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March 29, 2013

Mark Detterman
Senior Hazardous Materials Specialist, PG, CEG
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502

Re: Facility No. 9-9708
5910 MacArthur Boulevard, Oakland, California

Dear Mr. Detterman:

Attached for your review are the *Conceptual Site Model Report* and *Closure Request* for the above-referenced site. This report and closure request was prepared by ARCADIS, upon whose assistance and advice I have relied. I declare under penalty of perjury that the information and/or recommendations contained in the attached report and closure request are true and correct to the best of my knowledge. Should you have any further questions, please do not hesitate to contact me.

Very truly yours,

Kelly C. Esters
Project Manager

KCE:st
Encl.

ARCADIS
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Chevron Environmental Management Company

Conceptual Site Model and Closure Request

Former Chevron Service Station No. 9-9708
5910 MacArthur Boulevard
Oakland, California

March 2013

ARCADIS

Toni DeMayo
Project Geologist

Melissa Blanchette, P.G.
Certified Project Manager I

Conceptual Site Model and Closure Request

Former Chevron Service Station
No. 9-9708
5910 MacArthur Boulevard

Prepared for:
Chevron Environmental Management Company

Prepared by:
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Our Ref.:
B0060901.9708

Date:
March 2013

Tables

Figures

Appendices

1. Introduction

On behalf of Chevron Environmental Management Company, ARCADIS U.S., Inc. (ARCADIS) has prepared this Site Closure Request (request) for the former Chevron Service Station No. 9-9708, located at 5910 MacArthur Boulevard in Oakland, California (site; Figure 1). This document summarizes existing site data used to support a request for site closure

An environmental case associated with this site was originally opened in 1997 (www.geotracker.com). Regular groundwater monitoring and site investigations were completed under the supervision of the Alameda County Local Oversight Program and the San Francisco Bay Regional Water Quality Control Board beginning in 1997.

This request for closure is based on review of the following primary reports associated with the site:

- Site Assessment and Preferential Pathway Survey Report (ARCADIS 2012)
- Second Semiannual 2012 Groundwater Monitoring Report (ARCADIS 2013)
- Monitoring Well Installation Results Report (Delta 2002)
- Sensitive Receptor Survey Report (Delta 2001)
- Interim Correction Action Plan (Delta 2000)

After reviewing the site assessment and Conceptual Site Model (CSM) data, and conducting a risk-based evaluation of the site data, ARCADIS recommends closure for the site. Based on a review of historical soil and groundwater data and an evaluation of potentially complete exposure pathways, ARCADIS concludes that current site conditions will not pose a health risk to current and/or future human receptors.

This report includes the following sections:

1. Introduction – Provides an overview of the regulatory framework and a brief summary of the report objectives.
2. Site Description - Provides an overview of site features.
3. Conceptual Site Model – Provides a comprehensive summary of the site conditions including a discussion of the regional geology and hydrology, a history of the underground storage tank (UST) installation and removal activities, a summary of the environmental investigations conducted at the site, and a summary of the environmental investigations conducted at nearby facilities.

4. Distribution of Residual Hydrocarbons and Oxygenates at the Time of the Closure Request – Provides a summary of the current and historical distribution of residual hydrocarbons and oxygenates within the soils and groundwater, including a summary of non-aqueous phase liquid (NAPL) distribution, a linear regression evaluation of the groundwater plume, and a summary of soil gas evaluation.

5. Assessment of Impacts of Residual Constituents on Public Health and the Environment – Presents the results of the sensitive receptor and exposure pathway assessment.

6. Request for Closure - Assessment of site conditions.

7. Recommendations – Provides a summary of the recommendations.

8. References – Provides the references cited in this report.

2. Site Description

The site is currently an active Valero branded service station located at 5910 MacArthur Boulevard in Oakland, California (Figure 1) on the southeast corner of MacArthur Boulevard and Seminary Avenue. The site is bounded to the southeast by a mixed first-story commercial and second-story residential building which shares an open parking lot, and to the east by a two-story residential apartment building. A vacant lot and commercial businesses are located west of the site across MacArthur Boulevard. Mills College is located to the north-northwest of the site across Seminary Avenue.

Current site features include a convenience store, three gasoline USTs, and two dispenser islands with associated canopies (Figure 2). With the exception of the commercial building, signage, and landscaping, the site is paved with asphalt or concrete for parking. There are no current plans to redevelop the site, and it is expected to remain an active service station in the future.

Site groundwater has been characterized, with samples collected from six monitoring wells from 1997 to 2002. Site soils have been characterized with seven of nine soil borings in 2012 (Figure 2). Monitoring wells MW-1, MW-2, and MW-3 were installed in 1997 and sampled quarterly from 1997 to 2008, and semiannually since 2009. Well MW-4 was installed in 1999. These wells were sampled quarterly from 1999 to 2008 and semiannually since 2009. Wells MW-5 and MW-6 were installed in 2002. These wells were sampled quarterly from 2002 to 2008 and semiannually since 2009. Boring logs are presented in Appendix A.

3. Conceptual Site Model

Based on a review of the relevant reports and CSM data summarized in this section, it appears that impacts to soil and groundwater resulted from a former used oil UST. Site constituents of potential concern (COPCs) include total petroleum hydrocarbons as diesel range organics (TPH-DRO), total petroleum hydrocarbons as gasoline range organics (TPH-GRO), and total petroleum hydrocarbons as motor oil (TPH-MO); benzene, toluene, ethylbenzene, and xylenes (BTEX); and methyl tertiary butyl ether (MTBE).

In general, fuel hydrocarbon and oxygenate constituent impacts are delineated and contained on site, as described in Section 4.3.

TPH-GROs are present at concentrations below the standards at the majority of the groundwater monitoring wells. The remaining significant detections in groundwater are TPH-DRO and TPH-MO. Concentrations of COPCs in groundwater have generally been decreasing. Subsurface utilities are likely to be shallower than historical and current groundwater measurements. Thus, these are unlikely to intersect groundwater and act as a conduit for hydrocarbon migration. The well survey results show that the locations of the known wells are either upgradient or cross-gradient from the site. Because groundwater flow is generally northwest, these wells most likely do not provide a preferential pathway for the migration of petroleum hydrocarbons. ARCADIS recommends this site for low-threat closure.

3.1 Site Geology and Hydrogeology

The site is located at approximately 100 feet above mean sea level (coordinate datum North American Datum of 1983 [NAD83; 1986]), with the surrounding topography sloping towards the southwest. The site is situated on the eastern margin of the East Bay Plain at the western edge of the Berkeley Hills, approximately 2 miles northeast of San Leandro Bay. As mapped by Helley and others (1979), soil in the site vicinity consists of late Pleistocene alluvium consisting of weakly consolidated, slightly weathered, poorly sorted irregular interbedded clay, silt, sand, and gravel. The nearest surface water body is Lake Aliso, located approximately 2,700 feet northeast of the site on the Mills College campus. An unnamed creek is located approximately 1,000 feet south of the site (Delta 2001). In addition, an underground culvert (Lion Creek Culvert) runs through the north-northwest portion of the site, as shown on Figure 2 (Delta 2000).

The surface of the site consists of a 2-inch to 6-inch asphalt/concrete surface underlain by a 6- to 8-inch thick aggregate base material. Based on review of boring logs, the subsurface materials encountered at the site primarily consist of clay, sandy clay, sandy clay with gravel, and silty sand. Clay, the dominant soil component beneath the site, contains varying amounts of fine- to coarse-grained sand with silt. From approximately 2 feet below grade is a sandy clay layer extending to approximately 5 feet, which is underlain by clayey gravel with sand extending to approximately 16 feet, which is underlain by lean clay lens extending to 27 to 36 feet below ground surface (bgs). Beneath the lean clay layer is a lens of sandy silt to silty sand with gravel extending to the total depth explored of approximately 41.5 feet bgs. Boring logs for

each boring advanced at the site are included in Appendix A. Geologic cross sections have been prepared to illustrate the subsurface soil using the soil boring logs(Delta 2000). A cross section location map and cross sections A-A' through C-C' are shown on Figures 3 through 6.

Depths to groundwater were collected quarterly from May 1997 to December 2008 and have been collected semi-annually since 2009. Historical measurements indicate a range of groundwater depths from 8 feet bgs to as deep as 15 feet bgs and vary seasonally. Generally, water levels are highest during the first and fourth quarters and lowest during the second and third quarters. The water-bearing unit at the site consists of predominately clayey gravel with sand. Historical depth-to-water measurements for the site are presented in Table 1a (Delta 2000).

During the December 2012 sampling event, groundwater was encountered at approximately 9 to 13 feet bgs and flows toward the west-northwest at an approximate gradient of 0.027 foot per foot (Figure 7).

3.2 Underground Storage Tank History

The station maintains two dispenser islands with associated canopies and three 10,000-gallon USTs. The USTs contain regular unleaded gasoline, plus unleaded gasoline, and supreme unleaded fuel. A former used oil tank was located east of the station building. No information regarding the size or sampling associated with the removal of the used oil tank is available at this time. The locations of the USTs and site features are shown on Figure 2.

3.3 Site Assessment History

Assessment work at the site has included the following:

- Seventeen soil samples were collected and three groundwater monitoring wells (MW-1, MW-2, and MW-3) were installed in May 1997[1].
- One soil sample was collected and one groundwater monitoring well (MW-4) was installed in April 1999.
- Five soil samples were collected and two groundwater monitoring wells (MW-5 and MW-6) installed in January 2002.

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[1] Soil data presented in Table 1 by Delta Environmental Consultants, Inc. were originally presented in the Interim Corrective Action Plan and are provided as Attachment B of this report. The date presented for MW-4 states the sample was collected on 5/22/1997; however, ARCADIS finds this to be an error, as the well was installed in April 1999.

- A potential preferential pathway investigation conducted in May 2012.

- Seven soil borings (B-1 through B-4 and B-6 through B-8) were advanced on site in June 2012. Six grab groundwater samples were collected (B-1 through B-4 and B-7 through B-8).

Historical soil analytical data are provided in Appendix B, and current and historical groundwater analytical data are provided in Tables 1 and 2, respectively. A site map showing the locations of groundwater monitoring wells, soil borings, and soil samples is presented on Figure 2. Groundwater monitoring well and soil boring logs are included in Appendix A.

The site assessments are summarized below.

3.3.1 May 1997

In May 1997, Gettler-Ryan Inc. (GR) advanced three soil borings (MW-1 through MW-3) on site to a depth of 41.5 feet bgs, as part of a real estate transaction. A total of 17 soil samples were collected. Laboratory analytical results for these samples indicated that petroleum hydrocarbon constituents were present in the subsurface. TPH-GROs were detected in the soil and groundwater samples collected from MW-1 and MW-2, and heavy range petroleum hydrocarbons (oil and grease) were detected in the soil samples from MW-3, with the deepest impacts located at approximately 16 feet bgs. Each boring was converted to a groundwater monitoring well. Quarterly groundwater monitoring and sampling was performed at the site since the installation of the monitoring wells in May 1997 until 2008, when semi-annual sampling was initiated (Delta 2002).

3.3.2 April 1999

In April 1999, GR advanced one soil boring off site, downgradient of MW-1 and MW-2, to a depth of 20 feet bgs and completed the boring as groundwater monitoring well MW-4. One soil samples was collected at 11.5 feet bgs. BTEX, MTBE, and TPH-GRO were not detected in the soil samples (Delta 2002).

3.3.3 January 2002

In January 2002, Delta advanced two off-site borings, each to a depth of 20 feet bgs, and completed the borings as groundwater monitoring wells MW-5 and MW-6. Five soil samples were collected for chemical analysis, one of which was a soil stockpile sample. Concentrations of benzene and MTBE in the soil samples were below detection limits. The 10-foot soil sample collected at MW-5 contained detectable concentrations of TPH-GRO at 1.7 milligrams per kilogram (mg/kg), and the soil sample collected at MW-6 contained concentrations of toluene, ethylbenzene, and total xylenes at 0.016 mg/kg, 0.0083 mg/kg, and 0.020 mg/kg, respectively (Delta 2002).

3.3.4 May 2012

On May 5, 2012, ARCADIS conducted a potential preferential pathway (e.g., water, electric, and gas utility trenches) investigation on and near the site. Utilities were identified by a combination of underground service alert and a private utility surveyor. Figure 8 presents the subsurface utility map. It was concluded that subsurface utilities are likely to be shallower than historical and current groundwater measurements. Thus, they are unlikely to intersect groundwater and act as a conduit for hydrocarbon migration (ARCADIS 2012).

3.3.5 June 2012

In June 2012, ARCADIS advanced seven soil borings (B-1 through B-4 and B-6 through B-8), to characterize and evaluate possible soil and groundwater impacts associated with the former used oil UST. Soil boring B-5 was not advanced during drilling activities due to the proximity of subsurface utilities and structures. An air knife was used to attempt to clear B-9 to the minimum depth. However, refusal was met at 4.5 feet bgs after three attempts to move the location. A total of 13 soil samples were collected for chemical analysis. TPH-DRO and TPH-MO were detected in soil from B-1, B-2, B-4, and B-6. Concentrations of benzene, toluene, total xylenes, and polychlorinated biphenyls (PCBs) were below detection limit in the soil samples. Ethylbenzene was detected in B-7 and B-8, both from the 14 feet bgs soil sample. MTBE was detected in the soil sample taken from 14 feet bgs at B-8. Concentrations of lead, zinc, nickel, and chromium were detected in the soil samples. Concentrations of cadmium were detected in the soil samples from boring B-4. Naphthalene was detected in soil boring B-7 at 14 feet bgs. However, these concentrations of cadmium, chromium, lead, naphthalene, and zinc did not exceed their respective standards. Soil analytical results and exceedances are future discussed in Section 4.1.

Grab groundwater samples were collected from B-1 through B-4, B-7, and B-8. Concentrations of TPH-DRO and TPH-MO were detected in B-1, B-2, and B-4. TPH-DRO, TPH-MO, and PCBs from the B-8 grab sample were not analyzed because the well went dry before the sample containers were filled. Concentrations of benzene, ethylbenzene, and MTBE were detected in B-7 and B-8. Concentrations of PCBs, toluene, and total xylenes were below the detection limits for all grab samples (ARCADIS 2012).

3.4 Environmental Investigations at Nearby Facilities

There are three closed sites within 1,000 feet of the site. The sites are the Regal #404, Unknown, and Quik Stop #47. No additional information is available for these three sites (California State Water Resources Control Board 2012). One active leaking underground fuel tank site (LUFT site) with ongoing environmental investigations is located within 1,000 feet, downgradient and slightly cross-gradient of the site. This LUFT site is summarized below.

- As of December 2011, the LUFT site was a vacant lot. It is located approximately 200 feet to the southwest of the site, at 5901 MacArthur Boulevard. Holes were discovered in two USTs, an unleaded

gasoline UST (removed in May 1987), and a waste oil UST during its removal in February 1993. TPH-GRO, TPH-DRO, and benzene were detected in soil at maximum concentrations of 5,100, 840, and 6.4 mg/kg, respectively. The Alameda County Local Oversight Program case is currently open (OTG 2011).

4. Distribution of Residual Hydrocarbons and Oxygenates at Time of Closure Request

4.1 Soil

More than 35 soil samples have been collected at the site at depths ranging from 4 to 41 feet bgs to characterize concentrations of fuel hydrocarbons and oxygenates in site soils. Soil analytical results are summarized in Appendix B. Soil concentrations from the soil boring advanced in 2012 are shown on Figure 9. Figures 3 through 6 present cross sections showing the vertical distribution of fuel hydrocarbon and oxygenates in soil. Only the soil concentrations from the soil boring advanced in 2012 are shown on these cross sections. Maximum concentrations of COPCs in soils are summarized below:

- The maximum concentration of TPH-DRO (610 mg/kg) in soil was observed at 12 feet bgs at B-2, located north of the former used oil UST.

- The maximum concentration of TPH-MO (330 mg/kg) in soil was observed at 12 feet bgs at B-1, located south of the former used oil UST.

- Maximum concentrations of TPH-GRO (140 mg/kg, 11 feet bgs), toluene (0.16 mg/kg, 11 feet bgs), total xylenes (0.58 mg/kg, 11 feet bgs), and MTBE (1.3 mg/kg, 16 feet bgs) in soil were observed at MW-2, located just north of the USTs.

- The maximum concentration of benzene (0.0062 mg/kg, 11 feet bgs) was observed in soil at MW-1, located just south of the USTs. The maximum concentration of ethylbenzene (0.350 mg/kg) in soil was observed at 14 feet bgs at B-7, located east of the USTs.

- The maximum concentration of nickel (380 mg/kg) in soil was observed at 2 feet bgs at B-2, located north of the former used oil UST.

During the most recent soil sampling event in June 2012, a total of 13 soil samples were collected for chemical analysis. TPH-DRO and TPH-MO was detected in two of the 13 soil samples analyzed without silica gel cleanup. TPH-DRO and TPH-MO was detected in three of the 13 soil samples analyzed with silica gel cleanup. The maximum detected concentrations of 500 mg/kg and 280 mg/kg, respectively, were collected from 12 feet bgs in boring B-1. Except for samples collected from borings B-7 and B-8, BTEX was not detected above respective laboratory reporting limits in the soil samples submitted for laboratory analysis. Ethylbenzene was detected at 14 feet bgs from B-7 and B-8, at concentrations of 0.350 mg/kg and

0.0021 mg/kg, respectively. MTBE was detected at a concentration of 0.013 mg/kg in B-8 at 6 feet bgs (ARCADIS 2012).

Note that TPH-DRO and TPH-MO results presented on Figure 9 were analyzed with silica gel cleanup. This is because bulk TPH analyses do not measure specific compounds, but rather the total mass of organic compounds within a given elution range of the gas chromatograph. Non-petroleum compounds, including partially weathered polar biodegradation products and some natural organic matter, may co-elute with hydrocarbon constituents and may be reported as bulk TPH-DRO. Studies (OTG, 2011) suggest that the polar partially weathered non-petroleum hydrocarbon compounds can contribute to TPH-DRO concentrations well above the expected aqueous solubility of diesel (which is approximately 5 milligrams per liter [mg/L]). Silica gel cleanup applied following sample extraction has been shown to yield a more representative analysis of actual petroleum hydrocarbon in a groundwater sample (ARCADIS 2012).

4.2 Non-aqueous Phase Liquid

There is no evidence of non-aqueous phase liquid (NAPL) at the site. Hydrocarbon odors were noted in boring logs B1, B-2, B-4, B-7, and B-8 at depths ranging from 8 to 16 feet bgs, and staining was observed in boring logs B-2, B-7, and B-8 at depths ranging from 8 to 16 feet bgs; however, no evidence of NAPL was noted in site boring logs (Appendix A).

4.3 Groundwater

Concentrations of fuel hydrocarbons and oxygenates in groundwater have been analyzed quarterly from 1997 to 2008, and semi-annually since 2009. Historical analytical results are summarized in Tables 1 and 2. A groundwater concentration map is shown on Figures 10 and 11. Grab groundwater samples were collected for chemical analysis in June 2012. A grab groundwater concentration distribution map is shown on Figure 12. Historical data were reviewed to evaluate the spatial extent of fuel hydrocarbons and oxygenate impacts in groundwater and concentration trends through time.

Historical and recent maximum (December 2012) concentrations of COPCs in groundwater are described below:

- *TPH-DRO.* The historical maximum concentration was 30,000 micrograms per liter (µg/L) in the sample collected from MW-3, located approximately 3 feet east of the former used oil UST, during the First Quarter 2002 sampling event. The maximum concentration during the most recent sampling event (December 2012) was 3,100 µg/L in the sample collected from MW-4, located approximately 75 feet northwest of the USTs.

- *TPH*-GRO. The historical maximum concentration was 14,000 µg/L in the sample collected from MW-2, located approximately 100 feet west-northwest of the former used oil UST, during the Fourth Quarter

2005 sampling event. The maximum concentration during the most recent sampling event (December 2012) was 280 µg/L in the sample collected from MW-5, located approximately 200 feet west-southwest of the former used oil UST.

- *TPH*-MO. The historical maximum concentration was 38,000 µg/L in the sample collected from MW-3, located approximately 3 feet east of the former used oil UST, during the Second Quarter 2011 sampling event. The maximum concentration during the most recent sampling event (December 2012) was 1,400 µg/L in the sample collected from MW-4.

- *Benzene.* The historical maximum concentration was 1,500 µg/L in the sample collected from MW-2, located approximately 100 feet west-northwest of the former used oil UST, during the Fourth Quarter 2005 sampling event. The maximum concentration during the most recent sampling event (December 2012) was 2.4 µg/L in the sample collected from MW-2, located approximately 100 feet west-northwest of the former used oil UST.

- *MTBE.* The historical maximum concentration was 5,460 µg/L in a sample collected from MW-1, located approximately 100 feet west-southwest of the former used oil UST, during the First Quarter 2000 sampling event. The maximum concentration during the most recent sampling event (December 2012) was 10 µg/L in the sample collected from MW-1, located approximately 100 feet west-southwest of the former used oil UST.

The Second Semi-annual 2012 Concentration Map for TPH-GRO, TPH-DRO, and TPH-MO is shown on Figure 10. The Second Semi-annual 2012 Concentration Map for benzene and MTBE are shown on Figure 11. Dissolved-phase TPH-DRO, TPH-GRO, TPH-MO, and MTBE trends are discussed below. As mentioned above, during the most recent sampling event (December 2012), benzene concentrations in groundwater were below the detection limit of 0.50 µg/L, with the exception of MW-1 (0.79 µg/L) and MW-2 (2.4 µg/L).

4.3.1 Linear Regression Analysis and Plume Stability

A statistical evaluation of dissolved COPC concentration trends over time was completed using linear regression analyses.

Groundwater analytical data from current site monitoring wells are available from: 1997 through 2012 for monitoring wells MW-1, MW-2, and MW-3; 1999 through 2012 for monitoring well MW-4; and 2002 through 2012 for monitoring wells MW-5 and MW-6. Linear regression analyses using log normalized concentration data were conducted to estimate trend direction, attenuation rates, and the approximate time to achieve water quality objectives (WQOs) for COPC and monitoring well pairs where statistically significant decreasing trends were observed (USEPA 2002). WQOs for BTEX and MTBE are the California Primary Maximum Contaminant Levels (MCLs; California Department of Public Health 2011). Because MCLs have

not been established for TPH-DRO, TPH-DRO, TPH-MO, and tertiary butyl alcohol (TBA), conservative screening levels from the San Francisco Regional Water Quality Control Board (Tier 1 ecological screening levels [ESLs], Table F1-a; SFRWQCB 2013) were selected as WQOs for these analyses. Applicable WQOs are summarized in Table A below.

Table A: Water Quality Objectives Applicable to Site COPCs

COPC	WQO (µg/L)
TPH-GRO	100
TPH-DRO	100
TPH-MO	100
Benzene	1
Ethylbenzene	30
Toluene	40
Total Xylenes	20
MTBE	13
TBA	12

Linear regression analyses were not completed for COPC and monitoring well combinations if: 1) the COPC was not detected during the last 3 years of the monitoring history, or 2) COPC concentrations were below laboratory reporting limits during more than 50 percent of monitoring events. In addition to these criteria, a minimum of eight data points are required for a meaningful statistical analysis. Where non-detect values were used in computations, the concentrations were assumed to be equal to the laboratory reporting limit. Use of the laboratory reporting limits provides a conservative estimate for evaluating the concentration trends through time.

Linear regression analysis allows for estimating the time to reach screening levels at wells with decreasing COPC concentration trends. The coefficient of determination (R^2) is a measure of how well the linear regression fits the site data; R^2 values less than 0.1 indicate weak model fits, and R^2 greater than 0.5 indicate stronger model fits. Linear regression analyses with R^2 values of less than 0.1 were defined as having no apparent trend (no trend). The p-value of correlation provides a measure of the level of significance of the statistical test. Correlations were accepted as significant for p-values less than or equal to 0.05 (95% confidence level) and not significant for p-values greater than 0.05. The trend direction is defined as decreasing if the slope of the trend line is negative and increasing if the slope of the trend line is positive.

Results of the linear regression analyses, including R^2 value, p-value of the correlation, trend direction, and projected date to WQOs, are summarized in Table 3, with the analyses included in Appendix C.

4.3.2 DRO Concentrations

A linear regression analysis over the full monitoring period, from 1997 through 2012, at monitoring well MW-3 indicates a statistically significant increasing trend in DRO concentrations. However, when data collected over the past eight monitoring events are considered, it is evident that although DRO concentrations at this monitoring well exceed the WQO, they have remained relatively stable over the past 2 years.

4.3.3 GRO Concentrations

Linear regression analyses indicate statistically significant decreasing trends in GRO concentrations at monitoring wells MW-1, MW-2, and MW-5. Based on historical concentration trends, GRO was projected to reach the 100 µg/L WQO by 2010 at monitoring well MW-1. GRO concentrations at monitoring well MW-1 have remained stable at a concentration near this WQO since approximately 2004. Based on historical concentration trends, GRO was projected to reach the 100 µg/L WQO by 2007 at monitoring well MW-2. With the exception of one monitoring event (June 2009) GRO concentrations at monitoring well MW-2 have remained below the 100 µg/L WQO and below the 50 µg/L laboratory reporting limit since March 2006. Finally, based on historical concentration trends, GRO is projected to reach the 100 µg/L WQO by 2014 at monitoring well MW-5. Recently measured GRO concentrations at this monitoring location support this projection.

4.3.4 Benzene Concentrations

Linear regression analyses of benzene concentrations at monitoring wells MW-1 and MW-2 indicate statistically significant decreasing trends with projected dates to achieve the 1 µg/L WQO of 2010 and 2008, respectively. Benzene concentrations were measured at or below the 1 µg/L WQO during 12 of the past 14 groundwater monitoring events at monitoring well MW-1. At monitoring well MW-2, benzene concentrations have remained below the 1 µg/L since March 2006, with the exceptions of a concentration of 3 µg/L measured in June 2008, a concentration of 29 µg/L measured in June 2009, and a concentration of 2.4 µg/L measured in December 2012. Thus, recently measured benzene concentrations are generally consistent with the projected dates for achieving the WQO at these monitoring locations and indicate that impacts have naturally attenuated.

4.3.5 MTBE Concentrations

Linear regression analyses of MTBE concentrations at monitoring wells MW-1 and MW-2 indicate statistically significant decreasing trends with projected dates to achieve the 13 µg/L WQO of 2010 and 2008, respectively. The linear regression concentration trend analysis for MTBE at MW-1 was conducted after 2000, since there was a clear shift in trend direction at this time. MTBE concentrations at monitoring well MW-1 have remained stable and near the WQO since approximately June 2010. MTBE concentrations at monitoring well MW-2 have remained below the WQO since December 2008, with the exception of a

concentration of 15 µg/L measured in June 2012. Thus, recently measured benzene concentrations are generally consistent with the projected dates for achieving the WQO at these monitoring locations and indicate that impacts have naturally attenuated.

In summary, the majority of COPCs and monitoring well combinations exhibited concentrations below the reporting limits in the last 3 years of monitoring or had greater than 50 percent of concentrations below detection and did not meet the linear regression selection criteria. Where the defined criteria were met, linear regression analyses generally indicate statistically significant decreasing trends in COPC concentrations for all monitoring locations. The only exception is DRO concentrations at monitoring well MW-3, which appear to be stable. Overall, the groundwater data indicate ongoing natural attenuation of site groundwater impacts and a shrinking or stable plume.

4.4 Soil Gas

No soil gas surveys have been conducted at the site. Given that there is currently no NAPL in site soils or groundwater, potential vapor migration of volatile COPCs into on-site or off-site buildings is unlikely and not expected to pose adverse health effects to current and future building occupants. Section 5.3.1 further discusses the potential transport pathways and receptors.

5. Assessment of Impacts of Residual Constituents on Public Health and the Environment

Based on the CSM data presented above, the residual concentrations of COPCs in site environmental media are unlikely to pose risks to public health and the environment. This section includes a summary of sensitive receptors near the site, a summary of the water supply well survey, and potential exposure pathways.

5.1 Sensitive Receptors

The site is located within the East Bay Plain Groundwater Basin, Oakland Sub-Area. According to The East Bay Plain Groundwater Basin Beneficial Use Evaluation Report (RWQCB 1999, revised 2012), existing beneficial uses for groundwater in the sub-basin include: municipal and domestic supply, industrial/process supply, and agricultural supply.

The East Bay Municipal Utility District (EBMUD) currently supplies water to the site and surrounding properties and is expected to provide water to these areas in the future. On average, 90 percent of the water used by EBMUD comes from the protected watershed of the Mokelumne River (EBMUD 2012). The Bayside groundwater well provides additional storage. Sacramento River water is available when needed during dry years. Groundwater beneath the site is not currently used as a potable source and is not expected to be used as a drinking water source in the future.

According to the City of Oakland General Plan, current zoning for the site is General Commercial. The properties adjacent to the site to the west are zoned as Low-Density Residential and General Commercial in all other directions. ARCADIS anticipates that future site use will be consistent with current zoning.

The site is devoid of ecological habitat and surface water; therefore, it is anticipated that ecological receptors are absent from the site. It is expected that the site use will remain the same in the future. The nearest surface water body is Lake Aliso, located approximately 2,700 feet northeast of the site. Given these features at the site, potential exposure pathways for ecological receptors are incomplete.

Mills College is located across Seminary Avenue north of the site. There is a an elementary school located on Mills College property. The elementary school building is located approximately 375 feet north-northwest and side-gradient of the site.

5.2 Water Supply Wells Survey

To verify other potential receptors of groundwater, logs for wells within a 0.25-mile radius of the site were obtained from the California Department of Water Resources (DWR) and Alameda County Public Works Agency (ACPWA). Figure 13 shows the locations of these wells. Table 4 summarizes the result of the well receptor survey from files obtained from ACPWA. The table includes any active; inactive; standby;

decommissioned; abandoned; and dewatering, drainages, and cathodic wells within a 0.25-mile radius of the site. Five monitoring wells, one test well, one cathodic well, one abandoned well, and one unknown well were identified in this 0.25-mile radius well search. The latitude and longitude coordinates were provided by ACPWA and plotted on the map. However, there was only one well log available from this table (Well ID 10) which was a cathodic well installed to 120 feet bgs by Pacific Gas & Electric in May 1974. Well construction details were not specified on the wells completion report. Table 4 also presents wells located and associated with 5901 and 6001 MacArthur Boulevard. According to GeoTracker, these two addresses are associated with case closures, indicating that these monitoring wells are now abandoned (ARCADIS 2012).

The files obtained from the California DWR indicated that there were potentially nine wells (six monitoring wells and three unknown wells) located on Mills College, which is near the site. However, the exact locations of these wells are unknown and are not presented in Table 4 or on Figure 13 (ARCADIS 2012).

5.3 Summary of Potential Exposure Pathways

This section describes possible pathways associated with potential exposures to residual concentrations of fuel hydrocarbons and oxygenates detected in site media, and compares detected constituent concentrations to screening criteria defining levels that the regulatory agencies have deemed to be safe for human exposure under various scenarios. Site data were compared to commercial and residential screening criteria, based on a one-in-one million (1×10^{-6}) excess lifetime cancer risk, to support risk-based decision making for the site (SFRWQCB 2008). Potential constituent sources and potential transport pathways and receptors are described in the following sections.

5.3.1 Potential Transport Pathways and Receptors

A potential release mechanism at the site may include volatilization of petroleum-hydrocarbon-related constituents in subsurface soil to outdoor air and/or indoor air of current and future on-site commercial buildings, or to air within a trench used by future on- or off-site construction workers. On- or off-site potential receptors may be exposed to volatile constituents by inhaling affected indoor or outdoor air. Inhalation of outdoor air is not considered a complete exposure pathway because concentrations in outdoor air are likely to be insignificant given the atmospheric dilution effects from wind.

Dilution effects are less significant inside a building. Therefore, inhalation of volatile constituents by current and future on-site commercial workers is a potentially complete pathway. However, as described in Section 2, the site is currently an active Valero branded service station, there are no current plans for redevelopment, and it is expected that the site will continue to be used as an active service station in the future. A potential release mechanism at the site may include volatilization of petroleum-hydrocarbon-related constituents in groundwater to outdoor air and/or indoor air of current and future on-site commercial buildings and/or off-site commercial and residential buildings. In general, exposure to petroleum vapors migrating from soil or groundwater to indoor air may pose unacceptable human health risks; however, in

many petroleum release cases, potential human exposures to vapors are mitigated by bioattenuation processes as vapors migrate toward the ground surface. Given that there is currently no NAPL in site soils or groundwater, potential vapor migration into on-site buildings is unlikely and is not expected to pose adverse health effects to current and future building occupants. Moreover, according to the Low-Threat Closure (LTC) Policy (State Water Board 2012), satisfaction of the media-specific criteria for vapor migration to indoor air is not required at active service stations because exposures to volatile petroleum hydrocarbon constituents associated with historical fuel system releases are insignificant relative to typical exposures from surface spills and fugitive vapors at these service stations. Therefore, the exposure pathway for inhalation of indoor air from volatilization of site-related soil and groundwater constituents is potentially complete but insignificant for current and future on-site service station workers.

Constituents may leach from soil to groundwater beneath the site by percolation, resulting in potential direct contact exposures to constituents in groundwater. Routes of exposure by direct contact include ingestion of tap water, dermal contact with tap water, and inhalation of volatile constituents released from tap water. For this to be a complete exposure pathway, site groundwater must be brought to the surface via a well, or construction workers would have to dig to the water. Because the water table (based on the most recent sampling event) occurred between approximately 9 and 13 feet bgs, and historically between 8 and 15 feet bgs, it is unlikely that utility work would extend into the water table. As mentioned in Section 3.3.4, ARCADIS conducted a potential preferential pathway (e.g., water, electric, and gas utility trenches) evaluation on and near the site in May 2012. Utilities were identified by a combination of underground service alert and a private utility surveyor. It was concluded that subsurface utilities are likely to be shallower than historical and current groundwater measurements. Thus, they are unlikely to intersect groundwater and act as a conduit for hydrocarbon migration (ARCADIS 2012). Groundwater beneath the site is not currently used as a potable water source. The EBMUD currently supplies water to the site and surrounding properties. Therefore, tap water ingestion, dermal contact with groundwater, and inhalation of volatile constituents in groundwater (i.e., tap water) from beneath the site are unlikely exposure routes for current and future on- and off-site receptors.

Current and future on-site receptors may be exposed to COPCs in surface and subsurface soils by direct contact. Routes of exposure by direct contact may include incidental ingestion of soil, dermal contact with soil, and inhalation of dust particles that have been released by wind erosion into ambient (outdoor) air. Currently, direct contact exposures to constituents in soil and wind transport of constituents adhered onto dust particles are unlikely because the site is entirely covered by a building, asphalt, or concrete pavement, and soil is not exposed at the surface. The site is expected to remain in commercial use in the future. However, impacted soil may be exposed to the surface by future on-site utility/maintenance workers. Therefore, direct contact exposure pathways to future on-site construction/utility workers are considered to be potentially complete.

5.3.2 Summary of Complete Exposure Pathways

Based on this information, the following potential exposure pathways are considered complete for the site:

- Inhalation of volatile COPCs in indoor air from groundwater by current and future off-site commercial workers and residents

- Direct contact with COPCs in soil by future on-site utility workers

6. Assessment of Site Conditions Relative to Low-Threat Closure Policy

On July 31, 2012 the LTC Policy issued by the State Water Board was adopted by the Office of Administrative Law. This policy outlines eight General Criteria to assess whether sites are candidates for low-threat case closure and three categories of Media-Specific Criteria that also must be met. Current site conditions provided herein are evaluated against the corresponding General Criteria and Media-Specific criteria. Based on this evaluation, ARCADIS concludes that the site meets the requirements for low-threat case closure.

6.1 Evaluation of Low-Threat Closure General Criteria

Criterion A – The unauthorized release is located within the service area of a public water system

Drinking water is supplied to the site by EBMUD. On average, 90 percent of the water used by EBMUD comes from the protected watershed of the Mokelumne River. The Sacramento River water is available when needed during the dry years. Therefore, the site meets Criterion A of the LTC policy.

Criterion B – The unauthorized release consists only of petroleum.

As described in Section 3, impacts to soil and groundwater resulted from leaks from the used oil UST and have included only petroleum. Therefore, the site meets Criterion B of the LTC policy.

Criterion C – The unauthorized release has been stopped

Unauthorized releases of petroleum hydrocarbons at the site were likely associated with the used oil UST, which has been removed. Therefore, the site meets Criterion C of the LTC policy.

Criterion D – Free product has been removed to the Maximum Extent Practicable

The former used oil UST (the source) has been removed. As described in Section 4.2, no measureable free product has been observed in monitoring wells on site. Therefore, the site meets Criterion D of the LTC policy.

Criterion E – A conceptual site model has been developed

Section 3 of this report includes the current CSM. The CSM was developed based on historical documentation and data collected from 1997 through the present. Therefore, the site meets Criterion E of the LTC policy.

Criterion F – Secondary source removal has been addressed

More than 35 soil samples have been collected at the site at depths ranging from 4 to 41 feet bgs to characterize concentrations of fuel hydrocarbons and oxygenates in site soils. Remaining hydrocarbon soil impacts exist at approximately 12 feet bgs, at B-1 and B-2, north and south of the used oil UST. Remaining nickel soil impacts exist at approximately 2 to 6 feet bgs, surrounding the used oil UST and downgradient of the UST.

Based on the linear regression analysis reported in Sections 4.3.1 through 4.3.5, decreasing trends were observed at wells MW-1, MW-2, MW-5, and MW-6, indicating that there is no secondary source that is still contributing to groundwater impacts. Therefore, the site meets Criterion F of the LTC policy.

Criterion G – Soil and groundwater have been tested for MTBE and results reported in accordance with Health and Safety Code section 25296.15.

Soil and groundwater samples collected from 1997 through the present were analyzed for MTBE. MTBE groundwater analytical results are presented in Tables 1 and 2, and soil analytical results are presented in Appendix B. Therefore, the site meets Criterion G of the LTC policy.

Criterion H – Nuisance as defined by Water Code section 13050 does not exist at the site

Nuisance does not exist at the site. Site conditions and the treatment and disposal of site wastes are not injurious to health, indecent or offensive to the senses, do not obstruct free use of property, or interfere with the comfortable enjoyment of life or property. Site conditions and the treatment and disposal of site wastes do not affect an entire community or neighborhood or any considerable number of persons. Site impacts are restricted to the subsurface, and are present in a limited area that does not adversely affect the community at large. Therefore, the site meets Criterion H of the LTC policy.

6.2 Evaluation of Low-Threat Closure Media-Specific Criteria

In addition to meeting Criteria A through H described above, the site meets the Media-Specific Criteria including groundwater, vapor intrusion to indoor air, and direct contact and outdoor air exposure.

Groundwater Media-Specific Criteria

Site groundwater does not currently pose a risk to the existing or anticipated future beneficial uses of groundwater, and meets the Groundwater-Specific Criteria as outlined by the LTC Policy. The LTC Policy states that "the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites."

Plume Stability

According to the Technical Justification for Groundwater Media-Specific Criteria (State Water Board 2012), plume stability can be demonstrated in two ways: 1) "routinely observed non-detect values for groundwater parameters in down-gradient wells;" or 2) "stable or decreasing concentration levels in down-gradient wells." To demonstrate stable or decreasing concentration levels, linear regression analyses were conducted to assess the COPC trends in groundwater at monitoring locations both on site and within the downgradient plume.

Results of the linear regression analyses (Section 4.3, Table 3, and Appendix C) generally indicate decreasing or no significant trend in COPC concentrations throughout the on-site and downgradient groundwater plume, demonstrating an overall stable or shrinking plume.

Additional Groundwater-Specific Criteria

As described in the LTC Policy, a site can meet the Groundwater Media-Specific Criteria through one of five main classes. This site falls into class 5, which states that the groundwater plume poses a low threat to "human health and safety and to the environment and water quality objectives will be meet within a reasonable time frame."

The site poses a low threat to human health and the environment because it meets all the requirements of class 4 as described below; however, the exact contaminant plume length for DRO and MO are not defined. Requirement 4a states that "the contaminant plume that exceeds water quality objectives is less than 1,000 feet in length." While the DRO and MO plume lengths are not defined, BIOSCREEN modeling results suggest that the plume lengths will not exceed 1,000 feet. Further details of plume lengths are provided in the summary of plume lengths below.

4a. The contaminant plume that exceeds water quality objectives is less than 1,000 feet in length

Plume lengths were measured based on data collected during the Second Semiannual 2012 sampling event. Historically, groundwater gradient direction has predominately been northwest, as shown on Figure 7. The estimated total plume lengths for benzene and TPH-GRO are summarized below. Toluene, ethylbenzene, total xylenes, and MTBE were below their respective ESLs during the last sampling event.

- As shown on Figure 12, benzene was only detected above the ESL at monitoring well MW-2. To be conservative, the plume length was measured from the furthest upgradient well (MW-3) to the WQO of 1 µg/L contour line (Figure 12). The benzene plume associated with the site exceeding the WQO of 1 µg/L is approximately 150 feet long, which is less than the 1,000-foot criterion established in the LTC Policy.

- As shown on Figure 10, the TPH-GRO exceeds its ESL of 100 µg/L in one monitoring well (MW-5). Monitoring well MW-5 is located directly west and side-gradient of the source area, and wells MW-1, MW-2, and MW-3 (located near the probably sources) all have concentrations lower than MW-5. It is also closer to the open environmental case located across MacArther Blvd. The highest GRO concentrations on the 5901 MacArther Boulevard site was 5,700 µg/L, detected in a well located 50 feet west of MW-5. Therefore, it is likely that GRO impacts in this well may be associated with the site located across MacArther Blvd.

- As shown on Figure 10, the highest concentrations of TPH-DRO and TPH-MO were detected in the downgradient well MW-4. BIOSCREEN modeling results suggested that TPH-DRO and TPH-MO will naturally degrade within 1,000 feet of the source. As explained in Appendix D, TPH-DRO and TPH-MO are complex mixtures of hydrocarbons associated with releases that likely occurred at the former waste oil UST. The BIOSCREEN model simulates fate and transport of only a single chemical in groundwater. Therefore, naphthalene was selected as an indicator chemical for both TPH-DRO and TPH-MO because the U.S. Environmental Protection Agency (USEPA) has classified naphthalene as a Group C possible human carcinogen, it is the simplest polynuclear aromatic hydrocarbon, and it is a most mobile of all the TPH-DRO and TPH-MO chemicals. Consequently, naphthalene would be expected to have the greatest extent in groundwater and would therefore represent the worse-case scenario in terms of TPH-DRO and TPH-MO extent. BIOSCREEN model results demonstrate that the maximum extent of naphthalene in groundwater is approximately 464 feet hydraulically downgradient from the site. This delineation is based on conservative assumptions and, if anything, the actual extent of naphthalene is probably somewhat smaller. Therefore, TPH-DRO and TPH-MO are not expected to extend more the 464 feet downgradient of the source area.

4b. There is no free product at the site

As described in Section 4.2, no measureable free product has been observed in monitoring wells at the site.

4c. The nearest existing water supply well or surface water body is greater than 1,000 feet from the defined plume boundary

As described in Section 5.2 and shown in Table 4, no existing water supply wells are within 1,000 feet from the defined plume boundary. Five monitoring wells, one test well, one cathodic well, one abandoned well, and one unknown well were identified in this 0.25-mile radius well search. The unknown well is located on Mills College and is not likely used for water supply. ARCADIS has contacted Mills College to confirm the use of the unknown well.

As described in Section 5.1, the nearest surface water body is Lake Aliso, located approximately 2,700 feet northeast of the site, which meets the "nearest surface water body" criterion of greater than 1,000 feet established in the LTC Policy.

4d. The dissolved concentration of benzene is less than 1,000 µg/L and the dissolved concentration of MTBE is less than 1,000 µg/L

The most recent maximum concentration of benzene at the site was 2.4 µg/L detected in MW-2 during the Second Semiannual 2012 sampling event. Based on the current benzene concentrations detected within the site wells, the maximum detected benzene concentrations meet the less than 1,000 µg/L benzene criterion established in the LTC Policy.

The most recent maximum on-site MTBE concentration was 10 µg/L detected in MW-1 during the second semiannual 2012 sampling event.

Vapor Intrusion to Indoor Air

As described in the LTC Policy, satisfaction of the Media-Specific Criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities where there are no site-specific characteristics that would pose an unacceptable health risk. The site is an active commercial petroleum fueling facility with no unacceptable risk characteristics, and therefore subject to the stated exception to this Media-Specific Criteria.

Direct Contact and Outdoor Air Exposure

As described in the LTC Policy, sites will meet the Media-Specific Criteria for direct contact with contaminated soil or inhalation of contaminants volatized to outdoor air if 1) the maximum concentrations of COPCs in soil are less than or equal to those listed in Table 1 of the LTC Policy; 2) a site-specific risk assessment shows that COPCs present in soil will not adversely affect human health; or 3) exposure to COPCs is mitigated through engineering controls.

This site meets the first criterion listed above because, as summarized in Tables B and C below, maximum concentrations of petroleum constituents in soil are lower than or equal to those listed in Table 1 of the LTC Policy.

Table B. Comparison of COPC Concentrations with LTC Policy Commercial/Industrial Soil Screening Levels

Commercial/Industrial (0 to 5 feet bgs)		
Constituent	**Maximum Detected Soil Concentration 0 to 5 feet bgs**	**Commercial/Industrial Volatilization to Outdoor Air 0 to 5 feet bgs**
Benzene	ND	8.2
Ethylbenzene	ND	89
Naphthalene	ND	45
PAHs	n/a	0.68
Commercial/Industrial (5 to 10 feet bgs)		
Constituent	**Maximum Detected Soil Concentration 5 to 10 feet bgs**	**Commercial/Industrial Volatilization to Outdoor Air 5 to 10 feet bgs**
Benzene	0.027	12
Ethylbenzene	0.350	134
Naphthalene	0.200	45
PAHs	n/a	n/a

Notes:
1. all concentrations listed in mg/kg
2. ND = concentration of constituent not detected above the laboratory reporting limit
3. n/a = data not available
4. PAHs = polynuclear aromatic hydrocarbons

Table B. Comparison of COPC Concentrations with LTC Policy Soil Screening Levels

Constituent	**Maximum Detected Soil Concentration 0 to 10 feet bgs**	**Utility Worker 0 to 10 feet bgs**
Benzene	0.027	14
Ethylbenzene	0.350	314
Naphthalene	0.200	219
PAHs	n/a	n/a

Notes:
1. all concentrations listed in mg/kg
2. n/a = data not available
3. PAHs = polynuclear aromatic hydrocarbons

7. Recommendations

Site conditions meet the General and Media-Specific Criteria established in the LTC Policy, and therefore pose a low threat to human health, safety, and the environment, and satisfy the case-closure requirements of Health and Safety Code section 25296.10. Case closure is consistent with Resolution 92-49, which requires that cleanup goals be met within a reasonable time frame. Based on the results of this evaluation, Low-Threat Closure is recommended for this site.

Based on the evaluation of the site information and data presented in the CSM, and the results from the comparison of the site information and data against closure criteria (Section 6) set forth in the newly adopted LTC Policy, ARCADIS recommends that the site be closed.

Intention to Cease Groundwater Monitoring and Sampling

Groundwater data, as presented in this report, support a conclusion that the site and the impacted groundwater pose no significant threat to human health or the environment. Therefore, effective immediately, Chevron shall cease groundwater monitoring and sampling activities pending a response and further direction from the Central Coast Region – California Regional Water Quality Control Board.

8. References

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Tables

Table 1a
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-9708
5910 MacArthur Boulevard
Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-1															
05/29/97	96.61	84.41	12.20	--	--	--	--	--	--	--	--	--	--	--	--
06/04/97	96.61	84.40	12.21	--	--	380	58	1.2	5.4	40	85	--	--	--	--
09/16/97	96.61	83.84	12.77	--	--	420	120	<0.5	19	2.7	28	--	--	--	--
12/17/97	96.61	85.43	11.18	--	--	210[1]	43	0.61	11	0.61	69	--	--	--	--
03/18/98	96.61	84.59	12.02	--	--	210[1]	47	<0.5	8.2	<0.5	92	--	--	--	--
06/28/98	96.61	83.99	12.62	--	--	<50	<0.5	<0.5	<0.5	<0.5	66	--	--	--	--
09/07/98	96.61	82.32	14.29	--	--	<50	6.7	<0.5	<0.5	<0.5	92	--	--	--	--
12/29/98	96.61	83.18	13.43	--	--	<100	<1.0	<1.0	2.24	1.14	278	--	--	--	--
03/11/99	96.61	83.80	12.81	--	--	110	<1.0	<1.0	7.95	<1.0	418	--	--	--	--
05/04/99	96.61	83.85	12.76	--	--	--	--	--	--	--	--	--	--	--	--
06/29/99	96.61	84.06	12.55	--	--	352	34.6	<2.5	51	<2.5	780	--	--	--	--
09/29/99	96.61	83.21	13.40	--	--	647	167	<2.5	58.6	14.8	1,570	--	--	--	--
12/08/99	96.61	85.70	10.91	--	--	481	121	1.16	17.9	11	3,910	--	--	--	--
03/01/00	96.61	85.46	11.15	--	--	2,580	481	6.84	86.6	41.9	5,460	--	--	--	--
06/23/00	96.61	83.68	12.93	--	--	900[4]	120	<5.0	22	6.7	5,400	--	--	--	--
09/30/00	96.61	83.07	13.54	--	--	1,300[4]	450	5.5	170	11	2,000	--	--	--	--
12/08/00	96.61	83.63	12.98	--	--	<1,000	41.7	<10.0	11.5	<10.0	6,030	--	--	--	--
03/01/01	96.61	84.94	11.67	--	--	340[7]	36.6	<0.500	10.1	<0.500	3,360	--	--	--	--
06/19/01	96.61	83.94	12.67	--	--	610[4]	110	<5.0	9.2	<5.0	110	--	--	--	--
09/18/01	96.61	83.48	13.13	--	--	200	32	0.55	3.0	<1.5	1,600	--	--	--	--
12/26/01	96.61	85.14	11.47	--	--	140	9.1	<0.50	1.2	<1.5	1,900	--	--	--	--
03/06/02	97.52	86.38	11.14	--	--	93	7.0	<0.50	0.72	<1.5	1,000	--	--	--	--
06/21/02	97.52	84.92	12.60	--	--	93	8.2	<0.50	1.2	<1.5	1,300	--	--	--	--
09/27/02	97.52	84.38	13.14	--	--	78	1.5	<0.50	<0.50	<1.5	1,200	--	--	--	--
12/26/02	97.52	87.74	9.78	--	--	86	1.7	<0.50	<0.50	<1.5	600	--	--	--	--
03/28/03	97.52	85.96	11.56	--	--	190	24	<0.50	2.4	<1.5	1,200	--	--	--	--
06/16/03[11]	97.52	85.96	11.56	--	--	<50	3	<0.5	<0.5	<0.5	220	--	--	--	--
09/15/03[11]	97.52	85.21	12.31	--	--	53	3	<0.5	<0.5	<0.5	580	<50	--	--	--
12/15/03[11]	97.52	86.35	11.17	--	--	<50	<0.5	0.7	<0.5	0.8	410	<50	--	--	--
03/05/04[11]	97.52	86.09	11.43	--	--	760	110	2	12	2	460	<50	--	--	--
06/18/04[11]	97.52	85.40	12.12	--	--	1,400	200	3	7	2	740	<50	--	--	--
09/17/04[11]	97.52	85.12	12.40	--	--	920	48	<0.5	<0.5	<0.5	340	<50	--	--	--
12/17/04[11]	97.52	86.78	10.74	--	--	190	9	<0.5	<0.5	<0.5	110	<50	--	--	--
03/14/05[11]	97.52	87.67	9.85	--	--	120	5	<0.5	<0.5	<0.5	130	<50	--	--	--
06/13/05[11]	97.52	85.61	11.91	--	--	110	6	<0.5	<0.5	<0.5	130	<50	--	--	--
09/12/05[11]	97.52	85.31	12.21	--	--	290	10	<0.5	<0.5	<0.5	90	<50	--	--	--

Table 1a
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-9708
5910 MacArthur Boulevard
Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-1 (cont)															
12/12/05[11]	97.52	86.50	11.02	--	--	150	1	<0.5	<0.5	0.8	53	<50	--	--	--
03/13/06[11]	97.52	87.97	9.55	--	--	82	0.8	<0.5	<0.5	<0.5	66	<50	--	--	--
06/12/06[11]	97.52	86.52	11.00	--	--	140	4	<0.5	<0.5	<0.5	65	<50	--	--	--
09/11/06[11]	97.52	85.99	11.53	--	--	210	3	<0.5	<0.5	<0.5	32	<50	--	--	--
12/15/06[11]	97.52	88.13	9.39	--	--	190	1	<0.5	<0.5	<0.5	31	<50	--	--	--
03/16/07[11]	97.52	86.02	11.50	--	--	99	0.8	<0.5	<0.5	<0.5	41	<50	--	--	--
06/15/07[11]	97.52	86.46	11.06	--	--	210	10	<0.5	<0.5	<0.5	49	<50	--	--	--
09/14/07[11]	97.52	85.14	12.38	--	--	270	6	<0.5	<0.5	<0.5	35	<50	--	--	--
12/07/07[11]	97.52	84.88	12.64	--	--	90	0.7	<0.5	<0.5	<0.5	43	<50	--	--	--
03/07/08[11]	97.52	85.54	11.98	--	--	110	<0.5	<0.5	<0.5	<0.5	32	<50	--	--	--
06/06/08[11]	97.52	86.18	11.34	--	--	180	0.7	<0.5	<0.5	<0.5	29	<50	--	--	--
09/05/08[11]	97.52	85.39	12.13	--	--	200	1	<0.5	<0.5	<0.5	20	<50	--	--	--
12/15/08[11]	97.52	85.31	12.21	--	--	150	<0.5	<0.5	<0.5	<0.5	19	<50	--	--	--
03/16/09[11]	97.52	87.60	9.92	--	--	68	<0.5	<0.5	<0.5	<0.5	19	<50	--	--	--
06/15/09[11]	97.52	85.97	11.55	--	--	210	3	<0.5	<0.5	<0.5	21	<50	--	--	--
11/30/09[11]	97.52	85.41	12.11	--	--	61	<0.5	<0.5	<0.5	<0.5	21	<50	--	--	--
06/07/10[11]	97.52	85.62	11.90	--	--	140	1	<0.5	<0.5	<0.5	17	<50	--	--	--
12/08/10[11]	97.52	87.11	10.41	<39	--	60	<0.5	<0.5	<0.5	<0.5	14	<50	--	--	--
06/13/11[11]	97.52	86.27	11.25	<41[14]	75[14]	<50	<0.5	<0.5	<0.5	<0.5	13	<50	--	--	--
12/02/11[11]	97.52	84.70	12.82	<520[14]	<520[14]	140	1.7	<0.50	<0.50	<1.5	14	<150	--	--	--
6/21/2012[11]	97.52	84.25	13.27	<470	<470	130	<0.50	<0.50	<0.50	<1.0	11	<150	--	--	--
12/18/2012[1]	97.52	86.90	10.62	<48	94	70	0.79	<0.50	<0.50	<1.0	10	<150	--	--	--
MW-2															
05/29/97	96.91	83.85	13.06	--	--	--	--	--	--	--	--	--	--	--	--
06/04/97	96.91	83.96	12.95	--	--	1,600	120	5.9	32	15	2,100	--	--	--	--
09/16/97	96.91	83.92	12.99	--	--	1,100	23	3.2	7.0	2.5	1,200	--	--	--	--
12/17/97	96.91	84.73	12.18	--	--	7,100[1]	650	69	610	69	4,700/2,600[2]	--	--	--	--
03/18/98	96.91	84.21	12.70	--	--	5,900[1]	250	<50	98	<50	12,000/7,100[2]	--	--	--	--
06/28/98	96.91	83.98	12.93	--	--	4,300	400	<10	<10	<10	3,000/4,000[2]	--	--	--	--
09/07/98	96.91	83.94	12.97	--	--	3,700	220	5.1	38	7.6	1,300/1,400[2]	--	--	--	--
12/29/98	96.91	83.99	12.92	--	--	6,500	573	26.8	131	33.9	2,660	--	--	--	--
03/11/99	96.91	84.04	12.87	--	--	4,970	651	30.8	60.3	<5.0	2,600	--	--	--	--
05/04/99	96.91	84.05	12.86	--	--	--	--	--	--	--	--	--	--	--	--
06/29/99	96.91	83.98	12.93	--	--	2,030	238	11.6	8.98	<5.0	540	--	--	--	--
09/29/99	96.91	84.02	12.89	--	--	2,000	320	10.4	16.5	20.3	642	--	--	--	--
12/08/99	96.91	86.18	10.73	--	--	96.8	2.74	<0.5	<0.5	<0.5	<2.5	--	--	--	--
03/01/00	96.91	84.31	12.60	--	--	<50	6.92	<0.5	<0.5	<0.5	254	--	--	--	--
06/23/00	96.91	83.98	12.93	--	--	1,700[4]	490	7.5	<5.0	7.7	770	--	--	--	--
09/30/00	96.91	83.95	12.96	--	--	2,000[4]	420	14	<10	<10	380	--	--	--	--

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Former Chevron Service Station #9-9708
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Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-2 (cont)															
12/08/00	96.91	83.98	12.93	--	--	984	54.9	<2.50	4.15	<2.50	306	--	--	--	--
03/01/01	96.91	84.15	12.76	--	--	<50.0	4.16	<0.500	<0.500	<0.500	245	--	--	--	--
06/19/01	96.91	83.23	13.68	--	--	1,700[4]	250	9.2	<5.0	6.9	410	--	--	--	--
09/18/01	96.91	83.96	12.95	--	--	1,700	42	1.9	2.0	2.9	280	--	--	--	--
12/26/01	96.91	83.88	13.03	--	--	<50	0.50	<0.50	<0.50	<1.5	120	--	--	--	--
03/06/02	97.81	84.82	12.99	--	--	670	170	2.5	<0.50	<1.5	410	--	--	--	--
06/21/02	97.81	84.10	13.71	--	--	1,800	120	7.3	2.0	3.1	440	--	--	--	--
09/27/02	97.81	82.51	15.30	--	--	180	11	1.0	<0.50	<1.5	4,700	--	--	--	--
12/26/02	97.81	84.81	13.00	--	--	<50	<0.50	<0.50	<0.50	<1.5	160	--	--	--	--
03/28/03	97.81	84.46	13.35	--	--	580	88	2.2	22	12	280	--	--	--	--
06/16/03[11]	97.81	83.10	14.71	--	--	200	1	29	<0.5	<0.5	1,400	--	--	--	--
09/15/03[11]	97.81	82.78	15.03	--	--	130	<1	<1	<1	<1	2,400	<130	--	--	--
12/15/03[11]	97.81	84.84	12.97	--	--	<50	<0.5	<0.5	<0.5	<0.5	63	<50	--	--	--
03/05/04[11]	97.81	84.79	13.02	--	--	<50	0.8	<0.5	<0.5	<0.5	49	<50	--	--	--
06/18/04[11]	97.81	82.72	15.09	--	--	60	<0.5	<0.5	<0.5	<0.5	1,900	<50	--	--	--
09/17/04[11]	97.81	82.46	15.35	--	--	66	<1	<1	<1	<1	2,100	<130	--	--	--
12/17/04[11]	97.81	84.61	13.20	--	--	120	7	<0.5	<0.5	0.7	91	<50	--	--	--
03/14/05[11]	97.81	84.79	13.02	--	--	390	69	0.8	10	2	74	<50	--	--	--
06/13/05[11]	97.81	82.87	14.94	--	--	<50	6	<0.5	<0.5	<0.5	10	<50	--	--	--
09/12/05[11]	97.81	82.62	15.19	--	--	77	<1	<1	<1	<1	1,400	<100	--	--	--
12/12/05[11]	97.81	84.32	13.49	--	--	14,000	1,500	1,100	660	3,500	82	<250	--	--	--
03/13/06[11]	97.81	84.97	12.84	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
06/12/06[11]	97.81	83.19	14.62	--	--	<50	<0.5	<0.5	<0.5	<0.5	81	<50	--	--	--
09/11/06[11]	97.81	82.59	15.22	--	--	73	<0.5	<0.5	<0.5	<0.5	170	<50	--	--	--
12/15/06[11]	97.81	84.86	12.95	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.8	<50	--	--	--
03/16/07[11]	97.81	84.41	13.40	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
06/17/07[11]	97.81	83.14	14.67	--	--	<50	0.9	<0.5	<0.5	<0.5	46	<50	--	--	--
09/14/07[11]	97.81	82.70	15.11	--	--	<50	0.7	<0.5	<0.5	<0.5	170	<50	--	--	--
12/07/07[11]	97.81	82.46	15.35	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.7	<50	--	--	--
03/07/08[11]	97.81	83.90	13.91	--	--	<50	<0.5	<0.5	<0.5	<0.5	3	<50	--	--	--
06/06/08[11]	97.81	83.01	14.80	--	--	<50	3	<0.5	<0.5	<0.5	78	<50	--	--	--
09/05/08[11]	97.81	82.78	15.03	--	--	<50	<0.5	<0.5	<0.5	<0.5	130	<50	--	--	--
12/15/08[11]	97.81	82.63	15.18	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
03/16/09[11]	97.81	84.36	13.45	--	--	<50	<0.5	<0.5	<0.5	<0.5	6	<50	--	--	--

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Former Chevron Service Station #9-9708
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Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-2 (cont)															
06/15/09[11]	97.81	82.53	15.28	--	--	1,500	29	1	5	4	12	<50	--	--	--
11/30/09[11]	97.81	84.53	13.28	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
06/07/10[11]	97.81	84.62	13.19	--	--	<50	<0.5	<0.5	<0.5	<0.5	2	<50	--	--	--
12/08/10[11]	97.81	83.93	13.88	190	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
06/13/11[11]	97.81	83.75	14.06	<41[14]	<50[14]	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
12/02/11[11]	97.81	84.39	13.42	<520[14]	<520[14]	<50	<0.50	<0.50	<0.50	<1.5	3.8	<150	--	--	--
6/21/2012[11]	97.81	83.91	13.90	<480	<480	<50	<0.50	<0.50	<0.50	<1.0	15	<150	--	--	--
12/18/2012[1]	97.81	84.84	12.97	<48	130	<50	2.4	<0.50	<0.50	<1.0	2.9	<150	--	--	--
MW-3															
05/29/97	97.86	86.41	11.45	--	--	--	--	--	--	--	--	--	--	--	--
06/04/97[3]	97.86	86.58	11.28	--	1200	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	ND	1.0	--
09/16/97	97.86	85.67	12.19	--	2,700[1]	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--
12/17/97	97.86	87.06	10.80	--	1,200[1]	<50	0.9	0.53	<0.5	<0.5	<2.5	--	--	--	--
03/18/98	97.86	86.98	10.88	--	820[1]	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
06/28/98	97.86	86.26	11.60	--	1,100[1]	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	0.99	ND	<0.5-<5.0
09/07/98	97.86	85.64	12.22	--	1,100[1]	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	0.79	0.54	--
12/29/98	97.86	86.06	11.80	--	1,760[1]	185	<0.5	<0.5	<0.5	0.669	<2.0	--	1.04	0.578	<0.5-<5.0
03/11/99	97.86	86.83	11.03	--	1440	<50	<0.5	<0.5	<0.5	<0.5	<2.0	--	<1.0	<1.0	<1.0-<20
05/04/99	97.86	86.43	11.43	--	--	--	--	--	--	--	--	--	--	--	--
06/29/99	97.86	85.71	12.15	--	690[1]	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	0.754	<0.5	<0.5-<5.0
09/29/99	97.86	INACCESSIBLE		--	--	--	--	--	--	--	--	--	--	--	--
12/08/99	97.86	88.43	9.43	--	1,000[1]	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	<0.5	0.66	<0.5-<5.0
03/01/00	97.86	87.16	10.70	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	0.821	0.984	<0.5-<5.0
06/23/00	97.86	85.96	11.90	--	2,600[5]	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	<2.0	<2.0	<0.5-<2.0
09/30/00	97.86	85.45	12.41	--	1,100[5]	<50	<0.50	0.61	<0.50	0.82	2.7	--	<2.0	<2.0	<0.50-<2.0
12/08/00	97.86	85.78	12.08	--	870[5]	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	<2.0	<2.0	<0.50-<10
03/01/01	97.86	87.09	10.77	--	1,060[6]	60.9[7]	<0.500	<0.500	<0.500	<0.500	<2.50	--	0.545	0.528	<0.500-<5.00
06/19/01	97.86	85.87	11.99	--	120[5]	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	<1.2	<1.6	<0.50-<2.0
09/18/01	97.86	85.19	12.67	--	4,800	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	<1[8]	<2[8]	<1-<2[8]
12/26/01	97.86	86.92	10.94	--	5,000	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	<1[8]	<2[8]	<1-<2.0[8]
03/06/02	98.78	87.20	11.58	--	30,000	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	<1[8]	<2[8]	<1-<2.0[8]
06/21/02	98.78	86.23	12.55	--	3,800[10]	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	<1[8]	<2[8]	<1-<2.0[8]
09/27/02	98.78	85.93	12.85	--	2,000	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	<1[8]	<2[8]	<1-<2.0[8]
12/26/02	98.78	87.87	10.91	--	3,600	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	<1[8]	<2[8]	<1-<2.0[8]
03/28/03	98.78	86.77	12.01	--	2,100	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	<1[8]	<1[8]	<0.8-<2[8]
06/16/03[11]	98.78	86.79	11.99	--	2,400	<50	<0.5	<0.5	<0.5	<1	<0.5	--	<1[8]	0.8[8]	<0.5-<2[8]
09/15/03[11]	98.78	86.07	12.71	--	4,300	<50	<0.5	<0.5	<0.5	<1	<0.5	<50	<1[8]	0.8[8]	<0.8-<2[8]
12/15/03[11]	98.78	87.23	11.55	--	3,200	<50	<0.5	0.7	<0.5	0.7	<0.5	<50	<1[8]	0.8[8]	<0.8-<2[8]
03/05/04[11]	98.78	87.66	11.12	--	8,000	<50	<0.5	0.6	<0.5	0.7	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]

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WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-3 (cont)															
06/18/04[11]	98.78	86.21	12.57	--	3,100	<50	<0.5	<0.5	<0.5	<1	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
09/17/04[11]	98.78	85.92	12.86	--	3,200	<50	<0.5	<0.7	<0.8	<1.6	<0.5	<50	<1[8]	<1[8]	<0.8-<2[8]
12/17/04[11]	98.78	87.63	11.15	--	2,800	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
03/14/05[11]	98.78	88.21	10.57	--	1,300	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
06/13/05[11]	98.78	86.45	12.33	--	2,700	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
09/12/05[11]	98.78	85.89	12.89	--	2,000[12]	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
12/12/05[11]	98.78	87.40	11.38	--	3,900[12]	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
03/13/06[11]	98.78	88.43	10.35	--	2,800	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
06/12/06[11]	98.78	87.05	11.73	--	3,600	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
09/11/06[11]	98.78	86.42	12.36	--	4,000	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
12/15/06[11]	98.78	86.91	11.87	--	3,100	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
03/16/07[11]	98.78	87.55	11.23	--	1,800	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
06/15/07[11]	98.78	86.97	11.81	--	2,000	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<2[8]	<0.5[8]	<0.8-<2[8]
09/14/07[11]	98.78	86.31	12.47	--	1,600	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
12/07/07[11]	98.78	86.02	12.76	--	2,200	<50	<0.5	<0.5	<0.5	<1.0	<0.5	330	<1[8]	<0.5[8]	<0.8-<2[8,13]
03/07/08[11]	98.78	86.95	11.83	--	6,500	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
06/06/08[11]	98.78	86.51	12.27	--	2,800	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
09/05/08[11]	98.78	86.13	12.65	--	2,400	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
12/15/08[11]	98.78	86.12	12.66	--	8,700	<50	<0.5	<0.5	<0.5	<1.0	<0.5	230	<1[8]	<0.5[8]	<0.8-<2[8]
03/16/09[11]	98.78	86.42	12.36	--	4,900	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
06/15/09[11]	98.78	86.33	12.45	--	5,900	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
11/30/09[11]	98.78	86.92	11.86	--	4,400	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
06/07/10[11]	98.78	87.13	11.65	--	1,800[14]	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<50	<1[8]	<0.5[8]	<0.8-<2[8]
12/08/10[11]	98.78	85.82	12.96	4,000	7,300[14]	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
06/13/11[11]	98.78	87.09	11.69	38,000[14]	19,000[14]	<50	<0.5	2	<0.5	<0.5	<0.5	<50	--	--	--
12/02/11[11]	98.78	87.34	11.44	4,100[14]	2,000[14]	<50	<0.50	<0.50	<0.50	<1.5	<0.50	<150	--	--	--
6/21/2012[11]	98.78	86.98	11.80	1,500	6,800	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<150	--	--	--
12/18/2012[1]	98.78	88.57	10.21	570	1,800	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<150	--	--	--
MW-4															
05/04/99	96.25	83.66	12.59	--	--	140	<0.5	0.62	0.67	2.6	<2.5	--	--	--	--
06/29/99	96.25	83.64	12.61	--	--	183	<0.5	<0.5	1.1	<0.5	<5.0	--	--	--	--
09/29/99	96.25	83.70	12.55	--	--	64.3	<0.5	<0.5	<0.5	1.18	<2.5	--	--	--	--
12/08/99	96.25	83.81	12.44	--	--	91.2	0.589	<0.5	0.52	<0.5	86	--	--	--	--
03/01/00	96.25	84.55	11.70	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
06/23/00	96.25	84.12	12.13	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	--	--	--
09/30/00	96.25	84.30	11.95	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	--	--	--
12/08/00	96.25	83.85	12.40	--	--	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	--	--
03/01/01	96.25	INACCESSIBLE		--	--	--	--	--	--	--	--	--	--	--	--
06/19/01	96.25	82.83	13.42	--	--	210[7]	7.6	1.4	<0.50	<0.50	10	--	--	--	--

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Former Chevron Service Station #9-9708
5910 MacArthur Boulevard
Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-4 (cont)															
09/18/01	96.25	83.17	13.08	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
12/26/01	96.25	83.36	12.89	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
03/06/02	97.14	84.06	13.08	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
06/21/02	97.14	83.63	13.51	--	--	<50	<0.50	12	<0.50	<1.5	<2.5	--	--	--	--
09/27/02	97.14	83.47	13.67	--	--	110	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
12/26/02	97.14	84.12	13.02	--	--	<50	<0.50	2.6	<0.50	<1.5	<2.5	--	--	--	--
03/28/03	97.14	83.71	13.43	--	--	<50	<0.50	<0.50	<0.50	<1.5	18	--	--	--	--
06/16/03[11]	97.14	83.10	14.04	--	--	250	<0.5	31	<0.5	<0.5	<0.5	--	--	--	--
09/15/03[11]	97.14	82.93	14.21	--	--	220	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/15/03[11]	97.14	84.30	12.84	--	--	310	<0.5	21	<0.5	1	<0.5	<50	--	--	--
03/05/04[11]	97.14	84.00	13.14	--	--	<50	<0.5	0.7	<0.5	0.6	5	<50	--	--	--
06/18/04[11]	97.14	83.14	14.00	--	--	220	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
09/17/04[11]	97.14	83.06	14.08	--	--	97	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/17/04[11]	97.14	83.77	13.37	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.9	<50	--	--	--
03/14/05[11]	97.14	83.69	13.45	--	--	<50	<0.5	0.8	<0.5	<0.5	1	<50	--	--	--
06/13/05[11]	97.14	83.53	13.61	--	--	<50	<0.5	<0.5	<0.5	<0.5	2	<50	--	--	--
09/12/05[11]	97.14	83.34	13.80	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/12/05[11]	97.14	83.54	13.60	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
03/13/06[11]	97.14	83.95	13.19	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
06/12/06[11]	97.14	83.27	13.87	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.7	<50	--	--	--
09/11/06[11]	97.14	82.98	14.16	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.7	<50	--	--	--
12/15/06[11]	97.14	83.96	13.18	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.9	<50	--	--	--
03/16/07[11]	97.14	83.44	13.70	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.6	<50	--	--	--
06/15/07[11]	97.14	83.23	13.91	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.6	<50	--	--	--
09/14/07[11]	97.14	83.12	14.02	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/07/07[11]	97.14	82.91	14.23	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
03/07/08[11]	97.14	83.22	13.92	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
06/06/08[11]	97.14	83.23	13.91	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.5	<50	--	--	--
09/05/08[11]	97.14	83.12	14.02	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/15/08[11]	97.14	83.05	14.09	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.8	<50	--	--	--
03/16/09[11]	97.14	83.58	13.56	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
06/15/09[11]	97.14	83.05	14.09	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
11/30/09[11]	97.14	83.56	13.58	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
06/07/10[11]	97.14	83.88	13.26	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/08/10[11]	97.14	83.01	14.13	190	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
06/13/11[11]	97.14	84.07	13.07	1,900[14]	2,000[14]	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/02/11[11]	97.14	INACCESSIBLE		--	--	--	--	--	--	--	--	--	--	--	--
6/21/2012[11]	97.14	82.71	14.43	620	1,900	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<150	--	--	--
12/18/2012[1]	97.14	84.46	12.68	1,400	3,100	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<150	--	--	--

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Former Chevron Service Station #9-9708
5910 MacArthur Boulevard
Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-5															
03/06/02[9]	95.71	84.31	11.40	--	--	4,900	18	2.7	29	9.8	290	--	--	--	--
06/21/02	95.71	83.29	12.42	--	--	1,400	3.6	1.4	<0.50	1.6	190	--	--	--	--
09/27/02	95.71	83.00	12.71	--	--	540	1.3	<0.50	<0.50	<1.5	190	--	--	--	--
12/26/02	95.71	85.55	10.16	--	--	2,600	5.0	0.86	3.6	3.7	170	--	--	--	--
03/28/03	95.71	84.25	11.46	--	--	920	3.8	<0.50	2.1	1.7	160	--	--	--	--
06/16/03[11]	95.71	83.92	11.79	--	--	600	3	0.9	0.7	0.9	150	--	--	--	--
09/15/03[11]	95.71	83.28	12.43	--	--	760	<0.5	<0.5	<0.5	<0.5	180	<50	--	--	--
12/15/03[11]	95.71	85.01	10.70	--	--	1,200	0.7	0.5	0.6	0.8	120	<50	--	--	--
03/05/04[11]	95.71	84.65	11.06	--	--	1,800	2	0.7	0.7	2	60	<50	--	--	--
06/18/04[11]	95.71	83.54	12.17	--	--	1,700	<0.5	<0.5	<0.5	<0.5	77	<50	--	--	--
09/17/04[11]	95.71	83.35	12.36	--	--	1,900	<0.5	<0.5	<0.5	0.6	73	<50	--	--	--
12/17/04[11]	95.71	84.91	10.80	--	--	1,200	1	<0.5	<0.5	0.6	41	<50	--	--	--
03/14/05[11]	95.71	85.26	10.45	--	--	1,400	9	<0.5	<0.5	<0.5	19	<50	--	--	--
06/13/05[11]	95.71	83.82	11.89	--	--	760	<0.5	<0.5	<0.5	<0.5	16	<50	--	--	--
09/12/05[11]	95.71	83.43	12.28	--	--	610	<0.5	<0.5	<0.5	<0.5	22	<50	--	--	--
12/12/05[11]	95.71	84.63	11.08	--	--	630	<0.5	<0.5	<0.5	<0.5	13	63	--	--	--
03/13/06[11]	95.71	85.45	10.26	--	--	1,100	1	<0.5	<0.5	0.5	9	<50	--	--	--
06/12/06[11]	95.71	83.91	11.80	--	--	460	<0.5	<0.5	<0.5	<0.5	10	<50	--	--	--
09/11/06[11]	95.71	83.30	12.41	--	--	510	<0.5	<0.5	<0.5	<0.5	10	<50	--	--	--
12/15/06[11]	95.71	85.21	10.50	--	--	1,000	0.7	<0.5	<0.5	<0.5	6	<50	--	--	--
03/16/07[11]	95.71	84.71	11.00	--	--	430	<0.5	<0.5	<0.5	<0.5	8	<50	--	--	--
06/15/07[11]	95.71	83.83	11.88	--	--	420	<0.5	<0.5	<0.5	<0.5	5	<50	--	--	--
09/14/07[11]	95.71	83.39	12.32	--	--	380	<0.5	<0.5	<0.5	<0.5	6	<50	--	--	--
12/07/07[11]	95.71	83.14	12.57	--	--	420	<0.5	<0.5	<0.5	<0.5	3	<50	--	--	--
03/07/08[11]	95.71	84.20	11.51	--	--	400	<0.5	<0.5	<0.5	<0.5	4	<50	--	--	--
06/06/08[11]	95.71	83.51	12.20	--	--	400	<0.5	<0.5	<0.5	<0.5	4	<50	--	--	--
09/05/08[11]	95.71	83.33	12.38	--	--	470	<0.5	<0.5	<0.5	<0.5	6	<50	--	--	--
12/15/08[11]	95.71	83.25	12.46	--	--	<50	<0.5	<0.5	<0.5	<0.5	3	<50	--	--	--
03/16/09[11]	95.71	85.11	10.60	--	--	720	<0.5	<0.5	<0.5	<0.5	4	<50	--	--	--
06/15/09[11]	95.71	83.25	12.46	--	--	490	<0.5	<0.5	<0.5	<0.5	2	<50	--	--	--
11/30/09[11]	95.71	83.81	11.90	--	--	330	<0.5	<0.5	<0.5	<0.5	3	<50	--	--	--
06/07/10[11]	95.71	83.88	11.83	--	--	310	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
12/08/10[11]	95.71	84.18	11.53	14,000	--	320	<0.5	<0.5	<0.5	<0.5	2	<50	--	--	--
06/13/11[11]	95.71	84.13	11.58	<42[14]	240[14]	240	<0.5	<0.5	<0.5	<0.5	0.9	<50	--	--	--
12/02/11[11]	95.71	84.03	11.68	<500[14]	<500[14]	180	<0.50	<0.50	<0.50	<1.5	1.4	<150	--	--	--
6/21/2012[11]	95.71	83.49	12.22	<510	<510	200	<0.50	<0.50	<0.50	<1.0	0.68	<150	--	--	--
12/18/2012[1]	95.71	85.39	10.32	<47	290	280	<0.50	<0.50	<0.50	<1.0	0.98	<150	--	--	--

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WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
MW-6															
03/06/02[9]	95.84	85.67	10.17	--	--	220	<0.50	<0.50	<0.50	<1.5	53	--	--	--	--
06/21/02	95.84	84.86	10.98	--	--	<50	<0.50	<0.50	<0.50	<1.5	15	--	--	--	--
09/27/02	95.84	84.61	11.23	--	--	<50	<0.50	<0.50	<0.50	<1.5	11	--	--	--	--
12/26/02	95.84	87.47	8.37	--	--	57	<0.50	<0.50	<0.50	<1.5	19	--	--	--	--
03/28/03	95.84	85.53	10.31	--	--	<50	<0.50	<0.50	<0.50	<1.5	11	--	--	--	--
06/16/03[11]	95.84	85.50	10.34	--	--	<50	<0.5	0.6	<0.5	<0.5	5	--	--	--	--
09/15/03[11]	95.84	84.84	11.00	--	--	<50	<0.5	<0.5	<0.5	<0.5	6	<50	--	--	--
12/15/03[11]	95.84	86.49	9.35	--	--	<50	<0.5	<0.5	<0.5	<0.5	4	<50	--	--	--
03/05/04[11]	95.84	87.04	8.80	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
06/18/04[11]	95.84	85.04	10.80	--	--	<50	<0.5	<0.5	<0.5	<0.5	2	<50	--	--	--
09/17/04[11]	95.84	84.84	11.00	--	--	<50	<0.5	<0.5	<0.5	<0.5	2	<50	--	--	--
12/17/04[11]	95.84	86.32	9.52	--	--	<50	<0.5	<0.5	<0.5	<0.5	2	<50	--	--	--
03/14/05[11]	95.84	86.94	8.90	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.8	<50	--	--	--
06/13/05[11]	95.84	85.37	10.47	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
09/12/05[11]	95.84	85.16	10.68	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
12/12/05[11]	95.84	86.15	9.69	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
03/13/06[11]	95.84	87.16	8.68	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
06/12/06[11]	95.84	85.03	10.81	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.7	<50	--	--	--
09/11/06[11]	95.84	84.80	11.04	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.6	<50	--	--	--
12/15/06[11]	95.84	86.82	9.02	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.7	<50	--	--	--
03/16/07[11]	95.84	86.06	9.78	--	--	<50	<0.5	<0.5	<0.5	<0.5	1	<50	--	--	--
06/15/07[11]	95.84	84.99	10.85	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.7	<50	--	--	--
09/14/07[11]	95.84	85.71	10.13	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.9	<50	--	--	--
12/07/07[11]	95.84	85.39	10.45	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
03/07/08[11]	95.84	85.75	10.09	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.9	<50	--	--	--
06/06/08[11]	95.84	84.79	11.05	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.7	<50	--	--	--
09/05/08[11]	95.84	84.66	11.18	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.8	<50	--	--	--
12/15/08[11]	95.84	84.58	11.26	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.9	<50	--	--	--
03/16/09[11]	95.84	86.33	9.51	--	--	<50	<0.5	<0.5	<0.5	<0.5	2	<50	--	--	--
06/15/09[11]	95.84	84.82	11.02	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.5	<50	--	--	--
11/30/09[11]	95.84	84.98	10.86	--	--	<50	<0.5	<0.5	<0.5	<0.5	0.8	<50	--	--	--
06/07/10[11]	95.84	85.34	10.50	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/08/10[11]	95.84	85.88	9.96	520	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
06/13/11[11]	95.84	85.25	10.59	<40[14]	<50[14]	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<50	--	--	--
12/02/11[11]	95.84	INACCESSIBLE		--	--	--	--	--	--	--	--	--	--	--	--
6/21/2012[11]	95.84	INACCESSIBLE		--	--	--	--	--	--	--	--	--	--	--	--
12/18/2012[1]	95.84	86.67	9.17	<47	<47	<50	<0.5	<0.5	<0.5	<1.0	2.2	<150	--	--	--

Table 1a
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-9708
5910 MacArthur Boulevard
Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
TRIP BLANK															
06/04/97	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--
09/16/97	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--
12/17/97	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
03/18/98	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
06/28/98	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
09/07/98	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
09/07/98	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
12/29/98	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.0	--	--	--	--
03/11/99	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.0	--	--	--	--
05/04/99	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
06/29/99	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--
09/29/99	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
12/08/99	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
03/01/00	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--
06/23/00	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	--	--	--
09/30/00	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	--	--	--
12/08/00	--	--	--	--	--	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	--	--
03/01/01	--	--	--	--	--	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	--	--
06/19/01	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	--	--	--
09/18/01	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--

Table 1a
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-9708
5910 MacArthur Boulevard
Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
QA															
12/26/01	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
03/06/02	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
06/21/02	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
09/27/02	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
12/26/02	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
03/28/03	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<2.5	--	--	--	--
06/16/03[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
09/15/03[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
12/15/03[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
03/05/04[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
06/18/04[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
09/17/04[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
12/17/04[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
03/14/05[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
06/13/05[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
09/12/05[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
12/12/05[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
03/13/06[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
06/12/06[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
09/11/06[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
12/15/06[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
03/16/07[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
06/15/07[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
09/14/07[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
12/07/07[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
03/07/08[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
06/06/08[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
09/05/08[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
12/15/08[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--

Table 1a
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-9708
5910 MacArthur Boulevard
Oakland, California

WELL ID/	TOC*	GWE	DTW	TPH-MO	TPH-DRO	TPH-GRO	B	T	E	X	MTBE	ETHANOL	1,2-DCBt	1,2-DCAt	HVOCst
DATE	(ft.)	(msl)	(ft.)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
QA (cont)															
03/16/09[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
06/15/09[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
11/30/09[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
06/07/10[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
12/08/10[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
06/13/11[11]	--	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--
12/02/11[11]	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.5	<0.50	<150	--	--	--
6/21/2012[11]	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<150	--	--	--
12/18/2012[1]	--	--	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<150	--	--	--

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results prior to June 23, 2000, were compiled from reports prepared by Blaine Tech Services, Inc.

TOC = Top of Casing
(ft.) = Feet
GWE = Groundwater Elevation
(msl) = Mean sea level
DTW = Depth to Water
TPH = Total Petroleum Hydrocarbons
DRO = Diesel Range Organics
GRO = Gasoline Range Organics
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
MTBE = Methyl Tertiary Butyl Ether
1,2-DCB = 1,2-Dichlorobenzene
1,2-DCA = 1,2-Dichloroethane
(µg/L) = Micrograms per liter
(ppb) = Parts per billion
HVOC = Halogenated Volatile Organic Compounds
ND = Not Detected
-- = Not Measured/Not Analyzed
QA = Quality Assurance/Trip Blank

* TOC elevations were surveyed in February 2002, by Morrow Surveying. Elevations are based on City of Oakland Benchmark; a standard city of Oakland disc stamped "SEC 50 STA F" set under a standard casting on the monument line of Camden Street and 72 feet westerly of the monument at Seminary and Camden, (Elevation = 90.63 feet).

t Analysis by EPA Method 8010.

NOTE: All other VOC concentrations were below detection limits.

1 Chromatogram pattern indicates an unidentified hydrocarbon.
2 Confirmation run.
3 Sample also analyzed for the following: Total Oil & Grease by EPA Method 5520F was ND; Semivolatile Organics by EPA Method 8270B were ND; Volatile Organics by EPA Method 8010B were ND.
4 Laboratory report indicates gasoline C6-C12.
5 Laboratory report indicates unidentified hydrocarbons >C16.
6 Laboratory report indicates unidentified hydrocarbons C9-C24.
7 Laboratory report indicates unidentified hydrocarbons C6-C12.
8 Volatile Organic Compounds (VOCs) by EPA Method 8260.
9 Well development performed.
10 Laboratory report indicates the observed sample pattern is not typical of diesel/#2 fuel oil.
11 BTEX and MTBE analyzed by EPA Method 8260.
12 Laboratory report indicates the observed sample pattern includes #2 fuel/diesel and an additional pattern which elutes later in the DRO range.
13 Laboratory report indicates Chloroform at 7 ppb.
14 Analyzed with Silica Gel cleanup.

Table 1b
Groundwater Analytical Results - Select Metals and PCBs
Former Chevron Service Station No. 9-9708
5910 MacArthur Boulevard
Oakland, California

WELL ID/ DATE	Cd *(µg/L)*	Cr *(µg/L)*	Pb *(µg/L)*	Ni *(µg/L)*	Zn *(µg/L)*	PCBs *(µg/L)*
MW-3						
12/08/10	<2.0	<3.4	<6.9	<8.1	19,000	<1.16

EXPLANATIONS:

Cd = Cadmium (Dissolved)
Cr = Total Chromium (Dissolved)
Pb = Lead (Dissolved)
Ni = Nickel (Dissolved)
Zn = Zinc (Dissolved)
PCBs = Pesticides/Polychlorinated Biphenyls (inclusive of PCB-1016, PCB-1221, PCB-1232, PCB-1242, PC-1248, PCB-1254, PCB-1260, PCB-1262 and PCB-1268)
(µg/L) = Micrograms per liter

Table 2a
Grab Groundwater Analytical Data
Former Chevron Service Station No. 9-9708
5910 MacArthur Blvd
Oakland, California

Sample Name	Sample Date	Diesel Range Organics (EPA 8015B)				VOCs (EPA 8260B)					PCBs (EPA 8082)	Metals (EPA 6010B)				
		TPH-DRO (µg/L)	TPH-DRO with silica gel (µg/L)	TPH-mo (µg/L)	TPH-mo with silica gel(µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	PCBs (µg/L)	Lead (µg/L)	Zinc (µg/L)	Nickel (µg/L)	Chromium (µg/L)	Cadmium (µg/L)
ESLs for Deep Soils (>3m		100	100	100	100	1	40	30	20	5 13	0.014	2.5	81	8.2	50	0.025
California MCLs		--	--	--	--	1	150	300	1,750		0.5	15	--	100	--	5
B-1	06/14/12	**960**	<480	**710**	<480	<0.50	<0.50	<0.50	<0.50	<0.50	<0.97	**22**	**460**	**890**	**390**	<10
B-2	06/15/12	**1,500**	<490	**900**	<490	<0.50	<0.50	<0.50	<0.50	<0.50	<1.4	<5.0	<20	**46**	**13**	<50
B-3	06/15/12	<72	<480	<72	<480	<0.50	<0.50	<0.50	<0.50	<0.50	<0.95	**310**	**1,600**	**3,000**	**1,300**	<50
B-4	06/15/12	**77**	<500	<49	<500	<0.50	<0.50	<0.50	<0.50	<0.50	<0.99	**750**	**5,100**	**5,800**	**3,500**	<50
B-7	06/15/12	<48	<480	<48	<480	0.90	<0.50	3.6	<0.50	2.3	<0.96	**10**	**68**	**83**	**65**	<50
B-8*	06/15/12	--	--	--	--	0.56	<0.50	**14**	<0.50	**12**	--	**180**	**1,700**	**2,100**	**1,300**	<50

Explanation

bgs = below ground surface

TPH-DRO = Total Petroleum Hydrocarbons as Diesel Range Organics

TPH-MO = Total Petroleum Hydrocarbons as Motor Oil

MTBE = Methyl Tertiary Butyl Ether

PCB = Polychlorinated Biphenyls (All Aroclors were not detected)

EPA = Environmental Protection Agency

µg/L = Micrograms per liter

ESL = Environmental Screening Level (*Screening for Environmental Concerns at Sites with Contaminates Soil and Groundwater*), California RWQCB-San Francisco Bay Region, Interim Final - November 2007 (Revised May 2008)

MCL = Maximum Contaminant Level

<0.0005 = Not detected at concentration threshold as shown

-- = Not Analyzed/Applicable

BOLD = Concentrations meet or exceeds their respective ESL

[1] = For commercial/Industrial Land Use Only

* = B-8 went dry before all the sample containers were filled

Table 2b
Grab Groundwater Analytical Data - Additional VOCs
Former Chevron Service Station No. 9-9708
5910 MacArthur Blvd
Oakland, California

Sample Name	Sample Date	VOCs (EPA 8260B)										
		1,2,4-Trimethylbenzene (µg/L)	1,2-Dichlorobenzene (µg/L)	1,3,5-Trimethylbenzene (µg/L)	Chloroform (µg/L)	Isopropylbenzene (µg/L)	Naphthalene (µg/L)	n-Butylbenzene (µg/L)	N-Propylbenzene (µg/L)	sec-Butylbenzene (µg/L)	tert-Butylbenzene (µg/L)	p-Isopropyltoluene (µg/L)
ESLs for Deep Soils (>3m bgs) Groundater is Current or Potential Source of Drinking Water		--	10	--	70	--	17	--	--	--	--	--
California MCLs		--	600	--	--	--	--	--	--	--	--	--
B-1	06/14/12	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
B-2	06/15/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
B-3	06/15/12	<0.50	<0.50	<0.50	8.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
B-4	06/15/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1	<0.50
B-7	06/15/12	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	<0.50	0.73	<0.50
B-8	06/15/12	<0.50	<0.50	<0.50	<0.50	3.3	<0.50	<0.50	6.4	0.82	7.7	0.57

Explanation

bgs = below ground surface

EPA = Environmental Protection Agency

µg/L = Micrograms per liter

ESL = Environmental Screening Level (*Screening for Environmental Concerns at Sites with Contaminates Soil and Groundwater*), California RWQCB-San Francisco Bay Region, Interim Final - November 2007 (Revised May 2008)

MCL = Maximum Contaminant Level

<0.0005 = Not detected at concentration threshold as shown

-- = Not Analyzed/Applicable

BOLD = Concentrations meet or exceeds their respective ESL

[1] = For commercial/Industrial Land Use Only

Table 3
Summary of Statistical Analysis of Groundwater Analytical Data
Site Closure Request
Former Chevron Service Station No. 9-9708
5910 MacArthur Blvd.
Oakland, California

Constituent	Well	WQO (µg/L)[1]	Data Range						Linear Regression Analysis					
			Minimum Concentration (µg/L)	Maximum Concentration (µg/L)	Concentration Measured Most Recently (µg/L)	% of Data Above Laboratory Reporting Limit	Start Date	End Date	Coefficient of Determination, R-squared[2]	p-value of Correlation (Significance of Slope)	Attenuation Half-life (days)	Trend Direction	Significance of Trend[3]	Projected Year to Screening Level
DRO	MW-3	100	120	30,000	1,800	100	6/4/1997	12/18/2012	0.22	<0.05	NA	Increasing	Significant	NA
	MW-3 (March 2009)	100	1,800	19,000	1,800	100	3/16/2009	12/18/2012	0.03	0.68	2,659	No Trend	No Trend	Concentrations are stable
GRO	MW-1	100	50	2,580	70	88	6/4/1997	12/18/2012	0.19	<0.05	2,323	Decreasing	Significant	2010; at or near WQO since December 2004
GRO	MW-5	100	50	4,900	280	100	3/6/2002	12/18/2012	0.58	<0.05	1,173	Decreasing	Significant	2015
Benzene	MW-1	1	0.5	481	0.79	80	6/4/1997	12/18/2012	0.41	<0.05	807	Decreasing	Significant	2010; at or near WQO since 2007
Benzene	MW-2	1	0.5	1,500	2.4	61	6/4/1997	12/18/2012	0.49	<0.05	554	Decreasing	Significant	2008; at or near WQO since 2006
MTBE	MW-1	13	10	6,030	10	100	12/8/2000	12/18/2012	0.85	<0.05	507	Decreasing	Significant	2010; at or near WQO since 2010
MTBE	MW-2	13	0.5	12,000	3	93	6/4/1997	12/18/2012	0.57	<0.05	498	Decreasing	Significant	2008; at or near WQO since 2008

Notes, Abbreviations and Assumptions:
µg/L = micrograms per liter
NA = not applicable due to increasing trend
WQO = water quality objective
[1] WQO source = Benzene and MTBE are California Maximum Contaminant Levels (CDPH 2011), GRO and DRO are conservative screening levels (Table F1-a; SFRWQCB 2013)
[2] Linear regression analysis with R^2 values <0.1 were defined as having no apparent trend (No Trend)
[3] Statistically significant trend defined as having p-value ≤ 0.05
ND taken at reporting limit/reported value

Table 4
Well Survey (Within 0.25 mile from the Site)
Former Chevron Service Station #9-9708
5910 MacArthur Boulevard
Oakland, California

Map ID	Latitude	Longitude	Location	Owner	Use	Date Installed	Total Depth (ft)	Boring Diameter (in)	Well Screen or Perforations (ft bgs)	Blank Casing (ft bgs)	WCR #
MONITORING WELLS											
11	122.182095	-37.775617	6001 MacArthur Blvd	Quik Stop Markets, Inc	MON	May-93	28	4	--	--	--
12	122.182095	-37.775617	6001 MacArthur Blvd	Quik Stop Markets, Inc	MON	May-93	29	4	--	--	--
13	122.182095	-37.775617	6001 MacArthur Blvd	Quik Stop Markets, Inc	MON	May-93	29	4	--	--	--
15	122.182906	-37.776056	5901 MacArthur Blvd	--	MON	Oct-95	20	4	--	--	--
16	122.182906	-37.776056	5901 MacArthur Blvd	--	MON	Oct-95	20	4	--	--	--
CATHODIC WELLS											
10	122.180518	-37.777407	MACARTHUR BLVD &	PG&E	CAT	May-74	120	--	--	--	120160
TEST WELL											
14	122.182938	-37.77603	5901 MacArthur Blvd	Wickland Properties	TES	Oct-93	26	4	--	--	--
ABANDONED WELLS											
9	122.180518	-37.777407	5000 MACARTHUR	MILLS COLLEGE	ABN	--	0	6	--	--	--
UNKNOWN WELLS											
8	122.180494	-37.781117	BEHIND MILL POND	MILLS COLLEGE	--	--	0	0	--	--	--

Explanation

ft = feet, in inch

bgs = below ground surface

WCR = Well Completion Report

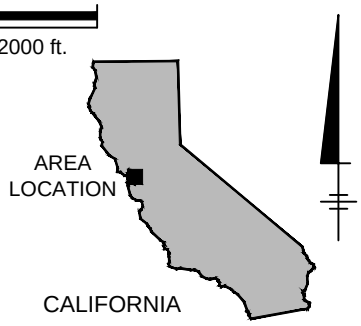
-- = Not Available

Figures

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., OAKLAND EAST, CALIFORNIA, 2012.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.



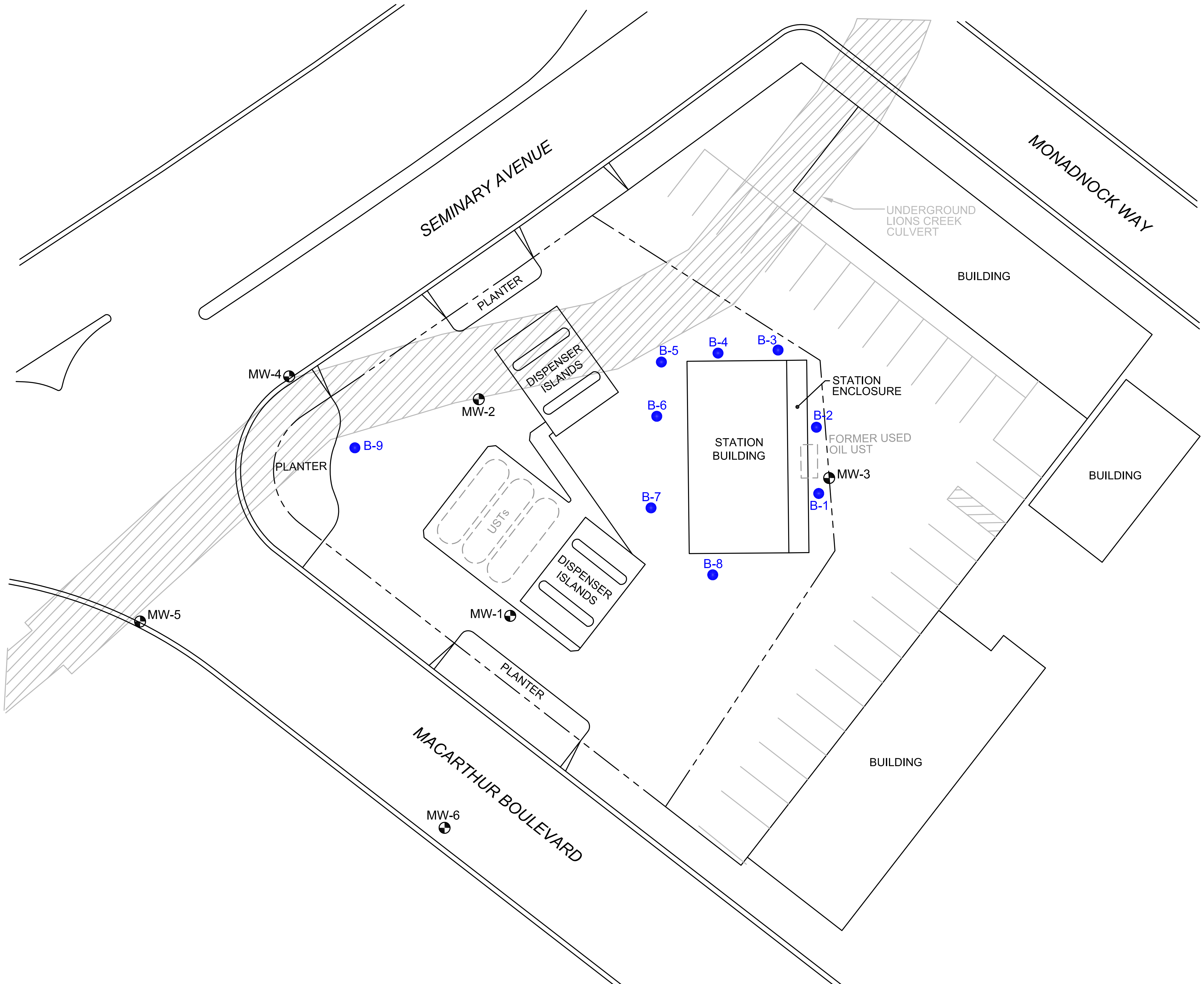
FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENVCAD DB: J. HARRIS
G:\ENVCAD\Petaluma\ACT\B0060901970800015\DWG\60901N02.dwg LAYOUT: 1 SAVED: 7/15/2012 11:18 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 12/5/2012 9:37 AM BY: HARRIS, JESSICA
XREFS: IMAGES: PROJECTNAME: ---
Oakland East 2012.jpg



LEGEND:

- PROPERTY LINE
- MW-1 MONITORING WELL
- B-1 BORING LOCATION (APPROXIMATE)
- UST UNDERGROUND STORAGE TANK

NOTES:

1. BASE MAP DIGITIZED FROM A PHOTOCOPY OF A DRAWING BY CONESTOGA-ROVER ASSOCIATES (CRA) TITLED "GROUNDWATER ELEVATION AND HYDROCARBON CONCENTRATION MAP", DATED JUNE 13, 2011, AT A SCALE OF 1" = 30'.
2. ALL LOCATIONS ARE APPROXIMATE.

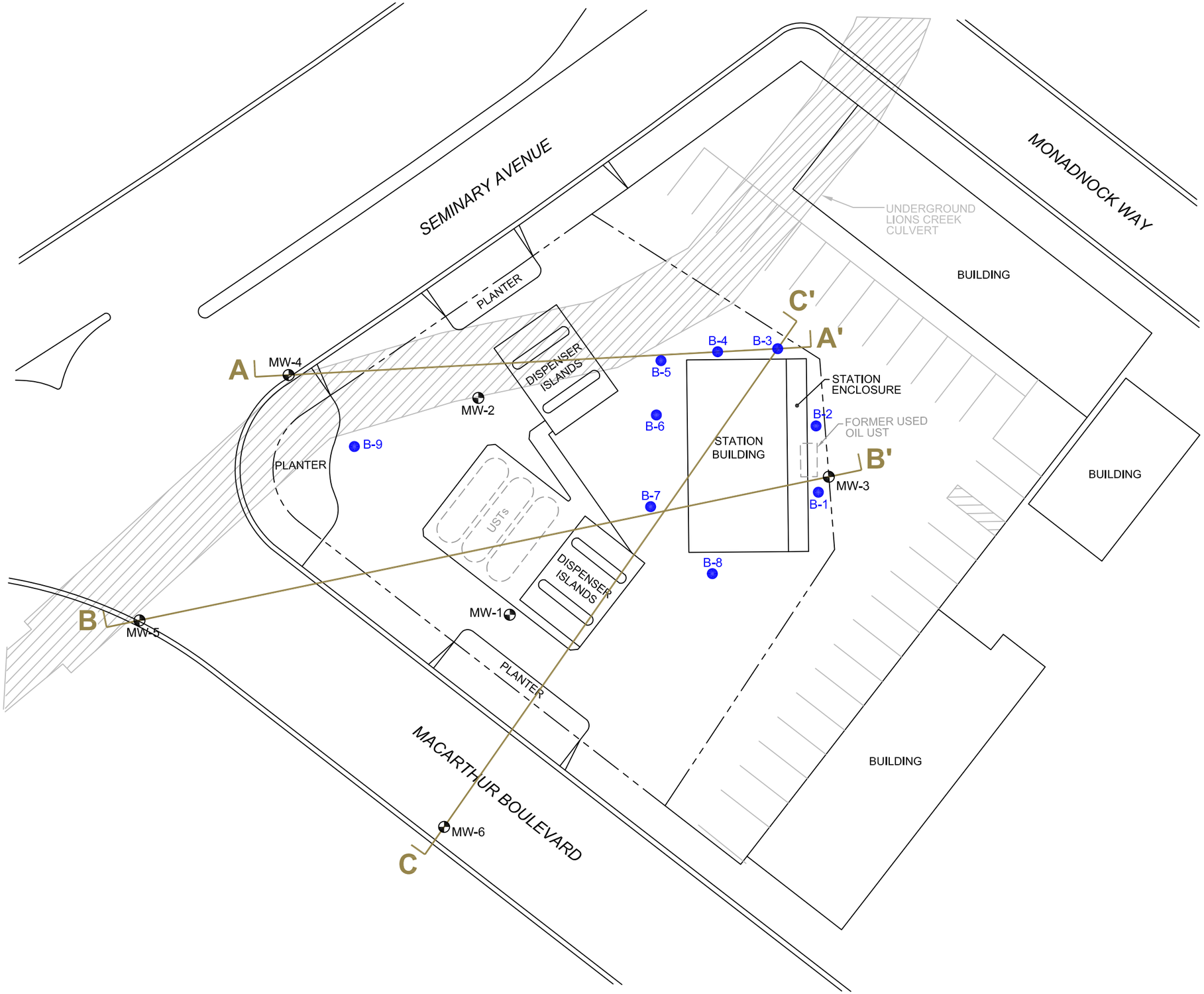
0 30' 60'
GRAPHIC SCALE

FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

SITE MAP

ARCADIS

FIGURE
2



LEGEND:

- PROPERTY LINE
- MW-1 MONITORING WELL
- B-1 BORING LOCATION (APPROXIMATE)
- UST UNDERGROUND STORAGE TANK
- A A' LINE OF GEOLOGIC CROSS SECTION

NOTES:

1. BASE MAP DIGITIZED FROM A PHOTOCOPY OF A DRAWING BY CONESTOGA-ROVER ASSOCIATES (CRA) TITLED "GROUNDWATER ELEVATION AND HYDROCARBON CONCENTRATION MAP", DATED JUNE 13, 2011, AT A SCALE OF 1" = 30'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 30' 60'

GRAPHIC SCALE

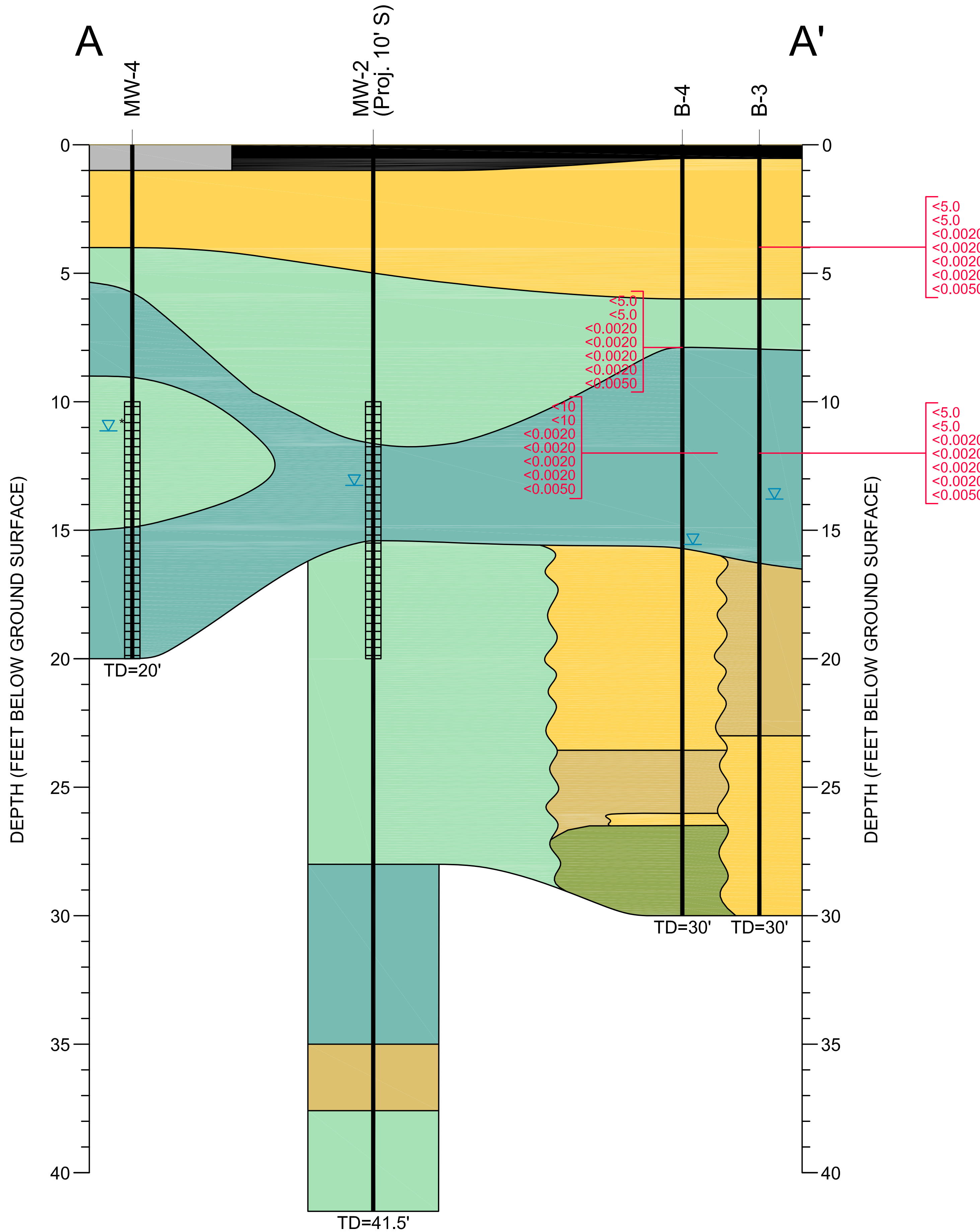
FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

CROSS SECTION LOCATION MAP

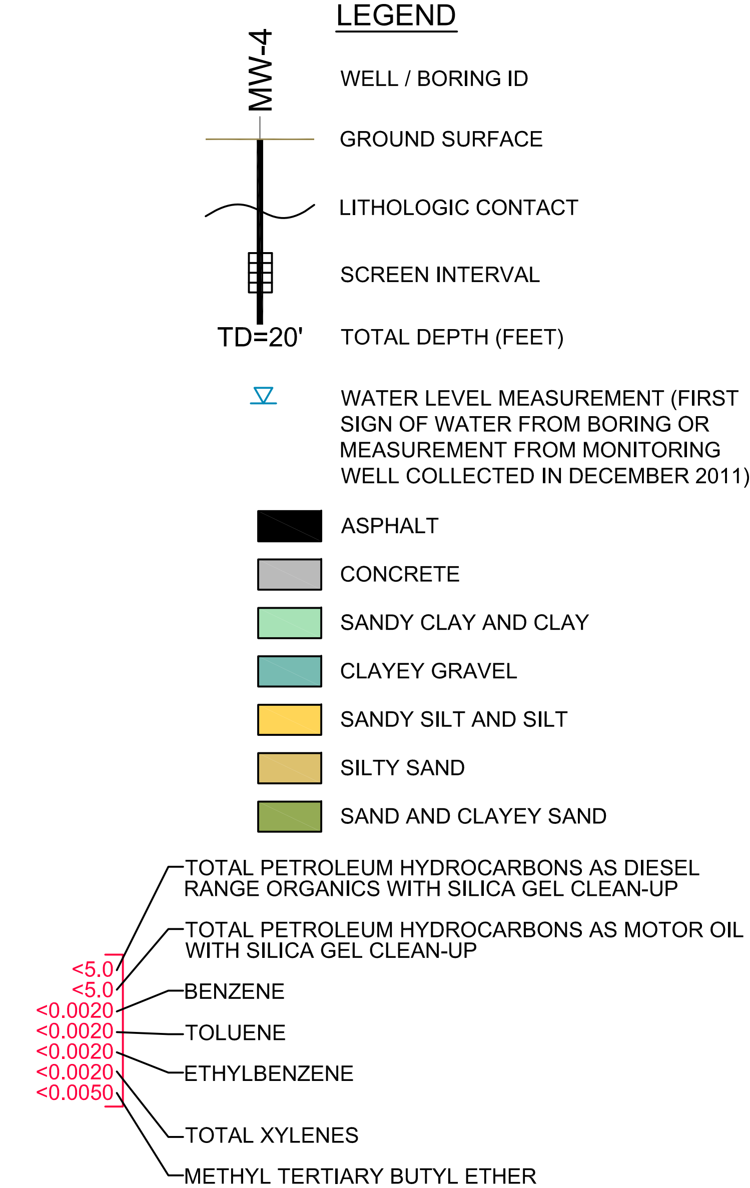
ARCADIS

FIGURE 3

XREFS: IMAGES: PROJECTNAME: ---

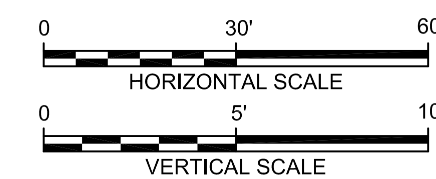


LEGEND



MW-4
WELL / BORING ID
GROUND SURFACE
LITHOLOGIC CONTACT
SCREEN INTERVAL
TD=20'
TOTAL DEPTH (FEET)
WATER LEVEL MEASUREMENT (FIRST SIGN OF WATER FROM BORING OR MEASUREMENT FROM MONITORING WELL COLLECTED IN DECEMBER 2011)
ASPHALT
CONCRETE
SANDY CLAY AND CLAY
CLAYEY GRAVEL
SANDY SILT AND SILT
SILTY SAND
SAND AND CLAYEY SAND
<5.0
<5.0
<0.0020
<0.0020
<0.0020
<0.0020
<0.0050
TOTAL PETROLEUM HYDROCARBONS AS DIESEL RANGE ORGANICS WITH SILICA GEL CLEAN-UP
TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL WITH SILICA GEL CLEAN-UP
BENZENE
TOLUENE
ETHYLBENZENE
TOTAL XYLENES
METHYL TERTIARY BUTYL ETHER

* FROM JUNE 2011 SINCE DECEMBER 2011 DATA WAS NOT AVAILABLE

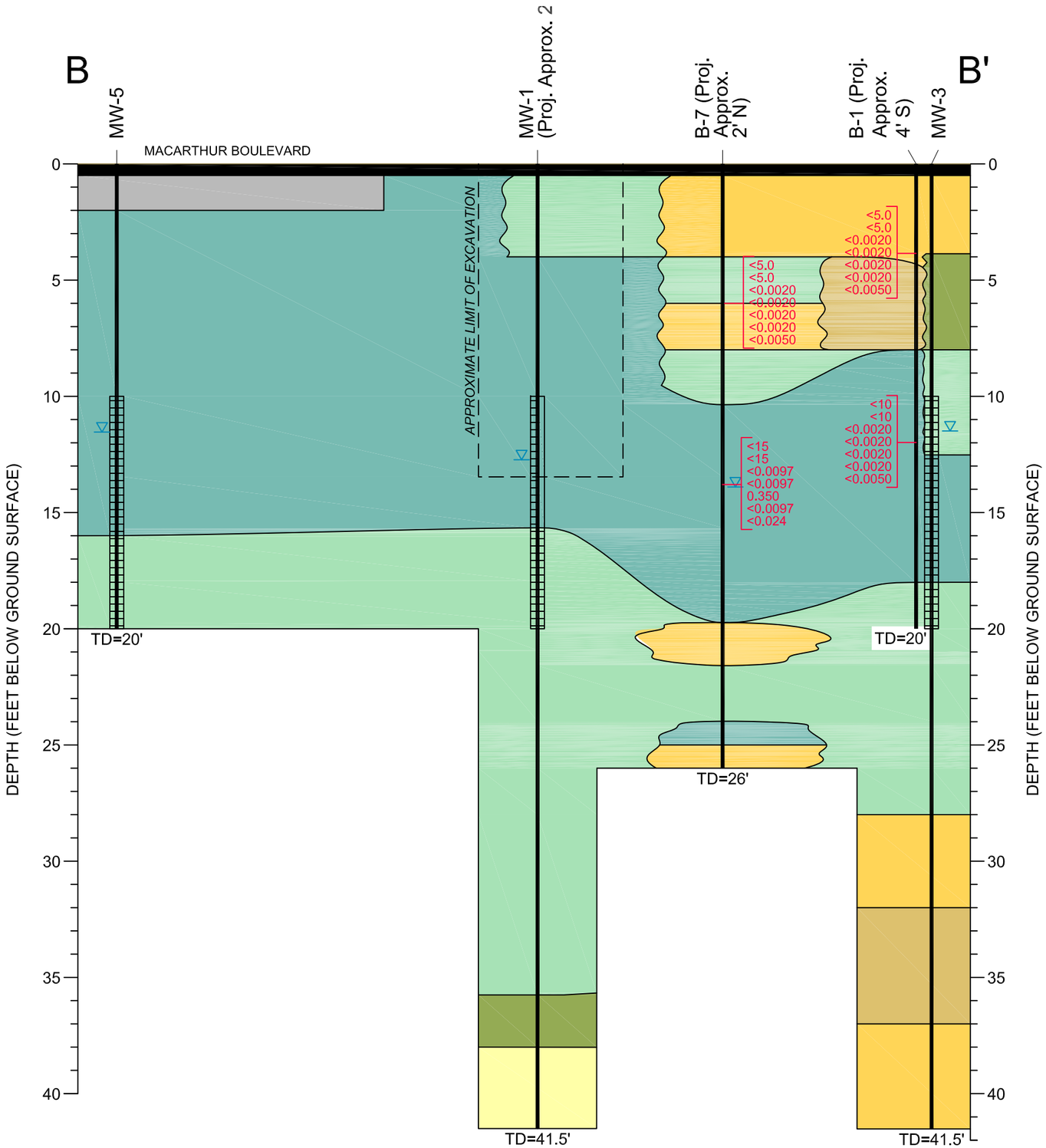


FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

CROSS SECTION A-A'

ARCADIS

FIGURE 4



LEGEND

MW-5 — WELL / BORING ID

GROUND SURFACE

LITHOLOGIC CONTACT

SCREEN INTERVAL

TD=20' — TOTAL DEPTH (FEET)

WATER LEVEL MEASUREMENT (FIRST SIGN OF WATER FROM BORING OR MEASUREMENT FROM MONITORING WELL COLLECTED IN DECEMBER 2011)

- ASPHALT
- CONCRETE
- SANDY CLAY AND CLAY
- CLAYEY GRAVEL
- SANDY SILT AND SILT
- SILTY SAND
- SAND AND CLAYEY SAND
- SAND WITH GRAVEL

TOTAL PETROLEUM HYDROCARBONS AS DIESEL RANGE ORGANICS WITH SILICA GEL CLEAN-UP

TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL WITH SILICA GEL CLEAN-UP

<5.0 — BENZENE

<5.0 — TOLUENE

<0.0020 — ETHYLBENZENE

<0.0020 — TOTAL XYLENES

<0.0020 — METHYL TERTIARY BUTYL ETHER

<0.0050

0 30' 60'
HORIZONTAL SCALE

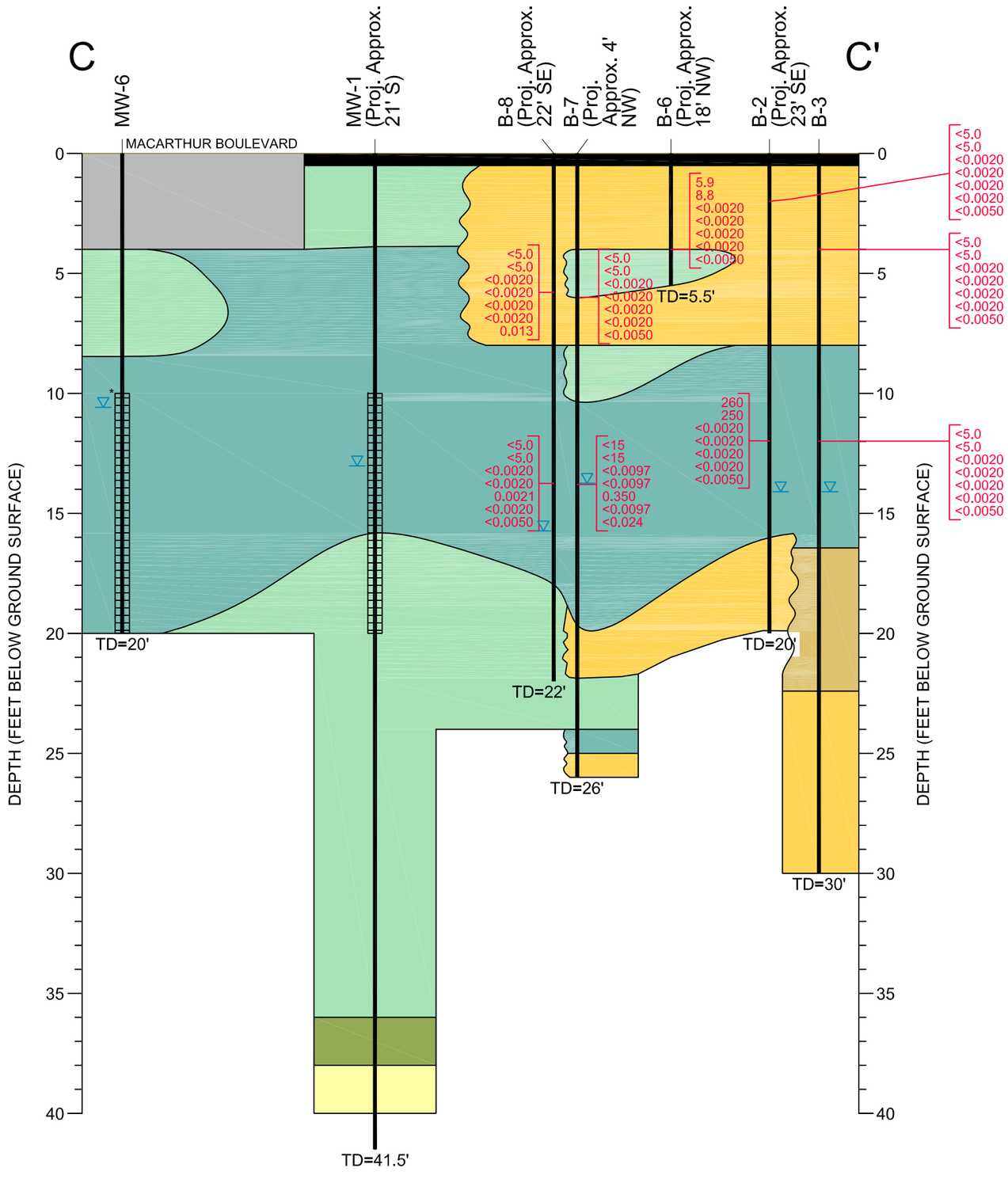
0 5' 10'
VERTICAL SCALE

FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

CROSS SECTION B-B'

ARCADIS

FIGURE 5



LEGEND

MW-6 — WELL / BORING ID

GROUND SURFACE

LITHOLOGIC CONTACT

SCREEN INTERVAL

TD=20' — TOTAL DEPTH (FEET)

WATER LEVEL MEASUREMENT (FIRST SIGN OF WATER FROM BORING OR MEASUREMENT FROM MONITORING WELL COLLECTED IN DECEMBER 2011)

- ASPHALT
- CONCRETE
- SANDY CLAY AND CLAY
- CLAYEY GRAVEL
- SANDY SILT AND SILT
- SILTY SAND
- SAND AND CLAYEY SAND
- SAND WITH GRAVEL

- TOTAL PETROLEUM HYDROCARBONS AS DIESEL RANGE ORGANICS WITH SILICA GEL CLEAN-UP
- TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL WITH SILICA GEL CLEAN-UP
- BENZENE
- TOLUENE
- ETHYLBENZENE
- TOTAL XYLENES
- METHYL TERTIARY BUTYL ETHER

* FROM JUNE 2011 SINCE DECEMBER 2011 DATA WAS NOT AVAILABLE

HORIZONTAL SCALE: 0, 30', 60'

VERTICAL SCALE: 0, 5', 10'

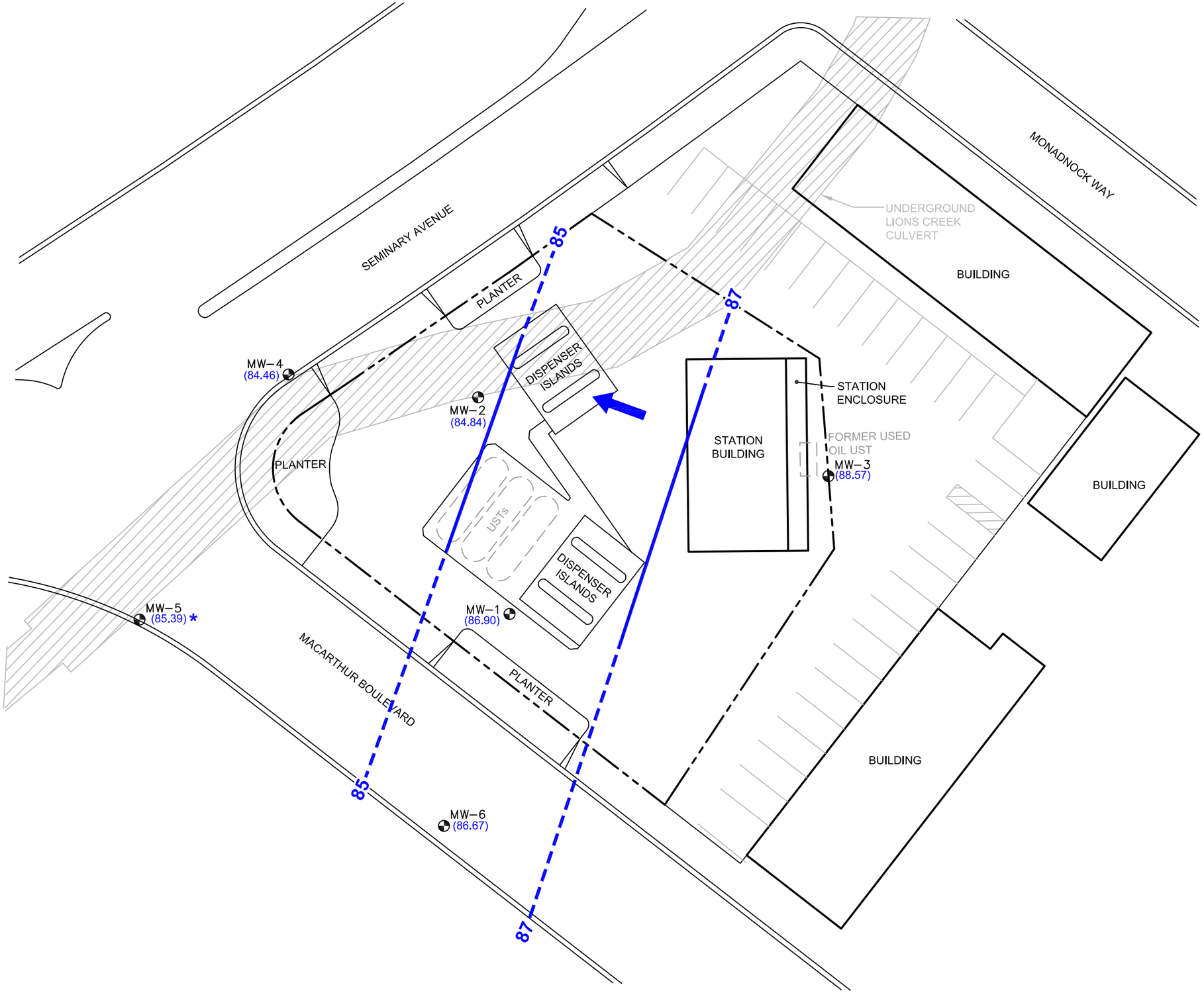
FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

CROSS SECTION C-C'

ARCADIS

FIGURE **6**

CITY: PETALUMA, CA DIV/GROUP: ENVCAD DB: (P. LISTER), J. HARRIS
G:\ENVCAD\SYRACUSE\ACTIB\006090119708\000150\DWG\609901V03.dwg LAYOUT: 6 SAVED: 12/6/2012 8:29 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 12/6/2012 8:29 AM BY: JONES, WENDY
XREFS: IMAGES: PROJECTNAME: ---
609901X00



LEGEND:

- PROPERTY LINE
- MONITORING WELL
- UST — UNDERGROUND STORAGE TANK
- (88.57) — GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (FT AMSL)
- 86 — GROUNDWATER ELEVATION CONTOUR, DASHED WHERE INFERRED (FT AMSL)
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW. HYDRAULIC GRADIENT IS APPROXIMATELY 0.027 FEET PER FOOT (FT/FT)
- * NOT USED FOR CONTOURING

NOTES:

1. BASE MAP DIGITIZED FROM A PHOTOCOPY OF A DRAWING BY CONESTOGA-ROVER ASSOCIATES (CRA) TITLED "GROUNDWATER ELEVATION AND HYDROCARBON CONCENTRATION MAP", DATED JUNE 13, 2011, @ A SCALE OF 1" = 30'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 30' 60'

GRAPHIC SCALE

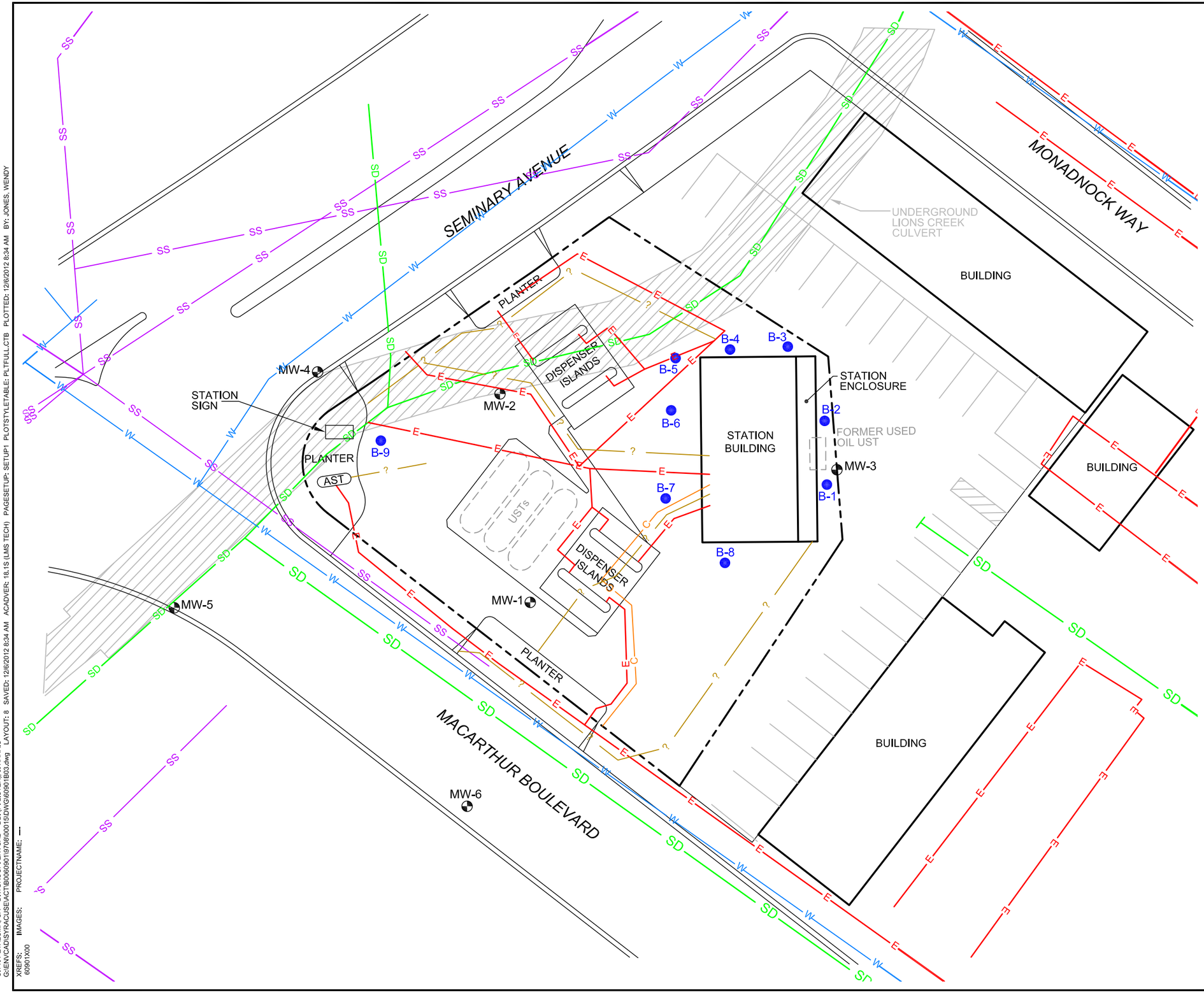
FORMER CHEVRON SERVICE STATION 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

GROUNDWATER ELEVATION CONTOUR MAP - SECOND SEMIANNUAL 2012

ARCADIS

FIGURE 7

CITY: SYRACUSE, NY DIV/GROUP: ENV/IM-DIV DB: P. LISTER PM: R. ANDRESEN TM: B. WALL TR: M. AL-JOHAR LYR: ON=*;OFF=REF
G:\ENV\CAD\SYRACUSE\ACTIVITY\B0060901\9708\000008\DWG\609001W01.dwg LAYOUT: 7 SAVED: 2/14/2013 10:26 AM ACADVER: 18.1S (LMS TECH) PAGESETUP:
XREFS: IMAGES: PROJECTNAME: ---
PLOTTED: 2/14/2013 10:27 AM BY: LISTER, PAUL



LEGEND:

- PROPERTY LINE
- MW-1 — MONITORING WELL
- B-1 — BORING LOCATION (APPROXIMATE)
- UST — UNDERGROUND STORAGE TANK
- AST — ABOVEGROUND STORAGE TANK
- W — WATER LINE
- SS — SANITARY SEWER LINE
- SD — STORM DRAIN LINE
- E — ELECTRICAL LINE
- C — COMMUNICATIONS LINE
- ? — UNIDENTIFIED LINE

NOTES:

1. BASE MAP DIGITIZED FROM A PHOTOCOPY OF A DRAWING BY CONESTOGA-ROVER ASSOCIATES (CRA) TITLED "GROUNDWATER ELEVATION AND HYDROCARBON CONCENTRATION MAP", DATED JUNE 13, 2011, AT A SCALE OF 1" = 30'.
2. ALL LOCATIONS ARE APPROXIMATE.

0 30' 60'

GRAPHIC SCALE

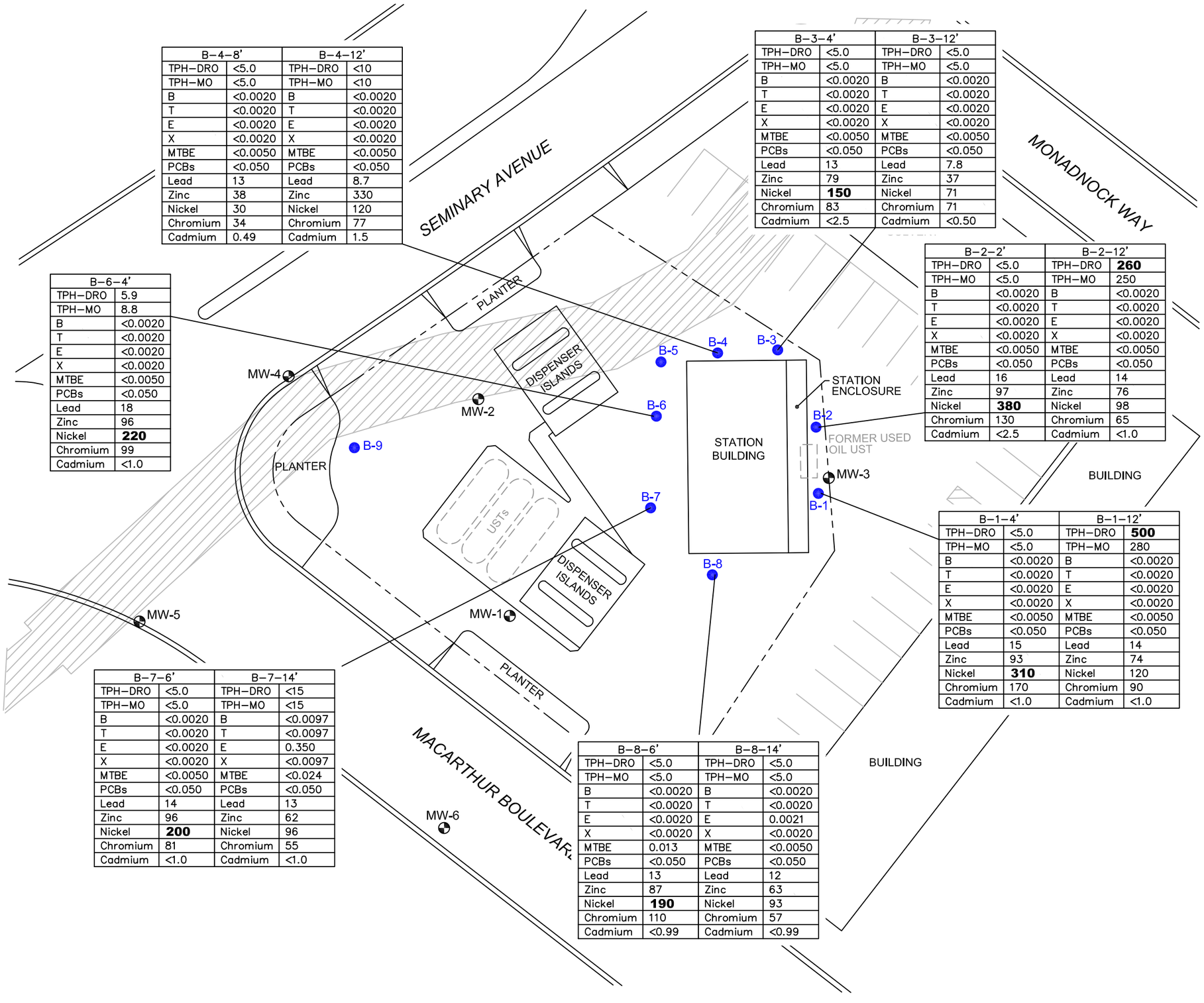
FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

SUBSURFACE UTILITY MAP

ARCADIS

FIGURE 8

CITY: PETALUMA, CA DIV/GROUP: ENVCAD DB: (P. LISTER), J. HARRIS
G:\ENVCAD\SYRACUSE\ACTIB0060901\9708\000115\DWG\609001B03.dwg LAYOUT: 8 SAVED: 12/6/2012 8:34 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP: SETUP1 PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/6/2012 8:34 AM BY: JONES, WENDY
XREFS: 609001X00 IMAGES: PROJECTNAME: ---



B–4–8’		B–4–12’	
TPH–DRO	<5.0	TPH–DRO	<10
TPH–MO	<5.0	TPH–MO	<10
B	<0.0020	B	<0.0020
T	<0.0020	T	<0.0020
E	<0.0020	E	<0.0020
X	<0.0020	X	<0.0020
MTBE	<0.0050	MTBE	<0.0050
PCBs	<0.050	PCBs	<0.050
Lead	13	Lead	8.7
Zinc	38	Zinc	330
Nickel	30	Nickel	120
Chromium	34	Chromium	77
Cadmium	0.49	Cadmium	1.5

B–3–4’		B–3–12’	
TPH–DRO	<5.0	TPH–DRO	<5.0
TPH–MO	<5.0	TPH–MO	<5.0
B	<0.0020	B	<0.0020
T	<0.0020	T	<0.0020
E	<0.0020	E	<0.0020
X	<0.0020	X	<0.0020
MTBE	<0.0050	MTBE	<0.0050
PCBs	<0.050	PCBs	<0.050
Lead	13	Lead	7.8
Zinc	79	Zinc	37
Nickel	**150**	Nickel	71
Chromium	83	Chromium	71
Cadmium	<2.5	Cadmium	<0.50

B–6–4’	
TPH–DRO	5.9
TPH–MO	8.8
B	<0.0020
T	<0.0020
E	<0.0020
X	<0.0020
MTBE	<0.0050
PCBs	<0.050
Lead	18
Zinc	96
Nickel	**220**
Chromium	99
Cadmium	<1.0

B–2–2’		B–2–12’	
TPH–DRO	<5.0	TPH–DRO	**260**
TPH–MO	<5.0	TPH–MO	250
B	<0.0020	B	<0.0020
T	<0.0020	T	<0.0020
E	<0.0020	E	<0.0020
X	<0.0020	X	<0.0020
MTBE	<0.0050	MTBE	<0.0050
PCBs	<0.050	PCBs	<0.050
Lead	16	Lead	14
Zinc	97	Zinc	76
Nickel	**380**	Nickel	98
Chromium	130	Chromium	65
Cadmium	<2.5	Cadmium	<1.0

B–1–4’		B–1–12’	
TPH–DRO	<5.0	TPH–DRO	**500**
TPH–MO	<5.0	TPH–MO	280
B	<0.0020	B	<0.0020
T	<0.0020	T	<0.0020
E	<0.0020	E	<0.0020
X	<0.0020	X	<0.0020
MTBE	<0.0050	MTBE	<0.0050
PCBs	<0.050	PCBs	<0.050
Lead	15	Lead	14
Zinc	93	Zinc	74
Nickel	**310**	Nickel	120
Chromium	170	Chromium	90
Cadmium	<1.0	Cadmium	<1.0

B–7–6’		B–7–14’	
TPH–DRO	<5.0	TPH–DRO	<15
TPH–MO	<5.0	TPH–MO	<15
B	<0.0020	B	<0.0097
T	<0.0020	T	<0.0097
E	<0.0020	E	0.350
X	<0.0020	X	<0.0097
MTBE	<0.0050	MTBE	<0.024
PCBs	<0.050	PCBs	<0.050
Lead	14	Lead	13
Zinc	96	Zinc	62
Nickel	**200**	Nickel	96
Chromium	81	Chromium	55
Cadmium	<1.0	Cadmium	<1.0

B–8–6’		B–8–14’	
TPH–DRO	<5.0	TPH–DRO	<5.0
TPH–MO	<5.0	TPH–MO	<5.0
B	<0.0020	B	<0.0020
T	<0.0020	T	<0.0020
E	<0.0020	E	0.0021
X	<0.0020	X	<0.0020
MTBE	0.013	MTBE	<0.0050
PCBs	<0.050	PCBs	<0.050
Lead	13	Lead	12
Zinc	87	Zinc	63
Nickel	**190**	Nickel	93
Chromium	110	Chromium	57
Cadmium	<0.99	Cadmium	<0.99

LEGEND:

- PROPERTY LINE
- MW-1 MONITORING WELL
- B-1 BORING LOCATION (APPROXIMATE)
- UST UNDERGROUND STORAGE TANK

TPH-DRO = TOTAL PETROLEUM HYDROCARBONS AS DIESEL RANGE ORGANICS
TPH-MO = TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
B = BENZENE
T = TOLUENE
E = ETHYLBENZENE
X = TOTAL XYLENES
MTBE = METHYL TERTIARY BUTYL ETHER
PCBS = POLYCHLORINATED BIPHENYSL (ALL AROCLORS)
BOLD = EXCEEDING RESPECTIVE ESL

NOTES:

1. BASE MAP DIGITIZED FROM A PHOTOCOPY OF A DRAWING BY CONESTOGA-ROVER ASSOCIATES (CRA) TITLED "GROUNDWATER ELEVATION AND HYDROCARBON CONCENTRATION MAP", DATED JUNE 13, 2011, AT A SCALE OF 1" = 30'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ALL RESULTS ARE REPORTED IN MILLIGRAMS PER KILOGRAM.
4. TPH-DRO AND TPH-MO RESULTS WERE ANALYZED WITH SILICA GEL CLEAN-UP.

0 30’ 60’
GRAPHIC SCALE

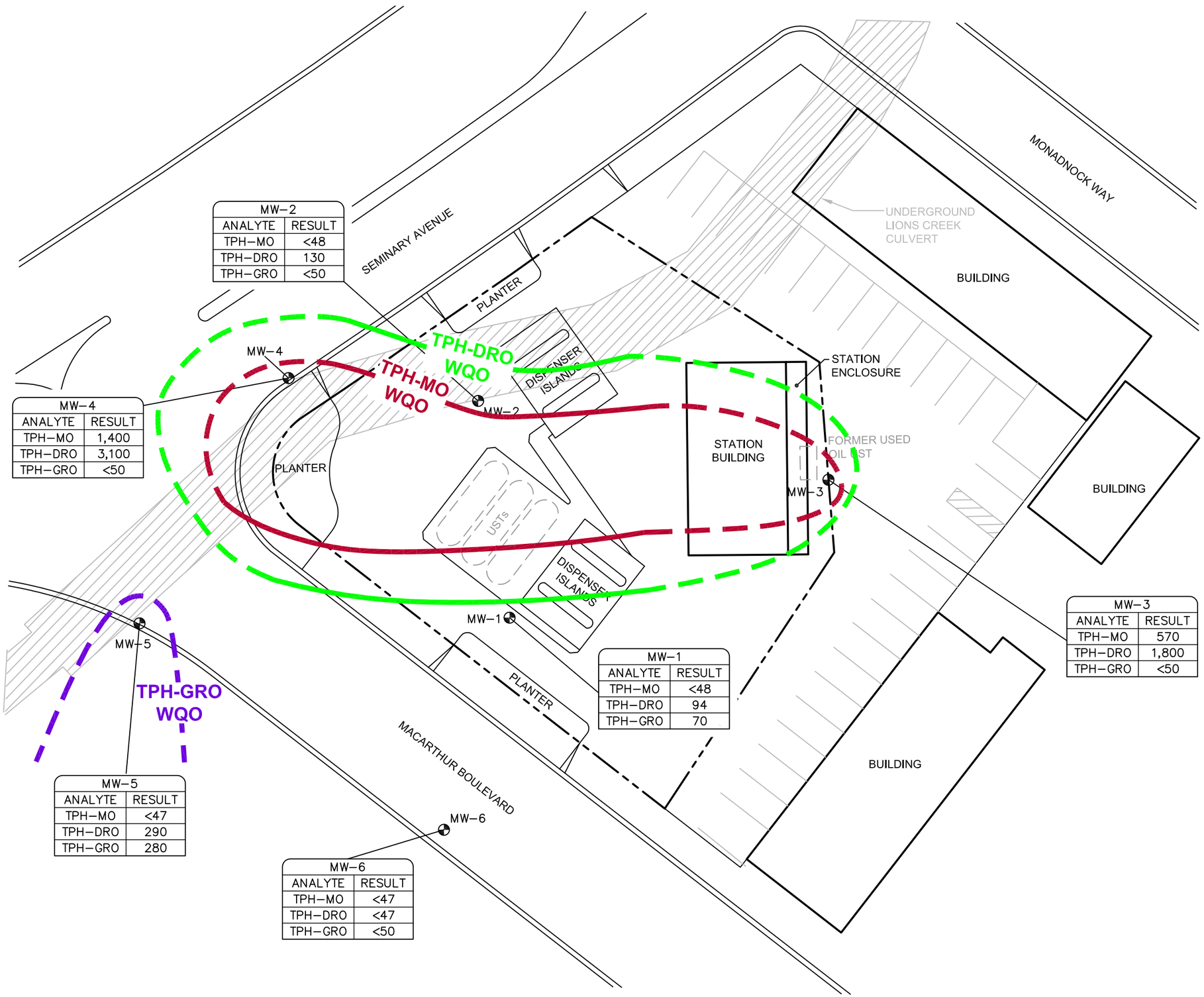
FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

SOIL CONCENTRATION DISTRIBUTION MAP

ARCADIS

FIGURE
9

CITY: PETALUMA, CA DIV/GROUP: ENVCAD DB: (P. LISTER), J. HARRIS
G:\ENVCAD\SYRACUSE\ACTIB0060901\9708\00015\DWG\60901B04.dwg LAYOUT: 9 SAVED: 12/6/2012 8:35 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 12/6/2012 8:36 AM BY: JONES, WENDY
XREFS: IMAGES: PROJECTNAME: ---
60901X00



LEGEND:

- PROPERTY LINE
- MONITORING WELL
- UST — UNDERGROUND STORAGE TANK
- TPH-MO — TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
- TPH-DRO — TOTAL PETROLEUM HYDROCARBONS AS DIESEL
- TPH-GRO — TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- < = — NOT DETECTED ABOVE DETECTION LIMIT INDICATED
- TPH-DRO WQO CONTOUR
- TPH-MO WQO CONTOUR
- TPH-GRO WQO CONTOUR
- WQO — WATER QUALITY OBJECTIVE EQUAL TO 100 MICROGRAMS PER LITER FOR TPH-GRO, TPH-DRO AND TPH-MO

NOTES:

1. BASE MAP DIGITIZED FROM A PHOTOCOPY OF A DRAWING BY CONESTOGA-ROVER ASSOCIATES (CRA) TITLED "GROUNDWATER ELEVATION AND HYDROCARBON CONCENTRATION MAP", DATED JUNE 13, 2011, @ A SCALE OF 1" = 30'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ALL CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER.

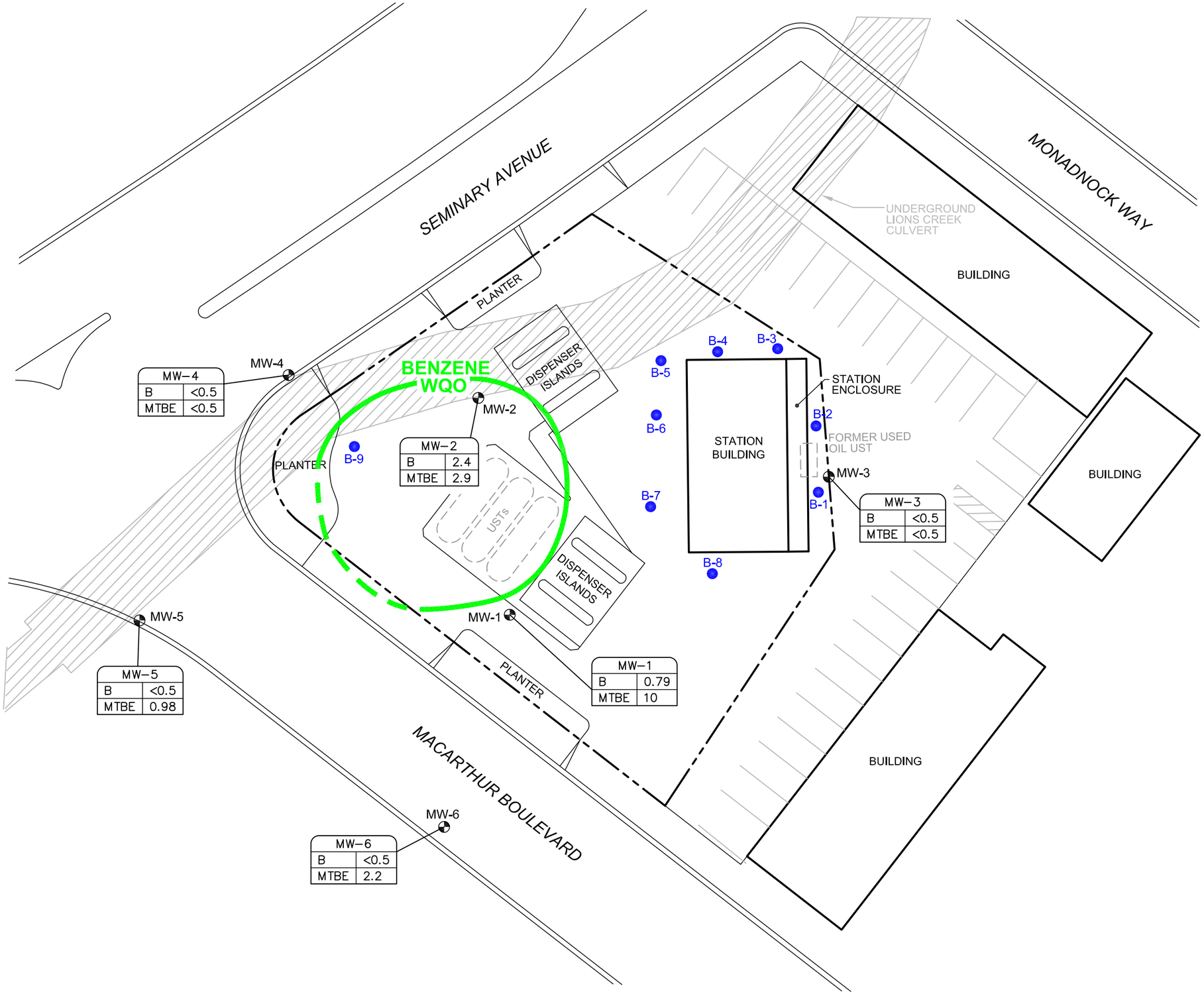
0 30' 60'
GRAPHIC SCALE

FORMER CHEVRON SERVICE STATION 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

TPH CONCENTRATION MAP - SECOND SEMIANNUAL 2012

ARCADIS

FIGURE **10**



LEGEND:

- PROPERTY LINE
- MW-1 — MONITORING WELL
- B-1 — BORING LOCATION (APPROXIMATE)
- UST — UNDERGROUND STORAGE TANK
- BENZENE WQO CONTOUR
- WQO — WATER QUALITY OBJECTIVE EQUAL TO 1.0 MICROGRAMS PER LITER FOR BENZENE AND 12 MICROGRAMS PER LITER FOR MTBE

SAMPLE ID	
B	<0.5
MTBE	<0.5

- B — BENZENE
- MTBE — METHYL TERTIARY BUTYL ETHER

NOTES:

1. BASE MAP DIGITIZED FROM A PHOTOCOPY OF A DRAWING BY CONESTOGA-ROVER ASSOCIATES (CRA) TITLED "GROUNDWATER ELEVATION AND HYDROCARBON CONCENTRATION MAP", DATED JUNE 13, 2011, AT A SCALE OF 1" = 30'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ALL CONCENTRATIONS REPORTED IN MICROGRAMS PER LITER.

0 30' 60'

GRAPHIC SCALE

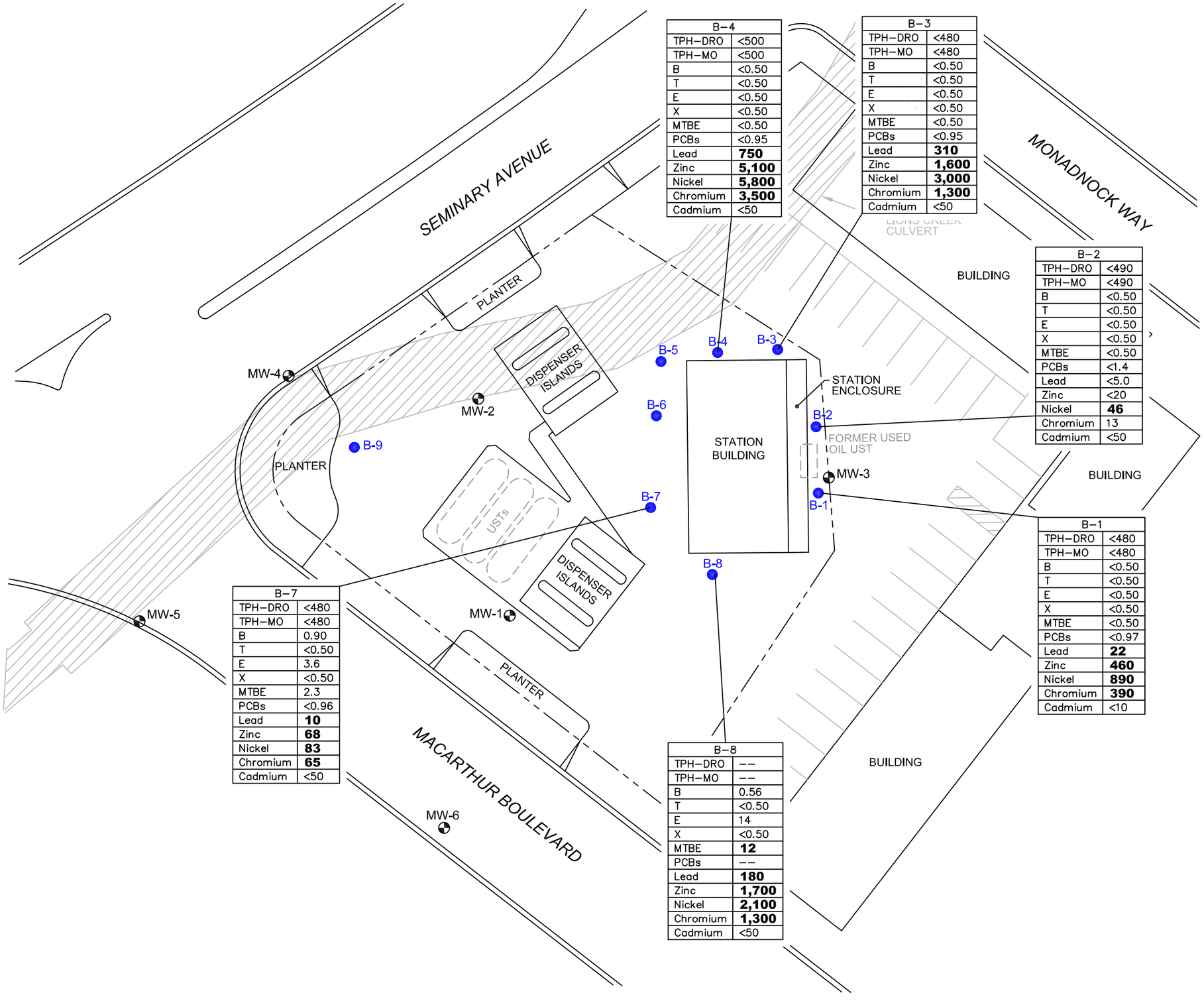
FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

BENZENE AND MTBE - CONCENTRATION MAP - SECOND QUARTER 2012

ARCADIS

FIGURE 11

CITY: PETALUMA, CA DIV/GROUP: ENVCAD DB: (P. LISTER), J. HARRIS
G:\ENVCAD\SYRACUSE\ACTIB\60609\01\97080\0014\DWG\60901C03.dwg LAYOUT: 11 SAVED: 3/25/2013 12:56 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/25/2013 12:56 PM BY: JONES, WENDY
XREFS: IMAGES: PROJECTNAME: ---
60901X00



B–4	
TPH–DRO	<500
TPH–MO	<500
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50
PCBs	<0.95
Lead	**750**
Zinc	**5,100**
Nickel	**5,800**
Chromium	**3,500**
Cadmium	<50

B–3	
TPH–DRO	<480
TPH–MO	<480
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50
PCBs	<0.95
Lead	**310**
Zinc	**1,600**
Nickel	**3,000**
Chromium	**1,300**
Cadmium	<50

B–2	
TPH–DRO	<490
TPH–MO	<490
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50
PCBs	<1.4
Lead	<5.0
Zinc	<20
Nickel	**46**
Chromium	13
Cadmium	<50

B–1	
TPH–DRO	<480
TPH–MO	<480
B	<0.50
T	<0.50
E	<0.50
X	<0.50
MTBE	<0.50
PCBs	<0.97
Lead	**22**
Zinc	**460**
Nickel	**890**
Chromium	**390**
Cadmium	<10

B–7	
TPH–DRO	<480
TPH–MO	<480
B	0.90
T	<0.50
E	3.6
X	<0.50
MTBE	2.3
PCBs	<0.96
Lead	**10**
Zinc	**68**
Nickel	**83**
Chromium	**65**
Cadmium	<50

B–8	
TPH–DRO	--
TPH–MO	--
B	0.56
T	<0.50
E	14
X	<0.50
MTBE	**12**
PCBs	--
Lead	**180**
Zinc	**1,700**
Nickel	**2,100**
Chromium	**1,300**
Cadmium	<50

LEGEND:

- PROPERTY LINE
- MW-1 MONITORING WELL
- B-1 BORING LOCATION (APPROXIMATE)
- UST UNDERGROUND STORAGE TANK

TPH-DRO = TOTAL PETROLEUM HYDROCARBONS AS DIESEL RANGE ORGANICS
TPH-MO = TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
B = BENZENE
T = TOLUENE
E = ETHYLBENZENE
X = TOTAL XYLENES
MTBE = METHYL TERTIARY BUTYL ETHER
PCBS = POLYCHLORINATED BIPHENYSL (ALL AROCLORS)
BOLD = EXCEEDING RESPECTIVE EXCEEDING RESPECTIVE SAN FRANCISCO REGIONAL WATER QUALITY CONTROL BOARD ENVIRONMENTAL SCREENING LEVELS
-- = NOT ANALYZED

NOTES:

1. BASE MAP DIGITIZED FROM A PHOTOCOPY OF A DRAWING BY CONESTOGA-ROVER ASSOCIATES (CRA) TITLED "GROUNDWATER ELEVATION AND HYDROCARBON CONCENTRATION MAP", DATED JUNE 13, 2011, AT A SCALE OF 1" = 30'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ALL RESULTS ARE REPORTED IN MICROGRAMS PER LITER.
4. TPH-DRO AND TPH-MO RESULTS WERE ANALYZED WITH SILICA GEL CLEAN-UP.

0 30' 60'
GRAPHIC SCALE

FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA
SITE CLOSURE REQUEST

GRAB GROUNDWATER CONCENTRATION DISTRIBUTION MAP

ARCADIS

FIGURE
12

CITY: PETALUMA, CA DIV/GROUP: ENVCAD DB: (P. LISTER), J. HARRIS R. BASSETT
G:\ENVCAD\SYRACUSE\ACTIB\0060901\9708\000141DWG\60901C02.dwg LAYOUT: 12 SAVED: 3/25/2013 12:03 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 3/25/2013 12:03 PM BY: JONES, WENDY
XREFS: IMAGES: PROJECTNAME: ---
60901X00

LEGEND:

- SITE LOCATION
- MONITORING WELL
- CAT WELL
- IRRIGATION WELL
- TEST WELL
- UNKNOWN
- ABANDONED WELL
- QUARTER MILE RADIUS

AREA LOCATION

Notes:

Aerial photography obtained from ESRI Inc, Arc GIS Online/Bing Maps

FORMER CHEVRON SERVICE STATION NO. 9-9708
5910 MACARTHUR BOULEVARD, OAKLAND, CA

SITE CLOSURE REQUEST

WELL SURVEY

ARCADIS

FIGURE
13

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT #:B0060901.9708.00002
PATH: Q:\Chevron\SiteID9-9708\SiteClosureReport\mxd\WaterSupplyWells.mxd 12/5/2012 12:17:28 PM

Appendix A

Boring Logs

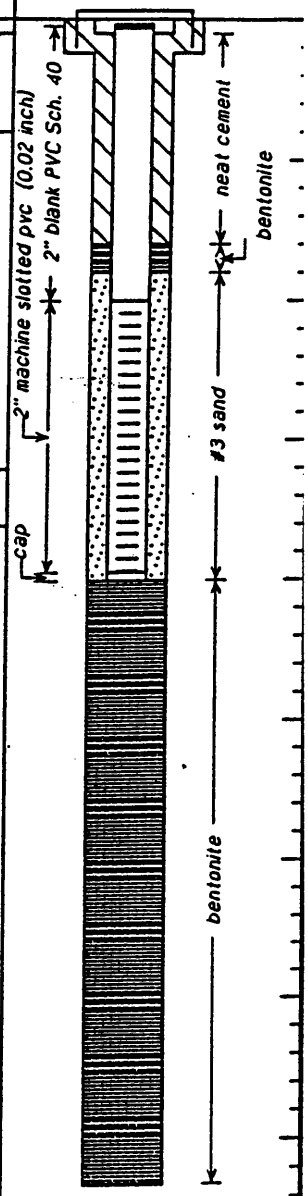
Gettler-Ryan, Inc.

Log of Boring MW-1

PROJECT: *Chevron SS# 9-9708*	LOCATION: *5910 MacArthur Boulevard, Oakland, CA*
G-R PROJECT NO. : *6395.01*	SURFACE ELEVATION: *96.61 feet MSL*
DATE STARTED: *05/22/97*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *05/23/97*	WL (ft. bgs): *12.21* DATE: *06/04/97* TIME: *13:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *41.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *Barbara Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SAMPLE INT.	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
						CL	ASPHALT
							SANDY CLAY (CL) – very dark brown (10YR 2/2), damp, stiff, low plasticity; 70% clay, 30% fine to coarse sand, trace gravel.
						GC	
5	0	38	MW1-8				CLAYEY GRAVEL (GC) – dark brown (7.5YR 4/2), damp, dense, 80% angular to subrounded gravel, 20% clay.
10	23	34	MW1-11				
15	215	19	MW1-15.5				Color changes to olive gray (5Y 5/2) at 15 feet.
	171	19	MW1-16			CL	SANDY CLAY (CL) – yellowish brown (10YR 5/4), moist, very stiff, low plasticity; 70% clay, 30% fine to coarse sand, trace fine gravel.
						CL	
20	9	17	MW1-21				CLAY (CL) – pale brown (10YR 6/3), damp, very stiff, medium plasticity ; 100% clay.
25	39	21	MW1-25				
30	7	14	MW1-31				Color changes to brown (10YR 5/3); becomes moist at 30 feet.
35	0	22	MW1-36				
						SC	CLAYEY SAND (SC) – brown (10YR 5/3), moist, medium dense; 60% fine to coarse sand, 40% clay.
						SW	
40	12	38	MW1-41				SAND WITH GRAVEL (SW) – brown (10YR 5/3), moist, dense; 60% fine to coarse sand, 30% angular to well rounded fine gravel, 10% clay.
45							(* = converted to equivalent standard penetration blows/ft.)

WELL DIAGRAM



JOB NUMBER: *6395.01*

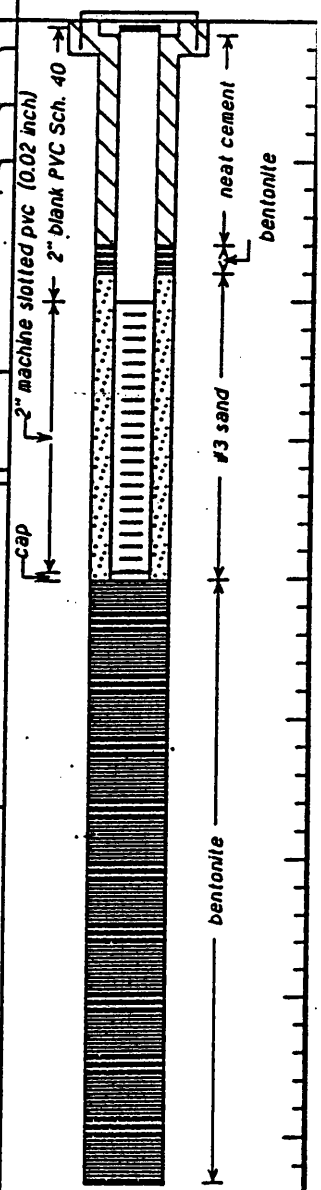
Gettler-Ryan, Inc.

Log of Boring MW-2

PROJECT: *Chevron SS# 9-9708*	LOCATION: *5910 MacArthur Boulevard, Oakland, CA*
G-R PROJECT NO. : *6395.01*	SURFACE ELEVATION: *96.91 feet MSL*
DATE STARTED: *05/22/97*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *05/23/97*	WL (ft. bgs): *12.95* DATE: *06/04/97* TIME: *13:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *41.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *Barbara Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				CL	ASPHALT OVER BASEROCK
				CL	SANDY CLAY (CL) – very dark brown (10YR 2/2), damp, stiff, low plasticity; 70% clay, 30% fine to coarse sand, trace fine gravel.
5	0	3	MW2-8	CL	CLAY (CL) – dark yellowish brown (10YR 4/8), damp, stiff, medium plasticity; 80% clay, 15% fine to coarse sand, 5% subrounded to well rounded fine gravel.
10	12	4	MW2-11		SANDY CLAY (CL) – dark yellowish brown (10YR 4/8), moist, soft, low plasticity; 60% clay, 30% fine to coarse sand, 10% subrounded to well rounded fine to coarse gravel.
				GC	Color changes to very dark brown (10YR 2/2) mottled reddish brown (5YR 4/4); with lenses of clayey sand; with wood pieces.
15	226	29	MW2-15.5		
	68	29	MW2-16	CL	CLAYEY GRAVEL WITH SAND (GC) – dark grayish brown (2.5Y 4/2), moist, medium dense; 40% angular to subrounded fine to coarse grave, 30% fine to coarse sand, 30% clay.
				CL	
20	16	13	MW2-21		SANDY CLAY (CL) – olive yellow (2.5Y 6/4), moist, stiff, low plasticity; 70% clay, 30% fine sand.
					CLAY (CL) – olive yellow (2.5Y 6/4) damp, very stiff, medium plasticity; 100% clay; waited 0.5 hr – no water in the hole.
25	22	22	MW2-26		Color changes to brown (10YR 5/3) mottled strong brown (7.5YR 5/8) at 20 feet.
				GC	With up to 10% fine to coarse sand, trace well rounded fine gravel at 25 feet.
30	67	66	MW2-31		CLAYEY GRAVEL WITH SAND (GC) – yellowish brown (10YR 5/4), damp, very dense; 40% angular to subrounded fone to coarse gravel, 40 % fine to coarse sand, 20% clay.
35	0	51	MW2-36	SM	SILTY SAND (SM) – yellowish brown (10YR 5/4), moist, very dense; 70% fine sand, 30% silt, trace subrounded to well rounded fine gravel.
				CL	
40	0	24	MW2-41		CLAY (CL) – yellowish brown (10YR 5/4), damp, very stiff, low plasticity; 90% clay, 10% fine sand.
45					(* = converted to equivalent standard penetration blows/ft.)

WELL DIAGRAM



JOB NUMBER: *6395.01*

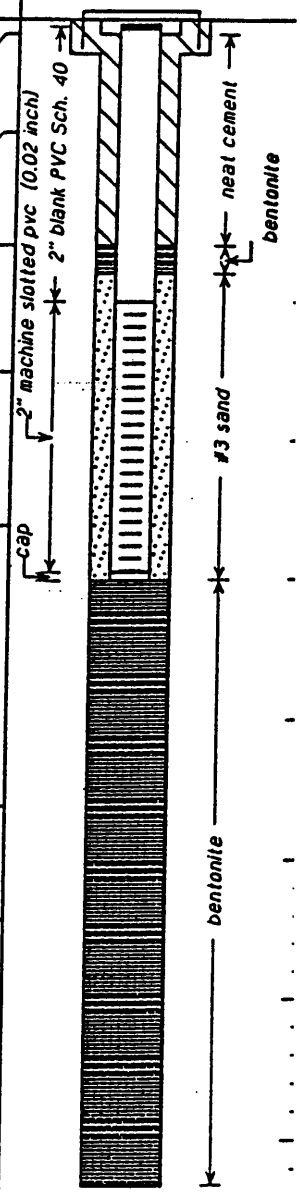
Gettler-Ryan, Inc.

Log of Boring MW-3

PROJECT: *Chevron SS# 9-9708*	LOCATION: *5910 MacArthur Boulevard, Oakland, CA*
G-R PROJECT NO. : *6395.01*	SURFACE ELEVATION: *97.86 feet MSL*
DATE STARTED: *05/22/97*	WL (ft. bgs): DATE: TIME:
DATE FINISHED: *05/23/97*	WL (ft. bgs): *11.28* DATE: *06/04/97* TIME: *13:00*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *41.5 Feet*
DRILLING COMPANY: *Bay Area Exploration, Inc.*	GEOLOGIST: *Barbara Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
				CL	ASPHALT
					CLAY (CL) – very dark brown (10YR 2/2), damp, stiff, low plasticity; 85% clay, 15% fine to coarse sand, trace fine gravel.
5	0	4	MW3-6	SC	CLAYEY SAND (SC) – dark brown (10YR 3/3), moist, loose; 50% fine to coarse sand, 45% clay, 5% subrounded to well rounded fine gravel.
10	17	27	MW3-11	CL	SANDY CLAY WITH GRAVEL (CL) – dark brown (10YR 3/3), moist, very stiff , low plasticity; 65% clay, 30% fine to coarse sand, 5% subrounded to well rounded fine to coarse gravel.
15	35	24	MW3-16	GC	CLAYEY GRAVEL WITH SAND (GC) – dark grayish brown 92.5Y 4/2), moist to saturated (clay matrix), medium dense; 40% angular to subrounded fine to coarse gravel, 30% fine to coarse sand, 30% clay; no water in the hole.
20	0	14	MW3-21	CL	CLAY (CL) – brown (10YR 5/3), moist, stiff, medium plasticity; 100% clay. Pulled out 5 feet of augers and waited 20 minutes – no water in the hole at 20 feet.
25	0	10	MW3-26		
30	27	28	MW3-31	ML	SANDY SILT (ML) – light yellowish brown (10YR 6/4), moist, dense; 55% silt, 40% fine sand, 5% well rounded fine gravel.
35	8.7	44	MW3-36	SM	SILTY SAND (SM) – light olive brown (2.5Y 5/6), damp, very dense; 70% fine sand, 30% silt; with lenses (up to 1 inch thick) of fine to coarse sand with subrounded to well rounded fine gravel.
40	102	43	MW3-41	ML	SANDY SILT (ML) – light olive brown (2.5Y 5/6), moist, low lasticity, hard; 60% silt, 40% fine sand.
45					(* = converted to equivalent standard penetration blows/ft.)

WELL DIAGRAM



JOB NUMBER: *6395.01*

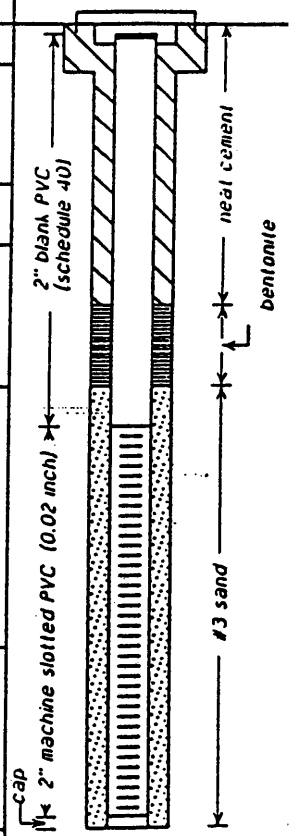
Gettler-Ryan, Inc.

Log of Boring MW-4

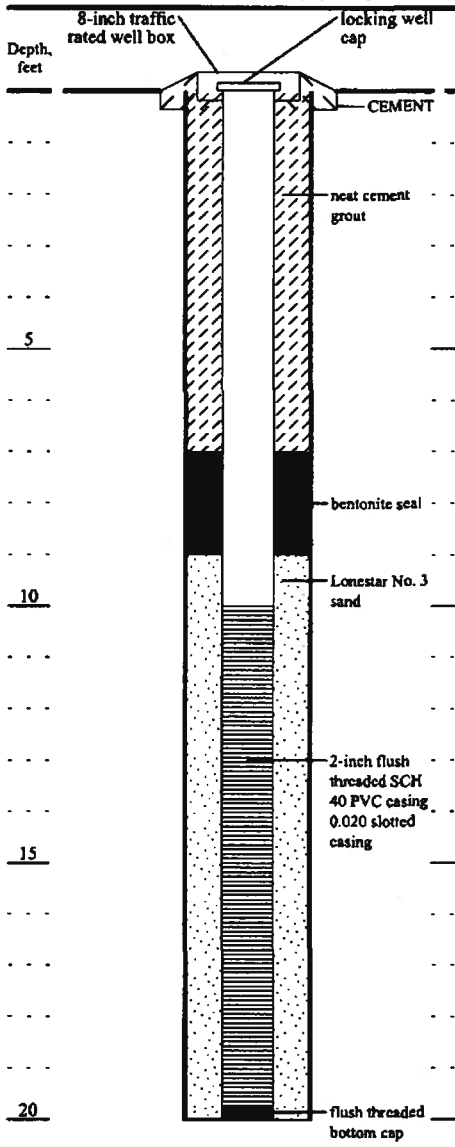
PROJECT: *Chevron SS #9-9708*	LOCATION: *5910 MacArthur Boulevard, Oakland, CA.*
GR PROJECT NO. : *346395.02*	SURFACE ELEVATION: *96.25ft. MSL*
DATE STARTED: *04/13/99*	WL (ft. bgs): *12.0* DATE: *04/13/99* TIME: *15:30*
DATE FINISHED: *04/13/99*	WL (ft. bgs): *12.0* DATE: *04/13/99* TIME: *16:25*
DRILLING METHOD: *8 in. Hollow Stem Auger*	TOTAL DEPTH: *20.0 Feet*
DRILLING COMPANY: *Bay Area Exploration Inc.*	GEOLOGIST: *Barbara Sieminski*

DEPTH feet	PID (ppm)	BLOWS/FT. *	SAMPLE NUMBER	SOIL CLASS	GEOLOGIC DESCRIPTION
					PAVEMENT - Concrete over baserock
				Fill	SILTY GRAVEL WITH SAND - yellowish brown (10YR 5/4), moist, dense; 50% fine to coarse gravel, 30% fine to coarse sand, 20% silt; fill.
5				CL - GC/SC	CLAY (CL) - very dark grayish brown (10YR 3/2) mottled pale brown (10 YR 6/3), moist, low plasticity, soft; 70% clay, 30% fine to caorse sand, trace gravel.
	0	3	MW4-6		CLAYEY GRAVEL WITH SAND (GC/SC) - strong brown (7.5YR 5/6), moist, loose; 45% fine to coarse gravel, 30% fine to coarse sand, 25% clay.
10				CL	SANDY CLAY WITH GRAVEL (CL) - very dark gray (10YR 3/1), moist, plasticity, medium stiff; 50% clay, 25% fine to coarse sand, 25 % fine to caorse gravel.
	0	6	MW4-11.5		Becomes saturated at 12 feet bgs.
15					
	0	12	MW4-16	GC	CLAYEY GRAVEL WITH SAND (GC) - brown (10YR 5/3), saturated, medium dense; 45% fine to coarse gravel, 30% fine to coatse sand, 25% clay.
	0	17	MW4-19.5		
20					Bottom of boring at 20.0 feet.
					(* = converted to equivalent standard penetration blows/ft.)
25					
30					
35					

WELL DIAGRAM



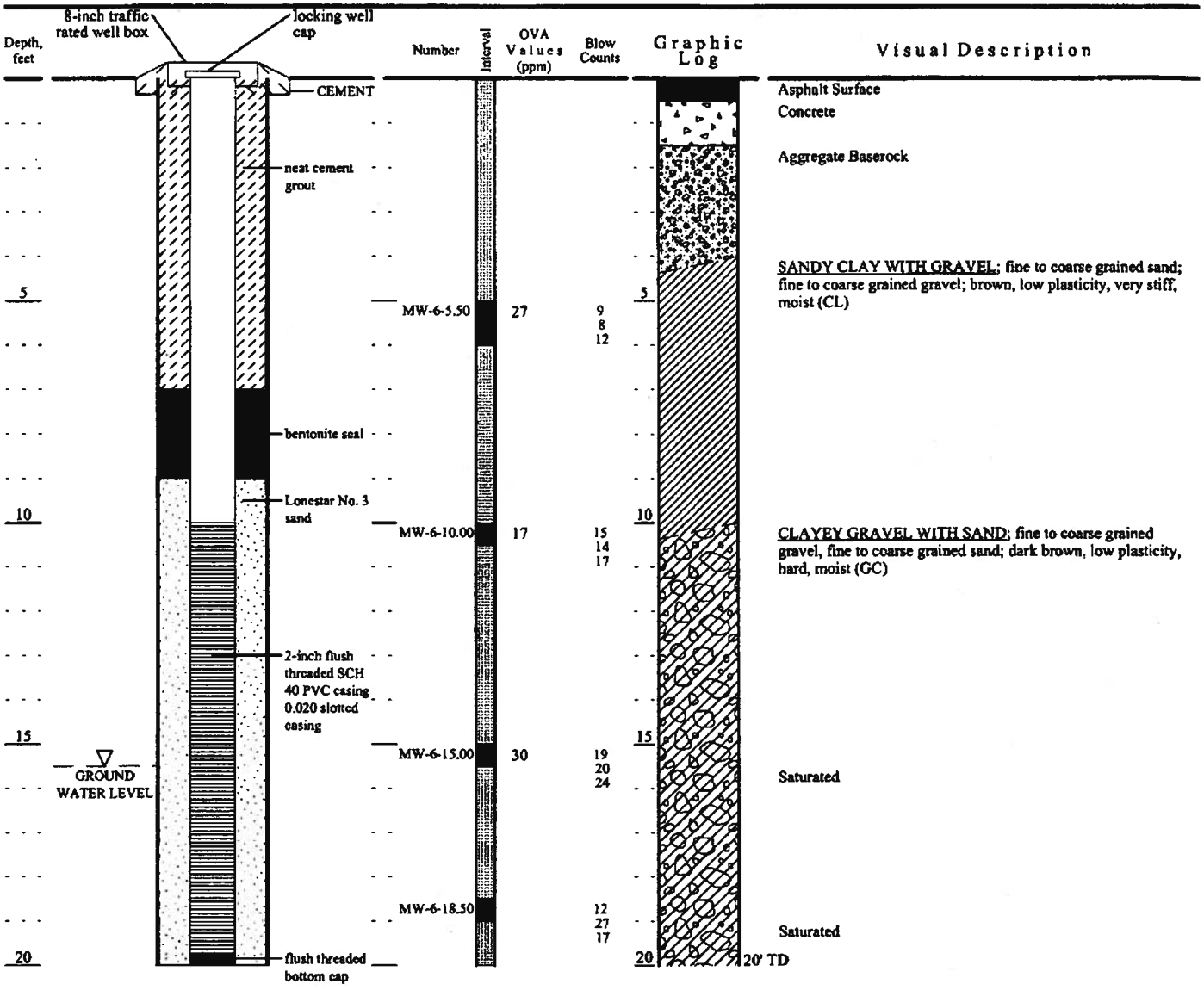
Delta Environmental Consultants, Inc.	Street Address: 5910 MacArthur Boulevard	Project ID: Chevron Station No. 9-9708	
	City & State: Oakland, Ca.	Surface Elev.: 96.04'	Well / Boring ID: MW-5
	Delta Project #: DG99-708	Casing Elev.: 95.71'	Total Depth: 20'



Dates and Times	Logger: Brett Bardsley	Sampling Method & Diameter: 2-inch ID split spoon	Permitting Agency: Alameda County Public Works Agency
Start: 1/25/02 1100	Drilling Company & Driller: Cascade Drilling, Inc., JD	Bore Hole Diameter: 8.25-inches	Permit #: W01-2162
Total Depth: 1/25/02 1515	Drillers C-57#: 717510	Diameter, Type & Slot Size of Casing: 2-inch SCH 40 PVC/0.020 slot	
Completion or backfill: 1/25/02 1600	Drilling Equipment and method: CME-75, hollow stem auger		Page 1 of 1

WELL DG99-708.GPJ 4/10/02

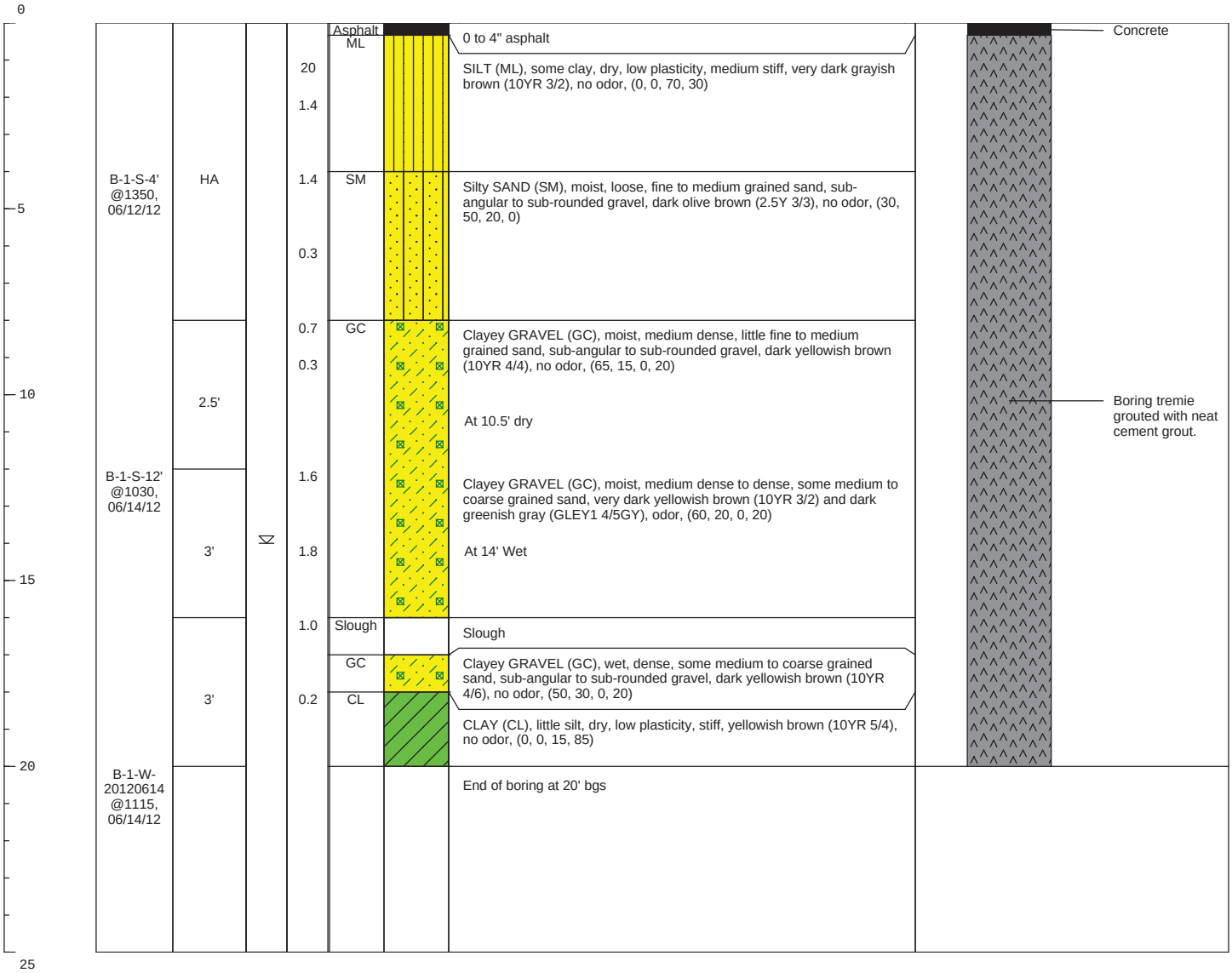
Delta Environmental Consultants, Inc.	Street Address: 5910 MacArthur Boulevard	Project ID: Chevron Station No. 9-9708	
	City & State: Oakland, Ca.	Surface Elev.: 96.27'	Well / Boring ID: MW-6
	Delta Project #: DG99-708	Casing Elev.: 95.84'	Total Depth: 20'



Dates and Times	Logger: Brett Bardsley	Sampling Method & Diameter: 2-inch ID split spoon	Permitting Agency: Alameda County Public Works Agency
Start: 1/25/02 1000	Drilling Company & Driller: Cascade Drilling, Inc., JD	Bore Hole Diameter: 8.25-inches	Permit #: W01-2163
Total Depth: 1/25/02 1645	Drillers C-57#: 717510	Diameter, Type & Slot Size of Casing: 2-inch SCH 40 PVC/0.020 slot	
Completion or backfill: 1/25/02 1730	Drilling Equipment and method: CME-75, hollow stem auger		Page 1 of 1

WELL DG99-708.GPJ 4/10/02

Date Start/Finish: 06/12/2012-06/14/2012	**Latitude:** NA	**Well ID:** **B-1**	
Drilling Company: Cascade Drilling, LP	**Longitude:** NA	**Client:** Chevron Environmental Management Company	
Drilling Method: Geoprobe	**Casing Elevation:** NA		
Rig Type: Geoprobe	**Total Depth:** 20 ft bgs	**Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA	
Sampling Method: Acetate Sleeve	**Boring Diameter:** 2.25 inch		
	Logged By: Loretta Kwong		
	Reviewed By: Melissa Blanchette, PG	**Project Number:** B0060901.9708.00002	



Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-1-W-20120614) at 1115 on 06/14/2012.

ARCADIS
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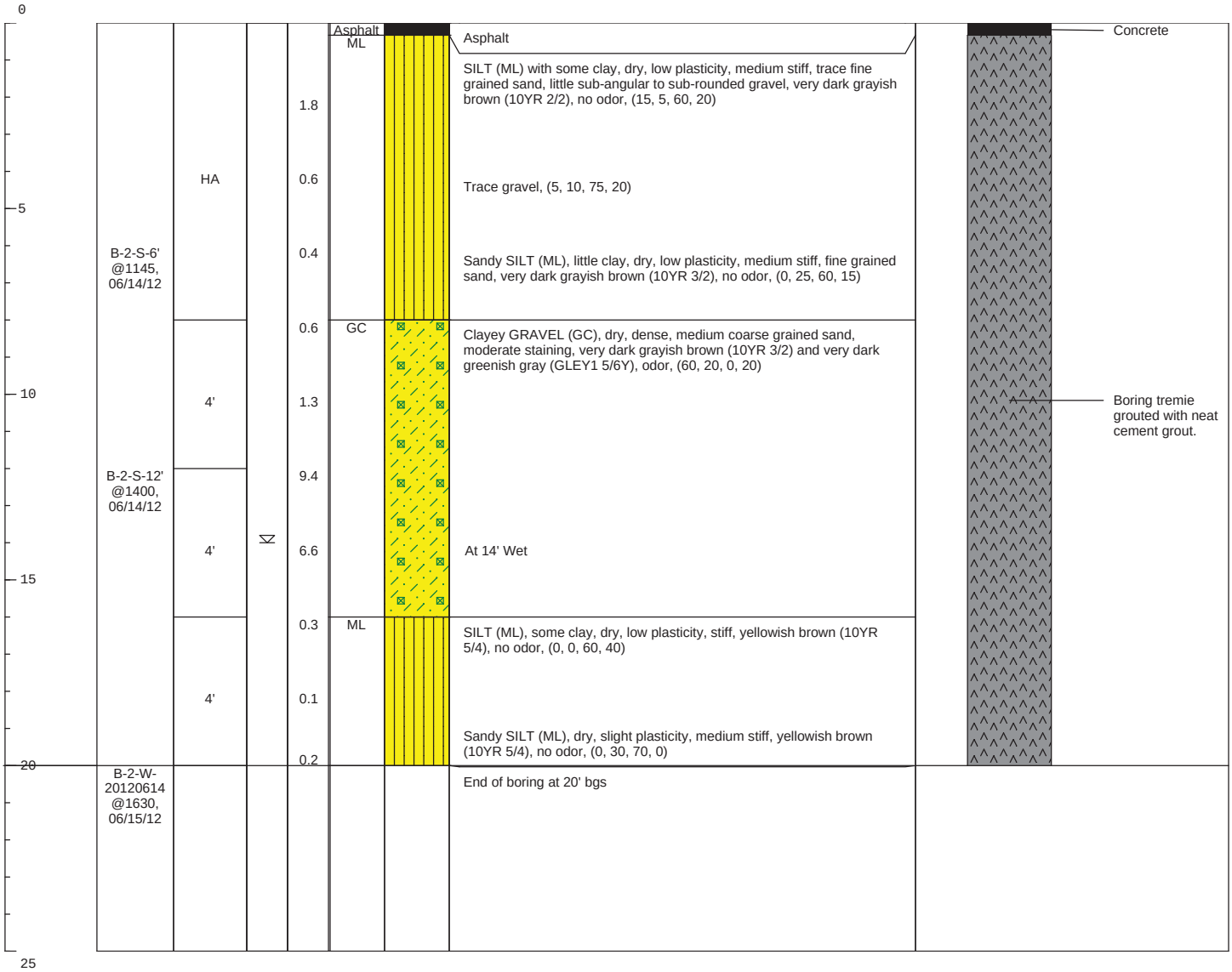
Date Start/Finish: 06/14/2012-06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 20 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** B-2 **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002	



Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-2-W-20120615) at 1630 on 06/15/2012.

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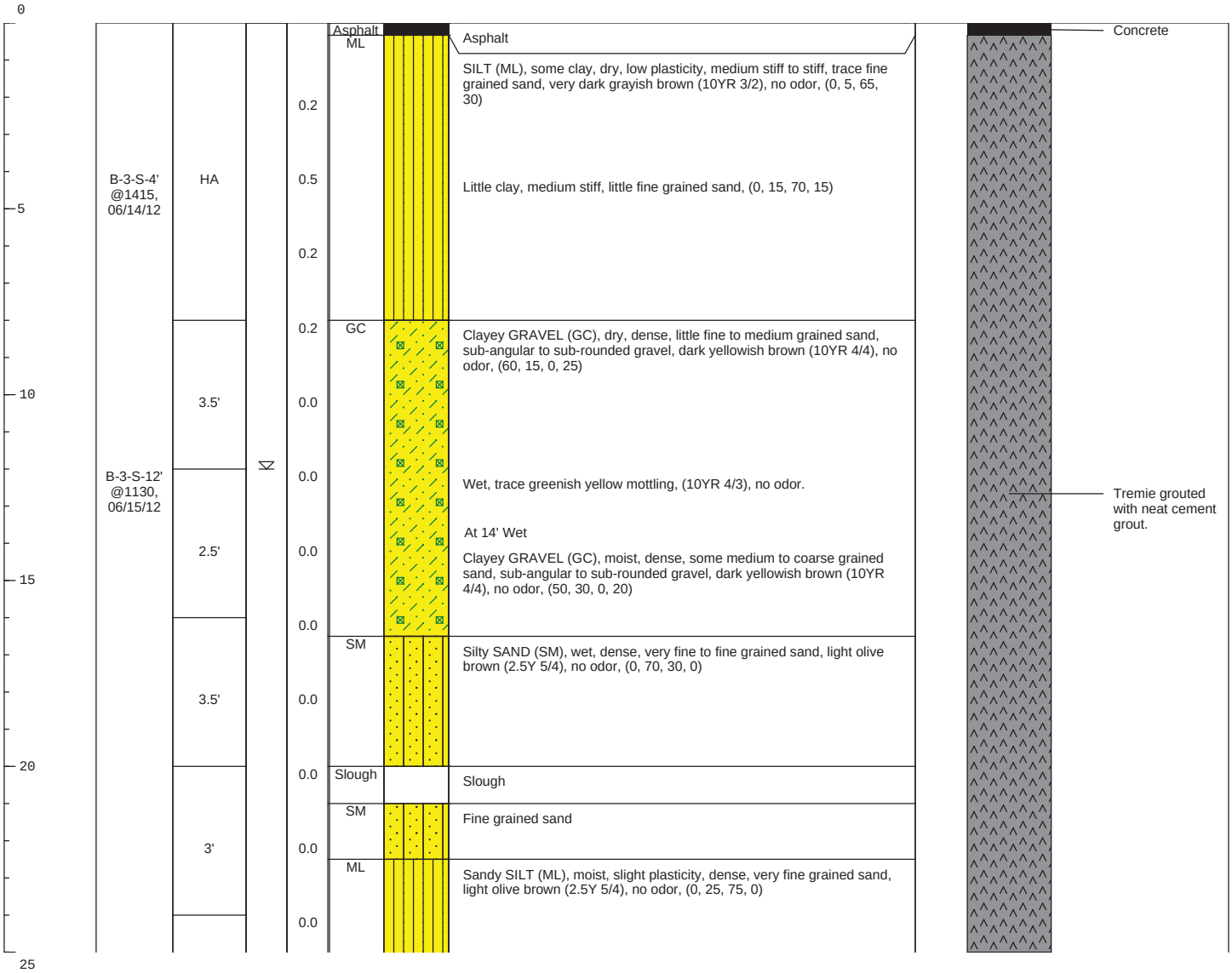
Date Start/Finish: 06/12/2012-06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 30 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** B-3 **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002	



Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-3-W-20120615) at 1525 on 06/15/2012.

ARCADIS
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Date Start/Finish: 06/12/2012-06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 30 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** **B-3** **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002

DEPTH	Lab Sample	Recovery (feet)	Groundwater	PID Headspace (ppm)	USCS Code	Geologic Column	Lithologic Description	Well Construction
25		2'		0.0			Sandy SILT (ML), moist, low plasticity, stiff, fine grained sand, light olive brown (2.5Y 5/4) and olive gray (5Y 5/2), no odor, (0, 30, 70, 0)	Tremie grouted with neat cement grout.
		2'		0.0			Olive gray (5Y 5/2)	
		2'		0.0			Olive gray (5Y 5/2), (0, 45, 55, 0)	
30	B-3-W-20120615 @1525, 06/15/12						End of boring at 30' bgs	
35								
40								
45								
50								

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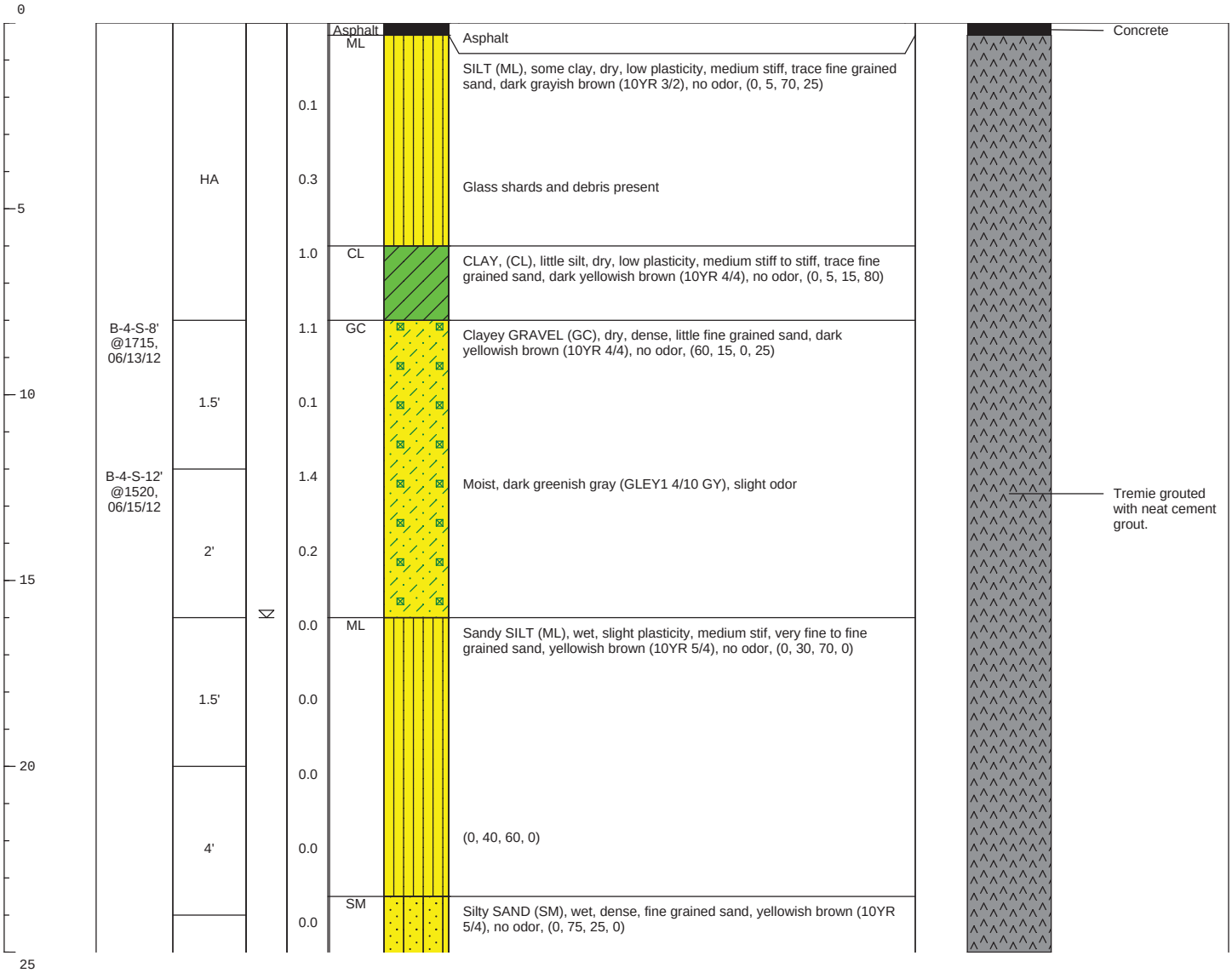
Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-3-W-20120615) at 1525 on 06/15/2012.

Date Start/Finish: 06/13/2012-06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 30 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** B-4 **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002	

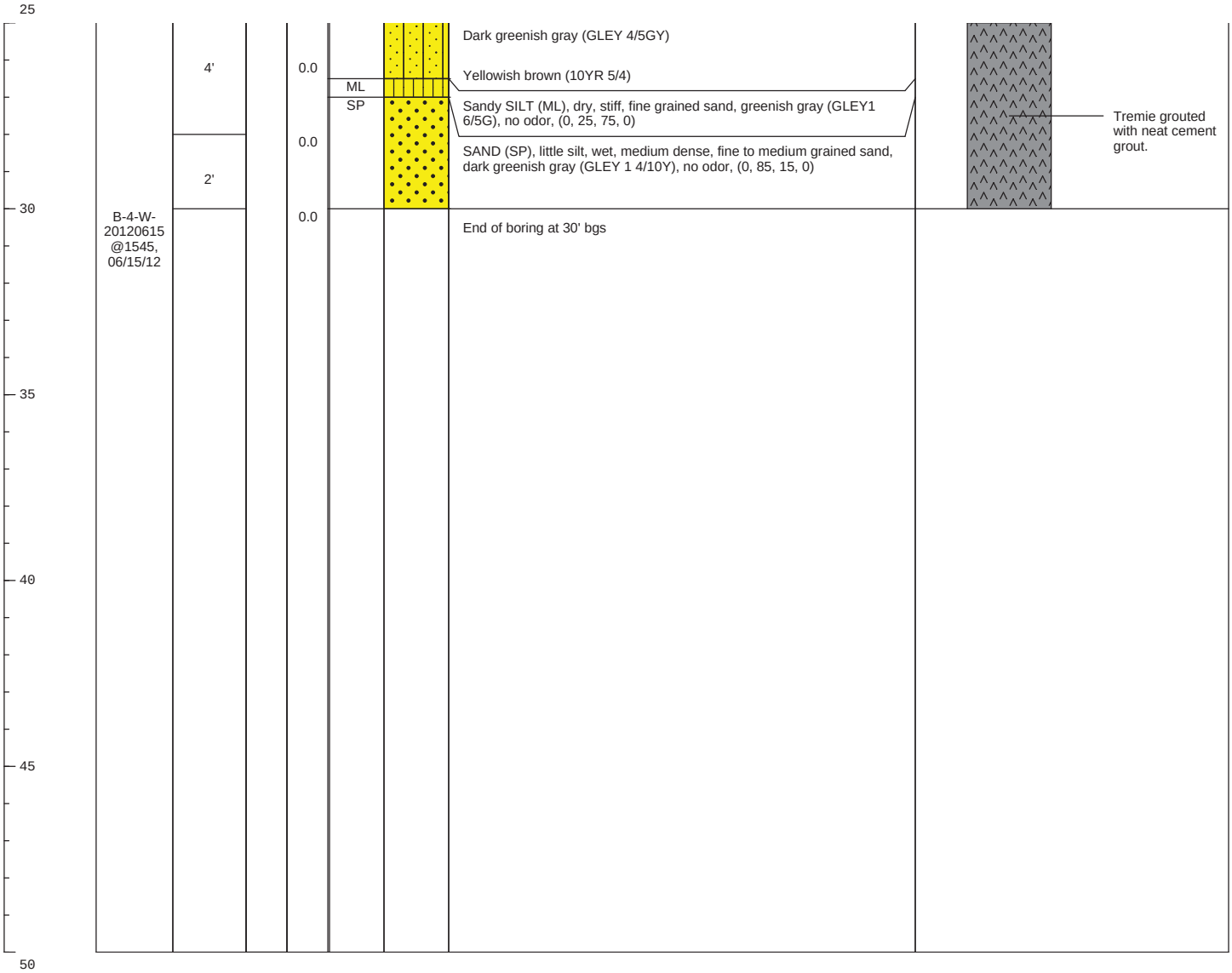


Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-4-W-20120615) at 1545 on 06/15/2012.

Date Start/Finish: 06/13/2012-06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 30 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** **B-4** **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002



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Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-4-W-20120615) at 1545 on 06/15/2012.

Date Start/Finish: 06/13/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 5.5 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** **B-6** **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002

DEPTH	Lab Sample	Recovery (feet)	Groundwater	PID Headspace (ppm)	USCS Code	Geologic Column	Lithologic Description	Well Construction
0					Asphalt		Asphalt	Concrete
				0.4	ML		SILT (ML), some clay, dry, low plasticity, medium stiff, trace fine grained sand, very dark grayish brown (10YR 3/2), no odor, (0, 5, 65, 30)	
		HA						Boring backfilled with neat cement grout.
5	B-6-S-4' @1500, 06/13/12			1.2	CL		CLAY (CL), little silt, dry, medium plasticity, medium stiff, little fine grained sand, dark yellowish brown (10YR 4/4), no odor, (0, 10, 15, 75)	
							End of boring and refusal at 5.5' bgs	
10								
15								
20								
25								

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Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger to 5' bgs.
Air knife to 5.5' bgs where refusal was met.

Date Start/Finish: 06/13/2012-06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 26 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** **B-7** **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002	

DEPTH	Lab Sample	Recovery (feet)	Groundwater	PID Headspace (ppm)	USCS Code	Geologic Column	Lithologic Description	Well Construction
0				Asphalt	ML		Asphalt	Concrete
				0.3			SILT (ML), some clay, dry, low plasticity, medium stiff, trace fine grained sand, very dark grayish brown (10YR 3/2), no odor, (0, 5, 65, 30)	
		HA		0.4	CL		CLAY (CL), little silt, dry, medium plasticity, medium stiff, trace fine grained sand, very dark grayish brown (10YR 3/2), no odor, (0, 5, 15, 80)	
5	B-7-S-6' @1100, 06/13/12			0.6	ML		SILT (ML), some clay, dry, low plasticity, medium stiff, little fine to medium grained sand, dark yellowish brown (10YR 4/4), no odor, (0, 10, 60, 30)	
				0.4	CL		Sandy CLAY (CL), dry, low plasticity, medium stiff, fine to medium grained sand, dark yellowish brown (10YR 3/4), no odor, (0, 30, 0, 70)	
10		4'		1.7	GC		Clayey GRAVEL (GC), dry, medium dense to dense, medium to coarse grained sand, sub-angular to sub-rounded gravel, medium greenish gray staining, very dark grayish brown (2.5Y 3/2), odor, (60, 15, 0, 25)	
				4.0				Boring tremie grouted with neat cement grout.
	B-7-S-14' @1535, 06/13/12	4'	▽	49.9			At 14' Wet	
15				0.3			Clayey GRAVEL (GC), moist, medium dense to dense, medium to coarse grained sand, dark yellowish brown (10YR 4/4), no odor, (65, 20, 0, 15)	
		4'		0.2				
20				0.2	ML		Sandy SILT (ML), moist, medium dense, very fine grained sand, yellowish brown (10YR 5/4), no odor, (0, 30, 70, 0)	
		4'		0.1	CL		CLAY (CL), little silt, moist, low plasticity, yellowish brown (10YR 5/4), no odor, (0, 0, 15, 85)	
				0.0	GC		Clayey GRAVEL (GC), moist, dense, fine to medium grained sand, dark yellowish brown (10YR 4/4), no odor, (60, 20, 0, 20)	
25								

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Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-7-W-20120615) at 1217 on 06/15/2012.

Date Start/Finish: 06/13/2012-06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 26 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** **B-7** **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002	

DEPTH	Lab Sample	Recovery (feet)	Groundwater	PID Headspace (ppm)	USCS Code	Geologic Column	Lithologic Description	Well Construction
25		2'			ML		Sandy SILT (ML), moist, medium dense, very fine grained sand, yellowish brown (10YR 5/4), no odor, (0, 30, 70, 0)	Boring tremie grouted with neat cement grout.
	B-7-W-20120615 @1217, 06/15/2012						End of boring at 26' bgs	
30								
35								
40								
45								
50								

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Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-7-W-20120615) at 1217 on 06/15/2012.

Date Start/Finish: 06/14/2012-06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 22 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** B-8 **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002	

DEPTH	Lab Sample	Recovery (feet)	Groundwater	PID Headspace (ppm)	USCS Code	Geologic Column	Lithologic Description	Well Construction
0					Asphalt		Asphalt	Concrete
					ML		SILT (ML), some clay, dry, low plasticity, medium stiff to stiff, little fine grained sand, dark gray (10YR 3/1), no odor, (0, 15, 60, 25)	
				2.3				
		HA		2.6				
5								
	B-8-S-6' @1640, 06/14/12			2.7			SILT (ML), little clay, dry, slight plasticity, medium stiff to stiff, fine grained sand, dark yellowish brown (10YR 4/4), no odor, (0, 15, 70, 15)	
				2.7	GC		Clayey GRAVEL (GC), dry, dense, medium to coarse grained sand, very dark grayish brown (10YR 3/2), no odor	
10		4'		0.0				
				1.2			Very dark greenish gray (GLEY1 3/5GY), mottling/staining	Boring tremie grouted with neat cement grout.
							Odor	
	B-8-S-14' @1635, 06/14/12	2'		2.3				
15			▽					
				0.1			Wet, dark yellowish brown (10YR 4/4), no odor	
		2.5'		0.0	CL		CLAY (CL), little silt, moist, low plasticity, hard, dark yellowish brown (10YR 4/4), no odor, (0, 0, 15, 85)	
20				0.1				
		2'						
	B-8-W-20120615 @1656, 06/15/2012						End of boring at 22' bgs	
25								

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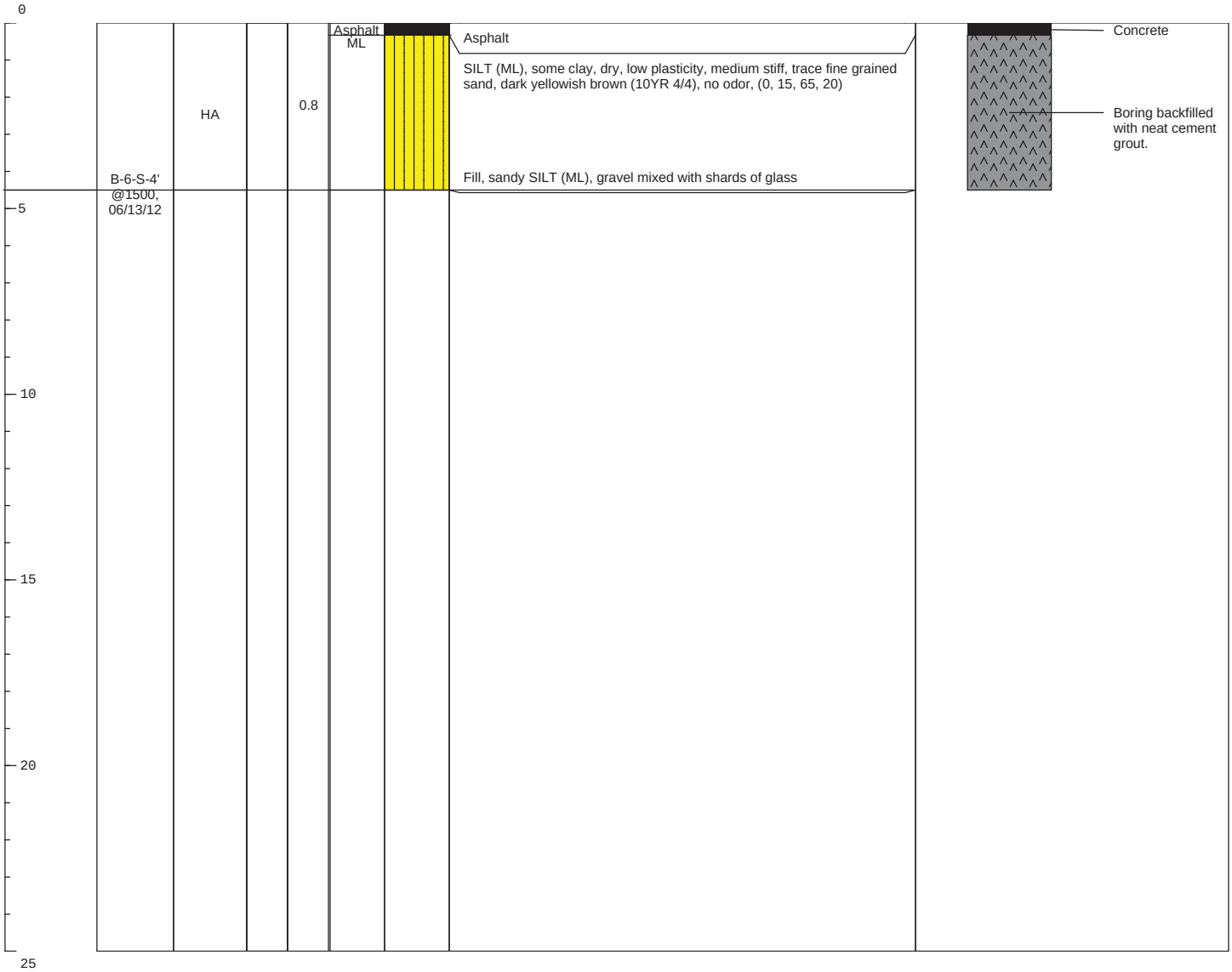
Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger or airknife to 8' 1" bgs.
Direct push to total depth.

Collected grab groundwater sample (B-8-W-20120615) at 1656 on 06/15/2012.

Date Start/Finish: 06/14/2012- 06/15/2012 **Drilling Company:** Cascade Drilling, LP **Drilling Method:** Geoprobe **Rig Type:** Geoprobe **Sampling Method:** Acetate Sleeve	**Latitude:** NA **Longitude:** NA **Casing Elevation:** NA **Total Depth:** 4.5 ft bgs **Boring Diameter:** 2.25 inch **Logged By:** Loretta Kwong **Reviewed By:** Melissa Blanchette, PG	**Well ID:** **B-9** **Client:** Chevron Environmental Management Company **Location:** CVX MT 9-9708 5910 MacArthur Blvd. Oakland CA **Project Number:** B0060901.9708.00002



Remarks: AMSL = Above Mean Sea Level; bgs = below ground surface; ft = feet; HA = hand auger; NA = Not Applicable/Available; PID = Photoionization Detector; ppm = parts per million

Hand auger to 4.5' bgs where refusal was met. Attempted at 3 locations.

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Appendix B

Soil Analytical Results

TABLE 1
CUMULATIVE SOIL SAMPLE ANALYTICAL RESULTS FROM DRILLING

Chevron Products Company Station No. 9-9708
5910 MacArthur Boulevard
Oakland, California

Sample ID	Date	Sample Depth (ft)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Total Xylene (mg/kg)	MTBE (mg/kg)	TPHg (mg/kg)	TPHd (mg/kg)	TOG (mg/kg)	VOC's (mg/kg)	Semi-VOC's (mg/kg)
MW-1	05/22/97	11.0	0.0062	0.014	<0.011	<0.011	<0.021	7.1	NA	NA	NA	NA
		15.5	0.027	<0.005	0.032	0.074	0.015	1.6	NA	NA	NA	NA
		16.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
		21.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
		31.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
		41.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
MW-2	05/22/97	11.0	<0.05	0.16	0.27	0.58	<1.0	140	NA	NA	NA	NA
		15.5	<0.005	<0.005	<0.005	<0.005	0.680	<1.0	NA	NA	NA	NA
		16.0	<0.014	<0.014	<0.014	<0.014	1.3	<2.8	NA	NA	NA	NA
		21.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
		31.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
		41.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
MW-3	05/22/97	11.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	<10	170	0.011[a]	ND
		16.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
		21.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
		31.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
		41.0	<0.005	<0.005	<0.005	<0.005	<0.01	<1.0	NA	NA	NA	NA
MW-4	05/22/97	11.5	<0.005	<0.005	<0.005	<0.005	<0.05	<1.0	NA	NA	NA	NA

TABLE 1
CUMULATIVE SOIL SAMPLE ANALYTICAL RESULTS FROM DRILLING

Chevron Products Company Station No. 9-9708
5910 MacArthur Boulevard
Oakland, California

Sample ID	Date	Depth (ft)	Cd (mg/kg)	Cr (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Zn (mg/kg)
MW-3	05/22/97	11.0	<2.0	46	120	11	110

a = All compounds analyzed were non detect except methylene chloride which is a common laboratory contaminant.
mg/kg = milligrams per kilogram.
NA = Not analyzed.
ND = Not detected.
Cd = Cadmium.
Cr = Chromium.
Ni = Nickel.
Pb = Lead.
Zn = Zinc.
MTBE = Methyl tertiary-butyl ether by EPA Method 8020.
TPHg = Total petroleum hydrocarbons as gasoline by EPA Method 8015 Modified.
TPHd = Total petroleum hydrocarbons as diesel by EPA Method 8015 Modified.
TOG = Total oil and grease by Standard Method 5520.
VOC's = Volatile Organic Compounds by EPA Method 8240.
Semi-VOC's = Semi-Volatile Organic Compounds by EPA Method 8270.

TABLE 1

SOIL SAMPLE ANALYTICAL RESULTS

Chevron Station No. 9-9708
5910 MacArthur Boulevard
Oakland, California

Sample ID	Date	Sample Depth (ft)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-Benzene (mg/kg)	Total Xylenes (mg/kg)	TPHg (mg/kg)	MTBE (mg/kg)	Total Lead (mg/kg)
MW-5-S-5.5	01/25/02	5.5	<0.0050	<0.0050	<0.0050	<0.015	<1.0	<0.050	NA
MW-5-S-10	01/25/02	10	<0.0050	<0.0050	<0.0050	<0.015	1.7	<0.050	NA
MW-6-S-5.5	01/25/02	5.5	<0.0050	<0.0050	<0.0050	<0.015	<1.0	<0.050	NA
MW-6-S-10	01/25/02	10	<0.0050	0.016	0.0083	0.020	<1.0	<0.050	NA
Soil Stockpile Results									
SP-1-4	01/25/02	---	<0.0050	<0.0050	0.014	<0.060	4.1	<0.050	<2.6

TPHg = Total petroleum hydrocarbons in the gasoline range (C5-C9).

MTBE = Methyl tertiary butyl ether.

mg/kg= milligrams per kilogram.

NA = Not analyzed

--- = Not applicable

Table 1
Soil Analytical Results
Former Chevron Service Station No. 9-9708
5910 MacArthur Boulevard, Oakland, CA

Sample Name	Sample Date	Sample Depth (feet bgs)	Diesel Range Organics (EPA 8015B)				VOCs (EPA 8260B)					PCBs (EPA Method 8082)	Metals (EPA 6010B)				
			TPH-DRO (mg/kg)	TPH-DRO with silica gel(mg/kg)	TPH-MO (mg/kg)	TPH-MO with silica gel(mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	PCBs (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)	Nickel (mg/kg)	Chromium (mg/kg)	Cadmium (mg/kg)
ESLs for Shallow Soils (≤3m bgs) Groundater is Current or Potential Source of Drinking Water[1]			83	83	2,500	2,500	0.044	2.9	3.3	2.3	0.023	0.74	750	600	150	--	7.4
ESLs for Deep Soils (>3m bgs) Groundater is Current or Potential Source of Drinking Water[1]			83	83	5,000	5,000	0.044	2.9	3.3	2.3	0.023	6.3	750	5,000	260	5,000	39
B-1	06/12/12	4	<5.0	<5.0	<5.0	<5.0	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	15	93	**310**	170	<1.0
	06/14/12	12	**590**	**500**	330	280	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	14	74	120	90	<1.0
B-2	06/14/12	2	<5.0	<5.0	<5.0	<5.0	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	16	97	**380**	130	<2.5
	06/14/12	12	**610**	**260**	310	250	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	14	76	98	65	<1.0
B-3	06/14/12	4	<5.0	<5.0	<5.0	<5.0	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	13	79	**150**	83	<2.5
	06/15/12	12	<5.0	<5.0	<5.0	<5.0	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	7.8	37	71	71	<0.50
B-4	06/13/12	8	<5.0	<5.0	<5.0	<5.0	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	13	38	30	34	0.49
	06/16/12	12	80	<10	33	<10	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	8.7	330	120	77	1.5
B-6	06/13/12	4	<5.0	5.9	<5.0	8.8	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	18	96	**220**	99	<1.0
B-7	06/13/12	6	<5.0	<5.0	<5.0	<5.0	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.050	14	96	**200**	81	<1.0
	06/13/12	14	<15	<15	<15	<15	<0.0097	<0.0097	0.350	<0.0097	<0.024	<0.050	13	62	96	55	<1.0
B-8	06/14/12	6	<5.0	<5.0	<5.0	<5.0	<0.0020	<0.0020	<0.0020	<0.0020	0.013	<0.050	13	87	**190**	110	<0.99
	06/14/12	14	<15	<5.0	<15	<5.0	<0.0020	<0.0020	0.0021	<0.0020	<0.0050	<0.050	12	63	93	57	<0.99

Explanation

EPA	Environmental Protection Agency
bgs	Below ground surface
TPH-DRO	Total Petroleum Hydrocarbons as Diesel Range Organics
TPH-MO	Total Petroleum Hydrocarbons as Motor Oil
MTBE	Methyl Tertiary Butyl Ether
PCB	Polychlorinated Biphenyls (All Aroclors were not detected)
ESL	Environmental Screening Level (*Screening for Environmental Concerns at Sites with Contaminates Soil and Groundwater),* California RWQCB-San Francisco Bay Region, Interim Final - November 2007 (Revised May 2008)
mg/kg	Milligrams per kilogram
<0.0005	Not detected at concentration threshold as shown
--	Not Applicable
BOLD	Concentrations meets or exceeds their respective ESL
[1]	For Commercial/Industrial Land Use Only

Table 2
Soil Analytical Data - Additional VOCs
Former Chevron Service Station No. 9-9708
5910 MacArthur Boulevard, Oakland, CA

Sample Name	Sample Date	Sample Depth (feet bgs)	VOCs (EPA 8260B)										
			1,2,4-Trimethylbenzene (mg/kg)	1,2-Dichlorobenzene (mg/kg)	1,3,5-Trimethylbenzene (mg/kg)	Chloroform (mg/kg)	Isopropylbenzene (mg/kg)	Naphthalene (mg/kg)	n-Butylbenzene (mg/kg)	N-Propylbenzene (mg/kg)	sec-Butylbenzene (mg/kg)	tert-Butylbenzene (mg/kg)	p-Isopropyltoluene (mg/kg)
ESLs for Shallow Soils (≤3m bgs) Groundater is Current or Potential Source of Drinking Water[1]			--	1.1	--	1.5	--	2.8	--	--	--	--	--
ESLs for Deep Soils (>3m bgs) Groundater is Current or Potential Source of Drinking Water[1]			--	1.1	--	2.1	--	3.4	--	--	--	--	--
B-1	06/12/12	4	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
	06/14/12	12	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
B-2	06/14/12	2	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
	06/14/12	12	<0.0020	0.0023	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	0.0065	<0.0050	<0.0020
B-3	06/14/12	4	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
	06/15/12	12	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
B-4	06/13/12	8	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
	05/16/12	12	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
B-6	06/13/12	4	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
B-7	06/13/12	6	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
	06/13/12	14	0.075	<0.0097	0.056	<0.0097	0.094	0.200	0.210	0.340	0.056	0.200	0.038
B-8	06/14/12	6	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	<0.0020	<0.0050	<0.0050	<0.0020
	06/14/12	14	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0050	<0.0050	0.0035	<0.0050	<0.0050	<0.0020

Explanation

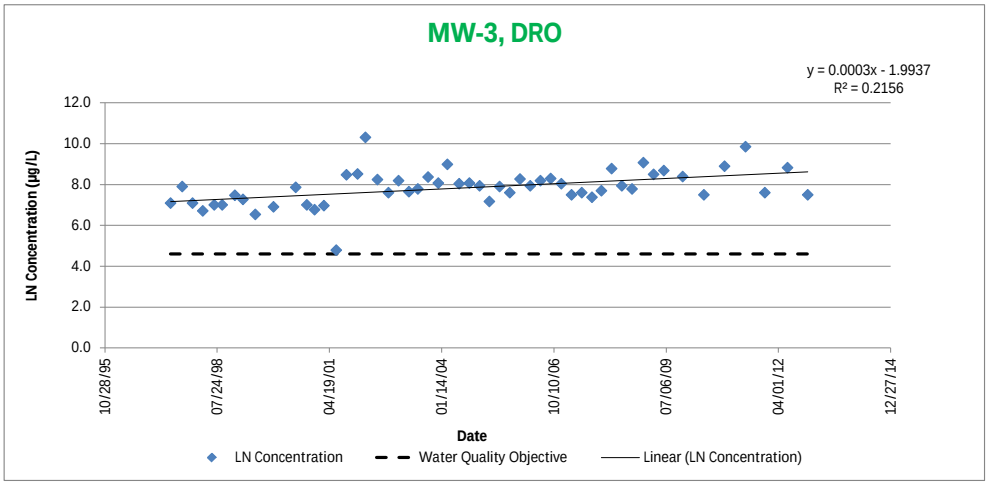
bgs	Below ground surface
mg/kg	Milligrams per kilogram
EPA	Environmental Protection Agency
ESL	Environmental Screening Level (*Screening for Environmental Concerns at Sites with Contaminates Soil and Groundwater),* California RWQCB-San Francisco Bay Region, Interim Final - November 2007 (Revised May 2008)
<0.0005	Not detected at concentration threshold as shown
--	Not Applicable
BOLD	Concentrations meets or exceeds their respective ESL
[1]	For Commercial/Industrial Land Use Only

Appendix C

Summary of Linear
Regression Analysis

Sample Information
Sample Location **MW-3**
Constituent **DRO**

Data		
Sample Date	Concentration	LN Concentration
	(ug/L)	
06/04/97	1200	7.09
09/16/97	2,700	7.90
12/17/97	1,200	7.09
03/18/98	820	6.71
06/28/98	1,100	7.00
09/07/98	1,100	7.00
12/29/98	1760	7.47
03/11/99	1440	7.27
06/29/99	690	6.54
12/08/99	1,000	6.91
06/23/00	2,600	7.86
09/30/00	1,100	7.00
12/08/00	870	6.77
03/01/01	1,060	6.97
06/19/01	120	4.79
09/18/01	4,800	8.48
12/26/01	5,000	8.52
03/06/02	30,000	10.31
06/21/02	3,800	8.24
09/27/02	2,000	7.60
12/26/02	3,600	8.19
03/28/03	2,100	7.65
06/16/03	2,400	7.78
09/15/03	4,300	8.37
12/15/03	3,200	8.07
03/05/04	8,000	8.99
06/18/04	3,100	8.04
09/17/04	3,200	8.07
12/17/04	2,800	7.94
03/14/05	1,300	7.17
06/13/05	2,700	7.90
09/12/05	2,000	7.60
12/12/05	3,900	8.27
03/13/06	2,800	7.94
06/12/06	3,600	8.19
09/11/06	4,000	8.29
12/15/06	3,100	8.04
03/16/07	1,800	7.50
06/15/07	2,000	7.60
09/14/07	1,600	7.38
12/07/07	2,200	7.70
03/07/08	6,500	8.78
06/06/08	2,800	7.94
09/05/08	2,400	7.78
12/15/08	8,700	9.07
03/16/09	4,900	8.50
06/15/09	5,900	8.68
11/30/09	4,400	8.39
06/07/10	1,800	7.50
12/08/10	7,300	8.90
06/13/11	19,000	9.85
12/02/11	2,000	7.60
06/21/12	6,800	8.82
12/18/2012	1800	7.50



Notes:

ND taken at reporting limit/reported value
Qualified data converted to reported value

Data quality	
Total # of data points used in regression	54
# of nondetects	0
% of data as detects	100

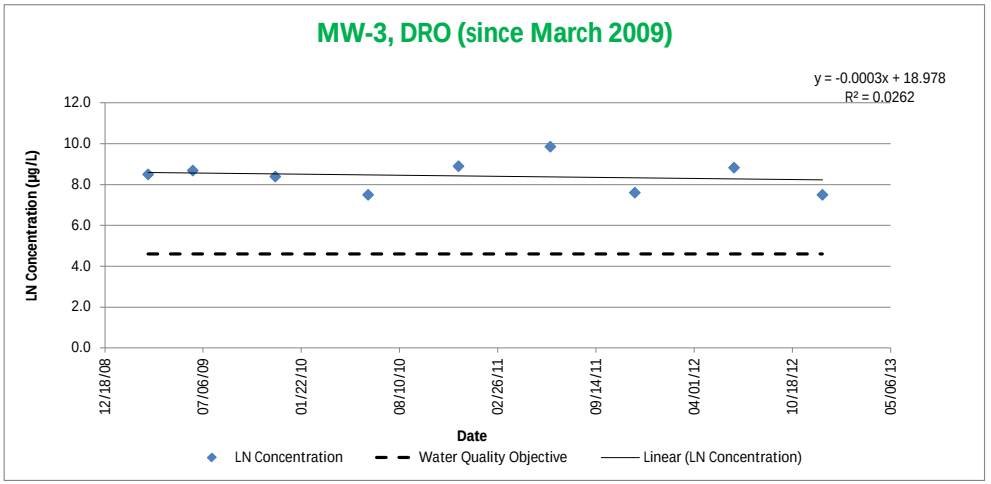
Results		
Coefficient of Determination (R^2) =	0.2156	
p-Value =	4.05E-04	
Attenuation Rate in Groundwater (K) =	-0.0003	$days^{-1}$
Attenuation Rate in Groundwater at 90% confidence (K) =	-0.0003	$days^{-1}$
Chemical Half Life in Groundwater ($t_{1/2}$) =	NA	days

Date Screening Level Reached	
Water Quality Objective	100
LN Water Quality Objective	4.6
Intercept	-1.994
Slope	0.00026
Date to Water Quality Objective	NA

Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm

Sample Information
Sample Location **MW-3 (March 2009)**
Constituent **DRO**

Data		
Sample Date	Concentration	LN Concentration
	(ug/L)	
03/16/09	4,900	8.50
06/15/09	5,900	8.68
11/30/09	4,400	8.39
06/07/10	1,800	7.50
12/08/10	7,300	8.90
06/13/11	19,000	9.85
12/02/11	2,000	7.60
06/21/12	6,800	8.82
12/18/12	1800	7.50



Notes:
ND taken at reporting limit/reported value
Qualified data converted to reported value

Data quality	
Total # of data points used in regression	9
# of nondetects	0
% of data as detects	100

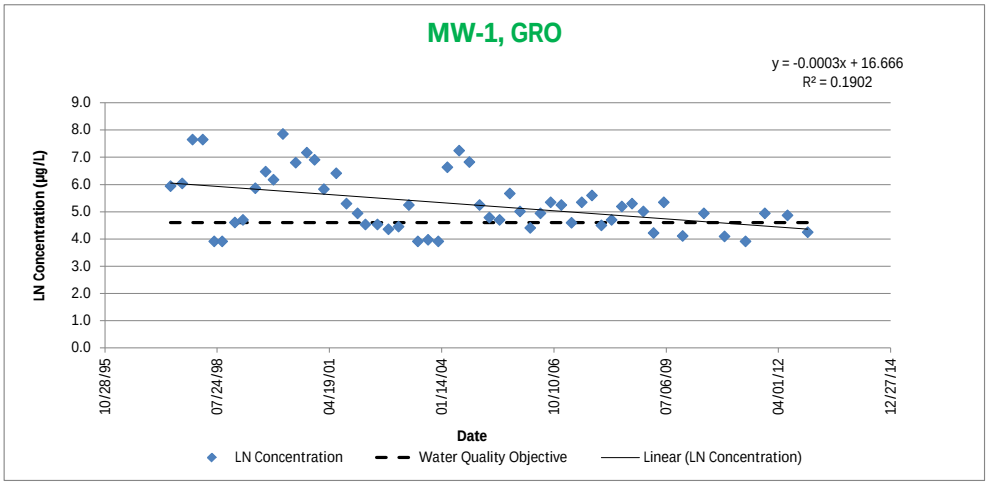
Results		
Coefficient of Determination (R^2) =	0.0262	
p-Value =	6.77E-01	
Attenuation Rate in Groundwater (K) =	0.0003	$days^{-1}$
Attenuation Rate in Groundwater at 90% confidence (K) =	-0.0006	$days^{-1}$
Chemical Half Life in Groundwater ($t_{1/2}$) =	2.66E+03	days

Date Screening Level Reached	
Water Quality Objective	100
LN Water Quality Objective	4.6
Intercept	18.978
Slope	-0.00026
Date to Water Quality Objective	NA

Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm

Sample Information
Sample Location **MW-1**
Constituent **GRO**

Data		
Sample Date	Concentration (ug/L)	LN Concentration
06/04/97	380	5.94
09/16/97	420	6.04
12/17/97	2,101	7.65
03/18/98	2101	7.65
06/28/98	50	3.91
09/07/98	50	3.91
12/29/98	100	4.61
03/11/99	110	4.70
06/29/99	352	5.86
09/29/99	647	6.47
12/08/99	481	6.18
03/01/00	2,580	7.86
06/23/00	900	6.80
09/30/00	1,300	7.17
12/08/00	1,000	6.91
03/01/01	340	5.83
06/19/01	610	6.41
09/18/01	200	5.30
12/26/01	140	4.94
03/06/02	93	4.53
06/21/02	93	4.53
09/27/02	78	4.36
12/26/02	86	4.45
03/28/03	190	5.25
06/16/03	50	3.91
09/15/03	53	3.97
12/15/03	50	3.91
03/05/04	760	6.63
06/18/04	1,400	7.24
09/17/04	920	6.82
12/17/04	190	5.25
03/14/05	120	4.79
06/13/05	110	4.70
09/12/05	290	5.67
12/12/05	150	5.01
03/13/06	82	4.41
06/12/06	140	4.94
09/11/06	210	5.35
12/15/06	190	5.25
03/16/07	99	4.60
06/15/07	210	5.35
09/14/07	270	5.60
12/07/07	90	4.50
03/07/08	110	4.70
06/06/08	180	5.19
09/05/08	200	5.30
12/15/08	150	5.01
03/16/09	68	4.22
06/15/09	210	5.35
11/30/09	61	4.11
06/07/10	140	4.94
12/08/10	60	4.09
06/13/11	50	3.91
12/02/11	140	4.94
06/21/12	130	4.87
12/18/2012	70	4.25



Notes:

ND taken at reporting limit/reported value
Qualified data converted to reported value

Data quality	
Total # of data points used in regression	56
# of nondetects	7
% of data as detects	88

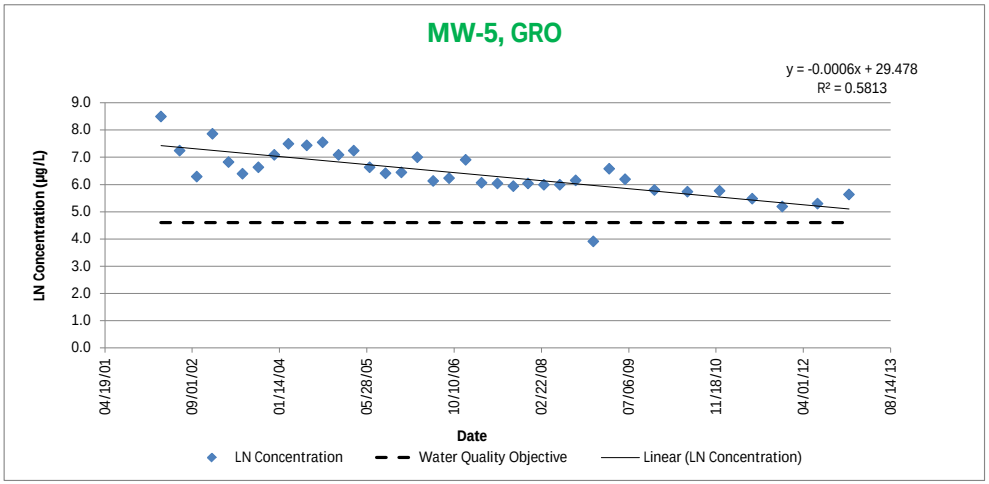
Results		
Coefficient of Determination (R^2) =	0.1902	
p-Value =	7.80E-04	
Attenuation Rate in Groundwater (K) =	0.0003	$days^{-1}$
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0002	$days^{-1}$
Chemical Half Life in Groundwater ($t_{1/2}$) =	2.32E+03	days

Date Screening Level Reached	
Water Quality Objective	100
LN Water Quality Objective	4.6
Intercept	16.666
Slope	-0.00030
Date to Water Quality Objective	9/15/2010

Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm

Sample Information
Sample Location **MW-5**
Constituent **GRO**

Data		
Sample Date	Concentration	LN Concentration
	(ug/L)	
03/06/02	4,900	8.50
06/21/02	1,400	7.24
09/27/02	540	6.29
12/26/02	2,600	7.86
03/28/03	920	6.82
06/16/03	600	6.40
09/15/03	760	6.63
12/15/03	1,200	7.09
03/05/04	1,800	7.50
06/18/04	1,700	7.44
09/17/04	1,900	7.55
12/17/04	1,200	7.09
03/14/05	1,400	7.24
06/13/05	760	6.63
09/12/05	610	6.41
12/12/05	630	6.45
03/13/06	1,100	7.00
06/12/06	460	6.13
09/11/06	510	6.23
12/15/06	1,000	6.91
03/16/07	430	6.06
06/15/07	420	6.04
09/14/07	380	5.94
12/07/07	420	6.04
03/07/08	400	5.99
06/06/08	400	5.99
09/05/08	470	6.15
12/15/08	50	3.91
03/16/09	720	6.58
06/15/09	490	6.19
11/30/09	330	5.80
06/07/10	310	5.74
12/08/10	320	5.77
06/13/11	240	5.48
12/02/11	180	5.19
06/21/12	200	5.30
12/18/2012	280	5.63



Notes:

ND taken at reporting limit/reported value
Qualified data converted to reported value

Data quality	
Total # of data points used in regression	37
# of nondetects	0
% of data as detects	100

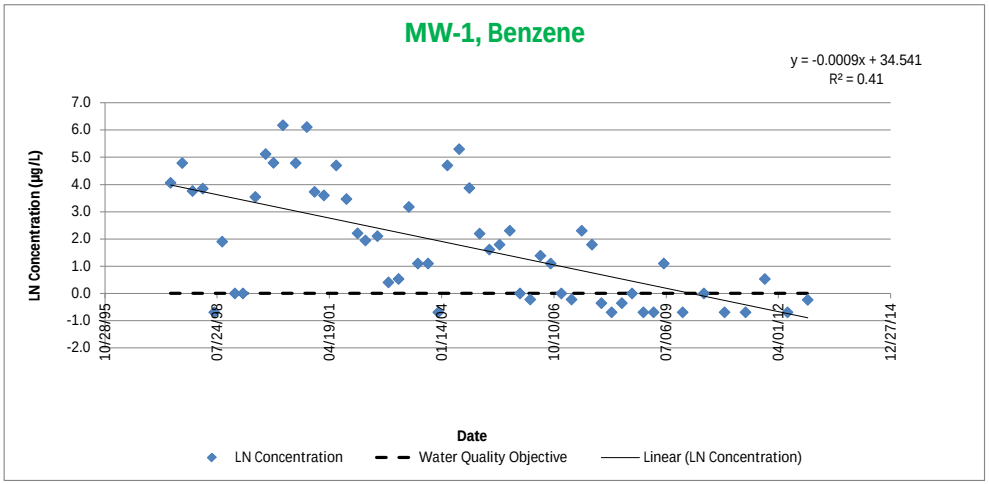
Results		
Coefficient of Determination (R^2) =	0.5813	
p-Value =	4.16E-08	
Attenuation Rate in Groundwater (K) =	0.0006	$days^{-1}$
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0005	$days^{-1}$
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.17E+03	days

Date Screening Level Reached	
Water Quality Objective	100
LN Water Quality Objective	4.6
Intercept	29.478
Slope	-0.00059
Date to Water Quality Objective	4/6/2015

Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm

Sample Information
Sample Location **MW-1**
Constituent **Benzene**

Data		
Sample Date	Concentration (ug/L)	LN Concentration
06/04/97	58	4.06
09/16/97	120	4.79
12/17/97	43	3.76
03/18/98	47	3.85
06/28/98	0.5	-0.69
09/07/98	6.7	1.90
12/29/98	1.0	0.00
03/11/99	1.0	0.00
06/29/99	34.6	3.54
09/29/99	167	5.12
12/08/99	121	4.80
03/01/00	481	6.18
06/23/00	120	4.79
09/30/00	450	6.11
12/08/00	41.7	3.73
03/01/01	36.6	3.60
06/19/01	110	4.70
09/18/01	32	3.47
12/26/01	9.1	2.21
03/06/02	7.0	1.95
06/21/02	8.2	2.10
09/27/02	1.5	0.41
12/26/02	1.7	0.53
03/28/03	24	3.18
06/16/03	3	1.10
09/15/03	3	1.10
12/15/03	0.5	-0.69
03/05/04	110	4.70
06/18/04	200	5.30
09/17/04	48	3.87
12/17/04	9	2.20
03/14/05	5	1.61
06/13/05	6	1.79
09/12/05	10	2.30
12/12/05	1	0.00
03/13/06	0.8	-0.22
06/12/06	4	1.39
09/11/06	3	1.10
12/15/06	1	0.00
03/16/07	0.8	-0.22
06/15/07	10	2.30
09/14/07	6	1.79
12/07/07	0.7	-0.36
03/07/08	0.5	-0.69
06/06/08	0.7	-0.36
09/05/08	1	0.00
12/15/08	0.5	-0.69
03/16/09	0.5	-0.69
06/15/09	3	1.10
11/30/09	0.5	-0.69
06/07/10	1	0.00
12/08/10	0.5	-0.69
06/13/11	0.5	-0.69
12/02/11	1.7	0.53
06/21/12	0.50	-0.69
12/18/2012	0.79	-0.24



Notes:

ND taken at reporting limit/reported value
Qualified data converted to reported value

Data quality	
Total # of data points used in regression	56
# of nondetects	11
% of data as detects	80

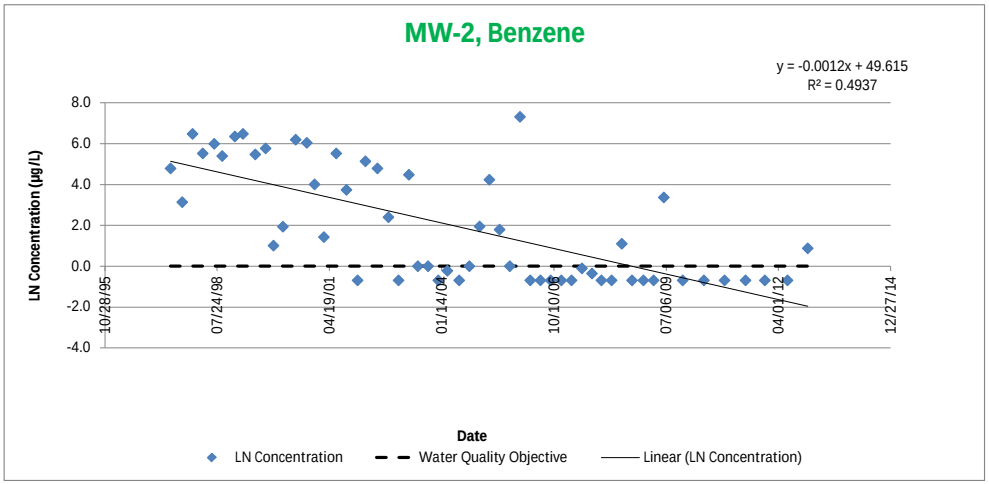
Results		
Coefficient of Determination (R^2) =	0.4100	
p-Value =	1.07E-07	
Attenuation Rate in Groundwater (K) =	0.0009	$days^{-1}$
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0007	$days^{-1}$
Chemical Half Life in Groundwater ($t_{1/2}$) =	8.07E+02	days

Date Screening Level Reached	
Water Quality Objective	1
LN Water Quality Objective	0.0
Intercept	34.541
Slope	-0.00086
Date to Water Quality Objective	2/8/2010

Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm

Sample Information
Sample Location **MW-2**
Constituent **Benzene**

Data		
Sample Date	Concentration	LN Concentration
	(ug/L)	
06/04/97	120	4.79
09/16/97	23	3.14
12/17/97	650	6.48
03/18/98	250	5.52
06/28/98	400	5.99
09/07/98	220	5.39
12/29/98	573	6.35
03/11/99	651	6.48
06/29/99	238	5.47
09/29/99	320	5.77
12/08/99	2.74	1.01
03/01/00	6.92	1.93
06/23/00	490	6.19
09/30/00	420	6.04
12/08/00	54.9	4.01
03/01/01	4.16	1.43
06/19/01	250	5.52
09/18/01	42	3.74
12/26/01	0.5	-0.69
03/06/02	170	5.14
06/21/02	120	4.79
09/27/02	11	2.40
12/26/02	0.5	-0.69
03/28/03	88	4.48
06/16/03	1	0.00
09/15/03	1	0.00
12/15/03	0.5	-0.69
03/05/04	0.8	-0.22
06/18/04	0.5	-0.69
09/17/04	1	0.00
12/17/04	7	1.95
03/14/05	69	4.23
06/13/05	6	1.79
09/12/05	1	0.00
12/12/05	1500	7.31
03/13/06	0.5	-0.69
06/12/06	0.5	-0.69
09/11/06	0.5	-0.69
12/15/06	0.5	-0.69
03/16/07	0.5	-0.69
06/17/07	0.9	-0.11
09/14/07	0.7	-0.36
12/07/07	0.5	-0.69
03/07/08	0.5	-0.69
06/06/08	3	1.10
09/05/08	0.5	-0.69
12/15/08	0.5	-0.69
03/16/09	0.5	-0.69
06/15/09	29	3.37
11/30/09	0.5	-0.69
06/07/10	0.5	-0.69
12/08/10	0.5	-0.69
06/13/11	0.5	-0.69
12/02/11	0.5	-0.69
06/21/12	0.5	-0.69
12/18/2012	2.4	0.88



Notes:

ND taken at reporting limit/reported value
Qualified data converted to reported value

Data quality	
Total # of data points used in regression	56
# of nondetects	22
% of data as detects	61

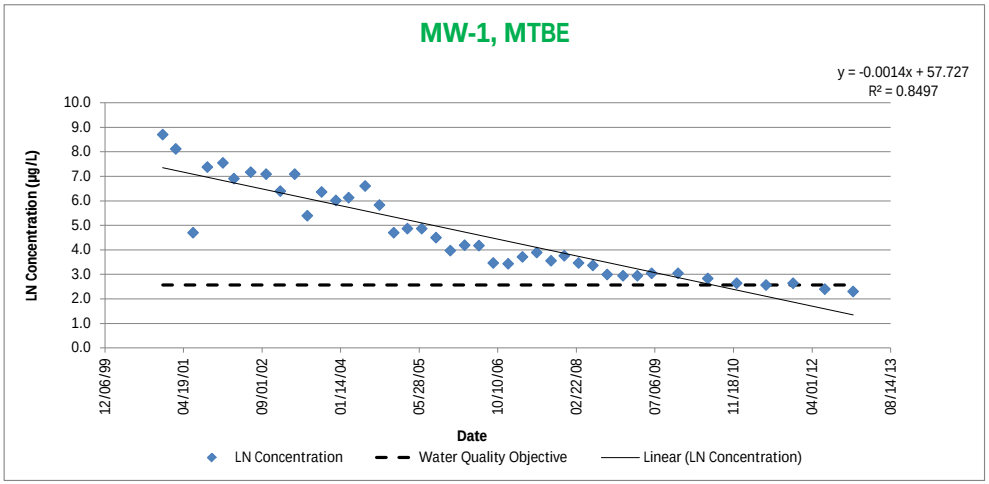
Results		
Coefficient of Determination (R^2) =	0.4937	
p-Value =	1.58E-09	
Attenuation Rate in Groundwater (K) =	0.0012	$days^{-1}$
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0010	$days^{-1}$
Chemical Half Life in Groundwater ($t_{1/2}$) =	5.54E+02	days

Date Screening Level Reached	
Water Quality Objective	1
LN Water Quality Objective	0.0
Intercept	49.615
Slope	-0.00125
Date to Water Quality Objective	9/6/2008

Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm

Sample Information
Sample Location **MW-1**
Constituent **MTBE**

Data		
Sample Date	Concentration	LN Concentration
	(ug/L)	
12/08/00	6,030	8.70
03/01/01	3,360	8.12
06/19/01	110	4.70
09/18/01	1,600	7.38
12/26/01	1,900	7.55
03/06/02	1,000	6.91
06/21/02	1,300	7.17
09/27/02	1,200	7.09
12/26/02	600	6.40
03/28/03	1,200	7.09
06/16/03	220	5.39
09/15/03	580	6.36
12/15/03	410	6.02
03/05/04	460	6.13
06/18/04	740	6.61
09/17/04	340	5.83
12/17/04	110	4.70
03/14/05	130	4.87
06/13/05	130	4.87
09/12/05	90	4.50
12/12/05	53	3.97
03/13/06	66	4.19
06/12/06	65	4.17
09/11/06	32	3.47
12/15/06	31	3.43
03/16/07	41	3.71
06/15/07	49	3.89
09/14/07	35	3.56
12/07/07	43	3.76
03/07/08	32	3.47
06/06/08	29	3.37
09/05/08	20	3.00
12/15/08	19	2.94
03/16/09	19	2.94
06/15/09	21	3.04
11/30/09	21	3.04
06/07/10	17	2.83
12/08/10	14	2.64
06/13/11	13	2.56
12/02/11	14	2.64
06/21/12	11	2.40
12/18/2012	10	2.30



Notes:

ND taken at reporting limit/reported value
Qualified data converted to reported value

Data quality	
Total # of data points used in regression	42
# of nondetects	0
% of data as detects	100

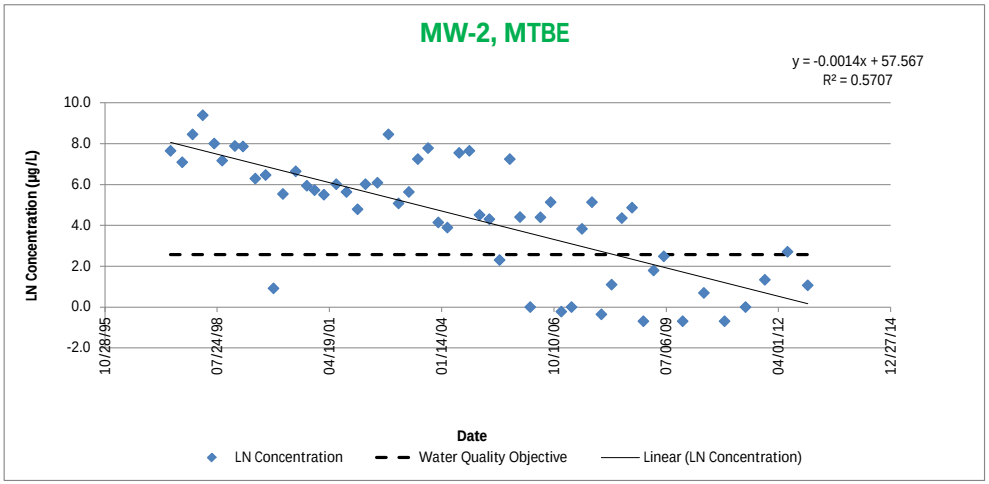
Results		
Coefficient of Determination (R^2) =	0.8497	
p-Value =	4.69E-18	
Attenuation Rate in Groundwater (K) =	0.0014	$days^{-1}$
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0012	$days^{-1}$
Chemical Half Life in Groundwater ($t_{1/2}$) =	5.07E+02	days

Date Screening Level Reached	
Water Quality Objective	13
LN Water Quality Objective	2.6
Intercept	57.727
Slope	-0.00137
Date to Water Quality Objective	7/14/2010

Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm

Sample Information
Sample Location **MW-2**
Constituent **MTBE**

Data		
Sample Date	Concentration	LN Concentration
	(ug/L)	
06/04/97	2100	7.65
09/16/97	1,200	7.09
12/17/97	4700	8.46
03/18/98	12,000	9.39
06/28/98	3000	8.01
09/07/98	1,300	7.17
12/29/98	2660	7.89
03/11/99	2,600	7.86
06/29/99	540	6.29
09/29/99	642	6.46
12/08/99	2.5	0.92
03/01/00	254	5.54
06/23/00	770	6.65
09/30/00	380	5.94
12/08/00	306	5.72
03/01/01	245	5.50
06/19/01	410	6.02
09/18/01	280	5.63
12/26/01	120	4.79
03/06/02	410	6.02
06/21/02	440	6.09
09/27/02	4,700	8.46
12/26/02	160	5.08
03/28/03	280	5.63
06/16/03	1400	7.24
09/15/03	2,400	7.78
12/15/03	63	4.14
03/05/04	49	3.89
06/18/04	1900	7.55
09/17/04	2,100	7.65
12/17/04	91	4.51
03/14/05	74	4.30
06/13/05	10	2.30
09/12/05	1,400	7.24
12/12/05	82	4.41
03/13/06	1	0.00
06/12/06	81	4.39
09/11/06	170	5.14
12/15/06	0.8	-0.22
03/16/07	1	0.00
06/17/07	46	3.83
09/14/07	170	5.14
12/07/07	0.7	-0.36
03/07/08	3	1.10
06/06/08	78	4.36
09/05/08	130	4.87
12/15/08	0.5	-0.69
03/16/09	6	1.79
06/15/09	12	2.48
11/30/09	0.5	-0.69
06/07/10	2	0.69
12/08/10	0.5	-0.69
06/13/11	1	0.00
12/02/11	4	1.34
06/21/12	15	2.71
12/18/2012	2.9	1.06



Notes:

ND taken at reporting limit/reported value
Qualified data converted to reported value

Data quality	
Total # of data points used in regression	56
# of nondetects	4
% of data as detects	93

Results		
Coefficient of Determination (R^2) =	0.5707	
p-Value =	1.72E-11	
Attenuation Rate in Groundwater (K) =	0.0014	$days^{-1}$
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0012	$days^{-1}$
Chemical Half Life in Groundwater ($t_{1/2}$) =	4.98E+02	days

Date Screening Level Reached	
Water Quality Objective	13
LN Water Quality Objective	2.6
Intercept	57.567
Slope	-0.00139
Date to Water Quality Objective	3/30/2008

Abbreviations and Notes
ug/l = micrograms per liter
LN = Natural Logarithm

ARCADIS

Appendix **D**

BIOSCREEN Modeling Summary

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MEMO

Date:
March 25, 2013

ARCADIS Project No.:
B0060901

Subject:

Delineation of TPH-DRO and TPH-MO in Site Groundwater
Former Chevron Service Station No. 9-9708
5910 MacArthur Boulevard
Oakland, California

Introduction

The purpose of this evaluation was to delineate the extent of chemicals of potential concern (COPCs) in groundwater at the Site using a combination of site-specific data where available and a widely-accepted mathematical fate and transport model. The mathematical model selected for this evaluation is BIOSCREEN, which is based on an exact solution to the Domenico Analytical Solute Transport Model (provide reference for the math). BIOSCREEN simulates migration of a single chemical in groundwater subject to processes including advection, dispersion, hydrophobic-sorption-based retardation, and biodegradation. The BIOSCREEN software was programmed in the Microsoft® Excel spreadsheet environment and for the Air Force Center for Environmental Excellence Technology Transfer Division. BIOSCREEN assumes isotropic and homogeneous hydrogeologic conditions, advection-dispersion dominated transport, equilibrium-based hydrophobic partitioning, and first-order degradation kinetics.

The main COCs at the Site include diesel-range total petroleum hydrocarbons (TPH-DRO) and motor-oil-range total petroleum hydrocarbons (TPH-MO), which are complex mixtures of hydrocarbons associated with releases that likely occurred at the former waste oil UST. Because the BIOSCREEN model simulates fate and transport of only a single chemical in groundwater, naphthalene was selected as an indicator chemical for both TPH-DRO and TPH-MO because US EPA has classified naphthalene as a Group C possible human carcinogen, it is the simplest polyaromatic hydrocarbon, and it is a most mobile of all the TPH-DRO and TPH-MO chemicals. Because of these characteristics, naphthalene would be expected to have the greatest extent in groundwater and would therefore represent the worse-case scenario in terms of TPH-DRO and TPH-MO extent.

The following assumptions apply to the modeling process described in this memorandum:

- The water bearing zone has an infinite horizontal extent
- The hydraulic conductivity is homogeneous and isotropic and the mobile porosity is homogeneous
- The groundwater linear velocity is spatially and temporally constant
- The plume remains within the upper water bearing zone

Model Input Parameters

Model input parameters were as follows:

Model Parameter	Parameter Value
Hydraulic conductivity	5 ft/day
Hydraulic gradient	0.027 foot/foot
Effective porosity	0.15
Average Linear Groundwater Velocity	0.9 ft/day
Longitudinal dispersivity	10 feet
Transverse dispersivity	1 feet
Solute retardation	6
Solute half life	193 days
Source width	30 feet
Source thickness	10 feet
Source concentration	32 mg/L

These parameters were derived as follows:

- **Hydraulic conductivity:** Hydraulic conductivity was selected based on literature values for soil types observed in site boring logs. For example, a hydraulic conductivity value of 5 feet per day (ft/day) or 1.7 x 10^{-3} centimeters per second (cm/s) is representative of the clayey gravel present at depths near the water table underlying the Site (Fetter 2008).
- **Hydraulic gradient:** Hydraulic gradient was calculated based on the second quarter 2012 groundwater elevation contour map as shown on Figure 7.
- **Effective porosity:** Effective porosity was assumed to be 0.15, based on reported tracer tests in alluvium, sand, and gravel (Payne et al, 2008).
- **Dispersivity:** Longitudinal dispersivity was assumed to be 10 feet and transverse dispersivity was assumed to be 1 foot. These values are considered to be conservative from a risk perspective.

- **Solute retardation:** Retardation was calculated from the organic-carbon partition coefficient of the solute of interest (naphthalene in this case), assumed fraction of soil organic carbon (0.0005), the soil bulk density and the effective porosity using the retardation formula as described in the BIOSCREEN users' manual (USEPA 1996).
- **Source width and thickness:** The source width was assumed based on site soil sampling data. The source the thickness was assumed to be 12 feet, which the average depth to groundwater at the site. The source thickness is within the typical range for petroleum fuels that typical float on the water table (USEP 1996).
- **Solute half life:** Solute half life was assumed to be the middle of the range of values calculated in field and laboratory studies as presented in the Aerobic Biodegradation of Organic Chemical in Environmental Media: A summary of Field and Laboratory Studies (Aronson et. al., 1999).

Results

Results demonstrate that the maximum extent of naphthalene in groundwater is approximately 464 feet hydraulically downgradient from the site. This delineation is based on conservative assumptions and, if anything, the actual extent of naphthalene is probably somewhat less.

As discussed above, naphthalene was selected as a worse-case indicator for TPH-DRO and TPH-MO because it is the most mobile of the chemicals that comprise these mixtures. Therefore, in all likelihood, the extent of TPH-DRO and TPH-MO is probably less than the extent predicted for naphthalene.

Figure D-1 BIOSCREEN Model Input

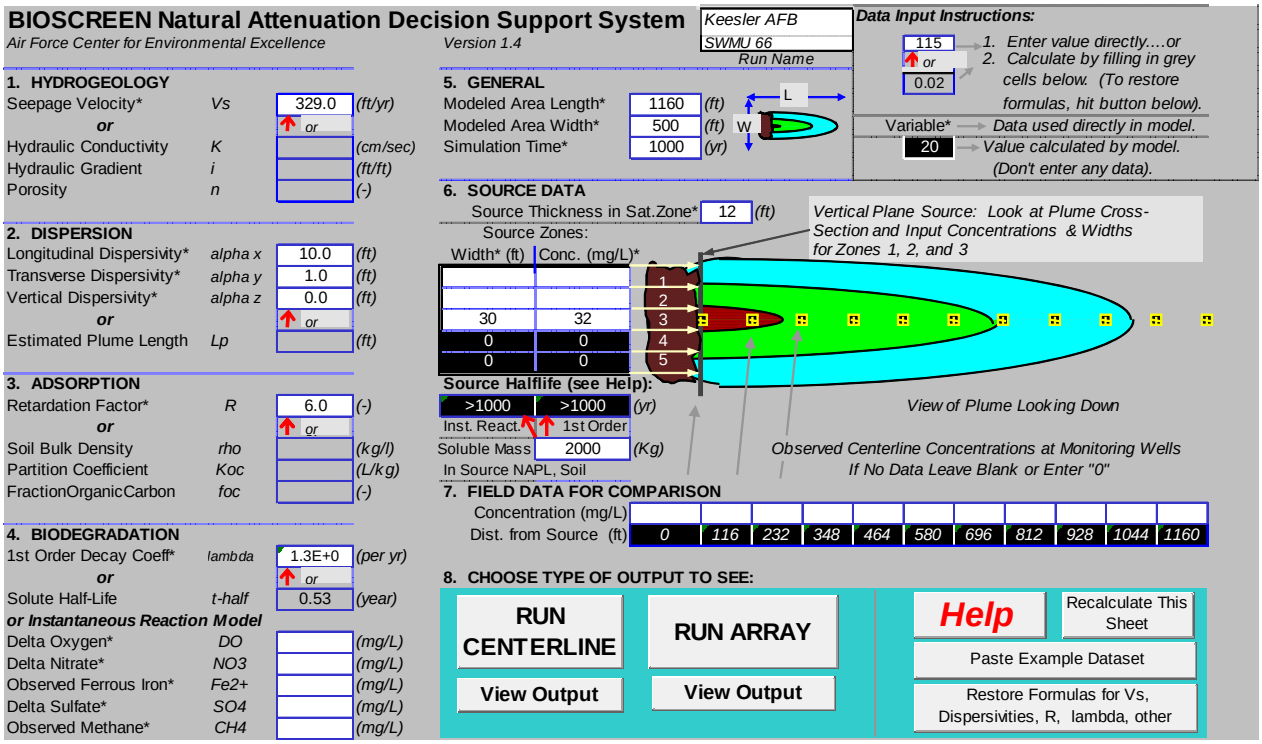
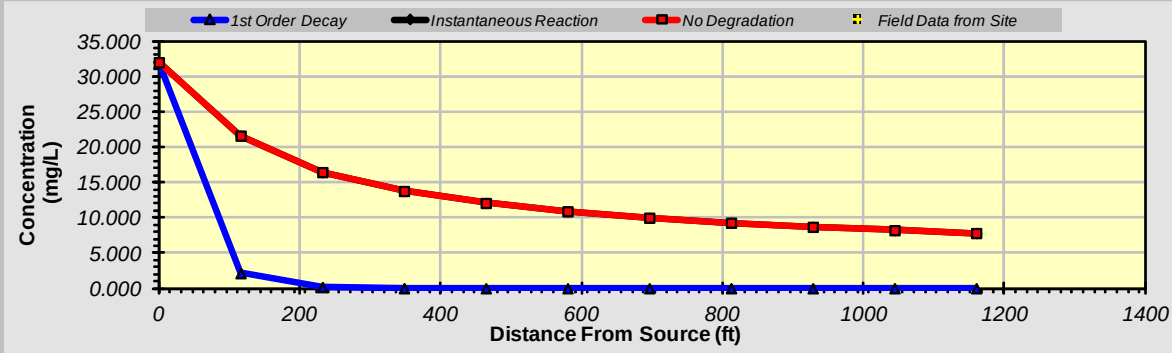


Figure D-2 BIOSCREEN Model Output

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

	Distance from Source (ft)										
TYPE OF MODEL	0	116	232	348	464	580	696	812	928	1044	1160
No Degradation	32.000	21.609	16.441	13.771	12.082	10.892	9.995	9.289	8.713	8.233	7.825
1st Order Decay	32.000	2.141	0.161	0.013	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	32.000	21.609	16.441	13.771	12.082	10.892	9.995	9.289	8.713	8.233	7.825
Field Data from Site											



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