# Atlantic Richfield Company

**Chuck Carmel**
Remediation Management Project Manager

PO Box 1257
San Ramon, CA 94583
Phone: (925) 275-3804
Mobile: (510) 798-8314
E-Mail: Shannon.Couchl@bp.com

August 21, 2013

Re: Addendum to Work Plan for Groundwater Investigation
Atlantic Richfield Company Station No. 2107
3310 Park Boulevard, Oakland, California
ACEH Case #RO0002526

"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."

Submitted by,

**Chuck Carmel**
Remediation Management Project Manager

Attachment:

BROADBENT
875 Cotting Ln., Suite G, Vacaville, CA 95688
[T] 707-455-7290 [F] 707-455-7295
broadbentinc.com



August 21, 2013 Project No. 06-88-614

Atlantic Richfield Company
P.O. Box 1257
San Ramon, California 94583
Submitted via ENFOS

Attn.: Mr. Chuck Carmel

Re: Addendum to Work Plan for Groundwater Investigation, Atlantic Richfield Company Station No. 2107, 3310 Park Boulevard, Oakland, California; ACEH Case No. RO0002526

Dear Ms. Couch:

Provided herein is Broadbent and Associates, Inc. (Broadbent) *Addendum to Work Plan for Groundwater Investigation* (Work Plan Addendum) for Atlantic Richfield Company Station No. 2107 located at 3310 Park Boulevard in Oakland, California (Site; Drawing 1). The *Work Plan for Groundwater Investigation* (Initial Work Plan) dated November 6, 2012 recommended that five proposed cone penetration test (CPT) soil borings be advanced offsite to define the downgradient extent of methyl tert-butyl ether (MTBE) in groundwater; and to close data gaps required to move the Site towards closure. In an email response from the Alameda County Environmental Health (ACEH) received on February 21, 2013, ACEH rejected the Initial Work Plan because it was not supported by a Conceptual Site Model (CSM) and potential vertical gradients were not evaluated. The ACEH email is included in Appendix A. This Work Plan Addendum has been prepared in response to the ACEH comments. A CSM has been prepared and is included as Table 1. A map showing all historic borings, monitoring wells, and soil vapor well is provided as Drawing 2. Additional data gaps were identified in the CSM; therefore, additional field activities are proposed herein in order to close these data gaps. The data gaps identified are as following:

- Lithology between the two distinct screen intervals of the existing nested wells is unclear
- A sensitive receptor survey has not been performed at this Site
- The Oil Changers 3000 may be a potential offsite source (located 200 feet upgradient of the Site; Drawing 3)
- The potential transmissive conduit study is incomplete

An additional potential data gap has been identified due to lack of downgradient soil vapor sampling. However, it is unclear as to how far the MTBE plume extends offsite. Therefore, the reality of a soil vapor data gap is dependent on proposed additional offsite investigation. If the results of the investigation proposed herein indicate soil vapor samples are necessary to close this data gap, they will be proposed at that time.

In order to address these data gaps, additional soil borings are proposed in conjunction with those proposed in the Initial Work Plan. The additional soil borings include one onsite and three offsite CPT borings. Proposed CPT borings from the Initial Work Plan and this Work Plan Addendum are included in Drawing 3. A sensitive receptor survey (SRS) is additionally proposed herein. Details of the CSM, additional scope of work, and schedule are presented below.

This Work Plan Addendum is intended to amend the scope of activities proposed in the Initial *Work Plan*. In addition, the CSM supports the scope of work proposed in the Initial Work Plan. The additional scope of work outlined herein is proposed in addition to all activities presented in the Initial Work Plan.

**CSM AND REVIEW OF SITE HYDROGEOLOGY**

In response to the ACEH request to evaluate Site conditions considering vertical gradients and vertical hydrogeologic connectivity, a CSM has been prepared and is provided as Table 1. Tables 2 and 3 provide historical groundwater elevations and hydrocarbon concentrations for each nested monitoring well. Table 4 represents the historical groundwater gradients. A summary of previous environmental activities performed at the Site are provided in Appendix B. Historical Site data and available soil boring logs are included in Appendix C. Appendix D includes trend graphs for concentrations of gasoline range organics (GRO), benzene, and MTBE for each active onsite and offsite well.

A detailed evaluation of potential vertical gradients at the Site is presented in the CSM. Further reviews of the nested monitoring wells associated with the Site suggest that a vertical gradient may exist between wells MW-11A and MW-11B. Soil boring log SB-10 (located approximately 3 feet (ft) southwest of well MW-11A) indicates that no lithologic recovery occurred from 16 to 20 ft below ground surface (bgs), which is similar to the screen interval in MW-11A. A silty sand layer was encountered in the soil boring at 21 to 22.5 ft bgs and gravelly silty sand was encountered at 30 to 32 ft bgs. For well MW-11B, varying sand layers were encountered from 16 to 30 ft bgs with the screen interval occurring at 26 to 30 ft bgs. The most recent groundwater monitoring event, which was conducted on March 26, 2013, yielded groundwater elevations in MW-11A and MW-11B to be 107.15 and 113.74 feet above site datum, respectively. The variance in groundwater elevations between the two wells may be an indication of two separate water bearing zones. However, it is unclear as to whether this difference represents an actual vertical gradient or a problem with the well construction and/or well screen.

Groundwater elevations from the most recent monitoring event for offsite monitoring wells MW-12A, MW-12B, MW-13A, and MW-13B were 111.96, 111.98, 111.81, and 111.83 ft above site datum respectively. There appears to be no indication of vertical gradients occurring in the offsite wells as evidenced by similar water elevations. As presented in the CSM (Table 1), lithology in these wells does not strongly indicate any separate water bearing zones are present to a depth of approximately 30 ft bgs. However, lithology in wells MW-12A and MW-12B indicates that some stratification in water-bearing zones may be present in the vicinity of this well, the observations are not consistent with wells MW-11A/B and MW-13A/B. Therefore, the presence and extent of any separate water-bearing zones to 30 ft bgs is unclear.

The CSM also notes that a data gap exists due to the lack of current SRS data. Therefore, the potential impacts to any potential offsite receptors are not known at this time. In support of the CSM (Table 1), supporting Drawings have been prepared and are included following this Work Plan Addendum. A map showing the most recent groundwater data (March 26, 2013) is provided as Drawing 4. GRO, benzene, and MTBE isoconcentration contour maps are provided in Drawings 5 through 7. Underground utilities located under Park Boulevard and 33$^{rd}$ Street are

shown in Drawing 8. However, the exact depths of the utilities are not provided; therefore, a detailed preferential pathway study will be conducted. Geologic cross sections are provided as Drawing 9 through 11.

**ADDITIONAL WORK PROPOSED**

The proposed scope of work outlined in the Initial Work Plan included advancing six CPT borings in the Oakland High School athletic field, north (downgradient) of the Site. Details of the proposed investigation in the adjacent athletic field are presented in the Initial Work Plan. In addition to these borings, three additional borings are proposed in order to evaluate lithologic and hydrogeological conditions both onsite and near current offsite wells MW-12A/B and MW-13A/B. Furthermore, in order to evaluate the potential for an offsite source (Oil Changers 3000), one additional boring will be advanced downgradient of the Oil Changers 3000 station. These additional borings will be advanced to a minimum of 40 ft bgs, and will be advanced with the same procedures outlined in the Initial Work Plan. Prefield and reporting activities will also remain the same as described in this Work Plan. Contingent upon the results from the offsite borings from this CPT investigation, an offsite soil vapor investigation will be performed.

A SRS is additionally proposed. This survey will include obtaining well logs from the California Department of Water Resources (DWR) and the Alameda County Public works for a 2000 ft radius. Additional receptors within this radius including surface water, schools, and hospitals will be evaluated. Results of the SRS will be included in the forthcoming investigation report.

**REPORTING AND SCHEDULE**

Access agreement negotiations with Oakland High School as well as the Oakland Unified School District are already underway. Upon approval of this Work Plan Addendum, the 10 total proposed soil CPT borings will be advanced (Drawing 3). Upon completion of the onsite and offsite field work, Broadbent will complete and submit a groundwater investigation report to the ACEH with all elements described in the Initial Work Plan. In addition, this report will include results from the SRS and an updated CSM.

It is unclear how long negotiations with the Oakland Unified School District will take to obtain access. However, once access is secured and all planning activities are carried out, field activities will be performed. Results of the field investigation and analytical results will be summarized in a report with an updated CSM and will be submitted 60 days following the completion of field work.

Should you have any questions or require additional information, please do not hesitate to contact us at (707) 455-7290.

Sincerely,
BROADBENT & ASSOCIATES, INC.


Kristene Tidwell, PG, CHG.
Senior Geologist

Attachment

| | |
|---|---|
| Drawing 1 | Site Location Map |
| Drawing 2 | Site Map with Monitoring Well, Historic Boring, & Soil Vapor Well Locations |
| Drawing 3 | Site Map with Proposed CPT Boring Locations |
| Drawing 4 | Groundwater Elevation Contour and Analytical Summary Map, March 26, 2013 |
| Drawing 5 | GRO Isoconcentration Contour Map |
| Drawing 6 | Benzene Isoconcentration Contour Map |
| Drawing 7 | Site Vicinity and Underground Utility Infrastructure |
| Drawing 8 | Cross Section Layout Plan |
| Drawing 9 | Geologic Cross Section A-A’ |
| Drawing 10 | Geologic Cross Section B-B’ |

| | |
|---|---|
| Table 1 | Conceptual Site Model |
| Table 2 | Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analysis |
| Table 3 | Summary of Fuel Additives Analytical Data |
| Table 4 | Historical Groundwater Gradient – Direction and Magnitude |

| | |
|---|---|
| Appendix A | Recent Regulatory Correspondence |
| Appendix B | Previous Environmental Activities at Site |
| Appendix C | Historical Site Data and Soil Boring Logs |
| Appendix D | GRO, Benzene, and MTBE Concentration Trend Graphs |

cc: Ms. Dilan Roe, Alameda County Environmental Health (submitted via ACEH ftp site)
Electronic copy uploaded to GeoTracker

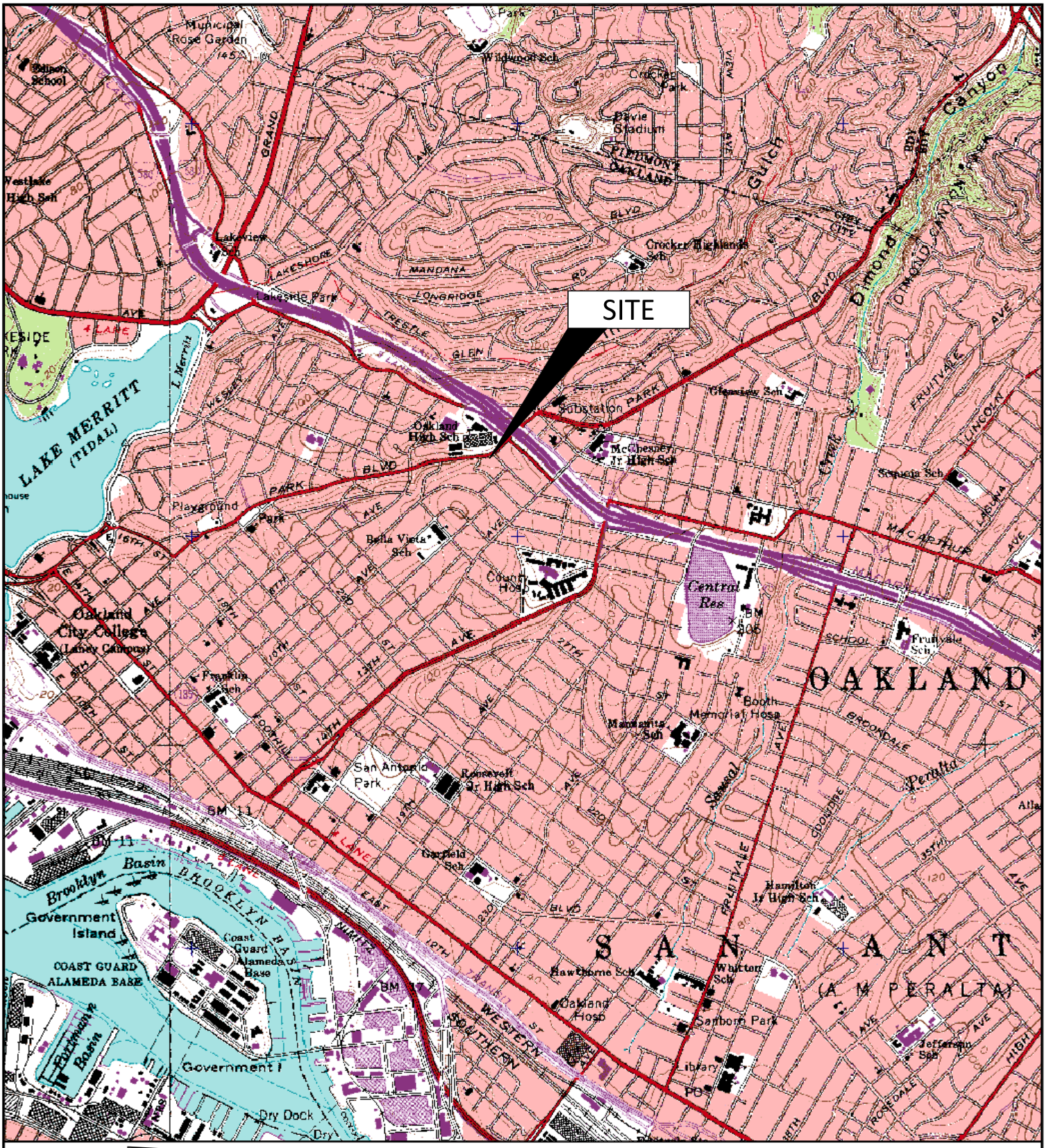
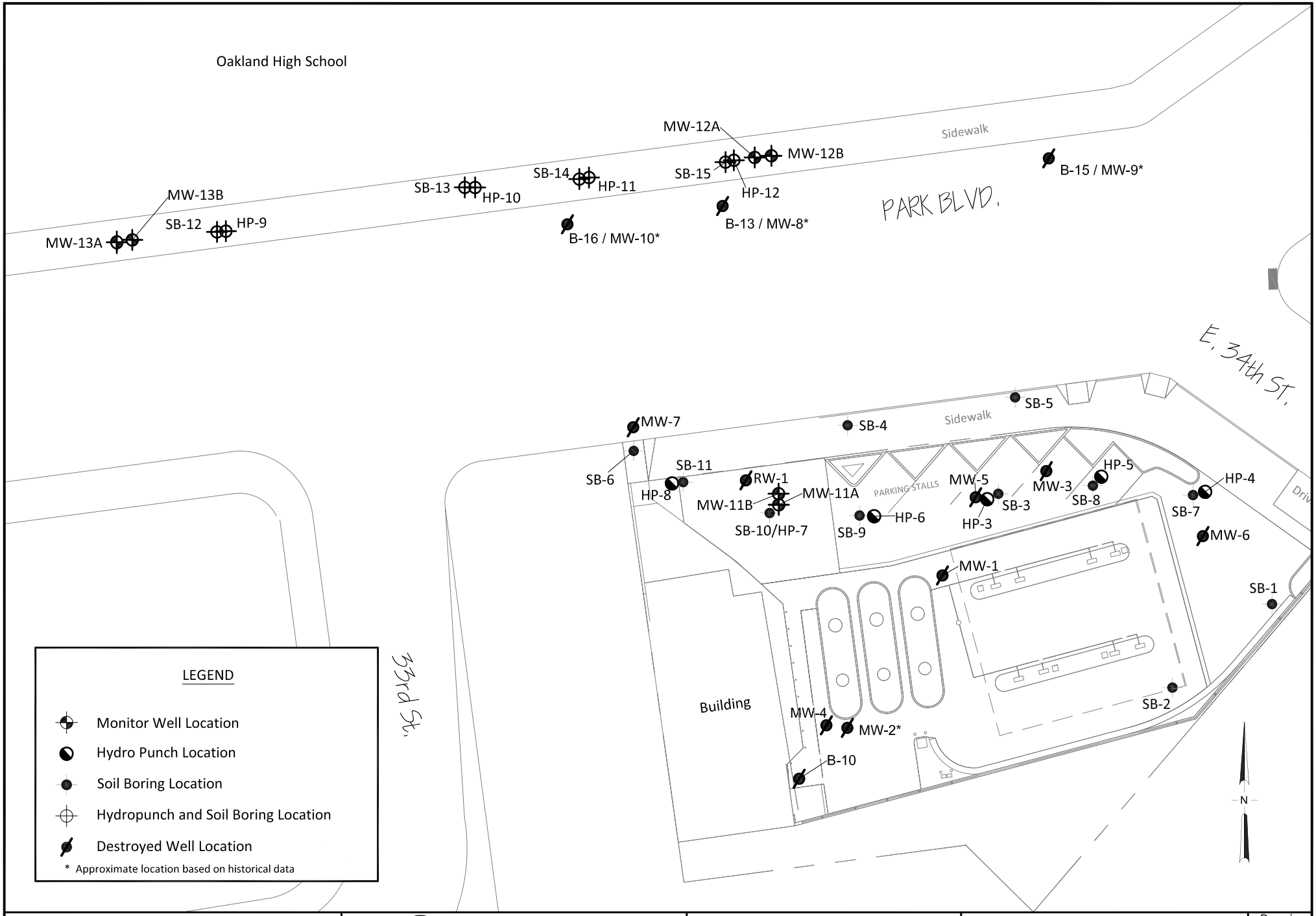



IMAGE SOURCE: USGS

| | | | |
|---|---|---|---|
| BROADBENT<br>1370 Ridgewood Dr., Suite 5<br>Chico, California 95973<br>Project No.: 06-88-614 Date: 4/16/2013 | Station #2107<br>3310 Park Boulevard<br>Oakland, California | Site Location Map | Drawing<br>1 |

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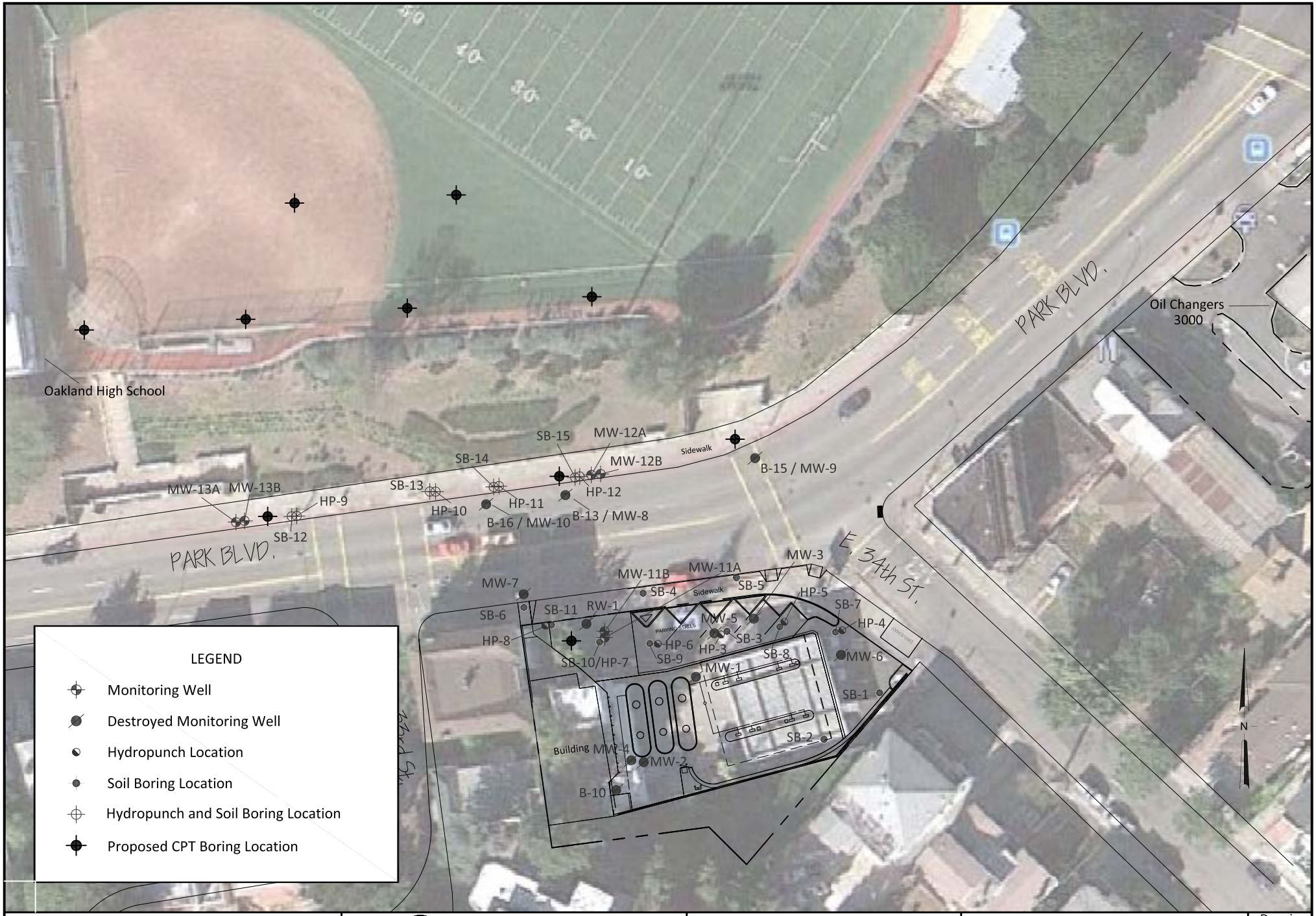
Site Map with Monitoring Well, Historic Boring & Soil Vapor Well Locations

Drawing
2




0 50 100

SCALE (ft)

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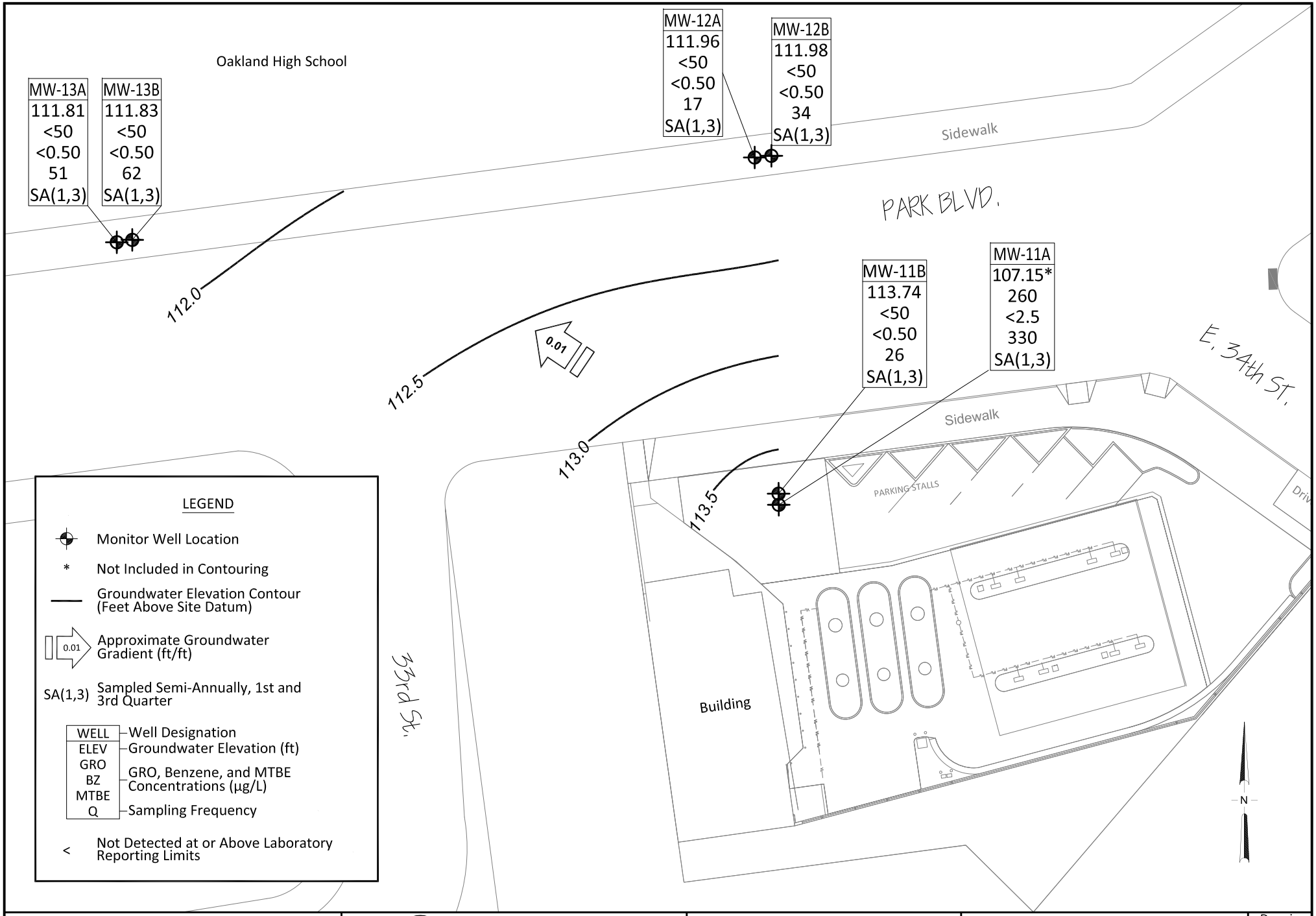
Project No.: 06-88-614 Date: 6/12/2013

Station #2107
3310 Park Boulevard
Oakland, California

Site Map with
Proposed CPT Boring Locations

Drawing
3




0 30 60

SCALE (ft)

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Station #2107
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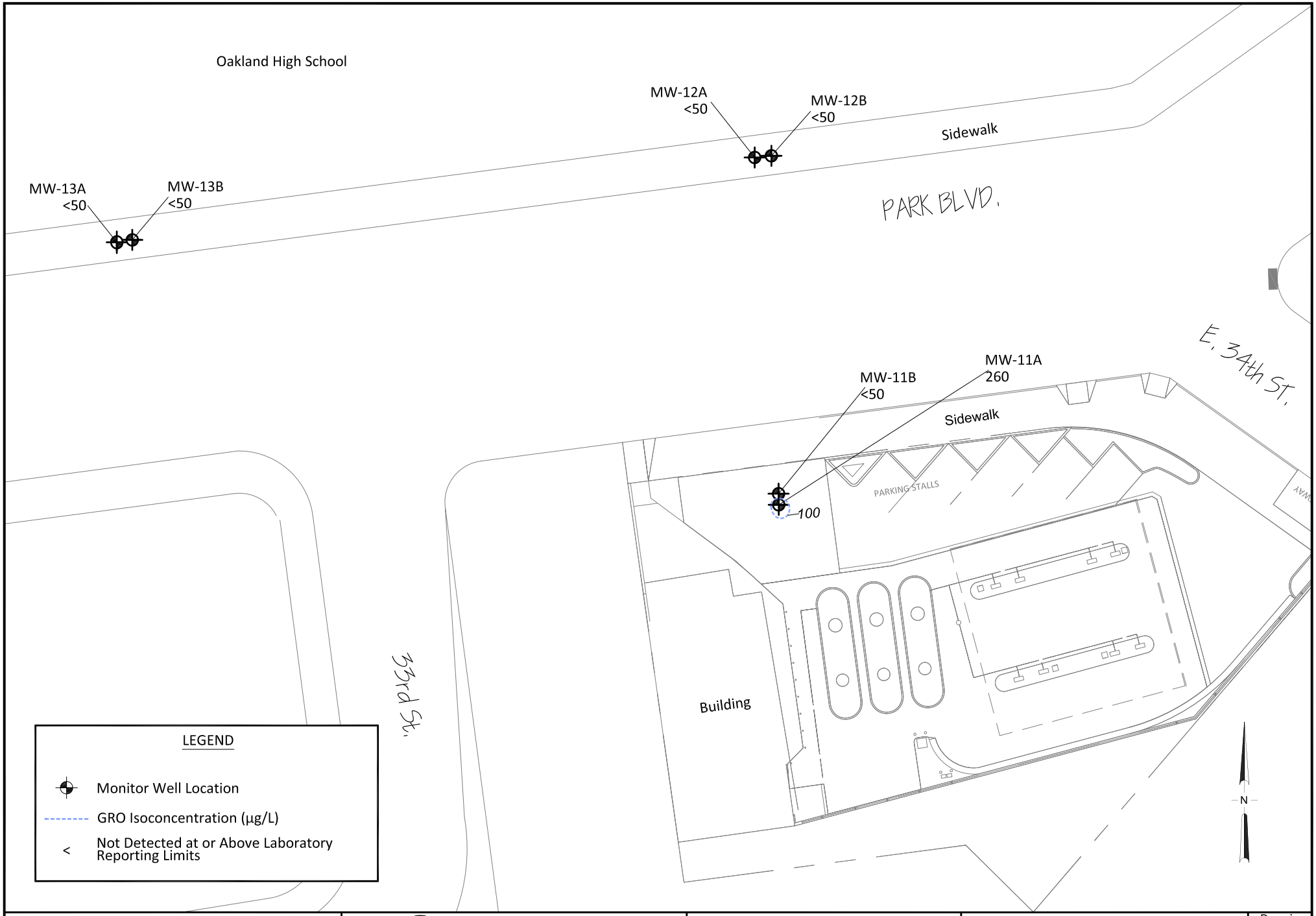
Groundwater Elevation Contour and Analytical Summary Map
March 26, 2013

Drawing
4




0 30 60

SCALE (ft)

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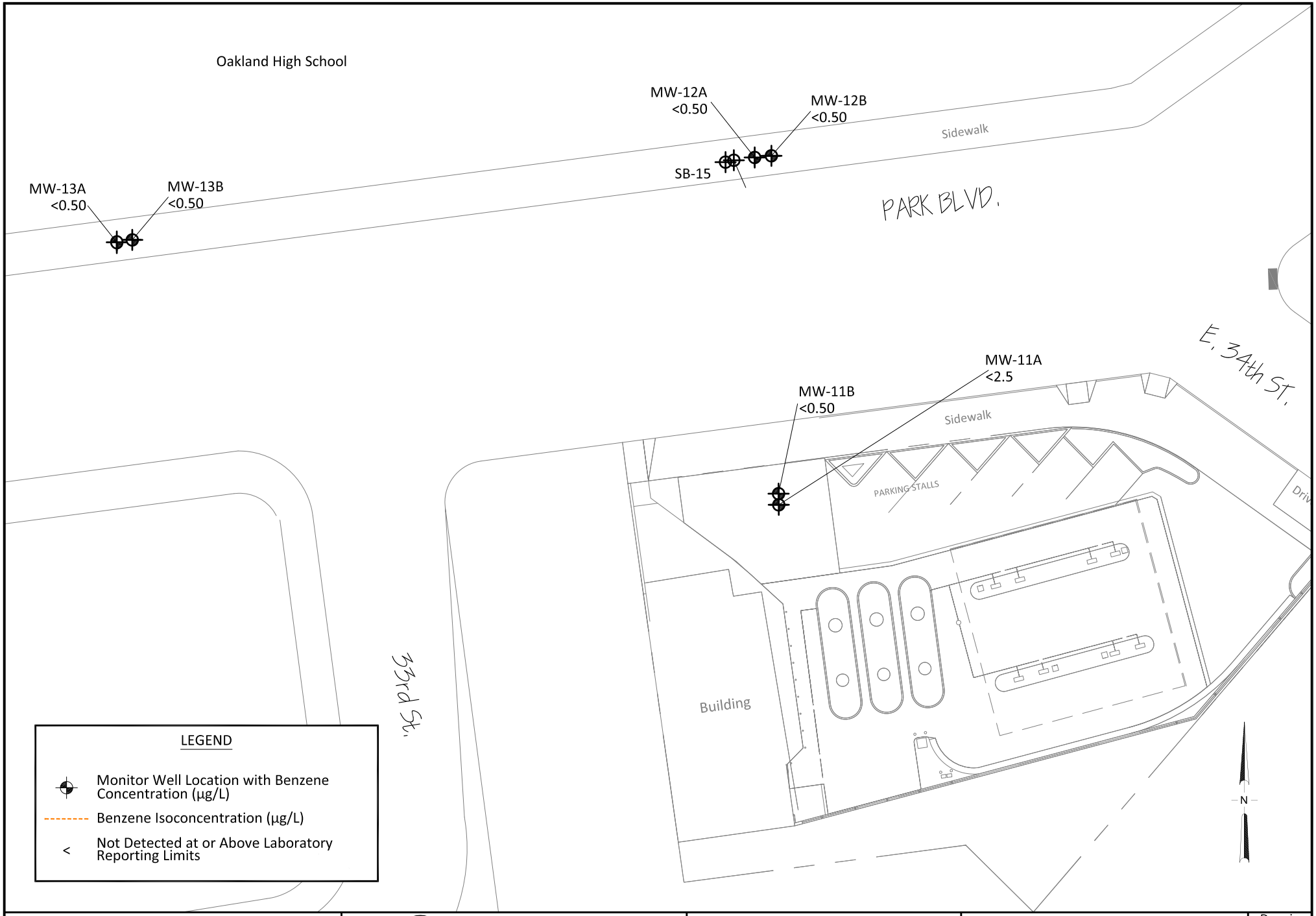
GRO Isoconcentration Contour Map

Drawing
5

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SCALE (ft)

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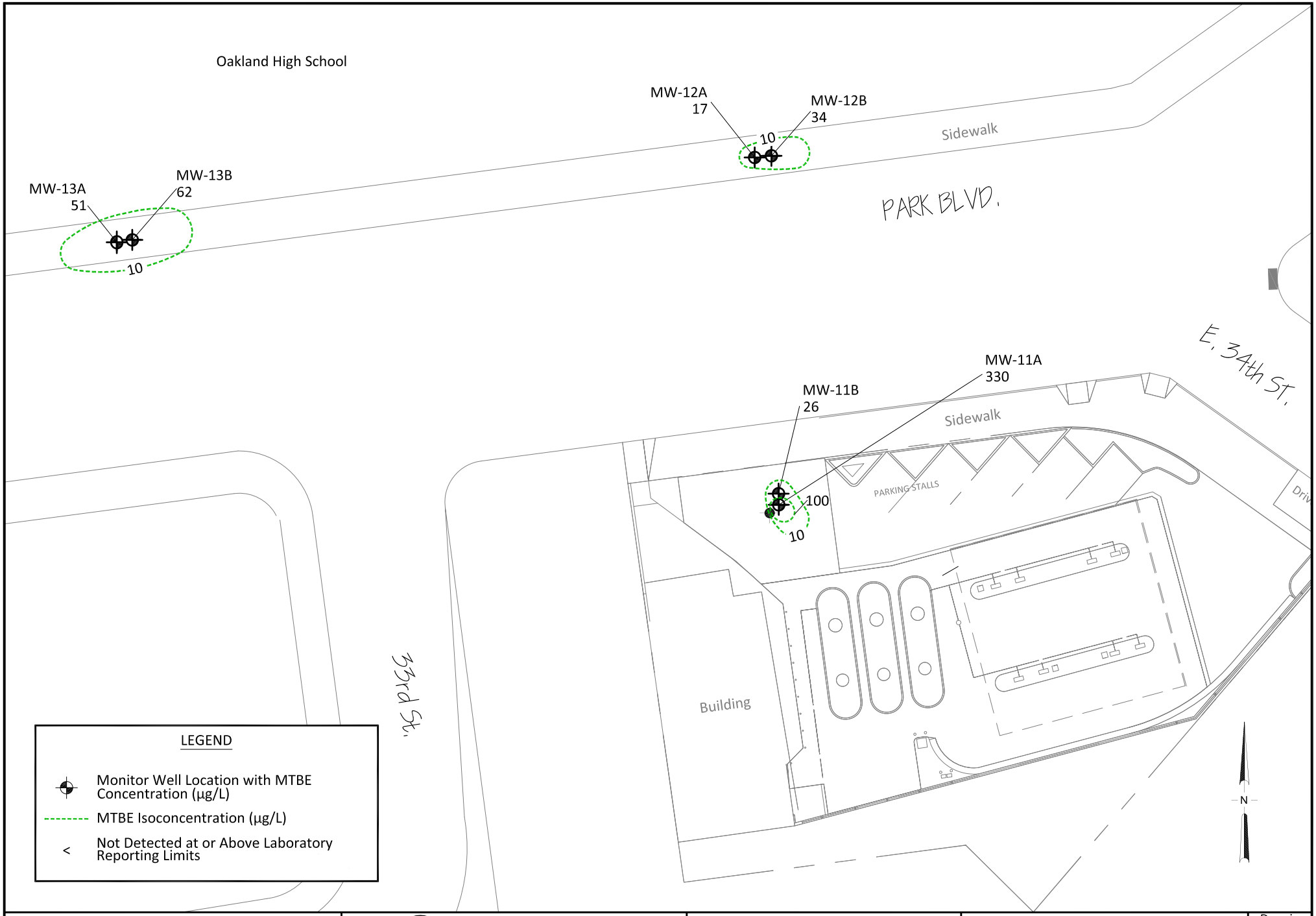
Benzene Isoconcentration Contour Map

Drawing

6

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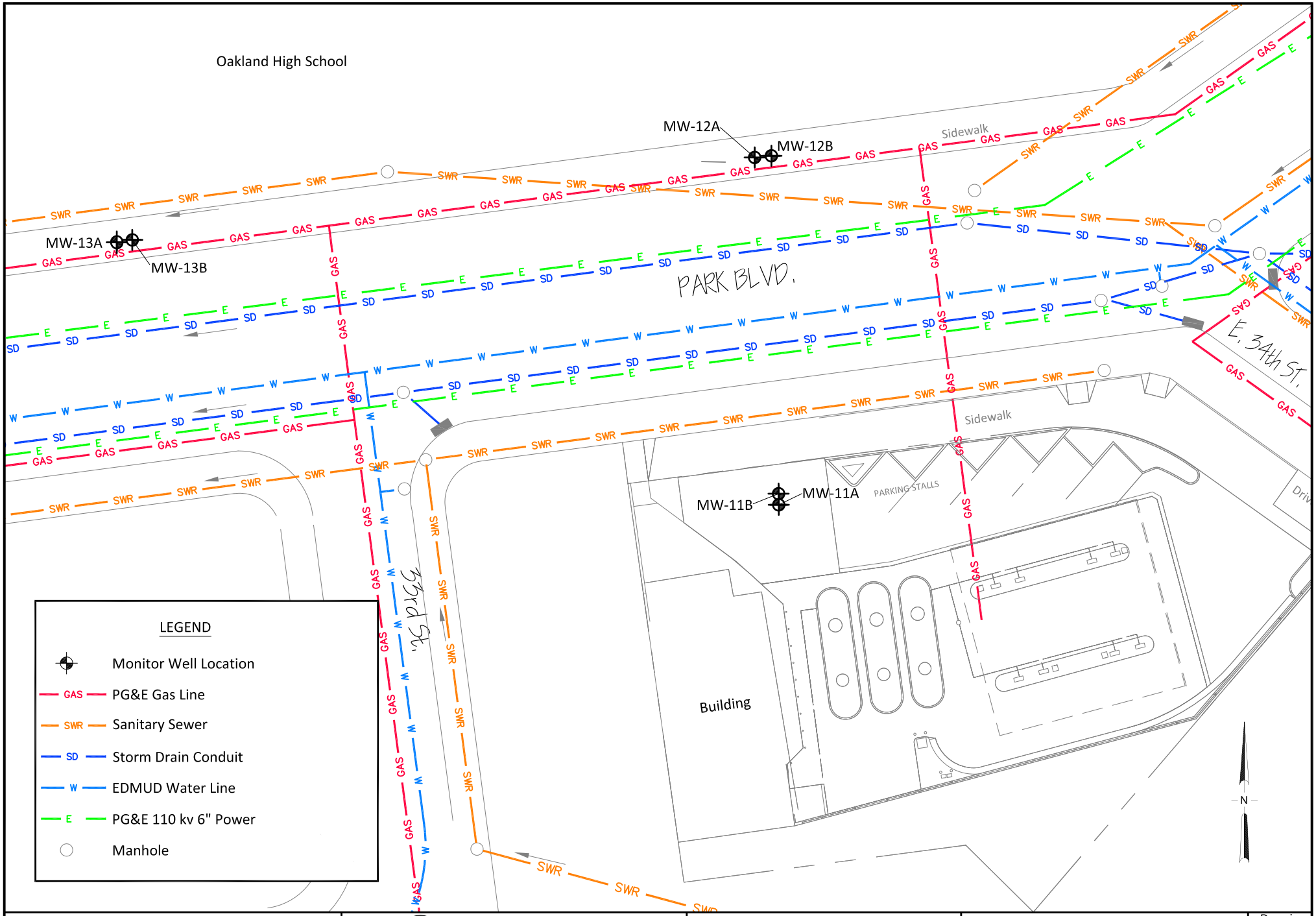
MTBE Isoconcentration Contour Map

Drawing
7

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SCALE (ft)

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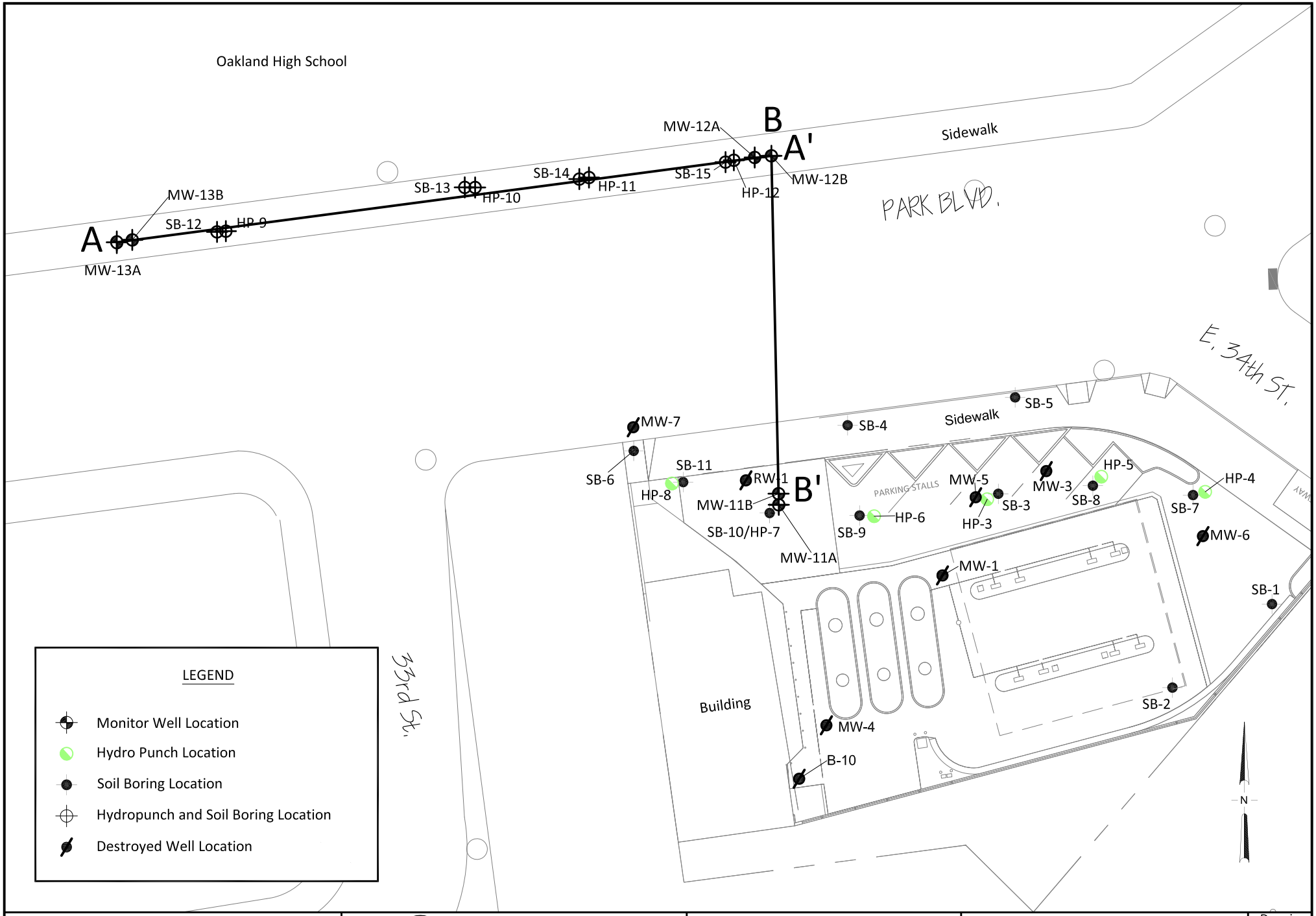
Site Vicinity and Underground Utility Infrastructure

Drawing
7

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SCALE (ft)

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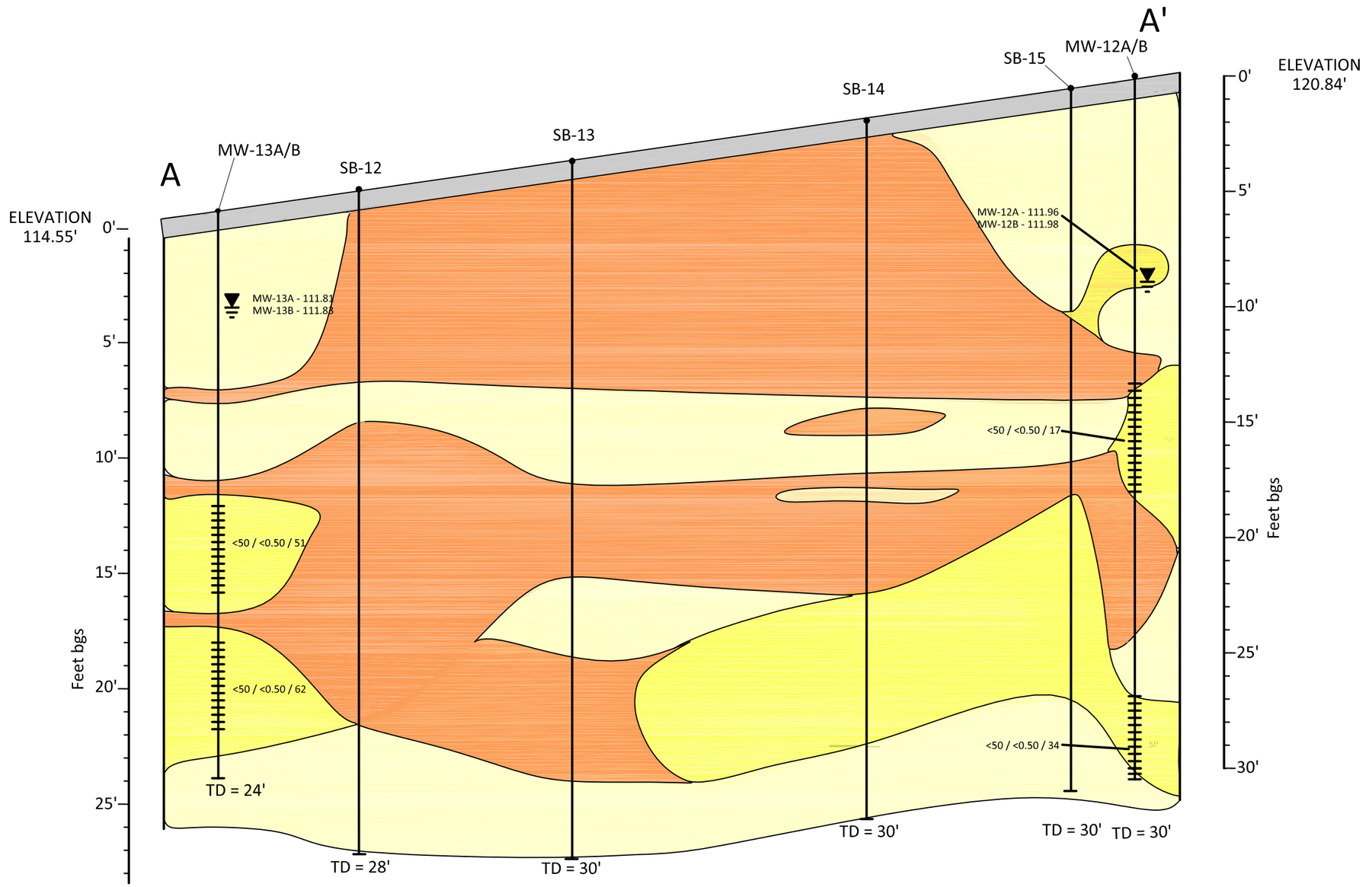
Cross Section Layout Plan

Drawing

8




Asphalt/Backfill/Concrete

Clay & Silt

Sand with Clay and Gravel, Sand with Clay and Silt, Clayey Sand

Sand with Fines

Groundwater Elevation in feet above mean sea level (MSD) - 3 /26 /2013

<50 / <0.50 / 62 = GRO / Benzene / MTBE concentrations in mg/L - 3 /26 /2013

Boring ID

Extent of Boring

Extent of Well Screen

TD = Total Depth (feet)

0 20 40

HORIZONTAL SCALE (ft)
VERTICAL EXAGGERATION 4:1

Drawing 6

Geologic Cross Section A - A'

Station #2107
3310 Park Boulevard
Oakland, California

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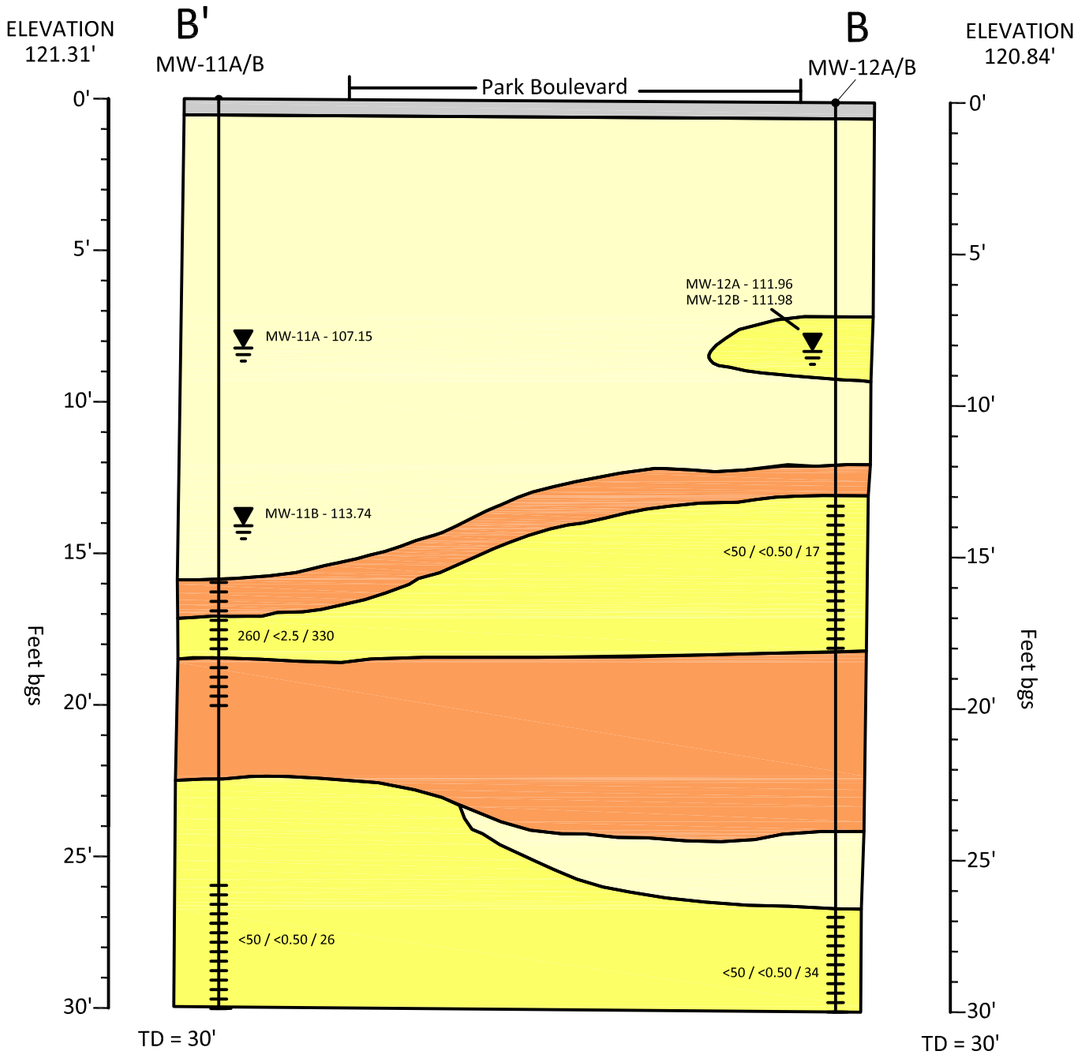
Project No.: 06-88-614 Date: 6/25/2013




Asphalt/Backfill/Concrete

Clay & Silt

Sand with Clay and Gravel, Sand with Clay and Silt, Clayey Sand

Sand with Fines

Groundwater Elevation in feet above mean sea level (MSD) - 3 /26 /2013

<50 / <0.50 / 26 = GRO / Benzene / MTBE concentrations in mg/L - 3 /26 /2013

Boring ID

Extent of Boring

Extent of Well Screen

TD = Total Depth (feet)

0 20 40

HORIZONTAL SCALE (ft)
VERTICAL EXAGGERATION 4:1

N

Drawing 10

Geologic Cross Section B - B'

Station #2107
3310 Park Boulevard
Oakland, California

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Project No.: 06-88-614 Date: 6/25/2013

Tables

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| Geology and Hydrogeology | Regional | The Site is located within the Oakland Sub-Area of the East Bay Plain of the San Francisco Basin. The Oakland Sub-Area contains a sequence of alluvial fans. The alluvial fill thickness ranges from 300 to 700 feet deep. There are no well-defined aquitards in the area. The largest and deepest wells in this sub-area historically pumped one to two million gallons per day at depths greater than 200 feet. Overall, sustainable yields are low due in part to low recharge potential. The Merritt sand in West Oakland was an important part of the early water supply for the City of Oakland. It is shallow (up to 60 feet), but before the turn of the last century, septic systems contaminated the water supply wells.<br><br>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. Flow direction and velocity are also influenced by buried stream channels that typically are oriented in an east to west direction. In the southern end of the study area however, near the San Lorenzo Sub-Area, the direction of flow may not be this simple. According to information presented in *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report,* the small set of water level measurements available seemed to show that the groundwater in the upper aquifers may be flowing south, with the deeper aquifers, the Alameda Formation, moving north. The nearest natural drainage is Sausal Creek, located approximately 1.0 mile southeast of the Site. Sausal Creek flows generally northeast to southwest near the Site vicinity. | None | NA |
| | Site | The Site elevation is approximately 127 ft above mean sea level. However, in the immediate Site vicinity, the elevation varies by approximately +/- 6 ft. Onsite wells MW-12A/B and MW-13A/B are located lower in elevation than onsite well MW-11A/B. Additionally, Park Boulevard directly to the north of the Site slopes downward to the west, from MW-12A/B to MW-13A/B. Further north of Park Boulevard is the Oakland High School athletic field, which has been graded 15 to 20 ft above Park Boulevard. Sloped landscaping is present between Park Boulevard and the athletic field (Drawing 2).<br><br>Sediments encountered during previous Site investigations consists of beds and lenses of | Yes | Conduct CPT investigation onsite and near wells on Park Boulevard |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| Geology and Hydrogeology (continued) | Site (continued) | varying thicknesses of sands and sands with fines, with some discontinuous layers of silts and clays. The groundwater was first encountered in soil at an approximate depth ranging from 1.3 to 20 ft bgs. According to the cross sections presented in Drawings 9 and 10 lithology is consistent with the geologic environment of alluvial deposits, and consistent with the regional geologic environment.<br><br>When the this case was reopen in 2009, wells were constructed in two intervals: One interval is screened in the three well locations from approximately 13 ft bgs to 18 ft bgs and the other generally 10 ft below the bottom of the upper interval. The screen intervals for these wells are depicted on the cross section drawings (Drawings 9 and 10). The purpose for the nested wells is not immediately apparent. According to the lithology presented in the cross sections, the subsurface consists primarily of sands and sands with fines, with some discontinuous layers of silts and clays. Site lithology as presented in the cross sections do not indicate that multiple water bearing zones are present at the Site. There is a 3 foot clay/silt layer in between the screen intervals at MW-12A/B, however it is likely that this layer does not indicate that two water bearing zones are present at the two screen intervals.<br><br>The water table fluctuates seasonally. Historical depth to groundwater in Site wells have ranged from 1.24 to 14.91 ft bgs. Historical groundwater gradient has generally been to the northwest with average hydraulic gradient ranging from 0.01 to 0.06 ft/ft (Table 4). Groundwater levels in well MW-11A have consistently been lower than other Site monitoring wells. It is unclear as to whether a localized vertical downward gradient is present in this location, or if the well construction and/or lithology is causing the lower groundwater levels in the upper screen interval.<br><br>Due to the uncertainty regarding the vertical connectivity of the screen intervals at wells MW-11A/B, MW-12A/B, and MW-13A/B, the geology and hydrogeology of the Site is not completely understood. Therefore, additional CPT borings will be advanced on- and offsite to further understand Site specific lithology. | | |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| Surface Water Bodies | | The nearest surface water body is the Central Reservoir, located approximately 3,500 ft southeast of the Site. Lake Merritt is located approximately 4,500 ft west of the Site. The lake is in an urban area near downtown Oakland and drains into the Oakland Inner Harbor (an inlet to the San Francisco Bay) to the immediate southwest. | None | NA |
| Nearby Wells | | A sensitive receptor survey has not been performed at the Site. Therefore, the presence of nearby municipal, irrigation, or domestic is not known at this time. A sensitive receptor survey is being proposed in the preceding Work Plan Addendum. | Yes | Perform Sensitive Receptor Survey |
| Constituents of Concern | Light-Non Aqueous Phase Liquid (LNAPL) | Measurable LNAPL has only been detected at the Site, in well MW-1, located in the northeast corner of the UST complex, on May 19, 1989 at a thickness of 0.125 ft. Sheen (less than 0.01 ft of LNAPL) was detected at the Site in wells MW-2 and MW-5, located near the UST complex, on May 19, 1989 and August 14, 1990, respectively. Since the environmental case was reopened in 2009 and since these few detections, measurable LNAPL or sheen have not been detected in any Site wells. | None | NA |
| | Gasoline Range Organics (GRO) | Historically, concentrations of GRO were detected near source area in former monitoring wells MW-3, MW-4, MW-5, and RW-1, located near the UST complex and dispenser island, with the exception of RW-1 which is located north of the station building. The former monitoring wells (MW-1 through MW-10 and RW-1) were destroyed during previous case closure in 1997. Since the environmental case was reopen in 2009, concentrations of GRO have been detected in monitoring well MW-11A, located next to former well RW-1 and north of the station building. GRO concentrations have not been detected in offsite wells MW-12A, MW-13A, and MW-13B, and very seldom in wells MW-11B and MW-12B. Historical maximum detected concentration of GRO was reported in former well MW-5 at 22,000 ppb on July 16, 1990. Maximum detected concentration within the last four monitoring events was reported in well MW-11A at 730 µg/L, indicating a strong decreasing GRO trend over time.<br><br>Based on recent and historical data, the GRO plume has been delineated. A GRO isoconcentration contour map for the most recent groundwater monitoring and sampling event (1Q13) is presented as Drawing 5. GRO concentration trend graphs for wells MW-11A through | None | NA |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| Constituents of Concern (continued) | GRO (continued) | MW-13A and MW-11B through MW-13B are included in Appendix D. These graphs and data presented in DD 2 show a strong decreasing trend for GRO in all Site wells, indicating a shrinking plume. | | |
| | Benzene | Concentrations of benzene were historically detected near source area in former monitoring wells MW-3, MW-4, MW-5, and RW-1, located near the UST complex and dispenser island, with the exception of RW-1 which is located north of the station building. The former monitoring wells (MW-1 through MW-10 and RW-1) were destroyed during previous case closure in 1997. Since the environmental case was reopen in 2009, concentrations of benzene have been detected in monitoring well MW-11A, located next to former well RW-1 and north of the station building. Benzene concentrations have not been detected in offsite wells MW-12A, MW-12B, MW-13A, and MW-13B, and very seldom in onsite well MW-11B. Historical maximum concentration of benzene was reported in former well MW-5 at 1,500 ppb on July 24 and October 31, 1991. Maximum detected concentration within the last four monitoring events was reported in well MW-11A at 7.3 µg/L, indicating a strong decreasing benzene trend over time.<br><br>Based on recent and historical data, the benzene plume has been delineated. A benzene isoconcentration contour map for the most recent groundwater monitoring and sampling event (1Q13) is presented as Drawing 6. Benzene concentration trend graphs for wells MW-11A through MW-13A and MW-11B through MW-13B are included in Appendix D. These graphs and data presented in Table 2 show a strong decreasing trend for benzene in all Site wells, indicating a shrinking plume. | None | NA |
| | Methyl tert-butyl ether (MTBE) | Prior to the environmental case being reopened in 2009, MTBE was not part of the monitoring program and was only sampled in the 3rd and 4th quarter 1995 monitoring events. In addition, the former monitoring wells (MW-1 through MW-10 and RW-1) were destroyed during previous case closure in 1997. Since the environmental case was reopened in 2009, concentrations of MTBE have been detected in all monitoring wells (MW-11A through MW-13A and MW-11B through MW-13B). Historical maximum concentration of MTBE was reported in well MW-12B at 840 µg/L on January 16, 2012 and has since decreased to 34 µg/L on March 26, 2013. This | YES | Perform downgradient CPT investigation in adjacent high school athletic field |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| Constituents of Concern (continued) | MTBE (continued) | concentration of MTBE is also representative of the maximum concentration within the last four monitoring events.<br><br>Based on recent and historical data, the MTBE plume has not been delineated in offsite wells MW-12A, MW-12B, MW-13A, and MW-13B. Offsite concentrations of MTBE are generally higher than onsite concentrations, and there is a possibility that the MTBE plume has migrated further offsite (downgradient). Recently (2012) the highest concentration of MTBE was reported in well MW-12B. A corresponding concentration TBA was also detected in this well in 2012, indicating biodegradation of the MTBE then present. Therefore, MTBE has potentially migrated further downgradient, but degradation is also occurring, which may limit the lateral extent of MTBE.<br><br>Additional CPT borings will be advanced to further delineate offsite MTBE concentrations. An MTBE isoconcentration contour map is not included in this report due to the lack of downgradient data. MTBE concentration trend graphs for wells MW-11A through MW-13A and MW-11B through MW-13B are included in Appendix D. | | |
| Potential Sources | Onsite | The exact release source and volume released at the Site is unknown; however, it is assumed that the source was the former UST and former waste oil tank complex located at the central and southern portion of the Site, respectively. These assumptions are supported by data collected since the environmental case was reopened in 2009 including proximity to historical free product and higher dissolved-phase petroleum hydrocarbon concentrations. Additional areas of documented soil contamination occurred beneath product pipelines and dispensers. It is also possible that that residual MTBE concentrations occurred near Site vent lines. An unknown amount of petroleum, mostly MTBE, remains dissolved in groundwater. A fluctuating groundwater table has likely caused a contaminant smear zone where the residual dissolved-phase hydrocarbons remain. However, the trends for the residual petroleum compounds in groundwater indicate that the remaining concentrations in this smear zone have degraded over time, and are impacting the groundwater beneath the Site to a far lesser degree than in the past, and will continue to degrade over time, with the exception of MTBE in offsite wells. MTBE in offsite groundwater monitoring wells MW-12B, MW-13A, and MW-13B have | None | NA |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| Potential Sources (continued) | | been increasing over time (Appendix D).<br><br>The removal and replacement of the storage and dispensing system was conducted to stop the potential release. The initial UST removal and replacement activities are documented within the ACEH files. The product line removal and upgrade activities are documented in the *Product Line Removal and Upgrade Soil Sampling Report* (URS, 2003). | | |
| | Offsite | An Oil Changers 3000 station is located about 200 ft northeast of the Site at 3418 Park Boulevard in Oakland, California. A cleanup case was open at this site on July 25, 2001. The site was assessed on August 17, 2001. However, documentation of activities could not be located; thus, the type of contaminant is unknown. Following the assessment activities, the case was closed on August 22, 2001.<br><br>This site is located (northeast) crossgradient of the Site based on the historic and current groundwater gradient direction (to the northwest). It is possible that this site may be contributing to the offsite MTBE contamination through a preferential pathway. Therefore, an offsite boring will be advanced downgradient of the Oil Changers 3000 station to evaluate the potential contamination, if any, from this site. | Yes | Conduct CPT investigation offsite and downgradient of Oil Changers 3000 |
| Nature and Extent of Environmental Impacts | Extent in Soil | Soil contamination appears defined at the Site. Downgradient and offsite investigation was completed by Broadbent in 2007 contained no concentrations of petroleum hydrocarbons (Broadbent, 2007). Based on historical data collected since the environmental case was reopened in 2009, the highest concentrations of GRO were detected at the northern portion of the Site, downgradient of the UST complex and the dispensers. The highest concentrations were consistently reported at approximately 6 to 21.5 ft bgs, which is consistent with the capillary fringe zone at the Site. One soil sample collected at 1 ft bgs had a GRO concentration of 350 mg/kg. This single shallow concentration may have been from a surface release, not related to the former USTs at the Site. Soil was defined laterally to non-detect for all petroleum compounds to the north (SB-6 and SB-12 through SB-15), and south (SB-2), and to 0.096 mg/kg toluene and 0.016 mg/kg xylenes to the east.<br><br>Since source areas have been removed and these concentrations were representative of overall | None | NA |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| Nature and Extent of Environmental Impacts (continued) | | groundwater concentrations at the time of sampling, it is likely that these concentrations have further attenuated over the last four years. Based on data and observations from current groundwater conditions, soil at the Site appears to be adequately defined. | | |
| | Extent in Shallow Groundwater | The current groundwater monitoring network at the Site includes a source area well (MW-11A); and downgradient wells (MW-12A and MW-13A). Isoconcentration maps for the most recent groundwater monitoring and sampling event (1Q13) for GRO and benzene are included as Drawings 5 and 6, respectively. Concentrations in these wells have decreased significantly since their installation, with the exception of MTBE in shallow well MW-13A (Table 2). Concentrations of MTBE in monitoring well MW-13A have been increasing over time. Based on the observed decreasing trends, with the exception of MTBE in well MW-13A, the extent of petroleum compounds is small and the plume appears to be shrinking (Appendix B). In addition, based on Drawings 5 and 6, the extent of petroleum compounds is well defined in all directions, and is predominately limited to onsite, with the exception of MTBE in the northwestern end of the Site and in offsite wells. Concentrations of MTBE in offsite monitoring well MW-13A has been increasing over time and has been decreasing in onsite monitoring well MW-11A; therefore, it is possible that the MTBE plume is detached. A CPT investigation will be performed downgradient and offsite to further delineate the MTBE plume.<br><br>Additionally, free product has not been observed at the Site since the environmental case was reopened in 2009 and dissolved petroleum concentrations are decreasing, with the exception of MTBE in well MW-13A. Additional downgradient characterization of groundwater beneath the Site is necessary to close this data gap. | Yes | Perform downgradient CPT investigation offsite and in adjacent high school athletic field |
| | Extent in Deeper Groundwater | An environmental impact assessment in deeper groundwater was performed at the Site by Broadbent in 2007 (Broadbent, 2007). Deep zone depth discrete groundwater samples were collected at depths between 21 and 25 ft bgs. Concentrations of GRO, benzene, and MTBE were detected at maximum concentrations of 84 µg/L, 0.80 µg/L, and 110 µg/L, respectively. In addition, the deep zone groundwater monitoring network at the Site include a source area well MW-11B and downgradient wells MW-12B and MW-13B. Deep zone isoconcentration maps for the most recent groundwater monitoring and sampling event (1Q13) for GRO and benzene are | Yes | Perform vertical CPT investigation on- and offsite |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| Nature and Extent of Environmental Impacts (continued) | Extent in Deeper Groundwater (continued) | included as Drawings 5 and 6, respectively. Concentrations of these deep zone wells have decreased significantly since their installation, with the exception of MTBE in deep zone wells MW-12B and MW-13B (Table 2). Based on the observed decreasing trends, with the exception of MTBE in wells MW-12B and MW-13B, the extent of petroleum compounds is small and the plume appears to be shrinking (Appendix B). Concentrations of MTBE in offsite monitoring wells MW-12B and MW-13B has been increasing over time and has been decreasing in onsite monitoring well MW-11B; therefore, it is possible that the MTBE plume is detached. In addition, based on these drawings, the extent of petroleum compounds is well defined in all directions, and is predominately limited to onsite, with the exception of MTBE in the northwestern end of the Site and in offsite wells. Therefore, a CPT investigation will be performed downgradient and offsite to further delineate the MTBE plume and to close this data gap.<br><br>Although groundwater has been monitored in deeper monitoring wells, previous evaluation of Site hydrogeology does not indicate that these well screens represent different water-bearing zones beneath the Site. According to the lithology presented above and in the cross sections, the subsurface consists primarily of sands and sands with fines, with some discontinuous layers of silts and clays. Site lithologies as presented in the cross sections do not indicate that multiple water bearing zones are present at the Site. There is a 3 foot clay/silt layer in between the screen intervals at MW-12A and MW-12B; however, it is likely that this layer does not indicate that two water bearing zones are present at the two screen intervals.<br><br>Due to the uncertainty regarding the vertical connectivity of the screen intervals at wells MW-11A, MW-11B, MW-12A, MW-12B, MW-13A, and MW-13B, the geology and hydrogeology of the Site is not completely understood. Therefore, CPT borings will advanced near onsite wells MW-11A and MW-11B, and offsite wells MW-12A and MW-12B to further characterize the soil lithology. | | |
| | Extent in Soil Vapor | A soil vapor investigation has not been conducted at the Site. However, due to current concentrations of petroleum compounds and their location (at an active service station and under a street), soil vapor assessment is not warranted at this time. If migration of contaminants are documented at the proposed sampling locations, downgradient of the Site and in the high | Possible | Advance soil vapor borings downgradient of the Site |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| | | school athletic field, then the necessity for an offsite (in the high school) soil vapor investigation will be evaluated. | | |
| Migration Pathways | Potential Conduits | A potential transmissive conduit study was performed by Broadbent for the Site (Drawing 7). However, the exact or estimated depths of the conduits were not presented. A sanitary sewer, natural gas, storm drain, water, and power lines are located along Park Boulevard, and gas, water, and sanitary sewer lines are located on East 34$^{th}$ Street. Utility lines generally tend to be shallow (above 10 ft bgs), and depth to groundwater at the Site is between 1.24 to 14.91 ft bgs. Thus, migration through the utility trenches is possible. Groundwater monitoring data from wells MW-13A and MW-13B, located downgradient of the Site and across Park Boulevard, have not contained any hydrocarbon concentrations since their installation, with the exception of MTBE concentrations, indicating migration through the utility trenches for GRO and benzene have not likely occurred. However, since concentrations of MTBE have been observed and are increasing in the offsite monitoring wells MW-13A and MW-13B, it is possible that migration of MTBE through the utility trenches may have occurred due to MTBE being lighter than most hydrocarbon petroleum compounds. In addition, concentrations of MTBE in offsite monitoring wells MW-12B, MW-13A, and MW-13B has been increasing over time and has been decreasing in onsite monitoring wells MW-11A and MW-11B; therefore, it is possible that the MTBE plume is detached. However, hydrocarbon concentrations in Site monitoring wells have decreased over time and will continue to decrease on Site, which may negate concerns regarding migration of MTBE through the utility trenches.<br><br>The Oil Changers 3000 station is located upgradient of all of the utilities located on Park Boulevard. It is possible that this station may be contributing to the offsite MTBE contamination through the utility trenches. Therefore, an offsite boring will be conducted downgradient of the Oil Changers 3000 station to evaluate the potential contamination, if any, from this location. | Yes | Perform a detailed preferential pathway study and perform a CPT investigation downgradient of the potential offsite source |
| Potential Receptors | Onsite | No onsite water supply wells or surface water bodies exists. The only potential onsite receptor would be onsite workers exposed to gasoline vapors. However, the exposure from current fueling operations represents a greater risk than any associated with potential groundwater or soil vapor exposure (CSWRCB, 2012). | None | NA |

**TABLE 1**

**CONCEPTUAL SITE MODEL**
Atlantic Richfield Company Station No. 2107
3310 Park Avenue
Oakland, California

| CSM Element | CSM Sub-Element | Description | Data Gap | How to Address |
|---|---|---|---|---|
| | | | | |
| Potential Receptors (continued) | Offsite | As discussed above, the nearest surface water bodies are the Central Reservoir and Lake Merritt, located approximately 3,500 ft upgradient and 4,500 ft downgradient of the Site, respectively.<br><br>Since a sensitive receptor survey has not been performed at the Site, the presence of nearby water supply wells is not known. Therefore, a sensitive receptor survey is being proposed in the preceding Revised Work Plan.<br><br>In addition, the Oakland High School is located downgradient of the Site. Therefore, a groundwater investigation has been proposed to identify the potential extent of MTBE in downgradient groundwater near the Site. Pending results from groundwater investigation, Oakland High School is currently considered a potential offsite receptor. | Yes | Perform downgradient CPT investigation in adjacent high school athletic field and perform a Sensitive Receptor Survey |

**Notes:**
ACEH = Alameda County Environmental Health
ARC = Atlantic Richfield Company
bgs = below ground surface
CSM = Conceptual Site Model
CSWRCB = California State Water Resources Control Board
ft = foot
ft/ft = foot per foot
GRO = Gasoline Range Organics
LNAPL = Light-Non Aqueous Phase Liquid
mg/kg = milligrams per kilogram
MTBE = Methyl tert-butyl Ether
NA = Not Applicable
No. = Number
ppm = Parts per billion
UST = Underground Storage Tank
µg/L = micrograms per liter

**References:**
State Water Resources Control Board. 17 April 2012. *Low-Threat Underground Storage Tank Case Closure Policy.*
URS, 31 January 2003. *Product Line Removal and Upgrade Soil Sampling Report.*

**Table 2. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses**

**ARCO Service Station #2107, 3310 Park Boulevard, Oakland, CA**

| Well ID and Date Monitored | P/NP | TOC (feet) | Top of Screen (ft bgs) | Bottom of Screen (ft bgs) | DTW (feet) | Water Level Elevation (feet) | Concentrations in µg/L | | | | | | DO (mg/L) | pH | Footnote |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | GRO/ TPHg | Benzene | Toluene | Ethyl-Benzene | Total Xylenes | MTBE | | | |
| **MW-11A** | | | | | | | | | | | | | | | |
| 3/9/2009 | P | 120.85 | 16.00 | 20.00 | 12.41 | 108.44 | 1,000 | 1.5 | <1.0 | 13 | 4.8 | 60 | 9.20 | 12.74 | |
| 6/18/2009 | P | | 16.00 | 20.00 | 14.58 | 106.27 | 260 | 11 | <5.0 | 6.8 | <5.0 | 280 | -- | 9.83 | a |
| 9/1/2009 | P | | 16.00 | 20.00 | 8.75 | 112.10 | 1,400 | 28 | 20 | 61 | 6.7 | 340 | 1.40 | 7.84 | |
| 11/11/2009 | -- | | 16.00 | 20.00 | 10.40 | 110.45 | -- | -- | -- | -- | -- | -- | 1.55 | 12.5 | |
| 2/19/2010 | P | | 16.00 | 20.00 | 8.90 | 111.95 | 1,300 | 20 | 17 | 25 | <5.0 | 340 | 2.01 | 12.13 | |
| 7/23/2010 | P | | 16.00 | 20.00 | 8.37 | 112.48 | 1,300 | 20 | 22 | 23 | <5.0 | 350 | 1.11 | 12.0 | |
| 3/10/2011 | P | | 16.00 | 20.00 | -- | -- | 250 | <5.0 | 5.4 | <5.0 | <5.0 | 76 | 4.17 | 12.3 | b, c (GRO) |
| 8/8/2011 | NP | | 16.00 | 20.00 | 14.88 | 105.97 | 730 | 7.3 | 16 | 11 | <5.0 | 310 | 1.47 | 12.1 | |
| 1/16/2012 | P | | 16.00 | 20.00 | 14.08 | 106.77 | -- | -- | -- | -- | -- | -- | 1.43 | 13.77 | |
| 9/11/2012 | P | | 16.00 | 20.00 | 14.91 | 105.94 | 220 | 4.4 | 11 | 6.4 | <2.0 | 280 | 1.36 | 12.76 | |
| **3/26/2013** | **P** | | **16.00** | **20.00** | **13.70** | **107.15** | **260** | **<2.5** | **4.2** | **<2.5** | **<5.0** | **330** | **5.03** | **12.75** | |
| **MW-11B** | | | | | | | | | | | | | | | |
| 3/9/2009 | P | 121.31 | 26.00 | 30.00 | 7.33 | 113.98 | 280 | 1.3 | 1.3 | 7.6 | <0.50 | 240 | 9.56 | 7.14 | |
| 6/18/2009 | P | | 26.00 | 30.00 | 7.38 | 113.93 | 130 | <5.0 | <5.0 | <5.0 | <5.0 | 200 | -- | 6.96 | a |
| 9/1/2009 | P | | 26.00 | 30.00 | 7.66 | 113.65 | 69 | <5.0 | <5.0 | <5.0 | <5.0 | 210 | 1.01 | 7.01 | |
| 11/11/2009 | P | | 26.00 | 30.00 | 7.70 | 113.61 | 55 | <5.0 | <5.0 | <5.0 | <5.0 | 200 | 0.38 | 6.7 | |
| 2/19/2010 | P | | 26.00 | 30.00 | 7.59 | 113.72 | 68 | <2.5 | <2.5 | <2.5 | <2.5 | 180 | 2.38 | 7.44 | |
| 7/23/2010 | P | | 26.00 | 30.00 | 7.42 | 113.89 | <50 | <2.5 | <2.5 | <2.5 | <2.5 | 110 | 1.57 | 7.02 | |
| 3/10/2011 | P | | 26.00 | 30.00 | 7.25 | 114.06 | <50 | <1.0 | <1.0 | <1.0 | <1.0 | 58 | 1.86 | 6.8 | |
| 8/8/2011 | P | | 26.00 | 30.00 | 7.24 | 114.07 | <50 | <1.0 | <1.0 | <1.0 | <1.0 | 60 | 1.33 | 7.8 | |
| 1/16/2012 | P | | 26.00 | 30.00 | 7.96 | 113.35 | <50 | <1.0 | <1.0 | <1.0 | <1.0 | 47 | 4.33 | 8.8 | |
| 9/11/2012 | P | | 26.00 | 30.00 | 7.61 | 113.70 | <50 | <0.50 | <0.50 | <0.50 | <1.0 | 27 | 1.17 | 7.07 | |
| **3/26/2013** | **P** | | **26.00** | **30.00** | **7.57** | **113.74** | **<50** | **<0.50** | **<0.50** | **<0.50** | **<1.0** | **26** | **1.95** | **6.85** | |
| **MW-12A** | | | | | | | | | | | | | | | |
| 3/9/2009 | P | 120.64 | 13.00 | 18.00 | 8.70 | 111.94 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 41 | 4.62 | 6.76 | |
| 6/18/2009 | P | | 13.00 | 18.00 | 8.58 | 112.06 | <50 | <1.0 | <1.0 | <1.0 | <1.0 | 40 | -- | 7.92 | a |
| 9/1/2009 | P | | 13.00 | 18.00 | 9.21 | 111.43 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 39 | 1.06 | 6.97 | |
| 11/11/2009 | P | | 13.00 | 18.00 | 9.15 | 111.49 | <50 | <1.0 | <1.0 | <1.0 | <1.0 | 41 | 0.51 | 6.2 | |
| 2/19/2010 | P | | 13.00 | 18.00 | 9.13 | 111.51 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 32 | 0.38 | 6.58 | |

**Table 2. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses**

**ARCO Service Station #2107, 3310 Park Boulevard, Oakland, CA**

| Well ID and Date Monitored | P/NP | TOC (feet) | Top of Screen (ft bgs) | Bottom of Screen (ft bgs) | DTW (feet) | Water Level Elevation (feet) | Concentrations in µg/L | | | | | | DO (mg/L) | pH | Footnote |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | GRO/ TPHg | Benzene | Toluene | Ethyl-Benzene | Total Xylenes | MTBE | | | |
| **MW-12A Cont.** | | | | | | | | | | | | | | | |
| 7/23/2010 | P | 120.64 | 13.00 | 18.00 | 9.18 | 111.46 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 34 | 0.68 | 7.6 | |
| 3/10/2011 | P | | 13.00 | 18.00 | 8.43 | 112.21 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 27 | 1.66 | 6.7 | |
| 8/8/2011 | P | | 13.00 | 18.00 | 8.33 | 112.31 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 32 | 3.40 | 7.5 | |
| 1/16/2012 | P | | 13.00 | 18.00 | 9.12 | 111.52 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 18 | 0.84 | 7.32 | |
| 9/11/2012 | P | | 13.00 | 18.00 | 8.95 | 111.69 | <50 | <0.50 | <0.50 | <0.50 | <1.0 | 22 | 1.20 | 6.99 | |
| **3/26/2013** | **P** | | **13.00** | **18.00** | **8.68** | **111.96** | **<50** | **<0.50** | **<0.50** | **<0.50** | **<1.0** | **17** | **1.07** | **6.76** | |
| **MW-12B** | | | | | | | | | | | | | | | |
| 3/9/2009 | P | 120.84 | 27.00 | 30.00 | 14.89 | 105.95 | <50 | <0.50 | 0.55 | <0.50 | <0.50 | 150 | 5.87 | 7.74 | |
| 6/18/2009 | P | | 27.00 | 30.00 | 13.51 | 107.33 | 140 | <2.5 | <2.5 | <2.5 | <2.5 | 380 | -- | 8.60 | a |
| 9/1/2009 | P | | 27.00 | 30.00 | 9.54 | 111.30 | 89 | <10 | <10 | <10 | <10 | 460 | 0.99 | 6.88 | |
| 11/11/2009 | P | | 27.00 | 30.00 | 11.53 | 109.31 | <50 | <5.0 | <5.0 | <5.0 | <5.0 | 600 | 1.00 | 6.46 | |
| 2/19/2010 | P | | 27.00 | 30.00 | 11.07 | 109.77 | 52 | <5.0 | <5.0 | <5.0 | <5.0 | 620 | 3.32 | 6.89 | |
| 7/23/2010 | P | | 27.00 | 30.00 | 10.75 | 110.09 | <50 | <10 | <10 | <10 | <10 | 510 | 1.70 | 7.54 | |
| 3/10/2011 | P | | 27.00 | 30.00 | 10.05 | 110.79 | <50 | <10 | <10 | <10 | <10 | 700 | 2.71 | 6.9 | |
| 8/8/2011 | P | | 27.00 | 30.00 | 9.35 | 111.49 | <50 | <10 | <10 | <10 | <10 | 510 | 1.70 | 6.9 | |
| 1/16/2012 | P | | 27.00 | 30.00 | 9.45 | 111.39 | <50 | <12 | <12 | <12 | <12 | 840 | 3.36 | 7.0 | |
| 9/11/2012 | P | | 27.00 | 30.00 | 9.31 | 111.53 | <50 | <5.0 | <5.0 | <5.0 | <10 | 790 | 1.13 | 7.13 | |
| **3/26/2013** | **p** | | **27.00** | **30.00** | **8.86** | **111.98** | **<50** | **<0.50** | **<0.50** | **<0.50** | **<1.0** | **34** | **4.93** | **7.03** | |
| **MW-13A** | | | | | | | | | | | | | | | |
| 3/9/2009 | P | 114.55 | 11.50 | 16.50 | 9.53 | 105.02 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 13 | 9.39 | 7.64 | |
| 6/18/2009 | P | | 11.50 | 16.50 | 2.88 | 111.67 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 23 | -- | 7.21 | a |
| 9/1/2009 | P | | 11.50 | 16.50 | 3.31 | 111.24 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 34 | 0.96 | 6.90 | |
| 11/11/2009 | P | | 11.50 | 16.50 | 3.66 | 110.89 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 21 | 1.79 | 6.5 | |
| 2/19/2010 | P | | 11.50 | 16.50 | 3.43 | 111.12 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 15 | 0.92 | 6.69 | |
| 7/23/2010 | P | | 11.50 | 16.50 | 3.22 | 111.33 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 24 | 1.4 | 7.0 | |
| 3/10/2011 | P | | 11.50 | 16.50 | 2.57 | 111.98 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 12 | 0.76 | 6.7 | |
| 8/8/2011 | P | | 11.50 | 16.50 | 8.43 | 106.12 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 29 | 3.59 | 7.2 | |
| 1/16/2012 | P | | 11.50 | 16.50 | 3.11 | 111.44 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 37 | 1.25 | 7.08 | |
| 9/11/2012 | P | | 11.50 | 16.50 | 3.03 | 111.52 | <50 | <0.50 | <0.50 | <0.50 | <1.0 | 64 | 1.50 | 6.98 | |

**Table 2. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses**

**ARCO Service Station #2107, 3310 Park Boulevard, Oakland, CA**

| Well ID and Date Monitored | P/NP | TOC (feet) | Top of Screen (ft bgs) | Bottom of Screen (ft bgs) | DTW (feet) | Water Level Elevation (feet) | Concentrations in µg/L | | | | | | DO (mg/L) | pH | Footnote |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | GRO/ TPHg | Benzene | Toluene | Ethyl-Benzene | Total Xylenes | MTBE | | | |
| **MW-13A Cont.** | | | | | | | | | | | | | | | |
| **3/26/2013** | **p** | **114.55** | **11.50** | **16.50** | **2.74** | **111.81** | **<50** | **<0.50** | **<0.50** | **<0.50** | **<1.0** | **51** | **1.19** | **6.76** | |
| **MW-13B** | | | | | | | | | | | | | | | |
| 3/9/2009 | P | 114.75 | 18.50 | 22.50 | 2.96 | 111.79 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 13 | 8.44 | 6.99 | |
| 6/18/2009 | P | | 18.50 | 22.50 | 2.85 | 111.90 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 12 | -- | 6.92 | a |
| 9/1/2009 | P | | 18.50 | 22.50 | 3.36 | 111.39 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 17 | 0.96 | 7.29 | |
| 11/11/2009 | P | | 18.50 | 22.50 | 3.49 | 111.26 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 21 | 2.45 | 6.39 | |
| 2/19/2010 | P | | 18.50 | 22.50 | 3.10 | 111.65 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 19 | 1.46 | 6.50 | |
| 7/23/2010 | P | | 18.50 | 22.50 | 2.74 | 112.01 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 15 | 1.16 | 7.19 | |
| 3/10/2011 | P | | 18.50 | 22.50 | 3.72 | 111.03 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 31 | 0.72 | 6.6 | |
| 8/8/2011 | P | | 18.50 | 22.50 | 2.48 | 112.27 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 32 | 1.51 | 6.8 | |
| 1/16/2012 | P | | 18.50 | 22.50 | 3.47 | 111.28 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 49 | 0.86 | 6.8 | |
| 9/11/2012 | P | | 18.50 | 22.50 | 3.15 | 111.60 | <50 | <0.50 | <0.50 | <0.50 | <1.0 | 63 | 1.62 | 7.05 | |
| **3/26/2013** | **p** | | **18.50** | **22.50** | **2.92** | **111.83** | **<50** | **<0.50** | **<0.50** | **<0.50** | **<1.0** | **62** | **1.37** | **6.86** | |

Symbols & Abbreviations:
-- = Not measured/applicable/analyzed/sampled
µg/L = Micrograms per liter
DO = Dissolved oxygen
DTW = Depth to water in ft below TOC
GRO = Gasoline range organics
mg/L = Milligrams per liter
MTBE = Methyl tert butyl ether
< = Not detected at or above specified laboratory reporting limit
NP = Well not purged prior to sampling
P = Well purged prior to sampling
TOC = Top of casing in ft above NAVD88 datum

Footnotes:
a = DO meter not working
b = Well full of water
c = Quantitation of unknown hydrocarbons(s) in sample based on gasoline

Notes:
Values for DO and pH were obtained through field measurements

**Table 3. Summary of Fuel Additives Analytical Data**

**ARCO Service Station #2107, 3310 Park Boulevard, Oakland, CA**

| Well ID and Date Monitored | Concentrations in µg/L | | | | | | | | Footnote |
|---|---|---|---|---|---|---|---|---|---|
| | Ethanol | TBA | MTBE | DIPE | ETBE | TAME | 1,2-DCA | EDB | |
| **MW-11A** | | | | | | | | | |
| 3/9/2009 | -- | <20 | 60 | <1.0 | <1.0 | <1.0 | -- | -- | |
| 6/18/2009 | <3,000 | <100 | 280 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | |
| 9/1/2009 | <3,000 | <100 | 340 | <5.0 | <5.0 | 5.3 | <5.0 | <5.0 | |
| 2/19/2010 | <3,000 | <100 | 340 | <5.0 | <5.0 | 6.1 | <5.0 | <5.0 | |
| 7/23/2010 | <3,000 | <100 | 350 | <5.0 | <5.0 | 6.5 | <5.0 | <5.0 | |
| 3/10/2011 | <6,000 | <100 | 76 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | |
| 8/8/2011 | <3,000 | <100 | 310 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | |
| 9/11/2012 | <300 | <20 | 280 | <1.0 | <1.0 | 4.1 | <1.0 | <1.0 | |
| **3/26/2013** | **<750** | **<50** | **330** | **<2.5** | **<2.5** | **3.9** | **<2.5** | **<2.5** | |
| **MW-11B** | | | | | | | | | |
| 3/9/2009 | -- | <10 | 240 | <0.50 | <0.50 | 3.1 | -- | -- | |
| 6/18/2009 | <3,000 | <100 | 200 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | |
| 9/1/2009 | <3,000 | <100 | 210 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | |
| 11/11/2009 | <3,000 | <100 | 200 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | |
| 2/19/2010 | <1,500 | <50 | 180 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | |
| 7/23/2010 | <1,500 | <50 | 110 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | |
| 3/10/2011 | <600 | <20 | 58 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 8/8/2011 | <600 | <20 | 60 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 1/16/2012 | <600 | 33 | 47 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 9/11/2012 | <150 | <10 | 27 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| **3/26/2013** | **<150** | **<10** | **26** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | |
| **MW-12A** | | | | | | | | | |
| 3/9/2009 | -- | <10 | 41 | <0.50 | <0.50 | <0.50 | -- | -- | |
| 6/18/2009 | <600 | <20 | 40 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 9/1/2009 | <300 | <10 | 39 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 11/11/2009 | <600 | <20 | 41 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | |
| 2/19/2010 | <300 | <10 | 32 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 7/23/2010 | <300 | <10 | 34 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 3/10/2011 | <300 | <10 | 27 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 8/8/2011 | <300 | <10 | 32 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |

**Table 3. Summary of Fuel Additives Analytical Data**

**ARCO Service Station #2107, 3310 Park Boulevard, Oakland, CA**

| Well ID and Date Monitored | Concentrations in µg/L | | | | | | | | Footnote |
|---|---|---|---|---|---|---|---|---|---|
| | Ethanol | TBA | MTBE | DIPE | ETBE | TAME | 1,2-DCA | EDB | |
| **MW-12A Cont.** | | | | | | | | | |
| 1/16/2012 | <300 | 19 | 18 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 9/11/2012 | <150 | <10 | 22 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| **3/26/2013** | **<150** | **<10** | **17** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | |
| **MW-12B** | | | | | | | | | |
| 3/9/2009 | -- | <10 | 150 | <0.50 | <0.50 | <0.50 | -- | -- | |
| 6/18/2009 | <1,500 | <50 | 380 | <2.5 | <2.5 | <2.5 | <2.5 | <2.5 | |
| 9/1/2009 | <6,000 | <200 | 460 | <10 | <10 | <10 | <10 | <10 | |
| 11/11/2009 | <3,000 | <100 | 600 | <5.0 | <5.0 | <5.0 | <5.0 | <5.0 | |
| 2/19/2010 | <3,000 | <100 | 620 | <5.0 | <5.0 | 5.1 | <5.0 | <5.0 | |
| 7/23/2010 | <6,000 | <200 | 510 | <10 | <10 | <10 | <10 | <10 | |
| 3/10/2011 | <6,000 | <200 | 700 | <10 | <10 | <10 | <10 | <10 | |
| 8/8/2011 | <6,000 | <200 | 510 | <10 | <10 | <10 | <10 | <10 | |
| 1/16/2012 | <7,500 | 320 | 840 | <12 | <12 | <12 | <12 | <12 | |
| 9/11/2012 | <1,500 | <100 | 790 | <5.0 | <5.0 | 8.7 | <5.0 | <5.0 | |
| **3/26/2013** | **<150** | **<10** | **34** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | |
| **MW-13A** | | | | | | | | | |
| 3/9/2009 | -- | <10 | 13 | <0.50 | <0.50 | <0.50 | -- | -- | |
| 6/18/2009 | <300 | <10 | 23 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 9/1/2009 | <300 | <10 | 34 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 11/11/2009 | <300 | <10 | 21 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 2/19/2010 | <300 | <10 | 15 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 7/23/2010 | <300 | <10 | 24 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 3/10/2011 | <300 | <10 | 12 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 8/8/2011 | <300 | <10 | 29 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 1/16/2012 | <300 | 26 | 37 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 9/11/2012 | <150 | <10 | 64 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| **3/26/2013** | **<150** | **<10** | **51** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | |
| **MW-13B** | | | | | | | | | |
| 3/9/2009 | -- | <10 | 13 | <0.50 | <0.50 | <0.50 | -- | -- | |
| 6/18/2009 | <300 | <10 | 12 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |

**Table 3. Summary of Fuel Additives Analytical Data**

**ARCO Service Station #2107, 3310 Park Boulevard, Oakland, CA**

| Well ID and Date Monitored | Concentrations in µg/L | | | | | | | | Footnote |
|---|---|---|---|---|---|---|---|---|---|
| | Ethanol | TBA | MTBE | DIPE | ETBE | TAME | 1,2-DCA | EDB | |
| **MW-13B Cont.** | | | | | | | | | |
| 9/1/2009 | <300 | <10 | 17 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 11/11/2009 | <300 | <10 | 21 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 2/19/2010 | <300 | <10 | 19 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 7/23/2010 | <300 | <10 | 15 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 3/10/2011 | <300 | <10 | 31 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 8/8/2011 | <300 | <10 | 32 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 1/16/2012 | <300 | 19 | 49 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| 9/11/2012 | <150 | <10 | 63 | <0.50 | <0.50 | <0.50 | <0.50 | <0.50 | |
| **3/26/2013** | **<150** | **<10** | **62** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | **<0.50** | |

Symbols & Abbreviations:
-- = Not analyzed/applicable/measurable
< = Not detected above reported detection limit
1,2-DCA = 1,2-Dichloroethane
µg/L = Micrograms per Liter
DIPE = Diisopropyl ether
EDB = 1, 2-Dibromoethane
ETBE = Ethyl tert-butyl ether
MTBE = Methyl tert-butyl ether
TAME = tert-Amyl methyl ether
TBA = tert-Butyl alcohol

Notes:
All volatile organic compounds analyzed using EPA Method 8260B

**Table 4. Historical Groundwater Gradient - Direction and Magnitude**

**ARCO Service Station #2107, 3310 Park Boulevard, Oakland, CA**

| Date Measured | Approximate Gradient Direction | Approximate Gradient Magnitude (ft/ft) |
|---|---|---|
| 3/9/2009 | Northeast | 0.06 |
| 6/18/2009 | Northeast | 0.06 |
| 9/1/2009 | North-Northwest | 0.03 |
| 11/11/2009 | North | 0.05 |
| 2/19/2010 | North | 0.03 |
| 7/23/2010 | North | 0.05 |
| 3/10/2011 | North-Northwest | 0.04 |
| 8/8/2011 | North | 0.03 |
| 1/16/2012 | North-Northwest | 0.02 |
| 9/11/2012 | North-Northwest | 0.03 |
| **3/26/2013** | **North-Northwest** | **0.01** |

Appendix A
Recent Regulatory Correspondence

## Kristene Tidwell

**From:** Roe, Dilan, Env. Health <Dilan.Roe@acgov.org>
**Sent:** Thursday, February 21, 2013 5:32 PM
**To:** Couch, Shannon L. (URS) (Shannon.Couch@bp.com); Skance, John
**Cc:** Kristene Tidwell; Tom Venus; Matt Herrick
**Subject:** Fuel Leak Case No. RO0000307 (BP Station 402), Fuel Leak Case No. RO0002526 (BP Station 2107), Fuel Leak Case No. RO0000494 (BP Station 2111), Fuel Leak Case No. RO0000190 (BP Station 2162), Fuel Leak Case No. RO0000078 (BP Station 374)
**Attachments:** BP Workplans.docx

Shannon and John:

Alameda County Environmental Health has reviewed the five work plans recently submitted by Broadbent & Associates, Inc. (BAI) for the subject sites (see attached file for details). ACEH has evaluated the data and recommendations presented in the work plans in conjunction with information contained in the case files and the State Water Resources Control Board's Low Threat Closure Policy (LTCP) criteria.

Due to the extensive nature of our comments on the work plans, I scheduled several lengthy teleconference calls with BAI staff last month on January 2, January 11, and January 28 to discuss the inadequacy of the proposed scopes of work. My concerns include but are not limited to the lack of site conceptual models for the site that justify the proposed scope of work, the failure to address data gaps that are critical to advancing your sites towards closure under the LTCP, a lack of understanding of the LTCP criteria, and the lack of inclusion of standard elements in the work plans that address goals and objectives, data quality objectives, and standard operating procedures/sampling and analysis plan.

Local Oversight Agencies are under mandate by the SWRCB to conduct evaluations of all sites using the LTCP, identify data gaps and impediments to closure, and work with responsible parties to develop a Path to Closure Plan by December 31, 2013. The Path to Closure must have milestone dates by calendar quarter which will achieve site cleanup and case closure in a timely and efficient manner that minimizes the cost of corrective action.

Therefore, I would like to schedule a meeting with you both as well as Matt Herrick, Kristine Tidwell, and Tom Venus to discuss our comments and a more efficient path forward. I would like to schedule a four hour meeting as my comments are extensive and the goal of this meeting is for everyone to come away with a thorough understanding of each of the sites and a plan to efficiently move them towards closure.

Please propose some times in the near future when your team could be available to meet, with the exception of next week.

Thank you,

**Dilan Roe, P.E.**
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502
510.567.6767; Ext. 36767
QIC: 30440
dilan.roe@acgov.org

PDF copies of case files can be reviewed/downloaded at:

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

| BP Station Number | Fuel Leak Case Number | Work Plan Title | Prepared By | Date Received | ACEH Response |
|---|---|---|---|---|---|
| Station 402 | RO0000307 | Revised Workplan for Monitoring Well Installation and Vapor Intrusion Assessment | Tom Venus, BAI | 11/8/2012 | Teleconference call and email correspondence with Tom Venus on 1/2/2013 to discuss ACEH comments on work plan including proposed locations of groundwater monitoring wells (plume delineation due to variable groundwater flow directions, proposed long screen intervals (purpose of monitoring – gravel aquifer, clay layers, water table fluctuations, etc.), collection of soil samples in the vadose zone only, and attempts to locate monitoring wells MW-1, MW-2, and MW-3. |
| Station 2107 | RO0002526 | Work Plan for Groundwater Investigation | Kristine Tidwell, BAI | 11/08/2012 | Teleconference call on 1/11/2013 to discuss ACEH's concerns with proposed off-site investigation without an updated SCM that discusses vertical gradients observed in nested monitoring wells. |
| Station 2111 | RO0000494 | Revised Soil & Groundwater Investigation Work Plan | Kristine Tidwell, BAI | 11/08/2012 | Teleconference call with Kristine Tidwell on 1/11/2013 and email correspondence on 1/14/2013 to discuss ACEH comments on work plan including soil boring locations, soil and groundwater sample collection and analysis methods, well survey evaluation, evaluation of monitoring well MW-8 and validation of data, confirmation sampling, and vapor intrusion to indoor air in adjacent off-site buildings. |
| Station 2162 | RO0000190 | Revised Work Plan for Off-Site Groundwater Investigation | Tom Venus, BAI | 1/3/2013 | ACEH review complete – work plan not supported by a SCM and data gaps not addressed. |
| Station 374 | RO0000078 | Soil Vapor Investigation WP | Kristine Tidwell, BAI | 11/21/2012 | Teleconference call on 1/28/2013 to discuss ACEH's comments on work plan including adequacy of proposed soil vapor investigation in light of shallow groundwater conditions, migration in utility corridors, and potential vapor intrusion in adjacent buildings. |

Appendix B
Previous Environmental Activities at Site

**Previous Environmental Activities at Site**

On January 12, 1987, contamination by petroleum hydrocarbons was discovered during excavation and removal of a waste-oil underground storage tank (UST) and three gasoline USTs from the Site. With this discovery, Alameda County Environmental Health (ACEH) opened the release/leak case number RO651. In a letter dated July 11, 1997, ACEH confirmed that no further action was required at the Site. However, methyl tert-butyl ether (MTBE) was not requested or required to be analyzed prior to the time of closure. Therefore, the remediation and monitoring infrastructure (nine monitoring wells and one remediation well) were removed from the Site, with the exception of remediation piping which was left under the main driveway. No additional environmental work was conducted at the Site until product line removal and upgrade construction activities in October and November of 2002. Historical data prior to closure of ACEH Case No.RO651, including geologic cross-sections, boring location maps, summarized soil and groundwater laboratory analytical results, and remediation system data, are mostly available within the ACEH files. However, due to the dates of completion and incomplete records, soil boring logs could not be located for the various subsurface investigations conducted prior to 1997.

In November 2002, URS oversaw a product line upgrade at the Site. Numerous soil samples were collected during the product line upgrading activities from depths ranging between 3.5 and 7.5 feet (ft) below ground surface (bgs). Gasoline Range Organics (GRO, C6-C12) was detected above laboratory reporting limits in six of the 20 collected soil samples, including over-excavation samples, at concentrations up to 4,000 milligrams per kilogram (mg/kg) in sample S-D7. Benzene was detected above laboratory reporting limits in one of the 20 soil samples collected at a concentration of 0.89 mg/kg in sample S-L2. Toluene, ethylbenzene, and total xylenes were detected above laboratory reporting limits in four of the 20 soil samples collected at maximum concentrations of 220 mg/kg, 150 mg/kg, and 1,100 mg/kg, respectively, in sample S-D7. MTBE was detected above laboratory reporting limits in 14 of the 20 collected soil samples at maximum concentrations of 83 mg/kg in sample S-L3.

Two groundwater samples (T-1 and BT-1) were collected during product line replacement activities. Sample T-1 was collected at eight ft bgs from the area underneath dispenser 8 (S-D8-5) and BT-1, collected from groundwater extracted during excavation activities. A water sample (Sump-1) was also collected from the sump for UST1, which appeared to contain light-non aqueous phase liquid (LNAPL). Laboratory analysis of sample Sump-1 indicated very high concentrations of GRO, benzene, toluene, ethylbenzene, and xylenes (BTEX), and MTBE, most likely due to the presence of LNAPL within the sump. GRO was detected above the laboratory reporting limit in sample T-1 at a concentration of 4,200 micrograms per liter (µg/L). BTEX was detected above the laboratory reporting limit in sample T-1 at concentrations of 300 µg/L, 3,200 µg/L, 1,300 µg/L, and 11,000 µg/L, respectively. MTBE was reported above the laboratory reporting limit in both samples T-1 and BT-1 at concentrations of 4,900 µg/L and 1,800 µg/L, respectively. Concentrations discovered during product line replacement activities indicated a potential release. Therefore, an Unauthorized Release Report was issued for the Site on January 21, 2003. Field activities are summarized in the URS *Product Line Removal and Upgrade Soil Sampling Report* dated January 31, 2003. A site map depicting sampling locations is provided as Drawing 2. A summary of laboratory analytical data are provided in Appendix C.

Additional groundwater investigation activities were carried out at the Site in March and May 2004. A total of 20 soil samples and four groundwater samples were collected during the additional investigation. GRO was detected above the laboratory reporting limits in one of the 20 soil samples at a

concentration of 350 mg/kg in sample SB-4-1.0. Toluene and total xylenes were detected above the laboratory reporting limits in soil samples collected from SB-1-5 at concentrations of 0.096 mg/kg and 0.016 mg/kg, respectively. MTBE was detected above laboratory reporting limits in three of the 20 soil samples at maximum concentrations of 0.027 mg/kg in samples SB-3-13 and SB-3-23.0. No additional analytes were detected above their respective reporting limits.

GRO was detected above laboratory reporting limits in one of the four groundwater samples collected at a concentration of 88 µg/L in sample SB-3. Toluene was detected above the laboratory reporting limit in one of the four groundwater samples collected at a concentration of 1.4 µg/L in sample SB-2. MTBE was detected above the laboratory reporting limit in two of the four samples at a concentration of 34 µg/L in samples SB-3 and SB-5. No additional analytes were detected above their respective reporting limits.

On August 30, 2004, URS received a letter from ACEH requesting additional field work at the Site to complete the scope of work proposed in the original work plan and addendum. The ACEH also requested depth-discrete groundwater sampling.

URS addressed the ACEH requests by conducting a soil and groundwater investigation. URS collected twelve depth-discrete groundwater samples from six locations (HP-3 through HP-8). URS also collected 26 soil samples from six onsite borings (SB-7 through SB-8 and HP-3). Soil analytical results from this investigation are summarized as follows:

- GRO was detected above the laboratory reporting limit in five of the 26 samples at concentrations ranging from 0.31 mg/kg (SB-11-6.5) to 220 mg/kg (SB-11-11.5);
- Total Xylenes were detected above the laboratory reporting limit in two of the 26 samples at concentrations of 0.011 mg/kg (SB-8-29.5) and 0.012 mg/kg (SB-11-29.5); and
- MTBE was detected above the laboratory reporting limit in 10 of the 26 soil samples at concentrations ranging from 0.0069 mg/kg (SB-9-19.5) and 0.56 mg/kg (SB-9-13.5).

Groundwater analytical results from this investigation are summarized as follows:

- GRO was detected above the laboratory reporting limit in six of the 12 samples collected at concentrations ranging from 72 µg/L (HP-6-30) and 1,300 µg/L (HP-7-20);
- Benzene was detected above the laboratory reporting limit in three of the 12 samples at concentrations ranging from 0.64 µg/L (HP-3-35) to 1.6 µg/L (HP-4-18);
- Toluene was detected above the laboratory reporting limit in eight of the 12 samples collected at concentrations ranging from 7.0 µg/L (HP-5-18) to 38 µg/L (HP-4-18);
- Ethylbenzene was detected above the laboratory reporting limit in seven of the 12 samples at concentrations ranging from 0.94 µg/L (HP-5-18) to 5.4 µg/L (HP-4-18);
- Total Xylenes were detected above the laboratory reporting limit in eight of the 12 samples at concentrations ranging from 6.2 µg/L (HP-5-18) to 27 µg/L A(HP-4-18); and
- MTBE was detected above the laboratory reporting limit in seven of the 12 samples collected at concentrations ranging from 6.6 µg/L (HP-6-30) to 3,700 µg/L (HP-7-30).

Results of this subsurface investigation are provided in Appendix C.

On June 25 and 26, 2007, Stratus observed RSI Drilling (RSI) advance a total of eight soil borings in four distinct locations on the north side of Park Boulevard, north of the Site, to evaluate the off-site horizontal extent of petroleum hydrocarbon impacted soil and groundwater. Soil borings SB-12 through SB-15 and Hydropunch® borings HP-9 through HP-12 were installed along the north side of Park

Boulevard. Each soil boring was advanced to a maximum depth of 30 feet bgs, with each Hydropunch® boring advanced to a maximum depth of 25 ft bgs.

MTBE was detected above the laboratory reporting limit of 0.005 mg/kg in two of the 16 soil samples collected June 25 and 26, 2007 at concentrations of 0.0087 mg/kg in boring sample SB12-15 and 0.0065 mg/kg in boring sample SB15-23. The remaining analytes were not detected above their respective reporting limits. GRO was detected above the laboratory reporting of 50 µg/L in three of the seven groundwater samples collected at concentrations of 51 µg/L in sample HP9-13, 59 µg/L in sample HP11-24, and 84 µg/L in sample HP12-25. Benzene was detected above the laboratory reporting limit of 0.50 µg/L in two of the seven groundwater samples collected at concentrations of 0.63 µg/L in sample HP11-24 and 0.80 µg/L in sample HP10-24. MTBE was detected above the laboratory reporting limit of 0.50 µg/L in each of the seven groundwater samples collected at concentrations ranging from 0.78 µg/L in sample HP10-16 to 110 µg/L in sample HP12-25. The remaining analytes were not detected above their respective reporting limits in the collected Hydropunch® samples. Results were reported by Broadbent in the *Offsite Soil and Ground-Water Investigation Report* dated August 29, 2007.

Monitoring wells MW-11A, MW-11B, MW-12A, MW-12B, MW-13A and MW-13B were installed by Stratus downgradient of the Site in March 2009. These wells were constructed as shallow wells (MW-11A, MW-12A, and MW-13A) and deeper wells (MW-11B, MW-12B, and MW-13B). The shallow wells were completed to total depths around 18 ft bgs and the deeper wells were advanced to approximately 30 ft bgs. The highest concentrations of petroleum compounds were detected in well MW-12B, directly across the street from the Site in the downgradient direction (Drawing 2). Results of this investigation were presented in an investigation report by Broadbent (Broadbent, 2009).

Current hydrocarbon concentrations detected in Site monitoring wells are primarily MTBE, with the highest concentrations being detected in well MW-12B. Lower concentrations of MTBE are detected in wells MW-12A, MW-11B, MW-13A, and MW-13. This current data indicates that the extent of MTBE downgradient of the Site is not defined.

**References**

ACEH, 15 April 2003. *Fuel Leak Case No.RO0002526, Arco #2107, 3310 Park Blvd., Oakland, CA 94610.* Letter to Atlantic Richfield Company.

ACEH 30 August 2004. *Fuel Leak Case No.RO0002526, Arco #2107, Active Automobile Service Station at 3310 Park Blvd., Oakland, California.* Letter to Atlantic Richfield Company.

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Appendix C
Historical Site Data and Soil Boring Logs

RESNA
Working To Restore Nature

Quarterly Groundwater Monitoring
ARCO Station 2107, 3310 Park Boulevard, Oakland, CA

March 9, 1993
69021.15

**TABLE 1**
**CUMULATIVE GROUNDWATER MONITORING DATA**
**ARCO Station 2107**
**Oakland, California**
**(Page 1 of 7)**

| Well / Date | Well Elevation | Depth to Water | Water Elevation | Floating Product |
|---|---|---|---|---|
| MW-1 | | | | |
| 05/19/89 | | 2.69 | 116.22 | 0.125 |
| 07/19/90 | 118.91 | 2.60 | 116.31 | None |
| 08/07/90 | | 2.61 | 116.30 | None |
| 08/14/90 | | 2.70 | 116.21 | None |
| 08/23/90 | | NM | NM | NM |
| 08/28/90 | | NM | NM | NM |
| 10/25/90 | | 2.69 | 116.22 | None |
| 01/23/91 | | 2.69 | 116.22 | None |
| 02/27/91 | | 2.68 | 116.23 | None |
| 03/19/91 | | 2.37 | 116.54 | None |
| 04/24/91 | | 2.40 | 116.51 | None |
| 05/31/91 | | NM | NM | NM |
| 06/12/91 | | 1.38 | 117.53 | NM |
| 07/24/91 | | 1.29 | 117.62 | None |
| 08/08/91 | | NM | NM | NM |
| 09/13/91 | | NM | NM | NM |
| 10/31/91 | | NM | NM | NM |
| 11/20/91 | | NM | NM | NM |
| 12/24/91 | | 2.78 | 116.13 | None |
| 01/06/92 | | 2.41 | 116.50 | None |
| 04/16/92 | 118.15 | 2.71 | 115.44 | None |
| 05/15/92 | | 2.68 | 115.47 | None |
| 06/30/92 | | 2.45 | 115.70 | None |
| 07/15/92 | | 2.65 | 115.50 | None |
| 08/25/92 | | 2.67 | 115.48 | None |
| 09/10/92 | | 2.68 | 115.47 | None |
| 10/31/92 | | 4.10 | 114.05 | None |
| 11/11/92 | | 2.73 | 115.42 | None |
| 12/16/92 | | 2.56 | 115.59 | None |
| MW-2 | | | | |
| 05/19/89 | | 1.57 | 116.22 | Sheen |
| 07/19/90 | 117.79 | 1.49 | 116.30 | None |
| 08/07/90 | | 1.50 | 116.29 | None |
| 08/14/90 | | 1.57 | 116.22 | None |
| 08/23/90 | | NM | NM | NM |
| 08/28/90 | | NM | NM | NM |
| 10/25/90 | | 1.55 | 116.24 | None |
| 01/23/91 | | 1.56 | 116.23 | None |
| 02/27/91 | | 1.55 | 116.24 | None |
| 03/19/91 | | 1.25 | 116.54 | None |

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2107
Oakland, California
(Page 2 of 7)

| Well Date | Well Elevation | Depth to Water | Water Elevation | Floating Product |
|---|---|---|---|---|
| MW-2 continued | | | | |
| 04/24/91 | | 1.26 | 116.53 | None |
| 05/31/91 | | NM | NM | NM |
| 06/12/91 | | 1.31 | 116.48 | None |
| 07/24/91 | | 1.24 | 116.55 | None |
| 08/08/91 | | NM | NM | NM |
| 09/13/91 | | NM | NM | NM |
| 10/31/91 | | NM | NM | NM |
| 11/20/91 | | NM | NM | NM |
| 12/24/91 | | 1.65 | 116.14 | None |
| 01/19/92 | | 1.33 | 116.46 | None |
| 04/16/92 | 117.20 | 1.80 | 115.40 | None |
| 05/15/92 | | 1.72 | 115.48 | None |
| 06/30/92 | | 1.52 | 115.68 | None |
| 07/15/92 | | 1.68 | 115.52 | None |
| 08/25/92 | | 1.72 | 115.48 | None |
| 09/10/92 | | 1.73 | 115.47 | None |
| 10/31/92 | | 6.52 | 110.68 | None |
| 11/11/92 | | 1.77 | 115.43 | None |
| 12/16/92 | | 1.59 | 115.61 | None |
| MW-3 | | | | |
| 07/19/90 | 117.85 | 3.27 | 114.58 | None |
| 08/07/90 | | 3.39 | 114.46 | None |
| 08/14/90 | | 3.41 | 114.44 | None |
| 08/23/90 | 117.85 | 3.47 | 114.38 | None |
| 08/28/90 | | 3.49 | 114.36 | None |
| 10/25/90 | | 3.57 | 114.28 | None |
| 01/23/91 | | 3.74 | 114.11 | None |
| 02/27/91 | | 3.75 | 114.10 | None |
| 03/19/91 | | 3.33 | 114.52 | None |
| 04/24/91 | | 3.35 | 114.50 | None |
| 05/31/91 | | 3.52 | 114.33 | None |
| 06/12/91 | | 3.58 | 114.27 | None |
| 07/24/91 | | 3.66 | 114.19 | None |
| 08/08/91 | | 3.56 | 114.29 | None |
| 09/13/91 | | 3.68 | 114.17 | None |

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2107
Oakland, California
(Page 3 of 7)

| Well / Date | Well Elevation | Depth to Water | Water Elevation | Floating Product |
|---|---|---|---|---|
| MW-3 (continued) | | | | |
| 10/31/91 | | 3.30 | 114.55 | None |
| 11/20/91 | | 3.66 | 114.19 | None |
| 12/24/91 | | 3.66 | 114.19 | None |
| 04/16/92 | | 3.52 | 114.33 | None |
| 05/15/92 | | 3.65 | 114.20 | None |
| 06/30/92 | | 3.47 | 114.38 | None |
| 07/15/92 | | 4.06 | 113.79 | None |
| 08/25/92 | | 3.84 | 114.01 | None |
| 09/10/92 | | 3.86 | 113.99 | None |
| 10/31/92 | | 3.51 | 114.34 | None |
| 11/11/92 | | 3.83 | 114.02 | None |
| 12/16/92 | | 3.44 | 114.51 | None |
| MW-4 | | | | |
| 07/19/90 | | 1.69 | 116.05 | None |
| 08/07/90 | 117.74 | 5.73 | 112.01 | None |
| 08/14/90 | | 3.42 | 114.32 | None |
| 08/23/90 | | 1.80 | 115.94 | None |
| 08/28/90 | | 1.83 | 115.91 | None |
| 10/25/90 | | 1.77 | 115.97 | None |
| 01/23/91 | | 2.08 | 115.66 | None |
| 02/27/91 | | 1.79 | 115.95 | None |
| 03/19/91 | | 1.37 | 116.37 | None |
| 04/24/91 | | 1.40 | 116.34 | None |
| 05/31/91 | | 1.44 | 116.30 | None |
| 06/12/91 | | 1.46 | 116.28 | None |
| 07/24/91 | | 1.52 | 116.22 | None |
| 08/08/91 | | 1.58 | 116.16 | None |
| 09/13/91 | | 1.67 | 116.07 | None |
| 10/31/91 | | 2.58 | 115.16 | None |
| 11/20/91 | | 3.79 | 113.95 | None |
| 12/24/91 | | 2.30 | 115.44 | None |
| 04-16-92 | | 2.45 | 115.29 | None |
| 05/15/92 | | 2.30 | 115.44 | None |
| 06/30/92 | | 2.26 | 115.48 | None |
| 07/15/92 | | 2.70 | 115.04 | None |
| 08/25/92 | | 2.54 | 115.20 | None |

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2107
Oakland, California
(Page 4 of 7)

| Well / Date | Well Elevation | Depth to Water | Water Elevation | Floating Product |
|---|---|---|---|---|
| MW-4 (continued) | | | | |
| 09/10/92 | | 2.47 | 115.27 | None |
| 10/31/92 | | 5.46 | 112.28 | None |
| 11/11/92 | | 2.34 | 115.40 | None |
| 12/16/92 | | 2.11 | 115.63 | None |
| MW-5 | | | | |
| 07/19/90 | | 1.90 | 116.10 | None |
| 08/07/90 | 118.00 | 1.94 | 116.06 | None |
| 08/14/90 | | 1.96 | 116.04 | Sheen |
| 08/28/90 | | 1.90 | 116.10 | None |
| 10/25/90 | | 2.05 | 115.95 | None |
| 08/23/90 | | 1.99 | 116.01 | None |
| 01/23/91 | | 2.68 | 115.32 | None |
| 02/27/91 | 118.00 | 2.56 | 115.44 | None |
| 02/27/91 | | 2.56 | 115.44 | None |
| 03/19/91 | | 2.44 | 115.56 | None |
| 04/24/91 | | 2.36 | 115.64 | None |
| 05/31/91 | | 2.08 | 115.92 | None |
| 06/12/91 | | 2.14 | 115.86 | None |
| 07/24/91 | | 2.20 | 115.80 | None |
| 08/08/91 | | 2.12 | 115.88 | None |
| 09/13/91 | | 2.23 | 115.77 | None |
| 10/31/91 | | 2.65 | 115.35 | None |
| 11/20/91 | | 2.54 | 115.46 | None |
| 12/24/91 | | 2.62 | 115.38 | None |
| 04/16/92 | | 3.26 | 114.74 | None |
| 05/15/92 | | 3.00 | 115.00 | None |
| 06/30/92 | | 2.79 | 115.21 | None |
| 07/15/92 | | NM | NM | NM |
| 08/25/92 | | 2.82 | 115.18 | None |
| 09/10/92 | | 2.81 | 115.19 | None |
| 10/31/92 | | 2.63 | 115.37 | None |
| 11/11/92 | | 2.81 | 115.19 | None |
| 12/16/92 | | 2.63 | 115.37 | None |

See notes on page 7 of 7.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2107
Oakland, California
(Page 5 of 7)

| Well / Date | Well Elevation | Depth to Water | Water Elevation | Floating Product |
|---|---|---|---|---|
| MW-6 | | | | |
| 07/19/90 | | 4.23 | 116.65 | None |
| 08/07/90 | 120.88 | 4.67 | 112.01 | None |
| 08/14/90 | | 4.39 | 114.32 | None |
| 08/23/90 | | 4.35 | 115.94 | None |
| 08/28/90 | | 4.34 | 115.91 | None |
| 10/25/90 | | 4.34 | 115.97 | None |
| 01/23/91 | | 4.46 | 115.66 | None |
| 02/27/91 | | 4.76 | 116.12 | None |
| 06/12/91 | | 4.14 | 116.74 | None |
| 07/24/91 | | 4.22 | 116.66 | None |
| 08/08/91 | | 4.60 | 116.28 | None |
| 03/19/91 | | 4.56 | 116.32 | None |
| 04/24/91 | | 4.28 | 116.60 | None |
| 05/03/91 | | 4.17 | 116.71 | None |
| 09/13/91 | | 4.27 | 116.61 | None |
| 10/31/91 | | 4.25 | 116.63 | None |
| 11/20/91 | | 4.30 | 116.58 | None |
| 12/24/91 | | 4.25 | 116.63 | None |
| 04/16/92 | | 4.58 | 116.30 | None |
| 05/15/92 | | 4.61 | 116.27 | None |
| 06/30/92 | | 4.52 | 116.36 | None |
| 07/15/92 | | 4.80 | 116.08 | None |
| 08/25/92 | | 4.73 | 116.15 | None |
| 09/10/92 | | 4.69 | 116.19 | None |
| 10/31/92 | | 4.60 | 116.28 | None |
| 11/11/92 | | 4.69 | 116.19 | None |
| 12/16/92 | | 4.33 | 116.55 | None |
| MW-7 | | | | |
| 09/13/91 | | 5.00 | 108.12 | None |
| 10/31/91 | 113.12 | 5.00 | 108.12 | None |
| 11/20/91 | | 5.24 | 107.88 | None |
| 12/24/91 | | 5.27 | 107.85 | None |
| 04/16/92 | | 4.88 | 108.24 | None |
| 07/15/92 | | 4.90 | 108.22 | None |
| 08/25/92 | | NM | NM | NM |
| 09/10/92 | | 4.71 | 108.41 | None |
| 10/31/92 | | 4.16 | 108.96 | None |
| 11/11/92 | | 4.70 | 108.42 | None |
| 12/16/92 | | 4.33 | 108.79 | None |

See notes on page 7 of 7.

Quarterly Groundwater Monitoring
ARCO Station 2107, 3310 Park Boulevard, Oakland, CA

March 9, 1993
69021.15

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2107
Oakland, California
(Page 6 of 7)

| Well / Date | Well Elevation | Depth to Water | Water Elevation | Floating Product |
|---|---|---|---|---|
| MW-8 | | | | |
| 05/15/92 | | 4.89 | 108.23 | None |
| 06/30/92 | | 4.67 | 108.45 | None |
| 07/15/92 | | 4.90 | 108.22 | None |
| 08/25/92 | | NM | NM | NM |
| 09/10/92 | | 4.71 | 108.41 | None |
| 09/13/91 | | 9.12 | 105.62 | None |
| 10/31/91 | 114.74 | 9.42 | 105.32 | None |
| 11/20/91 | | 10.00 | 104.74 | None |
| 12/24/91 | | 10.02 | 104.72 | None |
| 04/16/92 | | 9.10 | 105.64 | None |
| 05/15/92 | | 8.92 | 105.82 | None |
| 06/30/92 | | 8.83 | 105.91 | None |
| 07/15/92 | | 9.15 | 105.59 | None |
| 08/25/92 | | 8.92 | 105.82 | None |
| 09/10/92 | | 8.87 | 105.87 | None |
| 10/31/92 | | 8.82 | 105.92 | None |
| 11/11/92 | | 8.97 | 105.77 | None |
| 12/16/92 | | 8.66 | 106.08 | None |
| MW-9 | | | | |
| 06/30/92 | 117.72 | 9.51 | 108.21 | None |
| 07/15/92 | | 10.07 | 107.65 | None |
| 08/25/92 | | 9.91 | 107.81 | None |
| 09/10/92 | | 9.85 | 107.87 | None |
| 10/31/92 | | 9.37 | 108.35 | None |
| 11/11/92 | | 9.39 | 108.33 | None |
| 12/16/92 | | 9.47 | 108.25 | None |
| MW-10 | | | | |
| 06/30/92 | 112.43 | 9.50 | 102.93 | None |
| 07/15/92 | | 6.75 | 105.68 | None |
| 08/25/92 | | 6.83 | 105.60 | None |
| 09/10/92 | | 6.81 | 105.62 | None |
| 10/31/92 | | 6.62 | 105.81 | None |
| 11/11/92 | | 6.90 | 105.53 | None |
| 12/16/92 | | 6.45 | 105.98 | None |

See notes on page 7 of 7.

Quarterly Groundwater Monitoring
ARCO Station 2107, 3310 Park Boulevard, Oakland, CA

March 9, 1993
69021.15

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2107
Oakland, California
(Page 7 of 7)

| Well<br>Date | Well<br>Elevation | Depth to<br>Water | Water<br>Elevation | Floating<br>Product |
|---|---|---|---|---|
| RW-1 | | | | |
| 11/11/92 | not surveyed | 3.33 | — | None |
| 12/16/92 | | 2.81 | — | None |

NM = Not measured.
All measurements in feet.
Well elevation datum is mean sea level.

Table B-2
**Historical Groundwater Analytical Data**
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, TEPH as Diesel, and Oil and Grease)

ARCO Service Station 2107
3310 Park Boulevard at East 34th Street
Oakland, California

| Well Number | Date Sampled | TPH as Gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Xylenes (ppb) | TEPH as Diesel (ppb) | Oil and Grease (ppb) |
|---|---|---|---|---|---|---|---|---|
| MW-1 | 08/10/94 | 250 | 21 | 3.7 | 0.8 | 10 | NA | NA |
| | 11/21/94 | 87 | 8.4 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 05/22/95 | <50 | 3.2 | 5.1 | <0.50 | 2.0 | NA | NA |
| | 08/23/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 08/23/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 11/20/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| MW-2 | 08/10/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/21/94 | 13 | 2.3 | <0.5 | <0.5 | 1.7 | NA | NA |
| | 02/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 05/22/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 08/23/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 11/20/95 | <50 | 1.5 | <0.50 | <0.50 | <0.50 | NA | NA |
| MW-3 | 07/16/90 | 4,000 | 430 | 8.7 | 27 | 85 | NA | NA |
| | 10/25/90 | 5,400 | 800 | 6.6 | 25 | 30 | NA | NA |
| | 01/23/91 | 6,900 | 760 | 12 | 91 | 29 | NA | NA |
| | 04/24/91 | 4,300 | 800 | <120 | <120 | <120 | NA | NA |
| | 07/24/91 | 3,400 | 620 | <0.30 | 3.6 | 7.9 | NA | NA |
| | 10/31/91 | 4,100 | 690 | <6.0 | <6.0 | 22 | NA | NA |
| | 03/12/92 | Well Inaccessible | | | | | | |
| | 04/16/92 | 2,800 | 790 | <10.0 | 21 | <10.0 | NA | NA |
| | 06/30/92 | 1,100 | 170 | <2.5 | <2.5 | <2.5 | 880 * | NA |
| | 09/10/92 | 790 | 44 | <0.5 | 1.1 | 1 | NA | NA |
| | 09/25/92 | NA | NA | NA | NA | NA | 3,300 * | NA |
| | 11/11/92 | 810 | 31 | <0.5 | 1.4 | 1.1 | 510 * | NA |
| | 02/08/93 | 390 | <0.5 | 5 | 1.3 | 0.9 | 290 * | NA |
| | 05/10/93 | 130 | <0.5 | <0.5 | <0.5 | <0.5 | 110 * | NA |
| | 08/27/93 | 52 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 11/12/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 02/08/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 05/04/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 08/10/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 11/21/94 | Well Inaccessible | | | | | | |
| | 02/21/95 | 310 | <0.50 | <0.50 | <0.50 | <0.50 | 360 * | NA |
| | 05/22/95 | 100 | <0.50 | <0.50 | <0.50 | <0.50 | 420 * | NA |
| | 08/23/95 | Well Sampled Semiannually | | | | | | |
| | 11/20/95 | 200 | <0.50 | <0.50 | <0.50 | <0.50 | 250 * | NA |
| MW-4 | 07/16/90 | 1,500 | 100 (200) | 8.3 (15) | 4.7 (16) | 12 (25) | 300 | <5,000 |
| | 10/25/90 | 390 | 28 (<4) | <0.5 (<4) | 1.6 (<4) | 1.4 (<4) | < 100 | <5,000 |
| | 01/23/91 | 520 | 59 (59) | 1.6 (<2) | 0.7 (<2) | 3.7 (<2) | <100 | <5,000 |
| | 04/24/91 | 260 | 87 | <1.5 | 3.2 | <1.5 | NA | NA |
| | 07/24/91 | 56 | 3.9 | 0.41 | <0.30 | 0.3 | NA | NA |
| | 10/31/91 | 290 | 22 | 1.9 | 0.4 | 52 | NA | NA |
| | 03/12/92 | Well Inaccessible | | | | | | |
| | 04/16/92 | 260 | 56 | 3.4 | 5.2 | 83 | NA | NA |
| | 06/30/92 | 880 | 270 | 18 | 22 | 23 | 160 * | NA |
| | 09/10/92 | 270 | 80 | 0.6 | 3.6 | <0.5 | NA | NA |
| | 09/25/92 | NA | NA | NA | NA | NA | <50 | NA |
| | 11/11/92 | <50 | 5.2 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 02/08/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 05/10/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 08/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 11/12/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |

Table B-2 (continued)
**Historical Groundwater Analytical Data**
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, TEPH as Diesel, and Oil and Grease)

ARCO Service Station 2107
3310 Park Boulevard at East 34th Street
Oakland, California

| Well Number | Date Sampled | TPH as Gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Xylenes (ppb) | TEPH as Diesel (ppb) | Oil and Grease (ppb) |
|---|---|---|---|---|---|---|---|---|
| MW-4 | 02/08/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| (cont.) | 05/04/94 | <50 | 1.4 | 2.1 | <0.5 | 5.9 | <50 | NA |
| | 08/10/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | 60 * | NA |
| | 11/21/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 * | NA |
| | 02/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | <50 | NA |
| | 05/22/95 | <50 | 0.73 | 1.3 | <0.50 | <0.50 | 130 * | NA |
| | 08/23/95 | Well Sampled Semiannually | | | | | | |
| | 11/20/95 | <50 | <0.50 | <0 50 | <0.50 | <0.50 | NA | NA |
| MW-5 | 07/16/90 | 22,000 | 500 | 97 | 120 | 1,300 | NA | NA |
| | 10/25/90 | 21,000 | 750 | 30 | 190 | 1,800 | NA | NA |
| | 01/23/91 | 15,000 | 510 | 22 | 130 | 710 | NA | NA |
| | 04/24/91 | 15,000 | 580 | 260 | 160 | 1,100 | NA | NA |
| | 07/24/91 | 16,000 | 1,500 | 820 | 190 | 750 | NA | NA |
| | 10/31/91 | 21,000 | 1,500 | 84 | 310 | 1,000 | NA | NA |
| | 03/12/92 | Well Inaccessible | | | | | | |
| | 04/16/92 | 9,600 | 630 | 97 | 190 | 830 | NA | NA |
| | 06/30/92 | 11,000 | 510 | 54 | 120 | 740 | 4,800 * | NA |
| | 09/10/92 | 8,200 | 210 | 14 | 54 | 170 | NA | NA |
| | 09/25/92 | NA | NA | NA | NA | NA | 570 * | NA |
| | 11/11/92 | 7,100 | 230 | <10 ** | 62 | 87 | 3,700 * | NA |
| | 02/08/93 | 3.5 | 98 | <10 ** | <10 ** | 18 | 1,800 * | NA |
| | 05/10/93 | 350 | 13 | <0.5 | 1.2 | 0.9 | 240 * | NA |
| | 08/27/93 | 180 | 11 | 5 | 0.8 | 1.1 | 140 * | NA |
| | 11/12/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 02/08/94 | 300 | 13 | 57 | 5.7 | 38 | 70 * | NA |
| | 05/04/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 08/10/94 | <50 | 1.8 | <0.5 | 1.5 | <0.5 | 60 * | NA |
| | 11/21/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | 59 * | NA |
| | 02/21/95 | <50 | 1.2 | 2.0 | 0.52 | 1.1 | 150 * | NA |
| | 05/22/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 270 * | NA |
| | 08/23/95 | Well Sampled Semiannually | | | | | | |
| | 11/20/95 | <50 | <0.50 | 0.51 | <0.50 | <0.50 | 170 * | NA |
| MW-6 | 07/16/90 | <20 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 10/25/90 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | | |
| | 01/23/91 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 04/24/91 | <30 | <0.30 | <0.30 | <0.30 | <0.30 | NA | NA |
| | 07/24/91 | <30 | <0.30 | <0.30 | <0.30 | <0.30 | NA | NA |
| | 10/31/91 | <30 | <0.30 | <0.30 | <0.30 | <0.30 | NA | NA |
| | 03/12/92 | Well Inaccessible | | | | | | |
| | 04/16/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 06/30/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 09/10/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/11/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/10/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/12/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/04/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/10/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/21/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 05/22/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 08/23/95 | Well Sampled Annually | | | | | | |
| | 11/20/95 | Well Sampled Annually | | | | | | |

Table B-2 (continued)
**Historical Groundwater Analytical Data**
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, TEPH as Diesel, and Oil and Grease)

ARCO Service Station 2107
3310 Park Boulevard at East 34th Street
Oakland, California

| Well Number | Date Sampled | TPH as Gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Xylenes (ppb) | TEPH as Diesel (ppb) | Oil and Grease (ppb) |
|---|---|---|---|---|---|---|---|---|
| MW-7 | 08/29/91 | <30 | 0.73 | 1.1 | <0.30 | <0.30 | 130 | NA |
| | 10/31/91 | 44 | 1.4 | <0.30 | 0.63 | 1.3 | NA | NA |
| | 03/12/92 | Well Inaccessible | | | | | | |
| | 04/16/92 | 74 | 21 | <0.5 | 0.7 | 1.3 | <50 | NA |
| | 06/30/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 09/10/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/11/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/10/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/12/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/04/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/10/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/21/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 05/22/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 08/23/95 | Well Sampled Semiannually | | | | | | |
| | 11/20/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| MW-8 | 08/29/91 | <30 | <0.30 | <0.30 | <0.30 | <0.30 | <50 | NA |
| | 10/31/91 | <30 | 1.2 | <0.30 | 0.48 | 0.95 | NA | NA |
| | 03/12/92 | Well Inaccessible | | | | | | |
| | 04/16/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 06/30/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 09/10/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/11/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/10/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/12/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/94 | 50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/04/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/10/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/21/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 05/22/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 08/23/95 | Well Sampled Annually | | | | | | |
| | 11/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| MW-9 | 06/30/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 09/10/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/11/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/10/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/12/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/04/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/10/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/21/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 05/22/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 08/23/95 | Well Sampled Annually | | | | | | |
| | 11/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| MW-10 | 06/30/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 09/10/92 | <50 | <0 5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/11/92 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |

Table B-2 (continued)
**Historical Groundwater Analytical Data**
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, TEPH as Diesel, and Oil and Grease)

ARCO Service Station 2107
3310 Park Boulevard at East 34th Street
Oakland, California

| Well Number | Date Sampled | TPH as Gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Xylenes (ppb) | TEPH as Diesel (ppb) | Oil and Grease (ppb) |
|---|---|---|---|---|---|---|---|---|
| MW-10 | 02/08/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| (cont.) | 05/10/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/12/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/08/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 05/04/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 08/10/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 11/21/94 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | NA | NA |
| | 02/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 05/22/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| | 08/23/95 | Well Sampled Annually | | | | | | |
| | 11/21/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | NA | NA |
| RW-1 | 11/11/92 | 7,600 | 99 | 30 | 440 | 1,300 | 3,100 * | NA |
| | 02/08/93 | 430 | 70 | 1.9 | 6.4 | 9.2 | 130 * | NA |
| | 05/10/93 | 280 | 13 | <0.5 | 7.5 | 2 | 490 * | NA |
| | 08/27/93 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | 170 * | NA |
| | 11/12/93 | 350 | 13 | <0.5 | 2.2 | 0.7 | 110 * | NA |
| | 02/08/94 | <50 | 4.2 | 1 | <0.5 | 2.9 | <50 | NA |
| | 05/04/94 | 110 | 3.3 | <0.5 | 3.2 | 9.3 | ND | NA |
| | 08/10/94 | <50 | 0.6 | <0.5 | <0.5 | <0.5 | <50 | NA |
| | 11/21/94 | <50 | <0.5 | <0.5 | <0.5 | 1.8 | <50 | NA |
| | 02/21/95 | 50 | <0.50 | <0.50 | 1.2 | 2.3 | 220 | NA |
| | 05/22/95 | <50 | <0.50 | <0.50 | 1.7 | <0.50 | 130 * | NA |
| | 08/23/95 | Well Sampled Semiannually | | | | | | |
| | 11/20/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 97 * | NA |

TEPH = Total extractable petroleum hydrocarbons
ppb = Parts per billion
NA = Not analyzed
* = Sample reported to contain a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram reportedly did not match the typical diesel fingerprint.
** = Raised method reporting limit due to hgh analyte concentration requiring sample dilution.
Prior to June 1995, TPPH as gasoline and TEPH as Diesel were reported as TPH as gasoline and diesel, respectively.

Table B-3
**Historical Groundwater Analytical Data**
Total Methyl t-Butyl Ether

ARCO Service Station 2107
3310 Park Boulevard at East 34th Street
Oakland, California

| Well Number | Date Sampled | Methyl t-Butyl Ether (ppb) |
|---|---|---|
| MW-1 | 08/23/95 | <2.5 |
| | 11/20/95 | 8.6 |
| MW-2 | 08/23/95 | <2.5 |
| | 11/20/95 | 18 |
| MW-3 | 08/23/95 | NS |
| | 11/20/95 | 53 |
| MW-4 | 08/23/95 | NS |
| | 11/20/95 | 99 |
| MW-5 | 08/23/95 | NS |
| | 11/20/95 | 98 |
| MW-6 | 08/23/95 | NS |
| | 11/20/95 | NS |
| MW-7 | 08/23/95 | NS |
| | 11/20/95 | 160 |
| MW-8 | 08/23/95 | NS |
| | 11/21/95 | <2.5 |
| MW-9 | 08/23/95 | NS |
| | 11/21/95 | 14 |
| | | 27 * |
| MW-10 | 08/23/95 | NS |
| | 11/21/95 | 3.5 |
| RW-1 | 08/23/95 | NS |
| | 11/20/95 | 170 |
| | | 220 * |

ppb = Parts per billion
* = Confirmation for MTBE performed according to EPA Method 8240.

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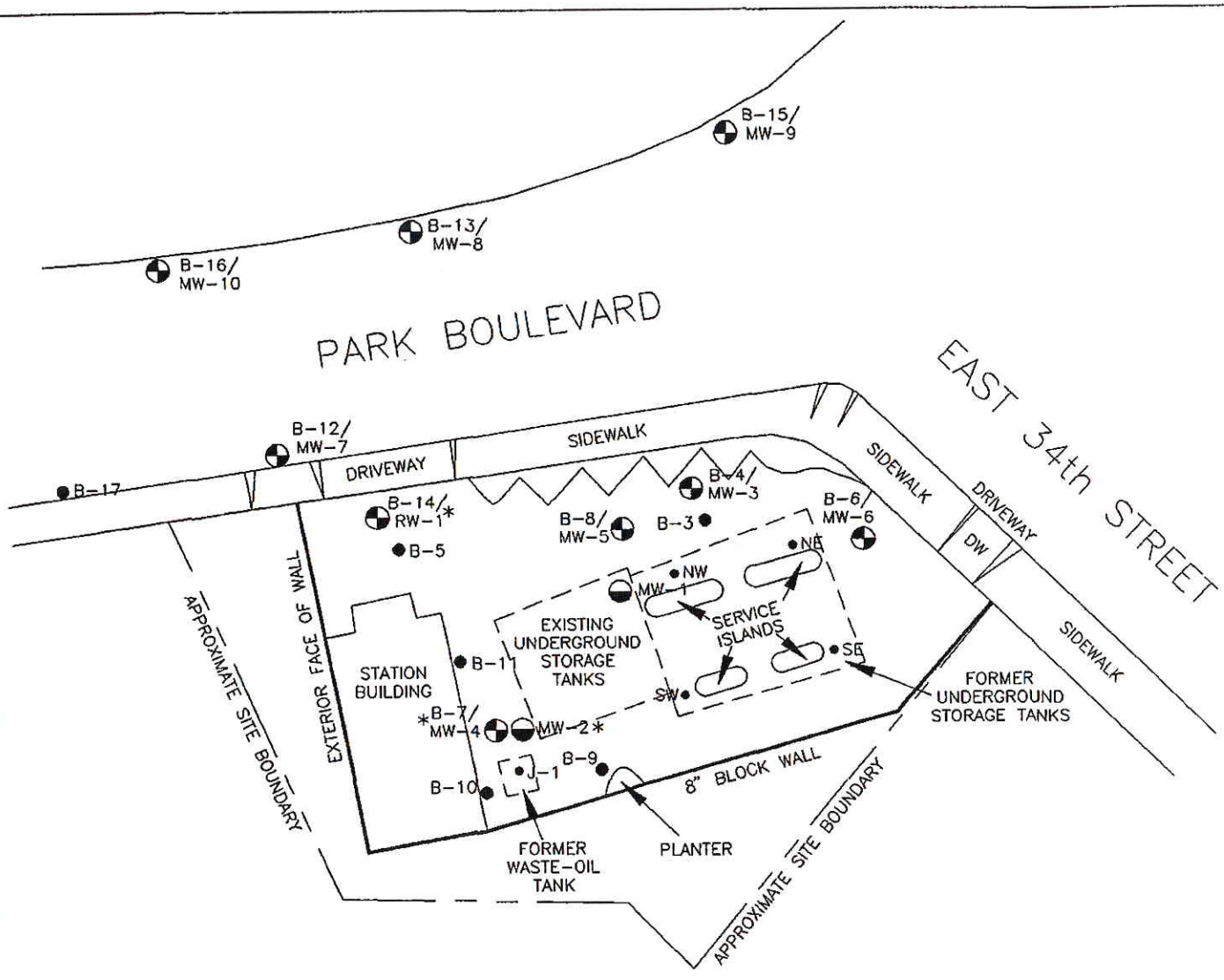
Quarterly Groundwater Monitoring
ARCO Station 2107, 3310 Park Boulevard, Oakland, CA

March 9, 1993
69021.15

**TABLE 3**
**CUMULATIVE RESULTS OF GROUNDWATER LABORATORY ANALYSES--BNAs, VOCs, and Metals**
**ARCO Station 2107**
**Oakland, California**

| Well / Date | BNAs | VOCs | Cadmium | Chromium | Lead | Zinc |
|---|---|---|---|---|---|---|
| MW-4 / 07/16/90 | ND | ND | <0.02 | <0.01 | <0.02 | <0.01 |

Results in parts per million (ppm).
BNAs: Base neutral and acid extractables including polynuclear aromatics, concentrations are below the laboratory reporting limits (<10 ppb) for all compounds tested.
ND: Results below detection levels, which were analyte specific.




EXPLANATION

B-11 ● = Soil boring (RESNA, 04/90, 05/91, and 06/92, and 10/92)

B-16/MW-10 ◓ = Groundwater monitoring well (RESNA, 04/90, 07/90, 08/91, and 06/92)

B-16/RW-1 ◓ = Groundwater recovery well (RESNA, 10/92)

MW-2 ◒ = Tank pit observation well (S.C.S. Engineers, 01/87)

J-1 ● = Soil sample (S.C.S. Engineers, 01/87)

* = Well was not surveyed, location is approximate

N

Approximate Scale

40 20 0 40 80

feet

SOURCE: Modified from plan supplied by John E Koch, Land Surveyor, July 27, 1992.

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PROJECT 69021.15 69021-15

**GENERALIZED SITE PLAN**
**ARCO Station 2107**
**3310 Park Boulevard**
**Oakland, California**

**PLATE**
**2**

COPY

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Subsurface Environmental Investigation
ARCO Station 2107, Oakland, California

December 30, 1992
69021.10

TABLE 1
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 2107
Oakland, California
(Page 1 of 3)

| Sample-Date | TPHg | TPHd | B | T | E | X | TOG | BNAs | VOCs | Cd | Cr | Pb | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Former Waste-Oil UST Pit-January 1987 | | | | | | | | | | | | | |
| *J-1 | NA | 140 | 0.79 | 5.8 | 2.5 | 14.0 | NA | NA | ** | NA | NA | NA | NA |
| Former Gasoline UST Pit-January 1987 | | | | | | | | | | | | | |
| *S.E. | <10 | <10 | NA | NA | NA | NA | <10 | NA | NA | NA | NA | NA | NA |
| *S.W. | <10 | <10 | NA | NA | NA | NA | <10 | NA | NA | NA | NA | NA | NA |
| *N.E. | <10 | <10 | NA | NA | NA | NA | <10 | NA | NA | NA | NA | NA | NA |
| *N.W. | <10 | <10 | NA | NA | NA | NA | <10 | NA | NA | NA | NA | NA | NA |
| Borings-April 1990 | | | | | | | | | | | | | |
| S-5-B3 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | ND | ND | ND | ND | ND | ND |
| S-10-B3 | <2.0 | NA | <0.050 | <0.050 | <0.050 | 0.057 | NA | ND | ND | ND | ND | ND | ND |
| S-20-B3 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | ND | ND | ND | ND | ND | ND |
| S-10-B4 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | ND | ND | ND | ND | ND | ND |
| S-5-B6 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | ND | ND | ND | ND | ND | ND |
| S-7-B6 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | ND | ND | ND | ND | ND | ND |
| S-13-B6 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | ND | ND | ND | ND | ND | ND |
| S-20-B6 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | ND | ND | ND | ND | ND | ND |
| Borings-July 1990 | | | | | | | | | | | | | |
| S-8.5-B7 | <2.0 | 110 | <0.050 | <0.050 | <0.050 | <0.050 | <50 | ND | ND | 0.507 | 18.3 | 9.48 | 41.8 |
| S-14-B7 | <2.0 | 110 | <0.050 | <0.050 | <0.050 | <0.050 | 90 | ND | ND | 0.565 | 16.8 | 9.95 | 49.8 |
| S-5-B8 | <2.0 | NA | <0.050 | 0.10 | 0.064 | 0.29 | NA | ND | ND | ND | ND | ND | ND |
| S-7.5-B8 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | NA | NA | NA | NA | <1.0* | NA |
| S-14.5-B8 | <2.0 | NA | <0.050 | <0.050 | <0.050 | <0.050 | NA | ND | ND | ND | ND | ND | ND |
| Borings-May 1991 | | | | | | | | | | | | | |
| S-15.5-B9 | <1.0 | <1.0 | <0.005 | <0.005 | <0.005 | 0.028 | <30 | NA | NA | NA | NA | NA | NA |
| S-21-B9 | <1.0 | <1.0 | <0.008 | <0.005 | <0.005 | 0.033 | <30 | NA | NA | NA | NA | NA | NA |
| S-25.5-B9 | <1.0 | <1.0 | <0.005 | <0.005 | <0.005 | 0.007 | <30 | NA | NA | NA | NA | NA | NA |
| S-5-B10 | <1.0 | <1.0 | <0.005 | <0.005 | <0.005 | <0.005 | <30 | NA | NA | NA | NA | NA | NA |
| S-10-B10 | <1.0 | <1.0 | <0.005 | <0.005 | <0.005 | <0.005 | <30 | NA | NA | NA | NA | NA | NA |
| S-15.5-B10 | <1.0 | <1.0 | <0.005 | <0.005 | <0.005 | <0.005 | <30 | NA | NA | NA | NA | NA | NA |
| S-20.5-B10 | <1.0 | <1.0 | <0.005 | <0.005 | <0.005 | <0.005 | <30 | NA | NA | NA | NA | NA | NA |

See notes on page 3 of 3.

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TABLE 1
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 2107
Oakland, California
(Page 2 of 3)

| Sample | TPHg | TPHd | B | T | E | X | TOG | BNAs | VOCs | Cd | Cr | Pb | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Borings (continued) | | | | | | | | | | | | | |
| S-8-B11 | 90 | 43 | 0.18 | 0.050 | 0.16 | 1.1 | 130 | NA | NA | NA | NA | NA | NA |
| S-12.5-B11 | <1.0 | 3.1 | <0.005 | <0.005 | <0.005 | <0.005 | <30 | NA | NA | NA | NA | NA | NA |
| S-20-B11 | <1.0 | <1.0 | <0.005 | <0.005 | <0.005 | <0.005 | <30 | NA | NA | NA | NA | NA | NA |
| Borings-August 1991 | | | | | | | | | | | | | |
| S-4.5-B12 | <1.0 | 3.3 | <0.005 | <0.005 | <0.005 | <0.005 | NA | NA | NA | NA | NA | NA | NA |
| S-10-B12 | <1.0 | 1.2 | <0.005 | <0.005 | <0.005 | <0.005 | NA | NA | NA | NA | NA | NA | NA |
| S-5-B13 | <1.0 | <1.0 | <0.005 | <0.005 | <0.005 | <0.005 | NA | NA | NA | NA | NA | NA | NA |
| Borings-October 1992 | | | | | | | | | | | | | |
| S-9-B14 | 1,700 | 2,500 | <0.0050 | <0.0050 | 25 | 130 | NA | NA | NA | NA | NA | NA | NA |
| S-11-B14 | 2.5 | <1.0 | 0.023 | 0.0050 | 0.12 | 0.31 | NA | NA | NA | NA | NA | NA | NA |
| S-15-B14 | 140 | 230 | <0.0050 | <0.0050 | 2.0 | 10 | NA | NA | NA | NA | NA | NA | NA |
| S-20-B14 | 3.6 | 2.4 | 0.043 | <0.0050 | 0.16 | 0.26 | NA | NA | NA | NA | NA | NA | NA |
| Borings-June 1992 | | | | | | | | | | | | | |
| S-5-B15 | <1.0 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | NA | NA | NA | NA | NA | NA | NA |
| S-8-B15 | <1.0 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | NA | NA | NA | NA | NA | NA | NA |
| S-9.5-B15 | <1.0 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | NA | NA | NA | NA | NA | NA | NA |
| S-31.5-B15 | <1.0 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | NA | NA | NA | NA | NA | NA | NA |
| S-5-B16 | <1.0 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | NA | NA | NA | NA | NA | NA | NA |
| S-25-B16 | <1.0 | <1.0 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | NA | NA | NA | NA | NA | NA | NA |
| Composite Stockpile | | | | | | | | | | | | | |
| S-0823-SP(a-d) | <1.0 | NA | <0.0050 | <0.0050 | <0.0050 | <0.0050 | NA | NA | NA | NA | NA | NA | NA |
| S-0615-SP A-B6 | | 24 | <0.050 | 0.12 | 0.12 | 0.11 | NA | NA | NA | NA | NA | NA | NA |
| SP-1019-A-D | 55 | 28 | 0.26 | 0.24 | 0.92 | 3.4 | NA | NA | NA | NA | NA | NA | NA |
| TTLC | | | | | | | | | | 100 | 2,500 | 1,000 | 5,000 |

See notes on page 3 of 3.

TABLE 1
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES
ARCO Station 2107
Oakland, California
(Page 3 of 3)

Results are in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline
B: benzene T: toluene E: ethylbenzene X: total xylenes
BNAs = base neutral and acid extractables including polynuclear aromatics
(ᶜ = naphthalene, ᵇ = 2-methylnaphthalene)
VOCs = volatile organics except for BTEX
< = Below indicated laboratory reporting limit
* = Soil sampling performed by SCS during UST removal and replacement (SCS, January 22, 1987).
** Results of VOC analysis:
2,400 ppb Acetone
65 ppb 2-Butone
790 ppb Benzene
10 Tetrachloroethene
5,800 ppb Toluene
2,500 ppb ethylbenzene
14,000 ppb Total xylenes
Nondetectable for 33 additional VOCs.

Estimated Concentrations of Tentatively Identified Extra Compounds:
2200 ppb 2-methylbutane
790 ppb methylcyclopentane
770 ppb methylcyclohexane
670 ppb 3-methylhexane
800 ppb 2,5,6-trimethyloctane

NA = Not Analyzed
* = Organic lead by DHS Method.
TTLC = Total threshold limit concentration values (Title 22 of the California Administrative Code, January 1988)

Sample Number explanation:
S-7.5-B8
S = Soil sample
7.5 = Sample depth in feet below ground surface
B8 = Boring number

Table 1

# Soil Analytical Data

ARCO Service Station #2107

3310 Park Blvd, Oakland, CA

| Soil Sample ID | Sample Depth (feet bgs) | Sample Elevation (feet msl) | Date Sampled | GRO/ TPH-g (mg/kg) | Benzene (mg/kg) | Toluene (mg/kg) | Ethyl-benzene (mg/kg) | Xylenes (mg/kg) | t-Butyl Alcohol (TBA) (mg/kg) | Methyl-tert butyl-ether (MTBE) (mg/kg) | Di-isopropal ether (DIPE) (mg/kg) | Ethyl-t-Butyl-Ether (ETBE) (mg/kg) | t-Amyl Methyl Ether (TAME) (mg/kg) | Ethanol (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SB-1-5 | 5 | 123.26 | 3/30/04 | ND<1.2 | ND<0.0061 | **0.096** | ND<0.0061 | **0.016** | ND<0.012 | ND<0.0061 | ND<0.012 | ND<0.0061 | ND<0.0061 | ND<0.1 |
| SB-1-10 | 10 | 118.26 | 3/30/04 | ND<1.3 | ND<0.0063 | ND<0.0063 | ND<0.0063 | ND<0.0063 | ND<0.013 | ND<0.0063 | ND<0.013 | ND<0.0063 | ND<0.0063 | ND<0.1 |
| SB-1-15 | 15 | 113.26 | 3/30/04 | ND<1.2 | ND<0.0059 | ND<0.0059 | ND<0.0059 | ND<0.0059 | ND<0.012 | ND<0.0059 | ND<0.012 | ND<0.0059 | ND<0.0059 | ND<0.1 |
| SB-1-18 | 18 | 110.26 | 3/30/04 | ND<1.2 | ND<0.0059 | ND<0.0059 | ND<0.0059 | ND<0.0059 | ND<0.012 | ND<0.0059 | ND<0.012 | ND<0.0059 | ND<0.0059 | ND<0.1 |
| SB-2-5 | 5 | 121.53 | 3/30/04 | ND<1.3 | ND<0.0067 | ND<0.0067 | ND<0.0067 | ND<0.0067 | ND<0.013 | ND<0.0067 | ND<0.013 | ND<0.0067 | ND<0.0067 | ND<0.1 |
| SB-2-10 | 10 | 116.53 | 3/30/04 | ND<1.2 | ND<0.0061 | ND<0.0061 | ND<0.0061 | ND<0.0061 | ND<0.012 | ND<0.0061 | ND<0.012 | ND<0.0061 | ND<0.0061 | ND<0.1 |
| SB-2-15 | 15 | 111.53 | 3/30/04 | ND<1.2 | ND<0.0060 | ND<0.0060 | ND<0.0060 | ND<0.0060 | ND<0.012 | ND<0.0060 | ND<0.012 | ND<0.0060 | ND<0.0060 | ND<0.1 |
| SB-2-20 | 20 | 106.53 | 3/30/04 | ND<1.2 | ND<0.0062 | ND<0.0062 | ND<0.0062 | ND<0.0062 | ND<0.012 | ND<0.0062 | ND<0.012 | ND<0.0062 | ND<0.0062 | ND<0.1 |
| SB-2-23 | 23 | 103.53 | 3/30/04 | ND<1.2 | ND<0.0060 | ND<0.0060 | ND<0.0060 | ND<0.0060 | ND<0.012 | ND<0.0060 | ND<0.012 | ND<0.0060 | ND<0.0060 | ND<0.1 |
| SB-3-8.0 | 8 | 115.87 | 5/7/04 | ND< 1.0 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.010 | **0.024** | ND<0.01 | ND<0.0050 | ND<0.0050 | ND<0.1 |
| SB-3-13 | 13 | 110.87 | 5/7/04 | ND< 1.0 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.010 | **0.027** | ND<0.01 | ND<0.0050 | ND<0.0050 | ND<0.1 |
| SB-3-18 | 18 | 105.87 | 5/7/04 | ND< 1.0 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | **0.19** | ND<0.0050 | ND<0.01 | ND<0.0050 | ND<0.0050 | ND<0.1 |
| SB-3-23.0 | 23 | 100.87 | 5/7/04 | ND< 1.0 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | **0.29** | **0.027** | ND<0.01 | ND<0.0050 | ND<0.0050 | ND<0.1 |
| SB-3-26.5 | 26.5 | 97.37 | 5/7/04 | ND< 1.0 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.010 | ND<0.0050 | ND<0.01 | ND<0.0050 | ND<0.0050 | ND<0.1 |
| SB-3-31.0 | 31 | 92.87 | 5/7/04 | ND< 1.0 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.010 | ND<0.0050 | ND<0.01 | ND<0.0050 | ND<0.0050 | ND<0.1 |
| HP-3-39.5 | 39.5 | 84.37 | 10/15/04 | ND<0.1 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| HP-3-46 | 46 | 77.87 | 10/15/04 | ND<0.1 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-4-1.0 | 1 | NM | 5/7/04 | **350** | ND<0.50 | ND<0.50 | ND<0.50 | ND<0.50 | ND<2.5 | ND<0.50 | ND<1.0 | ND<0.50 | ND<0.50 | ND<25 |
| SB-5-8 | 8 | 114.96 | 3/30/04 | ND<1.1 | ND<0.0056 | ND<0.0056 | ND<0.0056 | ND<0.0056 | ND<0.011 | ND<0.0056 | ND<0.011 | ND<0.0056 | ND<0.0056 | ND<0.1 |
| SB-5-16 | 16 | 106.96 | 3/30/04 | ND<1.3 | ND<0.0065 | ND<0.0065 | ND<0.0065 | ND<0.0065 | **0.016** | ND<0.0065 | ND<0.013 | ND<0.0065 | 0.0066 | ND<0.1 |
| SB-5-19 | 19 | 103.96 | 3/30/04 | ND<1.2 | ND<0.0059 | ND<0.0059 | ND<0.0059 | ND<0.0059 | ND<0.012 | ND<0.0059 | ND<0.012 | ND<0.0059 | ND<0.0059 | ND<0.1 |
| SB-6-1.0 | 1 | NM | 5/7/04 | ND< 1.0 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.010 | ND<0.0050 | ND<0.01 | ND<0.0050 | ND<0.0050 | ND<0.1 |
| SB-7- 6.0 | 6 | 120.22 | 10/14/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-7- 11.5 | 11.5 | 114.72 | 10/14/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-7- 16.0 | 16 | 110.22 | 10/14/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | **0.0056** | ND<0.0050 | ND<0.0050 | NA |
| SB-7- 19.5 | 19.5 | 106.72 | 10/14/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-8-6.0 | 6 | 118.82 | 10/15/04 | ND<0.1 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | **0.048** | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-8-14.0 | 14 | 110.82 | 10/15/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-8-16.0 | 16 | 108.82 | 10/15/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-8-25.0 | 25 | 99.82 | 10/15/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |

Table 1

## Soil Analytical Data

ARCO Service Station #2107

3310 Park Blvd, Oakland, CA

| Soil Sample ID | Sample Depth (feet bgs) | Sample Elevation (feet msl) | Date Sampled | GRO/ TPH-g (mg/kg) | Benzene (mg/kg) | Toluene (mg/kg) | Ethyl-benzene (mg/kg) | Xylenes (mg/kg) | t-Butyl Alcohol (TBA) (mg/kg) | Methyl-tert butyl-ether (MTBE) (mg/kg) | Di-isopropal ether (DIPE) (mg/kg) | Ethyl-t-Butyl-Ether (ETBE) (mg/kg) | t-Amyl Methyl Ether (TAME) (mg/kg) | Ethanol (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SB-8-29.5 | 29.5 | 95.32 | 10/15/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | **0.011** | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-9-10.5 | 10.5 | 112.29 | 10/14/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-9-13.5 | 13.5 | 109.29 | 10/14/04 | ND<2.5 | ND<0.050 | ND<0.050 | ND<0.050 | ND<0.050 | ND<5.0 | **0.56** | ND<0.025 | ND<0.025 | ND<0.025 | NA |
| SB-9-17.5 | 17.5 | 105.29 | 10/14/04 | ND<0.50 | ND<0.025 | ND<0.025 | ND<0.025 | ND<0.025 | ND<0.10 | **0.22** | ND<0.025 | ND<0.025 | ND<0.025 | NA |
| SB-9-19.5 | 19.5 | 103.29 | 10/14/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | **0.026** | **0.0069** | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-10-6.5 | 6.5 | 115.29 | 10/20/04 | **0.51** | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | **0.025** | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-10-14.0 | 14 | 107.79 | 10/20/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | **0.048** | **0.034** | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-10-20.5 | 20.5 | 101.29 | 10/20/04 | ND<2.5 | ND<0.050 | ND<0.050 | ND<0.050 | ND<0.050 | ND<5.0 | **0.21** | ND<0.025 | ND<0.025 | ND<0.025 | NA |
| SB-10-22.5 | 22.5 | 99.29 | 10/20/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | **0.059** | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-10-31.5 | 31.5 | 90.29 | 10/20/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | **0.011** | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-11-6.5 | 6.5 | 113.73 | 10/14/04 | **0.31** | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-11-11.5 | 11.5 | 108.73 | 10/14/04 | **220** | ND<0.25 | ND<0.25 | ND<0.25 | ND<0.25 | ND<0.25 | ND<0.12 | ND<0.12 | ND<0.12 | ND<0.12 | NA |
| SB-11-16.5 | 16.5 | 103.73 | 10/14/04 | **14** | ND<0.050 | ND<0.050 | ND<0.050 | ND<0.050 | ND<5.0 | ND<0.025 | ND<0.025 | ND<0.025 | ND<0.025 | NA |
| SB-11-21.5 | 21.5 | 98.73 | 10/14/04 | **24** | ND<0.050 | ND<0.050 | ND<0.050 | ND<0.050 | ND<5.0 | ND<0.025 | ND<0.025 | ND<0.025 | ND<0.025 | NA |
| SB-11-26.0 | 26 | 94.23 | 10/14/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.0050 | ND<0.020 | **0.012** | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |
| SB-11-28.5 | 28.5 | 91.73 | 10/14/04 | ND<0.10 | ND<0.0050 | ND<0.0050 | ND<0.0050 | **0.012** | ND<0.020 | **0.022** | ND<0.0050 | ND<0.0050 | ND<0.0050 | NA |

Notes:

1) Samples analyzed by EPA method 8260B.
2) Concentrations above laboratory reporting limits in **bold**.

bgs = below ground surface
GRO = Gasoline Range Organics
mg/kg = milligrams per kilogram
msl = mean sea level
NA = Not analyzed
ND< = Not detected below stated laboratory reporting limit
NM = Not measured
TPH-g = Total petroleum hydrocarbons as gasoline

# Table 2
## Groundwater Analytical Data
ARCO Service Station #2107
3310 Park Blvd, Oakland, CA

| Sample ID | Elevation (msl) | Sample Depth/ Interval (feet bgs) | Sample elevation (msl) | Date Sampled | GRO/ TPH-g (µg/L) | Benzene (µg/L) | Toluene (µg/L) | Ethyl-benzene (µg/L) | Xylenes (µg/L) | t-Butyl Alcohol (TBA) (µg/L) | MTBE (µg/L) | Di-isopropal ether (DIPE) (µg/L) | Ethyl-t-Butyl-Ether (ETBE) (µg/L) | tert-Amyl Methyl Ether (TAME) (µg/L) | Ethanol (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SB-1 | 128.26 | 18.5 | 109.8 | 03/30/04 | ND<50 | ND<0.50 | ND<0.50 | ND<0.50 | ND<1.0 | ND<5.0 | ND<0.50 | ND<1.0 | ND<0.50 | ND<0.50 | ND<50 |
| SB-2 | 126.532 | 23 | 103.532 | 03/30/04 | ND<50 | ND<0.50 | **1.4** | ND<0.50 | ND<1.0 | ND<5.0 | ND<0.50 | ND<1.0 | ND<0.50 | ND<0.50 | ND<50 |
| SB-3 | 123.867 | 32 | 91.867 | 05/07/04 | **88** | ND<0.50 | ND<0.50 | ND<0.50 | ND<1.0 | **110** | **34** | ND<1.0 | ND<0.50 | **1.1** | ND<50 |
| SB-5 | 122.964 | 19.5 | 103.464 | 03/30/04 | ND<50 | ND<0.50 | ND<0.50 | ND<0.50 | ND<1.0 | **45** | **34** | ND<1.0 | ND<0.50 | ND<0.50 | ND<50 |
| HP-3-35 | 123.867 | 31-35 | 88.9- 92.9 | 10/15/04 | ND<50 | **0.64** | **10** | **1.5** | **8.9** | ND<5.0 | **3.8** | ND<1.0 | ND<0.50 | ND<0.50 | ND<50 |
| HP-4-18 | 126.217 | 18-22 | 104.2- 108.2 | 10/14/04 | **140** | **1.6** | **38** | **5.4** | **27** | ND<20 | ND<0.50 | ND<0.50 | ND<0.50 | ND<0.50 | NA |
| HP-4-30 | 126.217 | 26-30 | 96.2- 100.2 | 10/14/04 | **96** | **0.91** | **23** | **3.5** | **17** | ND<20 | ND<0.50 | ND<0.50 | ND<0.50 | ND<0.50 | NA |
| HP-5-18 | 124.821 | 18-22 | 102.8- 106.8 | 10/20/04 | ND<50 | ND<0.50 | **7** | **0.94** | **6.2** | ND<20 | ND<0.50 | ND<0.50 | ND<0.50 | ND<0.50 | NA |
| HP-5-29 | 124.821 | 25-29 | 95.8- 99.8 | 10/20/04 | ND<50 | ND<0.50 | **9.2** | **1.2** | **7** | ND<20 | ND<0.50 | ND<0.50 | ND<0.50 | ND<0.50 | NA |
| HP-6-8 | 122.792 | 8-12 | 110.8- 114.8 | 10/14/04 | ND<250 | ND<2.5 | ND<2.5 | ND<2.5 | ND<2.5 | ND<100 | **92** | ND<2.5 | ND<2.5 | ND<2.5 | NA |
| HP-6-20 | 122.792 | 16-20 | 102.8- 106.8 | 10/14/04 | **170** | ND<1.0 | **15** | **2.9** | **16** | **76** | **82** | ND<1.0 | ND<1.0 | ND<1.0 | NA |
| HP-6-30 | 122.792 | 26-30 | 92.8- 96.8 | 10/14/04 | **72** | ND<0.50 | **13** | **2.2** | **13** | ND<20 | **6.6** | ND<0.50 | ND<0.50 | ND<0.50 | NA |
| HP-7-20 | 121.791 | 16-20 | 101.8- 105.8 | 10/20/04 | **1300** | ND<10 | ND<10 | ND<10 | ND<10 | ND<400 | **1200** | ND<10 | ND<10 | ND<10 | NA |
| HP-7-30 | 121.791 | 26-30 | 91.8- 95.8 | 10/20/04 | ND<5,000 | ND<50 | ND<50 | ND<50 | ND<50 | ND<2,000 | **3700** | ND<50 | ND<50 | ND<50 | NA |
| HP-8-27 | 120.229 | 23-27 | 93.2- 97.2 | 10/15/04 | ND<2,500 | ND<25 | 28 | ND<25 | **28** | ND<1,000 | **2100** | ND<25 | ND<25 | ND<25 | NA |
| HP-8-34 | 120.229 | 30-34 | 86.2- 90.2 | 10/15/04 | ND<2,500 | ND<25 | ND<25 | ND<25 | ND<25 | ND<1,000 | **880** | ND<25 | ND<25 | ND<25 | NA |

Notes:

1) Groundwater samples analyzed by EPA method 8260B.
2) Concentrations above laboratory reporting limits in **bold**.
3) SB- indicates groundwater grab sample from bottom of soil boring. HP- indicates depth distrete groundwater sample using a hydropunch.

bgs = below ground surface
ESL =Environmental Screening Level
GRO = Gasoline Range Organics
(mg/L) = micrograms per litre
msl =Mean sea level
MTBE = methyl tertiary butyl ether.
NA = Not Analyzed
ND< = Not detected below stated laboratory reporting limit
TPH-g = Total petroleum hydrocarbons as gasoline

Soil Water Analytical Data
ARCO Service Station 2107
3310 Park Boulevard
Oakland, California

**TABLE 1**
**Dispenser and Product Line Soil Sample Results**

| Soil Sample ID | Sample Depth (feet) | Date Sampled | TPHg as Gasoline (ppm) | Benzene (ppm) | Toluene (ppm) | Ethyl-benzene (ppm) | Xylenes (ppm) | MTBE (ppm) | Pb (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| S-D1 | 4 | 10/18/02 | ND<0.5 | ND<1.8 | ND<1.8 | ND<1.8 | ND<1.8 | 0.061 | 6.7 |
| S-D2 | 4 | 10/18/02 | ND<0.5 | ND<1.6 | ND<1.6 | ND<1.6 | ND<1.6 | ND<1.6 | 36 |
| S-D3 | 3.5 | 10/18/02 | ND<0.5 | ND<0.78 | ND<0.78 | ND<0.78 | ND<0.78 | 34 | 8.2 |
| S-D4 | 3.5 | 10/18/02 | ND<0.5 | ND<1.1 | ND<1.1 | ND<1.1 | ND<1.1 | 11 | 29 |
| S-D5 | 5 | 10/18/02 | ND<0.5 | ND<0.98 | ND<0.98 | ND<0.98 | ND<0.98 | 8.9 | ND<5.0 |
| S-D6 | 5 | 10/18/02 | ND<0.5 | ND<1.0 | ND<1.0 | ND<1.0 | ND<1.0 | 17 | ND<5.0 |
| S-D7 | 5 | 10/18/02 | 4,000 | ND<10.0 | 220 | 150 | 1,100 | 19 | 7.6 |
| S-D8 | 5 | 10/18/02 | 2,900 | ND<10.0 | 52 | 46 | 400 | 6.7 | 8.9 |
| S-L1 | 4.5 | 10/18/02 | ND<0.5 | ND<1.2 | ND<1.2 | ND<1.2 | ND<1.2 | 19 | ND<5.0 |
| S-L2 | 4 | 10/18/02 | ND<0.5 | 0.89 | ND<0.62 | ND<0.62 | ND<0.62 | 19 | ND<5.0 |
| S-L3 | 4.5 | 10/18/02 | ND<0.5 | ND<1.0 | ND<1.0 | ND<1.0 | 2.3 | 83 | 10 |
| S-L4 | 5 | 10/18/02 | ND<0.5 | ND<0.84 | ND<0.84 | ND<0.84 | ND<0.84 | 37 | ND<5.0 |
| S-L5 | 5 | 10/18/02 | 450 | ND<2.5 | 3.4 | 4.9 | 44 | ND<1.2 | ND<5.0 |
| S-L6 | 6.5 | 10/18/02 | 37 | ND<0.79 | ND<0.79 | ND<0.79 | ND<0.79 | 0.099 | 6.7 |
| VP-1 | 4 | 10/21/02 | ND<0.5 | ND<0.005 | ND<0.005 | ND<0.005 | ND<0.01 | ND<0.025 | -- |
| VP-2 | 4 | 10/21/02 | ND<0.5 | ND<0.005 | ND<0.005 | ND<0.005 | ND<0.01 | ND<0.025 | -- |

**TABLE 2**
**Groundwater Sample Results**

| Water Sample ID | Sample Depth (feet) | Date Sampled | TPHg as Gasoline (ppb) | Benzene (ppb) | Toluene (ppb) | Ethyl-benzene (ppb) | Xylenes (ppb) | MTBE (ppb) |
|---|---|---|---|---|---|---|---|---|
| T-1 | 7.5 | 10/21/02 | 4,200 | 300 | 3,200 | 1,300 | 11,000 | 4,900 |
| BT-1 | N/A | 10/18/02 | ND<1000 | ND<25 | ND<25 | ND<25 | ND<25 | 1,800 |
| Sump-1 | N/A | 10/18/02 | 640,000,000 | 4,000,000 | 70,000,000 | 170,000,000 | 990,000,000 | 53,000,000 |

**TABLE 3**
**Over-excavation Sample Results**

| Soil Sample ID | Sample Depth (feet) | Date Sampled | TPHg as Gasoline (ppm) | Benzene (ppm) | Toluene (ppm) | Ethyl-benzene (ppm) | Xylenes (ppm) | MTBE (ppm) | Pb (ppm) |
|---|---|---|---|---|---|---|---|---|---|
| S-OE1 | 7.5 | 10/18/02 | 2,200 | ND<2.5 | 7.9 | 7.1 | 40 | 3.4 | 5.5 |
| S-OE2 | 7.5 | 10/18/02 | 21 | ND<0.5 | ND<0.5 | ND<0.5 | ND<0.5 | 3.4 | 8.1 |
| OE-3 | 7 | 10/21/02 | ND<0.5 | ND<0.005 | ND<0.005 | ND<0.005 | ND<0.01 | ND<0.025 | -- |
| OE-4 | 7 | 10/21/02 | ND<0.5 | ND<0.005 | ND<0.005 | ND<0.005 | ND<0.01 | ND<0.025 | -- |

| | |
|---|---|
| TPH | = Total purgeable petroleum hydrocarbons using EPA Method 8015, modified. |
| BTEX | = Benzene, toluene, ethylbenzene, total xylenes using EPA Method 8021B. |
| MTBE | = Methyl Tertiary Butyl Ether. |
| ppb | = Parts per billion. |
| ppm | = Parts per million. |
| ND< | = Less than stated laboratory detection limit. |

**Table 1. Summary of Depth-Discrete Soil Sampling Data**
**BP Service Station No. 2107**
**3310 Park Boulevard, Oakland, California (ACEH Case No. RO0002526)**

| Boring I.D. | Date | Laboratory Analytical Results (mg/kg) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GRO | Benzene | Toluene | Ethylbenzene | Total Xylenes | MTBE | DIPE | ETBE | TBA | TAME | Ethanol | EDB | 1,2 DCA |
| **SB12-9** | 6/26/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB12-15** | 6/26/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | **0.0087** | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB12-23** | 6/26/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB12-27** | 6/26/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB13-11** | 6/25/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB13-15** | 6/25/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB13-21** | 6/25/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB13-29** | 6/25/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB14-9** | 6/26/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB14-15** | 6/26/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB14-19** | 6/26/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB14-29** | 6/26/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB15-9** | 6/25/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB15-17** | 6/25/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB15-23** | 6/25/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | **0.0065** | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| **SB15-29** | 6/25/2007 | <0.10 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.0050 | <0.020 | <0.0050 | <0.10 | <0.0050 | <0.0050 |
| Soil Quality Objectives* | | 5.0 | 1.0 | 42 | 29 | 17 | 5.0 | 0.8 | 13 | 12 | 13 | --- | 0.05 | 0.5 |

EDB = 1,2-Dibromoethane
1,2 DCA = 1,2 Dichloroethane
TAME = Tertiary amyl methyl ether
TBA = Tertiary butyl alcohol
GRO = Gasoline Range Organics, C4-C12
DIPE = Di-isopropyl ether
ETBE = Ethyl tert-butyl ether
MTBE = Methyl tert-butyl ether
* = Water Quality Objectives compiled from the CRWQCB's *A Compilation of Water Quality Goals - August 2003* and from other CRWQCB sources.

**Table 2. Summary of Depth-Discrete Ground-Water Sampling Data**
**BP Service Station No. 2107**
**3310 Park Boulevard, Oakland, California (ACEH Case No. RO0002526)**

| Boring I.D. | Date | Laboratory Analytical Results (µg/l) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GRO | Benzene | Toluene | Ethylbenzene | Total Xylenes | MTBE | DIPE | ETBE | TBA | TAME | Ethanol | EDB | 1,2 DCA |
| HP9-13 | 6/26/2007 | 51 [1] | <0.50 | <0.50 | <0.50 | <0.50 | 67 | <0.50 | <0.50 | <20 | <0.50 | <300 | <0.50 | <0.50 |
| HP9-21 | 6/26/2007 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 7.4 | <0.50 | <0.50 | <20 | <0.50 | <300 | <0.50 | <0.50 |
| HP10-16 | 6/26/2007 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 0.78 | <0.50 | <0.50 | <20 | <0.50 | <300 | <0.50 | <0.50 |
| HP10-24 | 6/26/2007 | <50 | 0.80 | <0.50 | <0.50 | <0.50 | 50 | <0.50 | <0.50 | <20 | <0.50 | <300 | <0.50 | <0.50 |
| HP11-24 | 6/26/2007 | 59 | 0.63 | <0.50 | <0.50 | <0.50 | 66 | <0.50 | <0.50 | <20 | <0.50 | <300 | <0.50 | <0.50 |
| HP12-19 | 6/25/2007 | <50 | <0.50 | <0.50 | <0.50 | <0.50 | 30 | <0.50 | <0.50 | <20 | <0.50 | <300 | <0.50 | <0.50 |
| HP12-25 | 6/25/2007 | 84 [1] | <1.0 | <1.0 | <1.0 | <1.0 | 110 | <1.0 | <1.0 | <40 | <1.0 | <600 | <1.0 | <1.0 |
| Water Quality Objectives* | | 5.0 | 1.0 | 42 | 29 | 17 | 5.0 | 0.8 | 10 | 12 | 13 | | 0.05 | 0.5 |

EDB = 1,2-Dibromoethane
1,2 DCA = 1,2 Dichloroethane
TAME = Tertiary amyl methyl ether
TBA = Tertiary butyl alcohol

GRO = Gasoline Range Organics, C4-C12
DIPE = Di-isopropyl ether
ETBE = Ethyl tert-butyl ether
MTBE = Methyl tert-butyl ether

[1] = Hydrocarbon result partly due to individual peak(s) in quantitation range

* = Water Quality Objectives compiled from the CRWQCB's *A Compilation of Water Quality Goals - August 2003* and from other CRWQCB sources.

# Table C-1
## Historical Groundwater Extraction System Performance Data

ARCO Service Station 2107
3310 Park Boulevard at East 34th Street
Oakland, California

| Sample I.D. | Date Sampled | Totalizer Reading (gallons) | Net Volume (gallons) | Average Flow Rate (gpm) | TPPH as Gasoline: Influent Concentration (µg/L) | TPPH as Gasoline: Net Removed (lbs) | TPPH as Gasoline: Removed to Date (lbs) | Benzene: Influent Concentration (µg/L) | Benzene: Net Remove (lbs) | Benzene: Removed to Date (lbs) | Primary Carbon Loading (percent) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INFL | 01/25/93 a | 2,095 | 2,095 | 3.2 | 2,400 | 0.04 | 0.04 | 52 | 0.001 | 0.00 | 0.1 |
| INFL | 01/26/93 | 7,135 | 5,040 | 3.5 | NS | 0.10 | 0.14 | NS | 0.007 | 0.01 | 0.2 |
| INFL | 01/28/93 | 8,799 | 1,664 | 3.6 | 4,800 | 0.07 | 0.21 | 270 | 0.004 | 0.01 | 0.3 |
| INFL | 02/05/93 | 36,879 | 28,080 | 3.6 | 4,300 | 1.00 | 1.21 | 710 | 0.115 | 0.13 | 1.5 |
| INFL | 02/10/93 | 52,388 | 15,509 | 2.2 | 1,600 | 0.21 | 1.42 | 180 | 0.058 | 0.18 | 1.8 |
| INFL | 02/18/93 | 68,516 | 16,128 | 1.4 | 890 | 0.12 | 1.54 | 76 | 0.017 | 0.20 | 1.9 |
| INFL | 02/25/93 | 86,660 | 18,144 | 1.8 | 220 | 0.03 | 1.57 | 7.1 | 0.006 | 0.21 | 2.0 |
| INFL | 03/08/93 | 94,670 | 8,010 | 1.5 | 5,100 | 0.34 | 1.91 | 610 | 0.021 | 0.23 | 2.4 |
| INFL | 03/19/93 | 113,162 | 18,492 | 2.3 | 5,100 | 0.79 | 2.70 | 300 | 0.070 | 0.30 | 3.4 |
| INFL | 03/24/93 | 123,876 | 10,714 | 2.5 | 2,400 | 0.21 | 2.91 | 140 | 0.020 | 0.32 | 3.6 |
| INFL | 04/01/93 | 139,936 | 16,060 | 2.6 | 3,400 | 0.45 | 3.36 | 160 | 0.020 | 0.34 | 4.2 |
| INFL | 05/05/93 | 210,724 | 70,788 | 1.7 | 680 | 0.40 | 3.76 | 55 | 0.063 | 0.40 | 4.7 |
| INFL | 05/20/93 | 237,367 | 26,643 | 1.2 | NS | 0.15 | 3.91 | NS | 0.009 | 0.41 | 4.9 |
| INFL | 06/01/93 | 250,687 | 13,320 | 1.0 | NS | 0.07 | 3.98 | NS | 0.005 | 0.41 | 5.0 |
| INFL | 06/09/93 | 262,835 | 12,148 | 1.0 | 660 | 0.07 | 4.05 | 28 | 0.004 | 0.42 | 5.1 |
| INFL | 06/28/93 | 286,217 | 23,382 | 0.9 | NS | 0.13 | 4.18 | NS | 0.003 | 0.42 | 5.2 |
| INFL | 07/08/93 | 292,667 | 6,450 | 0.5 | 260 | 0.01 | 4.19 | 1.4 | 0.001 | 0.42 | 5.2 |
| INFL | 07/22/93 | 306,145 | 13,478 | 0.7 | NS | 0.03 | 4.22 | NS | 0.004 | 0.43 | 5.3 |
| INFL | 08/04/93 | 333,223 | 27,078 | 1.4 | 480 | 0.11 | 4.33 | 67 | 0.008 | 0.43 | 5.4 |
| INFL | 08/18/93 | 359,835 | 26,612 | 1.2 | NS | 0.11 | 4.44 | NS | 0.008 | 0.44 | 5.6 |
| INFL | 09/23/93 | 389,991 | 30,156 | 0.6 | NS | 0.04 | 4.48 | NS | 0.009 | 0.45 | 5.6 |
| INFL | 10/06/93 | 402,021 | 12,030 | 0.7 | 130 | 0.01 | 4.50 | 7.4 | 0.004 | 0.46 | 5.6 |
| INFL | 10/21/93 | 419,854 | 17,833 | 0.6 | NS | 0.02 | 4.52 | NS | 0.001 | 0.46 | 5.6 |
| INFL | 11/10/93 | 426,649 | 6,795 | 0.6 | 850 | 0.05 | 4.56 | 8.4 | 0.000 | 0.46 | 5.7 |
| INFL | 11/24/93 | 441,330 | 14,681 | 0.8 | NS | 0.10 | 4.66 | NS | 0.001 | 0.46 | 5.8 |
| INFL | 01/26/94 | 454,825 | 13,495 | 1.2 | NS | 0.06 | 4.72 | NS | 0.001 | 0.46 | 5.9 |
| INFL | 02/02/94 | 455,192 | 367 | 0.03 | 140 | 0.00 | 4.72 | 8.1 | 0.000 | 0.46 | 5.9 |
| INFL | 03/01/94 | 455,604 | 412 | 0.01 | 87 | 0.00 | 4.72 | 2.8 | 0.000 | 0.46 | 5.9 |
| INFL | 03/29/94 | 502,785 | 47,181 | 1.2 | 1,500 | 0.59 | 5.31 | 21 | 0.005 | 0.46 | 6.6 |
| INFL | 04/27/94 b | 529,277 | 26,492 | 0.63 | NS | 0.33 | 5.64 | NS | 0.005 | 0.47 | 7.1 |
| INFL | 11/30/94 c | 531,268 | 1,991 | N/A | 830 | 0.01 | 5.66 | 0.93 | 0.000 | 0.47 | 7.1 |
| INFL | 12/16/94 d | 542,699 | 11,431 | 0.50 | NS e | 0.08 | 5.73 | NS e | 0.000 | 0.47 | 7.2 |
| INFL | 02/02/95 | 576,998 | 34,299 | 0.37 | 64 | 0.26 | 5.99 | 1.4 | 0.000 | 0.47 | 7.5 |
| INFL | 03/07/95 | 595,175 | 18,177 | 0.38 | NS e | 0.01 | 6.00 | NS e | 0.000 | 0.47 | 7.5 |
| INFL | 04/13/95 | 602,583 | 7,408 | 0.14 | ND | 0.00 | 6.00 | ND | 0.000 | 0.47 | 7.5 |
| INFL | 05/09/95 f | 612,957 | 10,374 | 0.28 | NS e | 0.00 | 6.00 | NS e | 0.000 | 0.47 | 7.5 |
| REPORTING PERIOD: 12/31/96 - 03/31/96 (f) | | | | | | | | | | | |
| TOTAL POUNDS REMOVED: | | | | | | | 6.00 | | | 0.47 | |
| TOTAL GALLONS REMOVED: | | | | | | | 0.98 | | | 0.06 | |
| PERIOD POUNDS REMOVED: | | | | | | 0.00 | | | 0.00 | | |
| PERIOD GALLONS REMOVED: | | | | | | 0.00 | | | 0.00 | | |
| TOTAL GALLONS EXTRACTED: | | | | | 612,957 | | | | | | |
| PERIOD GALLONS EXTRACTED: | | | | | N/A | | | | | | |
| PERIOD AVERAGE FLOW RATE (gpm): | | | | | N/A | | | | | | |
| PRIMARY BED CAPACITY REMAINING (%): | | | | | 92.5% | | | | | | |

TPPH = Total purgeable petroleum hydrocarbons
gpm = Gallons per minute
µg/L = Micrograms per liter
lbs = Pounds
NS = Not sampled
N/A = Not available or not applicable

a. All data prior to 9/1/94 provided by prior consultant.
b. RESNA shut system down 4/27/94.
c. Pacific Environmental Group, Inc. became consultant for the site 9/1/94.
d. System was shut down 12/16/94 to 12/31/94.
e. TPH/benzene pounds removed estimated from previous data.
f. System left shut down 5/9/95 due to low concentrations/removal rates.

System operation began 1/25/93 under RESNA Industries, Inc.; system shut down 4/27/94 - 11/29/94.
Carbon loading assumes an 8% isotherm.
Pounds of hydrocarbons removed to date through 3/29/94 provided by RESNA; benzene removed estimated from data provided.

Table C-2
**Historical Groundwater Extraction System Analytical Data**

ARCO Service Station 2107
3310 Park Boulevard
Oakland, California

| Sample I.D. | Date Sampled | TPPH as Gasoline (µg/L) | Benzene (µg/L) | Toluene (µg/L) | Ethyl-benzene (µg/L) | Xylenes (µg/L) |
|---|---|---|---|---|---|---|
| SP-1 | 11/02/94 | 59 | <0.50 | <0.50 | 2.7 | 7.0 |
| | 11/30/94 | 600 | 0.93 | <0.50 | 4.8 | 69 |
| | 02/02/95 | 64 | 1.4 | <0.50 | 0.54 | 1.8 |
| | 04/13/95 | <50 | <0.50 | <0.50 | 0.55 | 3.4 |
| SP-2 | 11/30/94 | 760 | <0.50 | <0.50 | 4.1 | 56 |
| | 02/02/95 | <50 | 1.2 | <0.50 | <0.50 | 1.1 |
| | 04/13/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| SP-3 | 11/30/94 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | 02/02/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | 04/13/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| SP-4 | 11/02/94 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | 11/30/94 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | 02/02/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |
| | 04/13/95 | <50 | <0.50 | <0.50 | <0.50 | <0.50 |

TPPH = Total purgeable petroleum hydrocarbons
µg/L = Micrograms per liter
ND = Not detected above detection limits
SP-1 = Sample location at influent to aeration tank
SP-2 = Sample location at midpoint between first and second carbon vessels
SP-3 = Sample location at midpoint between second and third carbon vessels
SP-4 = Sample location at effluent of treatment system
System startup on 1/25/93 by RESNA Industries, Inc.
Pacific Environmental Group, Inc. (PACIFIC) became consultant 9/01/94.
PACIFIC restarted system on 11/29/94.
See certified analytical reports for individual detection limits.

Figure C-1
**Historical Groundwater Extraction System Mass Removal Trend**

ARCO Service Station 2107
3310 Park Boulevard
Oakland, California

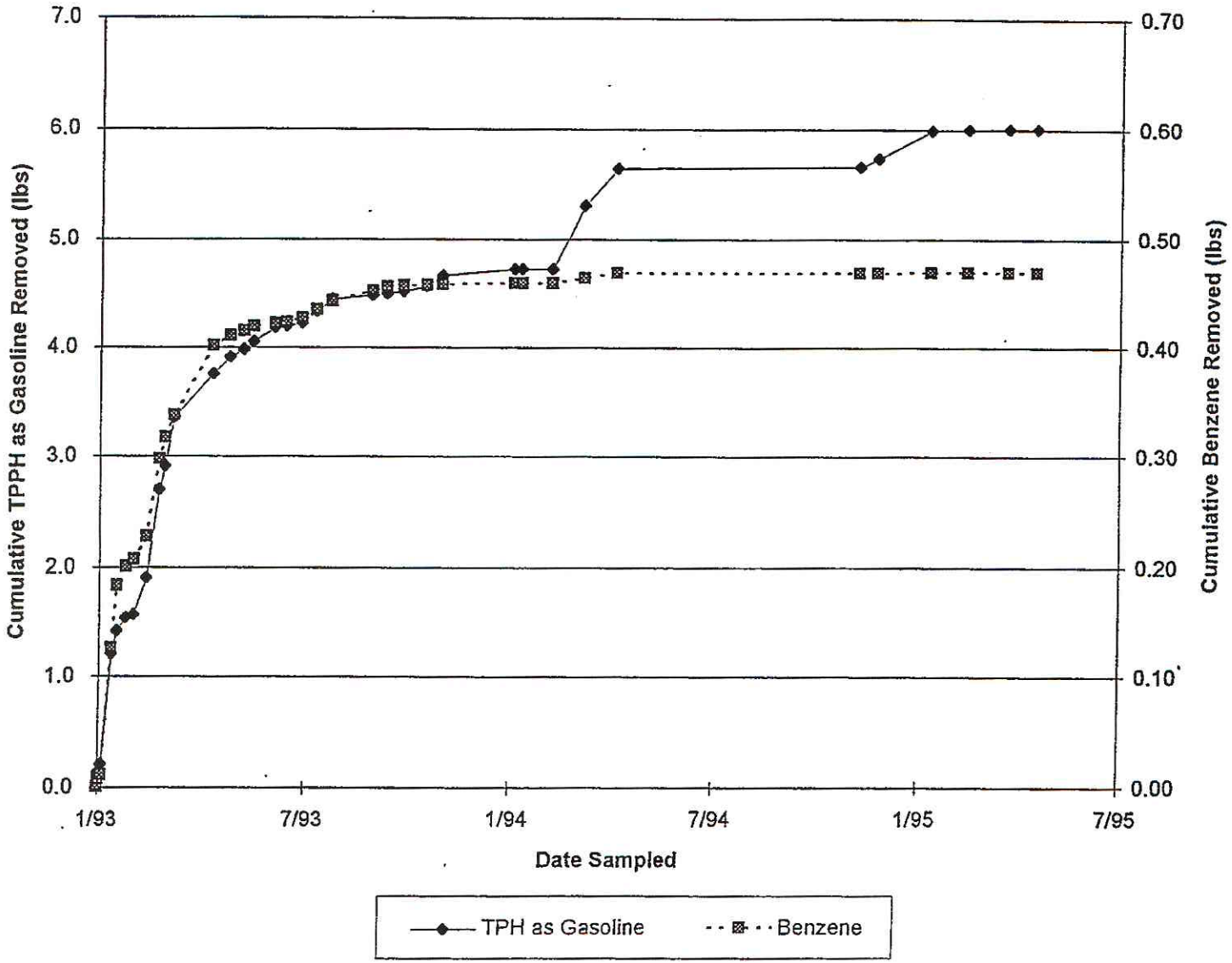
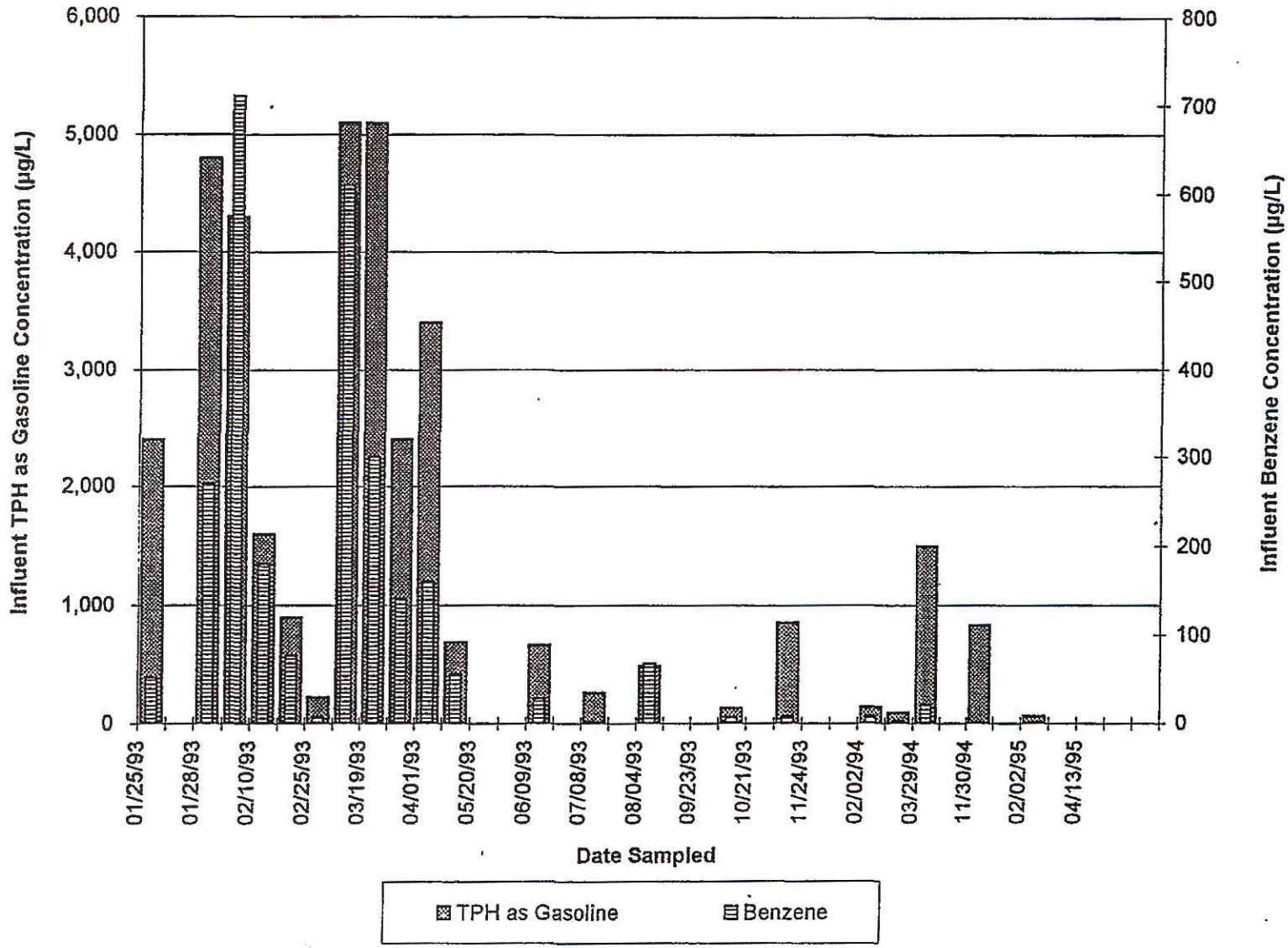


Figure C-2
Historical Groundwater Extraction System Hydrocarbon Concentrations

ARCO Service Station 2107
3310 Park Boulevard
Oakland, California



**Treatment and Disposal of Affected Material:**

| Material | Amount (include units) | Action (Treatment or Disposal w/destination) | Date |
|---|---|---|---|
| Tank | 3-10000gal | disposed/unknown | 1/12/87 |
| Tank | 1-550gal | disposed/unknown | 1/12/87 |
| Piping | unknown | | |
| Free Product | unknown | | |
| Soil | 70 cubic yards | disposed/Redwood Landfill | 4/1992 |
| Groundwater | 85,000 gallons | disposed/H & H Environmental | 2/1992 |
| Groundwater | 19,450 gallons | disposed/Gibson Oil | 3-4/1992 |
| Barrels | | | |

**Maximum Documented Contaminant Concentrations - - Before and After Cleanup**

| Contaminant | Soil (ppm) Before[1] | Soil (ppm) After[2] | Water (ppb) Before[3] | Water (ppb) After[4] |
|---|---|---|---|---|
| TPH (Gas) | <10 | 1,700 | 22,000 | 200 |
| TPH (Diesel) | 140 | 2500 | 4800 | 250 |
| Benzene | 0.79 | 0.18 | 1500 | 1.5 |
| Toluene | 5.8 | 0.10 | 820 | 0.51 |
| Ethyl benzene | 2.5 | 25 | 310 | <0.5 |
| Xylenes | 14 | 130 | 1800 | <0.5 |
| Oil & Grease | NA | 130 | <5000 | NA |
| Heavy metals | NA | * | NA | NA |
| Other - organic lead | NA | NA | 200 | NA |

* Laboratory analysis of soil samples collected from boring B7, detected the heavy metals cadmium, chromium, lead and zinc, at apparent geogenic concentrations of 0.565, 18.3, 9.95 and 49.8 mg/kg, respectively.

NA=Not analyzed

---

[1] "Before" concentrations were detected in sample J-1, collected from beneath the waste-oil UST, with the exception of TPHg. Also detected in sample J-1: acetone 2.4 mg/kg; 2-butanone 0.065 mg/kg; tetrachloroethene 0.010 mg/kg; and ethylbenzene 2.5 mg/kg. Non-detectable concentrations of TPHg were found in the four samples apparently collected from the sidewalls of the gasoline UST excavation.

[2] "After" concentrations were detected in sample S-9-B14, collected from boring B14 on 10/20/92 at a depth of 9' bgs, with the exception of benzene, O&G and toluene. Benzene and O&G concentrations were detected in sample S-8-B11, collected from boring B11, at a depth of 8 feet bgs. Toluene concentrations were detected in sample S-5-B8, collected from boring B-8, at a depth of 5 feet bgs.

[3] "Before" TPHg, TPHd and BTEX concentrations were detected in groundwater samples collected from MW-5 on 7/16/90, 6/30/92, 7/24/91, 7/24/91, 10/31/91 and 10/25/90, respectively.

[4] "After" TPHg, TPHd concentrations were detected from water sample collected from well MW-3 on 11/20/95. Benzene concentration was detected from water sample collected from MW-2 on 11/20/95. Toluene concentration was detected from water sample collected from MW-5 on 11/20/95.

URS

1333 Broadway, Suite 800
Oakland, California 94612

# LOG OF BORING

**Borehole ID:** SB-1

**Total Depth:** 18.5'

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Soil and Water Investigation | **Drilling Company:** Gregg Drilling and Testing, Inc. |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul Rogers |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe |
| **RG:** James Durkin | **Drilling Method:** 2" Direct Push |
| **Geologist:** Chris Sheridan | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 3/30/04 |

## BORING INFORMATION

| | |
|---|---|
| **Groundwater Depth:** NA | **Boring Location:** East corner of property, near entrance on East 34th St. |
| **Air Knife or Hand Auger Depth:** 5.0 feet | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2344641 Y 37.8031429 | **Boring Type:** Exploratory |

| Elevation (ft msl) | Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|---|
| 128 | 0 | | CONCRETE | | | | | |
| | | | SILTY GRAVELLY CLAY: dark brown (7.5 YR 3/3), clay with silt and fine to coarse gravel and sand; soft; no plasticity, moist. | CL | | | | Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. |
| 126 | 2 | | | | | | | |
| 124 | 4 | | | | | | | |
| | | | Low plasticity. | | 0 | SB-1-5 | | |
| 122 | 6 | | | | | | | |
| 120 | 8 | | | | | | | |
| | | | | | 0 | | | |
| 118 | 10 | | Moderately stiff to stiff. | | | SB-1-10 | | |
| 116 | 12 | | | | 6 | | | |
| 114 | 14 | | | | 0 | | | |
| | | | | | | SB-1-15 | | |
| 112 | 16 | | | | | | | |
| | | | | | | SB-1-18 | | |
| 110 | 18 | | SILTY SANDY GRAVEL: brown (7.5 YR 5/3) subangular to angular gravel, sand, silt, little clay; well graded, moist. EOB: Refusal @18.5' bgs. | GW | 0 | | | |

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# LOG OF BORING

**Borehole ID:** SB-2

**Total Depth:** 23.0'

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Soil and Water Investigation | **Drilling Company:** Gregg Drilling and Testing, Inc. |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul Rogers |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe |
| **RG:** James Durkin | **Drilling Method:** 2" Direct Push |
| **Geologist:** Chris Sheridan | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 3/30/04 |

## BORING INFORMATION

| | |
|---|---|
| **Groundwater Depth:** 16' | **Boring Location:** Under east corner of canopy |
| **Air Knife or Hand Auger Depth:** 5 feet | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2345458 Y 37.8030865 | **Boring Type:** Exploratory |

| Elevation (ft msl) | Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|---|
| 126 | 0 | | CONCRETE | | | | | |
| | | | Air knifed to 5' bgs | | | | | Borehole grouted with neat Portland Cement. Top 3" finished to grade with cement. |
| 124 | 2 | | | | 0 | | | |
| 122 | 4 | | | | | | | |
| | | | SILTY CLAY: brown (7.5 YR 4/3) clay with silt and fine to coarse sand; soft, moist, low plasticity. | CL | | SB-2-5 | | |
| 120 | 6 | | | | 0 | | | |
| 118 | 8 | | | | | | | |
| | | | | | 6 | | | |
| 116 | 10 | | CLAYEY SILT: brown (7.5 YR 4/3), silt with clay and trace fine to coarse gravel and sand; moist, slight plasticity. | ML | | SB-2-10 | | |
| | | | SAND: brown, fine; moist. | SP | 0 | | | |
| 114 | 12 | | SILTY CLAY: brown (7.5 YR 3/4), clay with silt; moist, low plasticity. | CL | | | | |
| | | | | | 0 | | | |
| 112 | 14 | | | | | | | |
| | | | Wet. | | | SB-2-15 | | |
| 110 | 16 | | | | | | | |
| | | | | | 0 | | | |
| 108 | 18 | | | | | | | |
| | | | Some gravel. | | 0 | | | |
| 106 | 20 | | | | | SB-2-20 | | |
| | | | | | 0 | | | |
| 104 | 22 | | EOB: Refusal @23.0' bgs. | | | SB-2-23 | | Groundwater grab sample SB-2. |

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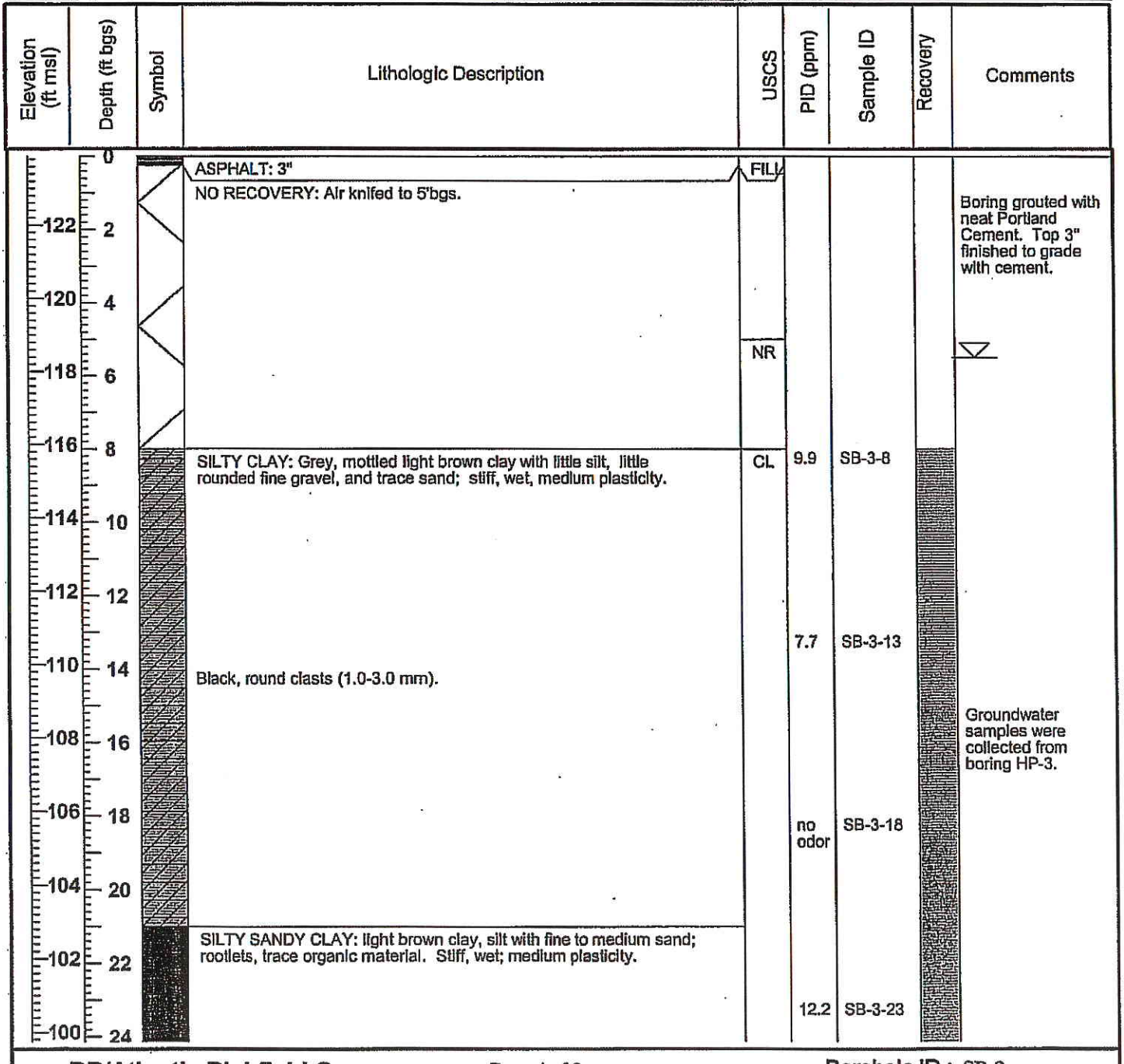
# LOG OF BORING

**Borehole ID:** SB-3

**Total Depth:** 32.0 ft. bgs

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Soil and Water Investigation | **Drilling Company:** Gregg Drilling and Testing, Inc. |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul Rogers |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe |
| **RG:** James Durkin | **Drilling Method:** 2" Direct Push |
| **Geologist:** Kevin Uno | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 5/7/04 |

| BORING INFORMATION | |
|---|---|
| **Groundwater Depth:** 5.5 ft. bgs | **Boring Location:** Parking stall across from pump #6. |
| **Air Knife or Hand Auger Depth:** 5 feet | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2347087 Y 37.8032083 | **Boring Type:** Exploratory |



| Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Recovery | Sample ID / Comments |
|---|---|---|---|---|---|---|
| 98 / 26 | | SILTY SAND: light brown, fine to coarse sand with little silt, loose, saturated. | SM | | | |
| 96 / 28 | | CLAYEY SANDY SILT: grey, mottled light brown, silt, some clay and little fine to coarse sand and trace gravel, moderately stiff, wet, medium plasticity. | ML | 12.1 | SB-3-26 | |
| 94 / 30 | | | | no odor | SB-3-31 | |
| 92 / 32 | | SAND: light brown, mostly coarse sand, little silt, trace gravel. Moderately dense, saturated. EOB: 32.0 ft. bgs. | SM | | | |

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# LOG OF BORING

**Borehole ID:** SB-4

**Total Depth:** 2.0 ft. bgs

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Soil and Water Investigation | **Drilling Company:** Gregg Drilling and Testing, Inc. |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul Rogers |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Hand Auger |
| **RG:** James Durkin | **Drilling Method:** Hand Auger |
| **Geologist:** Kevin Uno | **Sampling Method:** Hand packed brass tube. |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 5/7/04 |

| BORING INFORMATION | |
|---|---|
| **Groundwater Depth:** 2.0 ft. bgs | **Boring Location:** Sidewalk along Park Blvd. |
| **Air Knife or Hand Auger Depth:** NA | **Boring Diameter:** 2 inch |
| **Coordinates:** X NA Y NA | **Boring Type:** Exploratory |

| Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|
| 0 | | CONCRETE: 9" | | | | | |
| | | SAND: FILL, dark gray, sand with silt. Strong hydrocarbon odor. Wet. | SP | HC odor | SB-4-1.0 | | Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. ▽ |
| 2 | | EOB 2.0 ft' bgs. Boring abandoned when sloughing prevented air-knifing or hand augering to 5 ft. bgs. | | | | | |

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# LOG OF BORING

**Borehole ID:** SB-5

**Total Depth:** 19.5'

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Soil and Water Investigation | **Drilling Company:** Gregg Drilling and Testing, Inc. |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul Rogers |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe |
| **RG:** James Durkin | **Drilling Method:** 2" Direct Push |
| **Geologist:** Chris Sheridan | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 3/30/04 |

## BORING INFORMATION

| | |
|---|---|
| **Groundwater Depth:** 4.0' | **Boring Location:** Sidewalk along Park Blvd near intersection w/E 34th St. |
| **Air Knife or Hand Auger Depth:** 5 feet | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2346814 Y 37.8032765 | **Boring Type:** Exploratory |

| Elevation (ft msl) | Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|---|
| 122 | 0 | | ASPHALT: 3" | | | | | |
| | | | Air knifed to 5'bgs. | | | | | Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. |
| 120 | 2 | | | | | | | |
| | 4 | | | | | | | ▽ |
| 118 | | | 5.0-8.0' bgs: No Recovery. | | | | | |
| | 6 | | | | | | | |
| 116 | 8 | | SILTY CLAY: brown to dark brown (5Y 3/1) clay with some silt and few fine to medium sand, soft, wet, low to moderate plasticity. | CL | 0 | SB-5-8 | | |
| 114 | 10 | | | | 0 | | | |
| 112 | 12 | | 12.0-16.0' bgs: No Recovery. | | 6 | | | |
| 110 | 14 | | | | | | | |
| 108 | 16 | | First two feet of sample were slough (16.0-18.0'). | | | SB-5-16 | | |
| 106 | 18 | | | | 0 | | | |
| 104 | | | SANDY GRAVEL: brown (5Y 3/3) angular to subangular fine gravel with some sand, few clay and silt, stiff, wet. EOB: Refusal @ 19.5 ft. bgs | GW | 0 | SB-5-19 | | Groundwater grab sample at 19.5' bgs. |

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# LOG OF BORING

**Borehole ID:** SB-6

**Total Depth:** 2.0 ft. bgs

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Soil and Water Investigation | **Drilling Company:** Gregg Drilling and Testing, Inc. |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul Rogers |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Hand Auger |
| **RG:** James Durkin | **Drilling Method:** Hand Auger |
| **Geologist:** Kevin Uno | **Sampling Method:** Hand packed brass tube. |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 5/7/04 |
| **BORING INFORMATION** | |
| **Groundwater Depth:** 2.0 ft. bgs | **Boring Location:** Sidewalk along Park Blvd. |
| **Air Knife or Hand Auger Depth:** NA | **Boring Diameter:** 2 inch |
| **Coordinates:** X NA Y NA | **Boring Type:** Exploratory |

| Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|
| 0 | | CONCRETE: 9" | | | | | Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. |
| | | SAND: (FILL), dark gray sand with silt. Strong hydrocarbon odor; wet. | SP | HC odor | SB-6-1.0 | | ▽ |
| 2 | | EOB: 2.0 ft. bgs. Boring abandoned when sloughing prevented air-knifing or hand augering to 5 ft. bgs. | | | | | |

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# LOG OF BORING

**Borehole ID:** SB-7

**Total Depth:** 30 ft

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Soil and Water Investigation | **Drilling Company:** Vironex |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul White |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe 6610DT |
| **RG:** Bob Horwath | **Drilling Method:** 2" Direct Push |
| **Geologist:** Kevin Uno | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 10/14/04 |

## BORING INFORMATION

| | |
|---|---|
| **Groundwater Depth:** 16' | **Boring Location:** Along curb at E 34th St. entrance to Site. |
| **Air Knife or Hand Auger Depth:** Air knife to 5' bgs | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2345316 Y 37.8032140 | **Boring Type:** Exploratory |

| Elevation (ft msl) | Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|---|
| 126 | 0 | | ASPHALT: 3" | GP | | | | |
| | | | SANDY CLAYEY GRAVEL: (2.5Y 3/3) Dark olive brown. 60% gravel, 25% sand, 10 silt, 5% clay. Loose, moist, low plasticity. | | | | | Boring grouted with neat Portland Cement. Top 3". finished to grade with cement. |
| 124 | 2 | | CLAYEY SILT: (2.5Y 2.5/1) Black. 75% silt, 25% clay. Moderately stiff, moist, low to medium plasticity. | ML | | | | |
| 122 | 4 | | 60% silt, 40% clay. Medium plasticity. | | | | | |
| | | | SILTY SAND: (2.5Y 3/2) Very dark greyish brown. 65% fine sand, 30% silt, 5% clay. Loose, moist to wet, low plasticity. | SM | | | | |
| 120 | 6 | | SANDY SILT: (2.5Y 4/2) Dark grayish brown. 65% silt, 20% sand, 15% clay, trace gravel. Stiff, moist, low plasticity. | ML | | SB-7-6.0 | | |
| 118 | 8 | | NO RECOVERY | | 0 | | | |
| 116 | 10 | | CLAYEY SILT: (2.5Y 4/2) Dark grayish brown. 75% silt, 15% clay, 10% sand. Stiff, moist, medium plasticity. | ML | | | | |
| 114 | 12 | | Oxidation, mottling (Very dark gray and olive). | | | SB-7-11.5 | | |
| 112 | 14 | | NO RECOVERY | | | | | |
| 110 | 16 | | SANDY CLAYEY SILT: (2.5Y 4/2) Dark grayish brown. 65% silt, 25% sand, 10% clay. Mottling (Very dark gray and olive), stiff, moist to wet, medium plasticity. | | 0 | SB-7-16.0 | | ▽ |
| 108 | 18 | | | | No Odor | | | Groundwater samples were collected from boring HP-4. |
| 106 | 20 | | NO RECOVERY | | No Odor | SB-7-19.5 | | |
| 104 | 22 | | | | | | | |
| | 24 | | | | | | | |

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# LOG OF BORING

**Borehole ID: SB-7**

| Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Recovery | Sample ID / Comments |
|---|---|---|---|---|---|---|
| 102 | | | | | | |
| 100 | | CLAYEY SILT: Recovered cutting shoe: Olive. 85% silt, 15% clay, trace sand and clay. | ML | | | |
| 26 | | NO RECOVERY | | | | |
| 98 | | | | | | |
| 28 | | | | | | |
| 30 | | GRAVELLY SILTY SAND: Recovered cutting shoe: Olive brown. 65% fine to coarse sand, 25% gravel, 10% silt. Moist to wet, no plasticity. EOB: Refusal @30.0' bgs. | SW | | | |

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# LOG OF BORING

**Borehole ID:** SB-8

**Total Depth:** 30 ft

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Soil and Water Investigation | **Drilling Company:** Vironex |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul White |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe 6610 DT |
| **RG:** Bob Horwath | **Drilling Method:** 2" Direct Push |
| **Geologist:** Kevin Uno | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 10/15/04 |

## BORING INFORMATION

| | |
|---|---|
| **Groundwater Depth:** 20' | **Boring Location:** Located in parking stall closest to E 34th St. entrance. |
| **Air Knife or Hand Auger Depth:** Hand auger to 5' bgs | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2346152 Y 37.8032190 | **Boring Type:** Exploratory |

| Elevation (ft msl) | Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|---|
| 124 | 0 | | ASPHALT: 2" | | | | | |
| | 2 | | SANDY CLAYEY GRAVEL: (2.5Y 3/3) Dark olive brown. 60% gravel, 25% sand, 10 silt, 5% clay. Loose, moist, low plasticity. | GM | | | | Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. |
| 122 | | | CLAYEY SILT: (2.5Y 2.5/1) Black. 88% silt, 10% clay, 2% sand. Moderately stiff, moist, low to medium plasticity. | ML | | | | |
| | 4 | | | | | | | |
| 120 | | | SANDY SILT: 70% silt, 20% fine sand, 10% clay. Stiff, moist to wet, low plasticity. | | | | | |
| | 6 | | CLAYEY SILT: (10Y 4/1) Dark greenish gray. 85% silt, 15% clay. Stiff, moist, medium plasticity. | | | SB-8-6.0 | | |
| 118 | | | | | | | | |
| | 8 | | | | | | | |
| 116 | | | | | | | | |
| | 10 | | | | | | | |
| 114 | | | | | | | | |
| | 12 | | | | | | | |
| 112 | | | | | | | | |
| | 14 | | | | | SB-8-14 | | |
| 110 | | | CLAYEY SANDY SILT: (2.5Y 4/3) Olive brown. 70% silt, 15% clay, 15% sand. Stiff, moist to wet, medium plasticity. | | | | | Groundwater samples were collected from boring HP-5. |
| | 16 | | Mottling: Dark olive brown and olive brown. | | | SB-8-16.0 | | |
| 108 | | | | | | | | |
| | 18 | | | | | | | |
| 106 | | | | | | | | |
| | 20 | | | | | SB-8-19.5 | | ▽ |
| 104 | | | NO RECOVERY | | | | | |
| | 22 | | | | | | | |
| 102 | | | | | | | | |
| | 24 | | | | | | | |

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# LOG OF BORING

**Borehole ID: SB-8**

| Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Recovery | Sample ID / Comments |
|---|---|---|---|---|---|---|
| 100 / 26 | | CLAYEY SILT: 75% silt, 20% clay, 5% fine sand. Moderately stiff, moist, low to medium plasticity. | ML | | | |
| 98 / 28 | | SILTY SAND: 65% fine sand, 30% silt, 5% clay. Moist to wet, no to low plasticity. | SM | | SB-8-29.5 | 30 ft. bgs: End of Boring |
| 96 / 30 | | CLAYEY SILT: 70% silt, 30% clay. Very stiff, moist, medium plasticity. | ML | | | |

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# LOG OF BORING

**Borehole ID:** SB-9
**Total Depth:** 27.5 ft.

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Arco Site 2107 Soil and Water Investigation | **Drilling Company:** Vironex |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul White |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe 6610 DT |
| **RG:** Bob Horwath | **Drilling Method:** 2" Direct Push |
| **Geologist:** Kevin Uno | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 10/14/04 |

## BORING INFORMATION

| | |
|---|---|
| **Groundwater Depth:** 2.5 ft. bgs | **Boring Location:** Parking stall closest to Park Blvd.. |
| **Air Knife or Hand Auger Depth:** Airknife to 5' bgs | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2348093 Y 37.8031964 | **Boring Type:** Exploratory |

| Elevation (ft msl) | Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|---|
| 122 | 0 | | ASPHALT: 4" | | | | | |
| | 2 | | SANDY GRAVEL: (2.5Y 3/3) Dark olive brown. 60% gravel, 25% sand, 10 silt, 5% clay. Loose, moist, low plasticity. | GM | | | | |
| 120 | 4 | | GRAVELLY CLAY: (10GY 4/1) Dark greenish gray. 60% clay, 25% gravel, 15% silt. Stiff, wet, high plasticity. | CL | | | | |
| 118 | 6 | | NO RECOVERY | | | | | Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. |
| 116 | 8 | | | | | | | |
| 114 | 10 | | SANDY GRAVEL: (2.5Y 3/1) Very dark gray. 55% fine to medium subangular gravel, 30% fine to coarse sand, 10% silt, 5% clay. Stiff, wet, low plasticity. | ML | | SB-9-10.5 | | |
| 112 | 12 | | CLAYEY SILT: (2.5Y 5/3) Light olive brown. 80% silt, 20% clay. Mottling, stiff, wet, medium plasticity. | | | SB-9-13.0 | | |
| 110 | 14 | | NO RECOVERY | | | | | |
| 108 | 16 | | CLAYEY SILT: (2.5Y 5/3) Light olive brown. 80% silt, 20% clay. Mottling, stiff, wet, medium plasticity. | ML | | | | Groundwater samples were collected from boring HP-6. |
| 106 | 18 | | GRAVELLY SANDY SILT: 40% silt, 30% gravel, 25% sand, 5% clay. Mottling, stiff, wet, no to low plasticity. | | | SB-9-17.5 | | |
| 104 | 20 | | SANDY SILT: 90% silt, 10% fine sand. Wet; low plasticity. Grades to silty sand. | | | SB-9-19.5 | | |
| 102 | 22 | | SILTY SAND: 60% fine sand, 40% silt. Wet; low plasticity. Grades to silty sand. | SM | | | | |
| 100 | 24 | | SANDY GRAVELLY SILT: 50% silt, 25% sand, 15% gravel, 10% clay. Wet, no to low plasticity. | ML | | | | |
| | | | NO RECOVERY | | | | | |
| | | | GRAVELLY SILT: 50% silt, 25% gravel, 10% fine sand, 15% clay. | ML | | | | |

| Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Recovery | Sample ID / Comments |
|---|---|---|---|---|---|---|
| 98 | | Wet, no to low plasticity. | | | | |
| 26 | | SILTY SAND: 2.5Y 4/3 Olive brown. 70% sand, 30% silt. Moist, no plasticity. | SM | | | |
| 96 | | | | | | |

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# LOG OF BORING

**Borehole ID:** SB-10

**Total Depth:** 32 ft.

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Arco Site 2107 Soil and Water Investigation | **Drilling Company:** Vironex |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul White |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe 6610 DT |
| **RG:** Bob Horwath | **Drilling Method:** 2" Direct Push |
| **Geologist:** Kevin Uno | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 10/20/04 |

| BORING INFORMATION | |
|---|---|
| **Groundwater Depth:** 1.3 ft. bgs | **Boring Location:** Middle of driveway on Park Blvd.. |
| **Air Knife or Hand Auger Depth:** Hand auger to 5' bgs | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2348842 Y 37.8031970 | **Boring Type:** Exploratory |

| Elevation (ft msl) | Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Sample ID | Recovery | Comments |
|---|---|---|---|---|---|---|---|---|
| 120 | 0 | | ASPHALT: 3" | | | | | |
| | 2 | | SANDY GRAVEL: (2.5Y 3/3) Dark olive brown. Gravel and concrete pieces (to 1.0 ft. bgs), sand, and clay. Loose, moist to wet, low plasticity. | GM | | | | ▽ |
| 118 | 4 | | CLAYEY SILT: (10Y 2.5/1) Greenish black. 70% silt, 20% clay, 5% fine to coarse rounded sand and gravel. Stiff, moist, medium plasticity. | ML | | | | |
| 116 | 6 | | | | | | | Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. |
| 114 | 8 | | (2.5Y 4/3) Olive brown. | | | SB-10-6.5 | | |
| 112 | 10 | | Core sample sleeve destroyed from 10-13.5 ft. bgs. | | | | | |
| 110 | 12 | | | | | | | |
| 108 | 14 | | Mottling. | | | SB-10-14.0 | | |
| 106 | 16 | | NO RECOVERY | | | | | Groundwater samples collected from boring labeled as HP-7. |
| | | | NO RECOVERY: Hydropunch: HP-7-20 | | | | | |
| 104 | 18 | | | | | | | |
| 102 | 20 | | CLAYEY SANDY SILT: (5Y 4/2) Olive gray. 70% silt, 20% clay, 10% sand. Moderately stiff to stiff, moist, medium plasticity. | ML | | SB-10-20.5 | | |
| 100 | 22 | | SILTY SAND: (2.5Y 5/4) Light olive brown. 45% sand, 40% silt, 15% clay. Moist, dense, no to low plasticity. | SM | | | | |
| 98 | 24 | | CLAYEY SANDY SILT: (5Y 4/2) Olive gray. 70% silt, 20% clay, 10% sand. Moderately stiff to stiff, moist, medium plasticity. | ML | | SB-10-22.5 | | |

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# LOG OF BORING

**Borehole ID: SB-10**

| Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Recovery | Sample ID / Comments |
|---|---|---|---|---|---|---|
| 96 / 26 | | NO RECOVERY | | | | |
| | | NO RECOVERY: Hydropunch: HP-7-30 | | | | |
| 94 / 28 | | | | | | |
| 92 / 30 | | | | | | |
| | | GRAVELLY SILTY SAND: (2.5Y 4/3) Olive brown. 45% sand, 30% subangular to angular gravel, 20% silt, 5% clay. Moderately dense, moist, no plasticity. | SM | | | |
| 90 / 32 | | Refusal: End of Boring at 32' bgs | | | SB-10-31.5 | |

URS

1333 Broadway, Suite 800
Oakland, California 94612

# LOG OF BORING

**Borehole ID:** SB-11

**Total Depth:** 30 ft.

| PROJECT INFORMATION | DRILLING INFORMATION |
|---|---|
| **Project:** Arco Site 2107 Soil and Water Investigation | **Drilling Company:** Vironex |
| **Site Location:** 3310 Park Blvd., Oakland, CA | **Driller:** Paul White |
| **Project Manager:** Scott Robinson | **Type of Drilling Rig:** Geoprobe 6610 DT |
| **RG:** Bob Horwath | **Drilling Method:** 2" Direct Push |
| **Geologist:** Kevin Uno | **Sampling Method:** Continuous Core |
| **Job Number:** 38486908.0013601 | **Date(s) Drilled:** 10/14/04 |

## BORING INFORMATION

| | |
|---|---|
| **Groundwater Depth:** 3.8 ft. bgs | **Boring Location:** W side of driveway on Park Blvd.. |
| **Air Knife or Hand Auger Depth:** Airknife to 5' bgs | **Boring Diameter:** 2" |
| **Coordinates:** X -122.2349568 Y 37.8032163 | **Boring Type:** Exploratory |

| Elevation (ft msl) | Depth (ft bgs) | Lithologic Description | USCS | Sample ID | Comments |
|---|---|---|---|---|---|
| 120 | 0 | ASPHALT: 6" | | | |
| | | SANDY GRAVEL: (2.5Y 3/3) Dark olive brown. 60% gravel, 25% sand, 10 silt, 5% clay. Loose, moist, low plasticity. | GM | | |
| 118 | 2 | CLAYEY SILT: (10Y 2.5/1) Greenish black. 70% silt, 20% clay, 10% fine to coarse rounded gravel. Moderately stiff, moist, medium plasticity. | ML | | |
| 116 | 4 | | | | ▽ |
| 114 | 6 | 2.5Y 2.5/1 Black | | | Boring grouted with neat Portland Cement. Top 3" finished to grade with cement. |
| | | Increase to 10% fine to coarse sand; decrease clay. | | SB-11-6.5 | |
| 112 | 8 | | | | |
| 110 | 10 | (5Y 4/2) Olive gray. 75% silt, 15% clay, 10% fine to coarse sand. Moist; Low to medium plasticity. | | | |
| | | (2.5Y 5/1) Gray. Wet, soft. | | SB-11 -11.5 | |
| 108 | 12 | | | | |
| 106 | 14 | | | | |
| | | SANDY CLAYEY SILT: (5Y 4/2) Olive gray. 70% silt, 25% sand, 5% clay. Stiff, moist to wet, low plasticity. | | | Groundwater samples were collected from boring HP-8. |
| 104 | 16 | (2.5Y 2.5/1) Black | | SB-11 -16.5 | |
| | | NO RECOVERY | | | |
| 102 | 18 | | | | |
| 100 | 20 | SANDY CLAYEY SILT: (5Y 4/2) Olive gray. 65% silt, 20% fine to coarse sand, 10% clay. Low plasticity. | ML | | |
| 98 | 22 | (2.5Y 2.5/1) Black | | SB-11 -21.5 | |
| | | SILTY SAND: (5Y 5/3) Olive. 70% sand, 30% silt, trace gravel. Low plasticity. | SM | | |
| | 24 | | | | |

URS

# LOG OF BORING

**Borehole ID: SB-11**

| Depth (ft bgs) | Symbol | Lithologic Description | USCS | PID (ppm) | Recovery | Sample ID / Comments |
|---|---|---|---|---|---|---|
| 96 | | | | | | |
| 94 | 26 | 23.5 ft : Color change to (5G 4/1) dark greenish gray. GRAVELLY SILTY SAND: 65% sand, 20% gravel, 15% silt. Dense, wet, no plasticity. | | | | SB-11-26 |
| 92 | 28 | | | | | SB-11 -28.5 |
| | 30 | NO RECOVERY | | | | |

SOIL BORING LOG  Boring No. SB-12  Sheet 1 of 2

Client: ARCO Station No. 2107
Address: 3310 Park Boulevard, Oakland, CA
Project No.: E-2107
Logged By: Scott Bittinger
grout: 0 ft. to 28 ft.

Date: 6/26/2007
Drilling Company: RSI  rig type: Geoprobe 6600
Drilling Foreman: Art
Method: Direct Push  hole diam.: 2"

| Sample Type | Sample No. | Blow Count | Sample Time | Sample Recov. | Well Construct. | Depth Scale | LITHO COLUMN | Descriptions of Materials and Conditions | PID (PPM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | | Concrete | |
| | | | | | | 2 | | | |
| | | | | | | 3 | | air knife to 7.2' bgs. Not logged. | |
| | | | | | | 4 | | | |
| | | | | | | 5 | | | |
| | | | | | | 6 | | | |
| | | | | | | 7 | | | |
| | | | | | | 8 | SC | CLAYEY SAND with SILT, 7.2'-8.5', light olive brown, 60% fine grained sand, 40% silty clay, moist | |
| | | | | | | 9 | SP-SC | SAND with CLAY 8.5'-9.2', light olive brown, 90% fine grained sand, 10% silty clay, damp | |
| S | SB12-9 | | 11:36 | | | 10 | CL | SILTY CLAY 9.2'-11.2', light olive brown, 0-10% fine grained sand, dry, stiff | 0 |
| | | | | | | 11 | | | |
| S | SB12-11 | | 11:38 | | | 12 | SP-SC | SAND with CLAY and SILT, 11.2'-14', dark yellowish brown, 85-90% fine grained sand, 10-15% silty clay, damp to wet | 0 |
| | | | | | | 13 | | | |
| | | | | | | 14 | | | |
| | | | | | | 15 | SC | CLAYEY SAND 14'-15.8', grayish brown, 50-60% fine grained sand, 40-50% silty clay, moist | |
| S | SB12-15 | | 11:42 | | | 16 | | | 0 |
| | | | | | | 17 | | | |
| S | SB12-17 | | 11:45 | | | 18 | SW-SC | SAND with CLAY and SILT 15.8'-22', fine to coarse grained, 5% fine gravel, 10-15% silty clay, damp to wet | 0 |
| | | | | | | 19 | | | |
| S | SB12-19 | | 11:47 | | | 20 | | | 0 |

Comments: Soil continuously recovered in acrylic liners. Total depth of boring is 28 feet bgs. Boring backfilled to surface grade with neat cement.

STRATUS ENVIRONMENTAL, INC.

SOIL BORING LOG  Boring No. SB-12  Sheet 2 of 2

Client: ARCO Station No. 2107
Address: 3310 Park Boulevard
Oakland, CA
Project No.: E-2107
Logged By: Scott Bittinger

Date: 6/26/2007
Drilling Company: RSI  rig type: Geoprobe 6600
Drilling Foreman: Art
Method: Direct Push  hole diam.: 2"

| Sample Type | Sample No. | Blow Count | Sample Time | Sample Recov. | Well Construct. | Depth Scale | LITHO COLUMN | Descriptions of Materials and Conditions | PID (PPM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 21 | SW-SC | SAND with CLAY and SILT 15.8'-22', fine to coarse grained, 5% fine gravel, | |
| S | SB12-21 | | 11:55 | | | 22 | | 10-15% silty clay, damp to wet | 0 |
| | | | | | | 23 | SP-SC | SAND with CLAY and SILT 22'-23', fine grained, 10-15% silty clay, damp to wet | |
| S | SB12-23 | | 11:57 | | | 24 | CL | SILTY CLAY 23'-24', light olive brown with iron oxide staining, dry, stiff | 0 |
| | | | | | | 25 | | | |
| S | SB12-25 | | 11:59 | | | 26 | | | 0 |
| | | | | | | 27 | CL | SILTY CLAY 24'-28', very dark gray, dry to moist, stiff | |
| S | SB12-27 | | 12:01 | | | 28 | | | 0 |

## SOIL BORING LOG

**Boring No.** SB-13 **Sheet** 1 of 2

| | | | |
|---|---|---|---|
| Client | ARCO Station No. 2107 | Date | 6/25/2007 |
| Address | 3310 Park Boulevard | Drilling Company | RSI rig type: Geoprobe 6600 |
| | Oakland, CA | Drilling Foreman | Art |
| Project No. | E-2107 | Method | Direct Push hole diam.: 2" |
| Logged By: | Scott Bittinger | | |
| | grout: 0 ft. to 30 ft. | | |

| Sample Type | Sample No. | Blow Count | Sample Time | Sample Recov. | Well Construct. | Depth Scale | LITHO COLUMN | Descriptions of Materials and Conditions | PID (PPM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | | Concrete | |
| | | | | | | 2 | | | |
| | | | | | | 3 | | air knife to 7.2' bgs. Not logged. | |
| | | | | | | 4 | | | |
| | | | | | | 5 | | | |
| | | | | | | 6 | | | |
| | | | | | | 7 | | | |
| | | | | | | 8 | SC | CLAYEY SAND 7.2'-10', very dark gray, 55% fine grained sand, 45% clayey fines, damp | |
| | | | | | | 9 | | | |
| S | SB13-9 | | 13:53 | | | 10 | | | 1 |
| | | | | | | 11 | CL | SILTY CLAY 10'-12', olive brown, moist, stiff | |
| S | SB13-11 | | 13:59 | | | 12 | | SANDY CLAY with SILT 12'-12.8', olive gray, 65% silty clay, 35% fine grained sand, moist, stiff | 3.5 |
| | | | | | | 13 | CL | SILTY CLAY 12.8'-13.6', olive gray, moist, stiff | |
| S | SB13-13 | | 14:02 | | | 14 | | SANDY CLAY with SILT 13.6'-14', dark yellowish brown, 70% silty clay, 30% fine grained sand, moist | |
| | | | | | | 15 | SC | CLAYEY SAND 14'-16.5', dark yellowish brown, 70-90% fine grained sand, 10-30% silty clay, damp | |
| S | SB13-15 | | 14:07 | | | 16 | | | 0 |
| | | | | | | 17 | SW-SC | SAND with CLAY and SILT, 16.5'-18', dark yellowish brown, fine to coarse grained, 5% fine gravel, 10-15% silty clay, damp to wet | |
| S | SB13-17 | | 14:09 | | | 18 | | | 0 |
| | | | | | | 19 | CL | SILTY CLAY 18'-20', light olive gray with iron oxide staining, moist, stiff | |
| S | SB13-19 | | 14:12 | | | 20 | | | 0 |

Comments: Soil continuously recovered in acrylic liners. Total depth of boring is 30 feet bgs. Boring backfilled to surface grade with neat cement.

STRATUS ENVIRONMENTAL, INC.

SOIL BORING LOG

Boring No. SB-13

Sheet 2 of 2

Client: ARCO Station No. 2107

Address: 3310 Park Boulevard, Oakland, CA

Project No.: E-2107

Logged By: Scott Bittinger

Date: 6/25/2007

Drilling Company: RSI rig type: Geoprobe 6600

Drilling Foreman: Art

Method: Direct Push hole diam.: 2"

| Sample Type | Sample No. | Blow Count | Sample Time | Sample Recov. | Well Construct. | Depth Scale | LITHO COLUMN | Descriptions of Materials and Conditions | PID (PPM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2 1 | SC | CLAYEY SAND with SILT 20'-22', light olive gray, fine to medium grained, 25% silty clay, damp | |
| S | SB13-21 | | 14:14 | | | 2 2 | | | 0 |
| | | | | | | 2 3 | SW-SC | SAND with CLAY and SILT 22'-26.3', fine to coarse grained, trace gravel, 10-12% silty clay, damp | |
| S | SB13-23 | | 14:16 | | | 2 4 | | | 0 |
| | | | | | | 2 5 | | | |
| S | SB13-25 | | 14:19 | | | 2 6 | | | 0 |
| | | | | | | 2 7 | | | |
| S | SB13-27 | | 14:22 | | | 2 8 | CL | SILTY CLAY 26.3'-30', very dark gray, dry to moist, stiff | 0 |
| | | | | | | 2 9 | | | |
| S | SB13-29 | | 14:26 | | | 3 0 | | | 0 |

SOIL BORING LOG  Boring No. SB-14  Sheet 1 of 2

Client: ARCO Station No. 2107
Address: 3310 Park Boulevard, Oakland, CA
Project No.: E-2107
Logged By: Scott Bittinger
Date: 8/26/2007
Drilling Company: RSI  rig type: Geoprobe 6600
Drilling Foreman: Art
Method: Direct Push  hole diam.: 2"
grout: 0 ft. to 30 ft.

| Sample Type | Sample No. | Blow Count | Sample Time | Sample Recov. | Well Construct. | Depth Scale | LITHO COLUMN | Descriptions of Materials and Conditions | PID (PPM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | | Concrete | |
| | | | | | | 2 | | | |
| | | | | | | 3 | | air knife to 6.5' bgs. Not logged. | |
| | | | | | | 4 | | | |
| | | | | | | 5 | | | |
| | | | | | | 6 | | | |
| | | | | | | 7 | | | |
| | | | | | | 8 | SC | CLAYEY SAND with SILT, 6.5'-11.5', light olive brown 6.5'-10', dark yellowish | |
| | | | | | | 9 | | brown 10'-11.5', 50-65% fine grained sand, 35-50% silty clay, moist | |
| S | SB14-9 | | 8:44 | | | 10 | | | |
| | | | | | | 11 | | | |
| S | SB14-11 | | 8:46 | | | 12 | CL | SILTY CLAY with SAND 11.5'-12', dark yellowish brown, 85% silty clay, | |
| | | | | | | 13 | SC | 15% fine grained sand, moist<br>CLAYEY SAND with SILT, 12'-13.3', grayish brown, 60% fine grained sand, | |
| S | SB14-13 | | 8:48 | | | 14 | CL | 40% silty clay, moist<br>SILTY CLAY 13.3'-15', grayish brown, 8% fine grained sand, dry to moist, | |
| | | | | | | 15 | | stiff | |
| S | SB14-15 | | 8:50 | | | 16 | SP-SC | SAND with CLAY and SILT 15'-16', fine grained, 7-10% silty clay, damp | |
| | | | | | | 17 | CL | SANDY CLAY with SILT 16'-17.2', grayish brown, 80% silty clay, 20% fine | |
| S | SB14-17 | | 8:52 | | | 18 | SC | grained sand, moist<br>CLAYEY SAND with SILT, 17.2'-20', grayish brown to light olive brown, | |
| | | | | | | 19 | | 55-65% fine grained sand, 35-45% silty clay, moist | |
| S | SB14-19 | | 8:54 | | | 20 | | | 0 |

Comments: Soil continuously recovered in acrylic liners. Total depth of boring is 30 feet bgs. Boring backfilled to surface grade with neat cement.

STRATUS ENVIRONMENTAL, INC.

SOIL BORING LOG

Boring No. SB-14

Sheet 2 of 2

Client: ARCO Station No. 2107

Address: 3310 Park Boulevard, Oakland, CA

Project No.: E-2107

Logged By: Scott Bittinger

Date: 6/26/2007

Drilling Company: RSI  rig type: Geoprobe 6600

Drilling Foreman: Art

Method: Direct Push  hole diam.: 2"

| Sample Type | Sample No. | Blow Count | Sample Time | Sample Recov. | Well Construc L | Depth Scale | LITHO COLUMN | Descriptions of Materials and Conditions | PID (PPM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 21 | SP-SC | SAND with CLAY and SILT 20'-21', fine grained, 5-10% silty clay, damp to wet | |
| S | SB14-21 | | 8:58 | | | 22 | SW-SC | | 0 |
| | | | | | | 23 | | SAND with CLAY and SILT 21'-26.5', fine to coars grained, 10% fine gravel, 10-12% silty clay, damp to wet | |
| S | SB14-23 | | 9:00 | | | 24 | | | 0 |
| | | | | | | 25 | | | |
| S | SB14-25 | | 9:02 | | | 26 | | | 0 |
| | | | | | | 27 | | | |
| S | SB14-27 | | 9:05 | | | 28 | CL | SILTY CLAY 26.5'-30', light olive brown/pale yellow with iron oxide stains 26.5'-28', very dark gray 28'-30', dry to moist, stiff | 0 |
| | | | | | | 29 | | | |
| S | SB14-29 | | 9:08 | | | 30 | | | 0 |

SOIL BORING LOG

Boring No. SB-15

Sheet 1 of 2

Client: ARCO Station No. 2107

Address: 3310 Park Boulevard, Oakland, CA

Project No.: E-2107

Logged By: Scott Bittinger

Date: 6/25/2007

Drilling Company: RSI rig type: Geoprobe 6600

Drilling Foreman: Art

Method: Direct Push hole diam.: 2"

grout: 0 ft. to 30 ft.

| Sample Type | Sample No. | Blow Count | Sample Time | Sample Recov. | Well Construct. | Depth Scale | LITHO COLUMN | Descriptions of Materials and Conditions | PID (PPM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | | Concrete | |
| | | | | | | 2 | | | |
| | | | | | | 3 | | air knife to 6.5' bgs. Not logged. | |
| | | | | | | 4 | | | |
| | | | | | | 5 | | | |
| | | | | | | 6 | | | |
| | | | | | | 7 | | | |
| S | SB15-7 | | 11:28 | | | 8 | CL | SILTY CLAY 6.5'-9.3', dark grayish brown, moist, stiff | 0 |
| | | | | | | 9 | | | |
| S | SB15-9 | | 11:30 | | | 10 | SC | CLAYEY SAND with SILT 9.3'-12', dark yellowish grown, 80% fine to coarse grained sand, 20% silty clay, damp | 0 |
| | | | | | | 11 | | | |
| S | SB15-11 | | 11:33 | | | 12 | | | 0 |
| | | | | | | 13 | SC | CLAYEY SAND 12'-13.5', grayish brown, 85% fine grained sand, 15% silty clay, moist | |
| | | | | | | 14 | | | |
| | | | | | | 15 | CL | SILTY CLAY 13.5'-16.5', light olive brown, moist, stiff | |
| | | | | | | 16 | | | |
| | | | | | | 17 | | | |
| S | SB15-17 | | 12:20 | | | 18 | SP-SC | SAND with CLAY and SILT 16.5'-18', dark yellowish brown, 85% fine grained sand, 5% medium grained sand, 10% silty clay, wet | 0 |
| | | | | | | 19 | SW | SAND with CLAY and SILT 18'-27', fine to coarse grained, 5% fine gravel, 10% silty clay, wet | |
| S | SB15-19 | | 12:22 | | | 20 | | | 0 |

Comments: Soil continuously recovered in acrylic liners. Total depth of boring is 30 feet bgs. Boring backfilled to surface grade with neat cement.

STRATUS ENVIRONMENTAL, INC.

SOIL BORING LOG  Boring No. SB-15  Sheet 2 of 2

Client: ARCO Station No. 2107  Date: 6/25/2007

Address: 3310 Park Boulevard  Drilling Company: RSI  rig type: Geoprobe 6600

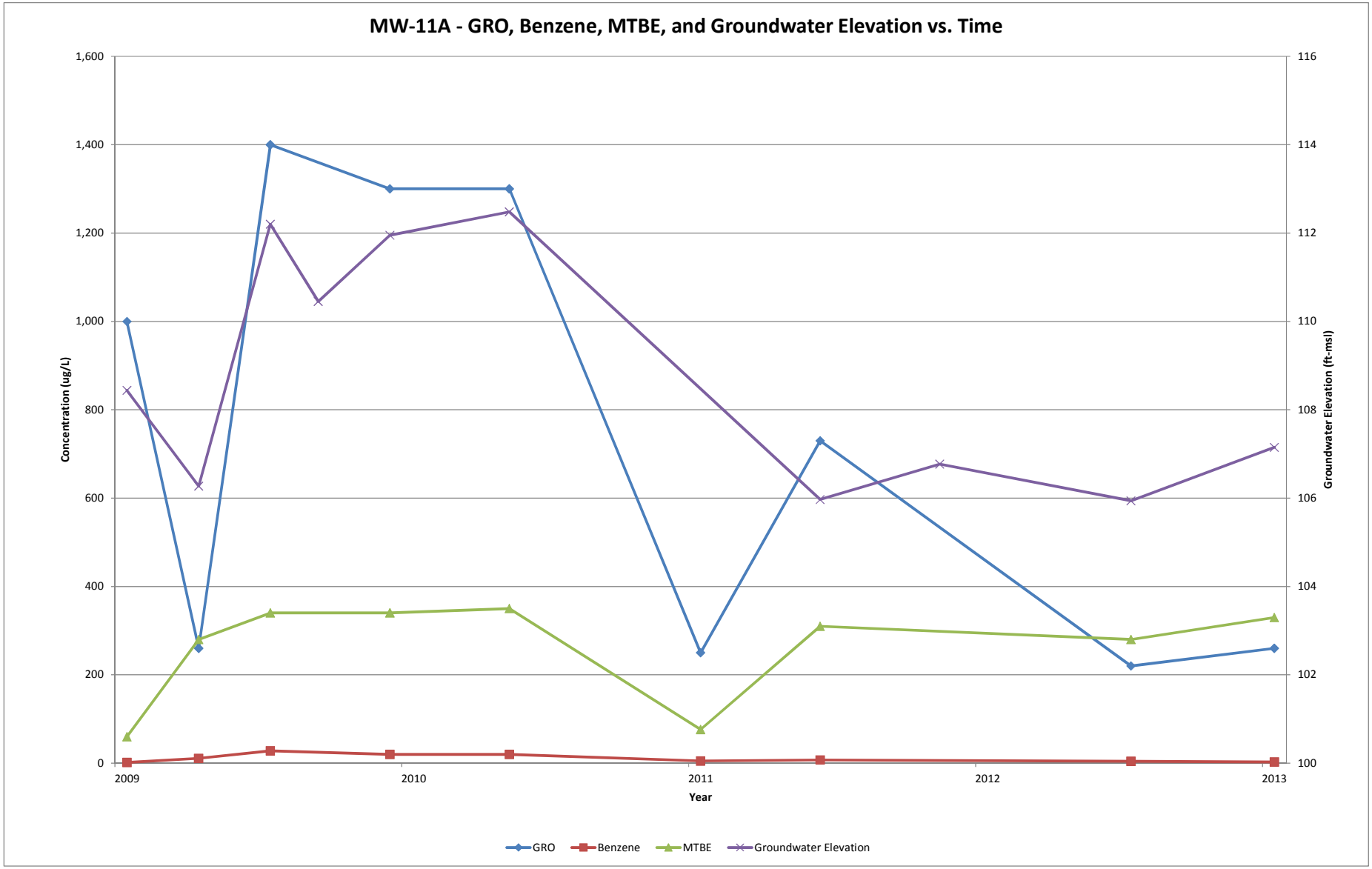
Oakland, CA  Drilling Foreman: Art

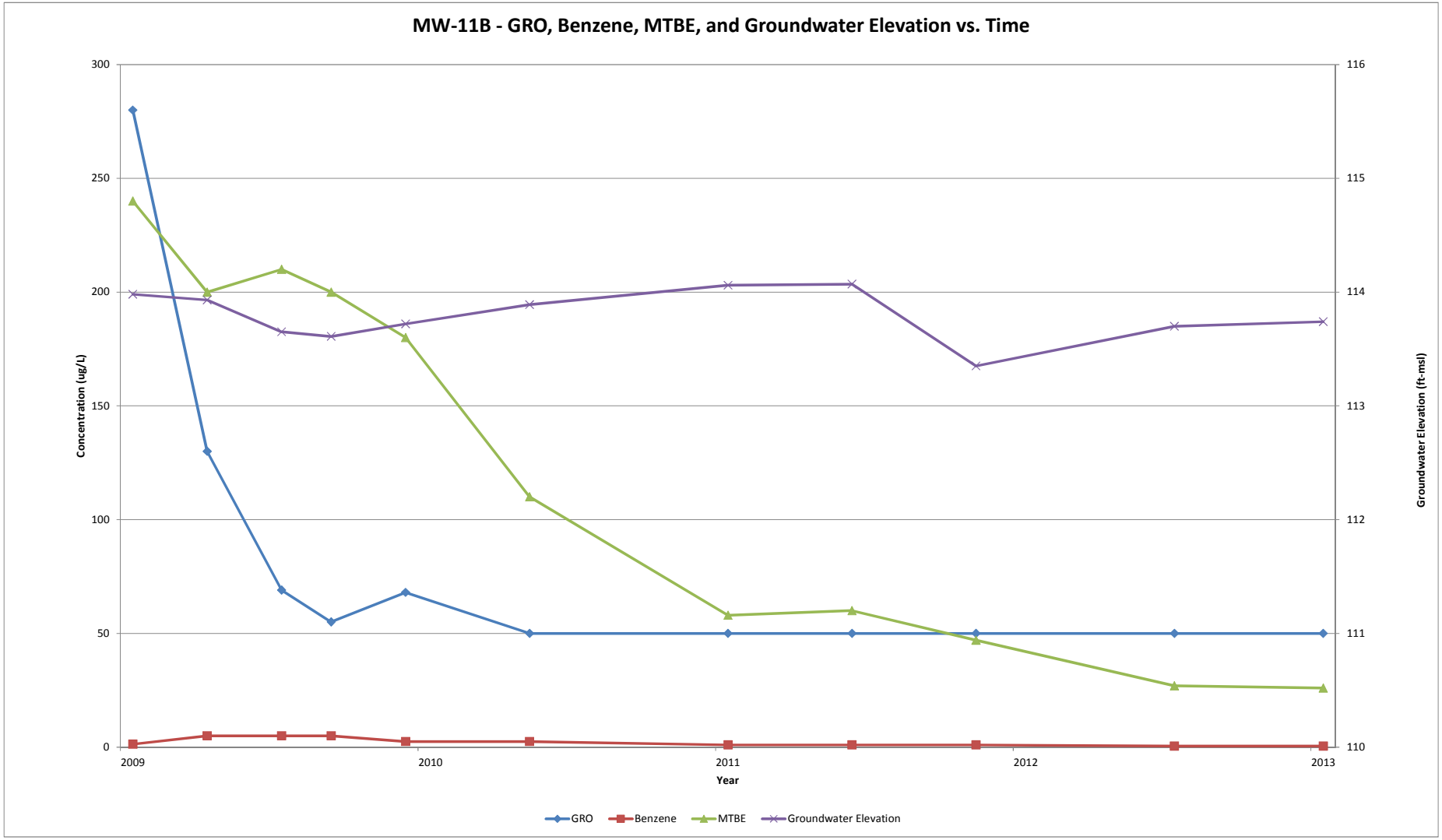
Project No.: E-2107  Method: Direct Push  hole diam.: 2"

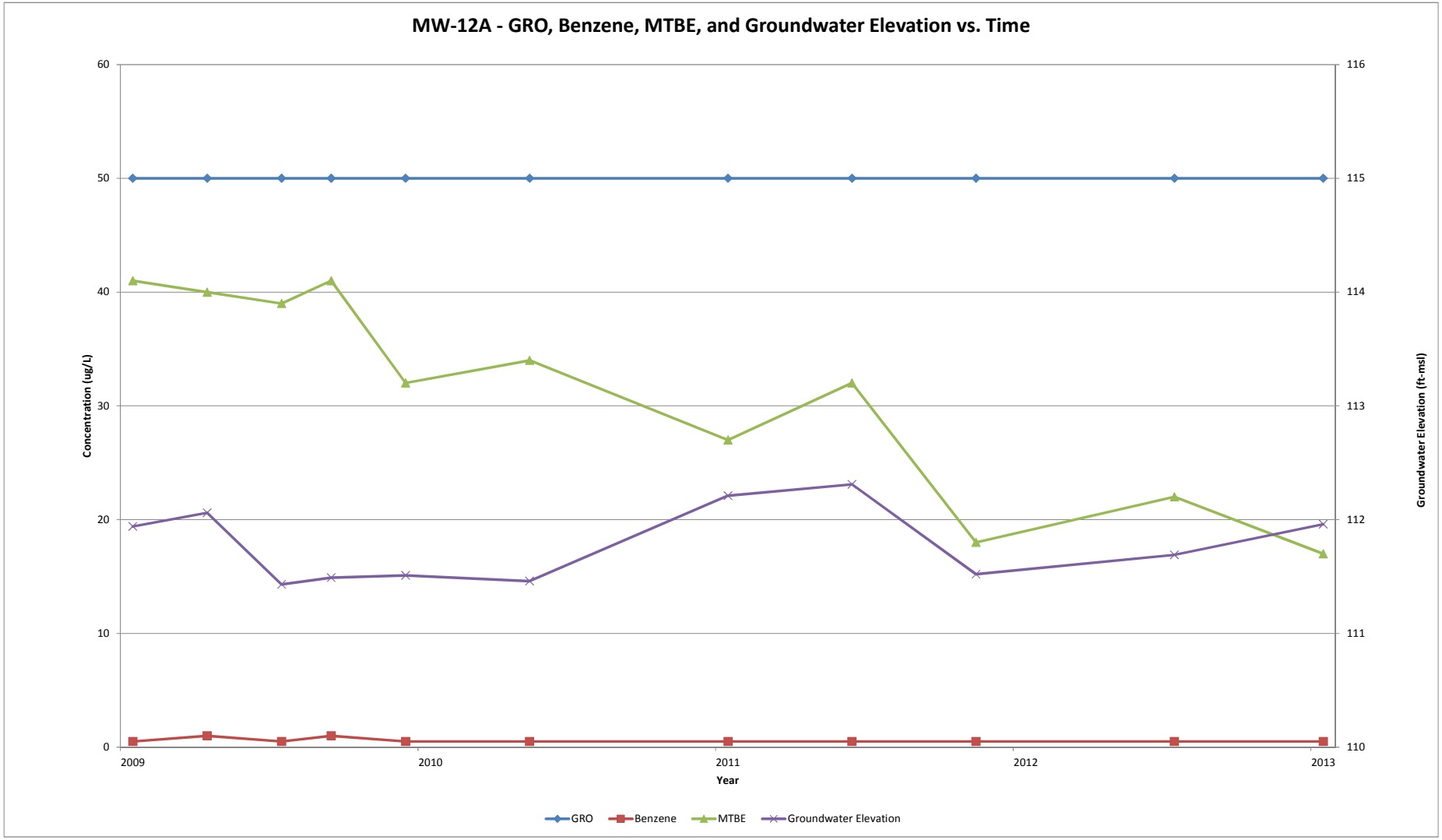
Logged By: Scott Billinger

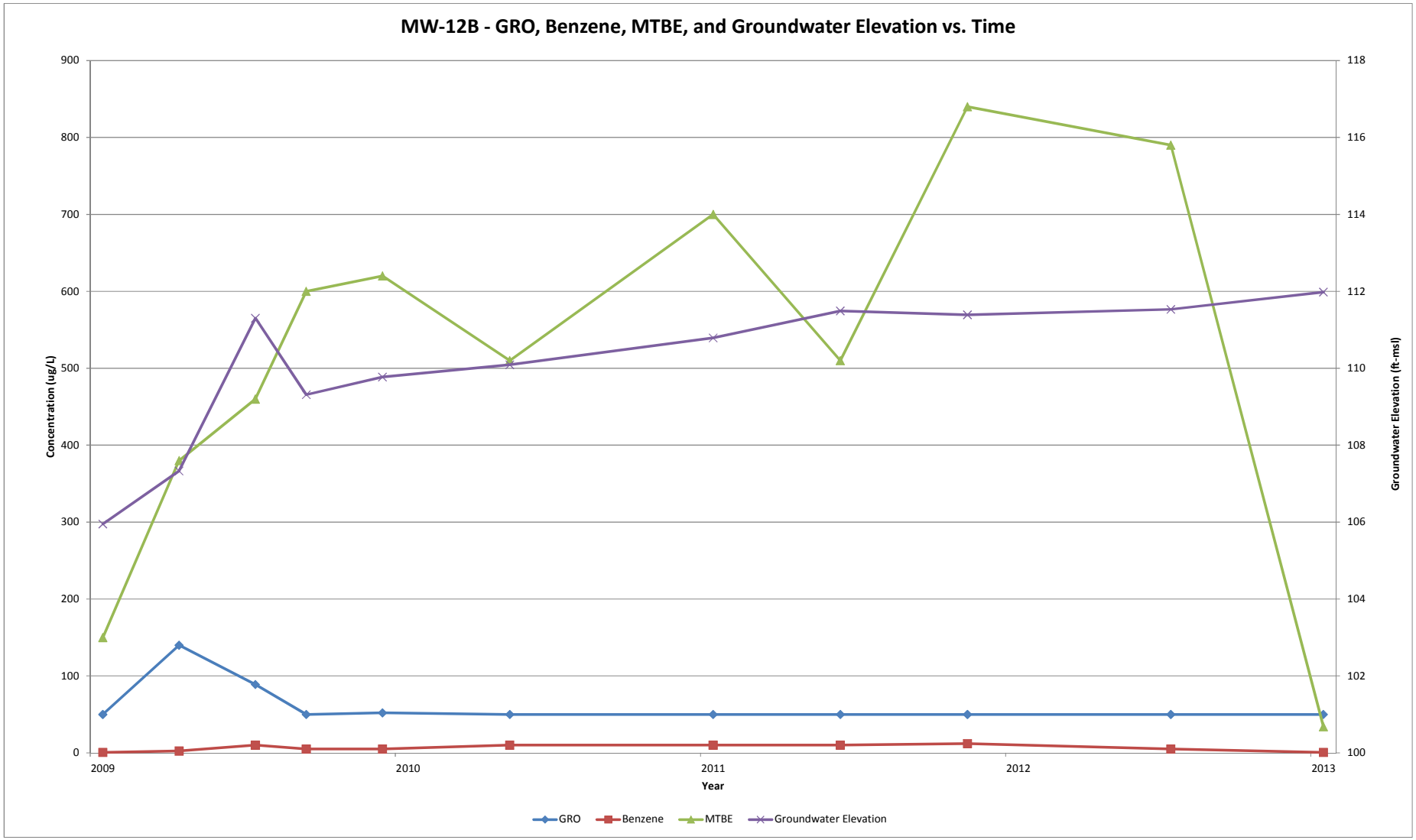
| Sample Type | Sample No. | Blow Count | Sample Time | Sample Recov. | Well Construct. | Depth Scale | LITHO COLUMN | Descriptions of Materials and Conditions | PID (PPM) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2 1 | | | |
| S | SB15-21 | | 12:25 | | | 2 2 | SW | SAND with CLAY and SILT 18'-27', fine to coarse grained, 5% fine gravel, | 0 |
| | | | | | | 2 3 | | 10% silty clay, wet | |
| S | SB15-23 | | 12:27 | | | 2 4 | | | 0 |
| | | | | | | 2 5 | | | |
| S | SB15-25 | | 12:35 | | | 2 6 | | | 0 |
| | | | | | | 2 7 | | | |
| S | SB15-27 | | 12:38 | | | 2 8 | CL | | 0 |
| | | | | | | 2 9 | | SILTY CLAY 27'-30', light olive brown with black manganese oxide stains 27'-29', very dark gray 29'-30', moist, stiff | |
| S | SB15-29 | | 12:45 | | | 3 0 | | | 0 |

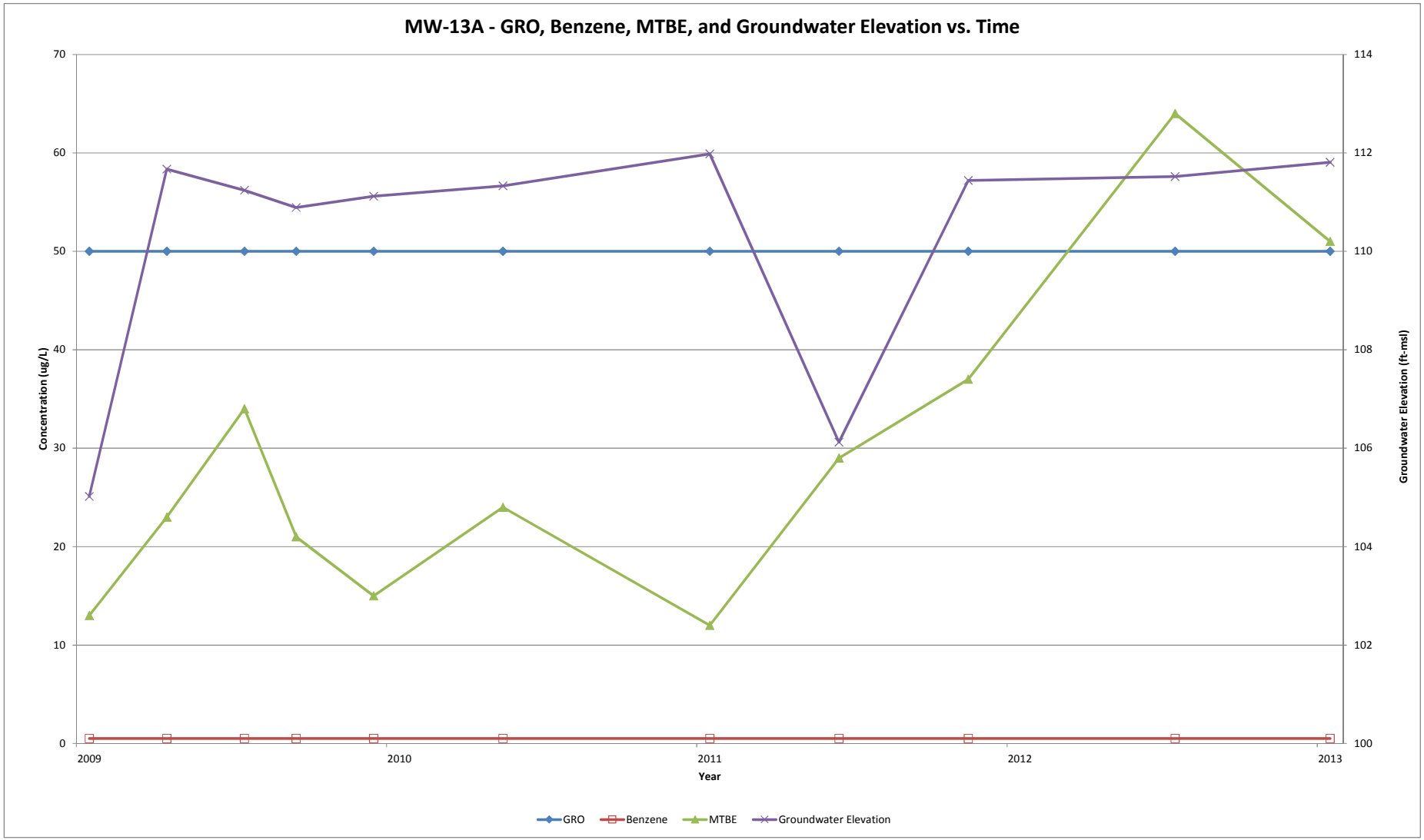
Appendix D
GRO, Benzene, and MTBE Concentration Trend Graphs

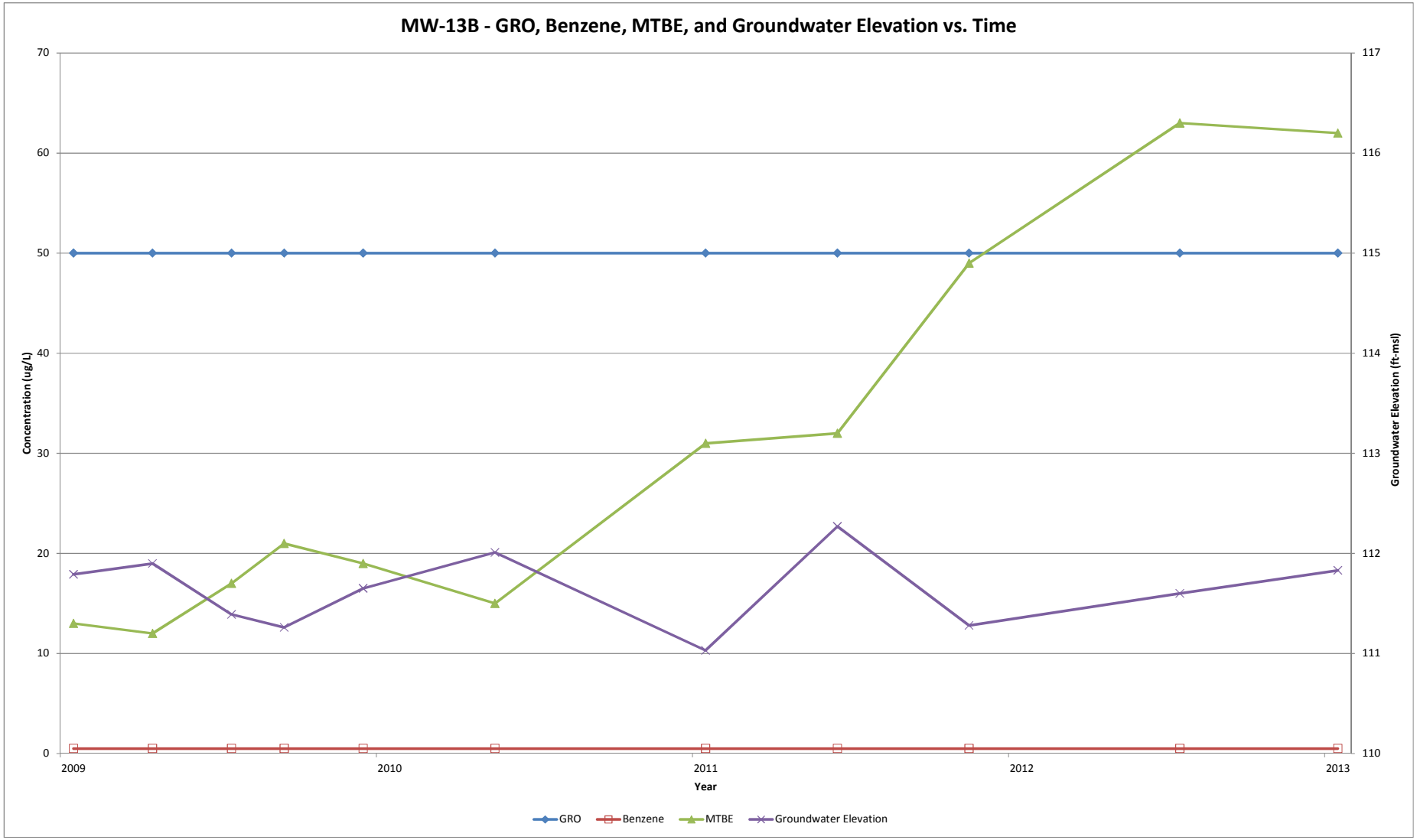

MW-11A - GRO, Benzene, MTBE, and Groundwater Elevation vs. Time
Concentration (ug/L)
Groundwater Elevation (ft-msl)
Year
1,600
1,400
1,200
1,000
800
600
400
200
0
116
114
112
110
108
106
104
102
100
2009
2010
2011
2012
2013
GRO
Benzene
MTBE
Groundwater Elevation


MW-11B - GRO, Benzene, MTBE, and Groundwater Elevation vs. Time
Concentration (ug/L)
Groundwater Elevation (ft-msl)
Year
300
250
200
150
100
50
0
116
115
114
113
112
111
110
2009
2010
2011
2012
2013
GRO
Benzene
MTBE
Groundwater Elevation


MW-12A - GRO, Benzene, MTBE, and Groundwater Elevation vs. Time
Concentration (ug/L)
Groundwater Elevation (ft-msl)
Year
60
50
40
30
20
10
0
116
115
114
113
112
111
110
2009
2010
2011
2012
2013
GRO
Benzene
MTBE
Groundwater Elevation


MW-12B - GRO, Benzene, MTBE, and Groundwater Elevation vs. Time
Concentration (ug/L)
Groundwater Elevation (ft-msl)
Year
900
800
700
600
500
400
300
200
100
0
118
116
114
112
110
108
106
104
102
100
2009
2010
2011
2012
2013
GRO
Benzene
MTBE
Groundwater Elevation


MW-13A - GRO, Benzene, MTBE, and Groundwater Elevation vs. Time
Concentration (ug/L)
Groundwater Elevation (ft-msl)
Year
0
10
20
30
40
50
60
70
100
102
104
106
108
110
112
114
2009
2010
2011
2012
2013
GRO
Benzene
MTBE
Groundwater Elevation


MW-13B - GRO, Benzene, MTBE, and Groundwater Elevation vs. Time
Concentration (ug/L)
Groundwater Elevation (ft-msl)
Year
2009
2010
2011
2012
2013
0
10
20
30
40
50
60
70
110
111
112
113
114
115
116
117
GRO
Benzene
MTBE
Groundwater Elevation