ExxonMobil
Environmental Services Company
4096 Piedmont Avenue #194
Oakland, California 94611
510 547 8196 Telephone
510 547 8706 Facsimile

Jennifer C. Sedlachek
Project Manager

ExxonMobil

February 4, 2015

Mr. Mark Detterman
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502-6577

RE: Former Exxon RAS #79374/990 San Pablo Avenue, Albany, California.

Dear Mr. Detterman:

Attached for your review and comment is a copy of the letter report entitled ***Feasibility Study/Corrective Action Plan,*** dated February 4, 2015, for the above-referenced site. The report was prepared by Cardno ERI of Petaluma, California, and details activities at the subject site.

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.

If you have any questions or comments, please contact me at 510.547.8196.

Sincerely,

Jennifer C. Sedlachek
Project Manager

Attachment: Cardno ERI's ***Feasibility Study/Corrective Action Plan,*** dated February 4, 2015

cc: w/ attachment
Ms. Muriel T. Blank, Trustee, The Blank Family Trust
Reverend Deborah Blank, Trustee, The Blank Family Trust
Ms. Marcia Blank Kelly, The Blank Family Trust

w/o attachment
Mr. Greg Gurss, Cardno ERI

Feasibility Study/Corrective Action Plan

Former Exxon Service Station 79374
Alameda County RO 2974

Cardno ERI 2735C.R09

February 4, 2015

Cardno ERI
Shaping the Future

Feasibility Study/Corrective Action Plan

Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Alameda County RO 2974

Cardno ERI 2735C.R09

February 4, 2015

SCANNED IMAGE
Greg Gurss
Senior Project Manager
for Cardno ERI
916 692 3130
Email: greg.gurss@cardno.com

SCANNED IMAGE
David R. Daniels
P.G. 8737
for Cardno ERI
707 766 2000
Email: david.daniels@cardno.com

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1 Introduction

At the request of ExxonMobil Environmental Services (EMES), on behalf of Exxon Mobil Corporation, Cardno ERI prepared this feasibility study/corrective action plan (FS/CAP) for the site. A draft CAP was requested in an Alameda County Department of Environmental Health (ACEH) letter dated February 8, 2013; however, the request for the CAP was postponed in ACEH letters dated May 24, 2013 and September 17, 2013 pending the completion of additional site assessment activities. A FS/CAP was requested by September 19, 2014 in ACEH letters dated July 7, 2014 and August 22, 2014. The *Response To Comments and Request For Extension,* dated September 5, 2014 (Cardno ERI, 2014c), was submitted requesting that the submission of the FS/CAP be delayed until the completion of additional sampling and assessment work. The ACEH approved an extension for the FS/CAP to February 5, 2015 in electronic correspondence dated November 25, 2014. Agency correspondence is included in Appendix A. The purpose of this FS/CAP is to evaluate remedial alternatives and propose a remedial strategy to progress the site towards closure.

2 Site Description

Former Exxon Service Station 79374 is located at 990 San Pablo Avenue, on the northwestern corner of the intersection of Buchanan Street and San Pablo Avenue, Albany, California (Plate 1). The site is a retail outlet for paint and painting products and is located in an area of mixed commercial and residential land use. The neighboring properties include another retail paint store, a restaurant, a beauty supply store, the City of Albany police department, the City of Albany Fire Department, and residential housing. A Generalized Site Plan is included as Plate 2. A tabular site conceptual model for the site detailing additional site information is included as Appendix B.

3 Geology and Hydrogeology

The site lies at an approximate elevation of 40 feet above msl, and the local topography slopes toward the southwest. The site is located along the eastern margin of the San Francisco Bay within the East Bay Plain (Hickenbottom and Muir, 1988). The surficial deposits in the site vicinity are mapped as Holocene alluvial fan and fluvial deposits (Graymer, 2000). The site is located approximately 1,630 feet north-northwest of Cordornices Creek and approximately 1½ miles southwest of the active northwest trending Hayward fault.

The East Bay Plain is regionally divided into two major groundwater basins: the San Pablo and the San Francisco Basin. These basins are tectonic depressions that are filled primarily with a sequence of coalescing alluvial fans. The San Francisco Basin is further divided into seven sub-areas. The site is located in the Berkeley Sub-Area, which is filled primarily by alluvial deposits that range from 10 to 300 feet thick with poorly defined aquitards (CRWQCB, 1999). Under natural conditions, the direction of groundwater flow in the East Bay Plain is east to west.

Soil boring logs indicate that the soil beneath the site consists predominantly of silt and clay with an apparently continuous coarse-grained unit 2 to 8 feet thick encountered between approximately 8 and 20 feet bgs (EC&A, 2008; Cardno ERI, 2011; Cardno ERI, 2012a). Fill material was encountered in the boring for well SVE3 (located in the former UST pit) to approximately 7 feet bgs. CPT soil borings indicate the presence of predominantly silt and clay between approximately 20 and 60 feet bgs, the maximum depth explored.

Historical groundwater elevation data indicate that DTW ranges from 5 to 11 feet bgs beneath the site with varying groundwater flow directions. The distribution of dissolved-phase hydrocarbons suggests that the dominant groundwater flow direction is west to southwest.

4 Previous Work

Cumulative groundwater monitoring and sampling data are summarized in Tables 1A and 1B. Well construction details are presented in Table 2. Cumulative soil analytical results are summarized in Tables 3A and 3B. Groundwater elevation maps from the two most recent monitoring events (April and October 2014) are included in Appendix C (Cardno ERI, 2014b; Cardno ERI 2014d). A cross section location map and cross sections are included in Appendix D (Cardno ERI, 2014a). Select groundwater, soil, and soil vapor analytical results are illustrated on Plates 3 through 5, respectively.

4.1 Fueling System Activities

In 1983, one used-oil UST and four gasoline USTs were removed and the resulting tank cavity was backfilled with sand and compacted to 90% (City of Albany, 1983).

4.2 Site Assessment Activities

Six exploratory borings (B1 through B6) were advanced on site in 2008. Maximum residual concentrations of TPHg, TPHd, and benzene were reported in the soil samples collected at 10.5 feet bgs from borings B1 and B2, located near the former USTs. Maximum dissolved-phase TPHg, TPHd, and benzene concentrations were also reported in the samples collected from soil borings B1 and B2, and the laboratory reported an immiscible sheen in the samples (EC&A, 2008).

Monitoring wells MW1 through MW6 and borings CPT1/HP1 and CPT2/HP2 were installed on site in 2010. Maximum residual concentrations of TPHg and TPHd in soil were reported in samples collected at 10.5 feet bgs from borings MW3 and MW5, located west of the former USTs. Dissolved-phase hydrocarbons were adequately delineated vertically at the site with petroleum hydrocarbon concentrations below or near the laboratory reporting limits in groundwater samples collected deeper than 27.5 feet bgs (Cardno ERI, 2011).

In January 2012, Cardno ERI installed SVE wells SVE1 through SVE3, AS well AS1, and monitoring well MW3A to be used during feasibility testing (Cardno ERI, 2012a).

In February and March 2014, Cardno ERI installed soil vapor sampling (SVS) wells SVS1 through SVS3 at the site and advanced on-site and off-site borings B7 through B17 (Cardno ERI, 2014a).

In December 2014, Cardno ERI installed off-site monitoring wells MW7 and MW8 (Cardno ERI, 2015).

4.3 Remediation Activities

According to City of Albany permit number 82-0708, the USTs were removed and the resulting excavation backfilled in 1983 (City of Albany, 1983). It is unknown if over-excavation was performed during UST removal.

Between January 31 and February 1, 2012, Cardno ERI conducted three four-hour feasibility tests: a DPE only test, a combined AS and DPE test, and an AS only test. Approximately 93 pounds of TPHg and 0.09 pound of benzene were removed during feasibility testing (Cardno ERI, 2012b).

4.4 Groundwater Monitoring Activities

Groundwater monitoring began at the site in 2010 with the installation of wells MW1 through MW6. Maximum concentrations have been reported from the UST cavity and southwest of the UST cavity in wells MW3, MW3A, MW4, and MW5. Concentrations of MTBE are typically not reported above the laboratory reporting limit.

4.5 Soil Vapor Monitoring Activities

Soil vapor monitoring began at the site in 2014 with the installation of wells SVS1 through SVS3 (Cardno ERI, 2014a). Reported vapor-phase TPHg concentrations are similar in each of the wells and exceed applicable screening levels by up to three orders of magnitude.

5 Site Conditions

5.1 Petroleum Hydrocarbon Concentrations in Soil

Maximum residual concentrations occur between approximately 8 and 10 feet bgs in and southwest of the former UST cavity. Residual TPHg concentrations greater than 1,000 mg/kg have been reported from borings B-1 (10.5 feet bgs), B-2 (10.5 feet bgs), B13 (11.5 feet bgs), AS1 (10 feet bgs), and SVE3 (12.5 feet bgs) all located either within the former UST cavity or within approximately 20 feet of it.

5.2 Petroleum Hydrocarbon Concentrations in Groundwater

5.2.1 Dissolved Constituent Distribution in Groundwater

Maximum dissolved-phase concentrations extend from the former UST cavity towards the southwest corner of the site. Dissolved-phase TPHg concentrations greater than 10,000 µg/L have been reported from wells MW3, MW4, and MW5 and borings B-1 and B-2. Dissolved-phase benzene has been reported at maximum concentrations of 650 µg/L (MW3) and 1,500 µg/L (B-2).

Dissolved-phase concentrations are adequately delineated vertically by borings HP1/HP1A and HP2A/HP2B where concentrations were near or below clean-up goals (Section 8) in the samples collected below 45 feet bgs.

Dissolved-phase concentrations are adequately delineated by the existing well network and soil borings advanced to date; however, the proposed work section below includes an additional well southwest of the site to monitor the lateral extent of dissolved-phase hydrocarbons. Dissolved-phase concentrations are delineated to the north, northeast, and east by wells MW6, MW1, and MW2, respectively.

5.2.2 Non-Aqueous Phase Liquid

The laboratory reported an immiscible sheen in the groundwater samples collected from soil borings B1 and B2 near the edge of the UST cavity (EC&A, 2008). Neither NAPL nor sheen have been observed in the site monitoring wells; however, during fourth quarter 2012, reported concentrations of TPHg (270,000 µg/L) were potentially indicative of the presence of NAPL. With the exception of fourth quarter 2012, concentrations of TPHd have been 16,000 µg/L or less and neither NAPL nor sheen has not been observed.

5.3 Petroleum Hydrocarbon Concentrations in Soil Vapor

The distribution of vapor-phase concentrations is not directly correlated to concentrations in soil or groundwater. With the exception of well SVS2 (west of the USTs), the SVS wells are not located in areas where maximum soil or groundwater concentrations are found; however, select vapor-phase concentrations exceed applicable screening levels by up to three orders of magnitude in each well. Maximum vapor-phase benzene concentrations have been reported in well SVS3, located near the former dispenser islands and the paint store. Oxygen levels reported in the vapor samples collected have varied from 2.5% to 5.5%.

6 Constituents of Concern and Remediation Target Zones

Cardno ERI identified TPHg and BTEX as the primary constituents of concern at the site. Based on the cumulative site data, it appears that vapor-phase concentrations exceed the applicable clean-up goals and are the primary risk associated with the site. The vapor-phase concentrations are most likely related to residual and dissolved-phase concentrations; therefore, the remedial approach needs to address residual, dissolved-phase, and vapor-phase concentrations.

Based on the occurrence, distribution, and concentrations of petroleum hydrocarbons at the site, Cardno ERI has identified the primary remediation target zone of TPHg and BTEX compounds in soil and groundwater primarily between approximately 8 and 12 feet bgs and vapor from the vadose zone soil.

7 Exposure Pathways

Cardno ERI evaluated potential receptors and exposure pathways at the site including risks to human health. The site is a retail paint outlet with a paved ground surface across the entire site. The retail building is the only structure occupied by workers at the site. In addition, a residential building is located directly west of the site. Groundwater is encountered beneath the site at an average depth of approximately 6 to 10 feet bgs and no active water supply wells have been identified located within a 1,000-foot radius of the site (Cardno ERI, 2014a). Land use in the immediate vicinity is mixed-use commercial/industrial and residential. Based on these site conditions, potential exposure pathways and receptors were evaluated.

Since the site is paved, direct exposure (via ingestion or dermal contact) to chemicals of concern released during EMES' operations is not likely; however, if the pavement is removed in the future during construction activities, potential exposure via dermal contact or ingestion with soil may occur. Direct exposure may be mitigated during hypothetical future construction work and is not considered a complete pathway at this time.

Shallow groundwater and deep groundwater are potential receptors; however, the lateral extent of groundwater containing dissolved-phase diesel and gasoline constituents are adequately delineated prior to any identified receptors. Cardno ERI does not consider the groundwater exposure pathway complete.

The potential exposure route of vapor inhalation may exist in the commercial setting for workers in the on-site building and for a residential setting for the adjacent residential property.

8 Selection of Clean-Up Goals

Based on the current site conditions and complete or potentially complete exposure pathways, Cardno ERI proposes application of ESLs established by the California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SFB, 2013), for soil and groundwater containing residual gasoline and diesel hydrocarbons and fuel oxygenates underlying the site and adjacent areas.

Since the site is a commercial facility and site usage is likely to remain commercial in the foreseeable future, Cardno ERI proposes using the commercial/industrial land use ESLs as the specific clean-up goals where groundwater is not a current or potential drinking water source. Hydrocarbon concentrations are also present at or near the site boundary with a residential property. Residential ESLs are appropriate for portions of the site bordering the residential property.

Cardno ERI proposes to use ESLs as long-term goals and criteria established in the State Water Resources Control Board's *Low-Threat Underground Storage Tank Closure Policy* (SWRCB, 2012) as short-term goals.

9 Evaluation of Remedial Alternatives

Cardno ERI evaluated the following remedial alternatives for the site to reduce petroleum hydrocarbon concentrations and progress the site to closure:

- Monitored natural attenuation.
- Excavation.
- *In-situ* chemical oxidation.
- Bioventing.
- Groundwater pump and treat.
- Air sparging/biosparging.
- Soil vapor extraction.
- High-vacuum DPE.

9.1 Monitored Natural Attenuation

Monitored natural attenuation reduces hydrocarbon concentrations through several mechanisms, including the destruction of constituents of concern by biological and chemical processes, adsorption, and dispersion. A monitored natural attenuation program consists of groundwater monitoring and sampling to measure the decrease in dissolved-phase hydrocarbon concentrations over time in the source and downgradient wells.

9.1.1 Advantages

Monitored natural attenuation does not require the installation, operation, or maintenance of an active remediation system; therefore, there are no capital equipment costs.

9.1.2 Disadvantages

If the time it takes to reach diminished/stabilized dissolved-phase constituents of concern is long, this approach may not be the most cost-effective option. Furthermore, this remedial strategy does not provide active source removal of constituents of concern from the vadose zone or capillary fringe. Not all constituents of concern are biodegradable, and attenuation by dispersion or adsorption does not reduce the mass of the constituents of concern.

9.1.3 Site Application

Based on the current concentrations of residual and dissolved-phase hydrocarbons, Cardno ERI concludes that natural attenuation will not effectively remediate soil and groundwater underlying and near the site within a reasonable time frame; however, natural attenuation will be applicable after active remediation reduces residual and dissolved-phase concentrations in current source areas. Cardno ERI recommends consideration of monitored natural attenuation for future use at the site.

9.2 Excavation

Excavation is the physical removal of soil containing petroleum hydrocarbons for aboveground treatment or recycling at a permitted facility.

9.2.1 Advantages

Excavation generally allows rapid implementation and can remove areas of petroleum hydrocarbons that may otherwise be difficult to address and constituents of concern that are not sufficiently volatile or soluble. Chemical oxidizers can be placed in the excavation bottom if constituents of concern are present in groundwater before backfilling.

9.2.2 Disadvantages

Excavation is generally only feasible if the remediation target zone is relatively shallow and the site conditions permit large scale excavations. The implementation of a large scale excavation has impacts on business operations at the site as well as traffic near the site. Further, excavation alone does not remediate constituents of concern in groundwater or residual hydrocarbons in saturated soil. The costs associated with an excavation, in particular the waste disposal costs, have the potential to be quite high and often times “clean” soil needs to be excavated and removed to access the deeper soil of the remediation target zone.

9.2.3 Site Application

Based on logistical constraints imposed by the layout at and surrounding the site, the performance of a large scale excavation may not feasible at this time at the site. The maximum residual concentrations occur between approximately 10 and 12 feet bgs in the southwestern portion of the site near the sidewalk and associated subsurface utilities as well as the residential building. A large scale excavation may be effective at remediating the on-site hydrocarbon concentrations but significant hydrocarbon mass may be left in place in accessible areas.

9.3 *In-Situ* Chemical Oxidation

In-situ chemical oxidation is performed by adding an oxidant to the subsurface to degrade residual hydrocarbons.

9.3.1 Advantages

Oxidizers may be injected at specific target locations and depths or added to an excavation containing groundwater before backfilling. Groundwater and/or vapor are not extracted; therefore, aboveground treatment facilities or discharge permits are not required.

9.3.2 Disadvantages

Chemical oxidation may be limited by the delivery of the chemical into the formation with a finite radius of influence surrounding the injection wells and may require multiple treatments to bring the oxidant into sufficient contact with the residual constituents of concern (and/or NAPL) to provide adequate source removal. Injected chemicals will follow the path of greatest permeability and may not reach constituents of concern in tighter formations. Additionally, some oxidants are delivered and most effectively transported via the dissolved-phase; therefore, those chemical oxidizers generally do not degrade the residual constituents of concern in the vadose zone. This method may require an injection permit and a modified groundwater sampling program.

Chemical injection also presents safety concerns as the reaction can generate heat, pressure, and unfavorable byproducts in the subsurface, which may cause potential surfacing of the injected chemical or affect subsurface structures in the vicinity.

9.3.3 Site Application

Cardno ERI concludes that chemical oxidation injection is not feasible given the potential to generate unfavorable byproduct in close proximity to a residential building.

9.4 Bioventing

Bioventing is an *in-situ* remedial technology that enhances the breakdown of constituents of concern by increasing the amount of air (oxygen) moving through the vadose zone.

9.4.1 Advantages

Bioventing is relatively easy to implement, minimizes the disruption to operations at the site, and may not require waste treatment or hauling.

9.4.2 Disadvantages

Bioventing only treats vadose soil and may require the use of other remedial technologies to address dissolved-phase concentrations as well as residual concentrations submerged by groundwater.

9.4.3 Site Application

Based on the current distribution of residual and dissolved-phase hydrocarbons, Cardno ERI concludes that bioventing will not effectively remediate soil and groundwater underlying and near the site within a reasonable time frame; however, bioventing may be applicable in conjunction with or following active remediation. Cardno ERI recommends consideration of bioventing for future use at the site or for use in conjunction with another technology.

9.5 Groundwater Pump and Treat

Groundwater pump and treat removes dissolved-phase constituents of concern by extracting and treating groundwater. This technology is most efficient at sites where constituents of concern have a low adsorption coefficient. The effluent, treated as necessary, is discharged to a storm drain or sanitary sewer in accordance with state or local permits obtained on a site-specific basis.

9.5.1 Advantages

Groundwater pump and treat may be effective in limiting the further migration of groundwater. It is advantageous for chemicals that have a low Henry's Law coefficient (e.g., MTBE or TBA), which would be difficult to remove with air sparging.

9.5.2 Disadvantages

Factors limiting efficiency are: 1) hydrogeologic factors such as subsurface heterogeneity, aquifers of very low permeability and presence of fractures; 2) chemical-related factors such as a chemical's potential to sorb to the soil or rock comprising the aquifer; and 3) necessity of aboveground treatment, discharge, and/or disposal. Also, groundwater pump and treat does not remove adsorbed-phase constituents of concern from the vadose zone.

9.5.3 Site Application

Cardno ERI considered groundwater pump and treat to remediate groundwater with dissolved-phase TPHg and BTEX at the site; however, due to the lack of chemicals with a low Henry's Law coefficient (such as MTBE) and presence of chemicals with a potential to sorb to soil (such as benzene), it is not a feasible remedial alternative. In addition, groundwater pump and treat would not directly address residual concentrations in the vadose zone.

9.6 Air Sparging/Biosparging

Air sparing is a remedial technology that injects air below the water table to volatilize dissolved-phase or residual contaminants into the vapor phase. In addition to volatilizing contaminants, AS also enhances microbial degradation by providing oxygen to the subsurface. Biosparging is similar to AS; however, biosparging is performed at lower pressures and air flow rates to supply oxygen to the subsurface without volatilizing contaminants. Vapor extraction and treatment is sometimes required with AS but typically not for biosparging.

9.6.1 Advantages

AS uses readily available equipment and at some sites does not require groundwater removal and treatment.

9.6.2 Disadvantages

AS has the potential to induce the migration of concentrations and at some sites may require extensive pilot testing to ensure effective vapor control during operation. Neither AS nor biosparing alone address concentrations in vadose soil.

9.6.3 Site Application

Based on the close proximity of the residential building to the remediation target zone and the potential to mobilize vapor-phase concentrations, Cardno ERI does not believe the use of AS is appropriate. An AS/DPE test was performed at the site and the addition of AS did not significantly increase the extracted soil vapor concentrations as compared to SVE alone (Cardno ERI, 2012b).

9.7 Soil Vapor Extraction

SVE is a technology typically applied for the remediation of vadose zones containing volatile hydrocarbons. This method uses SVE wells within the source area from which soil vapor can be extracted. A vacuum is exerted on the SVE wells, which induces flow of air in the vadose zone toward the extraction well(s), resulting in extraction of the volatile hydrocarbons. If necessary, the extracted vapor is treated on site by catalytic oxidation, thermal oxidation, or activated carbon.

9.7.1 Advantages

This method has been proven successful in removing volatile constituents of concern from permeable soils. Volatile constituents of concern beneath buildings or surface obstacles can be removed that might otherwise be inaccessible.

9.7.2 Disadvantages

SVE is less successful in remediating constituents of concern with low volatility or soil of low permeability, including those containing appreciable amounts of clay and silt. Preferential air flow paths in heterogeneous soils may inhibit air flow and volatilization in lower permeability soil strata. In soil of low permeability and/or sites with shallow groundwater conditions (i.e., <5 to10 feet bgs), SVE may not be feasible due to rising water covering casing perforations, thus preventing vacuum communication and air flow from the subsurface. Also, this method alone may not adequately address dissolved-phase constituents of concern in groundwater or residual adsorbed phase constituents of concern in the capillary fringe and saturated zone, which may continue to leach into groundwater.

9.7.3 Site Application

Cardno ERI considered use of SVE to address hydrocarbons beneath the site. Data obtained during the 2012 feasibility test at the site indicate that SVE produced a vacuum radius of influence of approximately 50 feet and a mass removal rate of up to 15 pounds of vapor-phase hydrocarbons per hour (Cardno ERI, 2012b). Cardno ERI considers SVE a viable method for the site. Higher vacuums than typically associated with SVE would likely be required to effectively remediate the submerged soil beneath the site.

9.8 Dual-Phase Extraction

DPE consists of simultaneous vapor and groundwater extraction. If both vapor and groundwater are extracted from a common pipe or hose, the method is usually termed DPE. If vapor and groundwater are extracted via different pipes or hoses (e.g., a pump in the well), the technique is usually termed vapor extraction/groundwater extraction (VEGE). If NAPL is also extracted, the technique has been called multi-phase extraction (MPE). A high-vacuum DPE system combination enhances the effectiveness of both fluid and vapor extraction systems.

As the groundwater is pumped out of the wells, the water table beneath the site is lowered and soil containing hydrocarbons in the capillary fringe and uppermost portion of the saturated zone is locally exposed. The exposed capillary fringe soil may then be remediated through SVE. The extracted vapor is typically treated by thermal or catalytic oxidation, GAC, or other appropriate treatment technologies.

9.8.1 Advantages

This technology may remediate adsorbed constituents of concern in the capillary fringe and upper saturated zone and may prevent migration of groundwater containing hydrocarbons.

9.8.2 Disadvantages

The effectiveness of the DPE system is sometimes contingent upon successfully lowering the water table so SVE can remove hydrocarbons adsorbed onto the soil as well as residual NAPL, if present. For highly permeable soils, a large quantity of water would have to be extracted to effectively lower the water table beneath the site or prevent migration of dissolved phase hydrocarbons. For soils of low permeability, high vacuums must be applied and low vapor flow may limit mass removal.

9.8.3 Site Application

Cardno ERI considered use of DPE to address residual, dissolved-phase hydrocarbons, and vapor-phase hydrocarbons beneath the site. Data obtained during the 2012 feasibility test at the site indicate that vacuum produced a vacuum radius of influence of approximately 50 feet and a mass removal rate of up to 15 pounds of vapor-phase hydrocarbons per hour (Cardno ERI, 2012b). Cardno ERI considers DPE a viable method for the site. Although the 2012 feasibility test (Cardno ERI, 2012b) extracted both groundwater and soil vapor, there were only 40 gallons of water generated during approximately eight hours of operation for an average flow rate of less than 0.1 gpm. Cardno ERI considers high-vacuum DPE a viable method for the site. DPE has the capability to remediate soil, groundwater, and soil vapor and could address the remedial targets at the site.

10 Cost Evaluation

Based on the cumulative site data, Cardno ERI evaluated three potentially viable remedial alternatives and estimated the costs associated with each technology. The costs for installing a "permanent" remediation system installation, performing high-intensity, targeted (HIT) events, and the costs for performing a remedial excavation were evaluated.

The "permanent" system was assumed to operate for a period of two years followed by one year of post remedial monitoring. The HIT events are assumed to last up to one month and be performed semi-annually for a period of three years followed by one year of post remedial monitoring. The HIT events are likely to be started in a shorter time frame than the "permanent" system due to the decrease in the amount of permits required to perform the work. The excavation assumes an excavation including shoring and dewatering with approximately 1,000 cubic yards of soil being removed.

Permanent Remediation System Installation

Task	Cost Per Event*	Frequency/Year	Number of Years	Total Cost
Well Installation	$30,000	1	1	$30,000
System Installation	$175,000	1	1	$175,000
Operations and Maintenance	$25,000	4	2	$200,000
Semi-Annual Sampling Event	$15,000	2	4	$120,000
System Demolition and Restoration	$30,000	1	1	$30,000
			Total Costs	**$555,000**

HIT Events Using Mobil Remediation Equipment

Task	Cost Per Event*	Frequency/Year	Number of Years	Total Cost
Well Installation	$30,000	1	1	$30,000
HIT Events	$30,000	2	3	$180,000
Semi-Annual Sampling Event	$15,000	2	4	$120,000
			Total Costs	**$330,000**

Excavation

Task	Cost Per Event*	Frequency/Year	Number of Years	Total Cost
Well Destruction	$20,000	1	1	$20,000
Well Reinstallation	$30,000	1	1	$30,000
Excavation (1,000 yards^3)	$275,000	1	1	$275,000
Waste Disposal (soil)	$150,000	1	1	$150,000
Semi-Annual Sampling Event	$15,000	2	3	$90,000
			Total Costs	**$565,000**

*Total includes costs for permits, subcontractors, analytical analyses, waste disposal, consumables, and personnel for field work and reports. Well destruction costs are assumed to be equivalent and are not included.

Based on the cost comparison, HIT events are the most cost-effective remedial technology. An added benefit of the HIT events is the flexibility in scheduling so if a lesser number of events are successful the costs may be reduced. There is significant additional expense associated with constructing and then demolishing a "permanent" remediation system as compared to using mobile remediation equipment. In addition to being more expensive, a remedial excavation may leave inaccessible areas of hydrocarbons in place and require additional monitoring or even additional remedial measures.

DPE is the technology best suited to address residual, dissolved-phase, and vapor-phase concentrations simultaneously. The water production during the 2012 feasibility test (less than 0.1 gpm) indicates that the system will primarily extract vapor but the groundwater extraction and higher vacuum associated with DPE will be more effective at remediating the zone of maximum residual concentrations (8 to 12 feet bgs) while also addressing the vapor-phase concentrations reported from approximately 5 feet bgs in the SVS wells.

11 Conclusions

Based on current site conditions, Cardno ERI concludes that:

- Active remediation is warranted at the site.
- The lateral and vertical distribution of petroleum hydrocarbon concentrations in soils is delineated.
- Dissolved-phase petroleum hydrocarbons are adequately delineated by the existing well network and previously advanced borings; however, an additional well southwest of the site would be useful to monitor the extent of dissolved-phase concentrations over time.
- Vapor-phase petroleum hydrocarbon concentrations exceed applicable screening levels for residential and commercial/industrial exposure scenarios by up to three orders of magnitude.
- Residual and dissolved-phase petroleum hydrocarbons are primarily limited to the former UST cavity and the southwest portion of the site. Concentrations extend off site approximately 20 feet to the southwest.
- Based on current site conditions, Cardno ERI concludes that DPE HIT events are the most cost-effective remedial technology to reduce residual, dissolved-phase, and vapor-phase petroleum hydrocarbon concentrations.

12 Recommendations

Cardno ERI recommends the use of DPE HIT events at the site to remediate hydrocarbon concentrations in soil, soil vapor, and groundwater. Cardno ERI recommends installing four extraction wells (SVE4 through SVE7) along the north and west sides of the site and one monitoring well (MW9) off site to the southwest.

13 Proposed Work

To progress the site to closure, Cardno ERI proposes to install four SVE wells (SVE4 through SVE7) along the north and west sides of the site and one monitoring well (MW9) off site to the southwest. In addition, Cardno ERI proposes using a mobile DPE remediation system to extract soil vapor and groundwater from existing wells SVE1 through SVE3 and proposed wells SVE4 through SVE7. The locations of the proposed wells are intended to supplement the existing remediation wells (SVE1 through SVE3) as well as to address vapor-phase concentrations near the on-site and adjacent buildings.

13.1 Pre-Drilling Activities

Prior to the onset of drilling, a boring and well installation permit will be obtained from the County. Prior to the installation of off-site well MW9, an encroachment permit will be obtained from the City of Albany. Cardno ERI personnel will visit the site to check for obstructions and to mark the proposed location. Underground Service Alert will be notified at least 48 hours prior to the onset of field activities. Prior to drilling, the locations will be excavated with air, water, and hand tools to a depth of 4 to 8 feet bgs in accordance with EMES protocols. The procedures for well installation are described in the field protocols presented in Appendix E.

13.2 Well Installation and Sampling Activities

Wells SVE4 through SVE7 will be advanced to approximately 12 feet bgs to target the depth interval with maximum hydrocarbon concentrations. The drilling locations will be sampled continuously from 5 feet bgs across the anticipated screened intervals to total depth for geological logging purposes. Select soil samples will be submitted for laboratory analysis.

The proposed wells will be constructed using 4-inch diameter, Schedule 40 PVC, with a screen approximately 7 feet in length, positioned during well installation in the zone of maximum hydrocarbon concentrations. The

wells are anticipated to be screened from approximately 5 to 12 feet bgs to target the maximum residual, dissolved-phase, and vapor-phase concentrations. The locations of the proposed wells are shown on Plate 6.

Well MW9 will be advanced to approximately 15 feet bgs to target the first encountered groundwater and the zone of maximum hydrocarbon concentrations. The drilling locations will be sampled continuously from 5 feet bgs across the anticipated screened intervals to total depth for geological logging purposes. Select soil samples will be submitted for laboratory analysis.

The proposed well will be constructed using 2-inch diameter, Schedule 40 PVC, with a screen approximately 10 feet in length from approximately 5 to 15 feet bgs to target the first-encountered groundwater. The location of the proposed wells are shown on Plate 6.

13.3 Laboratory Analyses

Select soil samples will be submitted for analysis to an EMES-approved, state-certified analytical laboratory. The samples will be analyzed for TPHd and TPHg using EPA Method 8015B, and BTEX, fuel oxygenates (MTBE, DIPE, ETBE, TAME, and TBA), and lead scavengers (1,2-DCA and EDB) using EPA Method 8260B. In addition, soil samples collected from the on-site borings will be analyzed for PAHs using EPA Method 8270C or 8310.

13.4 Waste Management Plan

The soil and rinsate water generated during drilling activities will be temporarily stored on site in DOT-approved, 55-gallon drums. Waste will be transported to an EMES-approved facility. Soil and water disposal documentation will be included in the report.

13.5 Site Safety Plan

Fieldwork will be performed in accordance with a site-specific safety plan.

14 Dual-Phase Extraction HIT Events

Targeted DPE events will be used to remove hydrocarbon concentrations from beneath the site using existing wells SVE1 through SVE3 and proposed wells SVE4 through SVE7 as the extraction wells. The HIT events will be performed on a semi-annual basis during the first and third quarters. Groundwater sampling and monitoring is performed on a semi-annual basis during the second and fourth quarters. This schedule is intended to provide a period of time for concentrations to equilibrate to evaluate the need for additional events. The first event will contain elements of a feasibility test to establish the flows, vacuums, and concentrations from the individual wells. To date, the feasibility testing activities have occurred near the former UST cavity (Cardno ERI, 2012b). Proposed wells SVE4 through SVE7 will be installed further from the former USTs and may produce a different flow/vacuum combination. Future HIT events will target wells to maximize mass removal during operations. It is anticipated that the HIT events will last between five days and 30 days, and may be extended if the mass removal is favorable.

14.1 Pre-Field Activities

Prior to field activities and if required, Cardno ERI will obtain an air discharge permit from the Bay Area Air Quality Management District (BAAQMD). Cardno ERI will notify the pertinent agencies and coordinate activities with property owner. Field work will occur in accordance with a site-specific health and safety plan and Cardno ERI's standard field protocols (Appendix E).

14.2 Equipment Setup

As part of equipment setup activities, Cardno ERI will:

- Mobilize a mobile DPE system to the site. The DPE system consists of a vacuum blower equipped with an air-water separator and pressure, temperature, and flow gauges.
- Acquire vapor-phase GAC vessels or a thermal/catalytic oxidizer for treatment of extracted soil vapor, install a holding tank to collect extracted groundwater, construct applicable piping and flexible hosing connections to connect the extraction wells to the remediation system and vent treated soil vapor to the atmosphere, and remove extracted groundwater from the site.
- Obtain a temporary source of power to facilitate the operation of the equipment.

14.3 Dual-Phase Extraction HIT Event

As part of the DPE HIT event, Cardno ERI will:

- Perform a series of DPE HIT events to remove dissolved-phase, residual, and vapor-phase hydrocarbons from beneath the site using wells SVE1 through SVE7 as the extraction wells.
- Monitor the system on a weekly basis at a minimum, or as required by applicable permits.
- Submit a minimum of one pre-test groundwater sample and one post-test groundwater sample collected from each extraction well and one set of vapor samples (influent and effluent samples) per week from the DPE system to a California state-certified laboratory, under COC protocol.
- Monitor the vapor extraction and treatment portion of the system using a PID, flow meter, and vacuum gauges to gauge system performance.

14.4 Data Evaluation

Based on the results of the DPE HIT event and subsequent groundwater and soil vapor sampling results, the need for additional source removal events will be evaluated and reported in each semi-annual sampling report.

15 Schedule

Cardno ERI anticipates implementation of the permitting for the proposed work following the approval of the FS/CAP.

16 Contact Information

The responsible party contact is Ms. Jennifer C. Sedlachek, ExxonMobil Environmental Services Company, 4096 Piedmont Avenue #194, Oakland, California, 94611. The consultant contact is Mr. Greg Gurss, Cardno ERI, 601 North McDowell Boulevard, Petaluma, California, 94954. The agency contact is Mr. Mark Detterman, Alameda County Health Care Services Agency, Environmental Health Services, 1131 Harbor Bay Parkway, Suite 250, Alameda, California, 94502-6577.

17 Document Distribution

Cardno ERI recommends submitted a copy of this report to the following:

Mr. Mark Detterman
Alameda County Health Care Services Agency,
Environmental Health Services
1131 Harbor Bay Parkway
Suite 250, Alameda, California 94502-6577

Ms. Muriel T. Blank, Trustee
The Blank Family Trusts
1164 Solano Avenue, #406
Albany, California 94706

Reverend Deborah Blank, Trustee
The Blank Family Trusts
1563 Solano Avenue, #344
Berkeley, California 94707

Ms. Marcia Blank, Trustee
The Blank Family Trusts
641 SW Morningside Road
Topeka, Kansas 66606

18 Limitations

For documents cited that were not generated by Cardno ERI, the data taken from those documents is used "as is" and is assumed to be accurate. Cardno ERI does not guarantee the accuracy of this data and makes no warranties for the referenced work performed nor the inferences or conclusions stated in these documents.

This document and the work performed have been undertaken in good faith, with due diligence and with the expertise, experience, capability, and specialized knowledge necessary to perform the work in a good and workmanlike manner and within all accepted standards pertaining to providers of environmental services in California at the time of investigation. No soil engineering or geotechnical references are implied or should be inferred. The evaluation of the geologic conditions at the site for this investigation is made from a limited number of data points. Subsurface conditions may vary away from these data points.

19 References

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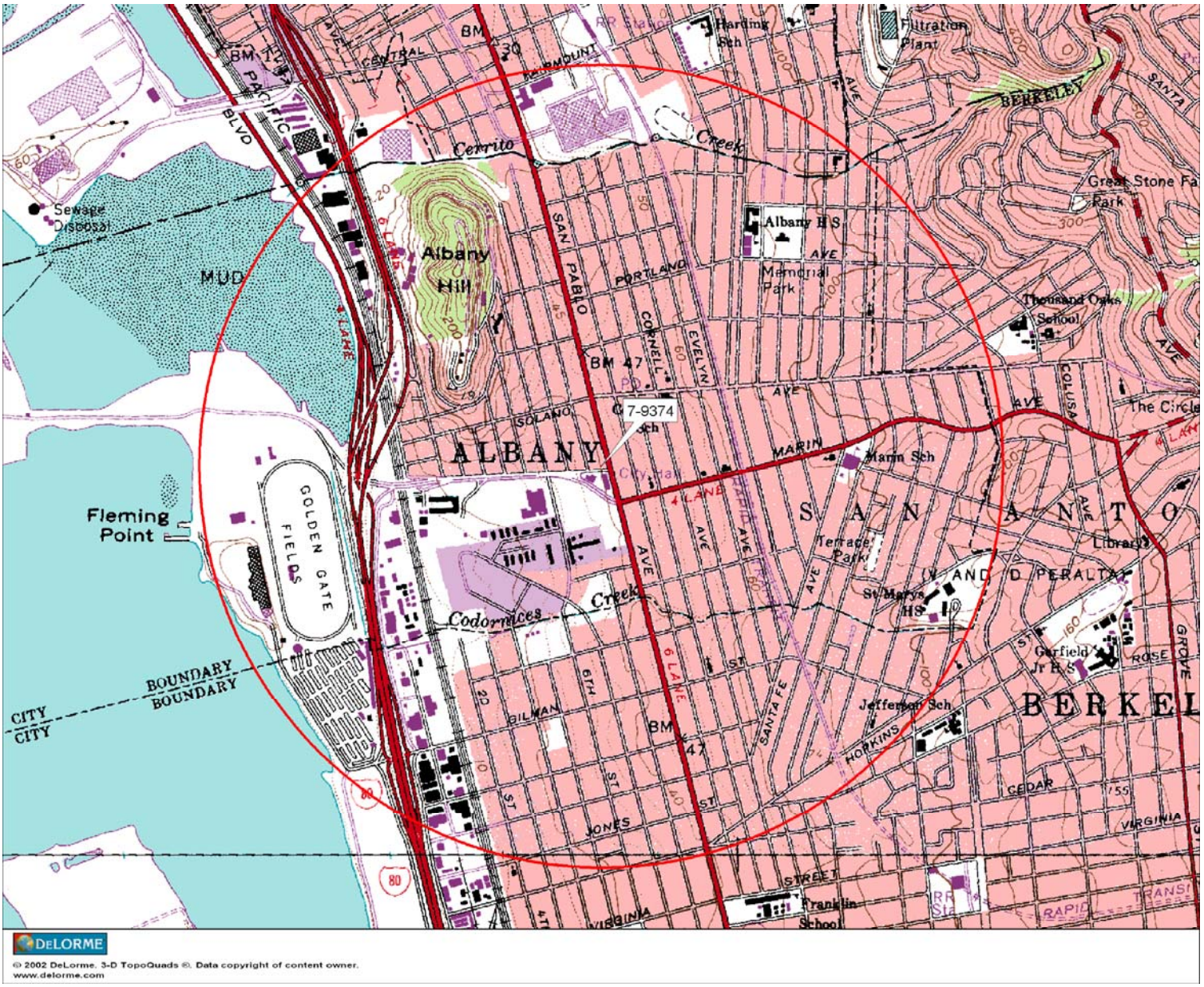
20 Acronym List

µg/L	Micrograms per liter
µs	Microsiemens
1,2-DCA	1,2-dichloroethane
acfm	Actual cubic feet per minute
AS	Air sparge
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
CEQA	California Environmental Quality Act
cfm	Cubic feet per minute
COC	Chain of Custody
CPT	Cone Penetration (Penetrometer) Test
DIPE	Di-isopropyl ether
DO	Dissolved oxygen
DOT	Department of Transportation
DPE	Dual-phase extraction
DTW	Depth to water
EDB	1,2-dibromoethane
EPA	Environmental Protection Agency
EPH	Extractable petroleum hydrocarbons
ESL	Environmental screening level
ETBE	Ethyl tertiary butyl ether
FID	Flame-ionization detector
fpm	Feet per minute
GAC	Granular activated carbon
gpd	Gallons per day
gpm	Gallons per minute
GRO	Gasoline-range organics
GWPTS	Groundwater pump and treat system
HVOC	Halogenated volatile organic compound
J	Estimated value between MDL and PQL (RL)
LEL	Lower explosive limit
LPC	Liquid-phase carbon
LRP	Liquid-ring pump
LUFT	Leaking underground fuel tank
LUST	Leaking underground storage tank
MCL	Maximum contaminant level
MDL	Method detection limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/m^3	Milligrams per cubic meter
MPE	Multi-phase extraction
MRL	Method reporting limit
msl	Mean sea level
MTBE	Methyl tertiary butyl ether
MTCA	Model Toxics Control Act
NAI	Natural attenuation indicators
NAPL	Non-aqueous phase liquid
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
ORP	Oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OVA	Organic vapor analyzer
P&ID	Process & Instrumentation Diagram
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene or perchloroethylene
PID	Photo-ionization detector
PLC	Programmable logic control
POTW	Publicly owned treatment works
ppmv	Parts per million by volume
PQL	Practical quantitation limit
psi	Pounds per square inch
PVC	Polyvinyl chloride
QA/QC	Quality assurance/quality control
RBSL	Risk-based screening levels
RCRA	Resource Conservation and Recovery Act
RL	Reporting limit
scfm	Standard cubic feet per minute
SSTL	Site-specific target level
STLC	Soluble threshold limit concentration
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound
TAME	Tertiary amyl methyl ether
TBA	Tertiary butyl alcohol
TCE	Trichloroethene
TOC	Top of well casing elevation; datum is msl
TOG	Total oil and grease
TPHd	Total petroleum hydrocarbons as diesel
TPHg	Total petroleum hydrocarbons as gasoline
TPHmo	Total petroleum hydrocarbons as motor oil
TPHs	Total petroleum hydrocarbons as stoddard solvent
TRPH	Total recoverable petroleum hydrocarbons
UCL	Upper confidence level
USCS	Unified Soil Classification System
USGS	United States Geologic Survey
UST	Underground storage tank
VCP	Voluntary Cleanup Program
VOC	Volatile organic compound
VPC	Vapor-phase carbon



FN 2735 TOPO

EXPLANATION

1/2-mile radius circle

N

APPROXIMATE SCALE

0 0.5 1 mile

SOURCE:
Modified from a map provided by DeLorme 3-D TopoQuads

Cardno ERI
Shaping the Future

SITE VICINITY MAP

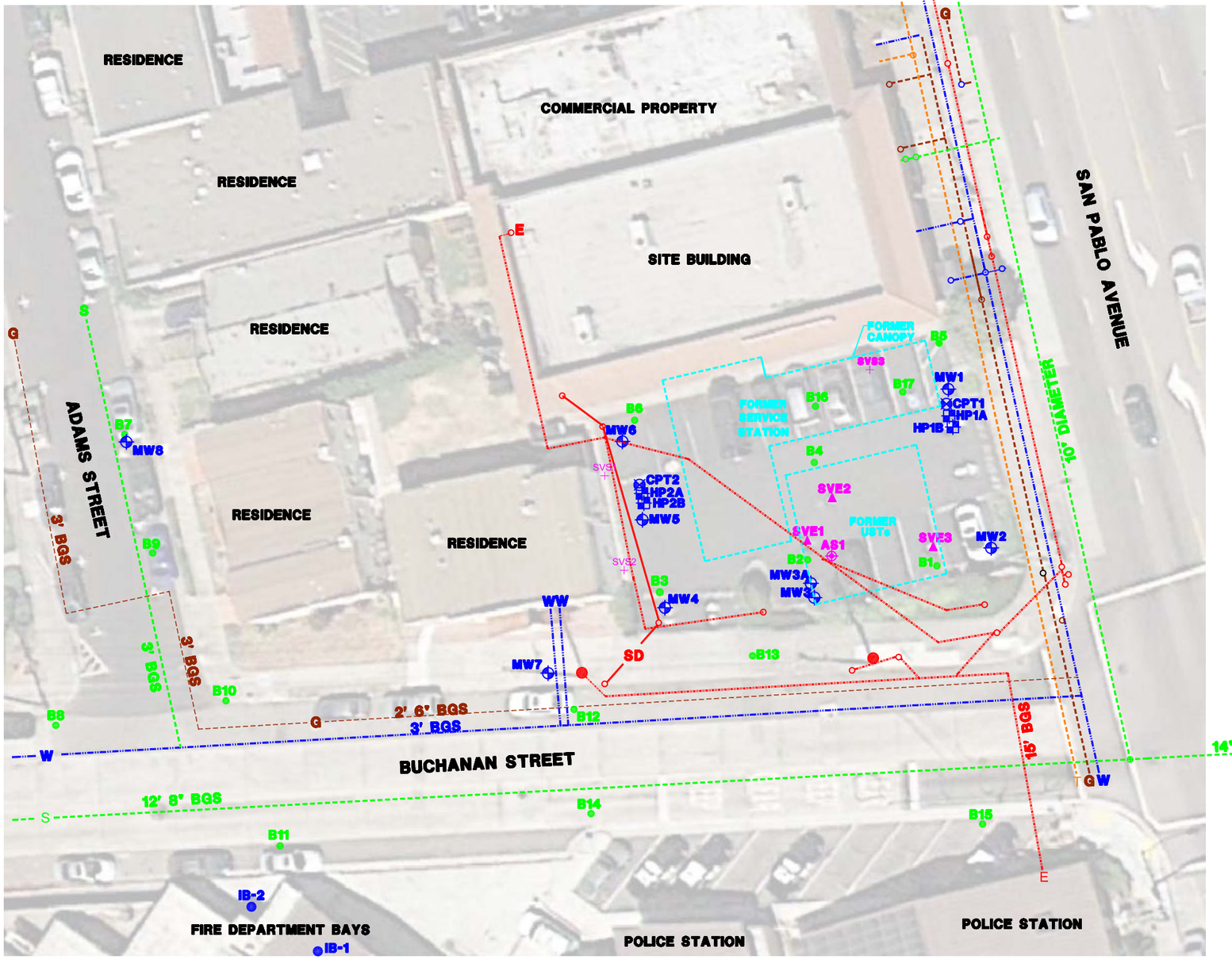
FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

PROJECT NO. 2735

PLATE 1

UTILITIES LEGEND

- TELEPHONE
- ELECTRICAL
- WATER
- GAS
- SEWER
- STORM DRAIN
- POWER POLE



APPROXIMATE SCALE

0 30 60 Feet

FN 2735 GPS AERIAL _SP

Cardno ERI
Shaping the Future

GENERALIZED SITE PLAN

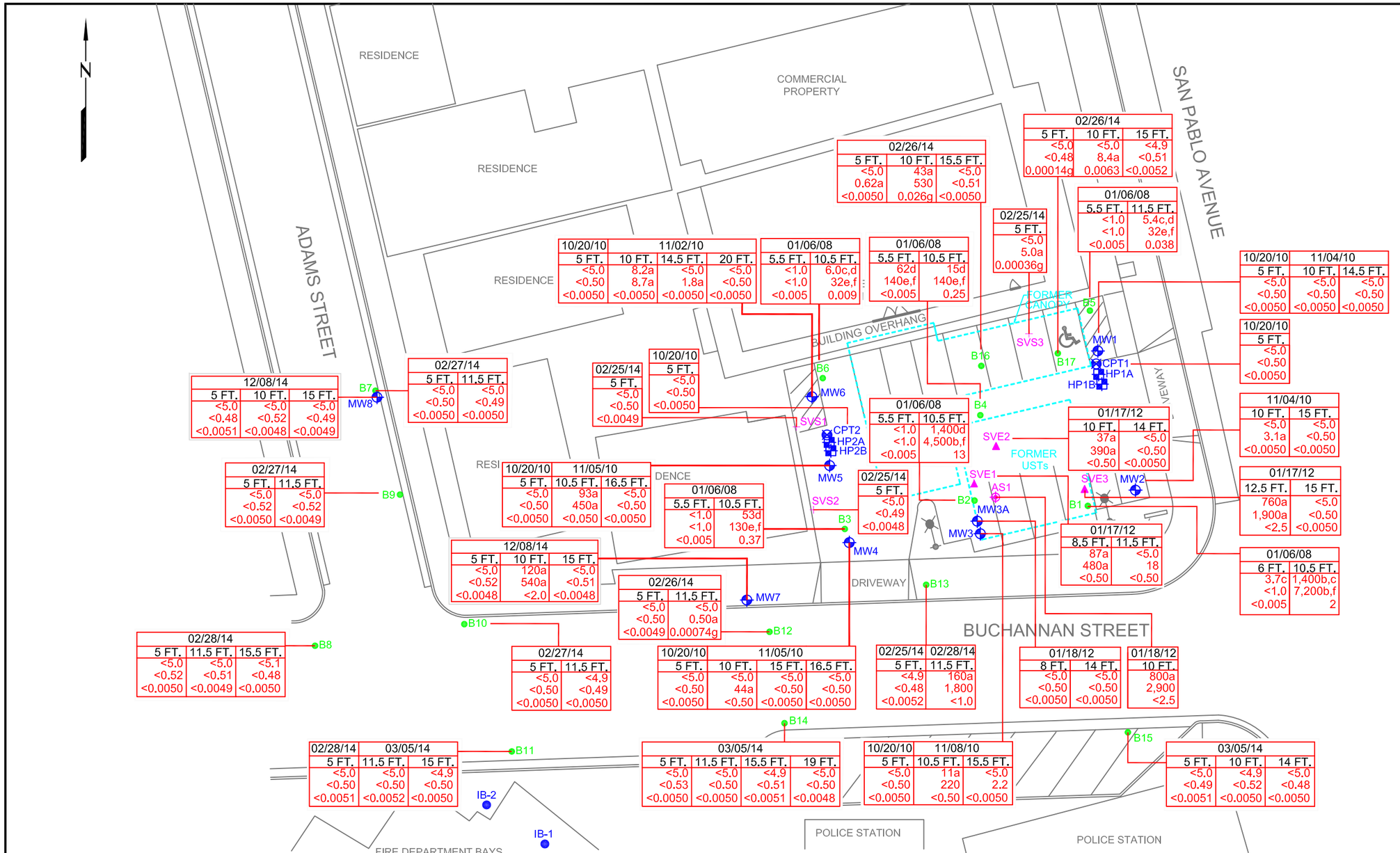
FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- MW8 Groundwater Monitoring Well
- B17 Soil Boring
- IB-2 Soil Boring by Other Consultant for City of Albany
- HP2B Hydropunch Boring
- CPT2 Cone Penetration Test Boring
- SVS3 Soil Vapor Sampling Well
- AS1 Air Sparge Well
- SVE3 Soil Vapor Extraction Well

PROJECT NO. 2735

PLATE 2



Analyte Concentrations in mg/kg

Sample Date
Sample Depth
Total Petroleum Hydrocarbons as diesel
Total Petroleum Hydrocarbons as gasoline
Benzene

- < Less than the Stated Laboratory Reporting Limit
- mg/kg Milligrams per Kilogram
- NM Not Measured
- a The chromatographic pattern does not match that of the specified standard.
- b Heavier gasoline range compounds are significant.
- c Diesel range compounds are significant; no recognizable pattern.
- d Gasoline range compounds are significant.
- e Strongly aged gasoline or diesel range compounds are significant.
- f No recognizable pattern.
- g Estimated value; analyte present at concentration above the method dection limit but below the reporting limit.

FN 27350004 R09

Cardno ERI
Shaping the Future

SELECT SOIL ANALYTICAL RESULTS

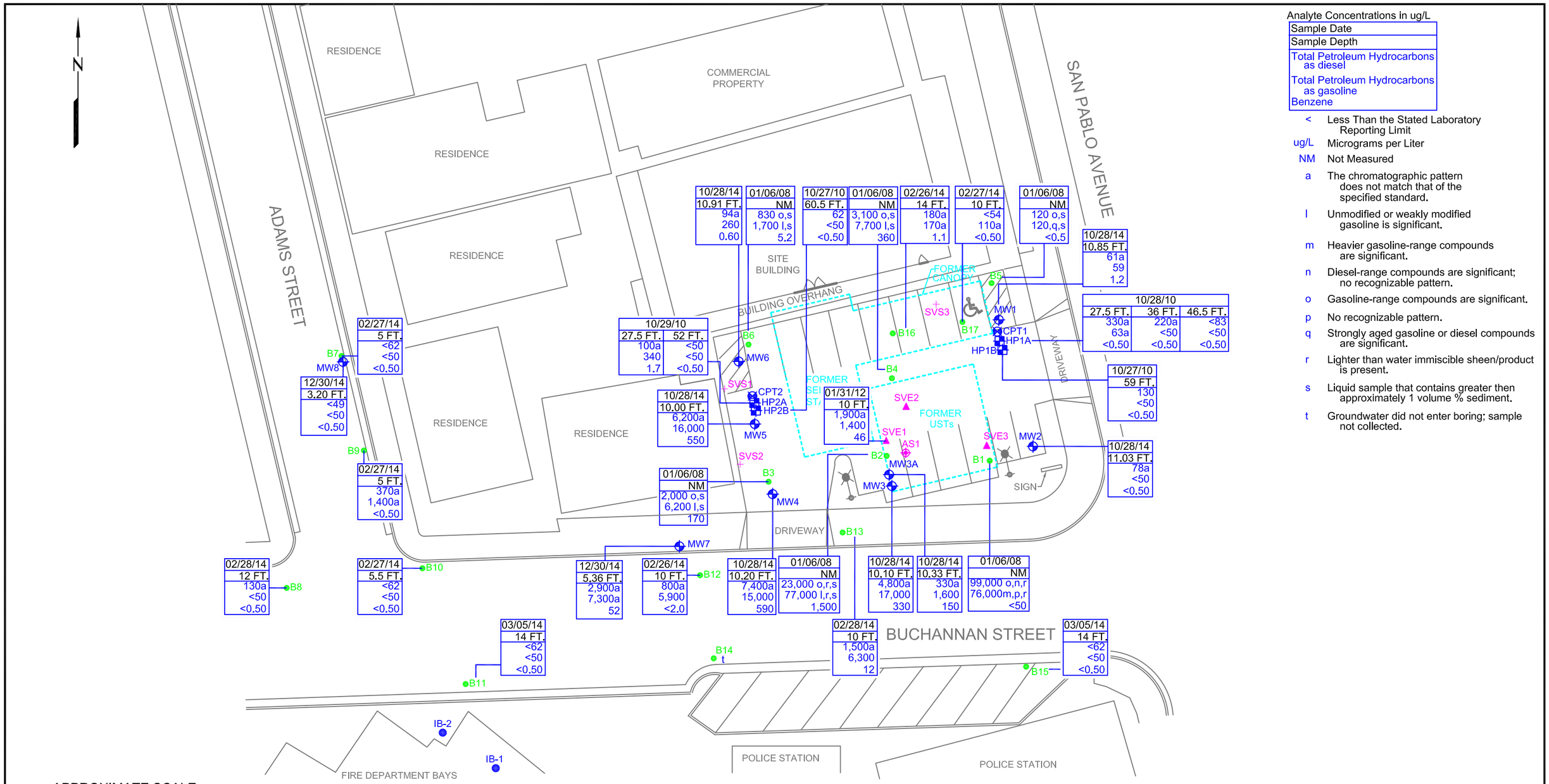
FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- MW8 Groundwater Monitoring Well
- B17 Soil Boring
- IB-2 Soil Boring by Other Consultant for City of Albany
- HP2B Hydropunch Boring
- CPT2 Cone Penetration Test Boring
- SVS3 Soil Vapor Sampling Well
- AS1 Air Sparge Well
- SVE3 Soil Vapor Extraction Well

PROJECT NO. 2735

PLATE 3



Analyte Concentrations in ug/L

Sample Date
Sample Depth
Total Petroleum Hydrocarbons as diesel
Total Petroleum Hydrocarbons as gasoline
Benzene

<	Less Than the Stated Laboratory Reporting Limit
ug/L	Micrograms per Liter
NM	Not Measured
a	The chromatographic pattern does not match that of the specified standard.
l	Unmodified or weakly modified gasoline is significant.
m	Heavier gasoline-range compounds are significant.
n	Diesel-range compounds are significant; no recognizable pattern.
o	Gasoline-range compounds are significant.
p	No recognizable pattern.
q	Strongly aged gasoline or diesel compounds are significant.
r	Lighter than water immiscible sheen/product is present.
s	Liquid sample that contains greater then approximately 1 volume % sediment.
t	Groundwater did not enter boring; sample not collected.

APPROXIMATE SCALE

0 30 60 Feet

FN 27350004 R09

Cardno ERI
Shaping the Future

SELECT GROUNDWATER ANALYTICAL RESULTS

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- MW8 — Groundwater Monitoring Well
- B17 — Soil Boring
- IB-2 — Soil Boring by Other Consultant for City of Albany
- HP2B — Hydropunch Boring
- CPT2 — Cone Penetration Test Boring
- SVS3 — Soil Vapor Sampling Well
- AS1 — Air Sparge Well
- SVE3 — Soil Vapor Extraction Well

PROJECT NO. 2735

PLATE 4

Analyte Concentrations in ug/m^3

Sample Date
Sample Depth
Total Petroleum Hydrocarbons as gasoline
Benzene
Naphthalene
O_2 + Argon

<	Less than the Stated Laboratory Reporting Limit
ug/m^3	Micrograms per cubic meter
a	Possibly biased high due to results of associated standard.
NA	Not applicable

EXISTING BUILDING

BUILDING OVERHANG

FORMER CANOPY

FORMER SERVICE STATION

SAN PABLO AVENUE

DRIVE WAY

EXISTING BUILDING

FORMER USTs

SIGN

DRIVE WAY

N

	03/07/14	
	5.5 FT.	DUP.
	150,000,000	150,000,000
	15,000	22,000
	1.1	NA
	4.41	3.10

	08/28/14
	5.5 FT.
	87,000,000
	21,000
	820a
	5.49

03/06/14	08/28/14
5.5 FT.	
180,000,000	90,000,000
<2,600	<8,000
<0.020	<20
2.58	2.49

03/06/14	08/28/14	
5.5 FT.	5.5 FT.	DUP.
190,000,000	80,000,000	89,000,000
1,700	<8,000	<8,000
<0.020	<20	NA
3.62	5.54	2.82

MW1 CPT1 HP1A HP1B MW6 SVS1 CPT2 HP2A HP2B MW5 SVS2 MW4 SVE2 SVE1 AS1 SVE3 MW2 MW3A MW3 SVS3

APPROXIMATE SCALE

0 10 20 Feet

FN 27350002 R09

Cardno ERI Shaping the Future

SELECT SOIL VAPOR ANALYTICAL RESULTS
March 6 and 7, 2014 and August 28, 2014

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- MW6 Groundwater Monitoring Well
- HP2B Hydropunch Boring
- CPT2 Cone Penetration Test Boring
- AS1 Air Sparge Well
- SVS3 Soil Vapor Sampling Well
- SVE3 Soil Vapor Extraction Well

PROJECT NO. 2735

PLATE 5

FN 27350003 R09

Cardno ERI
Shaping the Future

EXTENDED SITE PLAN SHOWING PROPOSED WELL LOCATIONS

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- MW8 — Groundwater Monitoring Well
- MW9 — Proposed Groundwater Monitoring Well
- B17 — Soil Boring
- HP2B — Hydropunch Boring
- CPT2 — Cone Penetration Test Boring
- AS1 — Air Sparge Well
- SVE3 — Soil Vapor Extraction Well
- SVE3 — Proposed Soil Vapor Extraction Well
- SVS3 — Soil Vapor Sampling Well

PROJECT NO. 2735

PLATE 6

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	TOC Elev. (feet)	DTW (feet)	GW Elev.	NAPL (feet)	O&G (µg/L)	TPHmo (µg/L)	TPHd (µg/L)	TPHg (µg/L)	MTBE (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
Monitoring Well Samples															
MW1	11/04/10	---	Well installed.												
MW1	12/01/10	---	41.45	Well surveyed.											
MW1	12/16/10	---	41.45	9.18	32.27	No	---	<250	71a	54	<0.50	1.4	0.65	0.58	1.6
MW1	01/31/11	---	41.45	8.78	32.67	No	---	<250	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW1	04/07/11	---	41.45	8.45	33.00	No	---	<250	65a	160a	<0.50	2.9	0.92	<0.50	1.7
MW1	07/18/11	---	41.45	9.49	31.96	No	---	<250	<50	63a	<0.50	<0.50	<0.50	<0.50	<0.50
MW1	10/13/11	---	41.45	9.86	31.59	No	---	<250	54	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW1	04/06/12	---	41.45	8.11	33.34	No	---	<250	130	130	<0.50	2.1	<0.50	<0.50	<0.50
MW1	10/19/12	---	41.45	10.42	31.03	No	---	<250	<50	<50	<0.50	0.51	2.2	<0.50	0.65
MW1	06/11/13	---	41.45	10.48	30.97	No	---	<250	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW1	12/19/13	---	41.45	10.67	30.78	No	---	<250	<50	<50	<0.50	<0.50	1.3	<0.50	0.53
MW1	04/03/14	---	44.19	Elevation converted to NAVD88.											
MW1	04/30/14	---	44.19	9.49	34.70	No	---	---	---	---	---	---	---	---	---
MW1	05/01/14	---	44.19	---	---	---	---	<240	<48	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW1	10/28/14	---	44.19	10.85	33.34	No	---	<250	61a	59	<0.50	1.2	<0.50	0.64	<0.50
MW2	11/04/10	---	Well installed.												
MW2	12/01/10	---	41.25	Well surveyed.											
MW2	12/16/10	---	41.25	8.11	33.14	No	---	<250	110a	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	01/31/11	---	41.25	9.29	31.96	No	---	<250	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	04/07/11	---	41.25	8.21	33.04	No	---	<250	<50	<50	0.51	<0.50	<0.50	<0.50	<0.50
MW2	07/18/11	---	41.25	9.52	31.73	No	---	<250	<50	54a	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	10/13/11	---	41.25	9.56	31.69	No	---	<250	98	75a	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	04/06/12	---	41.25	8.68	32.57	No	---	<250	60	68	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	10/19/12	---	41.25	11.03	30.22	No	---	<250	<50	59a	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	06/11/13	---	41.25	10.67	30.58	No	---	<250	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	12/19/13	---	41.25	10.77	30.48	No	---	<250	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	04/03/14	---	43.99	Elevation converted to NAVD88.											
MW2	04/30/14	---	43.99	9.63	34.36	No	---	---	---	---	---	---	---	---	---
MW2	05/01/14	---	43.99	---	---	---	---	<240	<48	53a	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	10/28/14	---	43.99	11.03	32.96	No	---	<250	78a	<50	<0.50	<0.50	<0.50	<0.50	<0.50
MW3	11/08/10	---	Well installed.												
MW3	12/01/10	---	40.42	Well surveyed.											
MW3	12/16/10	---	40.42	8.18	32.24	No	---	<250	2,900a	19,000	<12	350	130	940	290
MW3	01/31/11	---	40.42	7.64	32.78	No	---	390	2,800a	17,000a	<12	540	140	700	270
MW3	04/07/11	---	40.42	5.88	34.54	No	---	<250	2,700a	14,000	<10	600	150	780	230
MW3	07/18/11	---	40.42	8.31	32.11	No	---	<250	1,700a	19,000	<10	650	140	660	220
MW3	10/13/11	---	40.42	8.76	31.66	No	---	<250	1,900a	16,000	<10	520	150	900	270
MW3	04/06/12	---	40.42	8.13	32.29	No	---	<250	3,200a	18,000	<20	300	120	1,100	180
MW3	10/19/12	---	40.42	9.37	31.05	No	---	<250	1,700a	11,000a	<10	380	120	740	150

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	TOC Elev. (feet)	DTW (feet)	GW Elev.	NAPL (feet)	O&G (µg/L)	TPHmo (µg/L)	TPHd (µg/L)	TPHg (µg/L)	MTBE (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
MW3	06/11/13	---	40.42	9.48	30.94	No	---	<250	2,700a	17,000	<10	270	110	990	140
MW3	12/19/13	---	40.42	10.00	30.42	No	---	---	---	---	---	---	---	---	---
MW3	12/20/13	---	40.42	---	---	---	---	<250	2,000a	16,000	<10	310	120	710	120
MW3	04/03/14	---	43.16	Elevation converted to NAVD88.											
MW3	04/30/14	---	43.16	9.17	33.99	No	---	---	---	---	---	---	---	---	---
MW3	05/01/14	---	43.16	---	---	---	---	<240	3,100a	18,000	<10	230	110	1,100	170
MW3	10/28/14	---	43.16	10.10	33.06	No	---	<250	4,800a	17,000	<20	330	120	1,200	150
MW3A	01/18/12	---	Well installed.												
MW3A	02/06/12	---	40.68	Well surveyed.											
MW3A	04/06/12	---	40.68	6.02	34.66	No	---	<250	170a	1,300	<2.0	41	7.5	140	38
MW3A	10/19/12	---	40.68	10.44	30.24	No	---	<250	860a	4,400a	<5.0	390	59	410	82
MW3A	06/11/13	---	40.68	9.75	30.93	No	---	<250	160a	1,100	<2.0	99	14	110	3.6
MW3A	12/19/13	---	40.68	10.05	30.63	No	---	<250	270a	1,800	<2.0	150	18	65	4.7
MW3A	04/03/14	---	43.42	Elevation converted to NAVD88.											
MW3A	04/30/14	---	43.42	7.55	35.87	No	---	---	---	---	---	---	---	---	---
MW3A	05/01/14	---	43.42	---	---	---	---	<240	<48	130a	<0.50	7.0	1.2	7.4	1.3
MW3A	10/28/14	---	43.42	10.33	33.09	No	---	<250	330a	1,600	<0.50	150	17	26	4.0
MW4	11/05/10	---	Well installed.												
MW4	12/01/10	---	39.30	Well surveyed.											
MW4	12/16/10	---	39.30	6.10	33.20	No	---	<250	2,000a	9,900	<5.0	440	40	170	380
MW4	01/31/11	---	39.30	6.84	32.46	No	---	260	3,900a	13,000	<10	500	59	320	740
MW4	04/07/11	---	39.30	5.29	34.01	No	---	<250	1,900a	9,600	<10	530	59	250	340
MW4	07/18/11	---	39.30	7.36	31.94	No	---	<250	2,800a	14,000	<10	570	66	320	510
MW4	10/13/11	---	39.30	7.83	31.47	No	---	320	7,200a	14,000	<10	350	43	340	690
MW4	04/06/12	---	39.30	6.21	33.09	No	---	<250	1,800a	9,100a	<10	380	40	220	410
MW4	10/19/12	---	39.30	10.64	28.66	No	---	1,400a	20,000a	270,000	<10	440	88	2,100	3,800
MW4	03/06/13	---	39.30	8.02	31.28	No	---	---	---	---	---	---	---	---	---
MW4	06/11/13	---	39.30	9.05	30.25	No	---	<250	3,400a	16,000	<10	430	48	520	820
MW4	12/19/13	---	39.30	8.95	30.35	No	---	---	---	---	---	---	---	---	---
MW4	12/20/13	---	39.30	---	---	---	---	<250	2,800a	13,000	<10	590	41	430	530
MW4	03/05/14	---	39.30	---	---	No	---	---	---	---	---	---	---	---	---
MW4	04/03/14	---	42.04	Elevation converted to NAVD88.											
MW4	04/30/14	---	42.04	6.25	35.79	No	---	---	---	---	---	---	---	---	---
MW4	05/01/14	---	42.04	---	---	---	---	<240	3,000a	13,000	<10	520	46	310	340
MW4	10/28/14	---	42.04	10.20	31.84	No	---	<250	7,400a	15,000	<10	590	42	360	230
MW5	11/11/10	---	Well installed.												
MW5	12/01/10	---	40.38	Well surveyed.											
MW5	12/16/10	---	40.38	7.69	32.69	No	---	<250	1,100a	6,200	<2.5	150	96	270	980
MW5	01/31/11	---	40.38	8.00	32.38	No	---	270	4,600a	15,000	<10	520	310	1,100	2,500
MW5	04/07/11	---	40.38	6.73	33.65	No	---	<250	610a	2,500	<2.5	61	32	180	390
MW5	07/18/11	---	40.38	7.63	32.75	No	---	<250	2,000a	11,000	<2.5	340	160	990	1,800

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	TOC Elev. (feet)	DTW (feet)	GW Elev.	NAPL (feet)	O&G (µg/L)	TPHmo (µg/L)	TPHd (µg/L)	TPHg (µg/L)	MTBE (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
MW5	10/13/11	---	40.38	9.31	31.07	No	---	660	7,600a	23,000	<20	390	160	1,200	3,100
MW5	04/06/12	---	40.38	6.77	33.61	No	---	<250	880a	6,000a	<5.0	62	17	360	680
MW5	10/19/12	---	40.38	10.64	29.74	No	---	280a	2,100a	15,000	<20	580	63	950	1,400
MW5	06/11/13	---	40.38	10.06	30.32	No	---	<250	2,700a	13,000	<20	540	36	930	1,200
MW5	12/19/13	---	40.38	9.85	30.53	No	---	---	---	---	---	---	---	---	---
MW5	12/20/13	---	40.38	---	---	---	---	<250	2,100a	21,000	<20	370	36	1,500	1,400
MW5	04/03/14	---	43.12	Elevation converted to NAVD88.											
MW5	04/30/14	---	43.12	7.51	35.61	No	---	---	---	---	---	---	---	---	---
MW5	05/01/14	---	43.12	---	---	---	---	<240	2,000a	10,000	<10	170	10	600	510
MW5	10/28/14	---	43.12	10.00	33.12	No	---	360a	6,200a	16,000	<10	550	17	890	360
MW6	11/03/10	---	Well installed.												
MW6	12/01/10	---	41.06	Well surveyed.											
MW6	12/16/10	---	41.06	8.55	32.51	No	---	<250	110a	1,700	<0.50	2.8	1.2	61	46
MW6	01/31/11	---	41.06	8.52	32.54	No	---	<250	800a	2,000a	<1.0	6.0	<1.0	30	24
MW6	04/07/11	---	41.06	7.78	33.28	No	---	<250	660a	2,000	<0.50	10	1.0	20	19
MW6	07/18/11	---	41.06	9.27	31.79	No	---	<250	350a	1,000a	<0.50	2.5	<0.50	3.8	3.5
MW6	10/13/11	---	41.06	10.21	30.85	No	---	<250	370a	890a	<0.50	2.8	<0.50	7.9	5.5
MW6	04/06/12	---	41.06	7.19	33.87	No	---	<250	440a	1,400a	<0.50	2.4	<0.50	13	15
MW6	10/19/12	---	41.06	11.36	29.70	No	---	<250	99a	510a	<0.50	4.2	1.6	8.0	7.0
MW6	06/11/13	---	41.06	10.81	30.25	No	---	<250	150a	500	<0.50	<0.50	<0.50	2.4	1.1
MW6	12/19/13	---	41.06	10.78	30.28	No	---	<250	68a	440	<0.50	<0.50	<0.50	2.3	0.87
MW6	04/03/14	---	43.80	Elevation converted to NAVD88.											
MW6	04/30/14	---	43.80	8.23	35.57	No	---	---	---	---	---	---	---	---	---
MW6	05/01/14	---	43.80	---	---	---	---	<240	450a	1,500	<0.50	2.8	0.57	13	4.8
MW6	10/28/14	---	43.80	10.91	32.89	No	---	<250	94a	260	<0.50	0.60	<0.50	0.56	<0.50
MW7	**12/08/14**	**---**	**Well installed.**												
MW7	**12/23/14**	**---**	**41.21**	**Well surveyed.**											
MW7	**12/30/14**	**---**	**41.21**	**5.36**	**35.85**	**No**	**---**	**<250**	**2,900a**	**7,300a**	**<5.0**	**52**	**8.9**	**32**	**15**
MW8	**12/08/14**	**---**	**Well installed.**												
MW8	**12/23/14**	**---**	**39.65**	**Well surveyed.**											
MW8	**12/30/14**	**---**	**39.65**	**3.20**	**36.45**	**No**	**---**	**<250**	**<49**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**
AS1	01/18/12	---	Well installed.												
AS1	10/19/12	---	---	10.32	---	No	---	---	---	---	---	---	---	---	---
AS1	06/11/13	---	---	9.82	---	No	---	---	---	---	---	---	---	---	---
AS1	12/19/13	---	---	10.12	---	No	---	---	---	---	---	---	---	---	---
AS1	04/30/14	---	---	7.95	---	No	---	---	---	---	---	---	---	---	---
AS1	10/28/14	---	---	10.35	---	No	---	---	---	---	---	---	---	---	---
SVE1	01/17/12	---	Well installed.												
SVE1	02/06/12	---	40.58	Well surveyed.											
SVE1	10/19/12	---	40.58	10.21	30.37	No	---	---	---	---	---	---	---	---	---

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	TOC Elev. (feet)	DTW (feet)	GW Elev.	NAPL (feet)	O&G (µg/L)	TPHmo (µg/L)	TPHd (µg/L)	TPHg (µg/L)	MTBE (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
SVE1	06/11/13	---	40.58	9.63	30.95	No	---	---	---	---	---	---	---	---	---
SVE1	12/19/13	---	40.58	9.89	30.69	No	---	---	---	---	---	---	---	---	---
SVE1	04/03/14	---	43.32	Elevation converted to NAVD88.											
SVE1	04/30/14	---	43.32	7.70	35.62	No	---	---	---	---	---	---	---	---	---
SVE1	10/28/14	---	43.32	10.17	33.15	No	---	---	---	---	---	---	---	---	---
SVE2	01/17/12	---	Well installed.												
SVE2	02/06/12	---	40.94	Well surveyed.											
SVE2	10/19/12	---	40.94	10.48	30.46	No	---	---	---	---	---	---	---	---	---
SVE2	06/11/13	---	40.94	9.94	31.00	No	---	---	---	---	---	---	---	---	---
SVE2	12/19/13	---	40.94	10.20	30.74	No	---	---	---	---	---	---	---	---	---
SVE2	04/03/14	---	43.68	Elevation converted to NAVD88.											
SVE2	04/30/14	---	43.68	8.09	35.59	No	---	---	---	---	---	---	---	---	---
SVE2	10/28/14	---	43.68	10.50	33.18	No	---	---	---	---	---	---	---	---	---
SVE3	01/17/12	---	Well installed.												
SVE3	02/06/12	---	40.93	Well surveyed.											
SVE3	10/19/12	---	40.93	10.39	30.54	No	---	---	---	---	---	---	---	---	---
SVE3	06/11/13	---	40.93	9.65	31.28	No	---	---	---	---	---	---	---	---	---
SVE3	12/19/13	---	40.93	10.31	30.62	No	---	---	---	---	---	---	---	---	---
SVE3	04/03/14	---	43.67	Elevation converted to NAVD88.											
SVE3	04/30/14	---	43.67	7.79	35.88	No	---	---	---	---	---	---	---	---	---
SVE3	10/28/14	---	43.67	10.48	33.19	No	---	---	---	---	---	---	---	---	---
Grab Groundwater Samples															
B-1W	01/06/08	---	---	---	---	---	26r,s	<5,000	99,000o,n,r	76,000m,p,r	<50	<50	93	3,100	9,600
B-2W	01/06/08	---	---	---	---	---	---	310s	23,000o,r,s	77,000 l,r,s	<50	1,500	300	2,000	6,800
B-3W	01/06/08	---	---	---	---	---	---	<250s	2,000o,s	6,200 l,s	<10	170	32	740	250
B-4W	01/06/08	---	---	---	---	---	---	<250s	3,100o,s	7,700 l,s	<10	360	<10	240	20
B-5W	01/06/08	---	---	---	---	---	---	<250s	120o,s	120q,s	<0.5	<0.5	<0.5	<0.5	<0.5
B-6W	01/06/08	---	---	---	---	---	---	<250s	830o,s	1,700 l,s	<2.5	5.2	<2.5	100	8.6
DR-W	01/06/08	---	---	---	---	---	---	<250	96o	730m,p	<0.5	<0.5	<0.5	6.9	14
W-27.5-HP1A	10/28/10	27.5	---	---	---	---	---	260	330a	63a	<0.50	<0.50	<0.50	<0.50	<0.50
W-36-HP1A	10/28/10	36	---	---	---	---	---	<250	220a	<50	<0.50	<0.50	<0.50	<0.50	<0.50
W-46.5-HP1A	10/28/10	46.5	---	---	---	---	---	<420	<83	<50	<0.50	<0.50	<0.50	<0.50	<0.50
W-59-HP1B	10/27/10	59	---	---	---	---	---	<250	130	<50	<0.50	<0.50	<0.50	<0.50	<0.50

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	TOC Elev. (feet)	DTW (feet)	GW Elev.	NAPL (feet)	O&G (µg/L)	TPHmo (µg/L)	TPHd (µg/L)	TPHg (µg/L)	MTBE (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
W-27.5-HP2A	10/29/10	27.5	---	---	---	---	---	<250	100a	340	<0.50	1.7	2.1	20	46
W-52-HP2A	10/29/10	52	---	---	---	---	---	<250	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50
W-60.5-HP2B	10/27/10	60.5	---	---	---	---	---	<250	62	<50	<0.50	<0.50	<0.50	<0.50	<0.50
W-10-SVE1-1	01/31/12	10	---	---	---	---	---	990a	1,900a	2,000	<2.0	87	2.1	13	23
W-10-SVE1-2	01/31/12	10	---	---	---	---	---	890a	1,500a	1,400	<1.0	46	2.0	24	23
W-5-B7	02/27/14	5	---	---	---	---	---	<310	<62	<50	<0.50	<0.50	<0.50	<0.50	<0.50
W-12-B8	02/28/14	12	---	---	---	---	---	<240	130a	<50	<0.50	<0.50	<0.50	<0.50	<0.50
W-5-B9	02/27/14	5	---	---	---	---	---	<310	370a	1,400a	<0.50	<0.50	<0.50	<0.50	<0.50
W-5.5-B10	02/27/14	5.5	---	---	---	---	---	<310	<62	<50	<0.50	<0.50	<0.50	<0.50	<0.50
W-14-B11	03/05/14	14	---	---	---	---	---	<310	<62	<50	<0.50	<0.50	<0.50	<0.50	<0.50
W-10-B12	02/26/14	10	---	---	---	---	---	<250	800a	5,900	<2.0	<2.0	<2.0	7.5	<2.0
W-10-B13	02/28/14	10	---	---	---	---	---	<250	1,500a	6,300	<5.0	12	8.8	290	22
B14	03/05/14 t	---	---	---	---	---	---	---	---	---	---	---	---	---	---
W-14-B15	03/05/14	14	---	---	---	---	---	<310	<62	<50	1.3	<0.50	<0.50	<0.50	<0.50
W-14-B16	02/26/14	14	---	---	---	---	---	<250	180a	170a	<0.50	1.1	<0.50	5.4	<0.50
W-10-B17	02/27/14	10	---	---	---	---	---	<270	<54	110a	<0.50	<0.50	<0.50	<0.50	<0.50

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Notes:		
TOC	=	Top of well casing elevation; datum is NAVD88, prior to April 2014, datum was mean sea level.
DTW	=	Depth to water.
GW Elev.	=	Groundwater elevation; datum is NAVD88, prior to April 2014, datum was mean sea level. If liquid-phase hydrocarbons present, elevation adjusted using TOC - [DTW - (PT x 0.76)].
NAPL	=	Non-aqueous phase liquid.
O&G	=	Oil and grease with silica gel clean-up analyzed using Standard Method 5520B/F.
TPHmo	=	Total petroleum hydrocarbons as motor oil analyzed using EPA Method 8015 (modified).
TPHd	=	Total petroleum hydrocarbons as diesel analyzed using EPA Method 8015 (modified).
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using EPA Method 8015 (modified).
MTBE	=	Methyl tertiary butyl ether analyzed using EPA Method 8260B.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8260B.
EDB	=	1,2-dibromoethane analyzed using EPA Method 8260B.
1,2-DCA	=	1,2-dichloroethane analyzed using EPA Method 8260B.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method 8260B.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method 8260B.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method 8260B.
DIPE	=	Di-isopropyl ether analyzed using EPA Method 8260B.
Add'l VOCs	=	Additional volatile organic compounds or halogenated volatile organic compounds analyzed using EPA Method 8260B.
Add'l SVOCs	=	Additional semi-volatile organic compounds analyzed using EPA Method 8270C.
µg/L	=	Micrograms per liter.
ND	=	Not detected at or above laboratory reporting limits.
---	=	Not measured/Not sampled/Not analyzed.
<	=	Less than the stated laboratory reporting limit.
a	=	The chromatographic pattern does not match that of the specified standard.
b	=	n-butylbenzene.
c	=	sec-butylbenzene.
d	=	Isopropylbenzene.
e	=	n-propylbenzene.
f	=	1,2,4-trimethylbenzene.
g	=	1,3,5-trimethylbenzene.
h	=	Naphthalene.
i	=	1-butanone.
j	=	1,2-dibromo-3-chloropropane.
k	=	2-methylnapthalene.
l	=	Unmodified or weakly modified gasoline is significant.
m	=	Heavier gasoline-range compounds are significant.
n	=	Diesel-range compounds are significant; no recognizable pattern.
o	=	Gasoline-range compounds are significant.
p	=	No recognizable pattern.
q	=	Strongly aged gasoline or diesel compounds are significant.
r	=	Lighter than water immiscible sheen/product is present.
s	=	Liquid sample that contains greater than approximately 1 volume % sediment.
t	=	Groundwater did not enter boring, sample not collected.
u	=	Analyzed beyond the EPA-recommended hold time.
v	=	tert-butylbenzene.
w	=	cis-1,2-dichloroethene.

Notes:

x = p-isopropyltoluene.
y = Tetrachloroethene.
z = Trichloroethene.

TABLE 1B
ADDITIONAL CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	EDB (µg/L)	1,2-DCA (µg/L)	TAME (µg/L)	TBA (µg/L)	ETBE (µg/L)	DIPE (µg/L)	Add'l VOCs (µg/L)	Add'l SVOCs (µg/L)
Monitoring Well Samples										
MW1	11/04/10	---	Well installed.							
MW1	12/16/10	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW1	01/31/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW1	04/07/11	---	<0.50	<0.50	<0.50	10	<0.50	<0.50	---	---
MW1	07/18/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW1	10/13/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW1	04/06/12	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW1	10/19/12	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW1	06/11/13	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW1	12/19/13	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW1	05/01/14	---	<0.50	<0.50	<0.50	5.1	<0.50	<0.50	---	---
MW1	10/28/14	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	0.67f, 18w, 85u,y, 9.8,z	---
MW2	11/04/10	---	Well installed.							
MW2	12/16/10	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	01/31/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	04/07/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	07/18/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	10/13/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	04/06/12	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	10/19/12	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	06/11/13	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	12/19/13	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	05/01/14	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW2	10/28/14	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	8.8e, 73u,y, 8.9z	---
MW3	11/08/10	---	Well installed.							
MW3	12/16/10	---	<12	<12	<12	<120	<12	<12	---	---
MW3	01/31/11	---	<12	<12	<12	<120	<12	<12	---	---
MW3	04/07/11	---	<10	<10	<10	<100	<10	<10	---	---
MW3	07/18/11	---	<10	<10	<10	<100	<10	<10	---	---
MW3	10/13/11	---	<10	<10	<10	<100	<10	<10	---	---
MW3	04/06/12	---	<20	<20	<20	<200	<20	<20	---	---
MW3	10/19/12	---	<10	<10	<10	<100	<10	<10	---	---
MW3	06/11/13	---	<10	<10	<10	<100	<10	<10	---	---
MW3	12/20/13	---	<10	<10	<10	<100	<10	<10	---	---
MW3	05/01/14	---	<10	<10	<10	<100	<10	<10	---	---
MW3	10/28/14	---	<20	<20	<20	<200	<20	<20	30b, 110d, 210e, 36g, 290h	---
MW3A	01/18/12	---	Well installed.							
MW3A	04/06/12	---	<2.0	<2.0	<2.0	<20	<2.0	<2.0	---	---
MW3A	10/19/12	---	<5.0	<5.0	<5.0	<50	<5.0	<5.0	---	---
MW3A	06/11/13	---	<2.0	<2.0	<2.0	<20	<2.0	<2.0	---	---

TABLE 1B
ADDITIONAL CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	EDB (µg/L)	1,2-DCA (µg/L)	TAME (µg/L)	TBA (µg/L)	ETBE (µg/L)	DIPE (µg/L)	Add'l VOCs (µg/L)	Add'l SVOCs (µg/L)
MW3A	12/19/13	---	<2.0	<2.0	<2.0	<20	<2.0	<2.0	---	---
MW3A	05/01/14	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW3A	10/28/14	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	5.4b, 6.3c, 20d, 28e, 4.6f, 1.6g, 4.6h, 2.9v, 2.0x	---
MW4	11/05/10	---	Well installed.							
MW4	12/16/10	---	<5.0	<5.0	<5.0	<50	<5.0	<5.0	---	---
MW4	01/31/11	---	<10	<10	<10	<100	<10	<10	---	---
MW4	04/07/11	---	<10	<10	<10	<100	<10	<10	---	---
MW4	07/18/11	---	<10	<10	<10	<100	<10	<10	---	---
MW4	10/13/11	---	<10	<10	<10	<100	<10	<10	---	---
MW4	04/06/12	---	<10	<10	<10	<100	<10	<10	---	---
MW4	10/19/12	---	<10	<10	<10	<100	<10	<10	---	---
MW4	06/11/13	---	<10	<10	<10	<100	<10	<10	---	---
MW4	12/20/13	---	<10	<10	<10	<100	<10	<10	---	---
MW4	05/01/14	---	<10	<10	<10	<100	<10	<10	---	---
MW4	10/28/14	---	<10	<10	<10	<100	<10	<10	72b, 24c, 75d, 190e, 350f, 160g, 270h	---
MW5	11/11/10	---	Well installed.							
MW5	12/16/10	---	<2.5	<2.5	<2.5	<25	<2.5	<2.5	---	---
MW5	01/31/11	---	<10	<10	<10	<100	<10	<10	---	---
MW5	04/07/11	---	<2.5	<2.5	<2.5	<25	<2.5	<2.5	---	---
MW5	07/18/11	---	<2.5	<2.5	<2.5	<25	<2.5	<2.5	---	---
MW5	10/13/11	---	<20	<20	<20	<200	<20	<20	---	---
MW5	04/06/12	---	<0.50	<5.0	<5.0	<50	<5.0	<5.0	---	---
MW5	10/19/12	---	<20	<20	<20	<200	<20	<20	---	---
MW5	06/11/13	---	<20	<20	<20	<200	<20	<20	---	---
MW5	12/20/13	---	<20	<20	<20	<200	<20	<20	---	---
MW5	05/01/14	---	<10	<10	<10	<100	<10	<10	---	---
MW5	10/28/14	---	<10	<10	<10	<100	<10	<10	82b, 33c, 120d, 380e, 730f, 130g, 250h, 14x	---
MW6	11/03/10	---	Well installed.							
MW6	12/16/10	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	01/31/11	---	<1.0	<1.0	<1.0	<10	<1.0	<1.0	---	---
MW6	04/07/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	07/18/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	10/13/11	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	04/06/12	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	10/19/12	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	06/11/13	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	12/19/13	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	05/01/14	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
MW6	10/28/14	---	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	0.73c, 0.84d, 1.9e, 1.4h	---
MW7	**12/08/14**	**---**	**Well installed.**							
MW7	**12/30/14**	**---**	**<5.0**	**<5.0**	**<5.0**	**<50**	**<5.0**	**13**	**---**	**---**

TABLE 1B
ADDITIONAL CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	EDB (µg/L)	1,2-DCA (µg/L)	TAME (µg/L)	TBA (µg/L)	ETBE (µg/L)	DIPE (µg/L)	Add'l VOCs (µg/L)	Add'l SVOCs (µg/L)
MW8	**12/08/14**	**---**	**Well installed.**							
MW8	**12/30/14**	**---**	**<0.50**	**<0.50**	**<0.50**	**<5.0**	**<0.50**	**<0.50**	**---**	**---**
AS1	01/18/12	---	Well installed.							
AS1	10/19/12	- Present	Not sampled.							
SVE1	01/17/12	---	Well installed.							
SVE1	10/19/12	- Present	Not sampled.							
SVE2	01/17/12	---	Well installed.							
SVE2	10/19/12	- Present	Not sampled.							
SVE3	01/17/12	---	Well installed.							
SVE3	10/19/12	- Present	Not sampled.							
Grab Groundwater Samples										
B-1W	01/06/08	---	<50	<50	<50	<200	<50	<50	210b, 68c, 370d, 1,100e, 3,800f, 1,300g, 1,500h	4,000h, 3,900k
B-2W	01/06/08	---	<50	<50	<50	<200	<50	<50	110b, 140e, 440f, 2,400g, 730h, 610i, 32j	---
B-3W	01/06/08	---	<10	<10	<10	<40	<10	<10	25b, 11c, 74d, 190e, 290f, 49g, 55i	---
B-4W	01/06/08	---	<10	<10	<10	<40	<10	<10	46b, 19c, 48d, 160e, 16f, 100h	---
B-5W	01/06/08	---	ND	<0.5	<0.5	<2.0	<0.5	<0.5	2.6b, 0.83e, 4.8f, 1.2g, 6.5h	---
B-6W	01/06/08	---	<2.5	<2.5	<2.5	<10	<2.5	<2.5	14b, 5.6c, 17d, 60e, 32f, 5.8g, 38h, 10i	---
DR-W	01/06/08	---	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	6.9b, 2.4c, 2.5d, 11e, 17f, 5.5g, 7.0h	---
W-27.5-HP1A	10/28/10	27.5	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-36-HP1A	10/28/10	36	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-46.5-HP1A	10/28/10	46.5	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-59-HP1B	10/27/10	59	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-27.5-HP2A	10/29/10	27.5	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-52-HP2A	10/29/10	52	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-60.5-HP2B	10/27/10	60.5	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-10-SVE1-2	01/31/12	10	<1.0	<1.0	<1.0	57	<1.0	<1.0	---	---
W-10-SVE1-1	01/31/12	10	<2.0	<2.0	<2.0	62	<2.0	<2.0	---	---
W-5-B7	02/27/14	5	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-12-B8	02/28/14	12	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-5-B9	02/27/14	5	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-5.5-B10	02/27/14	5.5	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-14-B11	03/05/14	14	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---

TABLE 1B
ADDITIONAL CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Sampling Date	Depth (feet)	EDB (µg/L)	1,2-DCA (µg/L)	TAME (µg/L)	TBA (µg/L)	ETBE (µg/L)	DIPE (µg/L)	Add'l VOCs (µg/L)	Add'l SVOCs (µg/L)
W-10-B12	02/26/14	10	<2.0	<2.0	<2.0	<20	<2.0	<2.0	---	---
W-10-B13	02/28/14	10	<5.0	<5.0	<5.0	<50	<5.0	<5.0	---	---
B14	03/05/14 t		---	---	---	---	---	---	---	---
W-14-B15	03/05/14	14	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-14-B16	02/26/14	14	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---
W-10-B17	02/27/14	10	<0.50	<0.50	<0.50	<5.0	<0.50	<0.50	---	---

TABLE 1B
ADDITIONAL CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Notes:

TOC	=	Top of well casing elevation; datum is NAVD88, prior to April 2014, datum was mean sea level.
DTW	=	Depth to water.
GW Elev.	=	Groundwater elevation; datum is NAVD88, prior to April 2014, datum was mean sea level. If liquid-phase hydrocarbons present, elevation adjusted using TOC - [DTW - (PT x 0.76)].
NAPL	=	Non-aqueous phase liquid.
O&G	=	Oil and grease with silica gel clean-up analyzed using Standard Method 5520B/F.
TPHmo	=	Total petroleum hydrocarbons as motor oil analyzed using EPA Method 8015 (modified).
TPHd	=	Total petroleum hydrocarbons as diesel analyzed using EPA Method 8015 (modified).
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using EPA Method 8015 (modified).
MTBE	=	Methyl tertiary butyl ether analyzed using EPA Method 8260B.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8260B.
EDB	=	1,2-dibromoethane analyzed using EPA Method 8260B.
1,2-DCA	=	1,2-dichloroethane analyzed using EPA Method 8260B.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method 8260B.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method 8260B.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method 8260B.
DIPE	=	Di-isopropyl ether analyzed using EPA Method 8260B.
Add'l VOCs	=	Additional volatile organic compounds or halogenated volatile organic compounds analyzed using EPA Method 8260B.
Add'l SVOCs	=	Additional semi-volatile organic compounds analyzed using EPA Method 8270C.
µg/L	=	Micrograms per liter.
ND	=	Not detected at or above laboratory reporting limits.
---	=	Not measured/Not sampled/Not analyzed.
<	=	Less than the stated laboratory reporting limit.
a	=	The chromatographic pattern does not match that of the specified standard.
b	=	n-butylbenzene.
c	=	sec-butylbenzene.
d	=	Isopropylbenzene.
e	=	n-propylbenzene.
f	=	1,2,4-trimethylbenzene.
g	=	1,3,5-trimethylbenzene.
h	=	Naphthalene.
i	=	1-butanone.
j	=	1,2-dibromo-3-chloropropane.
k	=	2-methylnapthalene.
l	=	Unmodified or weakly modified gasoline is significant.
m	=	Heavier gasoline-range compounds are significant.
n	=	Diesel-range compounds are significant; no recognizable pattern.
o	=	Gasoline-range compounds are significant.
p	=	No recognizable pattern.
q	=	Strongly aged gasoline or diesel compounds are significant.
r	=	Lighter than water immiscible sheen/product is present.
s	=	Liquid sample that contains greater than approximately 1 volume % sediment.
t	=	Groundwater did not enter boring, sample not collected.
u	=	Analyzed beyond the EPA-recommended hold time.
v	=	tert-butylbenzene.
w	=	cis-1,2-dichloroethene.

Notes:

x = p-isopropyltoluene.
y = Tetrachloroethene.
z = Trichloroethene.

TABLE 2
WELL CONSTRUCTION DETAILS
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Well ID	Well Installation Date	TOC Elevation (feet)	Borehole Diameter (inches)	Total Depth of Boring (feet bgs)	Well Depth (feet bgs)	Casing Diameter (inches)	Well Casing Material	Screened Interval (feet bgs)	Slot Size (inches)	Filter Pack Interval (feet bgs)	Filter Pack Material
MW1	11/04/10	44.19	8	17	17	2	Schedule 40 PVC	12-17	0.020	10-17	#3 Sand
MW2	11/04/10	43.99	8	17	17	4	Schedule 40 PVC	12-17	0.020	10-17	#3 Sand
MW3	11/08/10	43.16	8	17	17	4	Schedule 40 PVC	11-16	0.020	9-16	#3 Sand
MW3A	01/18/12	43.42	10	15.5	15.5	4	Schedule 40 PVC	5-15	0.020	4.5-15.5	#2/12 Sand
MW4	11/05/10	42.04	8	17	13	2	Schedule 40 PVC	8-13	0.020	6-13	#3 Sand
MW5	11/05/10	43.12	8	17	14	2	Schedule 40 PVC	9-14	0.020	7-14	#3 Sand
MW6	11/03/10	43.80	10	20	20	2	Schedule 40 PVC	15-20	0.020	13-20	#3 Sand
MW7	12/08/14	41.21	10	15	15	2	Schedule 40 PVC	5-15	0.020	4-15	#3 Sand
MW8	12/08/14	39.65	10	15	15	2	Schedule 40 PVC	5-15	0.020	4-15	#3 Sand
AS1	01/18/12	---	8	15.5	15.5	1	Schedule 80 PVC	10.25-13.5	#60 mesh	10.5-15.5	#2/12 Sand
SVE1	01/17/12	43.32	10	15.5	15.5	4	Schedule 40 PVC	5-15	0.020	4.5-15.5	#2/12 Sand
SVE2	01/17/12	43.68	10	15	15	4	Schedule 40 PVC	5-15	0.020	4.5-15	#2/12 Sand
SVE3	01/17/12	43.67	10	15	15	4	Schedule 40 PVC	5-15	0.020	4.5-15.5	#2/12 Sand
SVS1	02/25/14	---	4	5.6	5.6	0.25	PVC	5.4-5.6	0.010	4.6-5.6	#3 Sand
SVS2	02/25/14	---	4	5.6	5.6	0.25	PVC	5.4-5.6	0.010	4.6-5.6	#3 Sand
SVS3	02/25/14	---	4	5.6	5.6	0.25	PVC	5.4-5.6	0.010	4.6-5.6	#3 Sand

Notes:

TOC = Top of well casing elevation; datum is NAVD88.

PVC = Polyvinyl chloride.

feet bgs = Feet below ground surface.

TABLE 3A
CUMULATIVE SOIL ANALYTICAL RESULTS
Former Exxon Service Station 79374
990 San Pablo Boulevard
Albany, California

Sample ID	Sampling Date	Depth (feet bgs)	TPHmo (mg/kg)	TPHd (mg/kg)	TPHg (mg/kg)	MTBE (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	EDB (mg/kg)	1,2-DCA (mg/kg)	TBA (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	Naph-thalene (mg/kg)	VOCs (mg/kg)	Lead (mg/kg)
Environmental Screening Levels, Potential Drinking Water Source (December 2013)																			
Shallow (<10 feet bgs), Residential (Table A-1)			---	100	100	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	80
Shallow (<10 feet bgs), Commercial (Table A-2)			---	110	500	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	320
Deep (≥10 feet bgs), Residential (Table C-1)			---	110	500	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	80
Deep (≥10 feet bgs), Commercial (Table C-2)			---	110	770	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	320
Soil Boring Samples																			
B-1	01/06/08	6.0	<5.0	3.7c	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	---	---	---	---	---	---	---	---	---
B-1	01/06/08	10.5	<100	**1,400b,c**	**7,200b,f**	<5.0	**2**	**51**	**110**	**400**	---	---	---	---	---	---	---	---	---
B-2	01/06/08	5.5	<5.0	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	---	---	---	---	---	---	---	---	---
B-2	01/06/08	10.5	<100	**1,400d**	**4,500b,f**	<5.0	**13**	**35**	**100**	**380**	---	---	---	---	---	---	---	---	---
B-3	01/06/08	5.5	<5.0	<1.0	<1.0	<0.50	<0.005	<0.005	<0.005	<0.005	---	---	---	---	---	---	---	---	---
B-3	01/06/08	10.5	<5.0	53d	**130e,f**	<0.50	**0.37**	0.29	2.6	0.44	---	---	---	---	---	---	---	---	---
B-4	01/06/08	5.5	<5.0	62d	**140e,f**	<0.50	<0.005	1.0	0.066	0.094	---	---	---	---	---	---	---	---	---
B-4	01/06/08	10.5	<5.0	15d	**140e,f**	<0.50	**0.25**	1.5	1.3	0.11	---	---	---	---	---	---	---	---	---
B-5	01/06/08	5.5	<5.0	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	---	---	---	---	---	---	---	---	---
B-5	01/06/08	11.5	<5.0	5.4c,d	32e,f	<0.25	0.038	0.24	0.051	0.035	---	---	---	---	---	---	---	---	---
B-6	01/06/08	5.5	<5.0	<1.0	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005	---	---	---	---	---	---	---	---	---
B-6	01/06/08	10.5	<5.0	6.0c,d	32e,f	<0.05	0.009	0.41	<0.005	0.039	---	---	---	---	---	---	---	---	---
S-5-B7	02/27/14	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.0099	<0.0099	<0.0099	<0.050	---	---
S-11.5-B7	02/27/14	11.5	<25	<5.0	<0.49	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-B8	02/28/14	5.0	<25	<5.0	<0.52	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	<0.050	---	---
S-11.5-B8	02/28/14	11.5	<25	<5.0	<0.51	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.049	<0.0098	<0.0098	<0.0098	---	---	---
S-15.5-B8	02/28/14	15.5	<26	<5.1	<0.48	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-B9	02/27/14	5.0	<25	<5.0	<0.52	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	<0.050	---	---
S-11.5-B9	02/27/14	11.5	<25	<5.0	<0.52	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.049	<0.0098	<0.0098	<0.0098	---	---	---
S-5-B10	02/27/14	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	<0.050	---	---
S-11.5-B10	02/27/14	11.5	<24	<4.9	<0.49	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-B11	02/28/14	5.0	<25	<5.0	<0.50	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.051	<0.010	<0.010	<0.010	<0.051	---	---
S-11.5-B11	03/05/14	11.5	<25	<5.0	<0.50	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.052	<0.010	<0.010	<0.010	---	---	---
S-15-B11	03/05/14	15.0	<24	<4.9	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-B12	02/26/14	5.0	<25	<5.0	<0.50	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.049	<0.0098	<0.0098	<0.0098	<0.049	---	---
S-11.5-B12	02/26/14	11.5	<25	<5.0	0.50a	<0.0052	0.00074g	<0.0052	0.00026g	<0.0052	<0.0052	<0.0052	<0.052	<0.010	<0.010	<0.010	---	---	---
S-5-B13	02/25/14	5.0	<24	<4.9	<0.48	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.052	<0.010	<0.010	<0.010	<0.052	---	---
S-11.5-B13	02/28/14	11.5	<25	**160a**	**1,800**	<1.0	<1.0	<1.0	**16**	1.5	<1.0	<1.0	<10	<2.0	<2.0	<2.0	---	---	---

TABLE 3A
CUMULATIVE SOIL ANALYTICAL RESULTS
Former Exxon Service Station 79374
990 San Pablo Boulevard
Albany, California

Sample ID	Sampling Date	Depth (feet bgs)	TPHmo (mg/kg)	TPHd (mg/kg)	TPHg (mg/kg)	MTBE (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	EDB (mg/kg)	1,2-DCA (mg/kg)	TBA (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	Naph-thalene (mg/kg)	VOCs (mg/kg)	Lead (mg/kg)
Environmental Screening Levels, Potential Drinking Water Source (December 2013)																			
Shallow (<10 feet bgs), Residential (Table A-1)			---	100	100	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	80
Shallow (<10 feet bgs), Commercial (Table A-2)			---	110	500	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	320
Deep (≥10 feet bgs), Residential (Table C-1)			---	110	500	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	80
Deep (≥10 feet bgs), Commercial (Table C-2)			---	110	770	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	320
S-5-B14	03/05/14	5.0	<25	<5.0	<0.53	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	<0.050	---	---
S-11.5-B14	03/05/14	11.5	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-15.5-B14	03/05/14	15.5	<24	<4.9	<0.51	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.051	<0.010	<0.010	<0.010	---	---	---
S-19-B14	03/05/14	19.0	<25	<5.0	<0.50	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.048	<0.0096	<0.0096	<0.0096	---	---	---
S-5-B15	03/05/14	5.0	<25	<5.0	<0.49	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.051	<0.010	<0.010	<0.010	<0.051	---	---
S-10-B15	03/05/14	10.0	<24	<4.9	<0.52	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-14.0-B15	03/05/14	14.0	<25	<5.0	<0.48	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-B16	02/26/14	5.0	<25	<5.0	0.62a	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.030g	<0.0099	<0.0099	<0.0099	<0.050	---	---
S-10-B16	02/26/14	10.0	<24	43a	**530**	<0.49	0.026g	<0.49	0.10g	0.058g	<0.49	<0.49	<4.9	<0.97	<0.97	<0.97	0.84g	---	---
S-15.5-B16	02/26/14	15.5	<25	<5.0	<0.51	<0.0050	<0.0050	<0.0050	0.00021g	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-B17	02/26/14	5.0	<25	<5.0	<0.48	<0.0050	0.00014g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.011g	<0.010	<0.010	<0.010	0.0021g	---	---
S-10-B17	02/26/14	10.0	<25	<5.0	8.4a	<0.0050	0.0063	<0.0050	<0.0050	0.00081g	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	<0.050	---	---
S-15.5-B17	02/26/14	15.5	<24	<4.9	<0.51	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.0052	<0.052	<0.010	<0.010	<0.010	---	---	---
Well Samples																			
S-5-MW1	10/20/10	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-10-MW1	11/04/10	10.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-14.5-MW1	11/04/10	14.5	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-10-MW2	11/04/10	10.0	<25	<5.0	3.1a	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-15-MW2	11/04/10	15.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-MW3	10/20/10	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-10.5-MW3	11/08/10	10.5	<25	11a	**220**	<0.50	<0.50	<0.50	2.0	1.1	<0.50	<0.50	<5.0	<1.0	<1.0	<1.0	---	---	---
S-15.5-MW3	11/08/10	15.5	<25	<5.0	2.2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-8-MW3A	01/18/12	8.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-14.5-MW3A	01/18/12	14.5	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	0.015	0.0052	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-MW4	10/20/10	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-10-MW4	11/05/10	10.0	<25	<5.0	44a	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.0	<1.0	<1.0	---	---	---
S-15-MW4	11/05/10	15.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-16.5-MW4	11/05/10	16.5	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-MW5	10/20/10	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-10.5-MW5	11/05/10	10.5	29	93a	**450a**	<0.050	<0.050	1.5	<0.50	<0.50	<0.50	<0.50	<5.0	<1.0	<1.0	<1.0	---	---	---
S-16.5-MW5	11/05/10	16.5	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-MW6	10/20/10	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-10-MW6	11/02/10	10.0	<25	8.2a	8.7a	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---

TABLE 3A
CUMULATIVE SOIL ANALYTICAL RESULTS
Former Exxon Service Station 79374
990 San Pablo Boulevard
Albany, California

Sample ID	Sampling Date	Depth (feet bgs)	TPHmo (mg/kg)	TPHd (mg/kg)	TPHg (mg/kg)	MTBE (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	EDB (mg/kg)	1,2-DCA (mg/kg)	TBA (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	Naph-thalene (mg/kg)	VOCs (mg/kg)	Lead (mg/kg)
Environmental Screening Levels, Potential Drinking Water Source (December 2013)																			
Shallow (<10 feet bgs), Residential (Table A-1)			---	100	100	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	80
Shallow (<10 feet bgs), Commercial (Table A-2)			---	110	500	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	320
Deep (≥10 feet bgs), Residential (Table C-1)			---	110	500	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	80
Deep (≥10 feet bgs), Commercial (Table C-2)			---	110	770	0.023	0.044	2.9	3.3	2.3	0.00033	0.0045	0.075	---	---	---	1.2	---	320
S-14.5-MW6	11/02/10	14.5	<25	<5.0	1.8a	<0.0050	<0.0050	<0.0050	<0.0093	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-20-MW6	11/02/10	20.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-MW7	12/08/14	5.0	---	<5.0	<0.52	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	---	---	<0.048	<0.0096	<0.0096	<0.0096	---	---	---
S-10-MW7	12/08/14	10.0	---	**120a**	**540a**	<2.0	<2.0	<2.0	<2.0	<2.0	---	---	<20	<4.0	<4.0	<4.0	---	---	---
S-15-MW7	12/08/14	15.0	---	<5.0	<0.51	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	---	---	<0.048	<0.0096	<0.0096	<0.0096	---	---	---
S-5-MW8	12/08/14	5.0	---	<5.0	<0.48	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	---	---	<0.051	<0.010	<0.010	<0.010	---	---	---
S-10-MW8	12/08/14	10.0	---	<5.0	<0.52	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	---	---	<0.048	<0.0096	<0.0096	<0.0096	---	---	---
S-15-MW8	12/08/14	15.0	---	<5.0	<0.49	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	---	---	<0.049	<0.0097	<0.0097	<0.0097	---	---	---
S-5-CPT1	10/20/10	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-CPT2	10/20/10	5.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-10-AS1	01/18/12	10.0	<25	**800a**	**2,900**	<2.5	<2.5	<2.5	**47**	<2.5	<2.5	<2.5	<25	<5.0	<5.0	<5.0	---	---	---
S-8.5-SVE1	01/17/12	8.5	<25	87a	**480a**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.0	<1.0	<1.0	---	---	---
S-11.5-SVE1	01/17/12	11.5	<25	<5.0	18	<0.0050	<0.50	0.010	0.084	0.11	<0.0050	<0.0050	<0.50	<0.010	<0.010	<0.010	---	---	---
S-10-SVE2	01/17/12	10.0	53a	37a	**390a**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<5.0	<1.0	<1.0	<1.0	---	---	---
S-14-SVE2	01/17/12	14.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<0.010	<0.010	<0.010	---	---	---
S-12.5-SVE3	01/17/12	12.5	57a	**760a**	**1,900a**	<2.5	<2.5	<2.5	<2.5	<2.5	<0.50	<0.50	<5.0	<1.0	<1.0	<1.0	---	---	---
S-15-SVE3	01/17/12	15.0	<25	<5.0	<0.50	<0.0050	<0.0050	<0.0050	0.015	0.033	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	---
S-5-SVS1	02/25/14	5.0	<25	<5.0	<0.50	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.049	<0.0099	<0.0099	<0.0099	<0.049	---	---
S-5-SVS2	02/25/14	5.0	<25	<5.0	<0.49	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.048	<0.0096	<0.0096	<0.0096	<0.048	---	---
S-5-SVS3	02/25/14	5.0	<25	<5.0	5.0a	<0.0050	0.00036g	<0.0050	0.0030g	0.00088g	<0.0050	<0.0050	0.016g	<0.010	<0.010	<0.010	0.0038g	---	---
Drum Samples																			
DR-1	01/06/08	---	<5.0	2.5c,d	4.9e,f	<0.050	<0.005	0.027	0.035	0.035	---	---	---	---	---	---	---	---	9.7
Soil Stockpile Samples																			
COMP(S-Profile-1-4)	11/08/10	---	<25	7.1a	14a	<0.0050	<0.0050	<0.0050	0.069	0.049	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	6.93
S-SP1 (1-4)	01/18/12	---	190a	39a	230	<0.0050	0.20	0.66	4.3	14	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	---	---	37.6
SP1	03/05/14	---	<24	<4.9	<0.49	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.050	<0.010	<0.010	<0.010	<0.050	ND	5.34

TABLE 3A
CUMULATIVE SOIL ANALYTICAL RESULTS
Former Exxon Service Station 79374
990 San Pablo Boulevard
Albany, California

Notes:

TPHmo	=	Total petroleum hydrocarbons as motor oil analyzed using EPA Method 8015B.
TPHd	=	Total petroleum hydrocarbons as diesel analyzed using EPA Method 8015B.
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using EPA Method 8015B.
MTBE	=	Methyl tertiary butyl ether analyzed using EPA Method 8260B; analyzed using EPA Method 8020 in 2008.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8260B.
EDB	=	1,2-Dibromoethane analyzed using EPA Method 8260B.
1,2-DCA	=	1,2-Dicholorethane analyzed using EPA Method 8260B.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method 8260B.
DIPE	=	Di-isopropyl ether analyzed using EPA Method 8260B.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method 8260B.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method 8260B.
Lead	=	Total lead analyzed using EPA Method 6010B.
VOCs	=	Volatile organic compounds analyzed using EPA Method 8260B.
HVOCs	=	Halogenated volatile organic compounds analyzed using EPA Method 8260B.
PAHs	=	Polyaromatic hydrocarbons analyzed using EPA Method 8310.
feet bgs	=	Feet below ground surface.
ND	=	Not detected.
---	=	Not analyzed/Not applicable
<	=	Less than the laboratory reporting limit.
a	=	The chromatographic pattern does not match that of the specified standard.
b	=	Heavier gasoline range compounds are significant.
c	=	Diesel range compounds are significant; no recognizable pattern.
d	=	Gasoline range compounds are significant.
e	=	Strongly aged gasoline or diesel range compounds are significant.
f	=	No recognizable pattern.
g	=	Estimated value; analyte present at concentration above the method detection limit but below the reporting limit.

TABLE 3B
ADDITIONAL CUMULATIVE SOIL ANALYTICAL RESULTS - HVOCs AND PAHs
Former Exxon Service Station 79374
990 San Pablo Boulevard
Albany, California

			HVOCs									PAHs		
Sample ID	Sampling Date	Depth (feet bgs)	1,2,4-trimethyl-benzene (mg/kg)	1,3,5-trimethyl-benzene (mg/kg)	Isopropyl-benzene (mg/kg)	Naph-thalene (mg/kg)	n-Butyl-benzene (mg/kg)	p-Isopropyl-toluene (mg/kg)	sec-Butyl-benzene (mg/kg)	t-Butyl-benzene (mg/kg)	HVOCs (mg/kg)	Naph-thalene (mg/kg)	Pyrene (mg/kg)	PAHs (mg/kg)
Environmental Screening Levels, Potential Drinking Water Source (December 2013)														
Shallow (<10 feet bgs), Residential (Table A-1)			---	---	---	1.2	---	---	---	---	---	1.2	85	---
Shallow (<10 feet bgs), Commercial (Table A-2)			---	---	---	1.2	---	---	---	---	---	1.2	85	---
Deep (≥10 feet bgs), Residential (Table C-1)			---	---	---	1.2	---	---	---	---	---	1.2	85	---
Deep (≥10 feet bgs), Commercial (Table C-2)			---	---	---	1.2	---	---	---	---	---	1.2	85	---
Soil Boring Samples														
Not analyzed for these analytes prior to 2014.														
S-5-B7	02/27/14	5.0	---	---	---	---	---	---	---	---	---	---	---	---
S-11.5-B7	02/27/14	11.5	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B8	02/28/14	5.0	---	---	---	---	---	---	---	---	---	---	---	---
S-11.5-B8	02/28/14	11.5	---	---	---	---	---	---	---	---	---	---	---	---
S-15.5-B8	02/28/14	15.5	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B9	02/27/14	5.0	---	---	---	---	---	---	---	---	---	---	---	---
S-11.5-B9	02/27/14	11.5	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B10	02/27/14	5.0	---	---	---	---	---	---	---	---	---	---	---	---
S-11.5-B10	02/27/14	11.5	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B11	02/28/14	5.0	---	---	---	---	---	---	---	---	---	---	---	---
S-11.5-B11	03/05/14	11.5	---	---	---	---	---	---	---	---	---	---	---	---
S-15-B11	03/05/14	15.0	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B12	02/26/14	5.0	---	---	---	---	---	---	---	---	---	<15	<10	ND
S-11.5-B12	02/26/14	11.5	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B13	02/25/14	5.0	---	---	---	---	---	---	---	---	---	**16**	<10	ND
S-11.5-B13	02/28/14	11.5	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B14	03/05/14	5.0	---	---	---	---	---	---	---	---	---	---	---	---
S-11.5-B14	03/05/14	11.5	---	---	---	---	---	---	---	---	---	---	---	---
S-15.5-B14	03/05/14	15.5	---	---	---	---	---	---	---	---	---	---	---	---
S-19-B14	03/05/14	19.0	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B15	03/05/14	5.0	---	---	---	---	---	---	---	---	---	---	---	---
S-10-B15	03/05/14	10.0	---	---	---	---	---	---	---	---	---	---	---	---
S-14.0-B15	03/05/14	14.0	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 3B
ADDITIONAL CUMULATIVE SOIL ANALYTICAL RESULTS - HVOCs AND PAHs
Former Exxon Service Station 79374
990 San Pablo Boulevard
Albany, California

			HVOCs									PAHs		
Sample ID	Sampling Date	Depth (feet bgs)	1,2,4-trimethyl-benzene (mg/kg)	1,3,5-trimethyl-benzene (mg/kg)	Isopropyl-benzene (mg/kg)	Naph-thalene (mg/kg)	n-Butyl-benzene (mg/kg)	p-Isopropyl-toluene (mg/kg)	sec-Butyl-benzene (mg/kg)	t-Butyl-benzene (mg/kg)	HVOCs (mg/kg)	Naph-thalene (mg/kg)	Pyrene (mg/kg)	PAHs (mg/kg)
Environmental Screening Levels, Potential Drinking Water Source (December 2013)														
Shallow (<10 feet bgs), Residential (Table A-1)			---	---	---	1.2	---	---	---	---	---	1.2	85	---
Shallow (<10 feet bgs), Commercial (Table A-2)			---	---	---	1.2	---	---	---	---	---	1.2	85	---
Deep (≥10 feet bgs), Residential (Table C-1)			---	---	---	1.2	---	---	---	---	---	1.2	85	---
Deep (≥10 feet bgs), Commercial (Table C-2)			---	---	---	1.2	---	---	---	---	---	1.2	85	---
S-5-B16	02/26/14	5.0	---	---	---	---	---	---	---	---	---	<15	<10	ND
S-10-B16	02/26/14	10.0	---	---	---	---	---	---	---	---	---	<15	<10	ND
S-15.5-B16	02/26/14	15.5	---	---	---	---	---	---	---	---	---	---	---	---
S-5-B17	02/26/14	5.0	---	---	---	---	---	---	---	---	---	<15	<10	ND
S-10-B17	02/26/14	10.0	---	---	---	---	---	---	---	---	---	<15	<10	ND
S-15.5-B17	02/26/14	15.5	---	---	---	---	---	---	---	---	---	---	---	---
Well Samples														
Not analyzed for these analytes prior to or after February 2014.														
S-5-SVS1	02/25/14	5.0	---	---	---	---	---	---	---	---	---	<15	11	ND
S-5-SVS2	02/25/14	5.0	---	---	---	---	---	---	---	---	---	<15	<10	ND
S-5-SVS3	02/25/14	5.0	---	---	---	---	---	---	---	---	---	<15	<10	ND
Drum Samples														
Not analyzed for these analytes.														
Soil Stockpile Samples														
COMP(S-Profile-1-4)	11/08/10	---	0.0053	0.062	0.061	0.098	0.14	0.012	0.053	0.018	ND	---	---	---
S-SP1 (1-4)	01/18/12	---	8.3	2.2	0.12	<5.0	0.20	0.018	0.051	<0.0050	2.5g	---	---	---
SP1	03/05/14	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 3B
ADDITIONAL CUMULATIVE SOIL ANALYTICAL RESULTS - HVOCs AND PAHs
Former Exxon Service Station 79374
990 San Pablo Boulevard
Albany, California

Notes:

TPHmo	=	Total petroleum hydrocarbons as motor oil analyzed using EPA Method 8015B.
TPHd	=	Total petroleum hydrocarbons as diesel analyzed using EPA Method 8015B.
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using EPA Method 8015B.
MTBE	=	Methyl tertiary butyl ether analyzed using EPA Method 8260B; analyzed using EPA Method 8020 in 2008.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8260B.
EDB	=	1,2-Dibromoethane analyzed using EPA Method 8260B.
1,2-DCA	=	1,2-Dicholorethane analyzed using EPA Method 8260B.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method 8260B.
DIPE	=	Di-isopropyl ether analyzed using EPA Method 8260B.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method 8260B.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method 8260B.
Lead	=	Total lead analyzed using EPA Method 6010B.
VOCs	=	Volatile organic compounds analyzed using EPA Method 8260B.
HVOCs	=	Halogenated volatile organic compounds analyzed using EPA Method 8260B.
PAHs	=	Polyaromatic hydrocarbons analyzed using EPA Method 8310.
feet bgs	=	Feet below ground surface.
ND	=	Not detected.
---	=	Not analyzed/Not applicable
<	=	Less than the laboratory reporting limit.
a	=	The chromatographic pattern does not match that of the specified standard.
b	=	Heavier gasoline range compounds are significant.
c	=	Diesel range compounds are significant; no recognizable pattern.
d	=	Gasoline range compounds are significant.
e	=	Strongly aged gasoline or diesel range compounds are significant.
f	=	No recognizable pattern.
g	=	Estimated value; analyte present at concentration above the method detection limit but below the reporting limit.

TABLE 4
CUMULATIVE SOIL VAPOR ANALYTICAL RESULTS
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Sample ID	Sampling Date	Depth (feet)	TPHg (µg/m³)	MTBE (µg/m³)	B (µg/m³)	T (µg/m³)	E (µg/m³)	X (µg/m³)	EDB (µg/m³)	1,2-DCA (µg/m³)	TBA (µg/m³)	TAME (µg/m³)	ETBE (µg/m³)	DIPE (µg/m³)	Naph-thalene (µg/m³)	Add'l VOCs (µg/m³)	Methane (%V)	Helium (%V)	CO_2 (%V)	O_2+ Argon (%V)	Vacuum (in Hg)
Environmental Screening Levels, Shallow Soil Gas, Table E-2 (December 2013)																					
Residential			300,000	4,700	42	160,000	490	52,000	17	58	---	---	---	---	36	---	---	---	---	---	---
Commercial/Industrial			2,500,000	47,000	420	1,300,000	4,900	440,00	170	580	---	---	---	---	360	---	---	---	---	---	---
Media-Specific Criteria for Vapor Intrusion to Indoor Air, No Bioattenuation Zone (SWRCB, 2012)																					
Residential			---	---	85	---	1,100	---	---	---	---	---	---	---	93	---	---	---	---	---	---
Commercial			---	---	280	---	3,600	---	---	---	---	---	---	---	310	---	---	---	---	---	---
Media-Specific Criteria for Vapor Intrusion to Indoor Air, With Bioattenuation Zone (SWRCB, 2012)																					
Residential			---	---	85,000	---	1,100,000	---	---	---	---	---	---	---	93,000	---	---	---	---	---	---
Commercial			---	---	280,000	---	3,600,000	---	---	---	---	---	---	---	310,000	---	---	---	---	---	---
SVS1	03/06/14	5.5	**180,000,000**	**<12,000**	**<2,600**	<3,000	**<3,500**	<3,500	**<6,100**	**<3,200**	<9,700	<13,000	<13,000	<13,000	<0.020	---	15.5	<0.0100	10.0	2.58	-5.00
SVS1	08/28/14	5.5	**90,000,000**	**<36,000**	**<8,000**	12,000	**<11,000**	<11,000	**<19,000**	**<10,000**	<30,000	<42,000	<42,000	<42,000	<20	ND	15.3	<0.0100	13.2	2.49	-5.00
SVS2	03/06/14	5.5	**190,000,000**	<1,800	**1,700**	740	**650**	3,100	**<960**	**<510**	<1,500	<2,100	<2,100	<2,100	<0.020	---	11.4	<0.0100	8.31	3.62	-5.00
SVS2	08/28/14	5.5	**80,000,000**	**<36,000**	**<8,000**	13,000	**<11,000**	<11,000	**<19,000**	**<10,000**	<30,000	<42,000	<42,000	<42,000	<20	ND	11.5	<0.0100	9.67	5.54	-5.00
SVS2 Dup	08/28/14	5.5	**89,000,000**	**<36,000**	**<8,000**	13,000	**<11,000**	<11,000	**<19,000**	**<10,000**	<30,000	<42,000	<42,000	<42,000	---	ND	13.5	<0.0100	11.3	2.82	-5.00
SVS3	03/07/14	5.5	**150,000,000**	**<5,800**	**15,000**	<1,500	**15,000**	<1,700	**<3,100**	**<1,600**	<4,900	<6,700	<6,700	<6,700	1.1	---	6.29	<0.0100	13.3	4.41	-5.00
SVS3 Dup	03/07/14	5.5	**150,000,000**	**<5,800**	**22,000**	<1,500	**23,000**	<1,700	**<3,100**	**<1,600**	<4,900	<6,700	<6,700	<6,700	---	---	6.73	<0.0100	14.4	3.10	-5.00
SVS3	08/28/14	5.5	**87,000,000**	**<36,000**	**21,000**	13,000	**31,000**	<11,000	**<19,000**	**<10,000**	<30,000	<42,000	<42,000	<42,000	**820a**	ND	5.11	<0.0100	14.7	5.49	-5.00

TABLE 4
CUMULATIVE SOIL VAPOR ANALYTICAL RESULTS
Former Exxon Service Station 79374
990 San Pablo Avenue
Albany, California

Notes:

TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using EPA Method TO-17; analyzed using EPA Method TO-3M in March 2014.
MTBE	=	Methyl tertiary butyl ether analyzed using EPA Method TO-15.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method TO-15.
EDB	=	1,2-dibromoethane analyzed using EPA Method TO-15.
1,2-DCA	=	1,2-dichloroethane analyzed using EPA Method TO-15.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method TO-15.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method TO-15.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method TO-15.
DIPE	=	Di-isopropyl ether analyzed using EPA Method TO-15.
Naphthalene	=	Naphthalene analyzed using EPA Method TO-17(M).
Add'l VOCs	=	Additional volatile organic compounds analyzed using EPA Method TO-15.
Methane	=	Methane analyzed using ASTM Method D-1946.
Helium	=	Helium analyzed using ASTM Method D-1946 (M).
CO_2	=	Carbon dioxide analyzed using ASTM Method D-1946.
O_2 + Argon	=	Oxygen plus argon analyzed using ASTM Method D-1946.
Vacuum	=	Vacuum measured using a vacuum gauge.
µg/m³	=	Micrograms per cubic meter.
%V	=	Percent by volume.
in Hg	=	Inches of mercury.
ND	=	Not detected.
Bold	=	Greater than or equal to the most stringent, applicable screening level.
<	=	Less than the stated method detection limit.
---	=	Not applicable.
a	=	Possibly biased high due to results of associated standard.

APPENDIX

A

CORRESPONDENCE

Cardno ERI

Shaping the Future

David R. Daniels

From: Detterman, Mark, Env. Health <Mark.Detterman@acgov.org>
Sent: Tuesday, November 25, 2014 4:36 PM
To: 'jennifer.c.sedlachek@exxonmobil.com'
Cc: Christine Capwell; Greg Gurss; David R. Daniels
Subject: Extension Approval; Former Exxon RAS #79374 / 990 San Pablo Ave, Albany, CA (RO2974)

Ms. Sedlachek,

In conjunction with the *Soil Vapor Assessment Report*, dated October 7, 2014, ACEH has reviewed the *Response to Comments and Request for Extension*, dated September 5, 2014. Both were submitted on your behalf by Cardno ERI. ACEH is in agreement with the requested extension of the FS/CAP. ACEH has updated Geotracker with the revised date of February 5, 2015. Please keep ACEH informed closer to this date should additional time be required for the FS/CAP due to site investigation delays (permitting and drilling delays) encountered more recently.

Mark Detterman
Senior Hazardous Materials Specialist, PG, CEG
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502
Direct: 510.567.6876
Fax: 510.337.9335
Email: mark.detterman@acgov.org

PDF copies of case files can be downloaded at:

http://www.acgov.org/aceh/lop/ust.htm

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

August 22, 2014

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(*Sent via E-mail to:*
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Conditional Work Plan Approval; Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Work Plan for Well Installation*, dated July 7, 2014, and the *Groundwater Monitoring Report, First and Second Quarter 2014,* dated July 18, 2014, which were prepared and submitted on your behalf by Cardno ERI (Cardno) for the subject site. Thank you for submitting the reports.

Based on ACEH staff review of the work plan, the proposed scope of work is conditionally approved for implementation provided that the technical comments below are incorporated during the proposed work. Submittal of a revised work plan or a work plan addendum is not required unless an alternate scope of work outside that described in the work plan or these technical comments is proposed. We request that you address the following technical comments, perform the proposed work, and send us the report described below. Please provide 72-hour advance written notification to this office (e-mail preferred to: mark.detterman@acgov.org) prior to the start of field activities.

TECHNICAL COMMENTS

1. **Work Plan Modifications –** The referenced work plan proposes a series of actions with which ACEH is in general agreement of undertaking; however, ACEH requests a modification to the approach. Please submit a report by the date specified below.
    a. **Subsurface Clearance Protocols –** The referenced work plan proposes to clear well bore locations with hand tools or an air knife. ACEH requests that clearance not include air knifing due to the likelihood of volatilization of light hydrocarbon fractions, in particular in the vicinity of soil bore B12 / MW7.

TECHNICAL REPORT REQUEST

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

- **September 19, 2014 –** Draft Feasibility Study / Corrective Action Plan
  File to be named: RO2974_DRAFT_FEASSTUD_R_yyyy-mm-dd

- **November 15, 2014 –** Site Investigation Report
  File to be named: RO2974_SWI_R_yyyy-mm-dd
- **December 5, 2014 –** Semi-Annual Groundwater Monitoring Report
  File to be named: RO2974_GWM_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.

Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm. 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. If you have any questions, please call me at (510) 567-6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark E. Detterman
DN: cn=Mark E. Detterman, o, ou, email, c=US
Date: 2014.08.22 15:31:19 -07'00'

Mark E. Detterman, PG, CEG
Senior Hazardous Materials Specialist

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

cc: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (Sent via E-mail to: rebekah.westrup@cardno.com)

Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (Sent via E-mail to: marciabkelly@earthlink.net)

Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (Sent via E-mail to: miracoli@earthlink.net)

Dilan Roe, ACEH (Sent via E-mail to: dilan.roe@acgov.org)
Mark Detterman, ACEH (sent via electronic mail to mark.detterman@acgov.org)
GeoTracker, file

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

July 7, 2014

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(*Sent via E-mail to:*
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Request for a Work Plan; Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Soil, Soil Vapor, and Groundwater Investigation Report and Site Conceptual Model*, dated May 2, 2014, which was prepared and submitted on your behalf by Cardno ERI (Cardno) for the subject site. The report recommended work to address identified data gaps including the offsite monitoring of groundwater by the installation of two wells, and evaluation of seasonal soil vapor concentrations beneath the site to evaluate the risk of vapor intrusion at the site. In general, ACEH is in agreement with the proposed work; however, discusses differences in the sections below.

ACEH has previously evaluated the data and recommendations presented in the above-mentioned reports, in conjunction with 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 the recent investigation and ACEH staff review, we have revised the checklist and have determined that the site fails to meet the Media-Specific Criteria for Groundwater and the Media-Specific Criteria for Vapor Intrusion to Indoor Air (see Geotracker for an updated copy).

Based on the review of the case file ACEH requests that you address the following technical comments and send us the documents requested below.

TECHNICAL COMMENTS

1. **Request for a Work Plan** – ACEH requests the submittal of a work plan by the date referenced below.

    a. **Groundwater Delineation** - The downgradient extent of the dissolved-phased groundwater plume remains undefined. It is appropriate to monitor the extent the offsite migration of the dissolved-phased plume to the south of the site utilizes the sanitary sewer installed at an approximate depth of 12.7 feet below grade surface (bgs) beneath Buchannan Street. The proposed installation of a well near bore B12 appears warranted. A second well was proposed to be installed near soil bore B8 to monitor the terminal end of the plume; however, ACEH requests that the well be placed near bore B9 due to the apparent split in the plume migration suggested by very low to trace grab groundwater sample concentrations collected from bores B8 and B10, and higher concentrations detected at soil bore B9 downgradient of offsite residential homes.

b. **Seasonal Soil Vapor Evaluation –** The referenced report also recommended seasonal soil vapor sampling. As communicated in previous directive letters ACEH is in agreement with this recommendation; however, ACEH requests the inclusion of Halogenated Volatile Organic Compounds (HVOCs) due to the documented, but unknown location, of a former waste oil underground storage tank (UST) at the site, and the detection of exceptionally high photoionization detector (PID) results in wells MW-3 and MW-4, and high results in MW-2, without the detection of significant petroleum hydrocarbon volatiles in soil samples collected at the time of well installation. The presence of sandy soils may also contribute to the generation of a subsurface vapor cloud; however, it is appropriate to verify that chlorinated solvents related to the former waste oil UST are not a part of this vapor.

   An evaluation of the foundation of the building at the subject site, or of the immediately downgradient adjacent residential homes was not included in the referenced report. The September 17, 2013 directive letter requested the evaluation of the onsite and offsite residential buildings prior to installation of vapor wells at the site. Based on a review of the residential homes on Google Earth Street View, it appears that one residential foundation may be partially below grade. This may effectively reduce the minimum five foot separation distance allowed by one LTCP vapor intrusion scenario, but also affects the appropriateness of the vapor well installation depth under the LTCP (required to be five feet below building foundations). ACEH requests a review of these foundations be undertaken, and a discussion of the depth of the existing vapor wells relative to the foundations be provided by the date requested below.

2. **Draft Feasibility Study / Corrective Action Plan** – ACEH's evaluation of the vapor well results indicates that the site does not satisfy the LTCP Petroleum Vapor Intrusion to Indoor Air criterion. Based on ACEH's analysis, three of four vapor samples contained oxygen less than 4% oxygen, benzene concentrations in groundwater beneath the site were recently as high as 590 micrograms per liter (µg/l), and the bioattenuation zone at the site appears to be approximately 6 feet (greater than 5 feet, but less than 10 feet). This combination of site characteristics eliminates each available scenario within the LTCP Vapor Intrusion to Indoor Air criteria.

   At this time, a Draft Feasibility Study / Corrective Action Plan (FS/CAP) prepared in accordance with Title 23, California Code of Regulations, Section 2725 appears warranted. The FS/CAP must include a concise background of soil and groundwater investigations performed in connection with this case and an assessment of the residual impacts of the chemicals of concern (COCs) for the site and the surrounding area where the unauthorized release has migrated or may migrate. The FS/CAP should also include, but is not limited to, a detailed description of site lithology, including soil permeability, and most importantly, contamination cleanup levels and LTCP appropriate cleanup goals in accordance with the San Francisco Regional Water Quality Control Board (SFRWQCB) Basin Plan. Should other non-petroleum contaminants be documented, other non-LTCP cleanup goals may be required, such as San Francisco Bay Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESL) guidance for all COCs, or other generated site-specific risk-based goals. Please note that soil cleanup levels should ultimately (within a reasonable timeframe) achieve water quality objectives (cleanup goals) for groundwater in accordance with the SFRWQCB Basin Plan. Please specify appropriate cleanup levels and cleanup goals in accordance with 23 CCR Section 2725, 2726, and 2727 in the CAP.

   The CAP must evaluate at least three viable alternatives for remedying or mitigating the actual or potential adverse affects of the unauthorized release(s) besides the 'no action' and 'monitored natural attenuation' remedial alternatives. Each alternative shall be evaluated not only for cost-effectiveness but also its timeframe to reach cleanup levels and cleanup goals, and ultimately the Responsible Party must propose the most cost-effective corrective action. Please submit the Draft FS/CAP by the date identified below.

3. **Groundwater Monitoring –** Please continue semi-annual groundwater monitoring in accordance with the approved groundwater monitoring plan for the site and submit groundwater monitoring report in accordance with the schedule below. For the reason discussed above for vapor, please also include analysis for HVOCs on a one time basis. The appropriateness of additional HVOC sampling is requested to be evaluated thereafter.

TECHNICAL REPORT REQUEST

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

- **July 25, 2014 –** Semi-Annual Groundwater Monitoring Report
  File to be named: RO2974_GWM_R_yyyy-mm-dd
- **September 5, 2014 –** Data Gap Investigation Work Plan and Foundation Analysis
  File to be named: RO2974_WP_R_yyyy-mm-dd
- **September 19, 2014** – Draft Feasibility Study / Corrective Action Plan
  File to be named: RO2974_DRAFT_FEASSTUD_R_yyyy-mm-dd
- **60 Days After Work Plan Addendum Approval –** Site Investigation Report
  File to be named: RO2974_SWI_R_yyyy-mm-dd
- **December 5, 2014 –** Semi-Annual Groundwater Monitoring Report
  File to be named: RO2974_GWM_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.

Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm. 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. If you have any questions, please call me at (510) 567-6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark E. Detterman
DN: cn=Mark E. Detterman, o, ou, email, c=US
Date: 2014.07.07 14:39:33 -07'00'

Mark E. Detterman, PG, CEG
Senior Hazardous Materials Specialist

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

cc: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (Sent via E-mail to: rebekah.westrup@cardno.com)

Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (Sent via E-mail to: marciabkelly@earthlink.net)

Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (Sent via E-mail to: miracoli@earthlink.net)

Dilan Roe, ACEH (Sent via E-mail to: dilan.roe@acgov.org)
Mark Detterman, ACEH (sent via electronic mail to mark.detterman@acgov.org)
GeoTracker, file

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

September 17, 2013

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(*Sent via E-mail to:*
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Data Gap Investigation Work Plan*, dated July 22, 2013, which was prepared by Cardno ERI for the subject site. The work plan recommends advancing eleven soil borings to define the on- and off-site extent of contamination and installing and sampling three soil vapor wells.

The proposed scope of work may be implemented provided that the modifications requested in the technical comments below are addressed and incorporated during the field implementation. Submittal of a revised Work Plan is not required unless an alternate scope of work outside that described in the Work Plan and technical comments below is proposed.

TECHNICAL COMMENTS

1. **Soil Vapor Probe Construction Depth–** Cardno ERI proposes to install soil vapor wells to a depth of 4 feet below ground surface (bgs) due to high groundwater conditions. ACEH notes that the depth to water in wells located adjacent to the proposed probes ranges from 8.11 to 10.42 feet bgs in well MW-1, 5.29 to 10.64 feet bgs in well MW-4, 6.73 to 10.64 feet bgs in MW-5, and 7.19 to 11.36 in MW-6. Prior to making a determination on probe depth, please evaluate the foundation of the residence next door and the on-site building to ensure that the probes are installed to a depth greater than five feet below the bottom of the foundations in accordance with the Low Threat Closure Policy. In order to meet the 5 foot below bottom of foundation requirement, the probes may be submerged during high water conditions, and therefore would preclude collection of data during these high water conditions, please ensure data is collected when the vapor probes are not submerged.

2. **Leak Test –** Please ensure that the shroud is placed over the wellhead and the sample container in accordance with the Department of Toxic Substances Control and California Regional Water Quality Control Board, Los Angeles and San Francisco Regional Water Quality Control Boards' April 2012 *Advisory – Active Soil Gas Investigations.*

3. **Seasonal Soil Vapor Evaluation –** Please include the results of the first soil vapor sampling event in the soil, groundwater and soil vapor investigation and site conceptual model report (SWI_SCM_R) requested below.

   Please conduct a second soil vapor monitoring event approximately 6-months from the first event and present the results in the SWI (soil gas) requested below.

4. **Updated Site Conceptual Model –** Please update the SCM to include the recent investigation results in tabular format and submit with the SWI_SCM_R requested below. Included for your reference is an example of an SCM in table format (Attachment A) which highlights the major SCM elements and their associated data gaps, if any, which need to be addressed to progress the site to case closure.

5. **Corrective Action Plan –** ACEH previously requested a draft corrective action plan (CAP) by June 12, 2013. A revised date will be issued by ACEH after completion of the data gap investigation and focused site conceptual model.

6. **Groundwater Monitoring –** Please continue semi-annual groundwater monitoring in accordance with the approved groundwater monitoring plan for the site and submit groundwater monitoring report (GWM_R) in accordance with the schedule below.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to Attachment 1 and the following naming convention and schedule:

- **December 16, 2013** –Soil and Water Investigation Report and Site Conceptual Model (soil, water and soil vapor) (File to be named: SWI_SCM_R_yyyy-mm-dd)
- **January 20, 2014** – Groundwater Monitoring Report (2nd Semi-Annual) (File to be named: GWM_R_yyyy-mm-dd)
- **June 16, 2014** – Soil and Water Investigation Report (soil vapor) (File to be named: SWI_R_yyyy-mm-dd)
- **July 20, 2014** – Groundwater Monitoring Report (1st Semi-Annual) (File to be named: GWM _R_yyyy-mm-dd)

Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,

Barbara J. Jakub

Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou, email=barbara.jakub@acgov.org, c=US
Date: 2013.09.17 11:55:46 -07'00'

Barbara J. Jakub, P.G.
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: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (*Sent via E-mail to:* rebekah.westrup@cardno.com)
Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (*Sent via E-mail to:* marciabkelly@earthlink.net)
Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (*Sent via E-mail to:* miracoli@earthlink.net)
Dilan Roe, ACEH (*Sent via E-mail to: dilan.roe@acgov.org)*
Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
GeoTracker, file

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

May 24, 2013

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(Sent via E-mail to:
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Response to Comments and Revised Work Plan for Off-Site Borings*, dated March 26, 2013, which was prepared by Cardno ERI for the subject site. The work plan recommends advancing six soil borings to define the off-site extent of contamination.

ACEH has evaluated the data and recommendations presented in the above-mentioned reports, in conjunction with the case files, and 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 the site fails to meet the LTCP General Criteria d (Free Product), e (Site Conceptual Model), f (Secondary Source Removal) and the Media-Specific Criteria for Groundwater, the Media-Specific Criteria for Vapor Intrusion to Indoor Air, and the Media-Specific Criteria for Direct Contact (see Attachment A for a copy of the LTCP checklist).

Therefore, at this juncture ACEH requests that you prepare a Revised 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 d (Free Product) –** The LTCP requires free product to be removed to the extent practicable at release sites where investigations indicate the presence of free product by removing in a manner that minimizes the spread of the unauthorized release into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site, and that properly treats, discharges, or disposes of recovery byproducts in compliance with applicable laws. Additionally, the LTCP requires that abatement of free product migration be used as a minimum objective for the design of any free product removal system.

ACEH's review of the case files indicates that insufficient data and analysis has been presented to assess free product at the site. Specifically, total petroleum hydrocarbons as gasoline (TPHg) TPHg was detected in MW-4 in October 2012 at a concentration of 270,000 micrograms per liter (µg/L), indicating the possible presence of separate phase hydrocarbons (SPH) due to either mobilization of SPH as a result of the pilot test or the drop in the water levels releasing petroleum hydrocarbons into the well.

At the request of ACEH, Cardno ERI is currently monitoring SPH in this well on a quarterly basis and will bail the SPH when present. Cardno ERI has requested to submit the quarterly data in the semi-annual reports. ACEH concurs with this request. In addition to monitoring for SPH, please evaluate the submerged conditions in MW-4 and the possible connection to the dramatic increase in concentrations in this well when depth to water was 10.64 feet below ground surface. Please present your analysis in the focused SCM described in Item 6.

2. **LTCP General Criteria e (Site Conceptual Model) –** According to the LTCP, the SCM is a fundamental element of a comprehensive site investigation. The SCM establishes the source and attributes of the unauthorized release, describes all affected media (including soil, groundwater, and soil vapor as appropriate), describes local geology, hydrogeology and other physical site characteristics that affect contaminant environmental transport and fate, and identifies all confirmed and potential contaminant receptors (including water supply wells, surface water bodies, structures and their inhabitants). The SCM is relied upon by practitioners as a guide for investigative design and data collection. All relevant site characteristics identified by the SCM shall be assessed and supported by data so that the nature, extent and mobility of the release have been established to determine conformance with applicable criteria in this policy.

   Our review of the case files indicates that insufficient data and analysis has not been presented to assess the nature, extent, and mobility of the release and to support compliance with General Criteria d as discussed in Item 1 above and Media Specific Criteria for Vapor Intrusion to Indoor Air, Groundwater, and Direct Contact and Outdoor Air Exposure as described in Items 3, 4 and 5 below, respectively.

3. **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 existing or future site buildings, and adjacent parcels. 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 and analysis fail to support the requisite characteristics of one of the four scenarios. Specifically, it appears that petroleum contamination migrated through a granular zone in shallow soil beneath the site, as evidenced by residual soil concentrations of TPH over 100 milligrams per kilograms (mg/kg) in the 5 to 10 foot intervals and the current groundwater concentrations of 270,000 µg/L TPHg and 440 µg/L benzene located in MW-4 which is adjacent to a residence. Therefore, please present a strategy in the Data Gap Investigation Work Plan described in Item 6 below to collect additional data to satisfy the bioattenuation zone 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 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 Final Vapor Intrusion Guidance (October 2011). Consistent with the guidance, ACEH requires installation of permanent vapor wells to assess temporal and seasonal variations in soil gas concentrations.

4. **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 and analysis has been presented to support the requisite characteristics of plume stability or plume classification as follows:

   i. The work plan and monitoring report proposes installing six soil borings and using two soil borings (IB-1 and IB-2 from the fire station site RO0000297) to define the extent of the downgradient plume. This data was collected in 1999 and may not be representative of the current conditions downgradient of MW-4. ACEH agrees with the locations of borings B7 through B12. However, ACEH requests that additional borings be advanced along Buchanan Street to assess the off-site extent of contamination in this area. Please consider using a transect of borings on approximately thirty foot centers to determine appropriate locations for future monitoring wells and provide adequate coverage of the downgradient extent of contamination. Please submit a map with the proposed boring locations in the Data Gap Work Plan requested in Item 6 below.

   ii. Previous gradient maps indicate gradient directions to the north-northeast, south-southeast, and north-northwest. ACEH requested an evaluation of groundwater contour maps using only wells screened within the same zone. In the work plan Cardno ERI states that they reviewed boring logs, well construction data, and groundwater elevation data and concluded that wells MW-3A, MW-4, MW-5, and SVE1 through SVE3 are screened no deeper than 15 feet bgs and produce a groundwater gradient consistent with the hydrocarbon distribution. Additionally, Cardno ERI concludes that wells MW-1, MW-2, MW-3 and MW-6 have screen intervals extending deeper than 15 feet bgs and do not yield a consistent groundwater gradient and the contour elevation map indicates a groundwater gradient in the shallow zone toward the west and southwest. Cardno ERI states they did not calculate groundwater flow in the deep zone due to varying well construction. Based on ACEH's review of groundwater flow data, the dissolved phase distribution map appears reasonable for October 19, 2012 and matches the contaminant distribution for the site. However, ACEH requests that previous gradient maps be reconstructed using the two zone scenario to verify that shallow groundwater has not historically flowed in other directions.

   iii. ACEH's review of the files indicate that naphthalene was detected at a maximum concentration of 1,500 µg/L in B-1 and additional volatile organic compounds (VOC) were detected in groundwater collected from the initial borings at the site. However, naphthalene has not been analyzed in groundwater monitoring wells.

Therefore, please evaluate VOC concentrations in groundwater monitoring wells and proposed borings at the site.

Please present a strategy in the Revised Data Gap Work Plan (described in Item 6 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 described in Item 6 below.

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 volatized to outdoor air poses a low threat to human health. According to the policy, release sites where human exposure may occur 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 and analysis has been presented to satisfy the media-specific criteria for direct contact and outdoor air exposure. Specifically, Cardno ERI has identified the canopy for the former gasoline station by viewing aerial photographs. The canopy is located in the northeastern portion of the site and is, as Cardno ERI suggests, the likely location of the former dispenser islands. No evaluation of soil or groundwater has been performed in this area.

   Therefore, please present a strategy in the Revised Data Gap Work Plan described in Item 6 below to collect sufficient data to satisfy the direct contact and outdoor air exposure criteria in the areas of likely dispenser locations. Sample and analyze soil at the five and ten foot intervals, at the groundwater interface, lithologic changes, and at areas of obvious impact. Also, collect a groundwater sample from each boring and propose the requisite analysis including naphthalene and polycyclic aromatic hydrocarbons (PAH) analysis.

   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 Item 6 below that assures that exposure to petroleum constituents in soil will have no significant risk of adversely affecting human health.

6. **Revised Data Gap Investigation Work Plan and Focused Site Conceptual Model** – Please prepare Revised Data Gap Investigation Work Plan to address the technical comments listed above. Please support the scope of work in the Revised 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.

7. **Corrective Action Plan** – ACEH previously requested a draft corrective action plan (CAP) by June 12, 2013. A revised date will be issued by ACEH after completion of the data gap investigation and focused site conceptual model.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to Attachment 1 and the following naming convention and schedule:

- **June 14, 2013** – Data Gap Investigation Plan and Site Conceptual Model
  (File to be named: WP_SCM_R_yyyy-mm-dd)

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,

Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou, email=barbara.jakub@acgov.org, c=US
Date: 2013.05.24 15:28:37 -07'00'

Barbara J. Jakub, P.G.
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: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (*Sent via E-mail to:* rebekah.westrup@cardno.com)
Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (*Sent via E-mail to:* marciabkelly@earthlink.net)
Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (*Sent via E-mail to:* miracoli@earthlink.net)
Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Dilan Roe, ACEH (*Sent via E-mail to: dilan.roe@acgov.org)*
Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
GeoTracker, file

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.

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

February 8, 2013

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(*Sent via E-mail to:*
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Thank you for the recently submitted documents entitled, *Groundwater Monitoring Report, Fourth Quarter 2012, and Response to Comments*, dated December 5, 2012, *Air Sparge and Dual-Phase Extraction Feasibility Testing* dated April 12, 2012, and *Work Plan for Groundwater Monitoring, Air-Sparge and Soil Vapor Extraction Well Installation* dated August 1, 2012 which were prepared by Cardno ERI for the subject site. Alameda County Environmental Health (ACEH) staff has reviewed the case file including the above-mentioned reports for the above-referenced site. The feasibility study tested dual-phase extraction (DPE), combined air-sparge/DPE, and air sparge for a total of four hours per test. The tests demonstrate that AS/DPE could be an effective remediation method for mass removal. However, a corrective action plan needs to be submitted and approved before installation of the remediation wells and implementation of the corrective action can begin. Therefore, the work plan cannot be approved at this time. Please address the following technical comments and send us the reports requested below.

TECHNICAL COMMENTS

1. **Separate Phase Hydrocarbons** – TPHg was detected in MW-4 at a concentration of 270,000 micrograms per liter, indicating the presence of SPH and possible mobilization of SPH due to the pilot test. Please monitor for SPH in this well. If measurable SPH is present please begin product bailing and record the depth of the SPH and mass removed in future monitoring reports.

   ACEH concurs with semi-annual monitoring and reporting until implementation of the CAP but requests quarterly SPH guaging in well MW-4. Please submit the monitoring reports by the dates requested below.

2. **Downgradient Extent of Contamination** – The work plan and monitoring report proposes installing two monitoring wells, one at the police station and one on Buchanan Street to monitor the extent of the plume. Rather than installing the wells at this time, ACEH requests that you identify the location of your dissolved contaminant plume by installing a transect(s) of

borings. Based on the results of this work, propose monitoring well locations for both groundwater and remediation system performance monitoring. Please evaluate if the sanitary sewer line intercepts contamination from the site and acts as a preferential pathway for the migration of contaminants.

ACEH realizes that there is a fire station across the street and would like to point out two things. First, the fire station is currently an active fuel leak case RO0000297. You may want to review this case for the limited amount of data available. Second, this station has doors on both the Buchanan Street side and the Marin Avenue side of the building. It may be possible to install borings and wells on Buchanan Street with minimal interference with fire station operations. Please submit a revised work plan to assess the extent of off-site contamination by the due date requested below.

3. **Aerial Photo Base Map** – We request that you use an aerial photo as the base map showing the site and its immediate vicinity for future site maps submitted for the site. Please label and identify the use of all properties on your map.

4. **Corrective Action Plan** – At this time, a Draft Corrective Action Plan (CAP) prepared in accordance with Title 23, California Code of Regulations, Section 2725 appears warranted. The CAP must include a concise background of soil and groundwater investigations performed in connection with this case and an assessment of the residual impacts of the chemicals of concern (COCs) for the site and the surrounding area where the unauthorized release has migrated or may migrate. The CAP should also include, but is not limited to, a detailed description of site lithology, including soil permeability, and most importantly, contamination cleanup levels and cleanup goals, in accordance with the San Francisco Regional Water Quality Control Board (SFRWQCB) Basin Plan and appropriate ESL guidance for all COCs and for the appropriate groundwater designation. Please note that soil cleanup levels should ultimately (within a reasonable timeframe) achieve water quality objectives (cleanup goals) for groundwater in accordance with the SFRWQCB Basin Plan. Please specify appropriate cleanup levels and cleanup goals in accordance with 23 CCR Section 2725, 2726, and 2727 in the CAP.

   The CAP must evaluate at least three viable alternatives for remedying or mitigating the actual or potential adverse affects of the unauthorized release(s) besides the 'no action' and 'monitored natural attenuation' remedial alternatives. Each alternative shall be evaluated not only for cost-effectiveness but also its timeframe to reach cleanup levels and cleanup goals, and ultimately the Responsible Party must propose the most cost-effective corrective action.

6. **Baseline Environmental Project Schedule** – The State Water Resources Control Board passed Resolution No. 2012-0062 on November 6, 2012 which requires development of a Path to Closure Plan by December 31, 2013 that addresses the impediments to closure for the site. The Path to Closure must have milestone dates by calendar quarter which will achieve site cleanup and case closure in a timely and efficient manner that minimizes the cost of corrective action. The Project Schedule should include, but not be limited to, the following key environmental elements and milestones as appropriate:

   - Preferential Pathway Study
   - Soil, Groundwater, and Soil Vapor Investigations

- Initial, Updated, and Final/Validated SCMs
- Interim Remedial Actions
- Feasibility Study/Corrective Action Plan
- Pilot Tests
- Remedial Actions
- Soil Vapor and Groundwater Monitoring Well Installation and Monitoring
- Public Participation Program (Fact Sheet Preparation/Distribution/Public Comment Period, Community Meetings, etc.)
- Case Closure Tasks (Request for closure documents, ACEH Case Closure Summary Preparation and Review, Site Management Plan, Institutional Controls, Public Participation, Landowner Notification, Well Decommissioning, Waste Removal, and Reporting.)

Please include time for regulatory and RP in house review, permitting, off-site access agreements, and utility connections, etc.

Please use a critical path methodology/tool to construct a schedule with sufficient detail to support a realistic and achievable Path to Closure Schedule. The schedule is to include at a minimum:

- Defined work breakdown structure including summary tasks required to accomplish the project objectives and required deliverables
- Summary task decomposition into smaller more manageable components that can be scheduled, monitored, and controlled
- Sequencing of activities to identify and document relationships among the project activities using logical relationships
- Identification of critical paths, linkages, predecessor and successor activities, leads and lags, and key milestones
- Identification of entity responsible for executing work
- Estimated activity durations (60-day ACEH review times are based on calendar days)

Please submit an electronic copy of the Path to Closure Schedule by the date listed below. ACEH will review the schedule to ensure that all key elements are included.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to the following schedule:

- **April 10, 2013 –** Work Plan
  (File to be named: WP_R_yyyy-mm-dd)

- **April 10, 2013** – Path to Closure and Schedule
  (File to be named PROJ_SCH_yyyy-mm-dd)

- **June 16, 2013** – Draft Corrective Action Plan
  (File to be named: CAP _R_yyyy-mm-dd)

- **June 20, 2013** – Groundwater Monitoring Report (Semi-annual Monitoring Report (1st Quarter 2013) (File to be named: GWM _R_yyyy-mm-dd)

  December 20, 2013 – Groundwater Monitoring Report (Semi-annual Monitoring Report (2nd Quarter 2013) (File to be named: GWM _R_yyyy-mm-dd)

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,

Barbara J. Jakub

Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou, email=barbara.jakub@acgov.org, c=US
Date: 2013.02.08 10:34:06 -08'00'

Barbara J. Jakub, P.G.
Hazardous Materials Specialist

Enclosure: Responsible Party(ies) Legal Requirements/Obligations
ACEH Electronic Report Upload (ftp) Instructions

cc: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (*Sent via E-mail to:* rebekah.westrup@cardno.com)
Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (*Sent via E-mail to:* marciabkelly@earthlink.net)
Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (*Sent via E-mail to:* miracoli@earthlink.net)
Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
GeoTracker, file

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

August 22, 2014

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(*Sent via E-mail to:*
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Conditional Work Plan Approval; Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Work Plan for Well Installation*, dated July 7, 2014, and the *Groundwater Monitoring Report, First and Second Quarter 2014,* dated July 18, 2014, which were prepared and submitted on your behalf by Cardno ERI (Cardno) for the subject site. Thank you for submitting the reports.

Based on ACEH staff review of the work plan, the proposed scope of work is conditionally approved for implementation provided that the technical comments below are incorporated during the proposed work. Submittal of a revised work plan or a work plan addendum is not required unless an alternate scope of work outside that described in the work plan or these technical comments is proposed. We request that you address the following technical comments, perform the proposed work, and send us the report described below. Please provide 72-hour advance written notification to this office (e-mail preferred to: mark.detterman@acgov.org) prior to the start of field activities.

TECHNICAL COMMENTS

1. **Work Plan Modifications –** The referenced work plan proposes a series of actions with which ACEH is in general agreement of undertaking; however, ACEH requests a modification to the approach. Please submit a report by the date specified below.
    a. **Subsurface Clearance Protocols –** The referenced work plan proposes to clear well bore locations with hand tools or an air knife. ACEH requests that clearance not include air knifing due to the likelihood of volatilization of light hydrocarbon fractions, in particular in the vicinity of soil bore B12 / MW7.

TECHNICAL REPORT REQUEST

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

- **September 19, 2014 –** Draft Feasibility Study / Corrective Action Plan
  File to be named: RO2974_DRAFT_FEASSTUD_R_yyyy-mm-dd

- **November 15, 2014 –** Site Investigation Report
  File to be named: RO2974_SWI_R_yyyy-mm-dd
- **December 5, 2014 –** Semi-Annual Groundwater Monitoring Report
  File to be named: RO2974_GWM_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.

Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm. 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. If you have any questions, please call me at (510) 567-6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark E. Detterman
DN: cn=Mark E. Detterman, o, ou, email, c=US
Date: 2014.08.22 15:31:19 -07'00'

Mark E. Detterman, PG, CEG
Senior Hazardous Materials Specialist

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

cc: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (Sent via E-mail to: rebekah.westrup@cardno.com)

Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (Sent via E-mail to: marciabkelly@earthlink.net)

Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (Sent via E-mail to: miracoli@earthlink.net)

Dilan Roe, ACEH (Sent via E-mail to: dilan.roe@acgov.org)
Mark Detterman, ACEH (sent via electronic mail to mark.detterman@acgov.org)
GeoTracker, file

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

July 7, 2014

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(*Sent via E-mail to:*
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Request for a Work Plan; Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Soil, Soil Vapor, and Groundwater Investigation Report and Site Conceptual Model*, dated May 2, 2014, which was prepared and submitted on your behalf by Cardno ERI (Cardno) for the subject site. The report recommended work to address identified data gaps including the offsite monitoring of groundwater by the installation of two wells, and evaluation of seasonal soil vapor concentrations beneath the site to evaluate the risk of vapor intrusion at the site. In general, ACEH is in agreement with the proposed work; however, discusses differences in the sections below.

ACEH has previously evaluated the data and recommendations presented in the above-mentioned reports, in conjunction with 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 the recent investigation and ACEH staff review, we have revised the checklist and have determined that the site fails to meet the Media-Specific Criteria for Groundwater and the Media-Specific Criteria for Vapor Intrusion to Indoor Air (see Geotracker for an updated copy).

Based on the review of the case file ACEH requests that you address the following technical comments and send us the documents requested below.

TECHNICAL COMMENTS

1. **Request for a Work Plan** – ACEH requests the submittal of a work plan by the date referenced below.

    a. **Groundwater Delineation** - The downgradient extent of the dissolved-phased groundwater plume remains undefined. It is appropriate to monitor the extent the offsite migration of the dissolved-phased plume to the south of the site utilizes the sanitary sewer installed at an approximate depth of 12.7 feet below grade surface (bgs) beneath Buchannan Street. The proposed installation of a well near bore B12 appears warranted. A second well was proposed to be installed near soil bore B8 to monitor the terminal end of the plume; however, ACEH requests that the well be placed near bore B9 due to the apparent split in the plume migration suggested by very low to trace grab groundwater sample concentrations collected from bores B8 and B10, and higher concentrations detected at soil bore B9 downgradient of offsite residential homes.

b. **Seasonal Soil Vapor Evaluation –** The referenced report also recommended seasonal soil vapor sampling. As communicated in previous directive letters ACEH is in agreement with this recommendation; however, ACEH requests the inclusion of Halogenated Volatile Organic Compounds (HVOCs) due to the documented, but unknown location, of a former waste oil underground storage tank (UST) at the site, and the detection of exceptionally high photoionization detector (PID) results in wells MW-3 and MW-4, and high results in MW-2, without the detection of significant petroleum hydrocarbon volatiles in soil samples collected at the time of well installation. The presence of sandy soils may also contribute to the generation of a subsurface vapor cloud; however, it is appropriate to verify that chlorinated solvents related to the former waste oil UST are not a part of this vapor.

   An evaluation of the foundation of the building at the subject site, or of the immediately downgradient adjacent residential homes was not included in the referenced report. The September 17, 2013 directive letter requested the evaluation of the onsite and offsite residential buildings prior to installation of vapor wells at the site. Based on a review of the residential homes on Google Earth Street View, it appears that one residential foundation may be partially below grade. This may effectively reduce the minimum five foot separation distance allowed by one LTCP vapor intrusion scenario, but also affects the appropriateness of the vapor well installation depth under the LTCP (required to be five feet below building foundations). ACEH requests a review of these foundations be undertaken, and a discussion of the depth of the existing vapor wells relative to the foundations be provided by the date requested below.

2. **Draft Feasibility Study / Corrective Action Plan** – ACEH's evaluation of the vapor well results indicates that the site does not satisfy the LTCP Petroleum Vapor Intrusion to Indoor Air criterion. Based on ACEH's analysis, three of four vapor samples contained oxygen less than 4% oxygen, benzene concentrations in groundwater beneath the site were recently as high as 590 micrograms per liter (µg/l), and the bioattenuation zone at the site appears to be approximately 6 feet (greater than 5 feet, but less than 10 feet). This combination of site characteristics eliminates each available scenario within the LTCP Vapor Intrusion to Indoor Air criteria.

   At this time, a Draft Feasibility Study / Corrective Action Plan (FS/CAP) prepared in accordance with Title 23, California Code of Regulations, Section 2725 appears warranted. The FS/CAP must include a concise background of soil and groundwater investigations performed in connection with this case and an assessment of the residual impacts of the chemicals of concern (COCs) for the site and the surrounding area where the unauthorized release has migrated or may migrate. The FS/CAP should also include, but is not limited to, a detailed description of site lithology, including soil permeability, and most importantly, contamination cleanup levels and LTCP appropriate cleanup goals in accordance with the San Francisco Regional Water Quality Control Board (SFRWQCB) Basin Plan. Should other non-petroleum contaminants be documented, other non-LTCP cleanup goals may be required, such as San Francisco Bay Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESL) guidance for all COCs, or other generated site-specific risk-based goals. Please note that soil cleanup levels should ultimately (within a reasonable timeframe) achieve water quality objectives (cleanup goals) for groundwater in accordance with the SFRWQCB Basin Plan. Please specify appropriate cleanup levels and cleanup goals in accordance with 23 CCR Section 2725, 2726, and 2727 in the CAP.

   The CAP must evaluate at least three viable alternatives for remedying or mitigating the actual or potential adverse affects of the unauthorized release(s) besides the 'no action' and 'monitored natural attenuation' remedial alternatives. Each alternative shall be evaluated not only for cost-effectiveness but also its timeframe to reach cleanup levels and cleanup goals, and ultimately the Responsible Party must propose the most cost-effective corrective action. Please submit the Draft FS/CAP by the date identified below.

3. **Groundwater Monitoring –** Please continue semi-annual groundwater monitoring in accordance with the approved groundwater monitoring plan for the site and submit groundwater monitoring report in accordance with the schedule below. For the reason discussed above for vapor, please also include analysis for HVOCs on a one time basis. The appropriateness of additional HVOC sampling is requested to be evaluated thereafter.

TECHNICAL REPORT REQUEST

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

- **July 25, 2014 –** Semi-Annual Groundwater Monitoring Report
  File to be named: RO2974_GWM_R_yyyy-mm-dd
- **September 5, 2014 –** Data Gap Investigation Work Plan and Foundation Analysis
  File to be named: RO2974_WP_R_yyyy-mm-dd
- **September 19, 2014** – Draft Feasibility Study / Corrective Action Plan
  File to be named: RO2974_DRAFT_FEASSTUD_R_yyyy-mm-dd
- **60 Days After Work Plan Addendum Approval –** Site Investigation Report
  File to be named: RO2974_SWI_R_yyyy-mm-dd
- **December 5, 2014 –** Semi-Annual Groundwater Monitoring Report
  File to be named: RO2974_GWM_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.

Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm. 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. If you have any questions, please call me at (510) 567-6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark E. Detterman
DN: cn=Mark E. Detterman, o, ou, email, c=US
Date: 2014.07.07 14:39:33 -07'00'

Mark E. Detterman, PG, CEG
Senior Hazardous Materials Specialist

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

cc: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (Sent via E-mail to: rebekah.westrup@cardno.com)

Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (Sent via E-mail to: marciabkelly@earthlink.net)

Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (Sent via E-mail to: miracoli@earthlink.net)

Dilan Roe, ACEH (Sent via E-mail to: dilan.roe@acgov.org)
Mark Detterman, ACEH (sent via electronic mail to mark.detterman@acgov.org)
GeoTracker, file

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

September 17, 2013

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(*Sent via E-mail to:*
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Data Gap Investigation Work Plan*, dated July 22, 2013, which was prepared by Cardno ERI for the subject site. The work plan recommends advancing eleven soil borings to define the on- and off-site extent of contamination and installing and sampling three soil vapor wells.

The proposed scope of work may be implemented provided that the modifications requested in the technical comments below are addressed and incorporated during the field implementation. Submittal of a revised Work Plan is not required unless an alternate scope of work outside that described in the Work Plan and technical comments below is proposed.

TECHNICAL COMMENTS

1. **Soil Vapor Probe Construction Depth–** Cardno ERI proposes to install soil vapor wells to a depth of 4 feet below ground surface (bgs) due to high groundwater conditions. ACEH notes that the depth to water in wells located adjacent to the proposed probes ranges from 8.11 to 10.42 feet bgs in well MW-1, 5.29 to 10.64 feet bgs in well MW-4, 6.73 to 10.64 feet bgs in MW-5, and 7.19 to 11.36 in MW-6. Prior to making a determination on probe depth, please evaluate the foundation of the residence next door and the on-site building to ensure that the probes are installed to a depth greater than five feet below the bottom of the foundations in accordance with the Low Threat Closure Policy. In order to meet the 5 foot below bottom of foundation requirement, the probes may be submerged during high water conditions, and therefore would preclude collection of data during these high water conditions, please ensure data is collected when the vapor probes are not submerged.

2. **Leak Test –** Please ensure that the shroud is placed over the wellhead and the sample container in accordance with the Department of Toxic Substances Control and California Regional Water Quality Control Board, Los Angeles and San Francisco Regional Water Quality Control Boards' April 2012 *Advisory – Active Soil Gas Investigations.*

3. **Seasonal Soil Vapor Evaluation –** Please include the results of the first soil vapor sampling event in the soil, groundwater and soil vapor investigation and site conceptual model report (SWI_SCM_R) requested below.

   Please conduct a second soil vapor monitoring event approximately 6-months from the first event and present the results in the SWI (soil gas) requested below.

4. **Updated Site Conceptual Model –** Please update the SCM to include the recent investigation results in tabular format and submit with the SWI_SCM_R requested below. Included for your reference is an example of an SCM in table format (Attachment A) which highlights the major SCM elements and their associated data gaps, if any, which need to be addressed to progress the site to case closure.

5. **Corrective Action Plan –** ACEH previously requested a draft corrective action plan (CAP) by June 12, 2013. A revised date will be issued by ACEH after completion of the data gap investigation and focused site conceptual model.

6. **Groundwater Monitoring –** Please continue semi-annual groundwater monitoring in accordance with the approved groundwater monitoring plan for the site and submit groundwater monitoring report (GWM_R) in accordance with the schedule below.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to Attachment 1 and the following naming convention and schedule:

- **December 16, 2013** –Soil and Water Investigation Report and Site Conceptual Model (soil, water and soil vapor) (File to be named: SWI_SCM_R_yyyy-mm-dd)
- **January 20, 2014** – Groundwater Monitoring Report (2nd Semi-Annual) (File to be named: GWM_R_yyyy-mm-dd)
- **June 16, 2014** – Soil and Water Investigation Report (soil vapor) (File to be named: SWI_R_yyyy-mm-dd)
- **July 20, 2014** – Groundwater Monitoring Report (1st Semi-Annual) (File to be named: GWM _R_yyyy-mm-dd)

Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,

Barbara J. Jakub

Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou, email=barbara.jakub@acgov.org, c=US
Date: 2013.09.17 11:55:46 -07'00'

Barbara J. Jakub, P.G.
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: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (*Sent via E-mail to:* rebekah.westrup@cardno.com)
Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (*Sent via E-mail to:* marciabkelly@earthlink.net)
Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (*Sent via E-mail to:* miracoli@earthlink.net)
Dilan Roe, ACEH (*Sent via E-mail to: dilan.roe@acgov.org)*
Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
GeoTracker, file

ALAMEDA COUNTY
HEALTH CARE SERVICES
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ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

May 24, 2013

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(Sent via E-mail to:
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Response to Comments and Revised Work Plan for Off-Site Borings*, dated March 26, 2013, which was prepared by Cardno ERI for the subject site. The work plan recommends advancing six soil borings to define the off-site extent of contamination.

ACEH has evaluated the data and recommendations presented in the above-mentioned reports, in conjunction with the case files, and 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 the site fails to meet the LTCP General Criteria d (Free Product), e (Site Conceptual Model), f (Secondary Source Removal) and the Media-Specific Criteria for Groundwater, the Media-Specific Criteria for Vapor Intrusion to Indoor Air, and the Media-Specific Criteria for Direct Contact (see Attachment A for a copy of the LTCP checklist).

Therefore, at this juncture ACEH requests that you prepare a Revised 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 d (Free Product) –** The LTCP requires free product to be removed to the extent practicable at release sites where investigations indicate the presence of free product by removing in a manner that minimizes the spread of the unauthorized release into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site, and that properly treats, discharges, or disposes of recovery byproducts in compliance with applicable laws. Additionally, the LTCP requires that abatement of free product migration be used as a minimum objective for the design of any free product removal system.

ACEH's review of the case files indicates that insufficient data and analysis has been presented to assess free product at the site. Specifically, total petroleum hydrocarbons as gasoline (TPHg) TPHg was detected in MW-4 in October 2012 at a concentration of 270,000 micrograms per liter (µg/L), indicating the possible presence of separate phase hydrocarbons (SPH) due to either mobilization of SPH as a result of the pilot test or the drop in the water levels releasing petroleum hydrocarbons into the well.

At the request of ACEH, Cardno ERI is currently monitoring SPH in this well on a quarterly basis and will bail the SPH when present. Cardno ERI has requested to submit the quarterly data in the semi-annual reports. ACEH concurs with this request. In addition to monitoring for SPH, please evaluate the submerged conditions in MW-4 and the possible connection to the dramatic increase in concentrations in this well when depth to water was 10.64 feet below ground surface. Please present your analysis in the focused SCM described in Item 6.

2. **LTCP General Criteria e (Site Conceptual Model) –** According to the LTCP, the SCM is a fundamental element of a comprehensive site investigation. The SCM establishes the source and attributes of the unauthorized release, describes all affected media (including soil, groundwater, and soil vapor as appropriate), describes local geology, hydrogeology and other physical site characteristics that affect contaminant environmental transport and fate, and identifies all confirmed and potential contaminant receptors (including water supply wells, surface water bodies, structures and their inhabitants). The SCM is relied upon by practitioners as a guide for investigative design and data collection. All relevant site characteristics identified by the SCM shall be assessed and supported by data so that the nature, extent and mobility of the release have been established to determine conformance with applicable criteria in this policy.

   Our review of the case files indicates that insufficient data and analysis has not been presented to assess the nature, extent, and mobility of the release and to support compliance with General Criteria d as discussed in Item 1 above and Media Specific Criteria for Vapor Intrusion to Indoor Air, Groundwater, and Direct Contact and Outdoor Air Exposure as described in Items 3, 4 and 5 below, respectively.

3. **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 existing or future site buildings, and adjacent parcels. 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 and analysis fail to support the requisite characteristics of one of the four scenarios. Specifically, it appears that petroleum contamination migrated through a granular zone in shallow soil beneath the site, as evidenced by residual soil concentrations of TPH over 100 milligrams per kilograms (mg/kg) in the 5 to 10 foot intervals and the current groundwater concentrations of 270,000 µg/L TPHg and 440 µg/L benzene located in MW-4 which is adjacent to a residence. Therefore, please present a strategy in the Data Gap Investigation Work Plan described in Item 6 below to collect additional data to satisfy the bioattenuation zone 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 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 Final Vapor Intrusion Guidance (October 2011). Consistent with the guidance, ACEH requires installation of permanent vapor wells to assess temporal and seasonal variations in soil gas concentrations.

4. **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 and analysis has been presented to support the requisite characteristics of plume stability or plume classification as follows:

   i. The work plan and monitoring report proposes installing six soil borings and using two soil borings (IB-1 and IB-2 from the fire station site RO0000297) to define the extent of the downgradient plume. This data was collected in 1999 and may not be representative of the current conditions downgradient of MW-4. ACEH agrees with the locations of borings B7 through B12. However, ACEH requests that additional borings be advanced along Buchanan Street to assess the off-site extent of contamination in this area. Please consider using a transect of borings on approximately thirty foot centers to determine appropriate locations for future monitoring wells and provide adequate coverage of the downgradient extent of contamination. Please submit a map with the proposed boring locations in the Data Gap Work Plan requested in Item 6 below.

   ii. Previous gradient maps indicate gradient directions to the north-northeast, south-southeast, and north-northwest. ACEH requested an evaluation of groundwater contour maps using only wells screened within the same zone. In the work plan Cardno ERI states that they reviewed boring logs, well construction data, and groundwater elevation data and concluded that wells MW-3A, MW-4, MW-5, and SVE1 through SVE3 are screened no deeper than 15 feet bgs and produce a groundwater gradient consistent with the hydrocarbon distribution. Additionally, Cardno ERI concludes that wells MW-1, MW-2, MW-3 and MW-6 have screen intervals extending deeper than 15 feet bgs and do not yield a consistent groundwater gradient and the contour elevation map indicates a groundwater gradient in the shallow zone toward the west and southwest. Cardno ERI states they did not calculate groundwater flow in the deep zone due to varying well construction. Based on ACEH's review of groundwater flow data, the dissolved phase distribution map appears reasonable for October 19, 2012 and matches the contaminant distribution for the site. However, ACEH requests that previous gradient maps be reconstructed using the two zone scenario to verify that shallow groundwater has not historically flowed in other directions.

   iii. ACEH's review of the files indicate that naphthalene was detected at a maximum concentration of 1,500 µg/L in B-1 and additional volatile organic compounds (VOC) were detected in groundwater collected from the initial borings at the site. However, naphthalene has not been analyzed in groundwater monitoring wells.

Therefore, please evaluate VOC concentrations in groundwater monitoring wells and proposed borings at the site.

Please present a strategy in the Revised Data Gap Work Plan (described in Item 6 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 described in Item 6 below.

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 volatized to outdoor air poses a low threat to human health. According to the policy, release sites where human exposure may occur 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 and analysis has been presented to satisfy the media-specific criteria for direct contact and outdoor air exposure. Specifically, Cardno ERI has identified the canopy for the former gasoline station by viewing aerial photographs. The canopy is located in the northeastern portion of the site and is, as Cardno ERI suggests, the likely location of the former dispenser islands. No evaluation of soil or groundwater has been performed in this area.

   Therefore, please present a strategy in the Revised Data Gap Work Plan described in Item 6 below to collect sufficient data to satisfy the direct contact and outdoor air exposure criteria in the areas of likely dispenser locations. Sample and analyze soil at the five and ten foot intervals, at the groundwater interface, lithologic changes, and at areas of obvious impact. Also, collect a groundwater sample from each boring and propose the requisite analysis including naphthalene and polycyclic aromatic hydrocarbons (PAH) analysis.

   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 Item 6 below that assures that exposure to petroleum constituents in soil will have no significant risk of adversely affecting human health.

6. **Revised Data Gap Investigation Work Plan and Focused Site Conceptual Model** – Please prepare Revised Data Gap Investigation Work Plan to address the technical comments listed above. Please support the scope of work in the Revised 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.

7. **Corrective Action Plan** – ACEH previously requested a draft corrective action plan (CAP) by June 12, 2013. A revised date will be issued by ACEH after completion of the data gap investigation and focused site conceptual model.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to Attachment 1 and the following naming convention and schedule:

- **June 14, 2013** – Data Gap Investigation Plan and Site Conceptual Model
  (File to be named: WP_SCM_R_yyyy-mm-dd)

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,

Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou, email=barbara.jakub@acgov.org, c=US
Date: 2013.05.24 15:28:37 -07'00'

Barbara J. Jakub, P.G.
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: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (*Sent via E-mail to:* rebekah.westrup@cardno.com)
Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (*Sent via E-mail to:* marciabkelly@earthlink.net)
Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (*Sent via E-mail to:* miracoli@earthlink.net)
Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Dilan Roe, ACEH (*Sent via E-mail to: dilan.roe@acgov.org)*
Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
GeoTracker, file

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.

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

February 8, 2013

Ms. Jennifer Sedlachek
ExxonMobil
4096 Piedmont Ave., #194
Oakland, CA 94611
(*Sent via E-mail to:*
jennifer.c.sedlachek@exxonmobil.com)

Mrs. Muriel Blank
Blank Family Trust
1164 Solano Ave., #406
Albany, CA 94706

Subject: Fuel Leak Case No. RO0002974 and GeoTracker Global ID T0619716673, Exxon, 990 San Pablo Ave., Albany, CA 94706

Dear Ms. Sedlachek and Mrs. Blank:

Thank you for the recently submitted documents entitled, *Groundwater Monitoring Report, Fourth Quarter 2012, and Response to Comments*, dated December 5, 2012, *Air Sparge and Dual-Phase Extraction Feasibility Testing* dated April 12, 2012, and *Work Plan for Groundwater Monitoring, Air-Sparge and Soil Vapor Extraction Well Installation* dated August 1, 2012 which were prepared by Cardno ERI for the subject site. Alameda County Environmental Health (ACEH) staff has reviewed the case file including the above-mentioned reports for the above-referenced site. The feasibility study tested dual-phase extraction (DPE), combined air-sparge/DPE, and air sparge for a total of four hours per test. The tests demonstrate that AS/DPE could be an effective remediation method for mass removal. However, a corrective action plan needs to be submitted and approved before installation of the remediation wells and implementation of the corrective action can begin. Therefore, the work plan cannot be approved at this time. Please address the following technical comments and send us the reports requested below.

TECHNICAL COMMENTS

1. **Separate Phase Hydrocarbons** – TPHg was detected in MW-4 at a concentration of 270,000 micrograms per liter, indicating the presence of SPH and possible mobilization of SPH due to the pilot test. Please monitor for SPH in this well. If measurable SPH is present please begin product bailing and record the depth of the SPH and mass removed in future monitoring reports.

   ACEH concurs with semi-annual monitoring and reporting until implementation of the CAP but requests quarterly SPH guaging in well MW-4. Please submit the monitoring reports by the dates requested below.

2. **Downgradient Extent of Contamination** – The work plan and monitoring report proposes installing two monitoring wells, one at the police station and one on Buchanan Street to monitor the extent of the plume. Rather than installing the wells at this time, ACEH requests that you identify the location of your dissolved contaminant plume by installing a transect(s) of

borings. Based on the results of this work, propose monitoring well locations for both groundwater and remediation system performance monitoring. Please evaluate if the sanitary sewer line intercepts contamination from the site and acts as a preferential pathway for the migration of contaminants.

ACEH realizes that there is a fire station across the street and would like to point out two things. First, the fire station is currently an active fuel leak case RO0000297. You may want to review this case for the limited amount of data available. Second, this station has doors on both the Buchanan Street side and the Marin Avenue side of the building. It may be possible to install borings and wells on Buchanan Street with minimal interference with fire station operations. Please submit a revised work plan to assess the extent of off-site contamination by the due date requested below.

3. **Aerial Photo Base Map** – We request that you use an aerial photo as the base map showing the site and its immediate vicinity for future site maps submitted for the site. Please label and identify the use of all properties on your map.

4. **Corrective Action Plan** – At this time, a Draft Corrective Action Plan (CAP) prepared in accordance with Title 23, California Code of Regulations, Section 2725 appears warranted. The CAP must include a concise background of soil and groundwater investigations performed in connection with this case and an assessment of the residual impacts of the chemicals of concern (COCs) for the site and the surrounding area where the unauthorized release has migrated or may migrate. The CAP should also include, but is not limited to, a detailed description of site lithology, including soil permeability, and most importantly, contamination cleanup levels and cleanup goals, in accordance with the San Francisco Regional Water Quality Control Board (SFRWQCB) Basin Plan and appropriate ESL guidance for all COCs and for the appropriate groundwater designation. Please note that soil cleanup levels should ultimately (within a reasonable timeframe) achieve water quality objectives (cleanup goals) for groundwater in accordance with the SFRWQCB Basin Plan. Please specify appropriate cleanup levels and cleanup goals in accordance with 23 CCR Section 2725, 2726, and 2727 in the CAP.

   The CAP must evaluate at least three viable alternatives for remedying or mitigating the actual or potential adverse affects of the unauthorized release(s) besides the 'no action' and 'monitored natural attenuation' remedial alternatives. Each alternative shall be evaluated not only for cost-effectiveness but also its timeframe to reach cleanup levels and cleanup goals, and ultimately the Responsible Party must propose the most cost-effective corrective action.

6. **Baseline Environmental Project Schedule** – The State Water Resources Control Board passed Resolution No. 2012-0062 on November 6, 2012 which requires development of a Path to Closure Plan by December 31, 2013 that addresses the impediments to closure for the site. The Path to Closure must have milestone dates by calendar quarter which will achieve site cleanup and case closure in a timely and efficient manner that minimizes the cost of corrective action. The Project Schedule should include, but not be limited to, the following key environmental elements and milestones as appropriate:

   - Preferential Pathway Study
   - Soil, Groundwater, and Soil Vapor Investigations

- Initial, Updated, and Final/Validated SCMs
- Interim Remedial Actions
- Feasibility Study/Corrective Action Plan
- Pilot Tests
- Remedial Actions
- Soil Vapor and Groundwater Monitoring Well Installation and Monitoring
- Public Participation Program (Fact Sheet Preparation/Distribution/Public Comment Period, Community Meetings, etc.)
- Case Closure Tasks (Request for closure documents, ACEH Case Closure Summary Preparation and Review, Site Management Plan, Institutional Controls, Public Participation, Landowner Notification, Well Decommissioning, Waste Removal, and Reporting.)

Please include time for regulatory and RP in house review, permitting, off-site access agreements, and utility connections, etc.

Please use a critical path methodology/tool to construct a schedule with sufficient detail to support a realistic and achievable Path to Closure Schedule. The schedule is to include at a minimum:

- Defined work breakdown structure including summary tasks required to accomplish the project objectives and required deliverables
- Summary task decomposition into smaller more manageable components that can be scheduled, monitored, and controlled
- Sequencing of activities to identify and document relationships among the project activities using logical relationships
- Identification of critical paths, linkages, predecessor and successor activities, leads and lags, and key milestones
- Identification of entity responsible for executing work
- Estimated activity durations (60-day ACEH review times are based on calendar days)

Please submit an electronic copy of the Path to Closure Schedule by the date listed below. ACEH will review the schedule to ensure that all key elements are included.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to the following schedule:

- **April 10, 2013 –** Work Plan
  (File to be named: WP_R_yyyy-mm-dd)

- **April 10, 2013** – Path to Closure and Schedule
  (File to be named PROJ_SCH_yyyy-mm-dd)

- **June 16, 2013** – Draft Corrective Action Plan
  (File to be named: CAP _R_yyyy-mm-dd)

- **June 20, 2013** – Groundwater Monitoring Report (Semi-annual Monitoring Report (1st Quarter 2013) (File to be named: GWM _R_yyyy-mm-dd)

  December 20, 2013 – Groundwater Monitoring Report (Semi-annual Monitoring Report (2nd Quarter 2013) (File to be named: GWM _R_yyyy-mm-dd)

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,

Barbara J. Jakub

Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou, email=barbara.jakub@acgov.org, c=US
Date: 2013.02.08 10:34:06 -08'00'

Barbara J. Jakub, P.G.
Hazardous Materials Specialist

Enclosure: Responsible Party(ies) Legal Requirements/Obligations
ACEH Electronic Report Upload (ftp) Instructions

cc: Rebekah Westrup, Environmental Resolutions, Inc., 601 North McDowell Blvd., Petaluma, CA 94954 (*Sent via E-mail to:* rebekah.westrup@cardno.com)
Mrs. Marcia B. Kelly, 641 SW Morningside Rd., Topeka, KS 66615 (*Sent via E-mail to:* marciabkelly@earthlink.net)
Rev. Deborah Blank, 1563 Solano Ave. #344, Berkeley, CA 94707 (*Sent via E-mail to:* miracoli@earthlink.net)
Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
GeoTracker, file

APPENDIX

B

SITE CONCEPTUAL MODEL

Cardno ERI

Shaping the Future

Element	Description	Data Gaps
Geology and Hydrogeology		
Regional Geology and Hydrogeology	The site lies at an approximate elevation of 40 feet above msl, and the local topography slopes toward the southwest. The site is located along the eastern margin of the San Francisco Bay within the East Bay Plain (Hickenbottom and Muir, 1988). The surficial deposits in the site vicinity are mapped as Holocene alluvial fan and fluvial deposits (Graymer, 2000). The active northwest trending Hayward fault is located approximately 1.5 miles northeast of the site. The East Bay Plain is regionally divided into two major groundwater basins: the San Pablo and the San Francisco Basin. These basins are tectonic depressions that are filled primarily with a sequence of coalescing alluvial fans. The San Francisco Basin is further divided into seven sub-areas. The site is located in the Berkeley Sub-Area, which is filled primarily by alluvial deposits that range from 10 to 300 feet thick with poorly defined aquitards (CRWQCB, 1999). Under natural conditions, the direction of groundwater flow in the East Bay Plain is east to west.	None
Site Geology, Hydrogeology, Hydraulic Flow, and Groundwater Gradient	Soil boring logs indicate that the soil beneath the site consists predominantly of silt and clay with an apparently continuous coarse-grained unit 2 to 8 feet thick encountered between approximately 8 and 20 feet bgs. Fill material was encountered in the boring for well SVE3 (located in the former UST pit) to approximately 7 feet bgs. CPT borings indicate the presence of predominantly silt and clay between approximately 20 and 60 feet bgs, the maximum depth explored. Coarse-grained layers up to 3 feet thick are interbedded with the silt and clay (EC&A, 2008; Cardno ERI, 2011; Cardno ERI, 2012). Historical groundwater elevation data indicate that DTW ranges from 5 to 11 feet bgs beneath the site with varying groundwater flow directions. The distribution of dissolved-phase hydrocarbons suggests that the dominant groundwater flow direction is west to southwest (Cardno ERI, 2014b). Due to varying well construction, Cardno ERI separated the wells into shallow and deep water-bearing zones. Wells MW3A, MW4, MW5, and SVE1 through SVE3 are screened no deeper than 15 feet bgs and are referred to as the shallow water-bearing zone; wells MW1 through MW3 and MW6 have screened intervals that extend deeper than 15 feet bgs and are referred to as the deep water-bearing zone. The groundwater elevations in wells screened deeper than 15 feet are commonly irregular and do not agree with the distribution of petroleum hydrocarbon concentrations. Although the water-bearing zones are referred to as shallow and deep, they likely do not represent unique water-bearing zones. During fourth quarter 2013, the groundwater flow direction in the shallow water-bearing zone was towards the southwest with a hydraulic gradient of approximately 0.008. Due to varying well construction, the groundwater flow in the deep water-bearing zone is not calculated (Cardno ERI, 2014b).	None
Facility History		
Facility Structures and Site Operations	In 1945, a service station owned by Signal Oil Company occupied the site. Humble Oil company acquired the site in 1967 from Standard Oil Company of California (Chevron), rebranding the site as an Enco station. The station was rebranded as an Exxon service station in 1975 (EDR, 2009a; EDR, 2009b). The service station was demolished in 1983. During demolition activities, one used-oil UST and four gasoline USTs were removed and the resulting tank cavity was backfilled with sand and compacted to 90% (City of Albany, 1983). Cardno ERI reviewed eight aerial photographs of the site and site vicinity dated from September 6, 1949, to June 21, 1983 (EDR, 2009b). Based on these photographs, the dispenser islands appeared to be located beneath the station canopy on the northern portion of the site and the former USTs appeared to be located on the southern portion of the site, east of the station's service bays. The location of the former used-oil UST is unknown. The approximate location of the former USTs are shown on Plate 2. A retail outlet for Benjamin Moore paints and painting products and associated asphalt parking currently occupy the site.	None

Element	Description	Data Gaps
Sensitive Receptors, Land Use, and Nearby Sites		
Surface Water Bodies	The site is located approximately 1,630 feet north-northwest of Cordornices Creek. No other surface water bodies have been located within a 300-meter radius of the site.	None
Nearby Wells	There are not public water supply, municipal, or domestic wells located within a ¼-mile radius of the site.	None
Public Use Areas	Two public use areas are present within a 100-meter radius of the site: the City of Albany Police, Fire, and City offices located across Buchanan Street at 1000 San Pablo Avenue and a physical therapy office located in the strip mall approximately 50 meters north of the site.	None
Residences	Sixteen residential buildings have been identified within a 300-meter radius of the site; five of those buildings are located within a 100-meter radius of the site.	None
Sub-Grade	Sub-grade structures have not been identified within a 100-meter radius of the site.	None
Utility Vaults	Twenty-three vaults have been identified on or immediately adjacent to the site. Vault uses include: water, telephone, gas meter, electric, sewer, traffic box, traffic signal, and anode.	None
Storm and Sanitary Sewers	Three storm drains are located on or adjacent to the site. The storm drains daylight along the curb and water flows west along Buchanan Street. The City of Albany Public Works Department confirmed that the storm drains discharge directly into the Bay. Two sanitary sewer cleanout vaults are located on site. The City of Albany Public Works Department confirmed that sewage is discharged at the East Bay Municipal Utilities District Treatment Plant, located 4.5 miles south of the site, at the entrance to the San Francisco Bay Bridge.	None
Other	Other site receptors have not been identified.	None
Nearby Sites	The surrounding areas consist of residential and commercial properties (Plate 2). The City of Albany Fire Department and Police Department are located south of the site on Buchanan Street. ACEH case number RO0000119, identified as Firestone #3655 in the GeoTracker™ database, is located across San Pablo Avenue to the east. A Shell Service Station and an Atlantic Richfield Company Service Station (Arco) are located approximately 350 and 500 feet away, respectively, south-southeast of the site.	None
Release Information		
Release History	The primary sources of petroleum hydrocarbons at the site are the former used-oil UST and the four former gasoline USTs. The USTs were removed in 1983 (City of Albany, 1983).	None
Extent and Distribution of Petroleum Hydrocarbon Concentrations	**Non-Aqueous Phase Liquid** An immiscible sheen was reported in groundwater samples collected from borings B1 and B2 (EC&A, 2008). Neither NAPL nor sheen have been observed in the groundwater monitoring wells at the site; however, during fourth quarter 2012, concentrations of TPHg (270,000 µg/L) reported in well MW4 were potentially indicative of the presence of NAPL. Although the TPHg concentrations increased, BTEX concentrations were consistent with previous data. Concentrations of TPHg reported since fourth quarter 2012 have and not indicative of the presence of NAPL and fourth quarter 2013 (13,000 µg/L) consistent with historical results. The fourth quarter 2012 TPHd result for well MW4 appears to have been anomalous.	None

Element	Description	Data Gaps
	Hydrocarbons in Groundwater Current and historic maximum dissolved-phase petroleum hydrocarbon concentrations have been reported in well MW3, located in the vicinity of the former USTs, and wells MW4 and MW5, located west of the former USTs. Concentrations are delineated to the east of the site by wells MW1 and MW2 and to the south of the site by borings B11 and B15. Dissolved-phase hydrocarbons are adequately vertically delineated at the site with petroleum hydrocarbon concentrations below or near the laboratory reporting limits in groundwater samples collected deeper than 27.5 feet bgs (Cardno ERI, 2011). **Data Gap:** Dissolved-phase petroleum hydrocarbons require monitoring off site to the west and southwest near borings B9 and B12. **How to Address:** Cardno ERI installed two off-site wells near borings B9 and B12. Cardno ERI recommends incorporating the wells into the semi-annual groundwater monitoring and sampling schedule at the site. Cardno ERI recommends Installing proposed well MW9 southwest of the site.	**Yes**
	Hydrocarbons in Soil Maximum residual petroleum hydrocarbon concentrations are present at approximately 10.5 feet bgs in the vicinity of the former USTs. With the exception of naphthalene by EPA Method 8310 in boring B13 (5 feet bgs) and TPHg in borings B4 (5 feet bgs) and SVE1 (8.5 feet bgs), residual petroleum hydrocarbon concentrations have been near or below reporting limits in the shallow soil samples collected at the site, including samples collected in the vicinity of the former UST and suspected dispenser island locations. Residual petroleum hydrocarbon concentrations are adequately delineated in both shallow (less than 10 feet bgs) and deep (greater than or equal to 10 feet bgs) soil to the northeast, the northwest, the west, the east, the southwest, and the south by borings B5 through B11, B14, B15, MW1, MW2, and CPT1. Residual TPHg (530 mg/kg) is present to the north at 10 feet bgs in boring B16, but is near or below reporting limits at 5 and 15.5 feet bgs (EC&A, 2008; Cardno ERI, 2011; Cardno ERI, 2014a).	None
	Hydrocarbons in Soil Vapor Maximum vapor-phase concentrations are present in well SVS3, located in the vicinity of the suspected locations of the former dispenser islands. Petroleum hydrocarbons exceed ESLs by up to three orders of magnitude in wells SVS1 through SVS3. **Data Gap:** Vapor-phase concentrations exceed applicable screening levels. **How to Address:** Remediation addressing vapor-phase concentrations proposed.	**Yes**
Exposure Routes and Potential Receptors		
Exposure Routes and Potential Receptors	Utility trench backfill material is not acting as a preferential pathway for petroleum hydrocarbon concentrations (Cardno ERI, 2014a). There are not public water supply, municipal, or domestic wells located within a quarter mile of the site. The nearest surface water body (Cordornices Creek) is located approximately 1,630 feet south-southeast of the site. Residual and dissolved-phase petroleum hydrocarbons are delineated south and east of the site and are not likely to migrate to Cordornices Creek. A construction worker excavating soil at the site is a potential receptor; however, since the site is paved, direct exposure (via ingestion or dermal contact) to chemicals of concern released during Exxon's operations is not likely. The potential exposure route of vapor inhalation may exist in the commercial/industrial setting for workers in the on-site retail outlet. Users of shallow and deep groundwater are potential receptors. **Data Gap:** See the groundwater and soil vapor data gaps in the Release Information section.	**Yes**

REFERENCES

California Regional Water Quality Control Board San Francisco Bay Region Groundwater Committee (CRWQCB). June 1999. *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, Alameda and Contra Costa Counties, CA.*

*C*ardno ERI. February 28, 2011. *Site Assessment Report, Former Exxon Service Station 79374, 990 San Pablo Avenue, Albany, California.*

Cardno ERI. April 12, 2012. *Well Installation Report, Former Exxon Service Station 79374, 990 San Pablo Avenue, Albany, California.*

Cardno ERI. July 7, 2014a. *Work Plan for Well Installation, Former Exxon Service Station 79374, 990 San Pablo Avenue, Albany, California.*

Cardno ERI. September 5, 2014b. *Response to Comments and Request for Extension, Former Exxon Service Station 79374, 990 San Pablo Avenue, Albany, California.*

City of Albany. March 28, 1983. *Building Permit 82-0708.*

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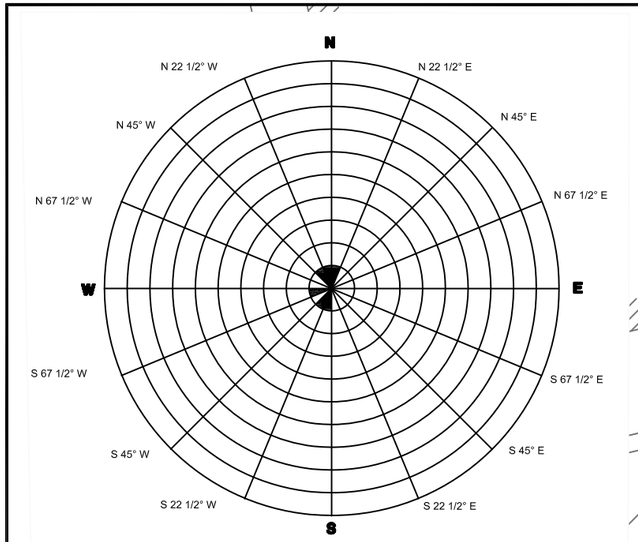
APPENDIX

C

GROUNDWATER ELEVATION MAPS

Cardno ERI

Shaping the Future



Rose diagram developed by evaluating the groundwater gradient direction from the quarterly monitoring data. Each circle on the rose diagram represents the gradient plotted in that 22 1/2 degree sector.

N Compass Direction

GROUNDWATER FLOW DIRECTION ROSE DIAGRAM

EXISTING BUILDING

BUILDING OVERHANG

FORMER CANOPY

SVS3

MW1

CPT1

HP1A

HP1B

FORMER SERVICE STATION

DRIVEWAY

SAN PABLO AVENUE

N

MW6

SVS1

CPT2

HP2A

HP2B

MW5

35.61

EXISTING BUILDING

FORMER USTs

SVE2

35.59

35.6

35.7

SVE1

35.62

35.8

GROUNDWATER FLOW DIRECTION

i = 0.0167

April 30, 2014

AS1

SVE3

35.88

MW2

SVS2

35.7

MW3A

35.87

MW3

35.8

SIGN

MW4

35.79

APPROXIMATE SCALE

0 10 20 Feet

DRIVEWAY

FN 2735 14 2QTR QM

Cardno ERI

Shaping the Future

GROUNDWATER ELEVATION MAP
SHALLOW WATER-BEARING ZONE
April 30, 2014

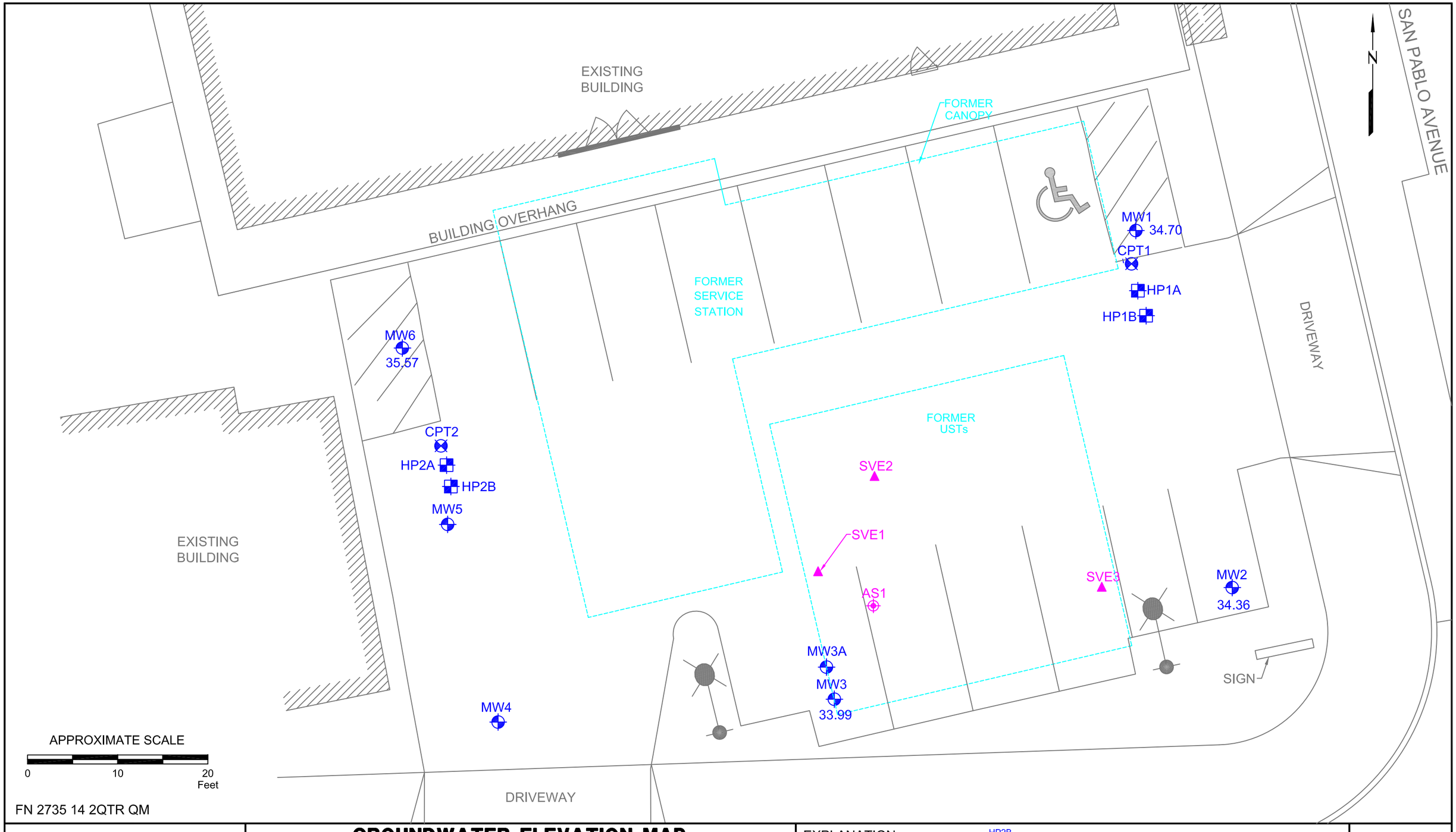
FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- MW5 — Groundwater Monitoring Well
- 35.61 — Groundwater elevation in feet; datum is NAVD88
- i = Interpreted Hydraulic Gradient
- HP2B — Hydropunch Boring
- CPT2 — Cone Penetration Test Boring
- 35.8 ---- Line of Equal Groundwater Elevation; datum is NAVD88
- AS1 — Air Sparge Well
- SVE3 — Soil Vapor Extraction Well
- SVS3 — Soil Vapor Sampling Well

PROJECT NO. 2735

PLATE 3



FN 2735 14 2QTR QM

Cardno ERI
Shaping the Future

GROUNDWATER ELEVATION MAP
DEEP WATER-BEARING ZONE
April 30, 2014

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

MW6 Groundwater Monitoring Well
35.57 Groundwater elevation in feet; datum is NAVD88

NOTE:
Wells not contoured due to varying well construction.

HP2B Hydropunch Boring

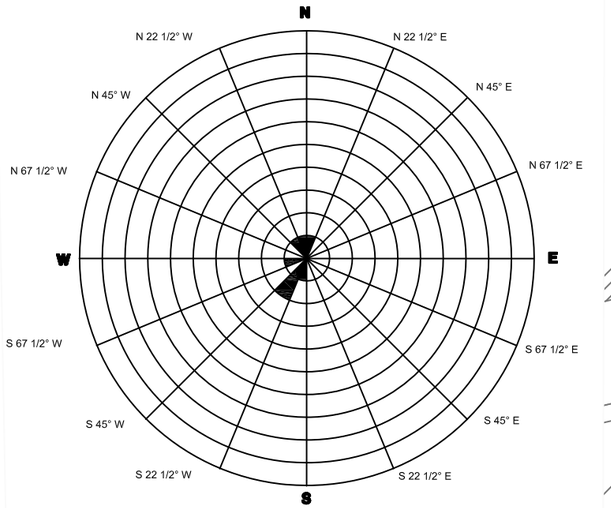
CPT2 Cone Penetration Test Boring

AS1 Air Sparge Well

SVE3 Soil Vapor Extraction Well

PROJECT NO.
2735

PLATE
4



Rose diagram developed by evaluating the groundwater gradient direction from the quarterly monitoring data. Each circle on the rose diagram represents the gradient plotted in that 22 1/2 degree sector.

N Compass Direction

GROUNDWATER FLOW DIRECTION ROSE DIAGRAM

EXISTING BUILDING

BUILDING OVERHANG

FORMER CANOPY

SVS3

MW1

CPT1

HP1A

HP1B

FORMER SERVICE STATION

DRIVEWAY

SAN PABLO AVENUE

N

MW6

SVS1

CPT2

HP2A

HP2B

FORMER USTs

SVE2
33.18

MW5
33.12

33.0

i = 0.007
October 28, 2014

GROUNDWATER FLOW DIRECTION

SVE1
33.15

AS1

SVE3
33.19

MW2

32.5

SVS2

MW3A
33.09

MW3

32.0

MW4
31.84

SIGN

EXISTING BUILDING

DRIVEWAY

APPROXIMATE SCALE

0 10 20 Feet

FN 2735 14 4QTR QM

Cardno ERI
Shaping the Future

GROUNDWATER ELEVATION MAP SHALLOW WATER-BEARING ZONE October 28, 2014

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- MW5 — Groundwater Monitoring Well
- 33.12 — Groundwater elevation in feet; datum is NAVD88
- i = Interpreted Hydraulic Gradient
- HP2B — Hydropunch Boring
- CPT2 — Cone Penetration Test Boring
- 33.0 — Line of Equal Groundwater Elevation; datum is NAVD88
- AS1 — Air Sparge Well
- SVE3 — Soil Vapor Extraction Well
- SVS3 — Soil Vapor Sampling Well

PROJECT NO. 2735

PLATE 3

FN 2735 14 4QTR QM

Cardno ERI
Shaping the Future

GROUNDWATER ELEVATION MAP
DEEP WATER-BEARING ZONE
October 28, 2014

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- MW6 — Groundwater Monitoring Well
- 32.89 — Groundwater elevation in feet; datum is NAVD88
- HP2B — Hydropunch Boring
- CPT2 — Cone Penetration Test Boring
- AS1 — Air Sparge Well
- SVE3 — Soil Vapor Extraction Well

NOTE:
Wells not contoured due to varying well construction.

PROJECT NO.
2735

PLATE
4

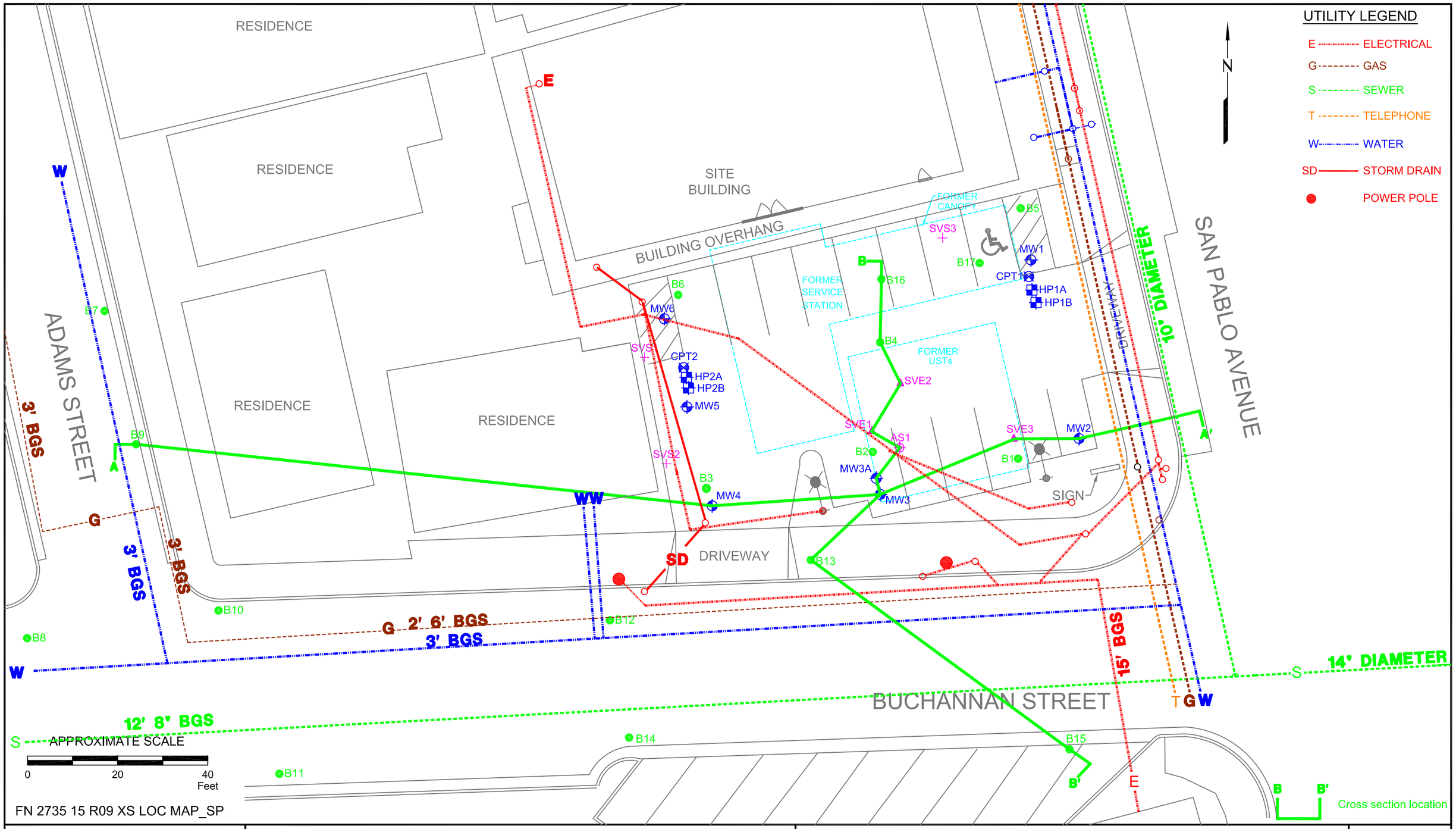
APPENDIX

D

CROSS SECTIONS

Cardno ERI

Shaping the Future



Cardno ERI
Shaping the Future

CROSS SECTION LOCATION MAP

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

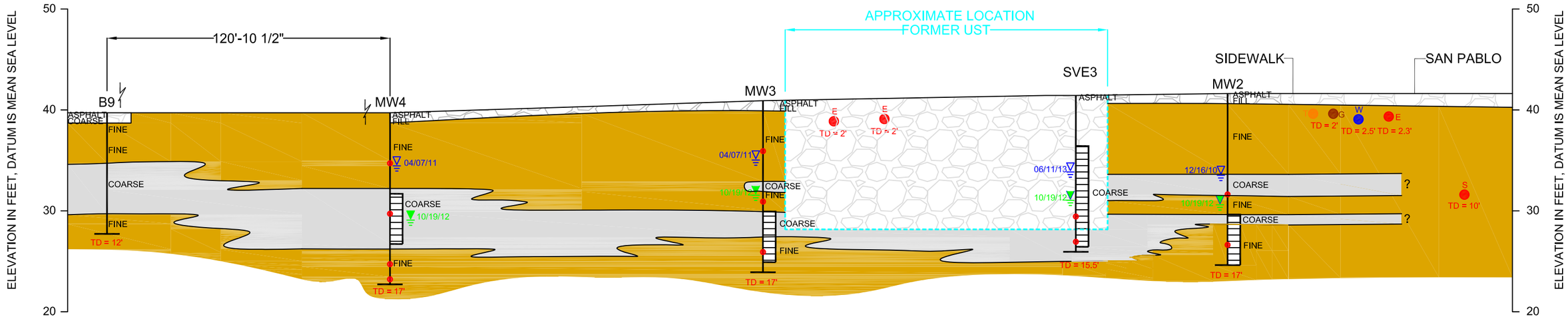
EXPLANATION

- MW6 Groundwater Monitoring Well
- B17 Soil Boring
- HP2B Hydropunch Boring
- CPT2 Cone Penetration Test Boring
- SVS3 Soil Vapor Sampling Well
- AS1 Air Sparge Well
- SVE3 Soil Vapor Extraction Well

PROJECT NO. 2735

PLATE 6

WEST A — EAST A'



B9
02/27/14
5 FT.
<5.0
<0.52
<0.0050
11.5 FT.
<5.0
<0.52
<0.0049

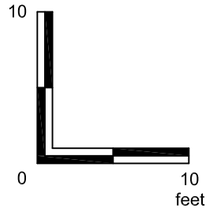
MW4
10/20/10
5 FT.
<5.0
<0.50
<0.0050
11/05/10
10 FT.
<5.0
44a
<0.50
15 FT.
<5.0
<0.50
<0.0050
16.5 FT.
<5.0
<0.50
<0.0050

MW3
10/20/10
5 FT.
<5.0
<0.50
<0.0050
11/08/10
10.5 FT.
11a
220
<0.50
15.5 FT.
<5.0
2.2
<0.0050

SVE3
01/17/12
12.5 FT.
760a
1,900a
<2.5
15 FT.
<5.0
<0.50
<0.0050

MW2
11/04/10
10 FT.
<5.0
3.1a
<0.0050
15 FT.
<5.0
<0.50
<0.0050

APPROXIMATE SCALE



No Vertical Exaggeration

FN 2735 15 R09 4QTR XS A-A'_SP

Analyte Concentrations in mg/kg

Sample
Sample Date
Sample Depth
Total Petroleum Hydrocarbons as diesel
Total Petroleum Hydrocarbons as gasoline
Benzene

< Less Than the Stated Laboratory Reporting Limit

mg/kg Milligrams per kilogram

a The chromatographic pattern does not match that of the specified standard.

Cardno ERI
Shaping the Future

CROSS SECTION A-A', SELECT SOIL ANALYTICAL RESULTS

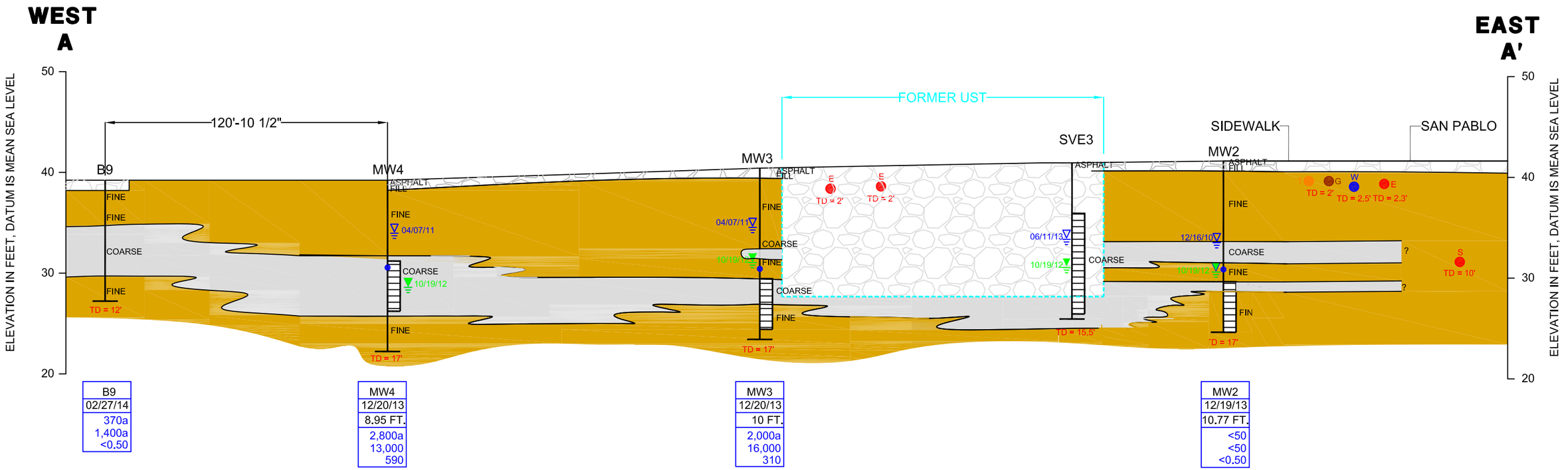
FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- Asphalt/Fill
- Fine-grained sediments
- Coarse-grained sediments
- E Electrical Conduit
- G Gas Line
- S Storm Drain
- T Telephone Conduit
- W Water Line
- Soil Sample Depth
- TD = Total Depth
- Minimum Groundwater Level
- Maximum Groundwater Level

PROJECT NO. 2735

PLATE 7



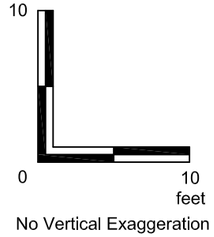
B9
02/27/14
370a
1,400a
<0.50

MW4
12/20/13
8.95 FT.
2,800a
13,000
590

MW3
12/20/13
10 FT.
2,000a
16,000
310

MW2
12/19/13
10.77 FT.
<50
<50
<0.50

APPROXIMATE SCALE



No Vertical Exaggeration

FN 2735 15 R09 4QTR XS A-A' GW_SP

Analyte Concentrations in ug/L

Sample
Sample Date
Sample Depth
Total Petroleum Hydrocarbons as diesel
Total Petroleum Hydrocarbons as gasoline
Benzene

< Less Than the Stated Laboratory Reporting Limit

ug/L Micrograms per Liter

a The chromatographic pattern does not match that of the specified standard.

Cardno ERI
Shaping the Future

CROSS SECTION A-A', SELECT GROUNDWATER ANALYTICAL RESULTS

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

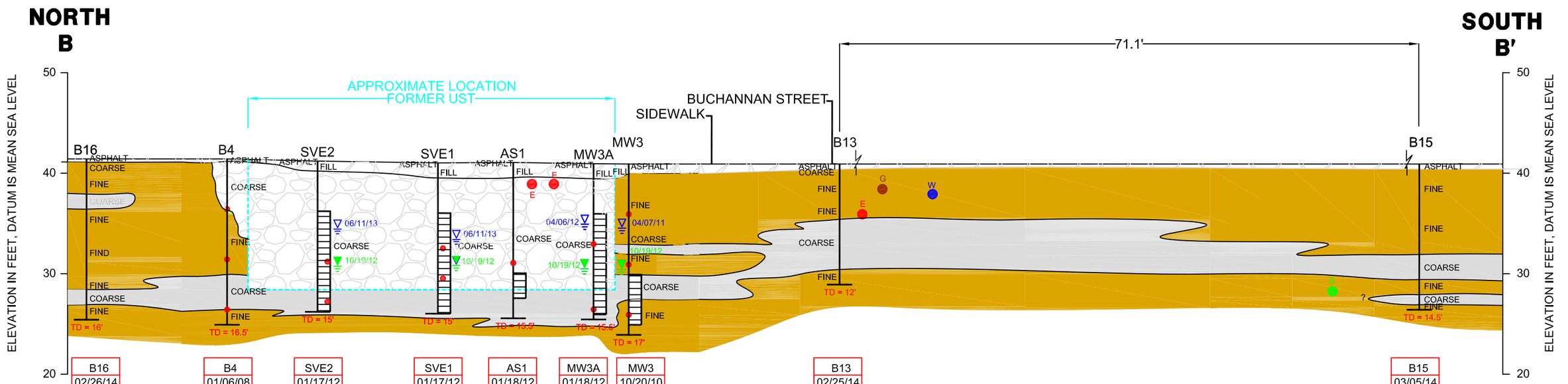
EXPLANATION

- Asphalt/Fill
- Fine-grained sediments
- Coarse-grained sediments
- E Electrical Conduit
- G Gas Line
- S Storm Drain
- T Telephone Conduit
- W Water Line
- Groundwater Sample Depth
- TD = Total Depth
- Minimum Groundwater Level
- Maximum Groundwater Level

PROJECT NO. 2735

PLATE 8

NORTH B — SOUTH B'



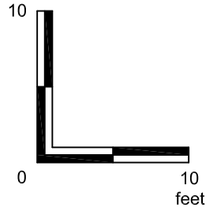
B16	B4	SVE2	SVE1	AS1	MW3A	MW3	B13	B15
02/26/14	01/06/08	01/17/12	01/17/12	01/18/12	01/18/12	10/20/10	02/25/14	03/05/14
5 FT.	5.5 FT.	10 FT.	8.5 FT.	10 FT.	8 FT.	5 FT.	5 FT.	5 FT.
<5.0	62d	37a	87a	800a	<5.0	<5.0	<4.9	<5.0
0.62a	140e,f	390a	480a	2,900	<0.50	<0.50	<0.48	<0.49
<0.0050	<0.005	<0.50	<0.50	<2.5	<0.0050	<0.0050	<0.0052	<0.0051
10 FT.	10.5 FT.	14 FT.	11.5 FT.		14.5 FT.	11/08/10	02/28/14	10 FT.
439	15d	<5.0	<5.0		<5.0	10.5 FT.	11.5 FT.	<4.9
530	140e,f	<0.50	18		<0.50	11a	160a	<0.52
0.026g	0.25	<0.0050	<0.50		<0.0050	220	1,800	<0.0050
15.5 FT.						<0.50	<1.0	14 FT.
<5.0						15.5 FT.		<5.0
<0.51						<5.0		<0.48
<0.0050						2.2		<0.0050
						<0.0050		

Analyte Concentrations in mg/kg

Sample
Sample Date
Sample Depth
Total Petroleum Hydrocarbons as diesel
Total Petroleum Hydrocarbons as gasoline
Benzene

<	Less Than the Stated Laboratory Reporting Limit
mg/kg	Milligrams per kilogram
a	The chromatographic pattern does not match that of the specified standard.
d	Gasoline range compounds are significant.
e	Strongly aged gasoline or diesel range compounds are significant.
f	No recognizable pattern.
g	Estimated value; analyte present at concentration above the method detection limit but below the reporting limit.

APPROXIMATE SCALE



No Vertical Exaggeration

FN 2735 15 R09 4QTR XS B-B'_SP

Cardno ERI
Shaping the Future

CROSS SECTION B-B,'
SELECT SOIL ANALYTICAL RESULTS

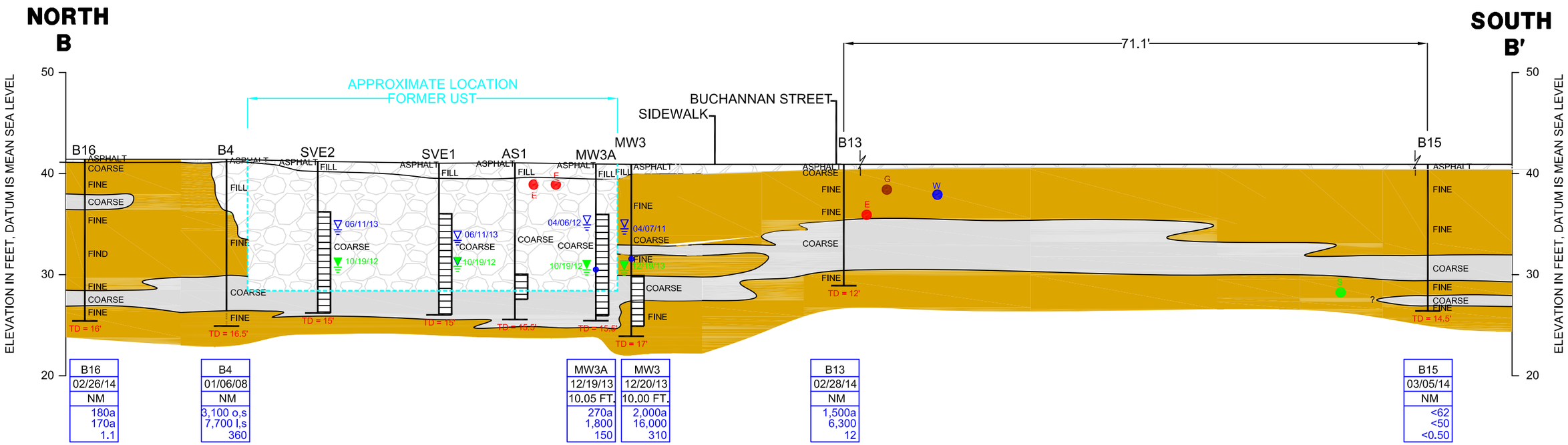
FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- Asphalt/Fill
- Fine-grained sediments
- Coarse-grained sediments
- E Electrical Conduit
- G Gas Line
- S Sewer Line
- W Water Line
- Soil Sample Depth
- TD = Total Depth
- Minimum Groundwater Level
- Maximum Groundwater Level

PROJECT NO. 2735

PLATE 9



B16	B4	MW3A	MW3	B13	B15
02/26/14	01/06/08	12/19/13	12/20/13	02/28/14	03/05/14
NM	NM	10.05 FT.	10.00 FT.	NM	NM
180a	3,100 o,s	270a	2,000a	1,500a	<62
170a	7,700 l,s	1,800	16,000	6,300	<50
1.1	360	150	310	12	<0.50

Analyte Concentrations in ug/L

Sample
Sample Date
Sample Depth
Total Petroleum Hydrocarbons as diesel
Total Petroleum Hydrocarbons as gasoline
Benzene

APPROXIMATE SCALE

10
0 10
feet

No Vertical Exaggeration

<	Less Than the Stated Laboratory Reporting Limit
ug/L	Micrograms per Liter
a	The chromatographic pattern does not match that of the specified standard.
l	Unmodified or weakly modified gasoline is significant.
o	Gasoline range compounds are significant.
s	Liquid sample that contains greater than approximately 1 volume % sediment.

FN 2735 15 R09 4QTR XS B-B'_SP

Cardno ERI
Shaping the Future

CROSS SECTION B-B',
SELECT GROUNDWATER ANALYTICAL RESULTS

FORMER EXXON SERVICE STATION 79374
990 San Pablo Avenue
Albany, California

EXPLANATION

- Asphalt/Fill
- Fine-grained sediments
- Coarse-grained sediments
- E Electrical Conduit
- G Gas Line
- S Sewer Line
- W Water Line
- Water Sample
- TD = Total Depth
- Minimum Groundwater Level
- Maximum Groundwater Level

PROJECT NO. 2735

PLATE 10

APPENDIX

E

FIELD PROTOCOLS

Cardno ERI

Shaping the Future

Cardno ERI
Dual-Phase Extraction Test
Field Protocol

Dual-phase extraction (DPE) consists of extracting vapor and liquid through the same conduit. If vapor phase, dissolved phase and separate phase contaminants are all present, the procedure is often referred to as multi-phase extraction. Testing procedures are the same for both.

Objective

The objective of a DPE test is often two-fold: 1) to determine the radius of influence (ROI) and obtain engineering data for evaluation of future remediation options at the site, and 2) to accomplish mass removal of hydrocarbons by removing both soil vapor and groundwater from one or more wells.

Cardno ERI utilizes a DPE mobile treatment system that has the capability of removing hydrocarbon-affected groundwater and soil vapor simultaneously. Vacuum may be provided by various types of blowers - a liquid ring pump (high vacuum for tight formations – 10 to 25 inches of mercury) or positive displacement or regenerative blowers (modest vacuum for sandy formations – 3 to 12 inches of mercury). Hydrocarbon vapor is treated on site with a thermal/catalytic oxidizer, which has been approved for operation by the local air pollution control agency. As an alternative, for sites with low soil vapor concentrations, Cardno ERI uses activated carbon to treat the extracted soil vapor.

Phase I – DPE Test to Obtain Engineering Data

For the extraction well, one groundwater well is selected near the center of the area to be tested. Usually this is a zone containing high levels of hydrocarbons. A wellhead assembly is installed as shown on Plate DPE-1 (attached). Vacuum is measured in three places: 1) at V_o to monitor the performance of the blower and to estimate flow from the pump curve, 2) at V_1 to determine the vacuum being applied to the formation, and 3) at V_2 to determine the line loss in the stinger and to be sure a standing head of water has not developed in the vacuum stinger tube. Vapor flow rates are measured and vapor samples are collected for analysis after vapor passes through the phase separator and blower.

Observation wells are selected at various distances from the extraction well. It may be necessary to drill additional observation wells if the existing wells are too far away from the extraction well to observe an induced vacuum and/or a water level decrease. If groundwater is present, the wells are equipped with a wellhead seal and a stinger tube as shown on Plate DPE-2 (Wells #3 and #4) (attached). The induced vacuum is periodically measured at V_3 and V_4 during the test using magnehelic gauges or other calibrated meters to determine the effective ROI for vapor extraction, and the values are recorded. The log of the induced vacuum is plotted against the distance from the extraction well to the observation well. The effective ROI is taken as the distance where the induced vacuum would be 0.5 inches of water.

The change in liquid level is measured in the stinger tube using a water level meter to an accuracy of 0.01 foot, and recorded to determine the hydraulic gradient and establish an ROI for groundwater capture. Various hydraulic models are used to determine a capture zone with respect to groundwater flow direction and gradient.

Note: Observation wells #1 and #2 on Plate DPE-2 are included for information to show the effect of removing only vapor from an extraction well. There would be an induced rise of the water level in the well due to vacuum, but the level in the stinger tube would not change because it is still under atmospheric pressure, indicating no hydraulic gradient and thus no net flow of groundwater toward the extraction well.

The test is run until the induced vacuum and depth to water in the observation wells stabilize – usually 4 to 8 hours. Stabilization is said to be reached when readings do not change more than 10% for three consecutive hourly

observations. The test for engineering data may be repeated on other extraction wells if there is an indication that the site stratigraphy may not be uniform.

Prior to starting Phase I of the DPE test, Cardno ERI performs the following tasks:

1. Collect groundwater samples from the extraction well(s).

2. Install a stinger tube in the extraction well, extending to approximately 1-2 feet above the total depth of each well. An aboveground hose, covered by a temporary ramp in traffic areas, is used to connect the wellhead assembly from the extraction well to the treatment system.

3. Install dip tubes in each observation well containing groundwater approximately 3 to 4 feet into groundwater.

4. Measure distances from each observation well to the extraction well.

5. Connect the extraction well to the phase separator on the unit.

6. Calibrate and install magnehelic gauges on all test wells to measure vacuum (in inches of water) and a flow meter [in cubic feet per minute (cfm)] at the extraction well.

7. Install a sample port after the phase separator and blower to sample the influent vapor stream.

8. Install a flow meter on the pressure side of the blower.

During Phase I of the DPE test, Cardno ERI performs the following tasks:

1. Check and change magnehelic gauges as needed to obtain readings in each gauge's scale range.

2. Record the following values:

   - Soil vapor influent concentrations at the unit on the pressure side of the blower
   - Vacuum readings at the extraction well
   - Vacuum readings at each observation well
   - Flow readings at the unit on the pressure side of the blower
   - Volume of groundwater extracted
   - Hour meter reading on the extraction unit
   - Water levels in each observation well containing groundwater

   The soil vapor concentrations are measured using a photo-ionization detector or a lower explosive limit meter. The meter is calibrated on a daily basis using a hexane or isobutylene standard. The calibration gas and concentration, and the well and system influent measurements are recorded.

   For very concentrated vapor streams, dilution air will be added and measured with a rotameter or pitot tube.

3. Pump water periodically from the phase separator into a holding tank.

4. Collect samples in a Tedlar® bag from the influent vapor stream for analysis by a client-approved, state-certified laboratory under proper storage, shipment and chain-of-custody (COC) protocol. Samples are always stored out of direct sunlight. No ice is placed in the cooler, and the COC is placed inside the cooler. At a minimum, samples are typically collected at the beginning and end of Phase I.

Phase II – DPE for Mass Removal

For mass removal, one or more groundwater wells are selected near the center of the area containing the highest hydrocarbons. Wellhead fittings as shown on Plate DPE-1 are placed on each extraction well. If more than one well is used for extraction, the total vacuum will be reduced. Care is exercised to ensure that a reasonable ROI is maintained.

Total vapor flow is measured on the pressure side of the blower and the measured flow rate is checked against the blower curve. Vapor samples are collected periodically in a Tedlar® bag for analysis on the pressure side of the blower, usually at the beginning, middle and end of an extended test.

Water is collected in tank(s) for later off-site disposal or treated on site with carbon adsorption through a properly permitted unit. The water produced is measured with a totalizer or by recording the level in the tank(s).

The mass of constituents removed with the soil vapor is calculated and tabulated using vapor flow rates and constituent concentrations; the mass of constituents removed with groundwater is calculated and tabulated using water volume and constituent concentrations.

Prior to starting Phase II of the DPE test, Cardno ERI performs the same tasks involving the extraction well(s) and the unit as prior to Phase I with the following modifications:

1. Connect the extraction well(s) to a manifold to provide individual well control as necessary during this portion of the test.

2. Install a sample port at each extraction well to sample soil vapor at each wellhead.

During Phase II of the DPE test, Cardno ERI performs the following tasks:

1. Record the same values for the extraction well(s) and the unit with the following modification:

    - Record soil vapor concentrations at each extraction well, if feasible

2. Pump water periodically from the phase separator into a holding tank.

3. Collect influent vapor stream samples for laboratory analysis as described in Phase I.

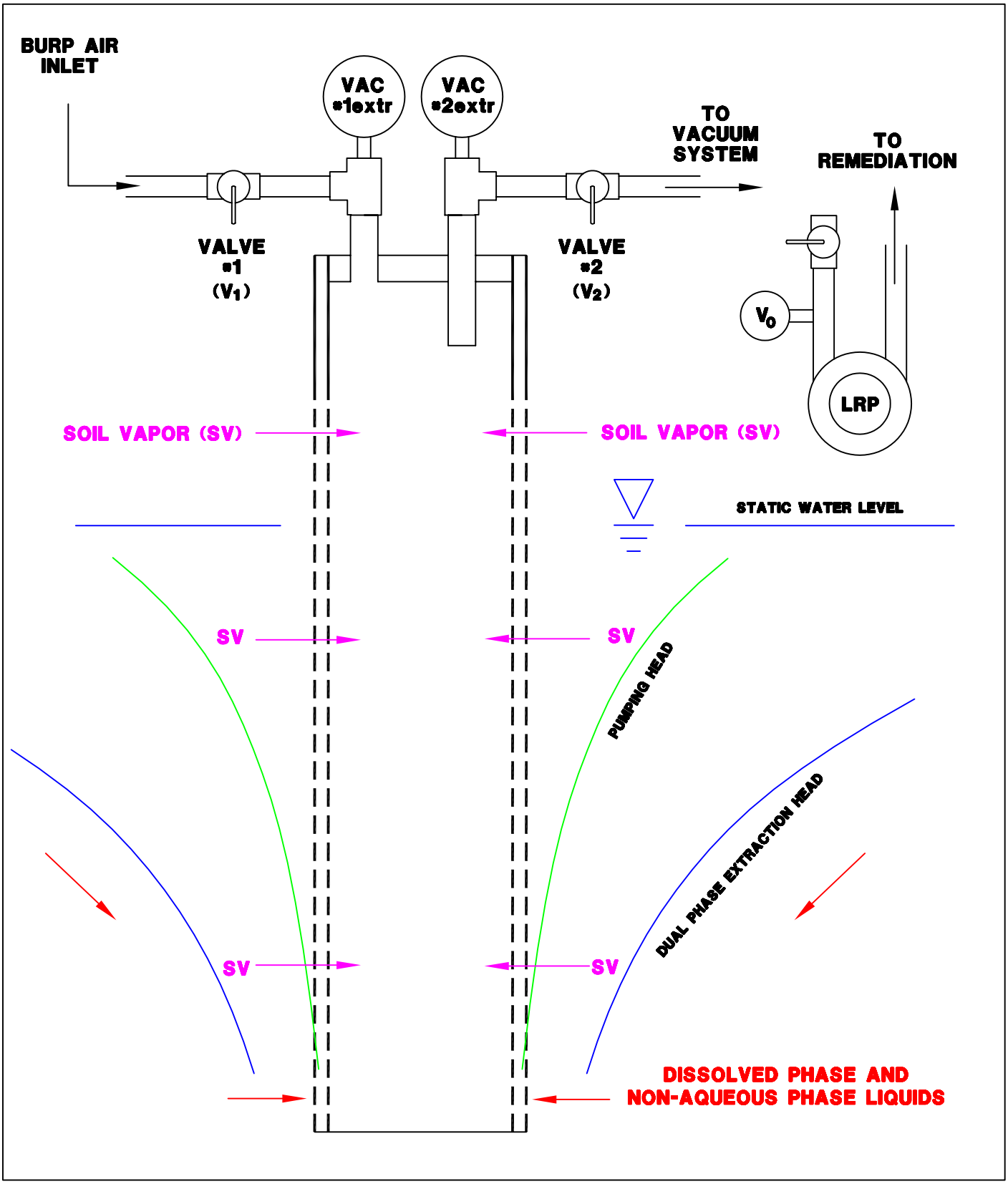
4. Collect groundwater samples periodically and at the end of Phase II for analysis of constituents of concern or those required by the permit. Submit groundwater samples collected during Phases I and II to a client-approved, state-certified laboratory under proper storage, shipment and COC protocol.

Groundwater Disposal

Extracted groundwater is treated at a client- and regulatory-approved facility, treated with a permitted mobile carbon treatment system, or transported off site in a truck or trailer-mounted tank and disposed of in accordance with regulatory requirements.

At the end of the DPE test and following receipt of the analytical results, Cardno ERI prepares a report summarizing the field and laboratory procedures, presenting the laboratory and feasibility testing results, providing mass removal calculations, and discussing conclusions and recommendations.

Attachments: Plate DPE-1 – Example Dual-Phase Extraction Wellhead Assembly
Plate DPE-2 – Example Observation Well Responses



FN Example DPE-EXTR

Cardno ERI
Shaping the Future

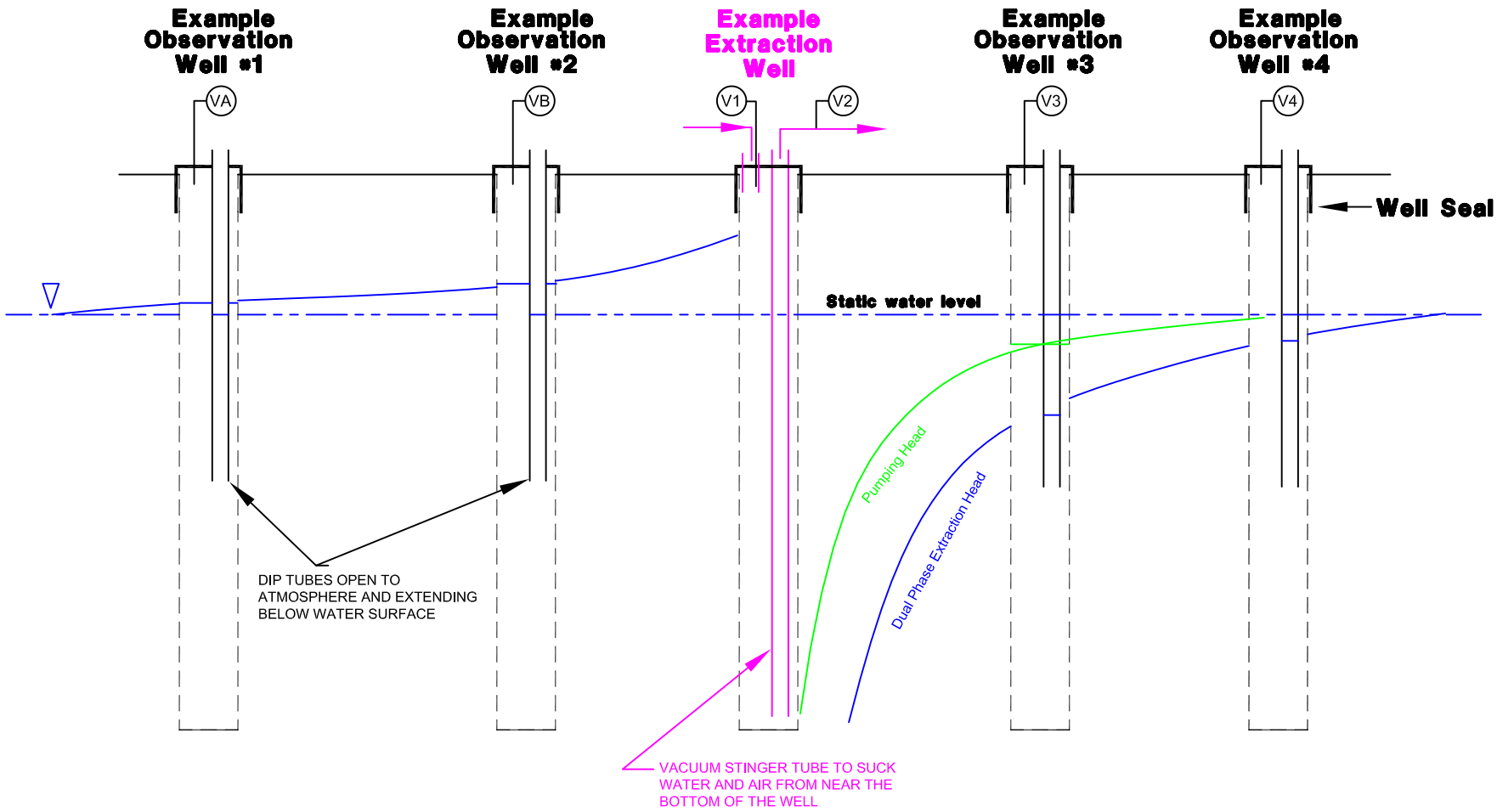
EXAMPLE DUAL-PHASE EXTRACTION WELLHEAD ASSEMBLY

Cardno ERI
25371 Commercentre Drive, Suite 250
Lake Forest, California 92630

PROJECT NO. DPE-1

PLATE DPE-1

DATE: 01/10/11



Note: water level in the dip tube can be different from water level in the formation

FN Example DPE-OBSER-2

Cardno ERI
Shaping the Future

EXAMPLE OBSERVATION WELL RESPONSES

Cardno ERI
25371 Commercentre Drive, Suite 250
Lake Forest, California 92630

EXPLANATION

(V1) Vacuum applied at example extraction well

(V3) Induced vacuum observed at example observation well #3

PROJECT NO.

DPE

PLATE

DPE-2

DATE: 01/10/11

Cardno ERI
Soil Boring and Well Installation
Field Protocol

Preliminary Activities

Prior to the onset of field activities at the site, Cardno ERI obtains the appropriate permit(s) from the governing agency(s). Advance notification is made as required by the agency(s) prior to the start of work. Cardno ERI marks the borehole locations and contacts the local one call utility locating service at least 48 hours prior to the start of work to mark buried utilities. Borehole locations may also be checked for buried utilities by a private geophysical surveyor. Prior to drilling, the borehole location is cleared in accordance with the client's procedures. Fieldwork is conducted under the advisement of a registered professional geologist and in accordance with an updated site-specific safety plan prepared for the project, which is available at the job site during field activities.

Drilling and Soil Sampling Procedures

Cardno ERI contracts a licensed driller to advance the boring and collect soil samples. The specific drilling method (e.g., hollow-stem auger, direct push method, or sonic drilling), sampling method [e.g., core barrel or California-modified split spoon sampler (CMSSS)] and sampling depths are documented on the boring log and may be specified in a work plan. Soil samples are typically collected at the capillary fringe and at 5-foot intervals to the total depth of the boring. To determine the depth of the capillary fringe prior to drilling, the static groundwater level is measured with a water level indicator in the closest monitoring well to the boring location, if available.

The borehole is advanced to just above the desired sampling depth. For CMSSSs, the sampler is placed inside the auger and driven to a depth of 18 inches past the bit of the auger. The sampler is driven into the soil with a standard 140-pound hammer repeatedly dropped from a height of 30 inches onto the sampler. The number of blows required to drive the sampler each 6-inch increment is recorded on the boring log. For core samplers (e.g., direct push), the core is driven 18 inches using the rig apparatus.

Soil samples are preserved in the metal or plastic sleeve used with the CMSSS or core sampler, in glass jars or other manner required by the local regulatory agency (e.g., Environmental Protection Agency Method 5035). Sleeves are removed from the sample barrel, and the lowermost sample sleeve is immediately sealed with Teflon™ tape, capped, labeled, placed in a cooler chilled to 4º Celsius and transported to a state-certified laboratory. The samples are transferred under chain-of-custody (COC) protocol.

Field Screening Procedures

Cardno ERI places the soil from the middle of the sampling interval into a plastic re-sealable bag. The bag is placed away from direct sunlight for a period of time which allows volatilization of chemical constituents, after which the tip of a photo-ionization detector (PID) or similar device is inserted through the plastic bag to measure organic vapor concentrations in the headspace. The PID measurement is recorded on the boring log. At a minimum, the PID or other device is calibrated on a daily basis in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration are recorded on a calibration log. Instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but they do not measure the concentration of petroleum hydrocarbons in the soil matrix with the same precision as laboratory analysis. Cardno ERI trained personnel describe the soil in the bag according to the Unified Soil Classification System and record the description on the boring log, which is included in the final report.

Air Monitoring Procedures

Cardno ERI performs a field evaluation for volatile hydrocarbon concentrations in the breathing zone using a calibrated photo-ionization detector or lower explosive level meter.

Groundwater Sampling

A groundwater sample, if desired, is collected from the boring by using Hydropunch™ sampling technology or installing a well in the borehole. In the case of using Hydropunch™ technology, after collecting the capillary fringe soil sample, the boring is advanced to the top of the soil/groundwater interface and a sampling probe is pushed to approximately 2 feet below the top of the static water level. The probe is opened by partially withdrawing it and thereby exposing the screen. A new or decontaminated bailer is used to collect a water sample from the probe. The water sample is then emptied into laboratory-supplied containers constructed of the correct material and with the correct volume and preservative to comply with the proposed laboratory test. The container is slowly filled with the retrieved water sample until no headspace remains and then promptly sealed with a Teflon-lined cap, checked for the presence of bubbles, labeled, entered onto a COC record and placed in chilled storage at 4° Celsius. Laboratory-supplied trip blanks accompany the water samples as a quality assurance/quality control procedure. Equipment blanks may be collected as required. The samples are kept in chilled storage and transported under COC protocol to a client-approved, state-certified laboratory for analysis.

Backfilling of Soil Boring

If a well is not installed, the boring is backfilled from total depth to approximately 5 feet below ground surface (bgs) with either neat cement or bentonite grout using a tremie pipe and either the boring is backfilled from 5 feet bgs to approximately 1 foot bgs with hydrated bentonite chips or backfill is continued to just below grade with neat cement grout. The borehole is completed to surface grade with material that best matches existing surface conditions and meets local agency requirements. Site-specific backfilling details are shown on the respective boring log.

Well Construction

A well (if constructed) is completed using materials documented on the boring log or specified in a work plan. The well is constructed with slotted casing across the desired groundwater sampling depth(s) and completed with blank casing to within 6 inches of surface grade. No further construction is conducted on temporary wells. For permanent wells, the annular space of the well is backfilled with Monterey sand from the total depth to approximately 2 feet above the top of the screened casing. A hydrated granular bentonite seal is placed on top of the sand filter pack. Grout may be placed on top of the bentonite seal to the desired depth using a tremie pipe. The well may be completed to surface grade with a 1-foot thick concrete pad. A traffic-rated well vault and locking cap for the well casing may be installed to protect against surface-water infiltration and unauthorized entry. Site-specific well construction details including type of well, well depth, casing diameter, slot size, length of screen interval and sand size are documented on the boring log or specified in the work plan.

Well Development and Sampling

If a permanent groundwater monitoring well is installed, the grout is allowed to cure a minimum of 48 hours before development. Cardno ERI personnel or a contracted driller use a submersible pump or surge block to develop the newly installed well. Prior to development, the pump is decontaminated by allowing it to run and re-circulate while immersed in a non-phosphate solution followed by successive immersions in potable water and de-ionized water baths. The well is developed until sufficient well casing volumes are removed so that turbidity is within allowable limits and pH, conductivity and temperature levels stabilize in the purge water. The volume of groundwater extracted is recorded on a log.

Following development, groundwater within the well is allowed to recharge until at least 80% of the drawdown is recovered. A new or decontaminated bailer is slowly lowered past the air/water interface in the well, and a water sample is collected and checked for the presence of non-aqueous phase liquid, sheen or emulsions. The water sample is then emptied into laboratory-supplied containers as discussed above.

Surveying

If required, wells are surveyed by a licensed land surveyor relative to an established benchmark of known elevation above mean sea level to an accuracy of +/- 0.01 foot. The casing is notched or marked on one side to identify a consistent surveying and measuring point.

Decontamination Procedures

Cardno ERI or the contracted driller decontaminates soil and water sampling equipment between each sampling event with a non-phosphate solution, followed by a minimum of two tap water rinses. De-ionized water may be used for the final rinse. Downhole drilling equipment is steam-cleaned prior to drilling the borehole and at completion of the borehole.

Waste Treatment and Soil Disposal

Soil cuttings generated from the drilling or sampling are stored on site in labeled, Department of Transportation-approved, 55-gallon drums or other appropriate storage container. The soil is removed from the site and transported under manifest to a client- and regulatory-approved facility for recycling or disposal. Decontamination fluids and purge water from well development and sampling activities, if conducted, are stored on site in labeled, regulatory-approved storage containers. Fluids are subsequently transported under manifest to a client- and regulatory-approved facility for disposal or treated with a permitted mobile or fixed-base carbon treatment system.