/14	72.7	ND	0.6 DCDFM	ND	135.87
	7/16/14	66.8	ND	ND	ND	138.51
	10/15/14	107	ND	ND	ND	140.43
	2/10/15	61.2	ND	ND	ND	144.45
MW-4	4/10/14	9.9	ND	0.5 DCDFM	ND	146.35
	7/16/14	11.0	ND	ND	ND	150.40
	10/15/14	4.30	ND	ND	ND	154.25
	2/10/15	37.4	ND	ND	ND	159.73
PQL		0.5	0.5	0.5 – 25.0	500	
Drinking Water MCL		5	5	varies	NE	

Notes:

1. µg/l – micrograms per liter
2. ND – not detected
3. -- - no sample because well was dry
4. PCE – tetracholoroethene, TCE – trichloroethene, VOCs – volatile organic compounds, TPH-G – total petroleum hydrocarbons as gasoline, DCDFM – Dichlorodifluoromethane
5. PQL – laboratory practical quantitation limit
6. MCL – maximum contaminant level

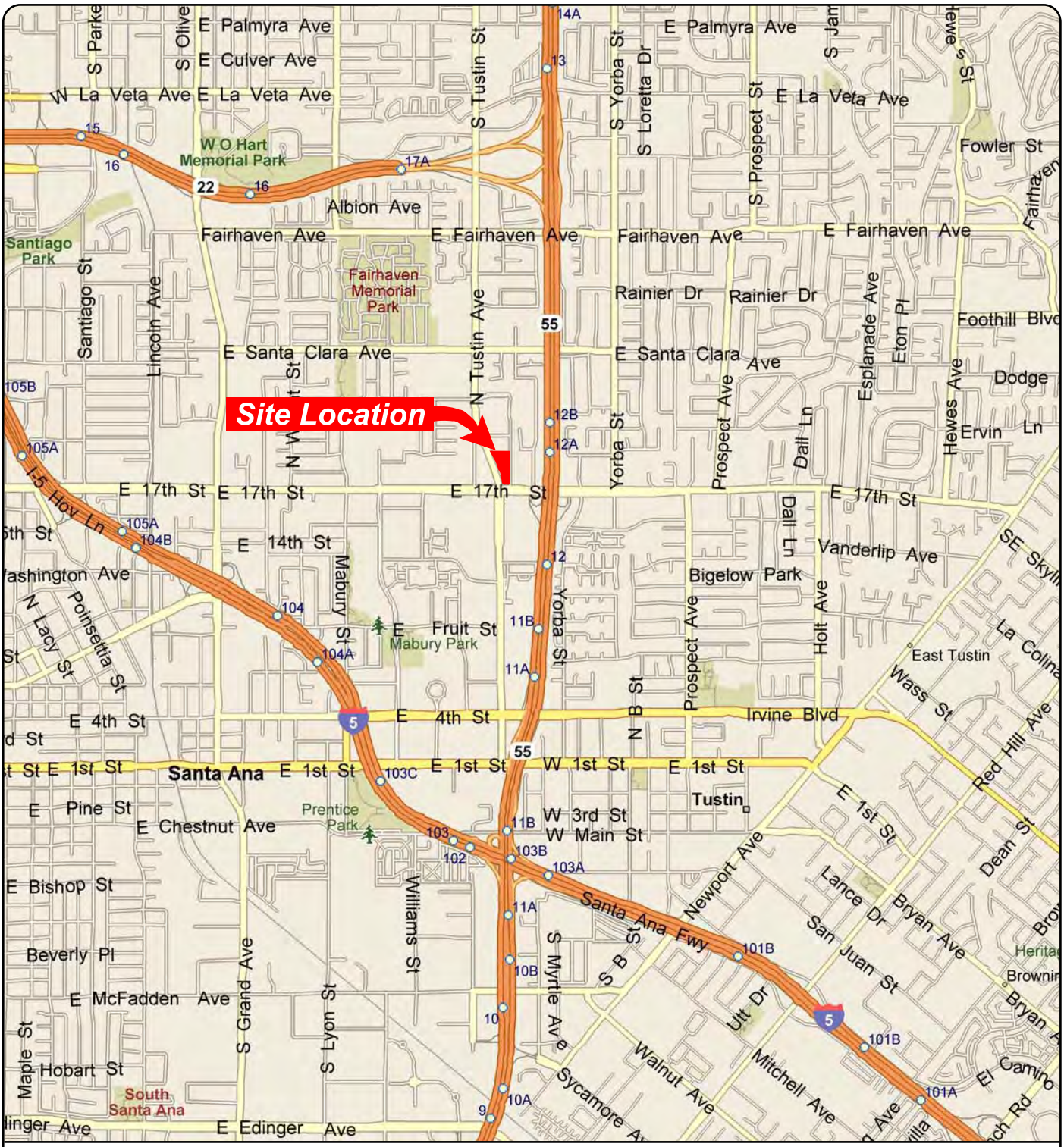
Source: SGI, 2014

TABLE 8 SUMMARY OF ARARS AND TBCS HALL PROPERTY – SANTA ANA		
Requirement	**Description**	**ARAR or TBC**
Resource Conservation and Recovery Act, as amended by the Hazardous and Solid Waste Amendments (40 CFR 260 to 299, 42 USC 7401-7642)	Federal act that classifies and regulates hazardous waste and facilities that treat, store and dispose of hazardous waste.	Applicable for determining whether environmental media impacted by COCs is a hazardous waste. May be applicable or relevant and appropriate depending upon whether any impacted media from the Site requires offsite disposal.
Clean Air Act (42 USC 7401-7642; 40 CFR 50-69)	Identifies categories of industrial sources and treatment standards. Establishes primary and secondary ambient air standards. States develop implementation plans for attainment of the standards.	May be applicable or relevant and appropriate depending upon the response action being considered. Impacts to air quality, if any, under local air district jurisdiction may result from implementation of some of the removal actions.
Occupational Safety and Health Act (29 CFR § 1910.120 et seq.)	Identifies PELs for inhalation or dermal exposure of workers to chemicals. When PELs are exceeded, OSHA requires the use of PPE or other methods to block exposure.	Applicable or relevant and appropriate depending upon the response action being considered. Impacts to air quality, if any, under local air district jurisdiction may result from implementation of some of the removal actions.
Clean Water Act (CWA) (33 USCA 125-1-1376 and 40 CFR 100-149.	Federal act that establishes a system of national effluent discharge standards and ocean discharge requirements.	Could be applicable or relevant and appropriate if groundwater treatment required
Safe Drinking Water Act	Establishes primary and secondary drinking water standards.	Could be applicable or relevant and appropriate based on groundwater monitoring sample results
Clean Air Act (42 USC 7401-7642, 40 CFR 50 – 69)	Identifies categories of industrial sources and treatment standards. Establishes primary and secondary ambient air standards. States develop implementation plans for attainment of the standards.	May be applicable or relevant and appropriate for soil vapor extraction option. Impacts to air quality, if any, under local air district jurisdiction may result from the implementation of some of the removal actions.
National Historic Preservation Act of 1966 (NHPA) 16 USC 470 and 36 CFR 800	Established to preserve historic properties	Not applicable since there are no structures on property.
Endangered Species Act of 1973	Established to conserve endangered or threatened species	None identified onsite.
Hazardous Waste Control Act (HSC, Chapter 6.5, section 25100 et seq., 22 CCR 66260.1 et seq.)	Establishes criteria for determining waste classification for the purposes of transportation and land disposal of wastes in California. Regulates treatment, storage, transportation and disposal of substances identified as hazardous.	Could be applicable or relevant and appropriate for any offsite disposal
Hazardous Waste	Establishes standards applicable to	Could be applicable or relevant and

TABLE 8 SUMMARY OF ARARS AND TBCS HALL PROPERTY – SANTA ANA		
Requirement	**Description**	**ARAR or TBC**
Generator Requirements (22 CCR 66262.1 et seq.)	generators of hazardous waste.	appropriate for any offsite disposal
Land Disposal Restrictions (22 CCR 66268.7 et seq.)	Establishes standards for treatment and land disposal of hazardous waste.	Could be applicable or relevant and appropriate for any offsite disposal
Stockpiling Requirements for Contaminated Soil (HSC section 25123.3(a)(2)	Establishes standards for stockpiling of non-RCRA contaminated soil	Not applicable or relevant as soil excavation will not be conducted.
California Hazardous Substances Account Act (HSC section 25340-25392)	Establishes fees regarding disposal of hazardous substances and outlines process for cleanup of hazardous substance release sites.	Could be applicable or relevant and appropriate for any offsite disposal
Porter Cologne Water Quality Act (23 CCR Chapter 3, Subchapter 15, WC section 13000 et seq.)	Establishes the authority of the State Water Resources Control Board and Regional Water Quality Control Boards to protect water quality by identifying beneficial uses of the waters of the State, establishing water quality objectives, and regulating discharges to waters of the state.	Could be applicable or relevant and appropriate for VOCs detected in groundwater.
Regional Water Quality Control Board Basin Plan	Adopts narrative standards and permissible concentrations of organic and inorganic chemicals for surface water, groundwater, point sources and non-point sources. Establishes beneficial uses of surface waters and groundwater.	Could be applicable or relevant and appropriate for VOCs detected in groundwater.
NPDES Permit	The State Water Resources Control Board (SWRCB), as part of the National Pollutant Discharge Elimination System (NPDES), has adopted a statewide NPDES General Permit for Stormwater Discharges Associated with Construction Activity (General Permit) to address discharges of storm water runoff from construction projects that encompass one acre or more in total acreage of soil disturbances.	Will be applicable for construction activities, including clearing, grading, excavation, soil stockpiling, material storing, onsite staging, offsite staging, and other land disturbance activities.
Hazardous Waste Haulers Act (22 CCR Chapter 30)	Governs transportation of hazardous materials in California.	Could be applicable or relevant and appropriate for any offsite disposal
Safe Drinking Water and Toxic Enforcement Act (Proposition 65) (22	Requires public warnings of potential exposure to suspected carcinogens and reproductive toxins.	Could be applicable or relevant and appropriate for Site depending on results of risk assessment.

TABLE 8 SUMMARY OF ARARS AND TBCS HALL PROPERTY – SANTA ANA		
Requirement	**Description**	**ARAR or TBC**
CCR section 12000 et seq.)		
California Occupational Health and Safety (8 CCR 5192)	Requires workers involved in hazardous substance operations associated with cleanup of sites to perform the cleanup operations in accordance with Cal OSHA health and safety requirements.	Applicable requirement for all workers who can come into contact with contaminated media at the Site
California Fish and Game Code (sections 1601-1607 and 5650)	Regulates activities that involve construction within stream channels to assure protection of fish and wildlife. Prohibits discharges to waters of the State that may cause adverse effects to fish, plant or bird life.	Could be applicable or relevant and appropriate for any discharge to storm sewer.
Local noise ordinance	Limits the amount of noise generated during certain times of day.	Could be applicable or relevant and appropriate for soil vapor extraction equipment.

FIGURES



STECHMANN GEOSCIENCE, INC.

DRAFTED BY: BDB

DATE: MAY 2015

SITE LOCATION MAP

Commercial Property
Former Addresses 13872, 13875, and 13972 N. Tustin Avenue
Santa Ana, CA

PROJECT NO.: 13-095-01

Figure **1**

Aerial Photograph Taken in 2005

N

0 300 600 Feet

Approximate Scale

STECHMANN GEOSCIENCE, INC.

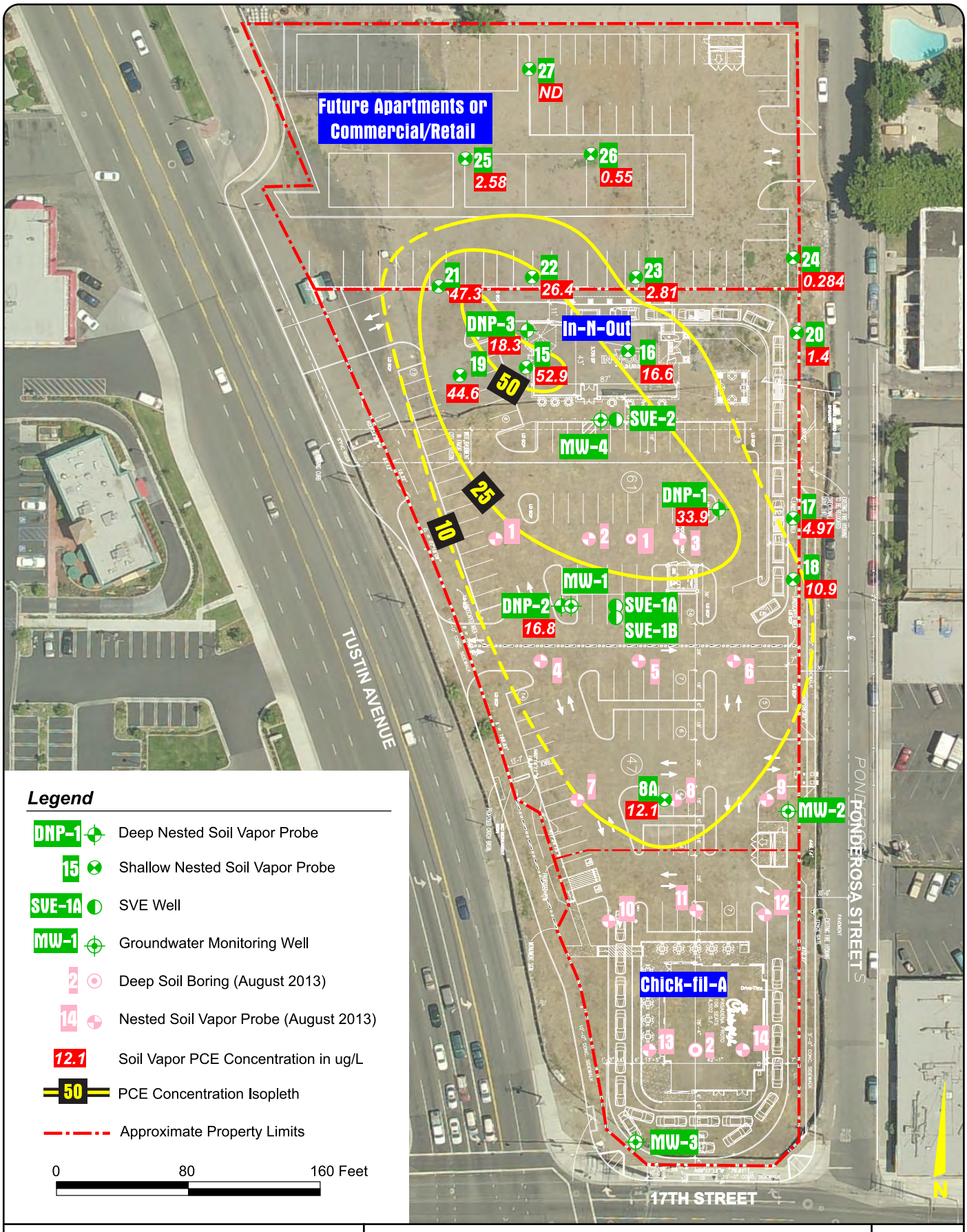
DRAFTED BY: BDB | DATE: MAY 2015

RECENT AERIAL PHOTOGRAPH OF SITE

Commercial Property
Former Addresses 13872, 13875, and 13972 N. Tustin Avenue
Santa Ana, CA

PROJECT NO.: 13-095-01

Figure **2**



STECHMANN GEOSCIENCE, INC.

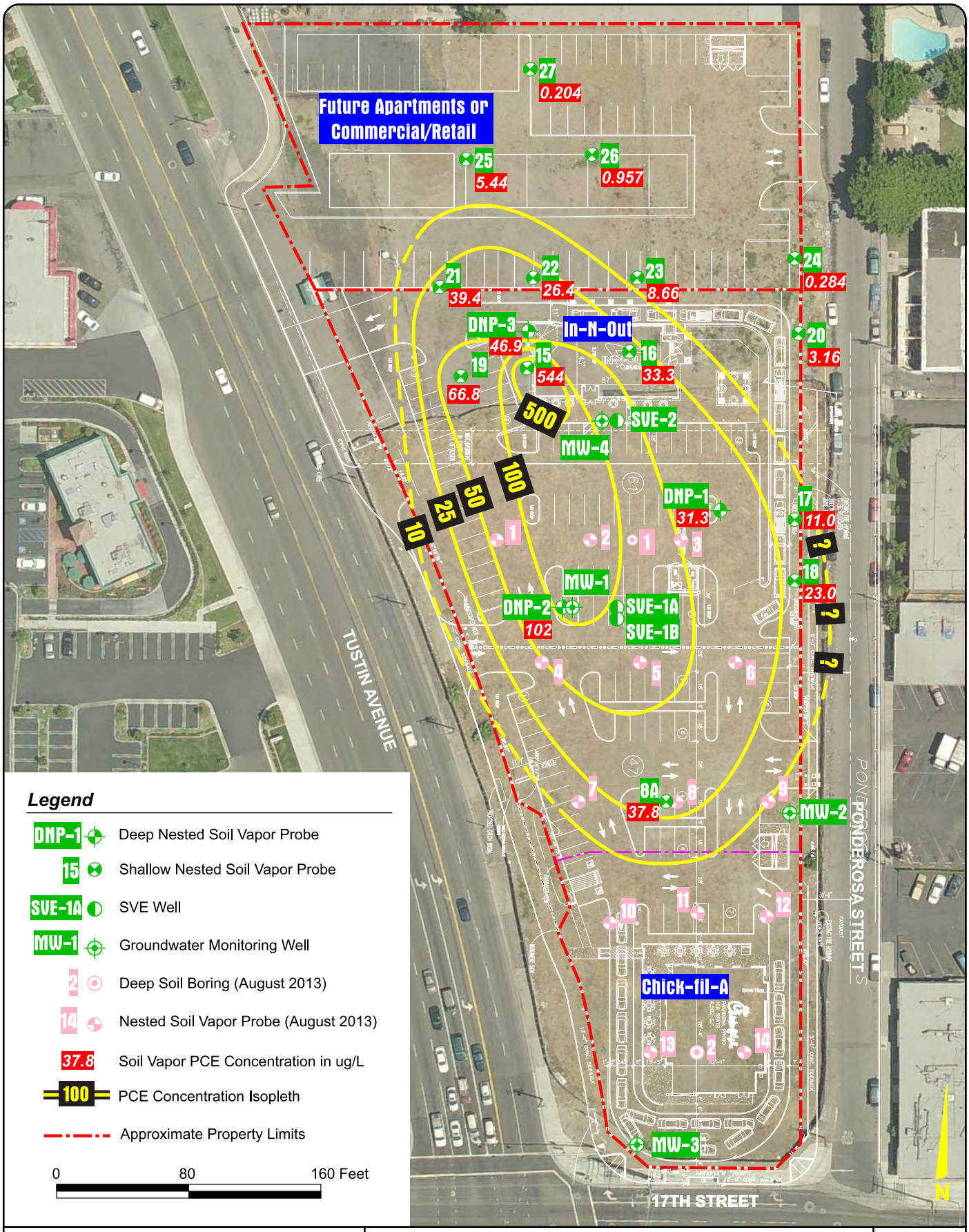
DRAFTED BY: BDB | DATE: MAY 2015

PCE SOIL VAPOR CONCENTRATIONS AT 5 FEET JULY 2014

Commercial Property
Former Addresses 13872, 13875, and 13972 N. Tustin Avenue
Santa Ana, CA

PROJECT NO.: 13-095-01

Figure 3



STECHMANN GEOSCIENCE, INC.

DRAFTED BY: BDB | DATE: MAY 2015

PCE SOIL VAPOR CONCENTRATIONS AT 15 FEET JULY 2014

Commercial Property
Former Addresses 13872, 13875, and 13972 N. Tustin Avenue
Santa Ana, CA

PROJECT NO.: 13-095-01

Figure **4**

STECHMANN GEOSCIENCE, INC.

DRAFTED BY: BDB

DATE: MAY 2015

LOCATION OF PROPOSED SOIL VAPOR PROBES

Commercial Property
Former Addresses 13872, 13875, and 13972 N. Tustin Avenue
Santa Ana, CA

PROJECT NO.: 13-095-01

Figure **5**

STECHMANN GEOSCIENCE, INC.

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PROPOSED SVE SYSTEM LAY-OUT

Commercial Property
Former Addresses 13872, 13875, and 13972 N. Tustin Avenue
Santa Ana, CA

PROJECT NO.: 13-095-01

Figure 6