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By Alameda County Environmental Health 9:01 am, Aug 04, 2017



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Subject:

**Offsite Soil Vapor and Groundwater Investigation Work Plan**  
Former BP Service Station No. 11132  
3201 35th Avenue  
Oakland, California 94619  
*Alameda County Local Oversight Program Case # RO0000014*  
*SFB-RWQCB Case No. 01-0227*

ENVIRONMENT

Dear Mr. Nowell:

Arcadis U.S., Inc. (Arcadis) has prepared this *Offsite Soil Vapor and Groundwater Investigation Work Plan* for the site property located at the former British Petroleum (BP) Service Station No. 11132, located at 3201 35th Avenue in Oakland, California.

Date:  
July 21, 2017

Contact:  
Megan Smoley

If you have any questions or comments regarding the contents of this report, please contact Megan Smoley at 626.590.1502 or by e-mail at [Megan.Smoley@arcadis.com](mailto:Megan.Smoley@arcadis.com).

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"I have read and acknowledge the content, recommendations and/or conclusions contained in the attached work plan submitted on my behalf to ACDEH's FTP server and the SWRCB's GeoTracker website."

Our ref:  
GP09BPNA.C112.C0000

Sincerely,

Arcadis U.S., Inc.



Megan Smoley, P.G. No. 8614  
Certified Project Manager

Copies:  
GeoTracker

BP West Coast Products, LLC

# OFFSITE SOIL VAPOR AND GROUNDWATER INVESTIGATION WORK PLAN

Former BP Service Station No. 11132  
3201 35<sup>th</sup> Avenue  
Oakland, California

July 21, 2017



OFFSITE SOIL VAPOR AND GROUNDWATER INVESTIGATION WORK PLAN

**OFFSITE SOIL  
VAPOR AND  
GROUNDWATER  
INVESTIGATION  
WORK PLAN**

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Our Ref.:  
GP09BPNA.C112.C0000

Date:  
July 21, 2017

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## 1 INTRODUCTION

Arcadis U.S., Inc. (Arcadis), on behalf of BP West Coast Products, LLC (BP), has prepared this *Offsite Soil Vapor and Groundwater Investigation Work Plan* (Work Plan) for the Former BP Service Station No. 11132, located at 3201 35th Avenue in Oakland, California (the Site, **Figure 1**). The proposed soil vapor investigation activities were developed to address comments included in Alameda County Environmental Health's (ACEH's) June 3, 2016 response letter to the *Well Installation and Well Replacement Report* submitted April 12, 2016 (Arcadis 2016), as well as address ACEH's June 9, 2017 response letter to the *Property Foundation Survey* submitted April 24, 2017 (Arcadis 2017a). ACEH's June 3, 2016 and June 9, 2017 response letters are provided for reference in **Appendix A**.

Additional groundwater investigation activities are also proposed for the Site pursuant to a groundwater evaluation performed in response to ACEH's technical comments presented in their June 9, 2017 response letter. The groundwater evaluation includes a discussion of the correlation between apparent hydraulic gradient direction and depth to water and other features, and an update to the groundwater portion of the conceptual site model (CSM) presented in **Section 6** of this Work Plan. Based on the groundwater evaluation and a review of the distribution of constituents of potential concern (COPCs) in groundwater, Arcadis concludes that additional groundwater investigation is warranted to adequately delineate the groundwater COPC plumes in the downgradient directions.

## 2 PROPOSED SCOPE OF WORK

Soil vapor investigation activities developed within the scope of this Work Plan are proposed to evaluate potential vapor intrusion pathways associated with residences adjacent to the Site. This Work Plan includes the recommendation for the installation of previously proposed soil vapor probe, SV-1S/D, (which was originally proposed in the *Work Plan – Additional Site Characterization*; Arcadis 2014) and an additional point, SV-2S/D, in front of the residential properties located to the south-southwest of the Site.

Additional groundwater investigation activities developed within the scope of this Work Plan are proposed to delineate the contaminant plume(s) downgradient in the south and southeast directions from the Site. This Work Plan includes a recommendation for the installation of two additional off-site monitoring wells (MW-12 and MW-13).

## 3 SITE DESCRIPTION

The Site is an active 76-branded gas station located on the northeast corner of the intersection of 35th Avenue and Suter Street, southwest of Interstate 580, in Oakland, California. Current facility operations consist of gasoline dispensing and retail sales by ConocoPhillips. The Site has operated as a gasoline service station since at least the early 1970s. It was acquired in 1989 from Mobil Oil Company by BP and operated under the BP brand. BP sold the station in 1994 to Tosco, which was acquired by Conoco Phillips who now operates the 76-branded station.

Leaking underground storage tanks (USTs) were removed and replaced in 1986. Product conveyance lines and fuel dispensing equipment were subsequently replaced in the 1990s. Existing USTs consist of one 12,000-gallon and two 10,000-gallon double-wall fiberglass USTs. Existing site features are shown on **Figure 2**.

### 3.1 Regional and Site-Specific Geology and Hydrogeology

The Site is situated in an alluvial plain generally underlain by Cretaceous and Jurassic metamorphic rocks of the Franciscan Complex. There is considerable spatial variation in the thickness of the Quaternary alluvial valley sediments. The alluvium has generally been derived from erosion and nearby fluvial re-deposition of the underlying Franciscan Complex. Alluvium was deposited as debris flows, mud flows and by braided streams. The sediments are generally poorly sorted and poorly to moderately bedded (California Department of Water Resources [CDWR] 2003).

Geology at the Site consists primarily of silty clays or clayey silts with varying amounts of sand and gravel, extending from the ground surface to the total depth investigated, approximately 45 feet below ground surface (bgs) (BAI 2008). Interbedded lenses of sandy gravelly silts and sandy gravelly clays have also been reported in subsurface soils.

The Site is located in the East Bay Plain Subbasin, Groundwater Basin No. 2-9.04 (CDWR 2003). The East Bay Plain Subbasin is a northwest trending alluvial basin, bounded on the north by San Pablo Bay, on the east by the contact with Franciscan basement rock and on the south by the Nile Cone Groundwater Basin. The East Bay Plain Subbasin extends beneath the San Francisco Bay to the west. The East Bay Plain Subbasin aquifer system consists of unconsolidated sediments of Quaternary age. These include the Santa Clara Formation, Alameda Formation, Temescal Formation and artificial fill.

Throughout most of the Alameda County portion of the East Bay Plain, from Hayward north to Albany, water level contours show that the general direction of groundwater flow is from east to west or from the Hayward Fault to the San Francisco Bay. Groundwater flow direction generally correlates to topography.

Groundwater depth historically varies across the Site from approximately 9 to 25 feet bgs. Average seasonal fluctuations are approximately 10 feet. Historically, the groundwater gradient has ranged from 0.002 to 0.045 foot per foot. Based on groundwater elevation data, the apparent groundwater flow direction is predominantly to the southwest, but has varied between southwest and southeast.

## 4 PREVIOUS SITE INVESTIGATIONS

A comprehensive summary of previous environmental investigations is presented in the *Site Conceptual Model with Feasibility Study Report* prepared by Broadbent & Associates, Inc. (BAI), dated July 21, 2008 (BAI 2008).

Soil impacts originate from historical operations relating to the former USTs. Laboratory analysis of soil samples collected from soil borings confirmed the presence of petroleum hydrocarbons in soils beneath the Site. Groundwater has been sampled on a quarterly or semi-annual basis since the 1986 site investigation following the originally reported UST release. Historically, measurable quantities of light non-aqueous phase liquid (LNAPL) have been detected in wells MW-1, MW-2, MW-8, MW-9, MW-10 and RW-1. During the most recent groundwater monitoring event conducted in first quarter 2017, LNAPL was detected in well OW-1 at a thickness of 0.19 feet. The highest concentrations of site COPCs were detected in well MW-2 during the first quarter 2017 at concentrations of 35,000 micrograms per liter ( $\mu\text{g/L}$ ) gasoline range organics (GRO); 7,630  $\mu\text{g/L}$  benzene; 1,810  $\mu\text{g/L}$  ethylbenzene; 3,920  $\mu\text{g/L}$  for total xylenes; and 175  $\mu\text{g/L}$  for methyl tertiary butyl ether (MTBE). The highest concentration of toluene (1,410  $\mu\text{g/L}$ ) was detected in well MW-10R during the first quarter 2017 (Arcadis 2017b).

## 5 PRE-FIELD ACTIVITIES

Prior to initiating the proposed field activities, the site-specific Health and Safety Plan (HASP) will be updated in accordance with state and federal requirements to address hazards associated with the updated scope of work for the Site. All necessary soil boring and well construction permits will be obtained from the Alameda County Public Works Agency (ACPWA) prior to the initiation of intrusive activities. Obstruction and excavation permits for the offsite soil vapor probe and monitoring well installations will be obtained from the City of Oakland to conduct work in the public right-of-way.

Underground utilities and other potential subsurface obstructions near the proposed monitoring wells and vapor probes will be located and marked by a private utility locator. In addition, Underground Service Alert (USA) will be notified a minimum of two working days prior to the commencement of intrusive activities.

In addition, as requested by ACEH in their June 3, 2016 response letter, Arcadis conducted a property foundation survey south of the Site between Mangels Avenue and Suter Street to evaluate the appropriate depth for the vapor probe installations. The property foundation survey included letters mailed in late 2016 to affected property owners requesting information regarding the presence of a crawl space or basement, and if present, the depth of the subgrade structure. Additionally, a visual survey of the properties was conducted by Arcadis field staff on March 30, 2017. The information gathered from these surveys was provided in the *Property Foundation Survey* submitted on April 24, 2017 (Arcadis 2017a). Results of the survey indicate that the deepest continuously occupied space downgradient of the Site is located at 3518 Mangels Avenue, where the first floor was observed by Arcadis field staff to extend approximately 3 to 4 feet bgs. A copy of the *Property Foundation Survey* is included as **Appendix B**.

## 6 SOIL VAPOR INVESTIGATION ACTIVITIES

To evaluate potential vapor intrusion pathways to offsite residences, paired shallow and deep soil vapor probes (SV-1S/D and SV-2S/D) will be installed in two locations along 35<sup>th</sup> Avenue, bordering the residences listed in ACEH's response letter dated June 3, 2016 (3202, 3210 and 3214 35<sup>th</sup> Avenue; see **Figure 2**). The exact vapor probe locations are subject to change by Arcadis staff based on the proximity of subsurface utilities and access considerations. The soil vapor probes will be permanently installed. The installation and sampling will be completed in accordance with the Standard Operating Procedures (SOPs) included in **Appendix C** and will also be performed in accordance with California Environmental Protection Agency/Department of Toxic Substances Control (Cal EPA/DTSC), Los Angeles Regional Water Quality Control Board (RWQCB-LA) and San Francisco RWQCB (RWQCB-SF) July 2015 *Advisory – Active Soil Gas Investigations* (Cal EPA et al 2015).

### 6.1 Soil Vapor Probe Construction

Soil vapor probes SV-1S/D and SV-2S/D will be advanced using hand augers and will contain vapor screens set at depths of approximately 5 and 9 feet bgs in accordance with ACEH's request and the Low-Threat Underground Storage Tank Case Closure Policy (LTC Policy; State Water Resources Control Board [SWRCB] 2012) for a sample collection depth of 5 feet below the depth of the foundation (i.e., the results of the property foundation survey indicate the deepest foundation occurs at approximately 3 to 4



## OFFSITE SOIL VAPOR AND GROUNDWATER INVESTIGATION WORK PLAN

feet bgs, so the deeper vapor probe at each location will be set at approximately 9 feet bgs). In addition, the 9 foot probe depth will serve to provide vapor intrusion characterization near the capillary fringe. The soil vapor probe depths may be adjusted in the field based on soil properties. Each vapor probe will be installed in a dedicated borehole to ensure the screen is capturing vapor from the intended depth. The 5 and 9 feet bgs vapor probes at each location will be set approximately 5 lateral feet from each other. Encountered subsurface materials will be logged continuously for stratigraphic characteristics (contacts, color, staining, odors, etc.) using the Unified Soil Classification System (USCS) under the supervision of a California Professional Geologist and field screened for volatile organic compounds (VOCs) with a photo-ionization detector (PID). The proposed soil vapor probe locations are shown on **Figure 2**.

When the boring has been advanced to its final depth, a 6-inch-long, 0.375-inch-outer-diameter stainless steel soil vapor screen will be set in a 1-foot interval of standard sand pack, allowing approximately 3 inches of sand above and below the screen. Teflon tubing (or equivalent) will be connected to the soil vapor screen and capped with a compression cap fitting at the surface to eliminate the potential for barometric pressure fluctuations to induce vapor transport between the subsurface and the atmosphere. A transitional seal consisting of 1 foot of dry granular bentonite will be used above the sand pack and below the annular seal, which will consist of bentonite grout or hydrated bentonite. Placement of the dry granular bentonite will ensure that the bentonite grout does not enter the vapor probe screen and inhibit the collection of soil vapor. The interval above the annular seal from 1 to 0.5 foot bgs will be filled with concrete. The surface of each soil vapor probe will be fitted with a flush mounted well box with sufficient room to secure the tubing and fittings. A soil vapor probe schematic diagram detailing the construction of the 5 and 9 feet bgs vapor probes is shown on **Figure 3**.

### 6.2 Soil Sampling

Soil samples will be collected in conjunction with the soil vapor sampling to satisfy the criteria established in *Petroleum Vapor Intrusion to Indoor Air* portion of the LTC Policy (SWRCB 2012). Samples will be collected from the 9-foot probe boreholes at depths of approximately 2, 5 and 9 feet. Sample depths are subject to change and will be determined by field staff based on observations (i.e., staining, odor). Soil samples retained for laboratory analyses will be collected using Terra Core® samplers and immediately placed in an ice-chilled cooler for transport to Soil samples will be submitted to Eurofins Calscience, Inc., a California state-certified laboratory located in Garden Grove, California under chain-of-custody protocol. Soil samples will be analyzed for:

- GRO (C<sub>6</sub>-C<sub>12</sub>) using United States Environmental Protection Agency (USEPA) Method 8015 Modified;
- Diesel range organics (DRO) using USEPA Method 8015 Modified;
- Benzene, toluene, ethylbenzene and total xylenes (BTEX, collectively), and MTBE using USEPA Method 8260; and
- Naphthalene using USEPA Method 8260.

### 6.3 Soil Vapor Sampling

Due to the introduction of atmospheric oxygen into the vadose zone during soil vapor probe installation, an equilibration time is required to allow the sand pack and tubing to equilibrate with the subsurface. The

## OFFSITE SOIL VAPOR AND GROUNDWATER INVESTIGATION WORK PLAN

*Advisory – Active Soil Gas Investigation* (Cal EPA et al 2015) requires a minimum of 48 hours for equilibration before testing, purging and sampling of the soil vapor probes. Purge volumes will be calculated based on the dimensions of the above-ground gauges, tubing, sampling equipment, below-ground sand pack pore space, tubing, and the soil vapor probe. Purge volume calculations, field conditions, flow rate, pump specifics, and other applicable information will be recorded by field personnel on soil vapor sample collection logs.

To confirm sampling train integrity, a shut-in leak test will be implemented. One vapor-tight two-way ball valve will be installed closest to the soil vapor port (port valve) and another vapor-tight two-way ball valve will be installed on the opposite end of the sampling train as a purge valve (purge valve). While the port valve is left in the closed position, a laboratory-provided syringe will be used to remove approximately 25 milliliters (mL) from the purge port, inducing a vacuum of approximately 7.5 inches of mercury (approximately 102 inches of water) within the sampling train. The purge valve will be closed and the vacuum within the sampling train will be monitored for a minimum of 2 minutes. If any loss in the vacuum is observed within the sampling train after 2 minutes, fittings will be adjusted and the test will be repeated until the vacuum in the sampling train does not dissipate.

Once shut-in testing is completed, the soil vapor probe will be purged of three purge volumes at a flow rate of  $\leq 200$  ml per minute (mL/min) using a calibrated air sampling pump or laboratory-provided plastic syringe with a three-way valve. A Tedlar bag will be collected after each volume step is completed and field measured for VOCs and fixed gases using a multi-gas meter with carbon filter attached. If concentrations of methane exceed the lower-explosive limit (LEL) of 5 percent by volume (%v), additional safe sample handling and shipping procedures will be implemented.

Leak testing will also be conducted concurrently with the purging to ensure the integrity of the sampling system. The well head and entire sampling train (valves, tubing, gauges, manifold and sample canister) will be placed in an enclosure with pliable weather stripping along the base. A tracer check compound (high purity helium) will be permitted into the enclosure. Approximately 10 to 20% helium will be maintained in the enclosure using a portable helium detector. Analysis for the tracer compound in the soil vapor sample will be used to assess if leakage occurred. Purged soil vapor will also be measured for helium as a pre-sampling leak detection procedure. Leakage will be calculated based on the following equation:

$$\% \text{ Leakage} = \frac{\text{Helium Concentration in Sample}}{\text{Helium Concentration in Shroud}} \times 100$$

According to Section 4.2.2.2 of the July 2015 *Advisory – Active Soil Gas Investigations* (CalEPA et al 2015), “An ambient air leak up to 5 percent is acceptable if quantitative tracer testing is performed by shrouding.” If leakage is calculated to be above 5% based on fixed gas analytical data, the quality of the soil vapor data will be considered potentially questionable.

The soil vapor samples will then be collected using 1-liter batch certified passivated canisters (or an acceptable alternative) at a flow rate of  $\leq 200$  mL/min. A vacuum of  $<10$  inches of mercury (in Hg) will be maintained throughout sampling. Soil vapor sampling will be stopped when the canister vacuum has dropped to no less than 5 in Hg.

## OFFSITE SOIL VAPOR AND GROUNDWATER INVESTIGATION WORK PLAN

The soil vapor samples will be shipped under appropriate chain-of-custody protocol to Eurofins Air Toxics Ltd. in Folsom, California, for analysis of the following:

- Full scan of VOCs by USEPA Method TO-15;
- One duplicate sample analyzed for naphthalene by USEPA Method TO-17 for verification of the TO-15 concentrations; and
- Oxygen, helium (tracer gas), methane and carbon dioxide by Modified American Standard for Testing Materials (ASTM) International D-1946.

In addition, quality control samples will be collected in accordance with the July 2015 *Advisory – Active Soil Gas Investigation* (Cal EPA et al 2015) and the SOPs included in **Appendix C**. A duplicate sample will be collected by connecting an additional canister and regulator in parallel with the parent sample to be collected concurrently and analyzed for comparability. An equipment blank will be collected to evaluate potential cross-contamination by transferring laboratory provided air from a canister to a canister and regulator via sample tubing and fittings.

### 6.4 Decontamination

All reusable equipment used during the scope of the investigation activities will be decontaminated appropriately using Liquinox® solution and deionized water rinse prior to mobilization between locations and/or sampling depths to prevent potential cross-contamination. All decontamination procedures will be conducted in accordance with procedures outlined in the site HASP.

### 6.5 Investigation-Derived Waste

Investigation-derived waste (IDW) generated during the investigation activities will likely include soil cuttings, decontamination fluids and personal protective equipment (PPE). Soil cuttings derived from drilling as well as wastewater from decontamination procedures will be placed in Department of Transportation (DOT)-approved 55-gallon drums for temporary storage prior to disposal. PPE, such as nitrile gloves, disposable supplies and other household-type waste, such as paper and plastic, will be treated as municipal waste. If required, one composite soil sample and one composite water sample will be collected from the IDW drums to characterize the waste prior to disposal. Pending characterization, the IDW will be stored on site in a secure and controlled area. The IDW will be disposed in accordance with the waste hauler, waste handling facility, and state and federal requirements. Wastewater will be transported by the subcontractor to the appropriate waste facility for disposal after waste characterization.

## 7 GROUNDWATER EVALUATION

In the technical comments provided in their June 9, 2017 response letter, ACEH requested that a groundwater evaluation be performed to assess “changes in flow direction”, including the “correlation of flow direction with depth to water, time of year and other considerations”, and that the groundwater portion of the CSM be updated. Arcadis initially reviewed and updated the north arrow on several groundwater elevation contour figures in June 2017 due to incorrect denotation of the north arrow. The corrected figures were uploaded to the SWRCB’s GeoTracker Website on June 22, 2017. The groundwater flow direction rose diagram was subsequently updated to reflect these changes (**Figure 4**

## OFFSITE SOIL VAPOR AND GROUNDWATER INVESTIGATION WORK PLAN

and **Table 1**). The updated rose diagram shows that apparent hydraulic gradient direction is predominantly to the southwest and south-southwest of the Site, but approximately 30% of the time (i.e., 16 instances out of 51 monitoring events), the apparent gradient direction shifts to the southeast. A review of the groundwater gradient and flow direction table (**Table 1**) indicates that the apparent shift to the southeast occurs in almost all instances during the first quarter.

Arcadis compared the historical monitoring record of groundwater elevations for the site groundwater monitoring wells to monthly precipitation totals from the closest National Oceanic and Atmospheric Administration (NOAA)/National Weather Station's (NWS) Cooperative Observer Program (COOP) station, which is located in the nearby San Leandro Hills (i.e., Upper San Leandro FLTRS station; COOP ID 049185) to evaluate if the apparent shifts in hydraulic gradient direction are potentially influenced by changes in precipitation, depth to water and seasonality. Data included in the graph presented in **Figure 5** show that increases in monthly precipitation, which appear to occur during the rainy season from approximately October to April, result in increases in groundwater elevations at the Site. When groundwater elevations are at their highest, measured typically in the first quarter of each year (**Table 2**), the apparent hydraulic gradient direction sometimes appears to shift toward the southeast (apparent hydraulic gradient directions to the southeast are denoted by black arrows in the graph on **Figure 5**).

In addition to normal precipitation and infiltration to the water table, Arcadis reviewed other surface water features to evaluate if other factors contributed to the shift in apparent hydraulic gradient direction during times of highest groundwater elevation. Arcadis attempted to locate stream gauge information nearby Peralta Creek, which is located approximately 500 feet north-northwest of the Site; however, no information could be found. Based on review of photos of Peralta Creek obtained from Alameda County Flood Control and Water Conservation District's online report on the Peralta Creek Restoration conducted in 2008 (ACFCD 2017), surface water in the creek appears to be approximately 10 to 15 feet below surrounding ground surfaces on which residences are located. This may indicate that if and when surface water is present, surface water may interact with groundwater, which is present between approximately 10 and 20 feet bgs in the vicinity of the Site. It may be possible that surface water in Peralta Creek is seasonal, and when surface water is present during the peak of the rainy season, surface water and groundwater interact, resulting in losing conditions from Peralta Creek to groundwater in the vicinity of the Site. This in turn may affect the apparent hydraulic gradient direction, and result in a shift in direction from southwest to southeast.

Other features evaluated included utilities, however based on the limited information provided by City of Oakland in their sewer and stormwater utility as-built drawings, the utilities appear to be present at a depth shallower than the highest depth to water measured at the Site (i.e., utilities present between 4 and 6 feet bgs vs. 8.63 feet bgs measured at MW-6 on March 1, 2017; **Table 2**). In addition, there is no information to suggest that a set of utilities runs northwest to southeast away from the Site (rather utilities appear to predominantly run along 35<sup>th</sup> Avenue in a northeast to southwest direction). Arcadis also attempted to find information regarding a Shell Oil pipeline that reportedly runs northwest to southeast along 35<sup>th</sup> Avenue, but no depth information could be obtained.

Conversely, the shift in apparent hydraulic gradient direction to the southeast may be due to differences in hydrogeology when highest groundwater elevations reach certain geologic layers, which based on review of depth to water measured during first quarter groundwater monitoring events would be between approximately 10 to 15 feet bgs (**Table 2**). Observations recorded on site boring logs denote some

qualitative changes in the amount of gravel present within silt and clay layers between 10 and 15 feet bgs. It may be possible that an increase in gravel content at these depths influences the shift in apparent hydraulic gradient direction. However, overall, the site boring logs indicate predominantly fine-grained soils, and increases in gravel are also noted at depths below 15 feet bgs, which coincide with times of lower groundwater elevation.

The groundwater COPC plumes for first quarter 2017 are shown on **Figures 6, 7 and 8**. The shape of the plumes is indicative of multiple releases or changes in flow direction. Both of these reasons could explain the historical and current configuration of the groundwater contaminant plumes. Further review of the GRO, benzene, and MTBE plume contour maps in light of the apparent hydraulic gradient direction evaluation reveals that additional groundwater investigation is warranted downgradient to the southeast of offsite monitoring well MW-7 and downgradient to the south of off-site monitoring well MW-10R.

## 8 GROUNDWATER INVESTIGATION ACTIVITIES

Additional groundwater investigation activities are proposed to further characterize downgradient concentrations of site COPCs in groundwater. Groundwater monitoring well MW-12 is proposed to delineate COPCs downgradient to the south of existing off-site monitoring well MW-10R, as well as delineate COPCs downgradient to the southeast of MW-11 (**Figure 9**). Groundwater monitoring well MW-13 is proposed to delineate COPCs to the southeast of existing off-site monitoring well MW-7 (**Figure 9**), which specifically contains detectable concentrations of MTBE in groundwater at this location (**Figure 8**).

### 8.1 Monitoring Well Installation

The pre-field activities proposed in **Section 4** of this Work Plan will be followed prior to the start of the monitoring well installation activities. Prior to the initiation of drilling, all proposed well locations will be cleared to a minimum depth of 6.5 feet bgs with a hand auger or air knife as a third line of evidence to identify potential subsurface utilities or obstructions. Once cleared, the borings will be advanced using a hollow stem auger (HSA) rig to an approximate total depth of 27 feet bgs by a C-57 licensed drilling contractor. The total installed depths of MW-12 and MW-13 are subject to change based on lithology. Encountered subsurface materials will be logged continuously for stratigraphic characteristics (contacts, color, staining, odors, etc.) using the USCS under the supervision of a California Professional Geologist, and field screened for VOCs with a PID. Soil samples will be retained for laboratory analyses based on elevated PID readings or visual/olfactory observations. Soil samples may be collected, if warranted based on field observations, using Terra Core® samplers and immediately placed in an ice-chilled cooler for transport to Eurofins Calscience, Inc. for the following laboratory analyses:

- GRO (C<sub>6</sub>-C<sub>12</sub>) using USEPA Method 8015 Modified;
- BTEX, MTBE, and naphthalene) using USEPA Method 8260.

Monitoring wells will be constructed with 2-inch-diameter schedule 40 polyvinyl chloride (PVC) casing with 15 feet of 0.010-inch slotted PVC screen. The screen interval will be set from approximately 12 to 27 feet bgs. The final well depth and screen placement interval will be dependent upon field observations to optimize well performance.

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A clean sand filter pack consisting of No. 2/12 Monterey Sand will be placed around the well from the bottom of the borehole to approximately 2 feet above the screen interval. Approximately 2 feet of hydrated bentonite will be placed above the filter pack. The remainder of the annular space will be grouted with neat cement to approximately 1 foot bgs. The well will be fitted with a locking well cap and completed with a traffic-rated flush-mounted well box. All well construction activities will be conducted in accordance with ACPWA specifications and under the supervision of a California Professional Geologist.

The top of casing and ground surface elevation, as well as the northing and easting for the new monitoring wells, will be surveyed by a California-licensed land surveyor after completion of the monitoring well installation.

### 8.2 Well Development

Following a minimum of 72 hours after installation, the newly installed monitoring wells will be developed using a combination of surging, bailing and pumping. A surge block will be moved up and down across the screened interval to remove fine-grained deposits from the formation near the monitoring well and boring wall and from the filter pack material. After surging the monitoring well, a bailer will be used to remove water containing suspended sediments from the casing. Additional purging activities will be conducted with a submersible pump placed near the bottom of the well. The final development task will consist of pumping the well at a steady flow rate while monitoring groundwater parameters (including pH, temperature, conductivity and turbidity) using a water quality meter with a flow-through cell. Pumping will continue until at least ten casing-volumes of water have been removed, and/or consecutive groundwater parameter readings have stabilized to within 10%.

### 8.3 Monitoring Well Sampling

Following well development, the monitoring wells will be added to the routine groundwater sampling program. New wells MW-12 and MW-13 will be monitored and sampled quarterly for the first year, and then subsequently added into the semi-annual groundwater monitoring program. The current groundwater monitoring program consists of semi-annual groundwater monitoring and sampling conducted in the first and third calendar quarters. The new data from MW-12 and MW-13 will be included in the semi-annual groundwater monitoring reports.

## 9 REPORTING AND SCHEDULE

Upon receipt of ACEH approval of the Work Plan and procurement of necessary permits, Arcadis will implement the proposed activities as quickly as possible to expedite elimination of data gaps and further the Site toward closure. Once field activities are complete, Arcadis will prepare a letter report summarizing the results of the proposed investigation activities with conclusions and recommendations.



## 10 REFERENCES

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# TABLES





**Table 1**  
**Groundwater Gradient and Flow Direction**  
**CA-11132**  
**3201 35th Ave, Oakland CA**

Site No.	Monitoring Date	Groundwater Gradient (feet per foot)	Groundwater Flow Direction															
			N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
11132	4Q00 <sup>1</sup>	0.03	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	1Q01 <sup>1</sup>	0.009	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	2Q01 <sup>1</sup>	0.01	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	3Q01 <sup>1</sup>	0.02	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	4Q01	0.016	0	0	0	0	0	0	0	0.5	0	0.5	0	0	0	0	0	0
	1Q02	0.016	0	0	0	0	0	0	0.5	0	0	0	0	0.5	0	0	0	0
	2Q02	0.010	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	3Q02	0.02	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	4Q02	0.005	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	1Q03	0.013	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	2Q03	0.006 to 0.016	0	0	0	0	0	0	0	0.33	0	0.33	0	0.33	0	0	0	0
	3Q03	0.008	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	4Q03	0.007	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	1Q04	0.004 to 0.045	0	0	0	0	0	0.33	0	0.33	0	0	0	0.33	0	0	0	0
	2Q04	0.011	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	3Q04	0.018	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	4Q04	0.002	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	1Q05	0.01	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	2Q05 <sup>2</sup>	0.01	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	3Q05 <sup>2</sup>	0.005	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	4Q05	0.03	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	1Q06	0.02	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	2Q06	0.003 to 0.005	0	0	0	0	0	0	0	0	0.5	0.5	0	0	0	0	0	0
	3Q06	0.01	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	4Q06	0.004	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	1Q07	0.01	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	2Q07	0.005	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	3Q07	0.008	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	4Q07	0.006	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	1Q08	0.008	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	2Q08	0.003	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	3Q08	0.007	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	4Q08	0.005	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	1Q09	0.01	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
2Q09	0.004	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
3Q09	0.005	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
1Q10	0.02	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
3Q10	0.01	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
1Q11	0.01	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
3Q11	0.003	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
1Q12	0.005	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
3Q12 <sup>1</sup>	0.007	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
1Q13 <sup>1</sup>	0.01	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
3Q13 <sup>1</sup>	0.007	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
1Q14 <sup>1</sup>	0.007	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
3Q14 <sup>1</sup>	0.01	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
1Q15 <sup>1</sup>	0.004	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
3Q15 <sup>1</sup>	0.010	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
1Q16 <sup>1</sup>	0.007	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
3Q16	0.005	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
1Q17	0.01	0	0	0	0.5	0	0	0	0.5	0	0	0	0	0	0	0	0	
<b>Avg Gradient: **</b>		0.010	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.50</b>	<b>1.33</b>	<b>2.50</b>	<b>9.67</b>	<b>0.50</b>	<b>4.33</b>	<b>14.00</b>	<b>13.17</b>	<b>5.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	

**Notes:**

Number of Events: ~ 51

~ Total number of gauging events, manually updated

Groundwater gradient and flow direction data from 2Q06 to 1Q12 provided by Broadbent & Associates, Inc.

Groundwater flow direction data from 4Q00 to 1Q06 estimated from figures provided by RRM, Cambria and URS consultants.

<sup>1</sup> Groundwater flow direction was updated to reflect a change made to the north arrow on the historic groundwater elevation figure.

<sup>2</sup> After a review of the historic groundwater elevation figure, an error observed in the groundwater flow direction was corrected.

\*\* Average gradient only includes single listed values.

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes	
MW-1	03/07/1991		169.75	20.59	--	149.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	04/01/1991		169.75	16.51	--	153.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	07/03/1992		169.75	22.30	0.27	147.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	10/05/1992		169.75	23.98	0.24	145.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	01/13/1993		169.75	17.03	0.24	152.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	04/23/1993		169.75	18.10	0.42	151.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	07/12/1993		169.75	22.02	0.49	147.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	10/21/1993		169.75	25.12	1.09	143.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	01/21/1994		169.75	23.02	0.76	145.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	04/20/1994		169.75	24.54	1.8	143.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/01/1994		169.75	24.11	0.35	145.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	12/23/1994		169.75	18.19	--	151.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	01/26/1995		169.75	16.25	1.1	152.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	06/08/1995		169.75	22.92	--	146.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/22/1995		169.75	24.45	0.85	144.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	10/27/1995		169.75	25.41	--	143.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	01/25/1996		169.75	18.20	--	151.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	04/19/1996		169.75	19.06	1.22	149.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	07/23/1996		169.75	22.98	0.89	145.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/11/1996		169.75	23.99	0.89	144.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	01/21/1997		169.75	16.80	0.9	152.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	04/29/1997		169.75	21.90	0.85	147.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	04/30/1997	Dup	--	--	--	--	92,000	3,500	8,100	4,400	23,800	6,900	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-1	04/30/1997		--	--	--	--	100,000	3,600	8,000	4,000	21,300	7,700	--	--	--	--	--	--	--	--	5.2	--	
MW-1	08/21/1997	Dup	169.75	23.40	--	146.35	120,000	3,200	8,100	3,800	19,600	5,200	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-1	08/21/1997		169.75	23.40	--	146.35	140,000	3,000	8,500	3,900	22,100	5,700	--	--	--	--	--	--	--	--	5.3	--	
MW-1	11/05/1997	Dup	169.75	23.70	--	145.51	88,000	7,300	4,800	3,600	16,900	8,200	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-1	11/05/1997		169.75	23.70	--	145.51	68,000	6,200	4,400	3,300	14,300	8,000	--	--	--	--	--	--	--	--	4.7	--	
MW-1	02/03/1998		169.75	13.63	0.32	155.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	02/04/1998	Dup	--	--	--	--	160,000	2,300	8,400	5,000	29,400	<10,000	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-1	02/04/1998		--	--	--	--	190,000	2,200	10,000	5,600	32,000	<10,000	--	--	--	--	--	--	--	--	5.3	--	
MW-1	05/28/1998		169.75	18.03	0.17	151.55	87,000	980	3,900	3,600	19,000	2,900	--	--	--	--	--	--	--	--	3.8	--	
MW-1	12/30/1998		169.75	19.50	0.08	150.17	70,000	530	3,200	2,900	16,000	3,600	--	--	--	--	--	--	--	--	--	--	
MW-1	02/02/1999		169.75	18.93	0.03	150.79	79,000	480	3,100	3,500	21,000	3,500	--	--	--	--	--	--	--	--	--	--	
MW-1	05/10/1999		169.75	18.28	0.03	151.44	110,000	160	1,900	3,700	24,000	3,000	--	--	--	--	--	--	--	--	--	--	
MW-1	08/24/1999		169.75	20.13	0.06	149.56	110,000	850	1,300	1,900	19,000	<50	--	--	--	--	--	--	--	--	--	--	
MW-1	11/03/1999		169.75	22.27	0.36	147.12	65,000	6,300	1,100	3,300	9,500	8,900	--	--	--	--	--	--	--	--	--	--	
MW-1	03/01/2000		169.75	14.79	0.23	154.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	04/21/2000		169.75	18.10	0.33	151.32	61,000	330	780	2,700	17,000	1,300	--	--	--	--	--	--	--	--	--	--	
MW-1	07/31/2000		169.75	21.60	0.53	147.62	1,500,000	340	2,100	24,000	120,000	2,700	--	--	--	--	--	--	--	--	--	--	
MW-1	11/20/2000		169.75	21.69	0.37	147.69	1,700,000	1,800	2,300	19,000	93,000	3,900	--	--	--	--	--	--	--	--	--	--	
MW-1	02/18/2001		169.75	16.70	0.13	152.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	02/26/2001		169.75	14.38	0.15	155.22	100,000	658	466	4,210	15,000	1,890	--	--	--	--	--	--	--	--	--	--	
MW-1	06/07/2001		169.75	20.78	--	148.97	70,000	705	440	3,870	12,200	2,720	--	--	--	--	--	--	--	--	--	--	
MW-1	09/05/2001		169.75	23.36	0.35	146.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/30/2001		169.75	20.85	0.41	148.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	12/06/2001		169.75	18.72	0.27	150.76	39,000	3,500	237	2,150	4,500	5,400	--	--	--	--	--	--	--	--	--	--	
MW-1	02/20/2002		169.75	17.43	0.15	152.17	52,000	465	271	1,600	11,400	106	--	--	--	--	--	--	--	--	--	--	
MW-1	06/20/2002		169.75	21.18	0.34	148.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	09/11/2002		169.75	22.86	0.4	146.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/12/2002		169.75	22.65	0.37	146.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	01/29/2003		169.75	18.15	0.3	151.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	05/22/2003		169.75	18.49	0.2	151.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	06/24/2003		169.75	21.44	0.35	147.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	07/28/2003		169.75	22.72	0.35	146.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/12/2003		169.75	22.64	0.23	146.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	09/12/2003		169.75	20.70	0.24	148.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/18/2003		169.75	21.70	0.25	148.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	02/23/2004		169.75	16.34	0.09	153.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	05/04/2004		169.75	21.28	0.16	148.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/04/2004		169.75	22.54	0.1	147.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	09/22/2004		169.75	22.76	0.2	147.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/10/2004		169.75	20.19	0.14	149.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	01/13/2005		169.75	14.58	0.03	155.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	02/15/2005		169.75	16.13	0.04	153.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	03/07/2005		169.75	13.31	0.01	156.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	05/16/2005		169.75	15.74	0.02	154.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/17/2005		169.75	21.15	0.08	148.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/18/2005		169.75	20.15	--	149.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	02/07/2006		169.75	15.19	0.01	154.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	05/19/2006		169.75	17.42	--	152.33	44,000	73	510	3,300	5,300	86	<400	<10	<10	<10	<10	<10	<6,000	--	--		
MW-1	08/23/2006		169.75	22.01	0.14	147.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/15/2006		169.75	21.98	0.																		

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes	
MW-1	02/14/2007		169.75	17.12	0.17	152.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	05/22/2007		169.75	19.49	0.01	150.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/15/2007		169.75	22.24	0.01	147.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/08/2007		169.75	21.84	0.01	147.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	02/20/2008		169.75	16.52	0.02	153.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	05/07/2008		169.75	20.91	0.02	148.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/20/2008		169.75	22.77	0.02	146.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	11/17/2008		169.75	22.05	--	147.70	27,000	780	30	1,800	1,400	590	350	<10	<10	<10	<10	27	<6,000	--	--		
MW-1	02/25/2009		169.75	15.28	0.02	154.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	04/08/2009		169.75	18.18	--	151.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	05/28/2009		169.75	19.62	0.01	150.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	06/16/2009		169.75	20.94	0.01	148.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/06/2009		169.75	22.31	0.01	147.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	03/04/2010		169.75	14.27	--	155.48	14,000	45	<10	810	390	<10	<80	<10	<10	<10	<10	<10	<2,000	0.54	--	(P)	
MW-1	09/02/2010		169.75	22.32	--	147.43	8,200	10	<5.0	230	140	<5.0	<40	<5.0	<5.0	<5.0	<5.0	<5.0	<1,000	--	--	(NP)	
MW-1	03/15/2011		169.75	14.99	--	154.76	4,500	<5.0	<5.0	56	30	16	<40	<5.0	<5.0	<5.0	<5.0	<5.0	<2,500	--	--	(P,1)	
MW-1	08/17/2011		169.75	20.41	--	149.34	1,200	<1.0	<1.0	24	15	8.3	<8.0	<1.0	<1.0	<1.0	<1.0	<1.0	<500	--	--	(P)	
MW-1	02/06/2012		169.75	18.69	--	151.06	710	<1.0	<1.0	2.9	2.2	10	100	<1.0	<1.0	<1.0	<1.0(*)	<1.0	<500	--	--	(P)	
MW-1	08/21/2012		169.75	21.77	--	147.98	5,000	230	7.3	230	68	77	<20	<2.5	<2.5	<2.5	<2.5	4.3	<1,300	--	--		
MW-1	02/04/2013		169.75	18.36	(Sheen)	151.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/01/2013		169.75	22.25	0.15	147.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(LPH)
MW-1	02/27/2014		169.75	19.82	0.07	149.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	08/27/2014		169.75	22.03	0.15	147.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1	03/27/2015		169.75	19.54	--	150.21	7,900	17	<2.5	110	25	13	<100	<2.5	<2.5	<2.5	<2.5	<2.5	<2,500	3.23	--	(odor, 1)	
MW-1	08/27/2015		169.75	21.64	0.1	148.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(LPH)
MW-1	03/28/2016		169.75	14.78	--	154.97	8,110	6.67J	<50.0	59.6	<30.0	5.80J	43.5J	<10.0	<10.0J3	<10.0	<10.0	<10.0	<1,000	1.75	--		
MW-1	09/07/2016		169.75	20.98	--	148.77	9,940	143	5.44J	123	15.2	<5.00	<25.0	<5.00	<5.00	<5.00	<5.00	<5.00	<500	0.22	--		
MW-1	03/01/2017		169.75	12.77	--	156.98	6,770	6.31	1.12	89.20	8.1	7.51	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	1.40	--		
MW-2	03/07/1991		168.14	19.18	--	148.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	04/01/1991		168.14	15.21	--	152.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	07/03/1992		168.14	20.93	--	147.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	10/05/1992		168.14	22.74	--	145.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	01/13/1993		168.14	15.55	--	152.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	04/23/1993		168.14	18.54	--	151.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	07/12/1993		168.14	20.46	--	147.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	10/21/1993		168.14	24.91	--	143.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	01/21/1994		168.14	21.20	--	146.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	04/20/1994		168.14	22.44	--	145.70	1,800	140	370	54	290	24	--	--	--	--	--	--	--	--	1.7	--	
MW-2	08/01/1994		168.14	22.24	--	145.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/23/1994		168.14	16.25	--	151.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	01/26/1995		168.14	14.55	--	153.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	06/08/1995		168.14	21.18	--	146.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	08/22/1995		168.14	22.76	--	145.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	10/27/1995		168.14	23.61	--	144.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	01/25/1996		168.14	15.95	--	152.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	04/19/1996		168.14	17.33	--	150.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	07/23/1996		168.14	21.25	--	146.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	11/11/1996		168.14	22.27	--	145.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	01/21/1997		168.14	15.19	--	152.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	04/29/1997		168.14	20.22	--	147.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	04/30/1997		--	--	--	--	130,000	4,600	15,000	6,000	37,000	<5,000	--	--	--	--	--	--	--	--	5	--	
MW-2	08/21/1997		168.14	21.74	--	146.40	110,000	6,000	16,000	4,700	28,000	<500	--	--	--	--	--	--	--	--	4.6	--	
MW-2	11/05/1997		168.14	21.61	--	146.53	120,000	7,800	18,000	4,900	28,100	<2,500	--	--	--	--	--	--	--	--	4.6	--	
MW-2	02/03/1998		168.14	11.51	--	156.63	75,000	590	1,500	1,800	12,800	<2,500	--	--	--	--	--	--	--	--	4.5	--	
MW-2	05/28/1998		168.14	16.51	--	151.63	79,000	3,900	3,100	3,100	18,000	900	--	--	--	--	--	--	--	--	4.3	--	
MW-2	12/30/1998		168.14	17.70	--	150.44	95,000	4,700	3,500	3,700	21,000	<250	--	--	--	--	--	--	--	--	--	--	
MW-2	02/02/1999		168.14	15.46	--	152.68	170,000	3,500	1,500	5,200	34,000	<500	--	--	--	--	--	--	--	--	--	--	
MW-2	05/10/1999		168.14	16.52	--	151.62	84,000	3,200	3,200	3,700	20,000	75	--	--	--	--	--	--	--	--	--	--	
MW-2	08/24/1999		168.14	20.73	--	147.41	130,000	9,100	9,200	4,700	27,000	<250	--	--	--	--	--	--	--	--	--	--	
MW-2	11/03/1999		168.14	20.93	--	147.21	120,000	10,000	21,000	4,700	30,200	2,200	--	--	--	--	--	--	--	--	--	--	
MW-2	03/01/2000		168.14	13.37	--	154.77	39,000	1,400	1,500	1,700	8,100	44	--	--	--	--	--	--	--	--	--	--	
MW-2	04/21/2000		168.14	16.59	--	151.55	68,000	3,300	2,500	3,100	20,000	260	--	--	--	--	--	--	--	--	--	--	
MW-2	07/31/2000		168.14	16.37	--	151.77	99,000	5,600	1,400	4,300	22,000	490	--	--	--	--	--	--	--	--	--	--	
MW-2	11/20/2000		168.14	19.71	--	148.43	37,000	5,100	1,500	1,300	4,800	2,800	--	--	--	--	--	--	--	--	--	--	
MW-2	02/18/2001		168.14	15.29	--	152.85	54,000	5,020	3,880	2,850	15,400	1,010	--	--	--	--	--	--	--	--	--	--	
MW-2	06/07/2001		168.14	19.43	--	148.71	110,000	7,240	4,380	4,160	22,100	567	--	--	--	--	--	--	--	--	--	--	
MW-2	09/05/2001		168.14	22.44	--	145.70	69,000	5,750	5,790	2,770	14,200	1,510	--	--	--	--	--	--	--	--	--	--	
MW-2	11/30/2001		168.14	19.58	--	148.56	120,000	7,270	6,540	4,590	23,000	794	--	--	--	--	--	--	--	--	--	--	
MW-2	02/20/2002		168.14	16.39	--	151.75	56,000	2,410	2,270	2,910	14,300	160	--	--	--	--	--	--	--	--	--	--	
MW-2	06/20/2002		168.14	19.77	--	148.37	86,000																

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes
MW-2	01/29/2003		168.14	16.80	--	151.34	77,000	4,700	2,600	2,800	13,000	820	<2,000	<50	<50	<50	<50	<50	<4,000	--	--	
MW-2	05/22/2003		168.14	17.15	--	150.99	52,000	6,400	2,600	1,800	7,400	1,000	<2,000	--	<50	<50	--	<50	<10,000	--	--	
MW-2	07/28/2003		168.14	21.47	--	146.67	31,000	6,900	5,500	2,200	12,000	1,700	<4,000	<100	<100	<100	<100	<100	<20,000	--	--	
MW-2	11/18/2003		168.14	20.50	--	147.64	23,000	3,300	800	500	2,000	500	<1,000	--	<25	<25	--	<25	<5,000	--	--	
MW-2	02/23/2004		168.14	14.77	--	153.37	84,000	14,000	6,200	3,100	14,000	790	<5,000	<120	<120	<120	<120	<120	<25,000	--	--	
MW-2	05/04/2004		168.14	20.09	--	148.05	120,000	15,000	17,000	4,900	24,000	780	<10,000	<250	<250	<250	<250	<250	<50,000	--	--	
MW-2	08/04/2004		168.14	21.39	--	146.75	38,000	9,100	3,300	1,900	5,800	430	<10,000	<250	<250	<250	<250	<250	<50,000	--	--	
MW-2	11/10/2004		168.14	18.98	--	149.16	22,000	4,400	2,000	940	3,600	310	<1,000	<25	<25	<25	<25	<25	<5,000	--	--	
MW-2	02/15/2005		168.14	15.62	--	152.52	67,000	11,000	4,200	3,000	11,000	690	<4,000	<100	<100	<100	<100	<100	<20,000	--	--	
MW-2	05/16/2005		168.14	14.71	--	153.43	94,000	11,000	7,600	4,100	17,000	560	<10,000	<250	<250	<250	<250	<250	<50,000	--	--	
MW-2	08/17/2005		168.14	20.00	--	148.14	110,000	13,000	8,000	4,300	18,000	480	<4,000	<100	<100	<100	<100	<100	<20,000	--	--	
MW-2	11/18/2005		168.14	20.89	--	147.25	37,000	11,000	2,400	1,500	4,600	340	<4,000	<100	<100	<100	<100	<100	<20,000	--	--	
MW-2	02/07/2006		168.14	13.31	--	154.83	74,000	8,900	5,800	3,600	14,000	440	<4,000	160	<100	<100	<100	<100	<60,000	--	--	
MW-2	05/19/2006		168.14	16.30	--	151.84	78,000	11,000	3,700	4,500	14,000	430	<4,000	<100	<100	<100	<100	<100	<60,000	--	--	
MW-2	08/23/2006		168.14	20.83	--	147.31	100,000	12,000	9,100	5,800	25,000	480	<4,000	<100	<100	<100	<100	<100	<60,000	--	--	
MW-2	11/15/2006		168.14	20.80	--	147.34	46,000	8,800	3,600	2,300	8,500	400	<4,000	<100	<100	<100	<100	<100	<60,000	0.7	--	
MW-2	02/14/2007		168.14	15.96	(Sheen)	152.18	100,000	13,000	3,600	6,200	26,000	810	<10,000	<100	<100	<100	<100	<100	<60,000	1.43	--	
MW-2	05/22/2007		168.14	18.20	--	149.94	91,000	15,000	8,700	4,700	20,000	1,000	<10,000	<250	<250	<250	<250	<250	<150,000	0.08	--	
MW-2	08/15/2007		168.14	21.23	(Sheen)	146.91	14,000	7,300	130	280	600	260	2,400	<50	<50	<50	<50	<50	<30,000	4.24	--	
MW-2	11/08/2007		168.14	20.32	--	147.82	22,000	7,400	420	640	1,700	240	2,800	<50	<50	<50	<50	<50	<30,000	1.21	--	
MW-2	02/20/2008		168.14	15.20	0.06	152.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	05/07/2008		168.14	19.80	0.04	148.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	08/20/2008		168.14	21.70	0.01	146.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	11/17/2008		168.14	20.73	--	147.41	45,000	8,400	700	1,500	5,600	320	1,800	<10	<10	<10	<10	<10	<6,000	--	--	
MW-2	02/25/2009		168.14	14.15	--	153.99	18,000	5,200	<250	380	1,400	<250	<5,000	<250	<250	<250	<250	<150,000	2.11	--	--	
MW-2	04/08/2009		168.14	17.00	--	151.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	05/28/2009		168.14	18.43	(Sheen)	149.71	37,000	5,300	1,600	1,400	5,600	510	<2,500	<120	<120	<120	<120	<120	<75,000	0.16	--	
MW-2	06/16/2009		168.14	19.80	0.01	148.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	08/06/2009		168.14	21.17	0.01	146.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	03/04/2010		168.14	13.03	--	155.11	18,000	9,500	270	510	1,400	350	2,600	<5.0	<5.0	<5.0	<5.0	12	<1,000	1.28	--	(P)
MW-2	09/02/2010		168.14	20.62	--	147.52	58,000	11,000	3,600	3,900	16,000	470	<80	<10	<10	<10	<10	<10	<2,000	--	--	(NP, Y)
MW-2	03/15/2011		168.14	13.70	--	154.44	63,000	12,000	2,900	4,100	15,000	500	<800	<100	<100	<100	<100	<100	<50,000	--	--	(P)
MW-2	08/17/2011		168.14	19.31	--	148.83	23,000	4,900	620	1,500	4,400	150	<800	<100	<100	<100	<100	<100	<50,000	--	--	(P)
MW-2	02/06/2012		168.14	17.49	--	150.65	26,000	6,400	200	1,700	3,400	360	<800	<100	<100	<100	<100	<100	<50,000	--	--	(P)
MW-2	08/21/2012		168.14	20.66	--	147.48	20,000	4,900	440	1,400	2,400	220	<800	<100	<100	<100	<100	<100	<50,000	--	--	
MW-2	02/04/2013		168.14	17.24	--	150.90	25,000	4,000	1,700	1,600	5,300	130	<800	<100	<100	<100	<100	<100	<50,000	--	--	
MW-2	08/01/2013		168.14	21.10	--	147.04	43,000	9,100	630	2,800	9,700	220	<2,000	<100	<100	<100	<100	<100	<50,000	--	--	
MW-2	02/27/2014		168.14	18.65	--	149.49	31,000	9,600	180	2,700	6,100	310	<2,000	<100	<100	<100	<100	<100	<50,000	--	--	
MW-2	08/27/2014		168.14	20.78	--	147.36	35,000	9,900	230	3,100	5,500	240	<4,000	<100	<100	<100	<100	<100	<100,000	3.24	450	(odor)
MW-2	03/27/2015		168.14	18.32	--	149.82	29,000	13,000	210	1,400	1,300	140	<4,000	<100	<100	<100	<100	<100	<100,000	2.29	--	(odor)
MW-2	08/27/2015		168.14	20.40	--	147.74	22,400	8,550	80.3	1,110	444	41.1J	416J	<1.00	<1.00	<1.00	<1.00	<1.00	<100	6.2	--	
MW-2	03/28/2016		168.14	13.55	--	154.59	36,500	7,360	609	1,350	3,140	118	463	<60.0	<50.0J3	<50.0	<50.0	<50.0	<5,000	1.64	--	
MW-2	09/07/2016		168.14	19.54	--	148.60	24,200	8,960	122J	626	668	90.8J	<500	<100	<100	<100	<100	<100	<10,000	0.38	--	
MW-2	03/01/2017		168.14	11.95	--	156.19	35,000	7,630	897	1,810	3,920	175	<500	<100	<100	<100	<100	<100	<10,000	3.13	--	
MW-3	07/09/1990		--	--	--	--	140	5.3	4.6	2	3.8	--	--	--	--	--	--	--	--	--	--	
MW-3	12/21/1990		--	--	--	--	0.19	100	6	0.9	27	--	--	--	--	--	--	--	--	--	--	
MW-3	03/07/1991		167.17	17.40	--	149.77	0.4	69	22	6.1	57	--	--	--	--	--	--	--	--	--	--	
MW-3	04/01/1991		167.17	13.69	--	153.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	06/27/1991		--	--	--	--	380	28	26	13	46	--	--	--	--	--	--	--	--	--	--	
MW-3	09/27/1991		--	--	--	--	0.07	7.9	--	0.4	1.1	--	--	--	--	--	--	--	--	--	--	
MW-3	12/18/1991		--	--	--	--	0.26	34	24	0.8	28	--	--	--	--	--	--	--	--	--	--	
MW-3	07/03/1992		167.17	19.59	--	147.58	71	9.4	0.9	5	13	--	--	--	--	--	--	--	--	--	--	
MW-3	10/05/1992	Dup	167.17	21.22	--	145.95	<50	2.2	<0.5	1.5	2.8	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-3	10/05/1992		167.17	21.22	--	145.95	67	5.1	1.1	6.1	8.1	--	--	--	--	--	--	--	--	--	--	
MW-3	01/13/1993		167.17	13.63	--	153.54	830	50	34	42	89	--	--	--	--	--	--	--	--	--	--	
MW-3	04/23/1993	Dup	167.17	15.02	--	152.15	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-3	04/23/1993		167.17	15.02	--	152.15	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
MW-3	07/12/1993		167.17	19.16	--	148.01	250	12	4.2	12	16	<5.0	--	--	--	--	--	--	--	--	--	
MW-3	10/21/1993	Dup	167.17	21.81	--	145.36	65	7.4	1	6.9	4.2	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-3	10/21/1993		167.17	21.81	--	145.36	52	4.4	1.4	4.7	3.3	<5.0	--	--	--	--	--	--	--	--	--	
MW-3	01/21/1994		167.17	19.94	--	147.23	57	3	3.4	3.6	9	<5.0	--	--	--	--	--	--	--	--	--	
MW-3	04/20/1994		167.17	20.24	--	146.93	600	26	23	33	88	28.7	--	--	--	--	--					

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes
MW-3	04/19/1996		167.17	15.26	--	151.91	460	55	4	33	63	<10	--	--	--	--	--	--	--	9.4	--	
MW-3	07/23/1996		167.17	19.19	--	147.98	<50	<0.5	<0.5	<0.5	<0.5	<10	--	--	--	--	--	--	--	9.2	--	
MW-3	11/11/1996		167.17	20.24	--	146.93	<250	<2.5	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	8.4	--	
MW-3	01/21/1997		167.17	13.09	--	154.08	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	5.4	--	
MW-3	04/29/1997		167.17	18.14	--	149.03	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	4.3	--	
MW-3	08/21/1997		167.17	19.64	--	147.53	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	4.9	--	
MW-3	11/05/1997		167.17	19.95	--	147.22	<250	<2.5	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	4.5	--	
MW-3	02/03/1998		167.17	10.57	--	156.60	<50	<0.50	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	4.7	--	
MW-3	05/28/1998		167.17	14.65	--	152.52	330	<2.5	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	4.2	--	
MW-3	12/30/1998		167.17	18.63	--	150.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/02/1999		167.17	13.12	--	154.05	<250	<5.0	<5.0	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	
MW-3	05/10/1999		167.17	14.21	--	152.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/24/1999		167.17	14.36	--	152.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/03/1999		167.17	19.21	--	147.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	03/01/2000		167.17	15.17	--	152.00	<50	<0.5	0.57	<0.5	0.62	<0.5	--	--	--	--	--	--	--	--	--	
MW-3	04/21/2000		167.17	14.88	--	152.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	07/31/2000		167.17	15.29	--	151.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/20/2000		167.17	17.31	--	149.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/18/2001		167.17	12.85	--	154.32	160	1.95	1.31	10.2	9.09	1	--	--	--	--	--	--	--	--	--	
MW-3	06/07/2001		167.17	18.00	--	149.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	09/05/2001		167.17	20.32	--	146.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/30/2001		167.17	16.94	--	150.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/20/2002		167.17	14.84	--	152.33	86	<0.5	0.845	6.58	5.75	<0.5	--	--	--	--	--	--	--	--	--	
MW-3	06/20/2002		167.17	18.40	--	148.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	09/11/2002		167.17	20.06	--	147.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/12/2002		167.17	19.84	--	147.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	01/27/2003		167.17	14.83	--	152.34	850	20	9.7	24	45	0.76	--	--	--	--	--	--	--	--	--	
MW-3	01/29/2003		--	--	--	--	--	--	--	--	--	0.76	<20	<50	<50	<50	<50	<50	<40	--	--	
MW-3	05/22/2003		167.17	15.60	--	151.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	07/28/2003		167.17	20.12	--	147.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/18/2003		167.17	19.15	--	148.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/23/2004		167.17	13.53	--	153.64	160	<0.50	1.1	9.6	12	<0.50	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<100	--	--	
MW-3	05/04/2004		167.17	18.61	--	148.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/04/2004		167.17	19.21	--	147.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/10/2004		167.17	17.48	--	149.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/15/2005		167.17	14.31	--	152.86	500	7.8	1.8	9.2	9.6	1.7	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<100	--	--	
MW-3	05/16/2005		167.17	13.11	--	154.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/17/2005		167.17	18.53	--	148.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/18/2005		167.17	19.34	--	147.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/07/2006		167.17	11.64	--	155.53	65	<0.50	<0.50	1.4	2.3	<0.50	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<300	--	--	
MW-3	05/19/2006		167.17	14.88	--	152.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/23/2006		167.17	19.43	--	147.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/15/2006		167.17	19.22	--	147.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/14/2007		167.17	13.80	--	153.37	200	1.1	<0.50	5.9	3.2	3.8	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<300	0.68	--	
MW-3	05/22/2007		167.17	16.80	--	150.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/15/2007		167.17	19.87	--	147.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/08/2007		167.17	19.27	--	147.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/20/2008		167.17	13.58	--	153.59	240	1.1	<0.50	0.99	0.79	2.3	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<100	2.58	--	
MW-3	05/07/2008		167.17	18.32	--	148.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/20/2008		167.17	20.29	--	146.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	11/17/2008		167.17	19.35	--	147.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/25/2009		167.17	11.77	--	155.40	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<300	3.45	--	
MW-3	05/28/2009		167.17	17.02	--	150.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/06/2009		167.17	19.87	--	147.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	03/04/2010		167.17	10.79	--	156.38	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<100	3.16	--	(P)
MW-3	09/02/2010		167.17	19.32	--	147.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	03/15/2011		167.17	11.77	--	155.40	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	(P)
MW-3	08/17/2011		167.17	17.98	--	149.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/06/2012		167.17	15.92	--	151.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/21/2012		167.17	19.42	--	147.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/04/2013		167.17	15.75	--	151.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(slight odor)
MW-3	08/01/2013		167.17	19.78	--	147.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	02/27/2014		167.17	16.95	--	150.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/27/2014		167.17	19.64	--	147.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	03/27/2015		167.17	17.16	--	150.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	08/27/2015		167.17	19.40	--	147.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	03/28/2016		167.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	09/07/2016		167.17	18.75	--	148.42	280	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	0.40	--	
MW-3	03/01/2017		167.17	10.16	--	157.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	12/21/1990		--	--	--	--	--	--	--	--	0.8	--	--	--	--	--	--	--	--	--	--	
MW-4	03/07/1991		170.36	20.72	--	149.64	--	2.2	3.8	1.5	2.8	--	--	--	--	--	--	--	--	--	--	
MW-4	04/01/1991		170.36	17.49	--	152.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes
MW-4	06/27/1991		--	--	--	--	--	6.3	1.8	0.4	1	--	--	--	--	--	--	--	--	--	--	--
MW-4	07/03/1992		170.36	22.16	--	148.20	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--
MW-4	10/05/1992		170.36	23.38	--	146.98	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--
MW-4	01/13/1993		170.36	17.58	--	152.78	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--
MW-4	04/23/1993		170.36	15.72	--	154.64	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--
MW-4	07/12/1993		170.36	21.74	--	148.62	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	--
MW-4	10/21/1993		170.36	23.84	--	146.52	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	--
MW-4	01/21/1994		170.36	22.42	--	147.94	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	--
MW-4	04/20/1994		170.36	22.66	--	147.70	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	2.2	--
MW-4	08/01/1994		170.36	23.01	--	147.35	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	1.9	--
MW-4	12/23/1994		170.36	17.03	--	153.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	01/26/1995		170.36	17.42	--	152.94	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	--	7.5	--
MW-4	06/08/1995		170.36	21.55	--	148.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/22/1995		170.36	23.47	--	146.89	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	6.4	--
MW-4	10/27/1995		170.36	24.50	--	145.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	01/25/1996		170.36	18.74	--	151.62	<50	<0.50	<0.50	<0.50	<1.0	58	--	--	--	--	--	--	--	--	--	--
MW-4	04/19/1996		170.36	18.63	--	151.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	07/23/1996		170.36	22.56	--	147.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/11/1996		170.36	23.63	--	146.73	<50	<1.0	<1.0	<1.0	<1.0	34	--	--	--	--	--	--	--	--	8.2	--
MW-4	01/21/1997		170.36	16.59	--	153.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	04/29/1997		170.36	21.43	--	148.93	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	4.7	--
MW-4	08/21/1997		170.36	22.91	--	147.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/05/1997		170.36	22.34	--	148.02	60	<0.5	<1.0	<1.0	<1.0	76	--	--	--	--	--	--	--	--	4.9	--
MW-4	02/03/1998		170.36	12.26	--	158.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	05/28/1998		170.36	18.50	--	151.86	70	<0.5	<1.0	<1.0	<1.0	160	--	--	--	--	--	--	--	--	4.2	--
MW-4	12/30/1998		170.36	19.69	--	150.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/02/1999		170.36	18.26	--	152.10	70	<1.0	<1.0	<1.0	<1.0	130	--	--	--	--	--	--	--	--	--	--
MW-4	05/10/1999		170.36	17.86	--	152.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/24/1999		170.36	17.93	--	152.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/03/1999		170.36	22.78	--	147.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	03/01/2000		170.36	18.04	--	152.32	<50	<0.5	0.67	<0.5	0.7	110	--	--	--	--	--	--	--	--	--	--
MW-4	04/21/2000		170.36	17.36	--	153.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	07/31/2000		170.36	17.83	--	152.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/20/2000		170.36	18.91	--	151.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/18/2001		170.36	17.72	--	152.64	88	<0.5	<0.5	<0.5	<0.5	97.3	--	--	--	--	--	--	--	--	--	--
MW-4	06/07/2001		170.36	20.23	--	150.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	09/05/2001		170.36	22.76	--	147.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/30/2001		170.36	21.30	--	149.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/20/2002		170.36	19.32	--	151.04	76	<0.5	<0.5	<0.5	<1.0	81	--	--	--	--	--	--	--	--	--	--
MW-4	06/20/2002		170.36	20.71	--	149.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	09/11/2002		170.36	22.22	--	148.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/12/2002		170.36	22.22	--	148.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	01/29/2003		170.36	19.80	--	150.56	100	<0.5	<0.5	<0.5	<0.5	66	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<40	--	--	--
MW-4	05/22/2003		170.36	19.35	--	151.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	07/28/2003		170.36	22.18	--	148.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/18/2003		170.36	21.65	--	148.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/23/2004		170.36	17.53	--	152.83	75	<0.50	<0.50	<0.50	<0.50	65	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<100	--	--	--
MW-4	05/04/2004		170.36	20.62	--	149.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/04/2004		170.36	21.30	--	149.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/10/2004		170.36	20.65	--	149.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/15/2005		170.36	18.91	--	151.45	<50	<0.50	<0.50	<0.50	<0.50	62	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<100	--	--	--
MW-4	05/16/2005		170.36	17.34	--	153.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/17/2005		170.36	21.31	--	149.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/18/2005		170.36	21.67	--	148.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/07/2006		170.36	16.74	--	153.62	100	<0.50	<0.50	1	3	29	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<300	--	--	--
MW-4	05/19/2006		170.36	18.22	--	152.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/23/2006		170.36	20.95	--	149.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/15/2006		170.36	22.21	--	148.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/14/2007		170.36	18.25	--	152.11	<50	<0.50	<0.50	<0.50	<0.50	61	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<300	0.95	--	--
MW-4	05/22/2007		170.36	20.16	--	150.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/15/2007		170.36	22.34	--	148.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/08/2007		170.36	21.86	--	148.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/20/2008		170.36	17.74	--	152.62	<50	<0.50	<0.50	<0.50	<0.50	36	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<100	2.13	--	--
MW-4	05/07/2008		170.36	21.38	--	148.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/20/2008		170.36	22.44	--	147.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	11/17/2008		170.36	22.20	--	148.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/25/2009		170.36	16.81	--	153.55	<50	<0.50	<0.50	<0.50	<0.50	26	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<300	2.8	--	--
MW-4	05/28/2009		170.36	20.37	--	149.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	08/06/2009		170.36	22.46	--	147.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	03/04/2010		170.36	17.11	--	153.25	<50	<0.50	<0.50	<0.50	<1.0	34	4.4	<0.50	<0.50	<0.50	<0.50	<0.50	<100	0.63	--	(P)
MW-4	09/02/2010		170.36	20.63	--	149.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	03/15/2011		170.36	16.47	--	153.89	<50	<0.50	<0.50	<0.50	<1.0	26	4.1	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	(P)
MW-4	08/17/2011		170.36	20.94	--	149.42	--															

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft ms)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft ms)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes
MW-4	02/08/2012		170.36	19.65	--	150.71	<50	<0.50	<0.50	<0.50	<1.0	32	<4.0	<0.50	<0.50	<0.50	<0.50(*)	<0.50	<250	--	--	(P)
MW-4	08/21/2012		170.36	22.00	--	148.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/04/2013		170.36	19.43	--	150.93	<50	<0.50	<0.50	<0.50	<1.0	34	<4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	--
MW-4	08/01/2013		170.36	22.43	--	147.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	02/27/2014		170.36	20.64	--	149.72	<50	<0.50	<0.50	<0.50	<1.0	24	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	--
MW-4	08/27/2014		170.36	22.24	--	148.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	03/27/2015		170.36	20.23	--	150.13	<50	<0.50	<0.50	<0.50	<1.0	22	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<500	3.5	--	--
MW-4	08/27/2015		170.36	21.87	--	148.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	03/28/2016		170.36	16.29	--	154.07	<100	<1.00	<5.00	<1.00	<3.00	15	<5.00	<1.00	<1.00J3	<1.00	<1.00	<1.00	<100	2.27	--	--
MW-4	09/07/2016		170.36	21.21	--	149.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	03/01/2017		170.36	15.00	--	155.36	<100	<1.00	<1.00	<1.00	<3.00	2.31	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	1.99	--	--
MW-5	07/09/1990		--	--	--	--	280	200	210	46	290	--	--	--	--	--	--	--	--	--	--	--
MW-5	12/21/1990		--	--	--	--	0.69	300	34	8.4	39	--	--	--	--	--	--	--	--	--	--	--
MW-5	03/07/1991		165.14	16.60	--	148.54	--	17	0.9	0.7	1.6	--	--	--	--	--	--	--	--	--	--	--
MW-5	04/01/1991		165.14	11.99	--	153.15	800	250	54	11	60	--	--	--	--	--	--	--	--	--	--	--
MW-5	06/27/1991		--	--	--	--	330	120	10	12	8	--	--	--	--	--	--	--	--	--	--	--
MW-5	09/27/1991		--	--	--	--	0.73	230	16	20	22	--	--	--	--	--	--	--	--	--	--	--
MW-5	07/03/1992		165.14	18.65	--	146.49	150	36	<0.5	<0.5	1.1	--	--	--	--	--	--	--	--	--	--	--
MW-5	10/05/1992		165.14	20.32	--	144.82	270	79	4	1.7	2.9	--	--	--	--	--	--	--	--	--	--	--
MW-5	01/13/1993		165.14	13.03	--	152.11	180	59	6	1.8	7.6	--	--	--	--	--	--	--	--	--	--	--
MW-5	04/23/1993		165.14	13.51	--	151.63	8,700	440	96	35	136	--	--	--	--	--	--	--	--	--	--	--
MW-5	07/12/1993		165.14	18.06	--	147.08	250	57	2.9	2.1	6	<-5.0	--	--	--	--	--	--	--	--	--	--
MW-5	10/21/1993		165.14	20.41	--	144.73	210	82	1.5	<0.5	1.4	--	--	--	--	--	--	--	--	--	--	--
MW-5	01/21/1994		165.14	18.86	--	146.28	110	36	1.2	<0.5	0.7	<-5.0	--	--	--	--	--	--	--	--	--	--
MW-5	04/20/1994		165.14	17.30	--	147.84	690	230	4.5	1.6	11	21.2	--	--	--	--	--	--	--	--	1.3	--
MW-5	08/01/1994		165.14	17.53	--	147.61	170	44	1.6	0.9	2.7	<-5.0	--	--	--	--	--	--	--	--	0.9	--
MW-5	12/23/1994		165.14	11.63	--	153.51	630	180	1.9	0.66	1.9	7.81	--	--	--	--	--	--	--	--	1.4	--
MW-5	01/26/1995		165.14	11.25	--	153.89	160	68	<0.5	<0.5	2.2	--	--	--	--	--	--	--	--	--	5.9	--
MW-5	06/08/1995	Dup	165.14	16.80	--	148.34	1,700	560	51	55	170	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-5	06/08/1995		165.14	16.80	--	148.34	2,000	630	58	61	180	--	--	--	--	--	--	--	--	--	6.5	--
MW-5	08/22/1995		165.14	19.02	--	146.12	3,700	1,100	18	27	59	<130	--	--	--	--	--	--	--	--	7.3	--
MW-5	10/27/1995		165.14	20.94	--	144.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	10/30/1995		--	--	--	--	6,500	2,200	55	180	270	<250	--	--	--	--	--	--	--	--	7.5	--
MW-5	01/25/1996	Dup	165.14	13.30	--	151.84	540	37	0.66	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	--	(Dup)
MW-5	01/25/1996		165.14	13.30	--	151.84	590	37	0.7	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	--	--
MW-5	04/19/1996		165.14	13.63	--	151.51	1,500	470	38	49	210	<5.0	--	--	--	--	--	--	--	--	8.1	--
MW-5	07/23/1996		165.14	17.61	--	147.53	140	4.6	<0.5	<0.5	<0.5	<10	--	--	--	--	--	--	--	--	8	--
MW-5	11/11/1996		165.14	18.70	--	146.44	140	40	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	7.9	--
MW-5	01/21/1997		165.14	11.63	--	153.51	730	300	<5.0	7.8	26	<50	--	--	--	--	--	--	--	--	5	--
MW-5	04/29/1997		165.14	16.74	--	148.40	340	530	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	--	4.8	--
MW-5	08/21/1997		165.14	18.26	--	146.88	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	4.9	--
MW-5	11/05/1997		165.14	18.84	--	146.30	120	13	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	4.4	--
MW-5	02/03/1998		165.14	9.49	--	155.65	<50	<0.50	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	4.3	--
MW-5	05/28/1998		165.14	13.57	--	151.57	4,900	1,500	34	180	311	<10	--	--	--	--	--	--	--	--	4.1	--
MW-5	12/30/1998		165.14	14.65	--	150.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	02/02/1999		165.14	12.56	--	152.58	100	<1.0	<1.0	<1.0	<1.0	9.1	--	--	--	--	--	--	--	--	--	--
MW-5	05/10/1999		165.14	13.36	--	151.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	08/24/1999		165.14	13.50	--	151.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	11/03/1999		165.14	18.48	--	146.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	03/01/2000		165.14	9.59	--	155.55	<50	<0.5	0.58	<0.5	0.54	2.9	--	--	--	--	--	--	--	--	--	--
MW-5	04/21/2000		165.14	13.52	--	151.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	07/31/2000		165.14	14.04	--	151.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	11/20/2000		165.14	15.89	--	149.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	02/18/2001		165.14	11.88	--	153.26	560	161	2.38	6.11	13	5.67	--	--	--	--	--	--	--	--	--	--
MW-5	06/07/2001		165.14	15.30	--	149.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	09/05/2001		165.14	19.32	--	145.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	11/30/2001		165.14	17.44	--	147.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	02/20/2002		165.14	13.88	--	151.28	4,200	940	18.7	98.2	176	55.6	--	--	--	--	--	--	--	--	--	--
MW-5	06/20/2002		165.14	16.20	--	148.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	09/11/2002		165.14	19.15	--	145.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	11/12/2002		165.14	19.01	--	146.13	390	55	0.89	3.4	3.5	210	--	--	--	--	--	--	--	--	--	--
MW-5	01/29/2003		165.14	16.33	--	148.81	7,900	1,400	34	220	350	82	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<400	--	--
MW-5	05/22/2003		165.14	14.35	--	150.79	9,900	2,300	91	400	690	<50	<2,000	--	<50	<50	<5.0	<5.0	<5.0	<10,000	--	--
MW-5	07/28/2003		165.14	18.90	--	146.24	3,200	690	14	81	100	120	<400	<10	<10	<10	<10	<10	<10	<2,000	--	--
MW-5	02/23/2004		165.14	12.21	--	152.93	7,500	1,500	100	190	350	100	<1,000	38	<25	<25	<25	<25	<25	<5,000	--	--
MW-5	05/04/2004		165.14	17.12	--	148.02	5,900	1,500	57	200	280	42	<1,000	<25	<25	<25	<25	<25	<25	<5,000	--	--
MW-5	08/04/2004		165.14	19.05	--	146.09	<2,500	<25	<25	<25	<25	390	<1,000	<25	<25	<25	<25	<25	<25	<5,000	--	--
MW-5	11/10/2004		165.14	16.95	--	148.19	870	80	<5.0	<5.0	<5.0	530	<200	<5.0	<5.0	<5.0	<5.0	5.5	<1,000	--	--	--
MW-5	02/15/2005		165.14	12.75	--	152.39	1,600	330	8	37	67	260	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<1,000	--	--
MW-5	05/16/2005		165.14	15.46	--	149.68	<500	<5.0	<5.0													

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes
MW-5	02/07/2006		165.14	10.27	--	154.87	2,100	590	9.6	86	110	200	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<3,000	--	--	
MW-5	05/19/2006		165.14	13.08	--	152.06	3,200	720	9.7	150	170	44	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<3,000	--	--	
MW-5	08/23/2006		165.14	17.02	--	148.12	1,400	69	<5.0	20	24	230	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<3,000	--	--	
MW-5	11/15/2006		165.14	18.30	--	146.84	1,100	24	<2.5	10	8.6	490	<100	<2.5	<2.5	<2.5	<2.5	4.2	<1,500	0.85	--	
MW-5	02/14/2007		165.14	13.16	--	151.98	680	110	<2.5	16	11	420	<100	<2.5	<2.5	<2.5	<2.5	3.6	<1,500	2.54	--	
MW-5	05/22/2007		165.14	15.42	--	149.72	2,800	660	8.8	74	100	26	<100	<2.5	<2.5	<2.5	<2.5	<2.5	<1,500	1.41	--	
MW-5	08/15/2007		165.14	18.80	--	146.34	2,800	50	<10	26	29	280	<400	<10	<10	<10	<10	<10	<6,000	3.81	--	
MW-5	11/08/2007		165.14	18.55	(Sheen)	146.59	3,800	77	<2.5	46	35	270	310	<2.5	<2.5	<2.5	<2.5	<2.5	<1,500	1.08	--	
MW-5	02/20/2008		165.14	12.21	--	152.93	2,500	530	<5.0	75	62	43	<100	<5.0	<5.0	<5.0	<5.0	<5.0	<1,000	2.01	--	
MW-5	05/07/2008		165.14	18.91	--	148.23	6,700	1,800	29	270	360	30	<200	<10	<10	<10	<10	<10	<8,000	2.45	--	
MW-5	08/20/2008		165.14	19.45	--	145.69	300	22	<2.0	8.5	5.3	260	270	<2.0	<2.0	<2.0	<2.0	3	<1,200	5.57	--	
MW-5	02/25/2009		165.14	11.12	--	154.02	140	6.4	<0.50	2.4	3.1	68	110	<0.50	<0.50	<0.50	<0.50	0.62	<300	4.38	--	
MW-5	05/28/2009		165.14	15.70	--	149.44	3,800	790	9.5	140	110	11	<20	<1.0	<1.0	<1.0	<1.0	<1.0	<600	0.04	--	
MW-5	08/06/2009		165.14	18.84	(Sheen)	146.30	78	<5.0	<5.0	<5.0	<5.0	190	340	<5.0	<5.0	<5.0	<5.0	<5.0	<3,000	0.06	--	
MW-5	03/04/2010		165.14	10.02	--	155.12	1,200	420	5.5	69	58	15	38	<0.50	<0.50	<0.50	<0.50	<0.50	<100	0.66	--	(P)
MW-5	09/02/2010		165.14	16.24	--	148.90	200	69	1.3	3.2	7.3	13	<4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<100	--	--	(NP.Y)
MW-5	03/15/2011		165.14	11.36	--	153.78	1,700	410	7.9	88	80	5.9	<4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	(P)
MW-5	08/17/2011		165.14	16.62	--	148.52	1,900	460	7.6	44	51	<5.0	<4.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2,500	--	--	(P)
MW-5	02/06/2012		165.14	14.36	--	150.78	580	140	<5.0	9.2	<10	9.6	<40	<5.0	<5.0	<5.0	<5.0(*)	<5.0	<2,500	--	--	(P)
MW-5	08/21/2012		165.14	18.22	--	146.92	290	23	0.75	4.8	4.3	17	200	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	
MW-5	02/04/2013		165.14	13.99	--	151.15	1,400	230	2.7	55	34	3.1	13	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	
MW-5	08/01/2013		165.14	18.64	--	146.50	<50	<0.50	<0.50	<0.50	<1.0	27	250	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	
MW-5	02/27/2014		165.14	16.03	--	149.11	83	3.5	<0.50	<0.50	<1.0	12	77	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	
MW-5	08/27/2014		165.14	18.28	--	146.86	430	43	0.59	2.8	1.2	9.1	210	<0.50	<0.50	<0.50	<0.50	<0.50	<500	3.08	<1.0	(odor)
MW-5	03/27/2015		165.14	15.56	--	149.58	2,200	370	5.1	74	37	4.2	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<500	3.08	--	( odor)
MW-5	08/27/2015		165.14	17.96	--	147.18	7,370	803	8.60J	62.2	75.8	8.63J	126	<10.0	<10.0	<10.0	--	<10.0	<1,000	3.37	--	
MW-5	03/28/2016		165.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(INA)
MW-5	09/07/2016		165.14	17.10	--	148.04	1,830	325	9.39J	47.3	22.1J	<10.0	<50.0	<10.0	<10.0	<10.0	<10.0	<10.0	<1,000	0.29	--	
MW-5	03/01/2017		165.14	8.89	--	156.25	426	32.8	1.01	22.6	8.62	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	2.65	--	
MW-6	12/21/1990		--	--	--	--	0.17	2.6	7	4.9	26	--	--	--	--	--	--	--	--	--	--	
MW-6	04/01/1991		165.40	11.79	--	153.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/18/1991		--	--	--	--	--	1.3	22	--	2.7	--	--	--	--	--	--	--	--	--	--	
MW-6	07/03/1992		165.40	17.77	--	147.63	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
MW-6	10/05/1992		165.40	19.46	--	145.94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
MW-6	01/13/1993		165.40	11.34	--	154.06	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
MW-6	04/23/1993		165.40	12.92	--	152.48	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
MW-6	07/12/1993		165.40	17.36	--	148.04	<50	<0.5	<0.5	<0.5	0.7	<5.0	--	--	--	--	--	--	--	--	--	
MW-6	10/21/1993		165.40	19.98	--	145.42	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
MW-6	01/21/1994		165.40	18.10	--	147.30	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	
MW-6	04/20/1994		165.40	18.68	--	146.72	<50	<0.5	<0.5	<0.5	<0.5	17.4	--	--	--	--	--	--	--	2	--	
MW-6	08/01/1994		165.40	18.90	--	146.50	<50	<0.5	<0.5	<0.5	<0.5	8.66	--	--	--	--	--	--	--	1.5	--	
MW-6	12/23/1994		165.40	12.94	--	152.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	01/26/1995		165.40	10.46	--	154.94	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	7.3	--	
MW-6	06/08/1995		165.40	16.84	--	148.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	08/22/1995		165.40	19.48	--	145.92	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	6.7	--	
MW-6	10/27/1995		165.40	20.39	--	145.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	01/25/1996		165.40	12.24	--	153.16	<50	<0.50	<0.50	<0.50	<1.0	9.9	--	--	--	--	--	--	--	--	--	
MW-6	04/19/1996		165.40	13.90	--	151.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	07/23/1996		165.40	17.83	--	147.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	11/11/1996		165.40	18.90	--	146.50	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	7.7	--	
MW-6	01/21/1997		165.40	11.97	--	153.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	04/29/1997		165.40	17.04	--	148.36	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	4.5	--	
MW-6	08/21/1997		165.40	18.58	--	146.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	11/05/1997		165.40	19.17	--	146.23	70	<0.5	<1.0	<1.0	<1.0	85	--	--	--	--	--	--	--	4.3	--	
MW-6	02/03/1998		165.40	9.87	--	155.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	05/28/1998		165.40	13.38	--	152.02	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	3.7	--	
MW-6	12/30/1998		165.40	14.45	--	150.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	02/02/1999		165.40	18.29	--	147.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	05/10/1999		165.40	17.49	--	147.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	08/24/1999		165.40	17.61	--	147.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	11/03/1999		165.40	16.26	--	149.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	03/01/2000		165.40	17.43	--	147.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	04/21/2000		165.40	13.32	--	152.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	07/31/2000		165.40	13.46	--	151.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	11/20/2000		165.40	14.78	--	150.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	02/18/2001		165.40	11.33	--	154.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	06/07/2001		165.40	16.36	--	149.04	--	--	--</													



Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes
MW-6	11/12/2002		165.40	18.78	--	146.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	01/29/2003		165.40	14.45	--	150.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	05/22/2003		165.40	14.36	--	151.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	07/28/2003		165.40	18.43	--	146.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	11/18/2003		165.40	17.48	--	147.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/23/2004		165.40	11.54	--	153.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	05/04/2004		165.40	16.58	--	148.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	08/04/2004		165.40	18.12	--	147.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	11/10/2004		165.40	15.75	--	149.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/15/2005		165.40	12.50	--	152.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	05/16/2005		165.40	11.51	--	153.89	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<100	--	--	--
MW-6	08/17/2005		165.40	16.85	--	148.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/07/2006		165.40	9.93	--	155.47	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<300	--	--	--
MW-6	08/23/2006		165.40	16.35	--	149.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	11/15/2006		165.40	17.42	--	147.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/14/2007		165.40	12.03	--	153.37	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<300	1.07	--	--
MW-6	05/22/2007		165.40	15.11	--	150.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	08/15/2007		165.40	18.08	--	147.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	11/08/2007		165.40	17.79	--	147.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/20/2008		165.40	11.81	--	153.59	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<100	1.29	--	--
MW-6	05/07/2008		165.40	16.75	--	148.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/25/2009		165.40	9.99	--	155.41	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<300	2.39	--	--
MW-6	08/06/2009		165.40	18.33	--	147.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	03/04/2010		165.40	9.11	--	156.29	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<100	0.88	--	(P)
MW-6	09/02/2010		165.40	17.80	--	147.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	03/15/2011		165.40	10.08	--	155.32	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	(P)
MW-6	08/17/2011		165.40	16.50	--	148.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/06/2012		165.40	14.44	--	150.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	08/21/2012		165.40	17.91	--	147.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/04/2013		165.40	14.13	--	151.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	08/01/2013		165.40	18.27	--	147.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	02/27/2014		165.40	15.33	--	150.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	08/27/2014		165.40	19.12	--	146.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	03/27/2015		165.40	15.58	--	149.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	08/27/2015		165.40	17.92	--	147.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	03/28/2016		165.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	09/07/2016		165.40	17.12	--	148.28	<100	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	1.63	--	(NS)
MW-6	03/01/2017		165.40	8.63	--	156.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	03/07/1991		167.61	19.04	--	148.57	--	--	0.4	0.3	2.4	--	--	--	--	--	--	--	--	--	--	--
MW-7	04/01/1991		167.61	15.18	--	152.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	06/27/1991		--	--	--	--	70	17	4	0.8	2.2	--	--	--	--	--	--	--	--	--	--	--
MW-7	09/27/1991		--	--	--	--	--	0.4	--	0.4	0.4	--	--	--	--	--	--	--	--	--	--	--
MW-7	12/18/1991		--	--	--	--	--	0.7	2.9	0.8	3.3	--	--	--	--	--	--	--	--	--	--	--
MW-7	07/03/1992		167.61	20.28	--	147.33	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--
MW-7	10/05/1992		167.61	21.56	--	146.05	<50	<0.5	<0.5	<0.5	1.5	--	--	--	--	--	--	--	--	--	--	--
MW-7	01/13/1993		167.61	15.41	--	152.20	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--
MW-7	04/23/1993		167.61	15.84	--	151.77	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--
MW-7	07/12/1993		167.61	19.84	--	147.77	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	--
MW-7	10/21/1993		167.61	21.61	--	146.00	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--
MW-7	01/21/1994	Dup	167.61	20.49	--	147.12	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	(Dup)
MW-7	01/21/1994		167.61	20.49	--	147.12	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	--
MW-7	04/20/1994		167.61	20.54	--	147.07	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	1.5	--
MW-7	08/01/1994		167.61	20.99	--	146.62	<50	0.7	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	1.9	--
MW-7	12/23/1994		167.61	15.00	--	152.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	01/26/1995		167.61	14.69	--	152.92	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	--	7	--
MW-7	06/08/1995		167.61	19.87	--	147.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	08/22/1995		167.61	21.49	--	146.12	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	6.4	--
MW-7	10/27/1995		167.61	22.53	--	145.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	01/25/1996		167.61	17.21	--	150.40	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	--	--	--	--
MW-7	04/19/1996		167.61	17.09	--	150.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	07/23/1996		167.61	21.02	--	146.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	11/11/1996		167.61	22.03	--	145.58	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	7.8	--
MW-7	01/21/1997		167.61	15.06	--	152.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	04/29/1997		167.61	20.11	--	147.50	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	4.4	--
MW-7	08/21/1997		167.61	21.59	--	146.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	11/05/1997		167.61	20.05	--	147.56	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	4.4	--
MW-7	02/03/1998		167.61	9.97	--	157.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	05/28/1998		167.61	13.52	--	154.09	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	--	4.3	--
MW-7	12/30/1998		167.61	18.33	--	149.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	02/02/1999		167.61	12.33	--	155.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	05/10/1999		167.61	13.52	--	154.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	08/24/1999		167.61	14.01	--	153.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes	
MW-7	11/03/1999		167.61	19.91	--	147.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	03/01/2000		167.61	19.89	--	147.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	04/21/2000		167.61	17.94	--	149.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	07/31/2000		167.61	17.33	--	150.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/20/2000		167.61	18.41	--	149.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/18/2001		167.61	15.13	--	152.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	06/07/2001		167.61	18.75	--	148.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	09/05/2001		167.61	20.48	--	147.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/30/2001		167.61	20.11	--	147.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/20/2002		167.61	18.40	--	149.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	06/20/2002		167.61	18.62	--	148.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	09/11/2002		167.61	20.05	--	147.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/12/2002		167.61	21.13	--	146.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	01/29/2003		167.61	19.10	--	148.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	05/22/2003		167.61	18.83	--	148.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	07/28/2003		167.61	19.88	--	147.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/18/2003		167.61	20.50	--	147.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/23/2004		168.08	15.92	--	152.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	05/04/2004		168.08	18.86	--	149.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	08/04/2004		168.08	19.10	--	148.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/10/2004		168.08	20.25	--	147.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/15/2005		168.08	16.37	--	151.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	08/17/2005		168.08	19.74	--	148.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/18/2005		168.08	20.82	--	147.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/07/2006		168.08	14.26	--	153.82	<500	<5.0	<5.0	<5.0	<5.0	270	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<3,000	--	--	
MW-7	05/19/2006		168.08	16.51	--	151.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	08/23/2006		168.08	20.30	--	147.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/15/2006		168.08	20.85	--	147.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/14/2007		168.08	16.57	--	151.51	520	<5.0	<5.0	<5.0	<5.0	740	<200	<5.0	<5.0	<5.0	<5.0	9.6	<3,000	3.08	--	--	
MW-7	05/22/2007		168.08	18.40	--	149.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	08/15/2007		168.08	20.85	--	147.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/08/2007		168.08	20.41	--	147.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/20/2008		168.08	15.90	--	152.18	<50	<0.50	<0.50	<0.50	<0.50	700	13	0.6	<0.50	<0.50	<0.50	12	<100	4.34	--	--	
MW-7	05/07/2008		168.08	19.41	--	148.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	08/20/2008		168.08	21.34	--	146.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	11/17/2008		168.08	20.54	--	147.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/25/2009		168.08	14.89	--	153.19	130	<20	<20	<20	<20	540	<400	<20	<20	<20	<20	<20	<12,000	4.28	--	--	
MW-7	05/28/2009		168.08	18.57	--	149.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	08/06/2009		168.08	20.83	--	147.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	03/04/2010		168.08	14.02	--	154.06	430	<0.50	<0.50	<0.50	<1.0	920	4	0.74	<0.50	<0.50	<0.50	17	<100	3.3	--	(P)	
MW-7	09/02/2010		168.08	20.43	--	147.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	03/15/2011		168.08	14.86	--	153.22	<1,000	<0.50	<0.50	<0.50	<1.0	990	130	0.81	<0.50	<0.50	<0.50	17	<250	--	--	(P)	
MW-7	08/17/2011		168.08	19.01	--	149.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/06/2012		168.08	18.20	--	149.88	<50	<0.50	<0.50	<0.50	<1.0	22	<4.0	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--	(P)	
MW-7	08/21/2012		168.08	20.29	--	147.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/04/2013		168.08	17.60	--	150.48	<500	<0.50	<0.50	<0.50	<1.0	290	<4.0	<0.50	<0.50	<0.50	<0.50	6.4	<250	--	--		
MW-7	08/01/2013		168.08	20.68	--	147.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	02/27/2014		168.08	18.86	--	149.22	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--		
MW-7	08/27/2014		168.08	19.68	--	148.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	03/27/2015		168.08	18.09	--	149.99	<50	<0.50	<0.50	<0.50	<1.0	240	<20	<0.50	<0.50	<0.50	<0.50	3.3	<500	3.42	--	--	
MW-7	08/27/2015		168.08	19.59	--	148.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	03/28/2016		168.08	13.92	--	154.16	222	<1.00	<5.00	<1.00	<3.00	458	<5.00	<1.00	<1.00J3	<1.00	<1.00	7	<100	2.51	--	--	
MW-7	09/07/2016		168.08	18.90	--	149.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	03/01/2017		168.08	12.75	--	155.33	<100	<1.00	<1.00	<1.00	<3.00	7.44	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	1.87	--	--	
MW-8	03/07/1991		165.74	16.72	--	149.02	2.7	780	450	64	310	--	--	--	--	--	--	--	--	--	--	--	
MW-8	04/01/1991		165.74	12.54	--	153.20	15,000	3,600	2,600	410	1,900	--	--	--	--	--	--	--	--	--	--	--	
MW-8	06/27/1991		--	--	--	--	12,000	3,400	1,100	240	750	--	--	--	--	--	--	--	--	--	--	--	
MW-8	09/27/1991		--	--	--	--	41	5,700	5,200	1,100	4,300	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/18/1991		--	--	--	--	3.2	990	150	120	250	--	--	--	--	--	--	--	--	--	--	--	
MW-8	07/03/1992		165.74	18.78	--	146.96	72,000	19,000	32,000	3,000	15,000	--	--	--	--	--	--	--	--	--	--	--	
MW-8	10/05/1992		165.74	20.48	--	145.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	01/13/1993		165.74	12.87	--	152.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	04/23/1993		165.74	13.90	--	151.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	07/12/1993		165.74	18.30	--	147.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	10/21/1993		165.74	21.91	--	142.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	01/21/1994		165.74	19.12	--	146.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	04/20/1994		165.74	19.28	--	146.46	26,000	1,700	4,100	960	4,000	632	--	--	--	--	--	--	--	--	1.1	--	
MW-8	12/23/1994		165.74	13.81	--	151.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	06/08/1995		165.74	17.82	--	147.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	08/22/1995		165.74	19.41	--	146.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	10/27/1995		165.74	20.47	--	145.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	01/25/1996		165.74	13.35	--	152.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes	
MW-8	04/19/1996		165.74	14.40	--	151.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	07/23/1996		165.74	18.35	--	147.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	11/11/1996		165.74	19.41	--	146.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	01/21/1997		165.74	12.29	--	153.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	08/21/1997		165.74	19.61	--	146.13	240,000	1,100	9,300	4,100	31,100	<1,000	--	--	--	--	--	--	--	--	5.2	--	
MW-8	11/05/1997		165.74	19.45	--	146.29	57,000	790	2,700	2,300	15,200	<1,000	--	--	--	--	--	--	--	--	5	--	
MW-8	02/03/1998		165.74	9.33	--	156.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	02/04/1998		--	--	--	--	94,000	570	1,500	2,100	15,200	<2,500	--	--	--	--	--	--	--	--	5.5	--	
MW-8	12/30/1998		165.74	15.48	--	150.26	120,000	460	2,300	2,200	15,000	150	--	--	--	--	--	--	--	--	--	--	
MW-8	02/02/1999		165.74	18.29	--	147.45	82,000	450	2,200	3,700	28,000	<500	--	--	--	--	--	--	--	--	--	--	
MW-8	05/10/1999		165.74	15.62	--	150.12	28,000	740	1,800	1,100	5,800	<25	--	--	--	--	--	--	--	--	--	--	
MW-8	08/24/1999		165.74	18.41	--	147.33	75,000	530	1,400	3,300	21,000	150	--	--	--	--	--	--	--	--	--	--	
MW-8	11/03/1999		165.74	18.71	--	147.03	70,000	600	1,300	3,600	20,500	750	--	--	--	--	--	--	--	--	--	--	
MW-8	03/01/2000		165.74	19.37	--	146.37	27,000	1,600	1,200	2,600	6,600	120	--	--	--	--	--	--	--	--	--	--	
MW-8	11/20/2000		165.74	17.42	--	148.32	1,300,000	1,400	1,700	20,000	16,000	5,700	--	--	--	--	--	--	--	--	--	--	
MW-8	09/05/2001		165.74	21.45	0.04	144.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	11/30/2001		165.74	18.31	--	147.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	02/20/2002		165.74	14.02	--	151.72	20,000	163	114	403	3,810	80.4	--	--	--	--	--	--	--	--	--	--	
MW-8	06/20/2002		165.74	17.56	--	148.18	28,000	466	141	962	5,850	2,520	--	--	--	--	--	--	--	--	--	--	
MW-8	09/11/2002		165.74	19.45	--	146.29	190,000	1,500	670	4,500	23,000	1,200	--	--	--	--	--	--	--	--	--	--	
MW-8	11/12/2002		165.74	19.15	--	146.59	420	6.4	2.9	16	110	31	--	--	--	--	--	--	--	--	--	--	
MW-8	01/29/2003		165.74	15.02	--	150.72	200,000	810	<500	2,000	11,000	<500	<2,000	<50	<50	<50	<50	<50	<50	<4,000	--	--	
MW-8	05/22/2003		165.74	15.07	--	150.67	--	--	--	--	--	--	<1,000	--	<25	<25	<25	<25	<25	<5,000	--	--	
MW-8	06/24/2003		165.74	17.95	--	147.79	43,000	860	300	2,100	9,600	46	--	--	--	--	--	--	--	--	--	--	
MW-8	07/28/2003		165.74	19.45	--	146.29	62,000	690	230	1,800	15,000	2,100	<4,000	<100	<100	<100	<100	<100	<20,000	--	--		
MW-8	08/12/2003		165.74	19.40	0.01	146.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	09/12/2003		165.74	19.34	--	146.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	11/18/2003		165.74	18.80	0.01	146.94	8,800	500	37	530	930	1,700	<400	--	<10	<10	--	20	<2,000	--	--		
MW-8	02/23/2004		165.74	12.82	0.01	152.92	32,000	840	360	1,000	7,100	110	<2,000	<50	<50	<50	<50	<50	<10,000	--	--		
MW-8	05/04/2004		165.74	18.87	0.01	146.87	42,000	570	230	1,700	8,400	2,000	<1,000	<25	<25	<25	<25	33	<5,000	--	--		
MW-8	08/04/2004		165.74	19.37	0.05	146.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	09/22/2004		165.74	19.60	--	146.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	11/10/2004		165.74	16.58	--	149.16	11,000	790	61	1,000	830	74	<1,000	<25	<25	<25	<25	<25	<5,000	--	--		
MW-8	02/15/2005		165.74	12.85	--	152.89	38,000	1,300	390	2,300	7,900	<50	<2,000	<50	<50	<50	<50	<50	<10,000	--	--		
MW-8	05/16/2005		165.74	12.22	--	153.52	31,000	1,000	360	2,500	7,500	<50	<2,000	<50	<50	<50	<50	<50	<10,000	--	--		
MW-8	08/17/2005		165.74	17.80	--	147.94	60,000	540	240	2,500	8,600	<50	<2,000	<50	<50	<50	<50	<50	<10,000	--	--		
MW-8	11/18/2005		165.74	21.02	--	144.72	33,000	340	120	1,400	4,900	140	<2,000	<50	<50	<50	<50	<50	<10,000	--	--		
MW-8	02/07/2006		165.74	10.73	--	155.01	5,700	94	27	260	820	7.5	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<3,000	--	--		
MW-8	05/19/2006		165.74	13.89	--	151.85	40,000	1,100	320	2,900	6,000	<25	<1,000	<25	<25	<25	<25	<25	<15,000	--	--		
MW-8	08/23/2006		165.74	18.85	--	146.89	21,000	520	150	1,800	6,300	82	<1,000	<25	<25	<25	<25	<25	<15,000	--	--		
MW-8	11/15/2006		165.74	18.75	--	146.99	3,300	81	<25	130	430	110	<1,000	<25	<25	<25	<25	<25	<15,000	0.81	--		
MW-8	02/14/2007		165.74	13.45	(Sheen)	152.29	9,300	320	<25	360	710	82	<1,000	<25	<25	<25	<25	<25	<15,000	1.89	--		
MW-8	05/22/2007		165.74	15.92	(Sheen)	149.82	17,000	370	51	760	1,600	11	<400	<10	<10	<10	<10	<10	<6,000	1.05	--		
MW-8	08/15/2007		165.74	19.11	(Sheen)	146.63	17,000	170	44	1,000	2,700	28	<400	<10	<10	<10	<10	<10	<6,000	3.93	--		
MW-8	11/08/2007		165.74	18.46	(Sheen)	147.28	24,000	150	43	1,100	3,200	27	<1,000	<25	<25	<25	<25	<25	<15,000	1.29	--		
MW-8	08/20/2008		165.74	19.66	0.01	146.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	02/25/2009		165.74	11.50	(Sheen)	154.24	3,400	160	11	88	65	35	<200	<10	<10	<10	<10	<10	<6,000	2.18	--		
MW-8	04/08/2009		165.74	14.55	--	151.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	05/28/2009		165.74	16.12	(Sheen)	149.62	8,300	410	54	660	800	<2.5	<50	<2.5	<2.5	<2.5	<2.5	<2.5	<1,500	0.06	--		
MW-8	06/16/2009		165.74	17.63	--	148.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	03/04/2010		165.74	10.33	--	155.41	11,000	520	110	830	1,600	<5.0	<40	<5.0	<5.0	<5.0	<5.0	<5.0	<1,000	0.82	--	(P)	
MW-8	09/02/2010		165.74	18.52	--	147.22	6,900	180	24	280	480	<5.0	<40	<5.0	<5.0	<5.0	<5.0	<5.0	<1,000	--	--	(P)	
MW-8	03/15/2011		165.74	11.03	--	154.71	14,000	470	150	1,400	3,000	<2.5	<20	<2.5	<2.5	<2.5	<2.5	<2.5	<1,200	--	--	(P)	
MW-8	08/17/2011		165.74	17.14	--	148.60	4,100	180	24	280	340	<5.0	<40	<5.0	<5.0	<5.0	<5.0	<5.0	<2,500	--	--	(P)	
MW-8	02/06/2012		165.74	15.07	--	150.67	5,100	140	18	210	220	<5.0	<40	<5.0	<5.0	<5.0	<5.0(*)	<5.0	2,900	--	--	(P)	
MW-8	08/21/2012		165.74	18.88	--	146.86	3,600	220	25	170	170	<5.0	<20	<5.0	<5.0	<5.0	<5.0	<5.0	<2,500	--	--		
MW-8	02/04/2013		165.74	14.88	--	150.86	2,300	71	13	150	230	<5.0	<40	<5.0	<5.0	<5.0	<5.0	<5.0	<2,500	--	--		
MW-8	08/01/2013		165.74	18.96	--	146.78	5,300	140	20	220	190	<5.0	<100	<5.0	<5.0	<5.0	<5.0	<5.0	<2,500	--	--		
MW-8	02/27/2014		165.74	16.30	--	149.44	4,900	200	28	200	110	<5.0	<100	<5.0	<5.0	<5.0	<5.0	<5.0	<2,500	--	--		
MW-8	08/27/2014		165.74	18.66	--	147.08	6,400	170	29	290	240	<5.0	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<5,000	2.49	80		
MW-8	03/27/2015		165.74	16.10	--	149.64	6,300	140	25	380	310	<5.0	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<5,000	1.48	--	(odor)	
MW-8	08/27/2015		165.74	18.39	--	147.35	5,800	94.2	14.7	112	62.9	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	8.61	--		
MW-8	03/28/2016		165.74	10.72	--	155.02	14,100	167	53.8	835	1,330	<50.0	3.70J	<1.00	<1.00J3	<1.00	<1.00	<1.00	<1.00	1.5	--		



Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes
MW-9	08/06/2009		166.20	19.25	(Sheen)	146.95	6,800	19	<2.0	120	250	18	<4.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1,200	0	--	
MW-9	03/04/2010		166.20	10.32	--	155.88	6,000	29	<2.5	<2.5	100	<2.5	<2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<500	0.62	--	(P)
MW-9	09/02/2010		166.20	18.72	--	147.48	5,700	31	<2.5	160	120	<2.5	<2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<500	--	--	(NP)
MW-9	03/15/2011		166.20	11.08	--	155.12	6,500	17	<2.5	150	73	<2.5	<2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<1,200	--	--	(P)
MW-9	08/17/2011		166.20	17.35	--	148.85	5,200	9.5	<2.5	71	54	<2.5	<2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<1,300	--	--	
MW-9	02/06/2012		166.20	15.52	--	150.68	4,200	14	<2.5	49	22	<2.5	<2.0	<2.5	<2.5	<2.5	<2.5	<2.5(*)	<2.5	<1,300	--	(P)
MW-9	08/21/2012		166.20	18.79	--	147.41	4,200	22	<2.5	42	21	<2.5	<2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<1,300	--	--	
MW-9	02/04/2013		166.20	14.16	--	152.04	4,100	4.8	<2.5	34	13	<2.5	<2.0	<2.5	<2.5	<2.5	<2.5	<2.5	<1,300	--	--	
MW-9	08/01/2013		166.20	19.16	--	147.04	5,500	4.8	<2.5	36	21	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<1,300	--	--	
MW-9	02/27/2014		166.20	16.27	--	149.93	6,300	9.1	<2.5	36	11	<2.5	<5.0	<2.5	<2.5	<2.5	<2.5	<2.5	<1,300	--	--	
MW-9	08/27/2014		166.20	18.94	--	147.26	5,400	8.5	<2.5	41	6.3	<2.5	<10.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2,500	0.2	17	(odor)
MW-9	03/27/2015		166.20	16.42	--	149.78	6,500	7.8	<2.5	38	5.6	<2.5	<10.0	<2.5	<2.5	<2.5	<2.5	<2.5	<2,500	1.96	--	
MW-9	08/27/2015		166.20	18.69	--	147.51	10,000	10.7	<5.00	21.7	2.86J	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	2.59	--	
MW-9	03/28/2016		166.20	10.96	--	155.24	7,630	4.41	<5.00	26.8	6.32	<1.00	<5.00	<1.00	<1.00J3	<1.00	<1.00	<1.00	<100	3.96	--	
MW-9	09/07/2016		166.20	17.89	--	148.31	7,730	7.22	<5.00	17.4	2.7J	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	0.24	--	
MW-9	09/07/2016		166.20	17.89	--	148.31	7,730	7.22	<5.00	17.4	2.7J	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	0.24	--	
MW-10	03/07/1991		167.01	18.09	--	148.92	1.6	120	190	32	230	--	--	--	--	--	--	--	--	--	--	
MW-10	04/01/1991		167.01	13.92	--	153.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	06/27/1991		--	--	--	--	12,000	7,300	500	150	300	--	--	--	--	--	--	--	--	--	--	
MW-10	09/27/1991		--	--	--	--	57	12,000	7,200	1,400	4,600	--	--	--	--	--	--	--	--	--	--	
MW-10	12/18/1991		--	--	--	--	5.3	2,500	120	36	79	--	--	--	--	--	--	--	--	--	--	
MW-10	07/03/1992		167.01	19.92	--	147.09	8,600	5,100	1,300	180	690	--	--	--	--	--	--	--	--	--	--	
MW-10	10/05/1992		167.01	21.92	--	145.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	01/13/1993		167.01	14.43	--	152.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	04/23/1993		167.01	15.26	--	151.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	07/12/1993		167.01	19.78	--	147.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	10/21/1993		167.01	22.90	--	144.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	01/21/1994		167.01	20.25	--	146.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	04/20/1994		167.01	20.74	--	146.27	100,000	12,000	24,000	2,400	14,000	1,577	--	--	--	--	--	--	--	1	--	
MW-10	08/01/1994		167.01	22.00	--	145.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	12/23/1994		167.01	16.08	--	150.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	01/26/1995		167.01	13.68	--	153.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	08/08/1995		167.01	19.08	--	147.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	08/22/1995		167.01	20.73	--	146.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	10/27/1995		167.01	21.69	--	145.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	01/25/1996		167.01	15.05	--	151.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	04/19/1996		167.01	16.26	--	150.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	07/23/1996		167.01	20.18	--	146.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	11/11/1996		167.01	21.20	--	145.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	01/21/1997		167.01	13.66	--	153.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	04/29/1997		167.01	18.71	--	148.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	04/30/1997		--	--	--	--	170,000	9,700	38,000	4,700	30,500	<5,000	--	--	--	--	--	--	--	--	5.6	
MW-10	08/21/1997		167.01	20.19	--	146.82	170,000	9,500	35,000	4,300	27,100	<5,000	--	--	--	--	--	--	--	--	5.3	
MW-10	11/05/1997		167.01	20.52	--	146.49	80,000	3,800	12,000	2,700	15,700	<500	--	--	--	--	--	--	--	--	4.4	
MW-10	02/03/1998		167.01	10.62	--	156.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	02/04/1998		--	--	--	--	72,000	500	1,300	1,700	12,000	<1,000	--	--	--	--	--	--	--	--	5.1	
MW-10	05/28/1998		167.01	15.46	--	151.55	220,000	3,200	24,000	5,200	43,000	<1,000	--	--	--	--	--	--	--	--	4.8	
MW-10	12/30/1998		167.01	16.65	--	150.36	110,000	3,500	14,000	5,800	50,000	<50	--	--	--	--	--	--	--	--	--	
MW-10	02/02/1999		167.01	14.58	--	152.43	74,000	1,000	2,800	1,000	26,000	860	--	--	--	--	--	--	--	--	--	
MW-10	05/10/1999		167.01	15.72	--	151.29	81,000	2,800	2,800	3,000	17,000	220	--	--	--	--	--	--	--	--	--	
MW-10	08/24/1999		167.01	19.85	--	147.16	54,000	3,500	3,800	1,500	9,100	<250	--	--	--	--	--	--	--	--	--	
MW-10	11/03/1999		167.01	20.00	--	147.01	30,000	3,000	3,500	1,200	5,000	31	--	--	--	--	--	--	--	--	--	
MW-10	03/01/2000		167.01	14.62	--	152.39	62,000	320	1,200	1,100	26,000	4,400	--	--	--	--	--	--	--	--	--	
MW-10	04/21/2000		167.01	15.46	--	151.55	88,000	2,700	7,400	3,700	35,000	2,400	--	--	--	--	--	--	--	--	--	
MW-10	11/20/2000		167.01	18.74	--	148.27	78,000	3,800	5,500	2,800	13,000	450	--	--	--	--	--	--	--	--	--	
MW-10	02/18/2001		167.01	14.10	--	152.91	39,000	1,050	1,160	1,550	14,700	4,180	--	--	--	--	--	--	--	--	--	
MW-10	06/07/2001		167.01	18.78	--	148.23	76,000	2,460	2,840	3,330	20,700	635	--	--	--	--	--	--	--	--	--	
MW-10	09/05/2001		167.01	21.40	0.01	145.60	25,000	2,510	2,070	1,090	4,540	189	--	--	--	--	--	--	--	--	--	
MW-10	11/30/2001		167.01	18.50	--	148.51	100,000	2,480	5,720	3,880	22,800	325	--	--	--	--	--	--	--	--	--	
MW-10	02/20/2002		167.01	14.39	--	152.62	49,000	2,170	3,070	1,960	12,300	1,090	--	--	--	--	--	--	--	--	--	
MW-10	06/20/2002		167.01	18.80	--	148.21	44,000	2,040	3,050	1,690	8,430	224	--	--	--	--	--	--	--	--	--	
MW-10	09/11/2002		167.01	20.52	--	146.49	28,000	1,200	2,700	1,400	6,800	<250	--	--	--	--	--	--	--	--	--	
MW-10	11/12/2002		167.01	20.37	0.07	146.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	01/29/2003		167.01	16.33	0.03	150.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	05/22/2003		167.01	16.32	--	150.69	13,000	2,100	850	630	1,600	300	<2,000	--	<50	<50	--	<50	<10,000	--	--	
MW-10	06/24/2003		167.01	18.73	0.04	148.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	07/28/2003		167.01	20.39	0.04	146.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	08/12/2003		167.01	20.43	0.01	146.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	09/12/2003		16																			

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes	
MW-10	08/04/2004		167.01	18.90	--	148.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	09/22/2004		167.01	20.60	--	146.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	11/10/2004		167.01	17.95	--	149.06	9,800	470	91	450	1,700	230	<1,000	<25	<25	<25	<25	<25	<5,000	--	--		
MW-10	01/13/2005		167.01	12.21	--	154.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	02/15/2005		167.01	14.19	--	152.82	30,000	510	330	1,800	7,200	77	<2,000	<50	<50	<50	<50	<50	<10,000	--	--		
MW-10	05/16/2005		167.01	13.85	--	153.16	37,000	540	730	2,100	9,200	<50	<2,000	<50	<50	<50	<50	<50	<10,000	--	--		
MW-10	08/17/2005		167.01	19.01	--	148.00	15,000	1,100	420	1,200	4,100	<50	<2,000	<50	<50	<50	<50	<50	<10,000	--	--		
MW-10	11/18/2005		167.01	19.95	--	147.06	12,000	1,200	240	550	1,300	16	<500	<12	<12	<12	<12	<12	<2,500	--	--		
MW-10	02/07/2006		167.01	12.28	(Sheen)	154.73	22,000	340	580	1,300	4,500	73	<1,000	<25	<25	<25	<25	<25	<15,000	--	--		
MW-10	05/19/2006		167.01	15.12	--	151.89	40,000	690	430	2,600	4,900	<25	<1,000	<25	<25	<25	<25	<25	<15,000	--	--		
MW-10	08/23/2006		167.01	20.00	--	147.01	13,000	1,500	540	1,200	3,000	<10	<400	<10	<10	<10	<10	<10	<8,000	--	--		
MW-10	11/15/2006		167.01	19.84	--	147.17	3,800	700	22	67	160	54	<400	<10	<10	<10	<10	<10	<6,000	0.65	--		
MW-10	02/14/2007		167.01	14.94	(Sheen)	152.07	37,000	350	120	2,400	8,100	120	<400	<10	<10	<10	<25	<10	<6,000	2.12	--		
MW-10	05/22/2007		167.01	17.17	(Sheen)	149.84	13,000	810	130	750	2,200	15	<400	<10	<10	<10	<10	<10	<6,000	0.06	--		
MW-10	08/15/2007		167.01	20.30	(Sheen)	146.71	4,400	550	38	160	310	<10	<400	<10	<10	<10	<10	<10	<6,000	3.09	--		
MW-10	11/08/2007		167.01	19.58	(Sheen)	147.43	13,000	970	130	480	1,600	6	<200	<5.0	<5.0	<5.0	<5.0	<5.0	<3,000	1.47	--		
MW-10	02/20/2008		167.01	14.27	0.05	152.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW-10	05/07/2008		167.01	18.61	--	148.40	16,000	970	150	770	2,000	<20	<400	<20	<20	<20	<20	<20	<12,000	2.18	--		
MW-10	08/20/2008		167.01	20.71	0.01	146.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW-10	11/17/2008		167.01	19.71	--	147.30	10,000	960	57	270	720	23	<400	<20	<20	<20	<20	<20	<12,000	--	--		
MW-10	02/25/2009		167.01	13.10	--	153.91	2,900	53	14	69	160	170	280	<10	<10	<10	<10	<10	<6,000	4.06	--		
MW-10	04/08/2009		167.01	15.91	--	151.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW-10	05/28/2009		167.01	17.37	(Sheen)	149.64	15,000	640	280	790	2,500	65	110	<2.5	<2.5	<2.5	<2.5	<2.5	<1,500	0.03	--		
MW-10	06/16/2009		167.01	18.79	0.01	148.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW-10	08/06/2009		167.01	20.19	(Sheen)	146.82	23,000	850	490	1,200	4,100	<25	<500	<25	<25	<25	<25	<25	<15,000	0.06	--		
MW-10	03/04/2010		167.01	12.32	--	154.69	12,000	71	72	740	1,800	<2.5	160	<2.5	<2.5	<2.5	<2.5	<2.5	<500	0.56	--	(P)	
MW-10	09/02/2010		167.01	19.63	--	147.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b,j)	
MW-10	03/15/2011		167.01	13.20	--	153.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b,j)	
MW-10	08/17/2011		167.01	18.27	--	148.74	4,000	780	39	250	290	<5.0	<40	<5.0	<5.0	<5.0	<5.0	<5.0	<2,500	--	--	(P)	
MW-10	02/06/2012		167.01	16.32	--	150.69	6,300	1,100	39	340	470	<5.0	<40	<5.0	<5.0	<5.0	<5.0(*)	<5.0	<2,500	--	--	(P)	
MW-10	08/21/2012		167.01	19.66	0.02	147.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(LPH)	
MW-10	02/04/2013		167.01	15.75	(Sheen)	151.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW-10	08/01/2013		167.01	20.03	0.01	146.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(LPH)	
MW-10	02/27/2014		167.01	17.65	0.01	149.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW-10	08/27/2014		167.01	19.69	0.01	147.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW-10	03/27/2015		167.01	17.19	0.01	149.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(b,j)	
MW-10	08/27/2015		167.01	19.26	0.02	147.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(LPH)	
MW-10R	03/28/2016	140.80	166.80	12.50	--	154.30	38,000	3,830	2,810	1,130	5,310	1.3	40.5	<1.00	<1.00J3	<1.00	<1.00	<1.00	<1.00	<100	1.82	--	
MW-10R	06/19/2016		166.80	17.51	--	149.29	24,800	447	68.8	1,090	1,950	<1.00	18.9	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	0.32	--	
MW-10R	09/07/2016		166.80	18.43	--	148.37	32,300	2,520	693	3,010	8,140	<50.0	<250	<50.0	<50.0	<50.0	<50.0	<50.0	<5,000	0.24	--		
MW-10R	12/14/2016		166.80	14.81	--	151.99	19,800	2,610	382	702	2,000	1.14	78.5	<1.00	<1.00	<1.00	<1.00	<1.00	<100	1.25	--		
MW-10R	03/01/2017		166.80	11.23	--	155.57	15,600	1,610	1,410	799	2,340	<50.0	<250	<50.0	<50.0	<50.0	<50.0	<50.0	<5,000	1.96	--		
MW-11	03/28/2016	139.64	165.64	11.32	--	154.32	<100	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00J3	<1.00	<1.00	<1.00	<1.00	<100	1.12	--	
MW-11	06/19/2016		165.64	15.71	--	149.93	197	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	0.35	--	
MW-11	09/07/2016		165.64	17.91	--	147.73	244	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	0.20	--	
MW-11	12/14/2016		165.64	13.09	--	152.55	260	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	1.77	--		
MW-11	03/01/2017		165.64	10.95	--	154.69	42.4J	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	1.91	--		
RW-1	03/07/1991		168.01	17.62	--	150.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	04/01/1991		168.01	14.40	--	153.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	07/03/1992		168.01	20.66	--	147.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	10/05/1992		168.01	23.34	--	144.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	01/13/1993		168.01	16.59	--	151.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	04/23/1993		168.01	16.17	--	151.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	07/12/1993		168.01	20.18	--	147.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	10/21/1993		168.01	25.70	--	142.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	01/21/1994		168.01	21.24	--	146.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	04/20/1994		168.01	32.20	--	135.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
RW-1	08/01/1994		168.01	21.70	--	146.31	29,000	580	950	300	7,800	1,200	--	--	--	--	--	--	--	--	1.1	--	
RW-1	12/23/1994		168.01	16.02	--	151.99	1,300	25	8.6	1.4	69	616	--	--	--	--	--	--	--	--	1.8	--	
RW-1	01/26/1995	Dup	168.01	13.78	--	154.23	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	--	--	(Dup)	
RW-1	01/26/1995		168.01	13.78	--	154.23	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	--	--	--		
RW-1	06/08/1995		168.01	20.05	--	147.96	1,300	130	<1.0	<1.0	36	--	--	--	--	--	--	--	--	--	--		
RW-1	08/22/1995	Dup	168.01	21.74	--	146.27	3,300	230	13	4.9	280	<25	--	--	--	--	--	--	--	--	--	(Dup)	
RW-1	08/22/1995		168.01	21.74	--	146.27	2,800	210	9.3	4.3	250	<25	--	--	--	--	--	--	--	--	6.6	--	
RW-1	10/27/1995		168.01	32.00	--	136.01	--	--	--														

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes		
RW-1	07/23/1996	Dup	168.01	20.76	--	147.25	47,000	3,700	2,500	930	5,300	35,000	--	--	--	--	--	--	--	--	--	(Dup)		
RW-1	07/23/1996		168.01	20.76	--	147.25	46,000	3,600	2,300	900	5,100	36,000	--	--	--	--	--	--	--	7.4	--			
RW-1	11/11/1996	Dup	168.01	21.73	--	146.28	31,000	2,900	1,000	860	4,600	22,000	--	--	--	--	--	--	--	--	--	(Dup)		
RW-1	11/11/1996		168.01	21.73	--	146.28	34,000	3,000	1,200	880	4,600	22,000	--	--	--	--	--	--	--	8.3	--			
RW-1	01/21/1997	Dup	168.01	14.20	--	153.81	270	42	17	2.7	36	1,500	--	--	--	--	--	--	--	--	--	(Dup)		
RW-1	01/21/1997		168.01	14.20	--	153.81	260	40	16	2.7	34	1,500	--	--	--	--	--	--	--	6.1	--			
RW-1	04/29/1997		168.01	19.15	--	148.86	32,000	3,100	590	1,300	6,000	46,000	--	--	--	--	--	--	--	5.3	--			
RW-1	08/21/1997		168.01	20.67	--	147.34	7,600	730	58	370	1,780	9,500	--	--	--	--	--	--	--	4.7	--			
RW-1	11/05/1997		168.01	21.01	--	147.00	39,000	2,300	86	1,300	3,840	56,000	--	--	--	--	--	--	--	4.5	--			
RW-1	02/03/1998		168.01	10.68	--	157.33	3,400	31	11	29	161	3,200	--	--	--	--	--	--	--	5.1	--			
RW-1	05/28/1998		168.01	15.55	--	152.46	2,000	90	15	60	305	2,700	--	--	--	--	--	--	--	4.3	--			
RW-1	12/30/1998		168.01	17.35	--	150.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	02/02/1999		168.01	14.58	--	153.43	82,000	2,300	120	2,000	3,200	78,000	--	--	--	--	--	--	--	--	--			
RW-1	05/10/1999		168.01	16.00	--	152.01	15,000	620	88	340	660	61,000	--	--	--	--	--	--	--	--	--			
RW-1	08/24/1999		168.01	20.00	--	148.01	52,000	1,400	170	2,200	2,900	37,000	--	--	--	--	--	--	--	--	--			
RW-1	11/03/1999		168.01	20.39	--	147.62	17,000	2,500	86	1,500	970	54,000	--	--	--	--	--	--	--	--	--			
RW-1	03/01/2000		168.01	12.97	--	155.04	17,000	580	78	790	1,100	13,000	--	--	--	--	--	--	--	--	--			
RW-1	04/21/2000		168.01	16.02	--	151.99	31,000	2,100	100	1,400	1,100	39,000	--	--	--	--	--	--	--	--	--			
RW-1	07/31/2000		168.01	21.89	--	146.12	47,000	1,300	170	2,700	2,300	30,000	--	--	--	--	--	--	--	--	--			
RW-1	11/20/2000		168.01	19.15	--	148.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	02/18/2001		168.01	15.35	--	152.66	14,000	589	89	600	712	13,000	--	--	--	--	--	--	--	--	--			
RW-1	06/07/2001		168.01	19.09	--	148.92	28,000	1,140	68.2	504	530	19,100	--	--	--	--	--	--	--	--	--			
RW-1	09/05/2001		168.01	22.06	0.02	145.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	11/30/2001		168.01	19.53	--	148.48	20,000	405	39.4	545	740	8,260	--	--	--	--	--	--	--	--	--			
RW-1	02/20/2002		168.01	15.99	--	152.02	13,000	469	29	434	655	7,240	--	--	--	--	--	--	--	--	--			
RW-1	06/20/2002		168.01	19.31	--	148.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	09/11/2002		168.01	21.07	0.03	146.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	11/12/2002		168.01	20.92	0.02	147.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	01/29/2003		168.01	16.31	0.04	151.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	05/22/2003		168.01	16.68	--	151.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	06/24/2003		168.01	19.76	0.07	148.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	07/28/2003		168.01	21.04	0.04	146.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	08/12/2003		168.01	21.41	0.01	146.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	09/12/2003		168.01	21.10	0.07	146.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	11/18/2003		168.01	20.10	0.01	147.91	12,000	770	<50	320	250	6,100	11,000	--	<50	<50	--	160	<10,000	--	--			
RW-1	02/23/2004		168.01	14.35	0.01	153.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	05/04/2004		168.01	19.58	0.02	148.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	08/04/2004		168.01	22.05	0.05	146.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	09/22/2004		168.01	21.28	0.06	146.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	11/10/2004		168.01	18.56	0.02	149.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	01/13/2005		168.01	12.51	0.01	155.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	02/15/2005		168.01	15.24	0.03	152.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	03/07/2005		168.01	11.90	0.02	156.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	05/16/2005		168.01	14.39	0.02	153.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	08/17/2005		168.01	19.91	0.03	148.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	11/18/2005		168.01	20.36	0.07	147.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	02/07/2006		168.01	12.87	0.01	155.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	05/19/2006		168.01	15.87	0.04	152.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	08/23/2006		168.01	20.50	0.07	147.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	11/15/2006		168.01	20.52	0.07	147.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	02/14/2007		168.01	15.44	0.04	152.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	05/22/2007		168.01	17.78	(Sheen)	150.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	08/15/2007		168.01	20.80	0.02	147.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	11/08/2007		168.01	20.32	0.01	147.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	02/20/2008		168.01	14.55	0.02	153.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	08/20/2008		168.01	21.34	0.02	146.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	11/17/2008		168.01	20.41	--	147.60	13,000	120	<20	590	320	120	<400	<20	<20	<20	<20	<20	<20	<12,000	--	--		
RW-1	02/25/2009		168.01	13.40	0.02	154.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	04/08/2009		168.01	16.45	--	151.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	05/28/2009		168.01	17.88	0.01	150.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	06/16/2009		168.01	19.30	0.01	148.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	08/06/2009		168.01	20.72	0.01	147.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	03/04/2010		168.01	12.33	--	155.68	8,000	20	<2.5	230	140	110	45	<2.5	<2.5	<2.5	<2.5	<2.5	5.7	<500	1.24	--	(P)	
RW-1	09/02/2010		168.01	20.14	--	147.87	4,700	18	<2.5	78	46	<2.5	<20	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<500	--	(NP)
RW-1	03/15/2011		168.01	13.03	--	154.98	7,000	3.7	<2.5	44	31	6.7	<20	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<1,200	--	--	(P)	
RW-1	08/17/2011		168.01	18.60	--	149.41	2,800	7.5	<2.5	12	10	8.8	<20	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<1,300	--	--	(P)	
RW-1	02/06/2012		168.01	16.81	--	151.20	1,300	3.1	<2.5	5.2	5.1	2.9	<20	<2.5	<2.5	<2.5	<2.5	<2.5(*)	<2.5	<1,300	--	--	(P)	
RW-1	08/21/2012		168.01	20.06	--	147.95	1,200	10	0.58	10	5.2	15	<4.0	<0.50	<0.50	<0.50	<0.50	1	<250	--	--	(P)		
RW-1	02/04/2013		168.01	16.36	(Sheen)	151.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			
RW-1	08/01/2013		168.01	20.50	0.01	147.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(LPH)		
RW-1	02/27/2014		168.01	17.66	--	150.35	800	<0.50	<0.50	<0.50	<1.0	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<250	--	--			
RW-1	08/27/2014		168.01	20.35	(Sheen)	147.66	2,800	5.9	1.7	12	5.2	6.												

Table 2  
 Historical Groundwater Monitoring and Analytical Data  
 CA-11132  
 3201 35th Ave, Oakland CA



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	EDB (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	NAPH (µg/L)	Notes
RW-1	08/27/2015		168.01	19.90	--	148.11	2,550	4.57	1.14J	4.54	3.66	<1.00	6.22	<1.00	<1.00	<1.00	--	<1.00	<100	8.36	--	(odor)
RW-1	03/28/2016		168.01	12.68	--	155.33	199	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00J3	<1.00	<1.00	<1.00	<100	1.01	--	
RW-1	09/07/2016		168.01	19.36	--	148.65	1,120	2.86	0.919J	2.28	2.66J	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	0.18	--	
RW-1	03/01/2017		168.01	10.63	--	157.38	225	<1.00	<1.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<100	2.31	--	
OW-1	09/07/2016		--	19.74	0.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(LPH)
OW-1	03/01/2017		--	12.04	0.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(LPH)

**Notes:**  
 TOC = Top of casing measured  
 DTW = Depth to water  
 LNAPL = Light non-aqueous phase liquid (LPH)  
 GW Elev = Groundwater elevation  
 GRO = Gasoline range organics  
 B = Benzene  
 T = Toluene  
 E = Ethylbenzene  
 X = Total xylenes  
 MTBE = Methyl tert-butyl ether  
 TBA = tert-butyl alcohol  
 DIPE = Di-isopropyl ether  
 ETBE = Ethyl tert-butyl ether  
 TAME = tert-Amyl methyl ether  
 DO = Dissolved oxygen  
 1,2-DCA = 1,2-dichloroethane  
 EDB = 1,2-dibromoethane  
 Ft msl = Feet above mean sea level  
 DUP = Duplicate sample  
 -- = Not analyzed/applicable/measured/available  
 < = Not detected at or above specified laboratory reporting limit  
 mg/L = Milligrams per liter  
 µg/L = Micrograms per liter  
 NP = Well not purged prior to sampling  
 P = Well purged prior to sampling  
 b = GWE adjusted assuming a specific gravity of 0.75 for free product  
 j = Well not sampled due to presence of LPH and nature of the product  
 J = The associated batch QC was outside the established quality control range for precision.  
 t = Sheen in well  
 y = Sample dilution was done with headspace in the sample vial; the samples were originally analyzed from VOAs without headspace  
 \* = LCS or LCS D exceeds the control limits  
 Beginning in the Fourth Quarter 2003, the laboratory modified the reported analyte list; TPHg was changed to GRO; the resulting data may be impacted by the potential of non-TPHg analytes within the requested fuel range resulting in a higher concentration being reported  
 Beginning in the Second Quarter 2004, the carbon range for GRO was changed from C6-C10 to C4-C12  
 Values for DO and pH were obtained through field measurements  
 GRO analysis was completed by EPA method 8260B (C4-C12) for samples collected from the time period April 2006 through February 4, 2008; the analysis for GRO was changed to EPA method 8015B (C6-C12)  
 for samples collected from the time period February 5, 2008 through August 6, 2009 and EPA method 8260B (C6-C12) from March 4, 2010 to the present  
 The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield Company and their previous consultants; Broadbent & Associates, Inc. has not verified the accuracy of this information



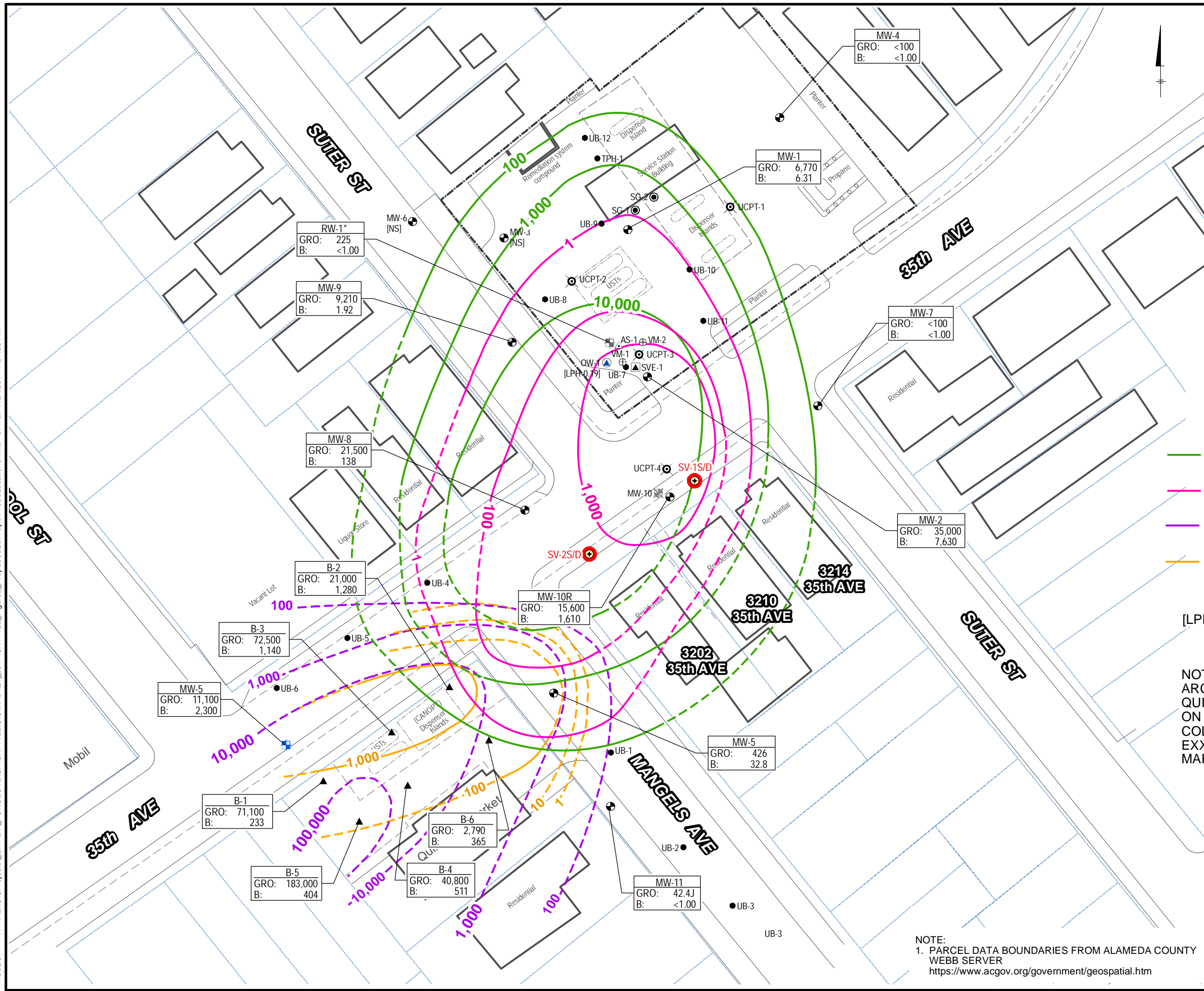
# FIGURES







CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: kgpters LD: PIC: PM: TM: PROJECT: \PATH: Z:\GIS\Projects\ENV\BP\_FOXGLOVE\CA11132\GIS\MXD\Q1\_2017\CA11132\_Figure2\_ProposedSoilVaporProbeLocations.mxd DATE: 7/21/2017 7:21:29 AM



**LEGEND:**

- PROPOSED SOIL VAPOR PROBE
- GROUNDWATER MONITORING WELL
- GROUNDWATER RECOVERY WELL
- EXXON-MOBIL WELL
- OBSERVATION WELL
- SOIL VAPOR EXTRACTION WELL
- SOIL VAPOR MONITORING WELL
- SOIL BORING (EXXON)
- SOIL BORING
- CPT/UVOST LOCATION
- SOIL GAS BORING
- AIR SPARGE WELL
- ABANDONED MONITORING WELL
- PROPERTY BOUNDARIES
- PROPERTY BOUNDARY
- CANOPY
- UNDERGROUND STORAGE TANKS

MW-1		SAMPLE LOCATION ID	CONCENTRATION IN MICROGRAMS PER LITER (µg/L)	ANALYTE
GRO:	B:			
6,770	6.31			

GRO ISOCONCENTRATION CONTOUR (µg/L)  
 ARCADIS; DASHED WHERE INFERRED

BENZENE ISOCONCENTRATION CONTOUR (µg/L)  
 ARCADIS; DASHED WHERE INFERRED

GRO ISOCONCENTRATION CONTOUR (µg/L)  
 QUIK STOP; DASHED WHERE INFERRED

BENZENE ISOCONCENTRATION CONTOUR (µg/L)  
 QUIK STOP; DASHED WHERE INFERRED

GRO GASOLINE RANGE ORGANICS  
 B BENZENE  
 [LPH-0.19] LIQUID PHASE HYDROCARBONS - THICKNESS IN FEET  
 RW-1\* NOT USED FOR CONTOURING

NOTE:  
 ARCADIS SAMPLES COLLECTED MARCH 1, 2017.  
 QUICKSTOP SAMPLES B-4 & B-6 WERE COLLECTED ON JULY 5, 2016. SAMPLES B-1, B-2, B-3, & B-5 WERE COLLECTED ON JULY 12, 2016.  
 EXXON MOBIL WELL MW-5 SAMPLE COLLECTED ON MARCH 27, 2017.

0 50 100  
 SCALE IN FEET

FORMER BP SERVICE STATION #11132  
 3201 35TH AVENUE  
 OAKLAND, CALIFORNIA

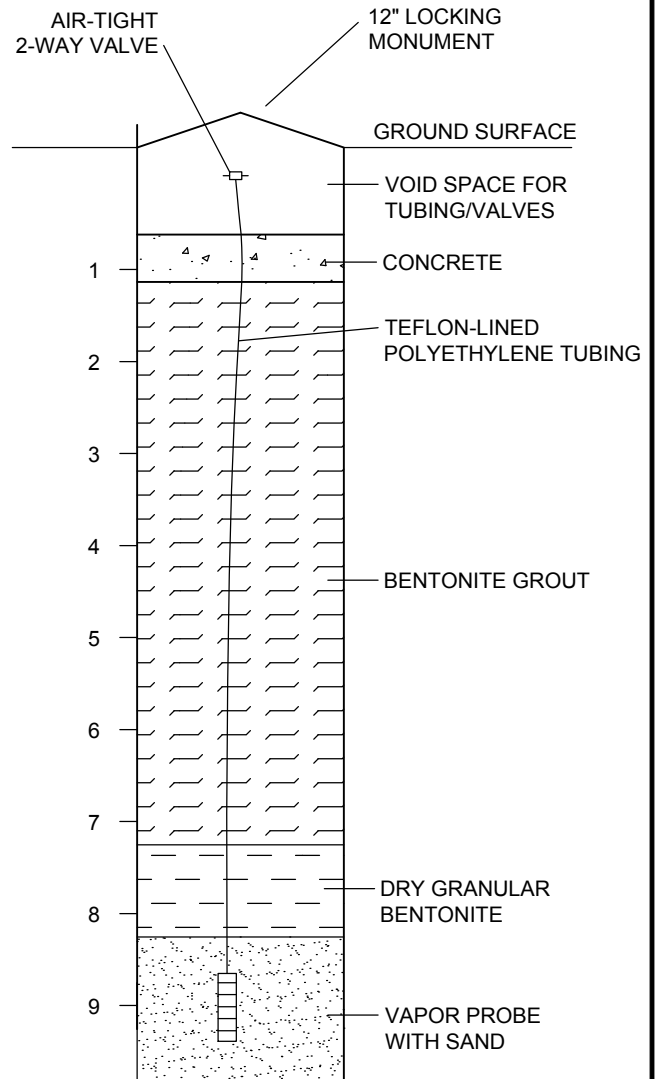
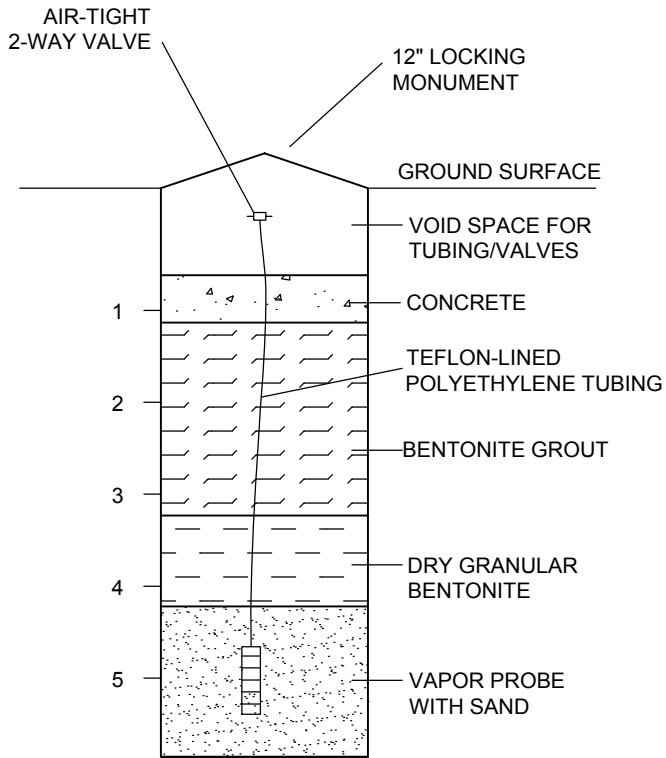
**PROPOSED SOIL VAPOR PROBE LOCATIONS**

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

NOTE:  
 1. PARCEL DATA BOUNDARIES FROM ALAMEDA COUNTY WEBB SERVER  
<https://www.acgov.org/government/geospatial.htm>

CITY: TAMPA, FL DIV: GROUP 85 DB: JARIBAR LD: (Opt) PIC: (Opt) PIM: M. Strickler TM: (Opt) LXR: (Opt) ON: OFF=REF  
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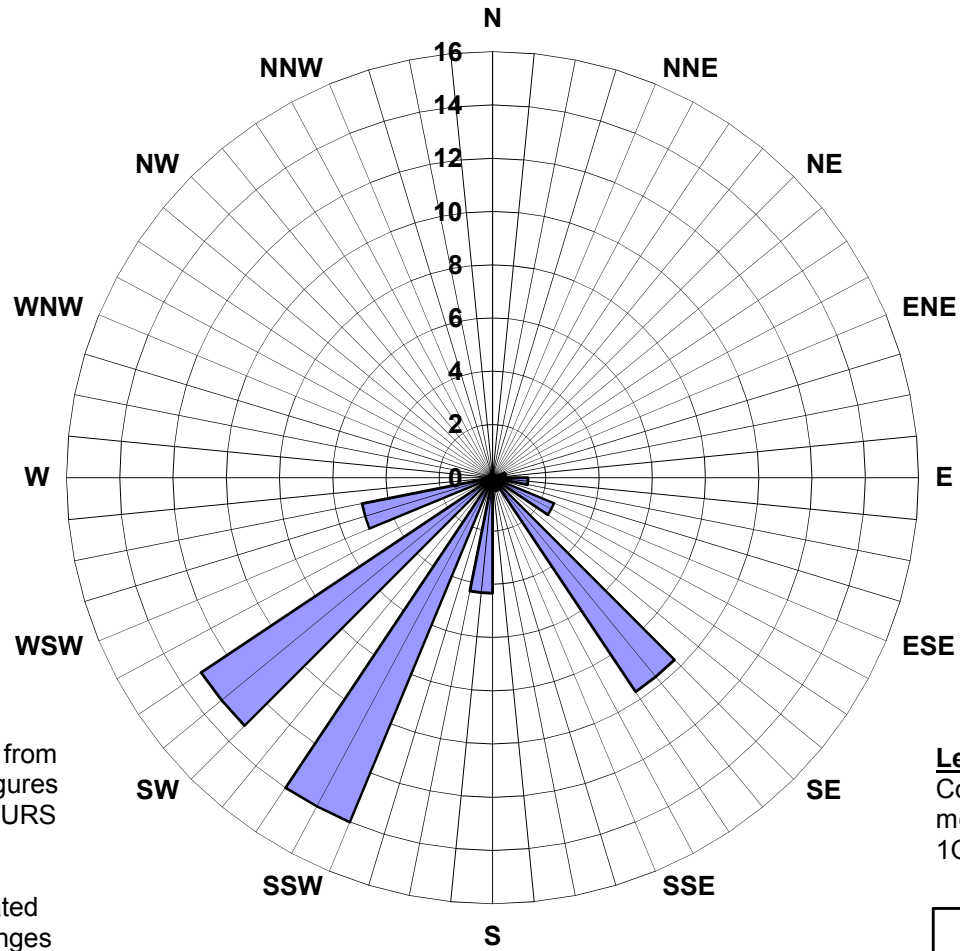
**NOTE:**

VAPOR PROBE IS CONSTRUCTED WITH A 6-INCH, 0.375-INCH OUTER DIAMETER STAINLESS STEEL SOIL VAPOR SCREEN WITH A STAINLESS STEEL IMPLANT ANCHOR

FORMER BP SERVICE STATION #11132  
 3201 35TH AVENUE  
 OAKLAND, CALIFORNIA

**VAPOR PROBE SCHEMATIC DIAGRAM**

**Figure 4**  
**Groundwater Flow Direction Rose Diagram**  
**CA BP 11132**  
**3201 35th Ave**  
**Oakland, California 94619**



**Notes**

Groundwater gradient and flow data from 2Q06 to 1Q12 monitoring events provided by Broadbent & Associates, Inc.

Groundwater flow direction data from 4Q00 to 1Q06 estimated from figures provided by RRM, Cambria and URS consultants.

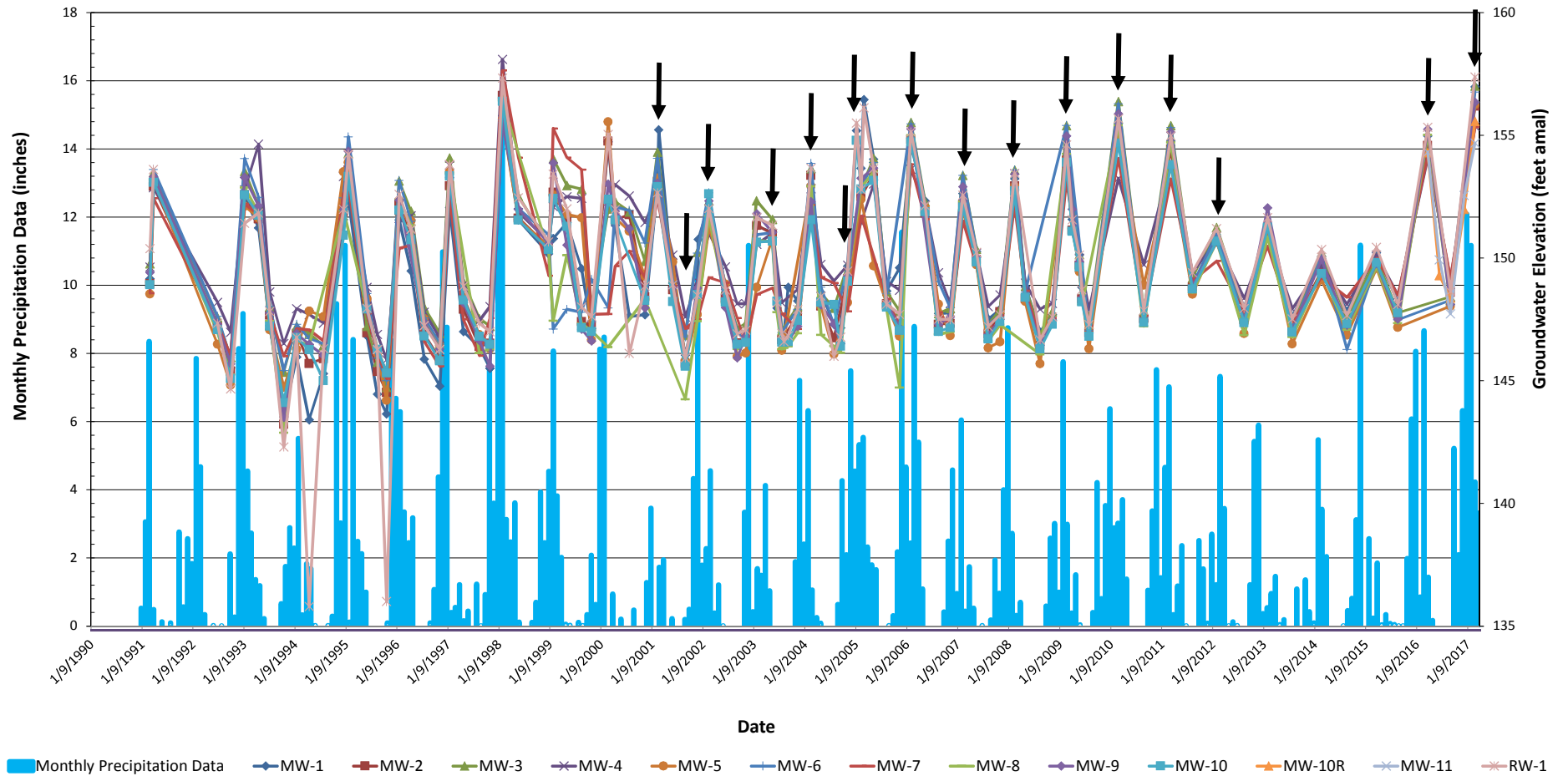
On June 20, 2017, Arcadis updated the Rose Diagram to reflect changes made to the north arrow on select groundwater elevation figures.

**Legend**

Concentric circles represent 51 monitoring events from 4Q00 to 1Q17.

■ Groundwater Flow Direction

## Monthly Precipitation vs. BP #11132 Site Groundwater Elevations



**LEGEND:**  
amsl - above mean sea level

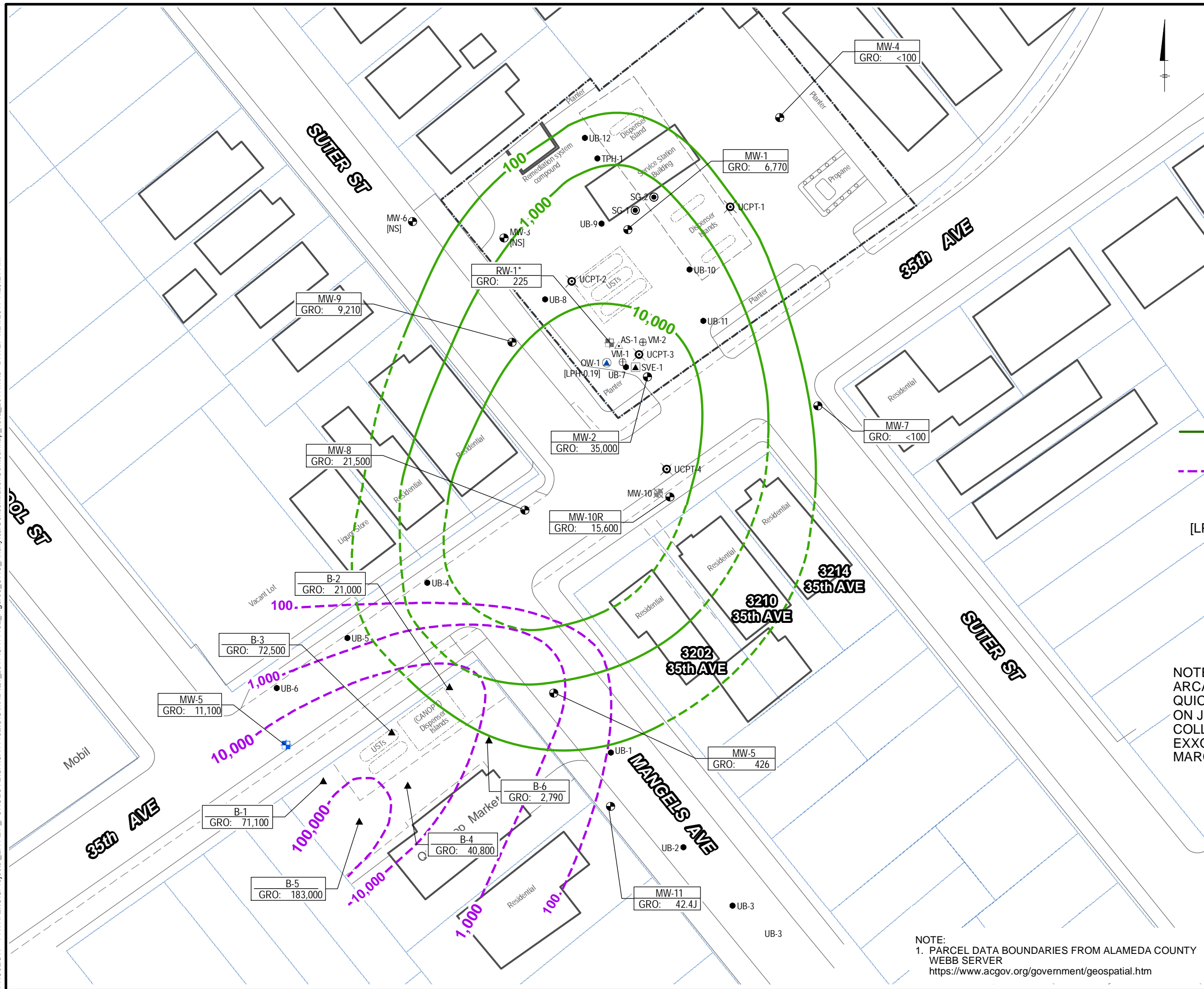
**NOTES:**  
Monthly precipitation data is from nearest NOAA/NWS COOP station, located in the San Leandro Hills (hills to the NE of BP #11132 Site)

Black arrows indicate monitoring events where the apparent hydraulic gradient direction shifts to the southeast (instead of the predominant southwest direction; 16 instances of out the last 51 monitoring events).

FORMER BP SERVICE STATION #11132 3201 35TH AVENUE OAKLAND, CALIFORNIA	
<b>Monthly Precipitation vs. BP #11132 Site Groundwater Elevations</b>	
	Design & Consultancy for natural and built assets
<b>FIGURE 5</b>	



CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: kgreters LD: PIC: PM: TM: PROJECT: Z:\GIS\Projects\EN\BVP\_FOXGLOVE\CA11132\GIS\MXD\Q1\_2017\CA11132\_Figure6\_GRO\_AnalyticalConcentrationContourMap\_1stQ\_2017.mxd DATE: 7/21/2017 7:25:21 AM



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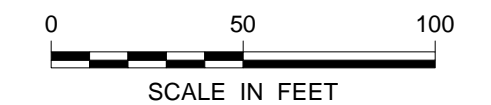
- GROUNDWATER MONITORING WELL
- ⊕ GROUNDWATER RECOVERY WELL
- ⊕ EXXON-MOBIL WELL
- OBSERVATION WELL
- ⊕ SOIL VAPOR EXTRACTION WELL
- ⊕ SOIL VAPOR MONITORING WELL
- ▲ SOIL BORING (EXXON)
- SOIL BORING
- ⊗ CPT/UVOST LOCATION
- ⊙ SOIL GAS BORING
- △ AIR SPARGE WELL
- ⊗ ABANDONED MONITORING WELL
- ▭ PROPERTY BOUNDARIES
- PROPERTY BOUNDARY
- CANOPY
- UNDERGROUND STORAGE TANKS

MW-1	SAMPLE LOCATION ID
GRO: 6,770	CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
	ANALYTE

- GRO ISOCONCENTRATION CONTOUR (µg/L) ARCADIS; DASHED WHERE INFERRED
- - - GRO ISOCONCENTRATION CONTOUR (µg/L) QUIK STOP; DASHED WHERE INFERRED

GRO GASOLINE RANGE ORGANICS  
[LPH-0.19] LIQUID PHASE HYDROCARBONS - THICKNESS IN FEET  
J CONCENTRATION BETWEEN REPORTING AND DETECTION LIMITS  
[NS] NOT SAMPLED  
< NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT  
RW-1\* NOT USED FOR CONTOURING

**NOTE:**  
ARCADIS SAMPLES COLLECTED MARCH 1, 2017.  
QUICKSTOP SAMPLES B-4 & B-6 WERE COLLECTED ON JULY 5, 2016. SAMPLES B-1, B-2, B-3, & B-5 WERE COLLECTED ON JULY 12, 2016.  
EXXON MOBIL WELL MW-5 SAMPLE COLLECTED ON MARCH 27, 2017.



FORMER BP SERVICE STATION #11132  
3201 35TH AVENUE  
OAKLAND, CALIFORNIA

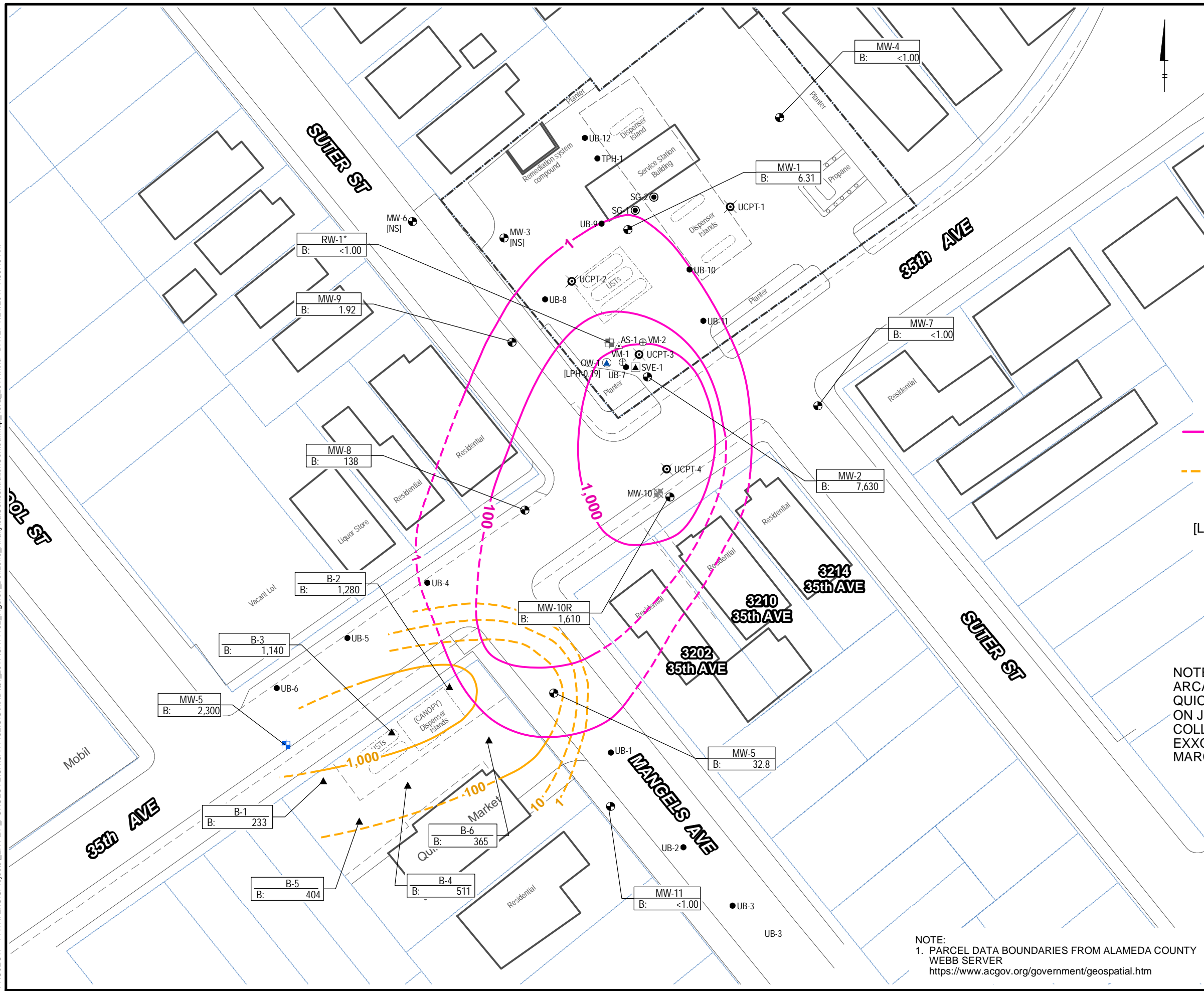
**GRO ANALYTICAL CONCENTRATION CONTOUR MAP  
FIRST QUARTER 2017 RESULTS**

**ARCADIS** Design & Consultancy for natural and built assets

FIGURE 6

**NOTE:**  
1. PARCEL DATA BOUNDARIES FROM ALAMEDA COUNTY WEBB SERVER  
<https://www.acgov.org/government/geospatial.htm>

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: kgpters LD: PIC: PM: TM: PROJECT: Z:\GIS\Projects\EN\B\BP\_FOXGLOVE\CA11132\GIS\MXD\Q1\_2017\CA11132\_Figure7\_Benzene\_AnalyticalConcentrationContourMap\_1stQ\_2017.mxd DATE: 7/21/2017 7:30:48 AM



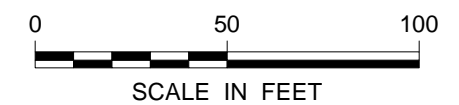
**LEGEND:**

- GROUNDWATER MONITORING WELL
- GROUNDWATER RECOVERY WELL
- ⊕ EXXON-MOBIL WELL
- OBSERVATION WELL
- ▲ SOIL VAPOR EXTRACTION WELL
- ⊕ SOIL VAPOR MONITORING WELL
- ▲ SOIL BORING (EXXON)
- SOIL BORING
- ⊗ CPT/UVOST LOCATION
- SOIL GAS BORING
- ▲ AIR SPARGE WELL
- ⊗ ABANDONED MONITORING WELL
- PROPERTY BOUNDARIES
- PROPERTY BOUNDARY
- CANOPY
- UNDERGROUND STORAGE TANKS

MW-1	SAMPLE LOCATION ID
B: 6.31	CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
	ANALYTE

- BENZENE ISOCONCENTRATION CONTOUR (µg/L) ARCADIS; DASHED WHERE INFERRED
- BENZENE ISOCONCENTRATION CONTOUR (µg/L) QUICK STOP; DASHED WHERE INFERRED
- B BENZENE
- [LPH-0.19] LIQUID PHASE HYDROCARBONS - THICKNESS IN FEET
- J CONCENTRATION BETWEEN REPORTING AND DETECTION LIMITS
- [NS] NOT SAMPLED
- < NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT
- RW-1\* NOT USED FOR CONTOURING

**NOTE:**  
 ARCADIS SAMPLES COLLECTED MARCH 1, 2017. QUICKSTOP SAMPLES B-4 & B-6 WERE COLLECTED ON JULY 5, 2016. SAMPLES B-1, B-2, B-3, & B-5 WERE COLLECTED ON JULY 12, 2016. EXXON MOBIL WELL MW-5 SAMPLE COLLECTED ON MARCH 27, 2017.



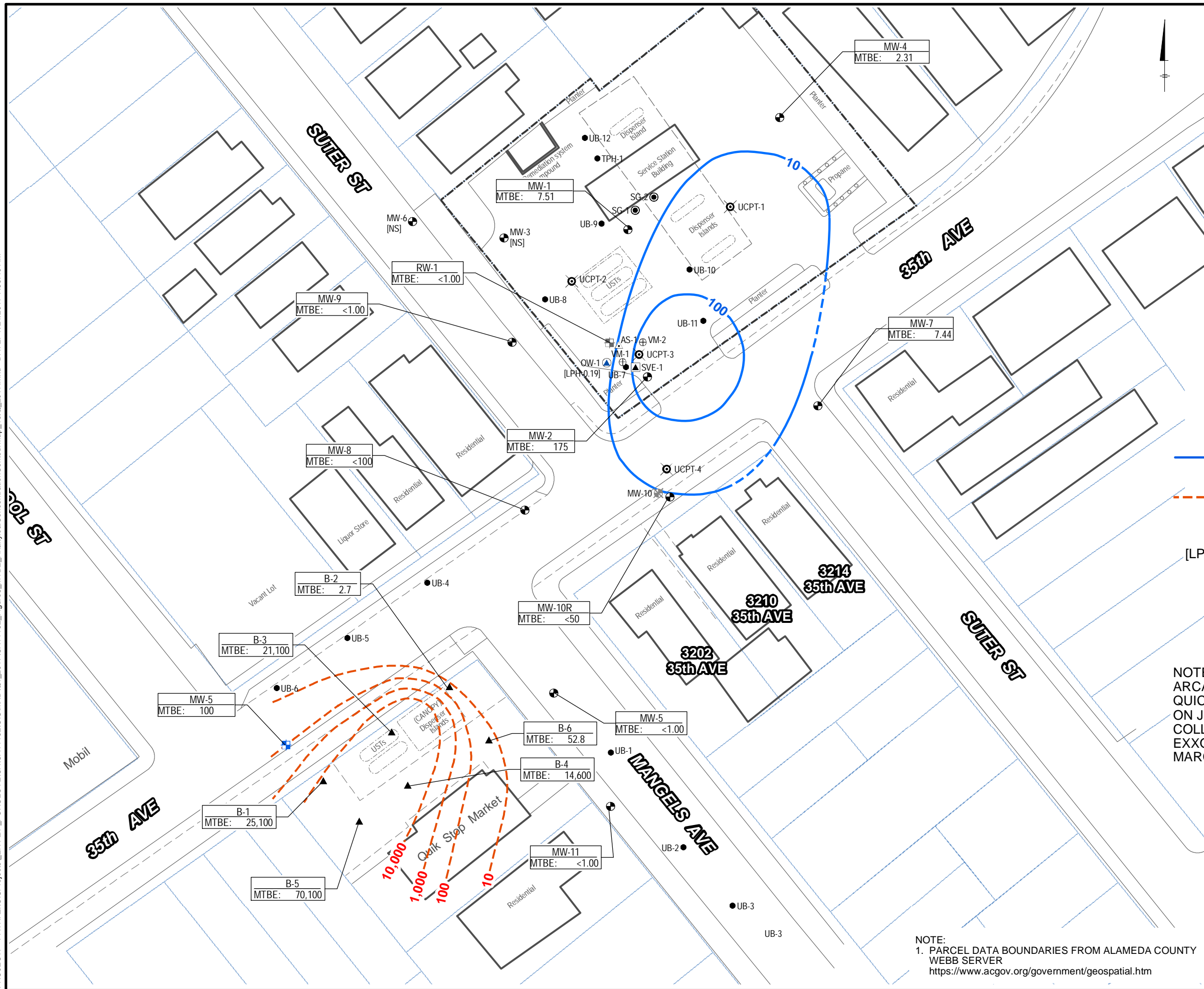
FORMER BP SERVICE STATION #11132  
 3201 35TH AVENUE  
 OAKLAND, CALIFORNIA

**BENZENE ANALYTICAL CONCENTRATION CONTOUR MAP**  
**FIRST QUARTER 2017 RESULTS**

**NOTE:**  
 1. PARCEL DATA BOUNDARIES FROM ALAMEDA COUNTY WEBB SERVER  
<https://www.acgov.org/government/geospatial.htm>



CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: kgpters LD: PIC: PM: TM:  
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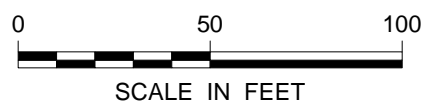
- ⊕ GROUNDWATER MONITORING WELL
- ⊕ GROUNDWATER RECOVERY WELL
- ⊕ EXXON-MOBIL WELL
- ⊕ OBSERVATION WELL
- ⊕ SOIL VAPOR EXTRACTION WELL
- ⊕ SOIL VAPOR MONITORING WELL
- ▲ SOIL BORING (EXXON)
- SOIL BORING
- ⊗ CPT/UVOST LOCATION
- ⊕ SOIL GAS BORING
- ⊕ AIR SPARGE WELL
- ⊕ ABANDONED MONITORING WELL
- ▭ PROPERTY BOUNDARIES
- - - PROPERTY BOUNDARY
- - - CANOPY
- - - UNDERGROUND STORAGE TANKS

MW-1	SAMPLE LOCATION ID
MTBE: 7.51	CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
	ANALYTE

- MTBE ISOCONCENTRATION CONTOUR (µg/L) ARCADIS; DASHED WHERE INFERRED
- - - MTBE ISOCONCENTRATION CONTOUR (µg/L) QUIK STOP; DASHED WHERE INFERRED

MTBE METHYL TERT-BUTYL ETHER  
 [LPH-0.19] LIQUID PHASE HYDROCARBONS - THICKNESS IN FEET  
 J CONCENTRATION BETWEEN REPORTING AND DETECTION LIMITS  
 [NS] NOT SAMPLED  
 < NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT

**NOTE:**  
 ARCADIS SAMPLES COLLECTED MARCH 1, 2017.  
 QUICKSTOP SAMPLES B-4 & B-6 WERE COLLECTED ON JULY 5, 2016. SAMPLES B-1, B-2, B-3, & B-5 WERE COLLECTED ON JULY 12, 2016.  
 EXXON MOBIL WELL MW-5 SAMPLE COLLECTED ON MARCH 27, 2017.

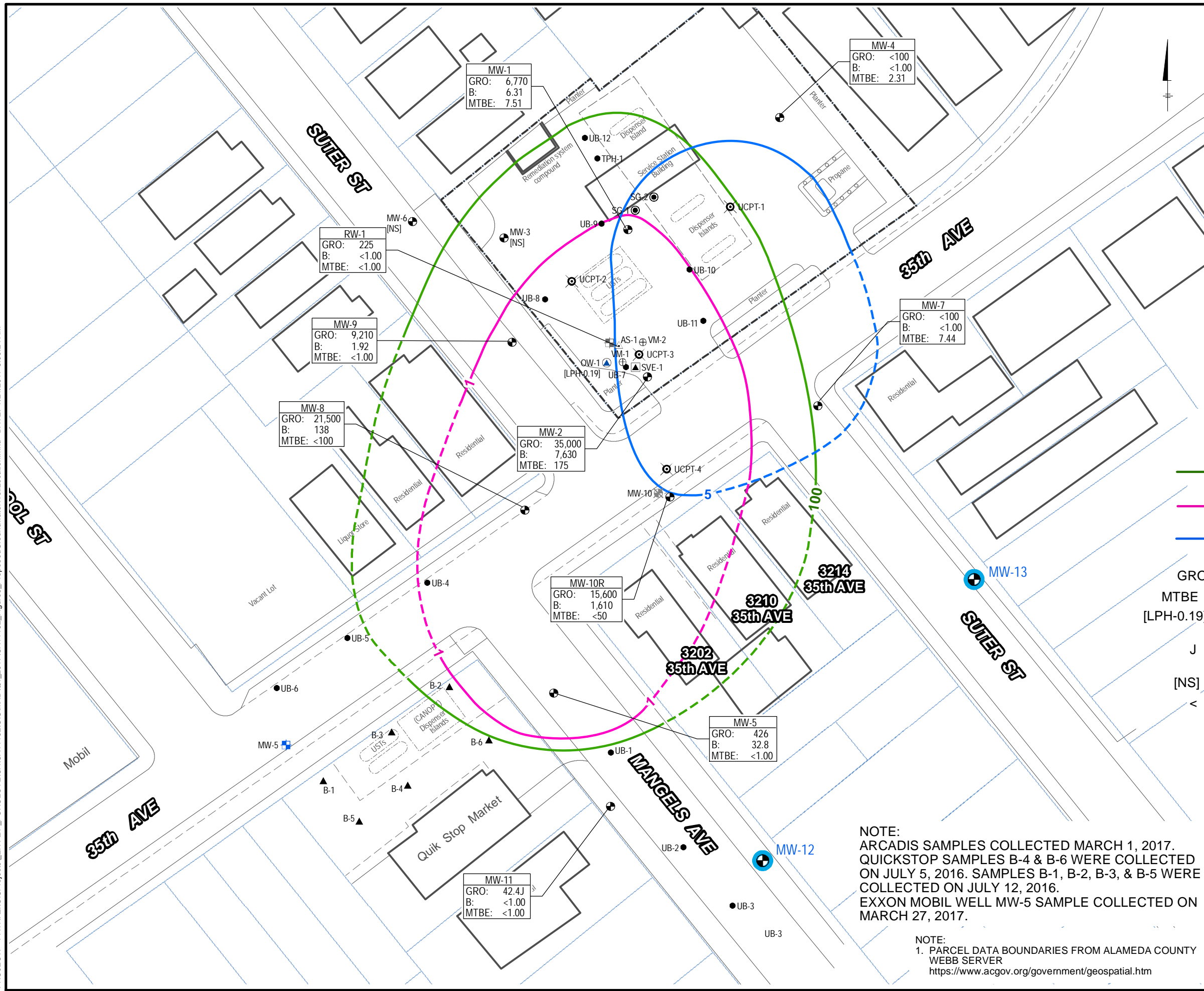


FORMER BP SERVICE STATION #11132  
 3201 35TH AVENUE  
 OAKLAND, CALIFORNIA

**MTBE ANALYTICAL CONCENTRATION CONTOUR MAP  
 FIRST QUARTER 2017 RESULTS**

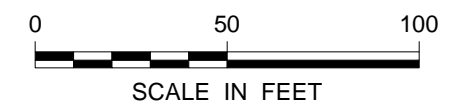
**ARCADIS** Design & Consultancy for natural and built assets

**NOTE:**  
 1. PARCEL DATA BOUNDARIES FROM ALAMEDA COUNTY WEBB SERVER  
<https://www.acgov.org/government/geospatial.htm>



- LEGEND:**
- PROPOSED GROUNDWATER MONITORING WELL LOCATION
  - GROUNDWATER MONITORING WELL
  - GROUNDWATER RECOVERY WELL
  - EXXON-MOBIL WELL
  - OBSERVATION WELL
  - SOIL VAPOR EXTRACTION WELL
  - SOIL VAPOR MONITORING WELL
  - SOIL BORING (EXXON)
  - SOIL BORING
  - CPT/UVOST LOCATION
  - SOIL GAS BORING
  - AIR SPARGE WELL
  - ABANDONED MONITORING WELL
  - PROPERTY BOUNDARIES
  - PROPERTY BOUNDARY
  - CANOPY
  - UNDERGROUND STORAGE TANKS

- | Symbol     | ANALYTE  |
|------------|--|
|            | GRO ISOCONCENTRATION CONTOUR (µg/L) ARCADIS; DASHED WHERE INFERRED     |
|            | BENZENE ISOCONCENTRATION CONTOUR (µg/L) ARCADIS; DASHED WHERE INFERRED |
|            | MTBE ISOCONCENTRATION CONTOUR (µg/L) ARCADIS; DASHED WHERE INFERRED    |
| GRO        | GASOLINE RANGE ORGANICS  |
| MTBE       | METHYL TERT-BUTYL ETHER  |
| [LPH-0.19] | LIQUID PHASE HYDROCARBONS - THICKNESS IN FEET                          |
| J          | CONCENTRATION BETWEEN REPORTING AND DETECTION LIMITS                   |
| [NS]       | NOT SAMPLED  |
| <          | NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT             |



**NOTE:**  
 ARCADIS SAMPLES COLLECTED MARCH 1, 2017.  
 QUICKSTOP SAMPLES B-4 & B-6 WERE COLLECTED ON JULY 5, 2016. SAMPLES B-1, B-2, B-3, & B-5 WERE COLLECTED ON JULY 12, 2016.  
 EXXON MOBIL WELL MW-5 SAMPLE COLLECTED ON MARCH 27, 2017.

**NOTE:**  
 1. PARCEL DATA BOUNDARIES FROM ALAMEDA COUNTY WEBB SERVER  
<https://www.acgov.org/government/geospatial.htm>

FORMER BP SERVICE STATION #11132  
 3201 35TH AVENUE  
 OAKLAND, CALIFORNIA

**PROPOSED GROUNDWATER WELL LOCATIONS**

**ARCADIS** Design & Consultancy for natural and built assets

FIGURE 9

# APPENDIX A

ACEH Response Letters







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

June 3, 2016

Atlantic Richfield Company  
(A BP Affiliated Company)  
P.O. Box 1257  
San Ramon, CA 94583  
Attn: Paul Supple  
(Sent via electronic mail to:  
[paul.supple@bp.com](mailto:paul.supple@bp.com))

ConocoPhillips  
76 Broadway  
Sacramento, CA 95818  
Attn: Ed Ralston  
(Sent via electronic mail to:  
[Ed.C.Ralston@p66.com](mailto:Ed.C.Ralston@p66.com))

Rajinder S & Sukhvinder Sull  
2004 Hartnell Street  
Union City, CA 94587  
(Sent via electronic mail to: [rsunion76@aol.com](mailto:rsunion76@aol.com))

Subject: Request for Addendum Work Plan, Fuel Leak Case No. RO0000014 and GeoTracker  
Global ID T0600100213, BP #11132, 3201 35<sup>th</sup> Avenue, Oakland, CA 94619

Dear Responsible Parties:

Thank you for the recently submitted documents entitled *Well Installation and Well Replacement Report (WR)*, dated April 12, 2016, and *First Quarter 2016 Semi-Annual Groundwater Monitoring Report (GWM)*, dated April 27, 2016. Both reports were prepared by ARCADIS U.S., Inc. (Arcadis), for subject site. Alameda County Environmental Health (ACEH) staff has reviewed the case file including afore-mentioned documents in conjunction with the State Water Resources Control Board's (SWRCBs) Low Threat Underground Storage Tank Case Closure Policy (LTCP).

The WR documents the destruction of off-site monitoring well MW-10, the installation of MW-10 replacement well MW-10R, and installation of off-site well MW-11.

The GWM documents the sampling and analytical results of four on-site and five off-site wells, including the recently installed wells MW-10R and MW-11.

#### Technical Comments

1. As expressed in our Directive letter dated September 18, 2015, ACEH was of the opinion that installation of soil gas probe SV-1, as outlined in the *Work Plan- Additional Site Characterization (Work Plan)*, dated June 25, 2014 and prepared by Arcadis, was premature, pending the findings of contaminant concentrations in the replacement well MW-10R. The GWM documents the analytical results for the initial sampling of well MW-10R, which was reported to contain the concentration of total petroleum hydrocarbons as gasoline (TPHg) at 38,000 micrograms per liter ( $\mu\text{g/L}$ ) and benzene, toluene, ethylbenzene, and xylenes (collectively BTEX) at 3,830, 2,810, 1,130, and 5,310  $\mu\text{g/L}$ , respectively. Additionally, the concentration of tertiary butyl alcohol (TBA) was reported at 40.5  $\mu\text{g/L}$ .

Based on these concentrations, ACEH is of the opinion that the soil gas investigation outlined in the Work Plan and ACEH's September 18, 2015 letter, is warranted. Sampling locations along 35<sup>th</sup> Avenue may include the residences (addressed as 3210, and 3214 35<sup>th</sup> Avenue) and the child care facility (at 3202 35<sup>th</sup> Avenue). Prior to performing the investigation, the foundations types and their depths, including the presence of basements, should be ascertained for determining the appropriate depth of sampling. ACEH requests the preparation and submittal of a figure depicting the proposed sample locations, accompanied by a cover letter documenting foundation types, the presence/absence of basements, and the proposed depth of sample collection for ACEH review and approval. Please submit the document as a work plan addendum by the date specified below.

ACEH requests the soil vapor investigation be performed in accordance with the July 2015 *Advisory- Active Soil Gas Investigations* (Advisory) prepared by California Environmental Protection Agency/ Department of Toxic Substances Control (Cal EPA / DTSC), and the Regional Water Quality Control Boards of the Los Angeles (LARWQCB) and San Francisco (SFRWQCB) regions.

Based on the difficulty permitting through the City of Oakland for the work performed for the WR, efforts should be made to perform the sampling within the properties being evaluated. The soil vapor sampling points should be located as close to structures as permissible. Additionally, in accordance with the Advisory, ACEH requests installation of permanent soil gas probes.

2. The Work Plan specifies that soil gas samples will be collected at depths of 5 and 10 feet based on the requirements of Appendix 4 of the LTCP. The LTCP specifies a sample collection depth of 5 feet below the depth of the foundation, or at 5 feet below the ground surface (bgs) for undeveloped sites. ACEH requests the LTCP sampling depth of 5 feet be followed for the soil gas investigation, with adjustments made based on the type of foundation of the adjacent structures.
3. The Work Plan specifies that the soil gas samples will be analyzed for benzene, ethyl benzene and naphthalene. While these three compounds are consistent with the LTCP, health risks associated with vapor intrusion to indoor air are not restricted to these three compounds. Therefore, ACEH requests a full scan TO-15 analysis be run. Additionally, one duplicate sample should be analyzed for naphthalene using the TO-17 analysis for verification of the TO-15 concentrations. ACEH concurs with the Work Plan that the soil gas sample analysis include oxygen and the tracer gas, identified as helium. Due to the elevated petroleum hydrocarbons reported in groundwater at MW-10R, ACEH requests the addition of methane and carbon dioxide to the analysis scope for a methanogenesis evaluation.
4. ACEH's review of the groundwater gradient data suggests the north arrow of site figures may not be properly oriented. Please review the orientation of the north arrow on the figures. If the north arrow is not properly aligned, ACEH requests a revision statement, a corrected rose diagram, and revised *Historical Groundwater Flow Direction and Gradient* table in future groundwater monitoring reports.
5. As stated above, groundwater at MW-10R includes 38,000 µg/L TPHg and 3,830 µg/L benzene. As MW-10R is an off-site downgradient well, ACEH requests a work plan for

additional contaminant plume definition down gradient of well MW-10R. Please provide the work plan by the date specified below.

6. The report entitled *First Quarter 2012 Monitoring Report*, dated April 13, 2012 and provided to ACEH by Arcadis, states the cumulative light non-aqueous phase petroleum hydrocarbons (LNAPL) recovered is 234.3 gallons of LNAPL/water mixture. Subsequent groundwater monitoring reports identify the 'cumulative liquid phase hydrocarbons recovered to date' as 'none'. LNAPL recovery has been performed at the site since free phase (FP) product was observed, with removal followed up with an interim FP removal system which began operation in November 1992. ACEH requests a review of LNAPL recovery data for the site and the cumulative total be expressed on the appropriate data sheet.

#### **TECHNICAL REPORT REQUEST**

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

- **July 5, 2016 –Work Plan Addendum** (Figure Depicting Soil Gas Sampling Locations with Cover Letter (file name: RO0000014\_WP\_ADEND\_R\_YYYY-MM-DD))
- **July 29, 2016 – Second Quarter 2016 Quarterly Groundwater Monitoring Report** (file name: RO0000014\_GWM\_R\_YYYY-MM-DD)
- **August 3, 2016 – Work Plan for Additional Contaminant Plume Definition** (file name: RO0000014\_WP\_R\_YYYY-MM-DD)

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

Respectfully,

Keith Nowell

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

cc: Megan Smoley, Arcadis U.S. Inc., 100 Montgomery Street, 7051 Fain Park Drive, Suite 119, Montgomery, AL 36117 (Sent via E-mail to: [Megan.Smoley@arcadis-us.com](mailto:Megan.Smoley@arcadis-us.com))

Dilan Roe (Sent via electronic mail to: [dilan.roe@acgov.org](mailto:dilan.roe@acgov.org))

Keith Nowell, ACEH (Sent via electronic mail to: [keith.nowell@acgov.org](mailto:keith.nowell@acgov.org))

GeoTracker, File

## Attachment 1

### Responsible Party(ies) Legal Requirements / Obligations

#### REPORT REQUESTS

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

#### ELECTRONIC SUBMITTAL OF REPORTS

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

#### PERJURY STATEMENT

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

#### PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

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

#### UNDERGROUND STORAGE TANK CLEANUP FUND

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

#### AGENCY OVERSIGHT

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

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

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

## REQUIREMENTS

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

RO#\_Report Name\_Year-Month-Date (e.g., RO#5555\_WorkPlan\_2005-06-14)

## Submission Instructions

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



ALAMEDA COUNTY  
**HEALTH CARE SERVICES**  
AGENCY

REBECCA GEBHART, Interim Director



DEPARTMENT OF ENVIRONMENTAL HEALTH  
LOCAL OVERSIGHT PROGRAM (LOP) FOR  
HAZARDOUS MATERIALS RELEASES  
1131 HARBOR BAY  
ALAMEDA, CA 94502  
(510) 567-6700  
FAX (510) 337-9335

June 9, 2017

Atlantic Richfield Company  
(A BP Affiliated Company)  
P.O. Box 1257  
San Ramon, CA 94583  
Attn: Paul Supple  
(Sent via electronic mail to:  
[paul.supple@bp.com](mailto:paul.supple@bp.com))

ConocoPhillips  
76 Broadway  
Sacramento, CA 95818  
Attn: Ed Ralston  
(Sent via electronic mail to:  
[Ed.C.Ralston@p66.com](mailto:Ed.C.Ralston@p66.com))

Rajinder S & Sukhvinder Sull  
2004 Hartnell Street  
Union City, CA 94587  
(Sent via electronic mail to: [rsunion76@aol.com](mailto:rsunion76@aol.com))

Subject: Request for Information, Fuel Leak Case No. RO0000014 and GeoTracker Global ID T0600100213,  
BP #11132, 3201 35<sup>th</sup> Avenue, Oakland, CA 94619

Dear Responsible Parties:

Alameda County Department of Environmental Health (ACDEH) staff has reviewed the case file including the recently submitted documents entitled *Property Foundation Survey (PFS)* and *Fourth Quarter 2016 and First Quarter 2017 Groundwater Monitoring Report (GWMR)*. Both documents are dated April 24, 2017 and were prepared by Arcadis U.S. Inc. (Arcadis) for the subject site. The GWMR presents the most recent groundwater monitoring data, collected on March 1, 2017, documenting concentrations of 2,610 micrograms per liter ( $\mu\text{g/L}$ ) benzene and 799  $\mu\text{g/L}$  ethyl benzene in groundwater recovered from off-site well MW-10R. Depth to water in well MW-10R was reported at 11.23 feet beneath the ground surface and is located in close proximity to a residence.

The results of the PFS indicate the residential structures surveyed do not have subterranean basements; however, two residences appear to have first floors that extend below grade up to 3- to 4- feet and one with a crawl space that extends approximately 2.5 feet below the ground surface.

ACDEH requests that you address the following technical comments and send us the technical reports described below.

**TECHNICAL COMMENTS**

1. Vapor Intrusion- Based on the elevated concentrations of benzene and ethyl benzene and the shallow depth to water, ACDEH is of the opinion that a risk of vapor intrusion to indoor air may exist. Therefore, ACDEH requests submittal of a work plan for the purpose of evaluating this risk. Please incorporate the findings of the PFS and comments made in our letter of June 3, 2016 into the work plan. Please submit the vapor intrusion assessment work plan by the date specified below.
2. Electronic Submittal of Information- A review of the groundwater data for the case suggests the contaminant plume may not be adequately defined. In part this may be due the lack of consistent reporting of groundwater flow direction. Due to the variable direction of the north arrow on site figures, information

conveyed on rose diagrams and groundwater flow direction tables may not reflect the direction of groundwater flow relative to site features. The California State Water Resources Control Board (SWRCB) required electronic submittal of information for LOP cases in September, 2001. Since the time the regulations took effect, more than 40 groundwater monitoring events have been performed for the site. However, only three figures (GEO\_MAPs) have been uploaded that depict the groundwater flow direction. ACDEH requests an update of the GeoTracker database to include the figures depicting groundwater flow, the groundwater contour maps, as GEO\_MAPs. Please submit a list to ACDEH via electronic mail, Attention: Keith Nowell, of the uploaded GEO\_MAPs by the date specified below. Additionally, ACDEH requests a footnote with future rose diagrams and historical groundwater flow direction tables noting if they have been updated to reflect changes to the north arrow.

3. Groundwater Evaluation Report- As indicated above, the groundwater gradient at the site appears highly variable. Please evaluate the changes in flow direction and present your findings and recommendations in a groundwater evaluation report. ACDEH requests the evaluation include a discussion of the correlation of flow direction with depth to water, time of year and other considerations when updating the groundwater section of the site conceptual model. Please include recommendations to address data gaps that may be identified in the evaluation and submit the groundwater evaluation report by the date specified below.

#### **SUBMITTAL ACKNOWLEDGEMENT STATEMENT**

Please note that ACDEH has updated its Attachment 1 with regard to report submittals to ACDEH. ACDEH will now be requiring a Submittal Acknowledgement Statement, replacing the Perjury Statement, as a cover letter signed by the Responsible Party (RP). The language for the Submittal Acknowledgement Statement is as follows:

*"I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH's FTP server and the SWRCB's GeoTracker website."*

Please make this change to your submittals to ACDEH.

#### **TECHNICAL REPORT REQUEST**

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

- **June 30, 2017 – Electronic Submittal of Information-** Groundwater Contour Map (GEO\_MAP) submittals; Provide list of the uploaded maps to ACDEH via electronic mail, Attention: Keith Nowell
- **July 24, 2017 – Work Plan for Vapor Intrusion Evaluation** (file name: RO0000014\_WP\_R\_yyyy-mm-dd)
- **August 8, 2017 – Groundwater Evaluation Report** (file name: RO0000014\_MISC\_R\_yyyy-mm-dd)

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

Responsible Parties  
RO0000014  
June 9, 2017, Page 3

Sincerely,

Keith Nowell, PG, CHG  
Hazardous Materials Specialist

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

cc: Megan Smoley, Arcadis U.S. Inc., 100 Montgomery Street, 7051 Fain Park Drive, Suite 119,  
Montgomery, AL 36117 (*Sent via electronic mail to: [Megan.Smoley@arcadis-us.com](mailto:Megan.Smoley@arcadis-us.com)*)

Dilan Roe, ACDEH, (*Sent via electronic mail to: [dilan.roe@acgov.org](mailto:dilan.roe@acgov.org)*)

Paresh Khatri, ACDEH, (*Sent via electronic mail to: [paresh.khatri@acgov.org](mailto:paresh.khatri@acgov.org)*)

Keith Nowell, ACDEH (*Sent via electronic mail to: [keith.nowell@acgov.org](mailto:keith.nowell@acgov.org)*)

Geotracker, File

## Attachment 1

### Responsible Party(ies) Legal Requirements / Obligations

#### REPORT REQUESTS

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

#### ELECTRONIC SUBMITTAL OF REPORTS

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

#### ACKNOWLEDGEMENT STATEMENT

All work plans, technical reports, or technical documents submitted to ACDEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH's FTP server and the SWRCB's GeoTracker website." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

#### PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6731, 6735, and 7835) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately licensed or certified professional. For your submittal to be considered a valid technical report, you are to present site-specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this case meet this requirement. Additional information is available on the Board of Professional Engineers, Land Surveyors, and Geologists website at: <http://www.bpelsg.ca.gov/laws/index.shtml>.

#### UNDERGROUND STORAGE TANK CLEANUP FUND

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

#### AGENCY OVERSIGHT

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

<b>Alameda County Environmental Cleanup Oversight Programs (LOP and SCP)</b>	<b>REVISION DATE:</b> December 1, 2016
	<b>ISSUE DATE:</b> July 5, 2005
	<b>PREVIOUS REVISIONS:</b> October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010, July 25, 2010; May 15, 2014, November 29, 2016
<b>SECTION:</b> Miscellaneous Administrative Topics & Procedures	<b>SUBJECT:</b> Electronic Report Upload (ftp) Instructions


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

## REQUIREMENTS

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

RO#\_Report Name\_Year-Month-Date (e.g., RO#5555\_WorkPlan\_2005-06-14)

## Submission Instructions

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

# APPENDIX B

2017 Property Foundation Survey



Mr. Keith Nowell  
Alameda County LOP  
1131 Harbor Bay Parkway  
Alameda, California 94502

Subject:

**Property Foundation Survey**  
Former BP Service Station No. 11132  
3201 35th Avenue  
Oakland, California 94619  
*Alameda County Local Oversight Program Case # RO0000014*  
*SFB-RWQCB Case #01-0227*

Arcadis U.S., Inc.  
1728 3rd Avenue North  
Suite 300  
Birmingham  
Alabama 35203  
Tel 205 930 5700  
Fax 205 930 5707  
[www.arcadis.com](http://www.arcadis.com)

Dear Mr. Nowell:

Arcadis U.S., Inc. (Arcadis) has prepared this *Property Foundation Survey* to document the results of a foundation survey completed south of the site property located at the former Atlantic Richfield Company (ARCO) Service Station #11132, located at 3201 35th Avenue in Oakland, California.

If you have any questions or comments regarding the contents of this report, please contact Megan Smoley at 626.590.1502 or by e-mail at [Megan.Smoley@arcadis.com](mailto:Megan.Smoley@arcadis.com).

"I declare that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct."

Sincerely,

Arcadis U.S., Inc.



Megan Smoley, P.G. No. 8614  
Certified Project Manager



ENVIRONMENT

Date:  
April 24, 2017

Contact:  
Megan Smoley

Phone:  
626.590.1502

Email:  
[Megan.Smoley@arcadis.com](mailto:Megan.Smoley@arcadis.com)

Our ref:  
GP09BPNA.C112.C0000

Copies:

Ms. Shelby Lathrop, Conoco Phillips, 76 Broadway, Sacramento, California 95818

Mr. Keith Nowell  
Hazardous Materials Specialist  
Alameda County Department of Environmental Health  
1131 Harbor Bay Parkway  
Alameda, California 94502

Subject:

**Property Foundation Survey**  
Former BP Service Station No. 11132  
3201 35<sup>th</sup> Avenue  
Oakland, California 94619  
*Alameda County Local Oversight Program Case # RO0000014*  
*SFB-RWQCB Case #01-0227*

Dear Mr. Nowell:

Arcadis U.S., Inc. (Arcadis) on behalf of British Petroleum (BP) has prepared this property foundation survey for the Former BP Service Station No. 11132, located at 3201 35<sup>th</sup> Avenue in Oakland, California (the Site, Figures 1 and 2). Alameda County Department of Environmental Health (ACDEH) requested the survey results as part of site investigation activities regarding the vapor intrusion pathway (Attachment 1). Survey results were obtained by attempts to contact the property owner directly via mail, and by observations conducted by Arcadis field staff, which included interaction with tenants/property owners. A summary of the results is presented on Figure 2. Property survey mailers returned to Arcadis are included as Attachment 2 and notes from Arcadis field staff are included as Attachment 3.

Results indicate that the deepest continuously occupied space downgradient of the Site is located at 3518 Mangels Avenue, where the first floor was observed by Arcadis field staff to extend approximately 3 to 4 feet below ground surface (bgs). In addition, the first floor at 3517 Suter Street also extends approximately 1 foot bgs. All other properties in the survey either contained a crawl space, evidence of a crawl space (vents present at the ground surface), or no evidence of a crawl space or first floor that extends below ground surface.

Arcadis U.S., Inc.  
1728 3<sup>rd</sup> Avenue North  
Suite 300  
Birmingham  
Alabama 35203  
Tel 205 930 5700  
Fax 205 930 5707  
[www.arcadis.com](http://www.arcadis.com)

ENVIRONMENT

Date:  
April 24, 2017

Contact:  
Megan Smoley

Phone:  
626.590.1502

Email:  
[Megan.Smoley@arcadis.com](mailto:Megan.Smoley@arcadis.com)

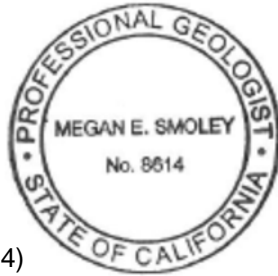
Our ref:  
GP09BPNA.C112.C0000



If you have any questions please contact Megan Smoley by telephone at 626.590.1502 or by email at [Megan.Smoley@arcadis.com](mailto:Megan.Smoley@arcadis.com).

Sincerely,

Arcadis U.S., Inc.



Megan Smoley, P.G. (No. 8614)  
Senior Geologist/Certified Project Manager

Copies:  
GeoTracker uploads

Enclosures:

**Figures**

- 1 Site Location Map
- 2 Site Plan Showing Property Survey Results

**Attachments**

- 1 ACDEH Correspondence
- 2 Results of Property Survey
- 3 Arcadis Field Survey

# FIGURES

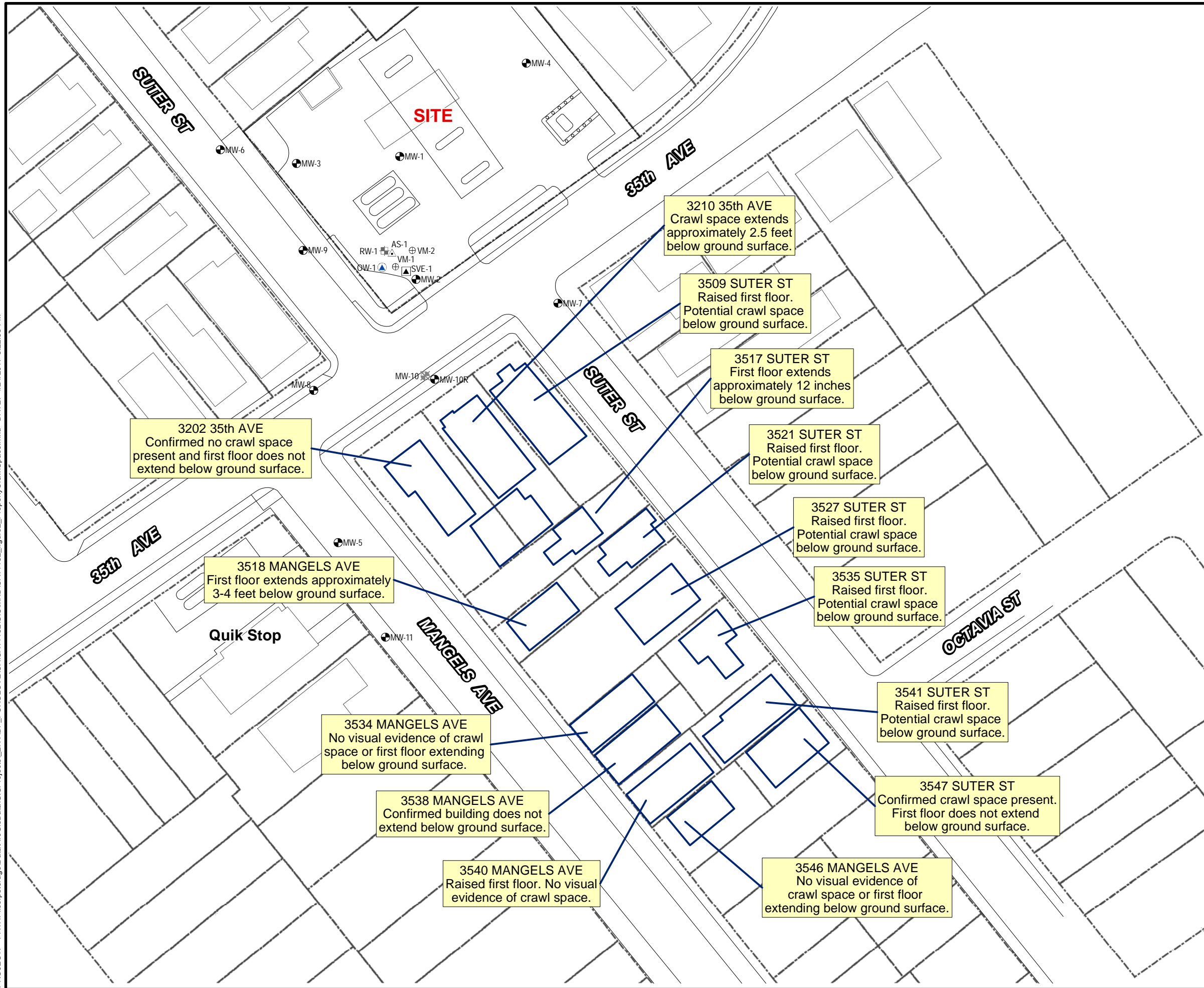








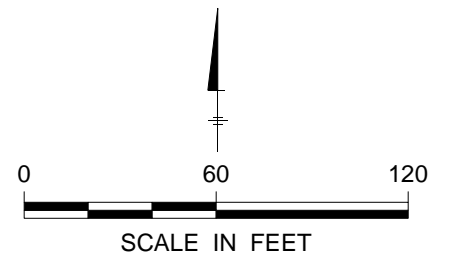
CITY: SAN FRANCISCO DIV/GROUP: EN/IM DB: kspeters LD: PIC: PM: TM: PROJECT: \\corporate\geodata\GIS\Projects\ENV\BP\_FOXGLOVE\CA\CA11132\GIS\MXD\CA11132\_figure2\_PropertyCrawlSpace.mxd DATE: 4/24/2017 3:22:58 PM



**LEGEND:**

- PROPERTY BOUNDARIES
- BUILDING FOOTPRINT
- GROUNDWATER MONITORING WELL
- GROUNDWATER RECOVERY WELL
- OBSERVATION WELL
- SOIL VAPOR EXTRACTION WELL
- SOIL VAPOR MONITORING WELL
- AIR SPARGE WELL
- ABANDONED MONITORING WELL

NOTES:  
 1. PARCEL DATA BOUNDARIES FROM ALAMEDA COUNTY WEBB SERVER  
<https://www.acgov.org/government/geospatial.htm>



FORMER BP SERVICE STATION #11132  
 3201 35TH AVENUE  
 OAKLAND, CALIFORNIA

**RESULTS OF PROPERTY SURVEY**

# ATTACHMENT 1

ACDEH Correspondence



2/27/17 Phone Log- RO14 – BP #11132, 3201 35<sup>th</sup> Ave., Oakland

Duration: Approximately 10 minutes

Received a call from Megan Smoley of Arcadis. She called to say they have performed a mailing for nearby properties regarding foundation types and have received one response. I asked if they had performed a windshield survey to ascertain if the residences were on raised foundations. Ms. Smoley said they have not.

Ms. Smoley inquired if I was about to issue a letter regarding well installation. I indicated that I recalled a soil gas investigation was the next step- this was why the foundation survey was important to proceed. I said I would review my case notes and follow up with a correspondence.

Keith Nowell

# ATTACHMENT 2

Results of Property Survey



**Property Information**

Street Address: ~~3210 West Street~~ <sup>35TH AVE.</sup> Oakland APN: 32-203-006-000

Name of property owner (and your name of tenant if applicable):

BETTY P. EAGLETON

Owner address:

3210 35TH AVE, OAKLAND, CA 94619

Does the property have a basement? Yes or No

A Crawl Space? Yes or No

If **YES** to either question, what is the approximate height of the basement or crawl space?

2.5 FT.



**Property Information**

Street Address: 3517 Suter St., Oakland

APN: 32-2030-62

Name of property owner (and your name of tenant if applicable):

ELIZABETH TITORMASKY, TRUSTEE

Owner address:

5680 CABOT DRIVE, OAKLAND, CA 94611

Does the property have a *basement*? Yes or No SEE BELOW

A *Crawl Space*? Yes or No

If **YES** to either question, what is the approximate height of the basement or crawl space?

If the basement or crawl space is partially above ground, what is the approximate height that extends below the ground surface?

THIS IS A TWO-STORY STRUCTURE.

THE GROUND FLOOR IS APPROXIMATELY  
12-INCHES BELOW GRADE.

RANDAL L. TITORMASKY (OCCUPANT)

15 NOV 2016

# ATTACHMENT 3

Arcadis Field Survey



1) 3509 Suter Street / 3214 Suter St.

- Nothing to suggest property extends below ground surface
- Potentially a crawl space below first floor \* First floor @ ~3'
  - ↳ Vents present (Photo)
- Water Meter leading to property
- Overhead Power/Comm. @ ~20' overhead
- City of Oakland Electric Vault in sidewalk on corner in front of prop.
- Sewer Cleanout in sidewalk

2) 3202 35<sup>th</sup> Avenue

- Spoke w/ Property tenant/owner & she said there was no basement or unit b.g.s.
- No crawlspace evidence such as vents observed.
- Water meter in sidewalk
- Overhead Power/Comm @ ~20'
- Sewer cleanout in sidewalk
- First floor @ ground surface

3) 3521 Suter Street

- Nothing (C) No evidence prop. extends b.g.s.
- Potentially crawlspace
  - ↳ Vents present
- Water meter
- Overhead Power/Comm. @ ~20'
- Sewer cleanout in sidewalk
- First floor @ ~3'

4) 3518 Mangels Avenue

- Lower Unit in building appears to extend potentially 3-6 ft. below ground surface.
  - ↳ Can see inside thru windows into room. An outside door leads to the unit.
- Spoke w/ Property owner/Tenant on 2<sup>nd</sup> walk-by. Property extends b.g.s. to 3-4' bgs (looked inside). Same property owner had reported that the 3517 Suter St. Property extends 12" bgs. He said that property likely extends to more like 14" bgs.
  - ↳ The house was originally a 1-story, but additional lower unit was installed years ago.
- Same utilities - SAA

5) 3527 Suter Street

- Crawlspace vents observed on google street view. Vents extend down to ground surface. - Confirmed.
- No evidence prop. extends b.g.s.
- First floor @ ~4.5'

6) 3534 Mangrels Avenue

- No evidence prop. extends b.g.s.
- No evidence of a crawlspace observed.
- Lower unit / Garage may have low ceilings or extend slightly b.g.s.
- First floor @ ground surface.

7) 3535 Suter Street

- No evidence prop. extends b.g.s.
- Crawlspace vents observed.
- First floor @ ~3.5'

8) 3538 Mangrels Avenue

- Spoke w/Tenant / Prop. owner — he said the prop. does not extend b.g.s.
- No evidence of a crawlspace observed.
- Lower unit / Garage may have low ceilings ~~or extend slightly b.g.s.~~ (C)
- First floor @ ground surface

9) 3541 Suter Street

- Crawlspace vents observed on google street view. Vents extend down to ground surface. - Confirmed
- No evidence of a crawlspace (C) the prop. extends b.g.s.
- First Floor @ ~2'

\* All houses have overhead Power/Comm @ ~20',  
\* Water meter & Sewer in sidewalk



10) 3540 Mangrels Avenue

- No evidence prop. extends b.g.s.
- No evidence of a crawlspace, however first floor is raised off ground surface by ~2 ft. Appear to be on foundation
- First floor @ ~2'

11) 3547 Suter Street

- There appears to be a basement/first floor that either has very low ceilings or extends below ground surface (gathered from google street view)
- ↳ Spoke with Property Owner/Tenant, he said that there is a crawlspace, but the floor does not go below ground surface
- First Floor @ ground surface

12) 3546 Mangrels Avenue

- No Evidence of a crawlspace or that Property Extends b.g.s.
- ~~• No Evidence of a crawlspace, however first floor is raised off ground surface by ~2 ft. Appear to be on foundation. (C)~~
- Lower floor/Unit appears to have low ceilings, could extend slightly b.g.s.
- First Floor @ ground surface

Additional Notes: Suter St. Utilities: - PGE gas line ~5' off curb in the south bound (4" GM) lane of Suter. Appears to be marked as a 4" Gas Main

<p>Mangrels Ave Utilities: -</p> <ul style="list-style-type: none"> <li>- PGE gas line ~4' off of Southbound lane on Mangrels. Marked as 2"</li> <li>- Abundant Linear Asphalt repair along Mangrels Ave (unmarked)</li> </ul>	<ul style="list-style-type: none"> <li>- Water Main ~5' off curb in the northbound lane on Suter</li> <li>- AT&amp;T underground Cable boxes in front of 3509 Suter.</li> <li>- unknown vault in center of Rd. in front of 3509 Suter</li> </ul>
--	--

Responses gathered from the following property owners via mail:

- 3210 35<sup>th</sup> Ave - Heard back from owner, property extends 2.5 feet below grade
- 3517 Suter Street - Heard back from owner, property extends 12" below grade

\*\*\*\*\* Number correlates to numbered property of concern on map\*\*\*\*\*

\* All houses have overhead power @ ~20' overhead, Water Meter & Sewer in Sidewalk

# APPENDIX C

## Arcadis Soil Vapor Installation and Sampling SOPs





**TECHNICAL GUIDANCE  
INSTRUCTIONS:  
SUB-SLAB  
VAPOR OR SOIL  
VAPOR SAMPLING  
USING PASSIVE  
CANISTERS  
- CALIFORNIA**


Rev. #: 1

Date: April 2017

---

A large orange geometric shape, resembling a right-angled triangle or a trapezoid, is positioned in the bottom right corner of the page. It is composed of two overlapping triangles: a larger one with its hypotenuse facing the top-left and a smaller one nested inside it, also with its hypotenuse facing the top-left. The overall effect is a solid orange shape that tapers towards the top-left corner.

## APPROVAL SIGNATURES

Prepared by:  Date: 4/7/17  
Ben Stanphill – Project Environmental Engineer

Reviewed by:  Date: 4/4/17  
Rob Moniz – Project Geologist

## I. SCOPE AND APPLICATION

This Technical Guidance Instruction (TGI) has been updated to reflect state-specific issues and criteria arising from sampling in California utilizing the California Environmental Protection Agency and Department of Toxic Substances Control's Advisory Active Soil Gas Investigations (EPA & DTSC 2015).

This document describes the procedures for collecting soil vapor or sub-slab soil vapor (herein referred to as "soil vapor") samples using passive canisters for the analysis of volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method TO-15 (TO-15). This document assumes a sample port – either sub-slab or exterior soil vapor – has already been installed. This document covers the above ground assembly and sampling methods.

Method TO-15 uses a 1-liter, 3-liter, or 6-liter SUMMA® passivated stainless steel canister to collect a whole-air sample. The whole-air sample is then analyzed for VOCs using a quadrupole or ion-trap gas chromatograph/mass spectrometer (GS/MS) system to provide typical compound detection limits of 0.5 parts per billion volume (ppbv).

The following sections list the necessary equipment and detailed instructions for collecting soil vapor samples for VOC analysis.

## II. PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, site-specific training, first-aid, and cardiopulmonary resuscitation (CPR), as needed. Arcadis field sampling personnel will be well versed in the relevant technical guidance instructions (TGIs) and possess the required skills and experience necessary to successfully complete the desired field work. Arcadis personnel responsible for leading soil vapor sample collection activities must have previous soil vapor sampling experience.

## III. EQUIPMENT LIST

The equipment required for soil vapor sample collection is presented below:

### Lab:

- 1, 3, or 6 – liter stainless steel SUMMA® canisters (order at least one extra, if feasible, and batch certified canisters or individual certified canisters as required by the project). Note that 1 liter are typical for most reporting limit requirements.
- Flow controllers. If ordered from a Lab, these will come with in-line particulate filters and vacuum gauges. Flow controllers are pre-calibrated to specified sample duration (e.g., 5-, 10, or 30- minutes) or flow rate (e.g., < 200 milliliters per minute [mL/min]). Confirm with the laboratory that the flow controller comes with an in-line particulate filter and pressure gauge (order at least one extra, if feasible).

### Lab or Equipment Rental Company

- 1/4-inch OD tubing (Teflon®, Nylaflo® or similar)
- Stainless steel duplicate "T" fitting provided by the laboratory (if collecting duplicate [i.e., split] samples)

## SUB-SLAB VAPOR OR SOIL VAPOR SAMPLING USING PASSIVE CANISTERS - CALIFORNIA

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- 60-mL syringe equipped with a three-way luer lock valve
- Tedlar® bag to collect purge air for venting outside a structure if working inside
- Extra 1/4-inch Swagelok (or similar) front and back compression sleeves. These can be ordered from McMaster Carr as well.

**McMaster Carr or Cole Parmer** ([www.mcmaster.com](http://www.mcmaster.com) or [www.coleparmer.com](http://www.coleparmer.com))

- Decontaminated stainless steel Swagelok or comparable “T” fitting and ball or needle valve for isolation of purge leg of sample train. Some labs send flow controllers with this purge port and valve built in. Confirm with the lab what flow controller they are sending (they can send a diagram or photo). A luer lock 3-way valve can be used at the “T” fitting as well.

### Rental Equipment/Supplies

- Appropriate equipment and materials for quality assurance testing as laid out in the respective quality assurance TGIs (i.e., helium leak testing, water dam testing, methane testing)
- Pump for purging (GilAir or similar), silicon tubing (to connect pump, helium tank, if Vapor Pins are present, etc.)
- PID and/or span gas detector, as needed
- Portable weather meter, if unable to use weather app or internet

### Personal Gear and Documents

- Appropriate-sized open-end wrench (typically 9/16-inch and ½”);
- Channel locking plier with 1.5in or larger opening (helium tank manifold and 2-way valves);
- Chain-of-custody (COC) form
- Sample collection log (attached)
- Nitrile gloves
- Work gloves
- Field notebook

## IV. CAUTIONS

The following cautions and field tips should be reviewed and considered prior to installing or collecting a soil vapor sample.

- Sampling personnel should not handle hazardous substances (such as gasoline), permanent marking pens (sharpies), wear/apply fragrances including sunscreens, or smoke cigarettes/cigars before and/or during the sampling event.
- Ensure that the flow controller is pre-calibrated to the proper sample collection duration (confirm with laboratory). Sample integrity can be compromised if sample collection is extended to the point that the canister reaches atmospheric pressure. Sample integrity is maintained if sample collection is terminated prior to the target duration and a measurable vacuum (e.g., 3 -7 – inches Hg) remains in the

## SUB-SLAB VAPOR OR SOIL VAPOR SAMPLING USING PASSIVE CANISTERS - CALIFORNIA

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canister when sample collection is terminated.

- The integrity of the sample train will be tested in accordance with the project specific requirements and the Active Soil Gas Advisory (CAEPA & DTSC 2015). These procedures are contained in their own TGI documents and include helium leak testing, water dam testing, and methane screening.
- It is important to record the canister pressure, start and stop times, and sample identification on a proper field sampling form. You should observe and record the time/pressure at the start, and then again one or two minutes after starting the sample collection. It is a good practice to lightly tap the pressure gauge with your finger before reading it to make sure it is not stuck. If the SUMMA canister is filling as expected, a 1-liter canister should take approximately 5 minutes to fill. Consult your project manager, risk assessor, or air sampling expert by phone if the SUMMA canister does not appear to be working properly.
- Ensure that there is still measurable vacuum in the SUMMA® after sampling. Sometimes the gauges sent from labs have off-set errors, or they stick.
- When sampling, carefully consider elevation. If your site is over 2,000' above sea level, or the difference in elevation between your site and your lab is more than 2,000', then pressure effects will be significant. If you take samples at a higher elevation they will contain less air for a given ending pressure reading. High elevation samples analyzed at low elevation will result in more dilution at the lab, which could affect reporting limits. Conversely, low elevation samples received by a laboratory at high elevation may appear to not have much vacuum left in them.  
[http://www.uigi.com/Atmos\\_pressure.html](http://www.uigi.com/Atmos_pressure.html).
- If possible, have equipment shipped two to three days before the scheduled start of the sampling event so that all materials can be checked. Check the pressure in each canister as soon as they arrive. If the initial vacuum pressure registers less than -25 inches of Hg, then the SUMMA® canister is not appropriate for use and another canister should be used. Order replacements if needed.
- Requesting extra canisters and flow controllers from the laboratory should also be considered to ensure that you have enough equipment on site in case of an equipment failure, especially at remote sites.

## V. HEALTH AND SAFETY CONSIDERATIONS

All sampling personnel should review the appropriate health and safety plan (HASP) and job safety analysis (JSA) prior to beginning work to be aware of all potential hazards associated with the job site and the specific task. Field sampling must be carefully performed to minimize the potential for injury and the spread of hazardous substances.

Soil Vapor sampling is often done on the ground with workers on their knees. Knee pads or a large pad can be used under the entire sample area (i.e. a large folded box). This will protect the worker's knees and the sampling equipment from touching the potentially impacted ground (i.e. asphalt parking lot with car oil stains).

The metal on metal fittings often create small metal splinters, so always used gloves when handling the

## SUB-SLAB VAPOR OR SOIL VAPOR SAMPLING USING PASSIVE CANISTERS - CALIFORNIA

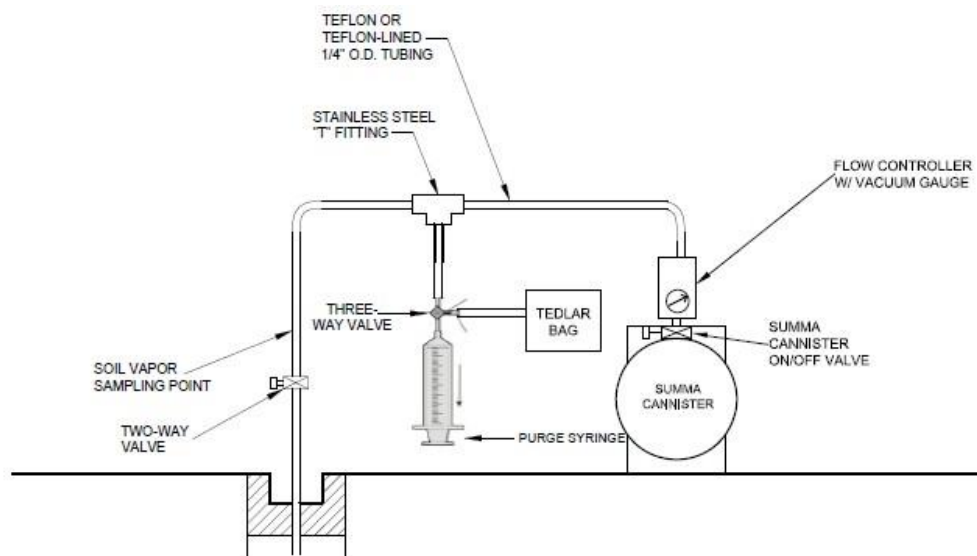
Rev. #:1 | Rev Date: April 2017

canisters, fittings, valves, etc. Do not blow the splinters off towards other workers.

## VI. SOIL VAPOR SAMPLE COLLECTION

### Sample Train Assembly

The following procedures should be used to collect a soil vapor sample using a passive canister (i.e., SUMMA canister). These methods can be used for both soil vapor samples and interior sub-slab soil vapor samples collected from both permanent or temporary sample points installations. A schematic of the suggested sample train set up is included below:



*Note: shroud over the entire sampling train is not shown*

1. Assemble the sample train by removing the cap from the SUMMA canister and connecting the flow controller with in-line particulate filter and vacuum gauge. The flow controller attaches directly to the canister and the pre-set rate dictates the sample duration.
2. Unless the flow controller manifold came with a purge port and valve, one will need to be added. Attach the canister and flow controller assembly to a stainless-steel T-fitting using a short length of 1/4- inch OD Teflon tubing. This T-fitting adds a leg to the sample train that will be used to purge “dead” air from the sample train in order to collect a more representative sample.
3. Connect the purge syringe with three-way valve to one of the free ends of the T-fitting using a length of Teflon sample tubing, Swagelok compression fittings and silicon tubing.
4. Attach a Swagelok two-way valve to the remaining free end of the T-fitting using a short length of 1/4- inch OD Teflon tubing. The two-way valve will be immediately adjacent to the sample point in the train assembly. This valve is used to isolate the sample train from the sample point prior to sampling in order to test the sample train’s integrity.
5. When collecting duplicate or other quality assurance/quality control (QA/QC) samples as required by applicable regulations and guidance, couple two SUMMA canisters using stainless steel Swagelok duplicate sample T-fitting supplied by the laboratory. Attach flow controller with in-line particulate filter



## SUB-SLAB VAPOR OR SOIL VAPOR SAMPLING USING PASSIVE CANISTERS - CALIFORNIA

Rev. #:1 | Rev Date: April 2017

and vacuum gauge to duplicate sample T-fitting.

6. Attach the terminal end of the two-way Swagelok valve to the sample port as appropriate. This may be done using the options below:
  - a. Use a section of silicon tube to connect the Teflon sample tubing to the barbed fitting of a Vapor Pin™ port.
  - b. Use Swagelok compression fittings to connect Teflon tubing to sampling port. Teflon tape should never be used on Swagelok compression fitting connections.
  - c. If a PVC well, you may need to make a slip cap with a nipple screwed into it. Then attach silicon tubing to the nipple

### Sample Documentation

1. At the beginning, middle, and end of the day, record the following information in the field notes if appropriate. Contact the local airport or other suitable information source (e.g., site-specific measurements, weatherunderground.com) to obtain the information:
  - a. wind speed and direction;
  - b. ambient temperature;
  - c. barometric pressure; and
  - d. relative humidity.
2. Record information on sample label tags on canister and on field log. This includes:
  - a. Canister number
  - b. Flow controller number
  - c. Sample ID
  - d. Time
  - e. Initial pressure in canister
  - f. And once sampling is complete, final pressure in canister
3. Record on the sample log and COC form the flow controller number with the appropriate SUMMA® canister number.
4. Take a photograph of the SUMMA® canister and surrounding area.

### Sample Collection

#### Shut-in Test

1. Perform a shut-in test by closing the two-way valve to the sample port. Open the three-way valve to the syringe and pull a vacuum of at least 100 inches of water (7.3 inches of mercury).
2. Quickly close the three-way valve and record the pressure indicated on the gauge connected to the canister. Observe the vacuum gauge for at least two minutes. If there are no leaks in the system, this vacuum should be held exactly (estimate the decimal place – i.e. 10.1 inches of mercury).
3. If vacuum holds, document values and proceed with sample collection. If not, attempt to rectify the situation by tightening fittings and restarting shut-in test.

### **3-Volume Purge concurrently with Leak Check**

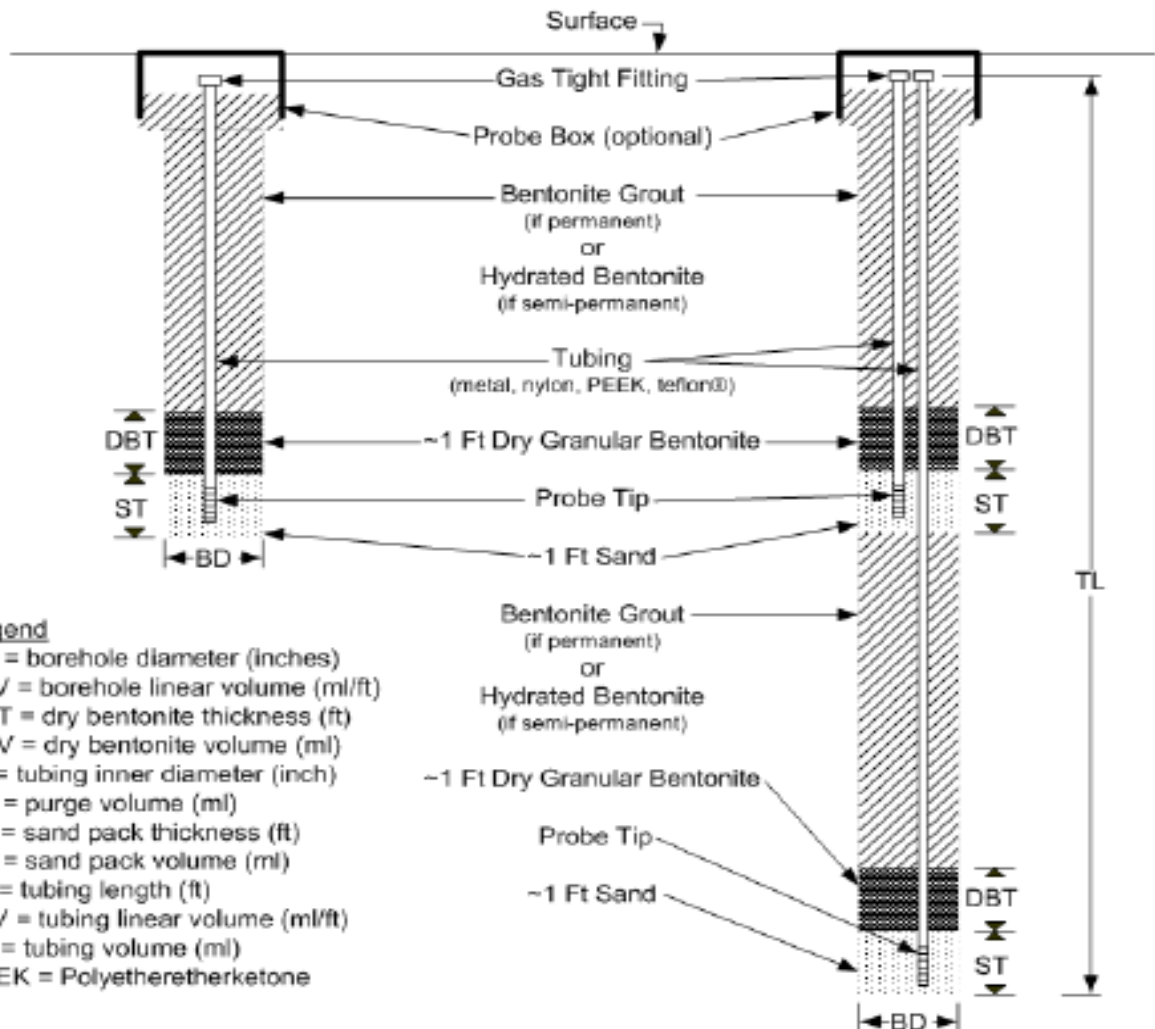
1. Set-up shroud in accordance with applicable TIG.
2. Open the two-way valve and purge the soil vapor sampling port and tubing with the portable sampling pump. Purge approximately three volumes of air from the soil vapor sampling port and sampling line using a flow rate of no more than 200 mL/min. Each purge volume includes;
  - The internal volume of the tubing and probe tip
  - The void space of the sand pack around the probe tip
  - The void space of the dry bentonite in the annular space

Purge air will be collected into a Tedlar bag to provide that VOCs are not released into interior spaces.

3. Perform quality control method tests such as helium leak testing or field screening for VOCS concurrently.
4. Close the three-way valve to the syringe in order to isolate this leg of the sample train.

Figure 1

Typical Single and Nested Soil Gas Probe Design & Purge Volume Calculation



(1) $TV = TL \times TLV =$ _____	X 6 if tubing ID = 3/16" = _____ ml
	X 16 if tubing ID = 5/16" = _____ ml
	X ___ if tubing ID = ___" = _____ ml
(2) $DBV = DBT \times BLV =$ _____	X 350 if BD = 2 1/8" = _____ ml
	X 820 if BD = 3 1/4" = _____ ml
	X ___ if BD = ___" = _____ ml
(3) $SV = ST \times BLV =$ _____	X 280 if BD = 2 1/8" = _____ ml
	X 660 if BD = 3 1/4" = _____ ml
	X ___ if BD = ___" = _____ ml
Note: porosity of 50% used for dry bentonite and 40% used for #3 sand pack to calculate BLV.	
$1 PV = (1)TV + (2) DBV + (3) SV =$ _____ ml	

Note: there are 16.387 ml in a cubic inch

## Sampling

1. Open the SUMMA® canister valve to initiate sample collection. Record on the sample log (attached) the time sampling began and the canister pressure. If the initial vacuum pressure registers less than -25 inches of Hg, then the SUMMA® canister is not appropriate for use and another canister should be used.
2. Check the SUMMA canister approximately half way through the sample duration and note progress on sample logs.

## Termination of Sample Collection

1. Sampling a 1 liter canister will take approximately 5 minutes, so do not leave it unattended or get distracted.
2. Record the final vacuum pressure. Stop collecting the sample by closing the SUMMA® canister valves. The canister should have a minimum amount of vacuum (approximately 5 inches of Hg or slightly greater).
3. Record the date and local time (24-hour basis) of valve closing on the sample collection log and COC form.
4. Disconnect sample tubing from the sample port; replace any coverings or abandon as appropriate to mitigate tripping hazards.
5. Remove the flow controller from the SUMMA® canister, re-install the brass plug on the canister fitting, and tighten with the appropriate wrench.
6. Package the canister and flow controller per Department of Transportation regulations for return shipment to the laboratory. These regulations can be found at the Transportation Safety Program's Team Site on the Source. The SUMMA® canister does not require preservation with ice or refrigeration during shipment.
7. Verify the appropriate forms and sample labels are filled out appropriately as directed by the laboratory (e.g., affix card with a string).
8. Complete and verify the COC form and place the requisite copies in a shipping container. Close the shipping container and affix a custody seal to the container closure. Ship the container to the laboratory via overnight carrier (e.g., Federal Express) or sign COC over to courier.

## VII. WASTE MANAGEMENT

No specific waste management procedures are required.

## VIII. DATA RECORDING AND MANAGEMENT

Measurements will be recorded on the sample log at the time of measurement with notations of the project name, sample date, sample start and finish time, sample location (e.g., GPS coordinates, distance from permanent structure [e.g., two walls, corner of room]), canister serial number, flow controller serial number,

SUB-SLAB VAPOR OR SOIL VAPOR SAMPLING USING PASSIVE  
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initial vacuum reading, and final pressure reading. Field sampling logs and COC records will be transmitted to the Project Manager.

## **IX. QUALITY ASSURANCE**

Duplicate samples should be collected in the field as a quality assurance step per project requirements. Generally, one duplicate is taken per 20 samples analyzed, but project specific requirements should take precedence.

## **X. REFERENCES**

California Environmental Protection Agency and Department of Toxic Substances Control (DTSC).  
Advisory Active Soil Gas Investigations. July 2015

DiGiulio et. al. 2003. Draft Standard Operating Procedure (SOP) for Installation of Sub-Slab Vapor Probes  
and Sampling Using EPA TO-15 to Support Vapor Intrusion Investigations.  
<http://www.cdphe.state.co.us/hm/indoorair.pdf> (Attachment C)

Di Giulio et. Al. 2006. Assessment of Vapor intrusion in Homes Near the Raymark Superfund Site Using  
Basement and Sub-Slab Air Samples. USEPA. EPA/600/R-05/147.

New York State Department of Health (NYSDOH). 2005. DRAFT "Guidance for Evaluating Soil Vapor  
Intrusion in the State of New York" February 23, 2005.



## Soil Vapor Sample Collection Log

		<b>Sample ID:</b>	
<b>Client:</b>		<b>Boring Equipment:</b>	
<b>Project:</b>		<b>Sealant:</b>	
<b>Location:</b>		<b>Tubing Information:</b>	
<b>Project #:</b>		<b>Miscellaneous Equipment:</b>	
<b>Samplers:</b>		<b>Subcontractor:</b>	
<b>Sample Point Location:</b>		<b>Moisture Content of Sampling Zone:</b>	
<b>Sampling Depth:</b>		<b>Purge Method:</b>	
<b>Time and Date of Collection:</b>		<b>Approximate Purge Volume:</b>	

**Instrument Readings:**

Date	Time	Canister Vacuum (a) (inches of Hg)	Temperature (°F)	Relative Humidity (%)	Air Speed (mph)	Barometric Pressure (inches of Hg)	PID (ppb)

(a) Record canister information at a minimum at the beginning and end of sampling

**Canister Information:**

<b>Size (circle one):</b>	1 L	6 L
<b>Canister ID:</b>		
<b>Flow Controller ID:</b>		
<b>Notes:</b>		

**General Observations/Notes:**




# **TECHNICAL GUIDANCE INSTRUCTIONS: ADMINISTERING HELIUM TRACER GAS LEAK TEST – CALIFORNIA**

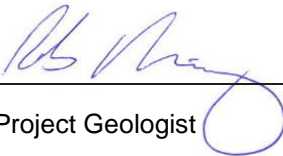
Rev. #: 1

Rev Date: April 2017



## APPROVAL SIGNATURES

Prepared by:  Date: 4/7/17  
Ben Stanphill – Project Environmental Engineer

Reviewed by:  Date: 4/4/17  
Rob Moniz – Project Geologist

## I. SCOPE AND APPLICATION

When collecting subsurface vapor samples as part of a vapor intrusion evaluation, a tracer gas serves as a quality assurance/quality control method to verify the integrity of the vapor port seal and the numerous connections comprising the sample train. Without the use of a tracer, verification that a soil vapor sample has not been diluted by ambient or indoor air is difficult.

This Technical Guidance Instruction (TGI) focuses on using helium as a tracer gas, and has been updated to incorporate California-specific criteria utilizing the California Environmental Protection Agency and Department of Toxic Substances Control's Advisory Active Soil Gas Investigations (EPA & DTSC 2015).

It should be noted that a field helium meter could register a false positive if methane is present in the subsurface. In this case an alternative method should be employed, such as a water dam test or use of a different tracer gas. The protocol for using a tracer gas includes the following basic steps: (1) enrich the atmosphere in the immediate vicinity of the sample port where ambient air could enter the sampling train during sampling with the tracer gas; and (2) measure a vapor sample from the sample tubing for the presence of elevated concentrations (> 5% of the shroud concentration) of the tracer. A plastic pail, bucket, garbage can or even a plastic bag can serve as a shroud to keep the tracer gas in contact with the port during the testing.

There are two basic approaches to testing for the tracer gas:

1. Include the tracer gas in the list of target analytes reported by the laboratory; and/or
2. Use a portable monitoring device to analyze a sample of purged soil vapor for the tracer prior to sampling for the compounds of concern. Note that tracer gas samples can be collected via syringe, Tedlar bag, etc. - they need not be collected in SUMMA® canisters or minicans.

This TGI focuses on monitoring helium using a portable sampling device, although helium can also be analyzed by the laboratory along with other volatile organic compounds (VOCs). Real-time tracer sampling allows the investigator to confirm the integrity of the port seals prior to formal sample collection.

During the initial stages of a subsurface vapor sampling program, lab tested tracer gas samples should be collected at each of the sampling points. If the results of the initial samples indicate that the port seals are adequate, the Project Manager can consider reducing the number of locations at which tracer gas samples are used in future monitoring rounds. At a minimum, 10% of the subsequent samples should be supported with tracer gas analyses. Soil gas port integrity should be rechecked with Tracer gas if land clearing/grading activities, freeze thaw cycles, or soil desiccation may have occurred. Points should also be rechecked if more than 2 years have elapsed since the last check of that point.

## II. PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, site-specific training, first aid, and cardiopulmonary resuscitation (CPR), as needed. Arcadis field sampling personnel will be competent in the relevant procedures and possess the required skills and experience necessary to successfully complete the desired field work. Arcadis personnel responsible for directing tracer gas testing must have previous experience conducting similar tests without direct supervision.

### III. EQUIPMENT LIST

The equipment required to conduct a helium tracer gas test is presented below:

- Appropriate PPE for site (as required by the Health and Safety Plan)
- Helium (ultra-high purity [UHP] or laboratory grade)
- Regulator for helium tank
- Shroud (plastic bucket, garbage can, plastic bag, etc)
  - The size of the shroud should be sufficient to fit over the sample port, SUMMA canister, and sampling train. It is worth noting that using the smallest shroud possible will minimize the volume of helium needed; this may be important when projects require a large number of helium tracer tests.
  - The shroud will need to have three small holes in it. These holes will accommodate the sample tubing, helium detector probe, and the helium line.
- Helium detector capable of measuring from 1 - 100% (Dielectric MGD-2002, Mark Model 9522, or equivalent)
- Tedlar bag
- Seal material for shroud (rubber gasket, VOC-free modeling clay, bentonite, sand-bags, etc.) to keep helium levels in shroud high in windy conditions. Although the sealing material is not in direct contact with the sample if leakage does not occur, sealing materials with high levels of VOC emissions should be avoided, since they could contaminate a sample if a leak occurs.
- Sample logs
- Field notebook

### IV. CAUTIONS

Helium is an asphyxiant! Be cautious with its use indoors! Never release large volumes of helium within a closed room!

Field sampling equipment must be carefully handled to minimize the potential for injury and the spread of hazardous substances. All sampling personnel should review the appropriate health and safety plan (HASP) and job safety analysis (JSA) prior to beginning work to be aware of all potential hazards associated with the job site and the specific task. Field staff should review the attachment on safely handling compressed gas cylinders prior to commencing field work.

Compressed gas cylinders should be handled with caution; see attachment on the use and storage of compressed gasses before beginning field work.

Care should be taken not to pressurize the shroud while introducing helium. If the shroud is completely air tight and the helium is introduced quickly, the shroud can be over-pressurized and helium can be pushed into the ground. Provide a relief valve or small gap where the helium can escape.

Because minor leakage around the port seal should not materially affect the usability of the soil vapor sampling results, the mere presence of the tracer gas in the sample should not be a cause for alarm. Consequently, portable field monitoring devices with detection limits in the low ppm range are more than

adequate for screening samples for the tracer. If high concentrations (> 5% of shroud concentration) of tracer gas are observed in a sample, all fittings within the sampling train should be checked and/or tightened to reduce the infiltration of ambient air and the tracer test re-administered. If the problem cannot be rectified, a new sample point should be installed or an alternate sampling train used. In either case, a sample should not be collected.

Flow rates between 100 to 200 milliliters per minute (mL/min) and vacuums less than 100 inches of water should be maintained during purging and sampling to minimize stripping (partitioning of vapors from pore water to soil gas), to prevent ambient air from diluting the soil gas samples, and to reduce variability between contractors. Maintaining these flow rates and vacuums will increase the likelihood that representative samples will be collected. A flow rate greater than 200 mL/min may be used when purging times are excessive, such as for deep wells with larger-diameter tubing. However, a vacuum of 100 inches of water or less must be maintained during sampling whenever a higher flow rate is used.

## V. PROCEDURE

The helium tracer test can be conducted when using temporary or permanent sampling points and inside or outside a facility. A visual example of a helium tracer gas test set-up is included as Figure 1.

1. Attach Teflon or Nylaflo sample tubing to the sample point. This can be accomplished utilizing a number of different methods depending on the sample install (i.e., Swage-Lok or comparable fittings).
2. Place the shroud over the sample point and tubing.
3. Pull the sample tubing through a hole in the shroud or under the shroud. Seal the opening with VOC free modeling clay if needed.
4. Place weight on top of shroud to help maintain a good seal with the ground.
5. Insert helium tubing and helium detector probe through the shroud. Seal both with modeling clay to prevent leaks.
6. Fill shroud with helium. Fill shroud slowly, allowing atmospheric air to escape either by leaving a gap where the shroud meets the ground surface or by providing a release valve on the side of the shroud. Do not pressurize the shroud!
7. Use the helium detector to monitor the helium concentration within the shroud from the lowest point in the shroud (bottom of the shroud nearest where the sample tubing intersects the ground). Helium should be added until the environment inside the shroud has >10% helium and should be kept within  $\pm 10\%$  of the target concentration. Or periodically (every min or 2), record the concentration so that an average can be calculated with some accuracy.
8. Purge the sample point through the sample tubing into a Tedlar bag using a syringe equipped with a three-way leuc lock valve. The purge rate should at least match the sample collection rate but not exceed 200 ml/min. Test the air in the Tedlar bag for helium using portable helium detector. If the point is free of leaks there should be very low helium in the purge air from the soil. The natural concentration of helium in the atmosphere is 0.00052% by volume and there are few if any natural sources of helium to soil gas.

9. If > 5% of the amount of helium present in the shroud is noted in purge air, rectify issues with the seal at the sample port and repeat the testing procedure. If the seal cannot be fixed, reinstall sample point.
10. Monitor and record helium level in shroud before, during and after tracer test.
11. Monitor and record helium level in purge exhaust.
12. At successful completion of tracer test and sample point purging, the soil vapor sample can be collected (if the helium shroud must be removed prior to sample collection be mindful not disturb the sample tubing and any established seals).

## **VI. WASTE MANAGEMENT**

No specific waste management procedures are required.

## **VII. DATA RECORDING AND MANAGEMENT**

Measurements will be recorded on the sample logs at the time of measurement with notations of the project name, sample date, sample start and finish time, sample location, and the helium concentrations in both the shroud and the purge air before, during, and after tracer testing. Any problems encountered should also be recorded in the field notes.

## **VIII. QUALITY ASSURANCE**

Conduct quality assurance as required by the project-specific work plan and/or Quality Assurance Project Plan (QAPP).



## **ATTACHMENT: Compressed Gases – Use and Storage**

In general, a compressed gas is any material contained under pressure that is dissolved or liquefied by compression or refrigeration. Compressed gas cylinders should be handled as high-energy sources and therefore as potential explosives and projectiles. Prudent safety practices should be followed when handling compressed gases since they expose workers to both chemical and physical hazards.

### **Handling**

- Safety glasses with side shields (or safety goggles) and other appropriate personal protective equipment should be worn when working with compressed gases.
- Cylinders should be marked with a label that clearly identifies the contents.
- All cylinders should be checked for damage prior to use. Do not repair damaged cylinders or valves. Damaged or defective cylinders, valves, etc., should be taken out of use immediately and returned to the manufacturer/distributor for repair.
- All gas cylinders (full or empty) should be rigidly secured to a substantial structure at 2/3 height. Only two cylinders per restraint are allowed in the laboratory and only soldered link chains or belts with buckles are acceptable. Cylinder stands are also acceptable but not preferred.
- Handcarts shall be used when moving large gas cylinders. Cylinders must be chained to the carts.
- All cylinders must be fitted with safety valve covers before they are moved.
- Only three-wheeled or four-wheeled carts should be used to move cylinders.
- A pressure-regulating device shall be used at all times to control the flow of gas from the cylinder.
- The main cylinder valve shall be the only means by which gas flow is to be shut off. The correct position for the main valve is all the way on or all the way off.
- Cylinder valves should never be lubricated, modified, forced, or tampered with.
- After connecting a cylinder, check for leaks at connections. Periodically check for leaks while the cylinder is in use.
- Regulators and valves should be tightened firmly with the proper size wrench. Do not use adjustable wrenches or pliers because they may damage the nuts.
- Cylinders should not be placed near heat or where they can become part of an electrical circuit.
- Cylinders should not be exposed to temperatures above 50 °C (122 °F). Some rupture devices on cylinders will release at about 65 °C (149 °F). Some small cylinders, such as lecture bottles, are not fitted with rupture devices and may explode if exposed to high temperatures.
- Rapid release of a compressed gas should be avoided because it will cause an unsecured gas hose to whip dangerously and also may build up enough static charge to ignite a flammable gas.
- Appropriate regulators should be used on each gas cylinder. Threads and the configuration of valve outlets are different for each family of gases to avoid improper use. Adaptors and homemade modifications are prohibited.
- Cylinders should never be bled completely empty. Leave a slight pressure to keep contaminants out.

## **Storage**

- When not in use, cylinders should be stored with their main valve closed and the valve safety cap in place.
- Cylinders must be stored upright and not on their side. All cylinders should be secured.
- Cylinders awaiting use should be stored according to their hazard classes.
- Cylinders should not be located where objects may strike or fall on them.
- Cylinders should not be stored in damp areas or near salt, corrosive chemicals, chemical vapors, heat, or direct sunlight. Cylinders stored outside should be protected from the weather.

### Lecture (calibration size) Bottles

- All lecture bottles should be marked with a label that clearly identifies the contents.
- Lecture bottles should be stored according to their hazard classes.
- Lecture bottles should be stored in a secure place to eliminate them from rolling or falling.
- Lecture bottles should not be stored near corrosives, heat, direct sunlight, or in damp areas.
- To avoid costly disposal fees, lecture bottles should only be purchased from suppliers that will accept returned bottles (full or empty). Contact the supplier before purchasing lecture bottles to ensure that they have a return policy.
- Lecture bottles should be dated upon initial use. It is advised that bottles be sent back to the supplier after one year to avoid accumulation of old bottles.

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<u>Submittal Type:</u>	GEO_REPORT
<u>Report Title:</u>	Offsite Soil Vapor and Groundwater Investigation Work Plan 072117
<u>Report Type:</u>	Soil and Water Investigation Workplan
<u>Report Date:</u>	7/21/2017
<u>Facility Global ID:</u>	T0600100213
<u>Facility Name:</u>	BP #11132
<u>File Name:</u>	CA 11132 170721 BP - Offsite SV and GW Workplan.pdf
<u>Organization Name:</u>	ARCADIS
<u>Username:</u>	ARCADISBP
<u>IP Address:</u>	8.39.233.11
<u>Submittal Date/Time:</u>	7/21/2017 2:24:12 PM
<u>Confirmation Number:</u>	<b>4591690301</b>

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