

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
REBECCA GEBHART, Acting Director



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April 14, 2016

Mr. Ed Hemmat and Mr. Mehrdad Dokhanchy
PO Box 11390
Oakland, CA 94611-0390
(Sent via E-mail to:
edhemmat@gmail.com and
mehrdad.dokhanchy@comcast.net

Exchange Support Services, Inc.
180 Grand Ave., Suite 1385
Oakland, CA 94621
Attention: Lloyd Kendall Jr.

Award Motors Inc.
210 Scenic Dr.
Piedmont, CA 94611
Attention: Jacki Li

Ms. Rita Robinson
13199 Skyline Blvd.
Oakland, CA 94619

Mr. Donald Rosenberg
2740 Ptarmigan Dr.
Walnut Creek, CA 94595-3121

Subject: Request for Work Plan, Fuel Leak Case No. RO0000182 and GeoTracker Global ID T06019784055, Robinson Property / Mohawk Oil Co., 5630 San Pablo Ave., Oakland, CA 94608

Dear Responsible Parties:

Alameda County Environmental Health (ACEH) has evaluated the case files to determine if the site is eligible for closure as a low risk site under the State Water Resources Control Board's (SWRCBs) Low Threat Underground Storage Tank Case Closure Policy (LTCP). Based on ACEH staff review, we have determined that it is unclear if the LTCP General Criteria c (The Unauthorized Release from the Underground Storage Tank- UST- System has stopped) and General Criteria f (Secondary Source Removal) has been satisfied. Additionally, the site fails to the Media-Specific Criteria for Groundwater, Vapor Intrusion to Indoor Air, and for Direct Contact.

Additional data may be available that ACEH is not aware of, or may not have been submitted, and therefore has not been incorporated in to ACEH's review. If additional data is made available, the data can be incorporated in future LTCP reviews. The evaluation of the site under the LTCP that is presented below is intended to initiate further discussions, submittal of other available documents, or the collection of additional data in order to determine if or when the site can be closed under the LTCP and to document current LTCP data gaps.

Therefore, at this juncture ACEH requests that you prepare a Data Gap Investigation Work Plan that is supported by a focused Site Conceptual Model (SCM) to address the Technical Comments provided below.

TECHNICAL COMMENTS

- 1. LTCP General Criteria c (The Unauthorized Release from the UST System has stopped) –** According to the LTCP, the primary source is defined as the tank, pipe, or other appurtenant structure that released petroleum into the environment has been removed, repaired, or replaced. There is conflicting data in the case files related to the presence and location of the USTs, and there is no documentation pertaining the status or condition of the USTs and associated fuel dispenser piping.

Therefore, it is unclear if all UST locations have been identified and the status and condition of the USTs are not known.

Please present a strategy in the Data Gap Work Plan (described in Technical Comment 8 below) to address the items discussed above. Alternatively, please provide justification of why the site satisfies this general criterion in the focused SCM described in Technical Comment 7 below.

2. **General Criteria f – Secondary Source Has Been Removed to the Extent Practicable** – “Secondary source” is defined as petroleum-impacted soil or groundwater located at or immediately beneath the point of release from the primary source. Unless site attributes prevent secondary source removal (e.g. physical or infrastructural constraints exist whose removal or relocation would be technically or economically infeasible), petroleum-release sites are required to undergo secondary source removal to the extent practicable as described in the policy. “To the extent practicable” means implementing a cost-effective corrective action which removes or destroys-in-place the most readily recoverable fraction of source-area mass.

As stated above, it is unclear to ACEH that the LTCP General Criteria f (Secondary Source Removal) has been satisfied. Conflicting data has been presented for the location of the USTs, and the locations and identification labels of soil bores advanced at the site are not consistent throughout the reports which document site work. Therefore, it is unclear if all UST locations have been identified and if the soil bores advanced at the site are appropriately placed to evaluate the presence of secondary source.

Please present a strategy in the Data Gap Work Plan (described in Technical Comment 8 below) to address the items discussed above. Alternatively, please provide justification of why the site satisfies this general criterion in the focused SCM described in Technical Comment 7 below.

3. **LTCP Media Specific Criteria for Groundwater** – To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites listed in the policy.

Our review of the case files indicates that insufficient data collection and analysis has been presented to support the requisite characteristics of plume stability or plume classification as follows:

- a. Prior to the 2015 groundwater monitoring event, nine groundwater monitoring events have been conducted since the installation of the five on-site monitoring wells. The nine groundwater monitoring events were conducted between May 19, 2005 and June 19, 2012. The groundwater monitoring reports for these nine events document a groundwater low in the central site area. The low is depicted as a southerly trending trough trending downward off site to the south on the groundwater contour diagrams. The September 25, 2015 report documenting the July 13, 2015 groundwater monitoring event and prepared by Cook Environmental Services Inc., states the measured elevation in well STMW-4 is anomalous as it does not fit the expected groundwater gradient trend. Hence, depth to water (dtw) data for STMW-4 was not incorporated into the groundwater contour map and the 2015 groundwater contour diagram does not depict the groundwater low.

Assuming the 2015 groundwater measurements for well STMW-4 are anomalous, the ground water contaminant plume is undefined in the west- to southwest direction.

- b. As indicated above, several groundwater monitoring reports prepared for the site suggest a groundwater trough exists in the central site area, with the trough trending downward to the south. As discussed in our November 6, 2015 meeting between ACEH and Mr. Hemmat and Mr. Dokhanchy, the library on the adjoining southern property was identified as operating a sump for basement dewatering. The method of sump water discharge was not identified. ACEH requests an evaluation be made to determine if the contaminated groundwater plume beneath the site is being pulled off-site toward the library and if the contaminant plume is controlled by the dewatering.

If the groundwater is being pulled to the south and is not controlled by sump pumping, the contaminant plume is not defined in the southerly direction.

Additionally, the sump discharge water should be tested for potential chemicals of concern (PCOCs). Results of the sump water analysis should be provided to library personnel for consideration for possible discharge permitting.

- c. As stated in Technical Comment 4a above, the September 25, 2015 groundwater monitoring report states the measured elevation in well STMW-4 is anomalous as it does not fit the expected groundwater gradient trend. As the 2015 depth-to-water data for well STMW-4 may not be not anomalous, ACEH requests that a 2015 groundwater gradient alternative map be reconstructed, incorporating the STMW-4 well data. Scaling of the groundwater contours should be sufficient to adequately portray groundwater flow.

Please present a strategy in the Data Gap Work Plan (described in Technical Comment 7 below) to address the items discussed above. Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Groundwater in the focused SCM.

4. **LTCP Media Specific Criteria for Vapor Intrusion to Indoor Air** – The LTCP describes conditions, including bioattenuation zones, which if met will assure that exposure to petroleum vapors in indoor air will not pose unacceptable health risks to human occupants of onsite and adjacent buildings. Appendices 1 through 4 of the LTCP criteria illustrate four potential exposure scenarios and describe characteristics and criteria associated with each scenario.

Our review of the case files indicates that the site data collection and analysis fail to support the requisite characteristics of one of the four scenarios. Specifically, there is a lack of a bioattenuation zone, as groundwater at the suite has been reported as high as 4.16 feet below the ground surface (bgs), there is no soil gas data, and residual soil concentrations of total petroleum hydrocarbons (TPH) over 100 milligrams per kilograms (mg/kg) remain in the 5 to 10 foot interval (550 milligrams per kilogram- mg/kg-TPH as gasoline- TPHg).

Additionally the library, located adjacent to the south side of the site, contains a basement with sump and is a potential sensitive receptor.

Therefore, please present a strategy in the Data Gap Investigation Work Plan described in Technical Comment 7 below to collect additional data to satisfy the characteristics of Scenarios 1, 2, or 3, or to collect soil gas data to satisfy Scenario 4.

Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Vapor Intrusion to Indoor Air in a SCM that assures that exposure to petroleum vapors in indoor air will not pose unacceptable health risks to occupants of future on-site structures and adjacent buildings.

Please note, that if direct measurement of soil gas is proposed, ensure that your strategy is consistent with the field sampling protocols described in the Department of Toxic Substances Control's Advisory-Active Soil Gas Investigations (July 2015).

- 5. LTCP Media Specific Criteria for Direct Contact and Outdoor Air Criteria** – The LTCP describes conditions where direct contact with contaminated soil or inhalation of contaminants volatilized to outdoor air poses a low threat to human health. According to the policy, release sites where human exposure may occur should satisfy the media-specific criteria for direct contact and outdoor air exposure and shall be considered low-threat if the maximum concentrations of petroleum constituents in soil are less than or equal to those listed in Table 1 for the specified depth bgs. Alternatively, the policy allows for a site specific risk assessment that demonstrates that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health, or controlling exposure through the use of mitigation measures, or institutional or engineering controls.

Our review of the case files indicates that insufficient data collection and analysis has been presented to satisfy the media-specific criteria for direct contact and outdoor air exposure. Specifically, no samples have been collected in the 0- to 5-foot interval and naphthalene has not been included as an analyte in soil samples recovered from the 5 to 10-foot interval.

Therefore, please present a strategy in the Data Gap Work Plan described in Technical Comment 7 below to collect sufficient data to satisfy the direct contact and outdoor air exposure criteria in the areas of likely UST, piping, and dispenser locations. Sample and analyze soil within the 0- to five and five- to- ten foot intervals, at the groundwater interface, lithologic changes, and at areas of obvious impact. Also, ACEH requests collection of a groundwater sample from each boring and propose the requisite analysis to include naphthalene. Additionally, include polycyclic aromatic hydrocarbon (PAH) analysis if a waste oil UST was in service at the site.

Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Direct Contact and Outdoor Air Exposure in the focused SCM described in Technical Comment 7 below that assures that exposure to petroleum constituents in soil will have no significant risk of adversely affecting human health.

- 6. Site History** – A Phase I Environmental Site Assessment (ESA-I) report was prepared for the property by AEI Consultants (AEI) in June 2000. This report has not been submitted to either the SWRCB GeoTracker or the ACEH ftp websites. ACEH is presently not able to determine if the site was used solely as a fueling station or included use as a service station. The former use of a waste oil determines the scope of analysis for samples collected at the site.

Therefore, please submit the ESA-I report by the date specified below.

Alternatively, please provide a detailed site history, including documentation, in the SCM described in Technical Comment 7 below.

- 7. Data Gap Investigation Work Plan and Focused Site Conceptual Model** – Please prepare a Data Gap Investigation Work Plan to address the technical comments listed above. Please support the scope of work in the Data Gap Investigation Work Plan with a focused SCM and Data Quality Objectives (DQOs) that relate the data collection to each LTCP criteria. For example please clarify which scenario within each Media-Specific Criteria a sampling strategy is intended to apply to.

In order to expedite review, ACEH requests the focused SCM be presented in a tabular format that highlights the major SCM elements and associated data gaps, which need to be addressed to progress the site to case closure under the LTCP. Please see Attachment A "Site Conceptual Model Requisite Elements". Please sequence activities in the proposed revised data gap investigation scope of work to enable efficient data collection in the fewest mobilizations possible.

TECHNICAL REPORT REQUEST

Please upload technical reports to the ACEH ftp site (Attention: Keith Nowell), and to the State Water Resources Control Board's Geotracker website, in accordance with the following specified file naming convention and schedule:

- **May 6, 2016** – Electronic Submittal of Information - Phase I Environmental Site Assessment (AEI, June 2000) (File to be named: PHASE1_R_yyyy-mm-dd)
- **June 14, 2016** – Data Gap Investigation Plan and Focused Site Conceptual Model (File to be named: WP_SCM_R_yyyy-mm-dd)

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

If your email address does not appear on the cover page of this notification ACEH is requesting you provide your email address so that we can correspond with you quickly and efficiently regarding your case.

Thank you for your cooperation. ACEH looks forward to working with you and your consultants to advance the case toward closure. Should you have any questions regarding this correspondence or your case, please call me at (510) 567-6764 or send an electronic mail message at keith.nowell@acgov.org.

Sincerely,

Keith Nowell, PG, CHG
Hazardous Materials Specialist

Enclosures: Attachment 1 - Responsible Party(ies) Legal Requirements/Obligations &
ACEH Electronic Report Upload (ftp) Instructions

Attachment A – Site Conceptual Model Requisite Elements

cc: Tim Cook - Cook Environmental Services, Inc., 1485 Treat Boulevard, Walnut Creek CA 94597
(Sent via E-mail to: tcook@cookenvironmental.com)

Dilan Roe, ACEH (Sent via E-mail to: dilan.roe@acgov.org)
Keith Nowell, ACEH (Sent via E-mail to: keith.nowell@acgov.org)
GeoTracker, file

Attachment 1

Responsible Party(ies) Legal Requirements / Obligations

REPORT REQUESTS

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) GeoTracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the GeoTracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in GeoTracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to \$10,000 per day for each day of violation.

Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)	REVISION DATE: May 15, 2014
	ISSUE DATE: July 5, 2005
	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010, July 25, 2010
SECTION: Miscellaneous Administrative Topics & Procedures	SUBJECT: Electronic Report Upload (ftp) Instructions

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- **Please do not submit reports as attachments to electronic mail.**
- Entire report including cover letter must be submitted to the ftp site as **a single portable document format (PDF) with no password protection.**
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- **Signature pages and perjury statements must be included and have either original or electronic signature.**
- **Do not password protect the document.** Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted.**
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:

RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Submission Instructions

- 1) Obtain User Name and Password
 - a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
 - i) Send an e-mail to deh.loptoxic@acgov.org
 - b) In the subject line of your request, be sure to include "**ftp PASSWORD REQUEST**" and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for.**
- 2) Upload Files to the ftp Site
 - a) Using Internet Explorer (IE4+), go to <ftp://alcoftp1.acgov.org>
 - (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site as they are NOT being supported at this time.
 - b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
 - c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
 - d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
 - e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.
- 3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
 - a) Send email to deh.loptoxic@acgov.org notify us that you have placed a report on our ftp site.
 - b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
 - c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
 - d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

ATTACHMENT A

Site Conceptual Model Requisite Elements

ATTACHMENT A

Site Conceptual Model

The site conceptual model (SCM) is an essential decision-making and communication tool for all interested parties during the site characterization, remediation planning and implementation, and closure process. A SCM is a set of working hypotheses pertaining to all aspects of the contaminant release, including site geology, hydrogeology, release history, residual and dissolved contamination, attenuation mechanisms, pathways to nearby receptors, and likely magnitude of potential impacts to receptors.

The SCM is initially used to characterize the site and identify data gaps. As the investigation proceeds and the data gaps are filled, the working hypotheses are modified, and the overall SCM is refined and strengthened until it is said to be “validated”. At this point, the focus of the SCM shifts from site characterization towards remedial technology evaluation and selection, and later remedy optimization, and forms the foundation for developing the most cost-effective corrective action plan to protect existing and potential receptors.

For ease of review, Alameda County Environmental Health (ACEH) requests utilization of tabular formats to (1) highlight the major SCM elements and their associated data gaps which need to be addressed to progress the site to case closure (see Table 1 of attached example), and (2) highlight the identified data gaps and proposed investigation activities (see Table 2 of the attached example). ACEH requests that the tables presenting the SCM elements, data gaps, and proposed investigation activities be updated as appropriate at each stage of the project and submitted with work plans, feasibility studies, corrective action plans, and requests for closures to support proposed work, conclusions, and/or recommendations.

The SCM should incorporate, but is not limited to, the topics listed below. Please support the SCM with the use of large-scaled maps and graphics, tables, and conceptual diagrams to illustrate key points (see Figures 2 through 6 for examples). Please include an extended site map(s) utilizing an aerial photographic base map with sufficient resolution to show the facility, delineation of streets and property boundaries within the adjacent neighborhood, downgradient irrigation wells, and proposed locations of transects, monitoring wells, and soil vapor probes.

- a. Regional and local (on-site and off-site) geology and hydrogeology. Include a discussion of the surface geology (e.g., soil types, soil parameters, outcrops, faulting), subsurface geology (e.g., stratigraphy, continuity, and connectivity), and hydrogeology (e.g., water-bearing zones, hydrologic parameters, impermeable strata). Please include a structural contour map (top of unit) and isopach map for the aquitard that is presumed to separate your release from the deeper aquifer(s), cross sections, soil boring and monitoring well logs and locations, and copies of regional geologic maps.
- b. Analysis of the hydraulic flow system in the vicinity of the site. Include rose diagrams for depicting groundwater gradients. The rose diagram shall be plotted on groundwater elevation contour maps and updated in all future reports submitted for your site. Please address changes due to seasonal precipitation and groundwater pumping, and evaluate the potential interconnection between shallow and deep aquifers. Please include an analysis of vertical hydraulic gradients, and effects of pumping rates on hydraulic head from nearby water supply wells, if appropriate. Include hydraulic head in the different water bearing zones and hydrographs of all monitoring wells.
- c. Release history, including potential source(s) of releases, potential contaminants of concern (COC) associated with each potential release, confirmed source locations, confirmed release locations, and existing delineation of release areas. Address primary leak source(s) (e.g., a tank, sump, pipeline, etc.) and secondary sources (e.g., high-

ATTACHMENT A

Site Conceptual Model (continued)

concentration contaminants in low-permeability lithologic soil units that sustain groundwater or vapor plumes). Include local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.).

- d. Plume (soil gas and groundwater) development and dynamics including aging of source(s), phase distribution (NAPL, dissolved, vapor, residual), diving plumes, attenuation mechanisms, migration routes, preferential pathways (geologic and anthropogenic), magnitude of chemicals of concern and spatial and temporal changes in concentrations, and contaminant fate and transport. Please include three-dimensional plume maps for groundwater and two-dimensional soil vapor plume plan view maps to provide an accurate depiction of the contaminant distribution of each COC.
- e. Summary tables of chemical concentrations in different media (i.e., soil, groundwater, and soil vapor). Please include applicable environmental screening levels on all tables. Include graphs of contaminant concentrations versus time.
- f. Current and historic facility structures (e.g., buildings, drain systems, sewer systems, underground utilities, etc.) and physical features including topographical features (e.g., hills, gradients, surface vegetation, or pavement) and surface water features (e.g. routes of drainage ditches, links to water bodies). Please include current and historic site maps.
- g. Current and historic site operations/processes (e.g., parts cleaning, chemical storage areas, manufacturing, etc.).
- h. Other contaminant release sites in the vicinity of the site. Hydrogeologic and contaminant data from those sites may prove helpful in testing certain hypotheses for the SCM. Include a summary of work and technical findings from nearby release sites, including the two adjacent closed LUFT sites, (i.e., Montgomery Ward site and the Quest Laboratory site).
- i. Land uses and exposure scenarios on the facility and adjacent properties. Include beneficial resources (e.g., groundwater classification, wetlands, natural resources, etc.), resource use locations (e.g., water supply wells, surface water intakes), subpopulation types and locations (e.g., schools, hospitals, day care centers, etc.), exposure scenarios (e.g. residential, industrial, recreational, farming), and exposure pathways, and potential threat to sensitive receptors. Include an analysis of the contaminant volatilization from the subsurface to indoor/outdoor air exposure route (i.e., vapor pathway). Please include copies of Sanborn maps and aerial photographs, as appropriate.
- j. Identification and listing of specific data gaps that require further investigation during subsequent phases of work. Proposed activities to investigate and fill data gaps identified.

TABLE 1
INITIAL SITE CONCEPTUAL MODEL
 Crown Chevrolet
 7544 Dublin Boulevard
 Dublin, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Geology and Hydrogeology	Regional	<p>The site is in the northwest portion of the Livermore Valley, which consists of a structural trough within the Diablo Range and contains the Livermore Valley Groundwater Basin (referred to as "the Basin") (DWR, 2006). Several faults traverse the Basin, which act as barriers to groundwater flow, as evidenced by large differences in water levels between the upgradient and downgradient sides of these faults (DWR, 2006). The Basin is divided into 12 groundwater basins, which are defined by faults and non-water-bearing geologic units (DWR, 1974).</p> <p>The hydrogeology of the Basin consists of a thick sequence of fresh-water-bearing continental deposits from alluvial fans, outwash plains, and lacustrine environments to up to approximately 5,000 feet bgs (DWR, 2006). Three defined fresh-water bearing geologic units exist within the Basin: Holocene Valley Fill (up to approximately 400 feet bgs in the central portion of the Basin), the Plio-Pleistocene Livermore Formation (generally between approximately 400 and 4,000 feet bgs in the central portion of the Basin), and the Pliocene Tassajara Formation (generally between approximately 250 and 5,000 or more feet bgs) (DWR, 1974). The Valley Fill units in the western portion of the Basin are capped by up to 40 feet of clay (DWR, 2006).</p>	None	NA
	Site	<p>Geology: Borings advanced at the site indicate that subsurface materials consist primarily of finer-grained deposits (clay, sandy clay, silt and sandy silt) with interbedded sand lenses to 20 feet below ground surface (bgs), the approximate depth to which these borings were advanced. The documented lithology for one on-site boring that was logged to approximately 45 feet bgs indicates that beyond approximately 20 feet bgs, fine-grained soils are present to approximately 45 feet bgs. A cone penetrometer technology test indicated the presence of sandier lenses from approximately 45 to 58 feet bgs and even coarser materials (interbedded with finer-grained materials) from approximately 58 feet to 75 feet bgs, the total depth drilled. The lithology documented at the site is similar to that reported at other nearby sites, specifically the Montgomery Ward site (7575 Dublin Boulevard), the Quest laboratory site (6511 Golden Gate Drive), the Shell-branded Service Station site (11989 Dublin Boulevard), and the Chevron site (7007 San Ramon Road).</p> <p>Hydrogeology: Shallow groundwater has been encountered at depths of approximately 9 to 15 feet bgs. The hydraulic gradient and groundwater flow direction have not been specifically evaluated at the site.</p>	<p>As noted, most borings at the site have been advanced to approximately 20 feet bgs, and one boring has been advanced and logged to 45 feet bgs; CPT data was collected to 75 feet bgs at one location. Lithologic data will be obtained from additional borings that will be advanced on site to further the understanding of the subsurface, especially with respect to deeper lithology.</p> <p>The on-site shallow groundwater horizontal gradient has not been confirmed. Additionally, it is not known if there may be a vertical component to the hydraulic gradient.</p>	<p>Two direct push borings and four multi-port wells will be advanced to depth (up to approximately 75 feet bgs) and soil lithology will be logged. See items 4 and 5 on Table 2.</p> <p>Shallow and deeper groundwater monitoring wells will be installed to provide information on lateral and vertical gradients. See Items 2 and 5 on Table 2.</p>
Surface Water Bodies		The closest surface water bodies are culverted creeks. Martin Canyon Creek flows from a gully west of the site, enters a culvert north of the site, and then bends to the south, passing approximately 1,000 feet east of the site before flowing into the Alamo Canal. Dublin Creek flows from a gully west of the site, enters a culvert approximately 750 feet south of the site, and then joins Martin Canyon Creek approximately 750 feet southeast of the site.	None	NA
Nearby Wells		The State Water Resources Control Board's GeoTracker GAMA website includes information regarding the approximate locations of water supply wells in California. In the vicinity of the site, the closest water supply wells presented on this website are depicted approximately 2 miles southeast of the site; the locations shown are approximate (within 1 mile of actual location for California Department of Public Health supply wells and 0.5 mile for other supply wells). No water-producing wells were identified within 1/4 mile of the site in the well survey conducted for the Quest Laboratory site (6511 Golden Gate Drive; documented in 2009); information documented in a 2005 report for the Chevron site at 7007 San Ramon Road indicates that a water-producing well may exist within 1/2 mile of the site.	A formal well survey is needed to identify water-producing, monitoring, cathodic protection, and dewatering wells.	Obtain data regarding nearby, permitted wells from the California Department of Water Resources and Zone 7 Water Agency (Item 11 on Table 2).

TABLE 1
INITIAL SITE CONCEPTUAL MODEL
 Crown Chevrolet
 7544 Dublin Boulevard
 Dublin, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Constituents of Concern		<p>Constituents of concern have been identified by comparing analytical results to environmental screening levels for residential land use and for groundwater that is a current or potential drinking water source, developed by the California Regional Water Quality Control Board, San Francisco Bay Region (May 2008).</p> <p>PCE and TCE have been identified as the primary constituents of concern at the site; these constituents have been detected in soil, groundwater and soil vapor in the northern portion of the site. Biodegradation byproducts (e.g., cis-1,2-DCE) are present in groundwater, but at lower concentrations relative to PCE and TCE and below their respective environmental screening levels. Vinyl chloride has been detected in soil vapor at concentrations above its screening level.</p> <p>In the northern portion of the site, benzene and ethylbenzene have been detected in soil vapor at concentrations above their respective screening levels.</p> <p>Chlorobenzene and related constituents, and to a lesser extent, benzene, are present in soil, groundwater, and soil vapor at the former sump and pit in Building B.</p>	None	NA
Potential Sources	On-site	<p>Building B has been used for servicing automobiles since the 1960s. Based on the minor detections of PCE in soil vapor (in an area where groundwater is not impacted) beneath Building B and in groundwater beneath the former sump in another portion of Building B, it is possible that PCE entered the drain line from the sump within Building B, and was released to the subsurface from the sewer line northeast of Building A between 1968 and the present. There is no likely source in Building A, which has only been used as a showroom. Investigation performed within and downgradient of Building C indicates that there are no significant impacts in this area.</p> <p>Two USTs (one 1,000-gallon gasoline and one 1,000-gallon waste oil) are present just south of Building B). The tanks appear to have been replaced in the 1980s and upgraded in 1998. Recent data collected in the vicinity of the USTs indicate that there are no significant impacts.</p>	<p>Concentrations of PCE in groundwater and soil vapor are highest approximately 50 feet west of the sewer line; the mechanism for these constituents to be present west of the sewer line is not currently known.</p> <p>The absence of localized impacts to soil in the vicinity of the USTs has not been confirmed.</p>	<p>A subsurface utility locator, using ground penetrating radar, will evaluate the area north of Building A to ascertain the possible presence of unknown, buried utilities that could serve as a PCE source or migration conduit in the area. See Item 10 on Table 2.</p> <p>No additional investigation is recommended at this time. Additional sampling may be conducted as part of the formal UST closure process, and any impacts addressed at that time.</p>
Potential Sources	Off-site	<p>The site is located within a commercial/industrial area, and several vehicle-maintenance related shops are located south of the site; these facilities appear to be served by a sewer that flows north along the western edge of the Crown site. It is possible that PCE was released to the subsurface upgradient of the site via the sewer line.</p> <p>Additionally, there are three dry cleaners located hydraulically upgradient of the Crown site, including Crow Canyon Cleaners at 7272 San Ramon Road, which has a known groundwater contamination issue (however, that site is approximately 0.5 mile from the Crown site and groundwater at the site has limited impact with maximum concentrations of 24 parts per billion). The other two sites, VIP Cleaners at 7214 Regional Street and "Dry Clean 1 Hour" at 7257 Regional Street, are slightly closer to the Crown site (0.3 mile) and may have had an undocumented release to soil or groundwater. All three of the sites are served by sewers that flow north, away from the Crown site, but sewer releases in the general area, if any, could have impacted groundwater flowing toward the Crown site.</p>	A specific off-site source is not known at this time. It is possible that additional research and/or investigation will be warranted at a later time, pending the results of this investigation.	NA

TABLE 1
INITIAL SITE CONCEPTUAL MODEL
 Crown Chevrolet
 7544 Dublin Boulevard
 Dublin, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Potential Presence of DNAPL		<p>Based on the currently available information, there does not appear to be separate-phase product (i.e., DNAPL) in soil or groundwater at the site. The U.S. EPA Fact Sheet entitled "Estimating Potential for Occurrence of DNAPL at Superfund Sites" (Fact Sheet) includes two flow charts that provide guidance for assessing whether site characterization data indicate the presence of DNAPL. The EPA approach uses lines of evidence that include consideration of historical site use and site characterization data.</p> <p>Based on the historical site use flow chart, some activities may have been performed (i.e., metal cleaning/degreasing and paint removing/stripping) that possibly may have resulted in historical DNAPL releases. However, review of available historical site chemical inventories does not indicate the presence of pure product PCE; it was likely present within other products at lower concentrations (percentage of product mixtures).</p> <p>Laboratory data generated from site characterization activities conducted to date do not indicate the potential for DNAPL, based on the following conditions, which are components of the laboratory data flow chart in the Fact Sheet:</p> <ul style="list-style-type: none"> • Concentrations of PCE in groundwater are not greater than 1% of the solubility of PCE (i.e., greater than 2,000 µg/L, which is 1% of the pure product solubility of PCE)¹; • Concentrations of PCE on soils are not greater than 10,000 mg/kg (and PID readings collected every 1 to 3 feet in the area of elevated groundwater concentrations were all 0, with the exception of several readings at 0.1 parts per million); and • Concentrations of PCE in groundwater calculated from water/soil partitioning relationships and soil samples are not greater than 1,500 µg/L. 	Some elements listed in the Fact Sheet that would further our understanding of whether DNAPL is present at the site include additional knowledge of site stratigraphy and vertical distribution of PCE.	Four multi-port wells will be advanced to depth (up to approximately 75 feet bgs) and soil lithology will be logged. See items 4 and 5 on Table 2.
Nature and Extent of Environmental Impacts	Extent in Soil	<p>PCE and TCE have been detected in soil samples collected north of Buildings A and B. All concentrations are less than their respective screening levels for residential shallow soil, applicable to groundwater considered to be a potential source of drinking water (screening levels of 370 and 460 µg/kg for PCE and TCE, respectively). PCE was detected at concentrations up to 6.8 µg/kg in soil at a depth of approximately 5.5 feet bgs in the vicinity of the highest PCE concentrations in groundwater and soil vapor (locations NM-B-32 and SV-22, respectively). It is likely that these PCE detections represent PCE in the vapor phase and not a source of PCE in soil. PCE and TCE were detected in deeper soil samples (between 12.5 and 14.5 feet bgs) at concentrations up to 36 µg/kg (in borings NM-B-23B, -24, -25, -26, 29, and -30). These soil samples were generally located within the saturated zone and it is likely that the detected concentrations represent PCE and TCE in groundwater. Soil was screened during advancement of the direct-push probe approximately every 1 to 4 feet using a PID; readings in most borings were 0 ppm; the highest PID readings (up to 22 ppmv of total VOCs) were observed at SB-02 within a likely saturated zone.</p>	Additional samples will be collected to confirm absence of significant VOC concentrations in soil.	Soil samples will be collected from select borings, as indicated on Table 2 (Items 1, 3, and 8); sampling locations are prescribed and/or will be collected based on field observations.
		<p>Chlorobenzenes and petroleum-related constituents were detected in soil in the vicinity of the former sump and pit at concentrations greater than their respective ESLs; soil remediation was performed in 2011. Currently inaccessible impacted soil remains in place under existing building foundation walls at concentrations greater than ESLs.</p>	Soil samples have collected to a total depth of 11.5 feet bgs pre-remediation and 8 feet bgs post-remediation beneath the sump. The remediation consisted of soil excavation to a depth of 16 feet bgs. No soil samples were collected at the base of the excavation because the soil was saturated; there is currently no data confirming the absence of significant impacts to soil beneath the sump.	No additional investigation is recommended at this time. Additional soil removal and sampling may be conducted at the time of redevelopment.

TABLE 1
INITIAL SITE CONCEPTUAL MODEL
 Crown Chevrolet
 7544 Dublin Boulevard
 Dublin, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Nature and Extent of Environmental Impacts	Extent in Soil	TPHho (at concentrations greater than the residential ESL) was detected in soil sample SB-20-11 near a hydraulic lift east of the former pit in Building B (an elevated concentration of TPHho also was detected in soil sample SB-25-8; this sample location subsequently was excavated). Analysis for PCBs was performed on 13 samples, which were collected in the vicinity of hydraulic lifts within Building B. One PCB, Aroclor 1242, was detected in a soil sample collected at location NM-B-5 just north of the pit in Building B; however, the concentration of Aroclor 1242 at this location was an order of magnitude lower than its screening level. No other PCBs were detected in soil samples (however, the detection limit for Aroclor in 1 sample of the 13 samples analyzed was above the screening level).	None	NA
Nature and Extent of Environmental Impacts	Extent in Shallow Groundwater	<p>Grab groundwater data are available for VOCs on approximately 50- to 100-foot centers throughout the northern portion of the site, indicating that PCE, TCE, and some related breakdown products (other VOCs) are present in groundwater at concentrations greater than their respective screening levels that consider groundwater to be a current or potential drinking water resource (the screening level is 5 µg/L for both PCE and TCE). The current data indicate that the highest concentrations of PCE in groundwater are limited to a small area just north of Building A, adjacent to and near a sewer line (concentrations in this area range from 120 to 190 µg/L at locations NM-B-23B2 and NM-B-32, respectively; these concentrations are not indicative of separate-phase product in groundwater). PCE also was detected at concentrations less than 50 µg/L upgradient (to the north and west) and downgradient (to the east) of the highest concentration area.</p> <p>TCE is present at higher concentrations relative to PCE at sampling locations NM-B-26-W and NM-B-28-W, in the northeast corner of the site; cis- and trans-1,2-DCE also were detected in these groundwater samples (at concentrations below their respective screening levels). Cis- and trans-1,2-DCE also have been detected (below screening levels) at other groundwater sampling locations. The results suggest that natural biodegradation could be occurring.</p> <p>With the exception of one shallow grab groundwater sample (Basics sample B8 located at the former sump) in which PCE was detected at 9.6 µg/L, only low concentrations of PCE (less than 5 µg/L) were detected in shallow groundwater in the vicinity of the former sump and pit.</p>	<p>Groundwater concentrations are not defined to less than the ESL in the following areas:</p> <ul style="list-style-type: none"> • The northern and western property boundaries. • The eastern property boundary and the adjacent property to the east. • Within Building A, south of the highest concentration area. <p>No temporal data are available.</p> <p>Specific data to confirm that natural biodegradation processes may be occurring has not been collected.</p>	<p>Seven monitoring wells will be installed to collect groundwater samples for evaluation of current and long-term concentration trends. See items 1, 2, 3, 5, 4, 7, and 8 in Table 2.</p> <p>Groundwater samples will be analyzed for field parameters that could indicate that natural biodegradation is occurring. See Item 2 in Table 2.</p>
		Chlorobenzenes and petroleum-related constituents are present in shallow groundwater at concentrations greater than ESLs in the vicinity of the former sump within Building B (where soil remediation was conducted in 2011). The presence of these constituents (e.g., gasoline-range organics, benzene, and chlorobenzene) in groundwater appears to be limited to an area within approximately 15 feet of the former sump. These constituents were not detected above ESLs in groundwater samples collected at the former pit in Building B.	No temporal data are available.	One shallow groundwater monitoring well will be installed within the area of known impacts. See Item 2 on Table 2.
		TPHho (at a concentration greater than its screening level) was detected in an unfiltered groundwater sample (SB-20) collected near one hydraulic lift east of the former pit in Building B; however, no TPHho was detected in the filtered groundwater sample. The unfiltered sample result is likely representative of TPHho sorbed onto soil particles, as TPHho was also detected in soil at 11 feet bgs at this location. The reporting limits for TPHho (and TPHd and TPHmo) in groundwater are greater than the respective screening levels for these constituents. However, no TPH was detected down to the laboratory's method detection limit for the filtered samples. While concentrations less than the laboratory reporting limit are estimated, the absence of detections indicates that dissolved TPHd, TPHmo, and TPHho are not present.	None	NA
		Total chromium was detected above the residential ESL at one location (SB-06), but dissolved concentrations in the vicinity were less than the screening level.	None	NA

TABLE 1
INITIAL SITE CONCEPTUAL MODEL
 Crown Chevrolet
 7544 Dublin Boulevard
 Dublin, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Nature and Extent of Environmental Impacts	Extent in Deeper Groundwater	Grab groundwater samples have been collected from two deeper water-bearing zones. Samples were collected from approximately 42 to 47 feet bgs and from 58 to 63 feet bgs from a boring just downgradient of the former sump within building B, and from approximately 43.5 feet bgs from a boring adjacent to the sewer line (northeast of Building A, just east of the highest concentration area). No constituents were detected in the deeper groundwater samples.	Limited data are available within the area of known PCE impacts to shallow groundwater, and no temporal data are available.	Nested, multi-port groundwater monitoring wells will be installed at four locations. Ports will be located within the shallowest water-bearing zone, in addition to one to two deeper water bearing zones (as possible based on saturated units encountered). See Item 5 of Table 2.
Nature and Extent of Environmental Impacts	Extent in Soil Vapor	PCE, TCE, vinyl chloride, and some related breakdown products, were detected in soil vapor in the northern portion of the north parcel; PCE, TCE, and vinyl chloride concentrations are greater than residential screening levels for evaluation of potential vapor intrusion concerns (410, 1,200, and 31 µg/m ³ , respectively [Table E-2 of the May 2008 Water Board publication]) in some areas. The highest concentrations of PCE detected in soil vapor (up to a maximum concentration of 35,000 µg/m ³ at location SV-22) were in the vicinity of the highest concentrations of PCE in groundwater (north of Building A, near the sewer line). PCE has been detected in soil vapor at concentrations greater than the ESL (up to 9,600 µg/m ³ at location SV-24) at various locations north of Buildings A and B, along the sewer line running from between Buildings A and B to Dublin Boulevard, and along the floor drain lateral to the sewer line within Building B. (It should be noted that PCE was detected at 4,700 µg/m ³ in sample SV-3, collected from within a former pit in Building B; this pit has since been removed). The higher concentrations of TCE in soil vapor also generally correlate with the higher concentrations of TCE in groundwater. The concentration of vinyl chloride in soil vapor exceeded its screening level in three samples collected in the north-central area of the north parcel (SG-03, SG-04, and SV-23).	Only limited soil vapor data is available at the eastern property boundary.	A transect of four nested temporary soil vapor probes will be installed at the eastern property boundary. Based on results of initial sampling, at least two of these probes will be converted to permanent vapor monitoring probes. See Item 6 on Table 2.
		PCE was detected in one vapor sample, at a concentration that is approximately an order of magnitude less than its screening level, at the northwestern corner of the southern parcel. No auto servicing activities are known to have been conducted in this area, which was historically used as a parking lot. PCE was not detected in groundwater at this location.	The source and extent of PCE in soil vapor is not known.	Four temporary soil vapor probes will be installed and sampled in the southern parcel around the location of the PCE detection. See Item 9 on Table 2.
Nature and Extent of Environmental Impacts	Extent in Soil Vapor	Benzene and ethylbenzene have been detected in shallow soil vapor (i.e., collected from 1.5 to 5 feet bgs) north of Buildings A and B at concentrations exceeding their respective screening levels. Benzene was detected at concentrations generally ranging from 90 to 160 µg/m ³ , with one detected concentration of 1,300 µg/m ³ (the shallowest soil vapor sample, which was collected from a depth of 1.5 to 2 feet bgs at location SV-16) in the northeastern portion of the north parcel. Ethylbenzene concentrations were greater than the screening level at two locations, up to a maximum concentration of 1,300 µg/m ³ at location SV-16. These constituents were not detected in corresponding soil and groundwater samples, and there was not a visible pattern to the soil vapor sample concentrations. Additionally, there is no known source of petroleum-related constituents in the northern portion of the north parcel.	The extent of benzene and ethylbenzene at concentrations greater than screening levels has not been defined. While shallow soil will be removed during the proposed redevelopment, and engineering controls are expected to be implemented in this area due to PCE concentrations in soil vapor, only limited soil vapor data is available at the eastern property boundary.	A transect of four nested temporary soil vapor probes will be installed at the eastern property boundary. Based on results of initial sampling, at least two of these probes will be converted to permanent vapor monitoring probes. See Item 6 on Table 2.
		Soil vapor sampling was conducted in the vicinity of the former sump and pit in Building B prior to remediation, and some concentrations of PCE, benzene, 1,2-dichlorobenzene, and 1,4-dichlorobenzene were greater than their respective screening levels at that time.	Post-remediation soil vapor concentrations are not known.	No additional investigation is recommended at this time. Additional sampling may be conducted at the time of redevelopment.
Migration Pathways	Potential Conduits	Figure 2 shows the known locations of on-site utilities, including sanitary sewer laterals, water, gas, and electrical lines. These facilities could act as conduits for vapor migration. From the data collected at the site, it appears that concentrations of VOCs in soil vapor generally correlate with concentrations of VOCs in groundwater. Based on this observation, it appears that these utilities act as only a minor conduit, if at all.	While we believe that PCE was released to the subsurface via the main on-site sewer line and lateral from Building B, the highest concentrations of PCE in soil vapor and groundwater are west (in the presumed upgradient direction) of the on-site sewer main. The extent of possible subsurface utilities just north of Building A, which may have acted as a source for a PCE release, is not known.	A subsurface utility locator will evaluate the area, including with ground-penetrating radar, to evaluate if there are potential conduits in the area. See Item 10 on Table 2.

TABLE 1
INITIAL SITE CONCEPTUAL MODEL
 Crown Chevrolet
 7544 Dublin Boulevard
 Dublin, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Potential Receptors/Risk	On-site	Potable water at the site currently is provided via municipal supply and will continue to be in the foreseeable future. As such, direct contact to groundwater is not contemplated. Receptors at the site could include the following: <ul style="list-style-type: none"> • Current worker via vapor intrusion to indoor air • Future construction worker via soil, groundwater, and soil vapor • Future resident via vapor intrusion to indoor air • Future maintenance worker via soil and soil vapor 	Potential impacts to on-site receptors are not known.	Human health risks will be evaluated following additional data collection.
Potential Receptors/Risk	Off-site	Potential off-site receptors include: <ul style="list-style-type: none"> • Nearby water-producing wells, if any are present • Concrete-lined Dublin Creek and Martin Canyon Creek 	Potential impacts to off-site receptors are not known.	Data will be obtained from the California Department of Water Resources and Zone 7 Water Agency regarding the location of nearby water-producing wells, including the depth at which groundwater is extracted, will be obtained. See Item 11 on Table 2. The potential for constituents at the site to impact off-site receptors will be evaluated pending the results of the proposed investigation.

Abbreviations

bgs = below ground surface
 cis-1,2-DCE = cis-1,2-dichloroethene
 trans-1,2-DCE = trans-1,2-dichloroethene
 DNAPL = dense non-aqueous phase liquid
 mg/kg = milligrams per kilogram
 PCE = tetrachloroethene
 PCBs = polychlorinated biphenyls
 PID = photoionization detector
 ppm = parts per million
 ppmv = parts per million by volume
 TCE = trichloroethene
 TPHho = total petroleum hydrocarbons as hydraulic oil
 TPHd = total petroleum hydrocarbons as diesel
 TPHmo = total petroleum hydrocarbons as motor oil
 µg/kg = micrograms per kilogram
 µg/L = micrograms per liter
 µg/m³ = micrograms per cubic meter

Note

1. Pankow, J., et al, 1996, Dense chlorinated solvents in groundwater: background and history of the problem: in Pankow D. and Cherry J. (eds.), Dense Chlorinated Solvents and other DNAPLs in Groundwater, Waterloo Press, Portland, Ore., Ch. 1, pp. 1-52.

TABLE 2
DATA GAPS AND PROPOSED INVESTIGATION

Crown Chevrolet
7544 Dublin Boulevard
Dublin, California

Item	Data Gap	Proposed Investigation	Rationale	Analysis
1	Refine groundwater contours beneath Building A. Collect data relevant to the potential for biodegradation.	Advance two borings to approximately 20 feet bgs within Building A for collection of soil and grab groundwater samples. ¹ Soil samples will be collected at two depths in the vadose zone. Soil samples will be collected based on field indications of impacts (PID readings, odor, staining) or, in the absence of field indications of impacts, at 5 and 10 feet bgs.	The highest concentrations of PCE in groundwater were detected at boring NM-B-32, just north of Building A. One boring will be advanced approximately 15 feet from the northern building wall to provide data close to the highest concentration area. A second boring will be advanced approximately halfway between the first boring and existing boring NM-B-31 to provide additional spatial data for contouring purposes. These borings will be part of a transect in the highest concentration area.	<i>Groundwater:</i> VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance. <i>Soil:</i> VOCs by EPA Method 8260 (soil samples to be collected using field preservation in accordance with EPA Method 5035).
2	Confirm shallow groundwater flow direction. Evaluate VOC concentration trends over time. Collect data relevant to the potential for biodegradation.	Install seven shallow groundwater monitoring wells to approximately 15 to 20 feet bgs in northern portion of site (monitoring well locations may be adjusted pending results of grab groundwater samples). <ul style="list-style-type: none"> • Three of these wells will be pre-pack wells installed using direct push technology, and a grab groundwater sample will be collected from these borings prior to installation of the well. • Four of these wells will be part of nested, multi-port wells that will also allow collection of chemical and water level data from deeper groundwater (see Item 6, below). • Soil samples will be collected only if there are field indications of impacts (with the exception of the well planned in the highest PCE concentration area, where soil samples will be collected at two depths in the vadose zone based on field indications of impacts (PID readings, odor, staining) or, in the absence of field indications of impacts, at 5 and 10 feet bgs.). • Groundwater monitoring frequency to be determined. 	To evaluate groundwater flow direction, a minimum of three wells is needed; the seven proposed wells will provide for a more robust analysis. It is proposed that the wells be spaced throughout the northern portion of the north parcel to evaluate concentration trends while also evaluating groundwater flow direction. <ul style="list-style-type: none"> • In the west, one well is proposed at the western property boundary at the location where PCE concentrations are highest (the location may be adjusted based on the results of grab groundwater samples to be collected nearby). • A second well is proposed in the area with the highest concentrations of PCE in groundwater, north of Building A. • Three wells are proposed in a north-south line through the middle of the northern parking lot to evaluate spatial variations in PCE and TCE concentrations. • A sixth well is proposed just southwest (downgradient) of the former sump, where VOCs have been detected in groundwater. • A seventh well is proposed at the eastern property boundary; its distance from the northern property boundary is based on where existing data indicate the highest concentrations of PCE are present. 	<i>Groundwater:</i> VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance. <i>Soil:</i> VOCs by EPA Method 8260 (soil samples to be collected using field preservation in accordance with EPA Method 5035).
3	Evaluate groundwater impacts along western property boundary (presumed upgradient boundary).	Advance a transect of three borings to approximately 20 feet bgs at the western property boundary for collection of soil and grab groundwater samples (one will be converted to a monitoring well; see Item 2, above). Soil samples will be collected at two depths in the vadose zone based on field indications of impacts (PID readings, odor, staining) or, in the absence of field indications of impacts, at 5 and 10 feet bgs.	PCE was detected in boring NM-B-34, at the western property boundary. A transect of three additional borings is proposed at an approximately 15-foot spacing to the south to provide more data regarding PCE at the upgradient property boundary. Data from these borings may be used to modify the location of one of the monitoring wells.	<i>Groundwater:</i> VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance. <i>Soil:</i> VOCs by EPA Method 8260 (soil samples to be collected using field preservation in accordance with EPA Method 5035).
4	Evaluate deeper lithology at the site.	Advance two direct push borings to approximately 75 feet bgs (one downgradient of the highest concentration area and one upgradient). Soil samples will be collected only if there are field indications of impacts. Soil lithology will be logged.	One boring is proposed adjacent to the location of the westernmost nested well, and one is proposed between the two nested wells in the central portion of the northern parking lot (see Item 6, below). No borings are proposed in the highest concentration area, as a precaution to avoid potential cross-contamination.	None

TABLE 2
DATA GAPS AND PROPOSED INVESTIGATION

Crown Chevrolet
7544 Dublin Boulevard
Dublin, California

Item	Data Gap	Proposed Investigation	Rationale	Analysis
5	Evaluate the possible presence of impacts to deeper groundwater. Evaluate deeper groundwater concentration trends over time. Obtain data regarding the vertical groundwater gradient. Obtain more lithological data below 20 feet bgs.	Install four continuous multichannel tubing (CMT) groundwater monitoring wells (aka multi-port wells) to approximately 65 feet bgs in the northern parking lot with ports at three depths (monitoring well locations may be adjusted pending results of shallow grab groundwater samples; we will discuss any potential changes with ACEH before proceeding). Groundwater monitoring frequency to be determined. Soil samples will be collected only if there are field indications of impacts. Soil lithology will be logged. However, information regarding the moisture content of soil may not be reliable using sonic drilling technology (two borings will be logged using direct push technology; see Item 4, above).	One well is proposed at the western (upgradient) property boundary to confirm that there are no deeper groundwater impacts from upgradient. Two wells are proposed near the center of the northern parking lot to evaluate potential impacts in an area where deeper impacts, if any, would most likely to be found. One well is proposed at the eastern (downgradient) property boundary to confirm that there are no impacts extending off-site. Port depths will be chosen based on the locations of saturated soils (as logged in direct push borings; see Item 4, above), but are expected at approximately 15, 45, and 60 feet bgs.	<i>Groundwater:</i> VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
6	Evaluate possible off-site migration of impacted soil vapor in the downgradient direction (east). Evaluate concentration trends over time.	Install 4 temporary nested soil vapor probes at approximately 4 and 8 feet bgs along the eastern property boundary. Based on the results of the sampling, two sets of nested probes will be converted to vapor monitoring wells to allow for evaluation of VOC concentration trends over time.	Available data indicate that PCE and TCE are present in soil vapor in the eastern portion of the northern parking lot. Samples are proposed on approximately 50-foot intervals along the eastern property boundary to provide a transect of concentrations through the vapor plume. The depths of 4 and 8 feet bgs are chosen to provide data closest to the source (i.e., groundwater) while avoiding saturated soil, and also provide shallower data to help evaluate potential attenuation within the soil column. Two sets of nested vapor probes will be converted into vapor monitoring wells (by installing well boxes at ground surface); the locations of the permanent wells will be chosen based on the results of samples from the temporary probes.	<i>Soil vapor:</i> VOCs by EPA Method TO-15.
7	Evaluate potential for off-site migration of impacted groundwater in the downgradient direction (east).	Advance two borings to approximately 20 feet bgs in the parking lot of the property east of the Crown site for collection of grab groundwater samples.	Two borings are proposed off-site, on the property east of the Crown site, just east of the building in the expected area of highest potential VOC concentrations.	<i>Groundwater:</i> VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
8	Evaluate VOC concentrations just north of the highest concentration area.	Advance two borings to approximately 20 feet bgs north of Building A for collection of soil and grab groundwater samples. Soil samples will be collected at two depths in the vadose zone. Soil samples will be collected based on field indications of impacts (PID readings, odor, staining) or, in the absence of field indications of impacts, at 5 and 10 feet bgs.	The highest concentrations of PCE in groundwater were detected at boring NM-B-32, just north of Building A. The nearest available data to the north are approximately 75 feet away. One of the borings will be advanced approximately 20 feet north of NM-B-32 to provide data close to the highest concentration area. A second boring will be advanced approximately halfway between the first boring and former boring NM-B-33 to provide additional spatial data for contouring purposes. These borings will be part of a transect in the highest concentration area.	<i>Groundwater:</i> VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance. <i>Soil:</i> VOCs by EPA Method 8260 (soil samples to be collected using field preservation in accordance with EPA Method 5035).
9	Evaluate VOC concentrations in soil vapor in the south parcel of the site.	Install four temporary soil vapor probes at approximately 5 feet bgs around boring SV-25, where PCE was detected in soil vapor at a low concentration.	PCE was detected in soil vapor sample SV-25 in the southern parcel, although was not detected in groundwater in that area. Three probes will be installed approximately 30 feet from of boring SV-25 to attempt to delineate the extent of impacts. A fourth probe is proposed west of the original sample, close to the property boundary and the location of mapped utility lines, which may be a potential conduit, to evaluate potential impacts from the west.	<i>Soil vapor:</i> VOCs by EPA Method TO-15.
10	Obtain additional information regarding subsurface structures and utilities to further evaluate migration pathways and sources.	Ground penetrating radar (GPR) and other utility locating methodologies will be used, as appropriate, to further evaluate the presence of unknown utilities and structures at the site.	Utilities have been identified at the site that include an on-site sewer lateral and drain line, and shallow water, electric, and gas lines. Given the current understanding of the distribution of PCE in groundwater at the site, it is possible that other subsurface utilities, and specifically sewer laterals, exist that may act as a source or migration pathway for distribution of VOCs in the subsurface.	NA

TABLE 2
DATA GAPS AND PROPOSED INVESTIGATION
 Crown Chevrolet
 7544 Dublin Boulevard
 Dublin, California

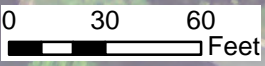
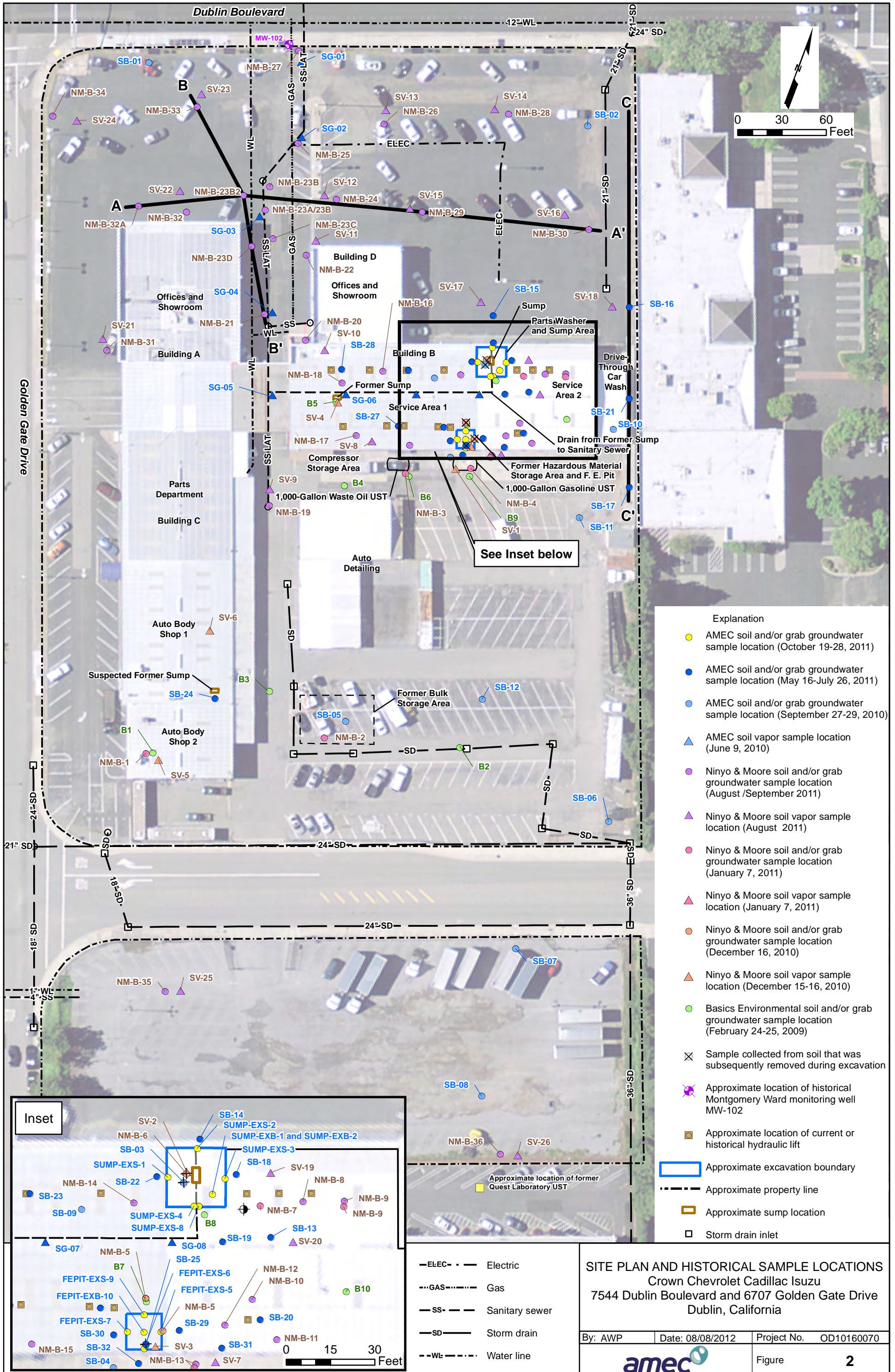
Item	Data Gap	Proposed Investigation	Rationale	Analysis
11	Perform a formal well survey to identify water-producing wells.	A formal well survey will be performed to identify water-producing, monitoring, and cathodic protection wells. Data will be obtained regarding nearby, permitted wells from the California Department of Water Resources and Zone 7 Water Agency (Item 11 on Table 2).	If groundwater downgradient of the site is being used for supply purposes, it is possible that VOCs related to the site could be impacting groundwater.	NA

Notes

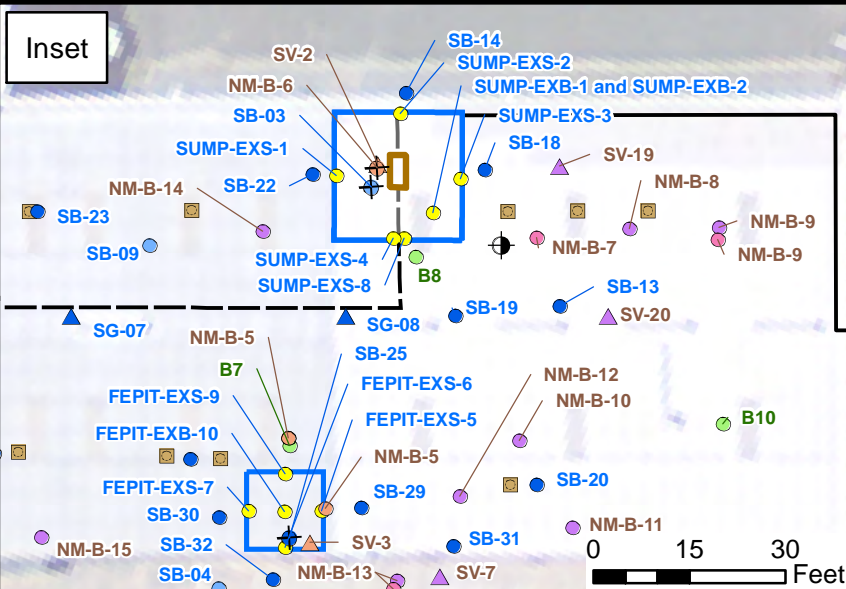
1. Borings for soil/grab groundwater collection may be terminated at 15 feet bgs if groundwater is encountered and grab groundwater sample collection is possible at that depth. Soil lithology will be logged at all borings.

Abbreviations

- bgs = below ground surface
- EPA = U.S. Environmental Protection Agency
- PCE = tetrachloroethene
- TPHg = total petroleum hydrocarbons quantified as gasoline
- VOCs = volatile organic compounds



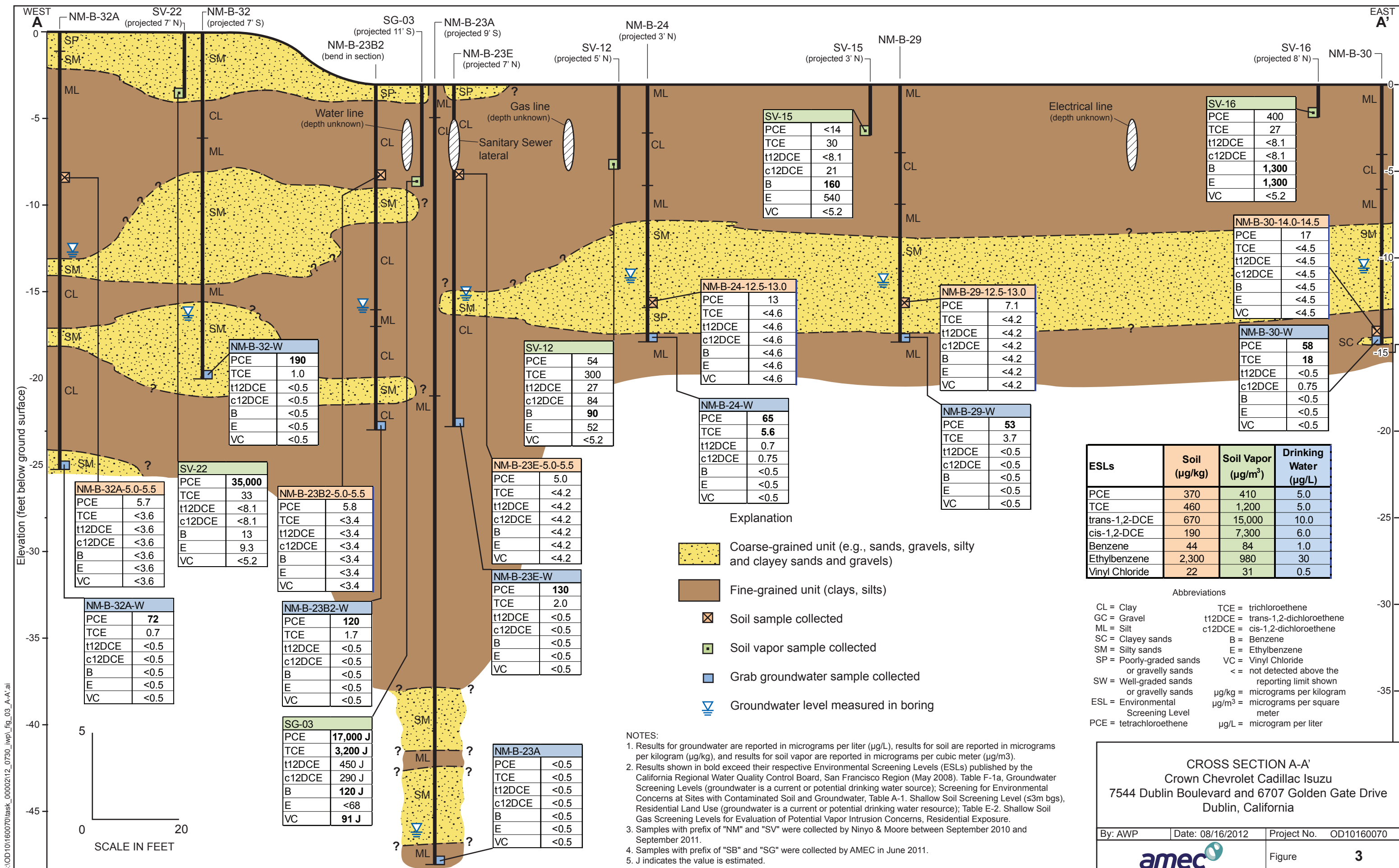
- Explanation**
- AMEC soil and/or grab groundwater sample location (October 19-28, 2011)
 - AMEC soil and/or grab groundwater sample location (May 16-July 26, 2011)
 - AMEC soil and/or grab groundwater sample location (September 27-29, 2010)
 - ▲ AMEC soil vapor sample location (June 9, 2010)
 - Ninyo & Moore soil and/or grab groundwater sample location (August /September 2011)
 - ▲ Ninyo & Moore soil vapor sample location (August 2011)
 - Ninyo & Moore soil and/or grab groundwater sample location (January 7, 2011)
 - ▲ Ninyo & Moore soil vapor sample location (January 7, 2011)
 - Ninyo & Moore soil and/or grab groundwater sample location (December 16, 2010)
 - ▲ Ninyo & Moore soil vapor sample location (December 15-16, 2010)
 - Basics Environmental soil and/or grab groundwater sample location (February 24-25, 2009)
 - ⊗ Sample collected from soil that was subsequently removed during excavation
 - ⊗ Approximate location of historical Montgomery Ward monitoring well MW-102
 - ⊗ Approximate location of current or historical hydraulic lift
 - Approximate excavation boundary
 - Approximate property line
 - ⊗ Approximate sump location
 - Storm drain inlet



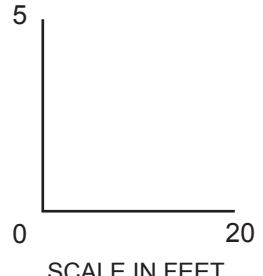
- ELEC--- Electric
- GAS--- Gas
- SS--- Sanitary sewer
- SD--- Storm drain
- WL--- Water line

SITE PLAN AND HISTORICAL SAMPLE LOCATIONS
 Crown Chevrolet Cadillac Isuzu
 7544 Dublin Boulevard and 6707 Golden Gate Drive
 Dublin, California

By: AWP	Date: 08/08/2012	Project No. OD10160070
		Figure 2



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- Explanation**
- Coarse-grained unit (e.g., sands, gravels, silty and clayey sands and gravels)
 - Fine-grained unit (clays, silts)
 - Soil sample collected
 - Soil vapor sample collected
 - Grab groundwater sample collected
 - Groundwater level measured in boring

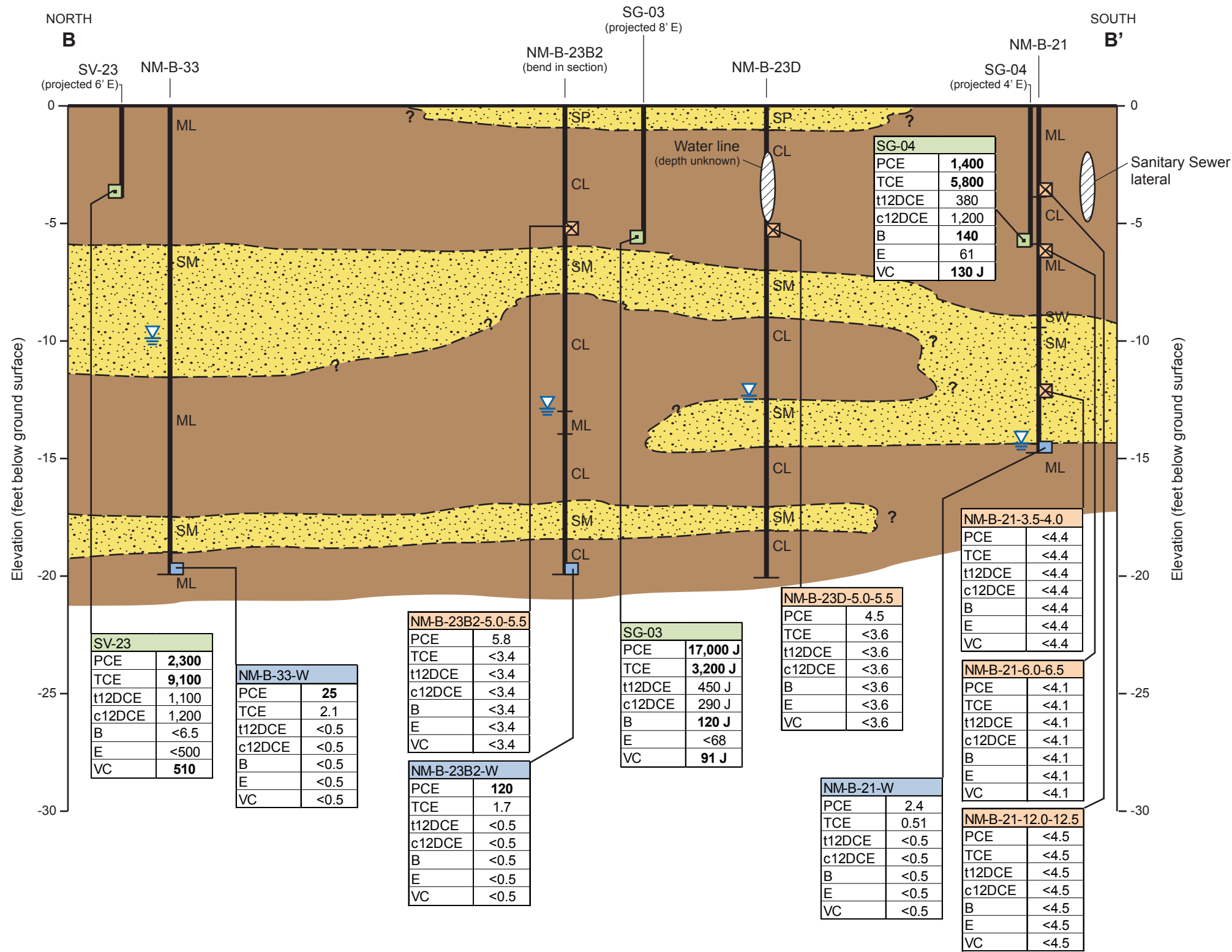
- NOTES:**
- Results for groundwater are reported in micrograms per liter (µg/L), results for soil are reported in micrograms per kilogram (µg/kg), and results for soil vapor are reported in micrograms per cubic meter (µg/m³).
 - Results shown in bold exceed their respective Environmental Screening Levels (ESLs) published by the California Regional Water Quality Control Board, San Francisco Region (May 2008), Table F-1a, Groundwater Screening Levels (groundwater is a current or potential drinking water source); Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Table A-1. Shallow Soil Screening Level (≤3m bgs), Residential Land Use (groundwater is a current or potential drinking water resource); Table E-2. Shallow Soil Gas Screening Levels for Evaluation of Potential Vapor Intrusion Concerns, Residential Exposure.
 - Samples with prefix "NM" and "SV" were collected by Ninyo & Moore between September 2010 and September 2011.
 - Samples with prefix "SB" and "SG" were collected by AMEC in June 2011.
 - J indicates the value is estimated.

ESLs	Soil (µg/kg)	Soil Vapor (µg/m ³)	Drinking Water (µg/L)
PCE	370	410	5.0
TCE	460	1,200	5.0
trans-1,2-DCE	670	15,000	10.0
cis-1,2-DCE	190	7,300	6.0
Benzene	44	84	1.0
Ethylbenzene	2,300	980	30
Vinyl Chloride	22	31	0.5

- Abbreviations**
- | | |
|--|--|
| CL = Clay | TCE = trichloroethene |
| GC = Gravel | t12DCE = trans-1,2-dichloroethene |
| ML = Silt | c12DCE = cis-1,2-dichloroethene |
| SC = Clayey sands | B = Benzene |
| SM = Silty sands | E = Ethylbenzene |
| SP = Poorly-graded sands or gravelly sands | VC = Vinyl Chloride |
| SW = Well-graded sands or gravelly sands | < = not detected above the reporting limit shown |
| ESL = Environmental Screening Level | µg/kg = micrograms per kilogram |
| PCE = tetrachloroethene | µg/m ³ = micrograms per square meter |
| | µg/L = microgram per liter |

CROSS SECTION A-A'
Crown Chevrolet Cadillac Isuzu
7544 Dublin Boulevard and 6707 Golden Gate Drive
Dublin, California

By: AWP	Date: 08/16/2012	Project No. OD10160070
		Figure 3



Explanation

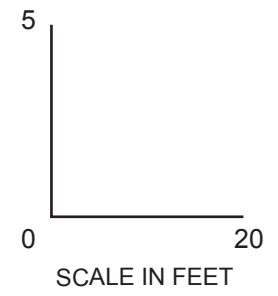
- Coarse-grained unit (e.g., sands, gravels, silty and clayey sands and gravels)
- Fine-grained unit (clays, silts)
- Soil sample collected
- Soil vapor sample collected
- Grab groundwater sample collected
- Groundwater level measured in boring

Abbreviations

CL = Clay
 GC = Gravel
 ML = Silt
 SC = Clayey sands
 SM = Silty sands
 SP = Poorly-graded sands or gravelly sands
 SW = Well-graded sands or gravelly sands
 ESL = Environmental Screening Level
 PCE = tetrachloroethene

TCE = trichloroethene
 t12DCE = trans-1,2-dichloroethene
 c12DCE = cis-1,2-dichloroethene
 B = Benzene
 E = Ethylbenzene
 VC = Vinyl Chloride
 < = not detected above the reporting limit shown
 µg/kg = micrograms per kilogram
 µg/m³ = micrograms per square meter
 µg/L = microgram per liter

ESLs	Soil (µg/kg)	Soil Vapor (µg/m³)	Drinking Water (µg/L)
PCE	370	410	5.0
TCE	460	1,200	5.0
trans-1,2-DCE	670	15,000	10.0
cis-1,2-DCE	190	7,300	6.0
Benzene	44	84	1.0
Ethylbenzene	2,300	980	30
Vinyl Chloride	22	31	0.5



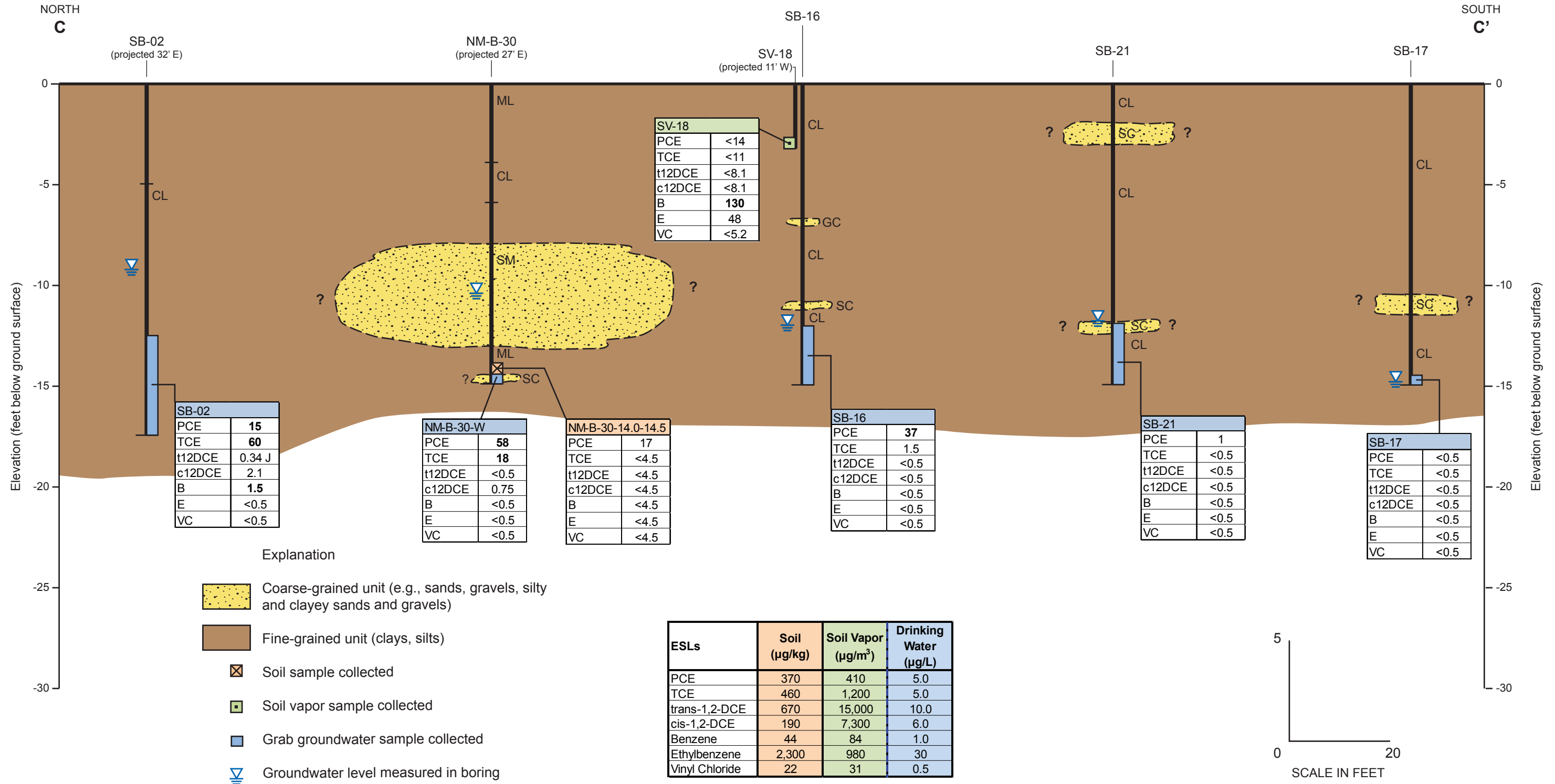
- NOTES:**
- Results for groundwater are reported in micrograms per liter (µg/L), results for soil are reported in micrograms per kilogram (µg/kg), and results for soil vapor are reported in micrograms per cubic meter (µg/m³).
 - Results shown in bold exceed their respective Environmental Screening Levels (ESLs) published by the California Regional Water Quality Control Board, San Francisco Region (May 2008). Table F-1a, Groundwater Screening Levels (groundwater is a current or potential drinking water source); Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Table A-1. Shallow Soil Screening Level (≤3m bgs), Residential Land Use (groundwater is a current or potential drinking water resource); Table E-2. Shallow Soil Gas Screening Levels for Evaluation of Potential Vapor Intrusion Concerns, Residential Exposure.
 - Samples with prefix of "NM" and "SV" were collected by Ninjo & Moore between September 2010 and September 2011.
 - Samples with prefix of "SB" and "SG" were collected by AMEC in June 2011.
 - J indicates the value is estimated.

CROSS SECTION B-B'
 Crown Chevrolet Cadillac Isuzu
 7544 Dublin Boulevard and 6707 Golden Gate Drive
 Dublin, California

By: AWP Date: 08/16/2012 Project No. OD10160070

Figure **4**

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NOTES:

- Results for groundwater are reported in micrograms per liter (µg/L), results for soil are reported in micrograms per kilogram (µg/kg), and results for soil vapor are reported in micrograms per cubic meter (µg/m³).
- Results shown in **bold** exceed their respective Environmental Screening Levels (ESLs) published by the California Regional Water Quality Control Board, San Francisco Region (May 2008). Table F-1a, Groundwater Screening Levels (groundwater is a current or potential drinking water source); Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Table A-1. Shallow Soil Screening Level (≤3m bgs), Residential Land Use (groundwater is a current or potential drinking water resource); Table E-2. Shallow Soil Gas Screening Levels for Evaluation of Potential Vapor Intrusion Concerns, Residential Exposure.
- Samples with prefix of "NM" and "SV" were collected by Ninyo & Moore between September 2010 and September 2011.
- Samples with prefix of "SB" and "SG" were collected by AMEC in June 2011.
- J indicates the value is estimated.

CROSS SECTION C-C'
Crown Chevrolet Cadillac Isuzu
7544 Dublin Boulevard and 6707 Golden Gate Drive
Dublin, California

By: AWP	Date: 08/16/2012	Project No. OD10160070
		Figure 5

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