



March 31, 2015

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Alameda, California 94502

**RECEIVED**

By Alameda County Environmental Health 10:10 am, Apr 29, 2015

**RE: Conceptual Site Model and Closure Request**  
3943 Broadway, Oakland, California 94611  
Fuel Leak Case No.: RO0000203

Dear Mr. Nowell,

I declare under penalty of perjury that to the best of my knowledge the information and/or recommendations contained in the attached report is/are true and correct.

If you have any questions or need additional information, please contact me at (925) 790-6912.

Sincerely,

A handwritten signature in blue ink, appearing to read "Nicole Arceneaux".

Nicole Arceneaux  
Union Oil of California – Project Manager

Attachment:  
Conceptual Site Model and Closure Request

**Union Oil Company of California**

**Conceptual Site Model and  
Closure Request**

Unocal Station No. 0746  
3943 Broadway  
Oakland, California  
Case No. RO0000203

March 31, 2015

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**Conceptual Site Model and  
Closure Request**

Unocal Station No. 0746  
3943 Broadway Avenue  
Oakland, California  
Case No. RO0000203

Prepared for:  
Chevron Environmental Management  
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Our Ref.:  
B0047338.2014

Date:  
March 31, 2015

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**Acronyms and Abbreviations**

ACEH	Alameda County of Environmental Health
ARCADIS	ARCADIS U.S., Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
btoc	below top of casing
COPC	constituent of potential concern
CSM	conceptual site model
Delta	Delta Consultants, Inc.
DPE	dual phase extraction
DWR	Department of Water Resources
EBMUD	East Bay Municipal Utilities District
ESL	Environmental Screening Level
GRI	Gettler-Ryan Incorporated
KEI	Kaprealian Engineering, Inc.
LNAPL	light nonaqueous phase liquid
Low-Threat Closure Policy	Low-Threat Underground Storage Tank Case Closure Policy
LUST	leaking underground storage tank
mg/kg	milligrams per kilogram
MTBE	methyl tertiary butyl ether
MRL	method reporting limit
R <sup>2</sup> value	coefficient of determination
request	Conceptual Site Model and Closure Request
site	Unocal Service Station No. 0746, located at 3943 Broadway Avenue, Oakland, California



SFRWQCB	San Francisco Regional Water Quality Control Board
SVE	soil vapor extraction
SWRCB	State Water Resources Control Board
TPH-g	total petroleum hydrocarbons as gasoline
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
WQO	water quality objective
°F	degrees Fahrenheit
µg/L	micrograms per liter



## Conceptual Site Model and Closure Request

Unocal Station No. 0746  
Oakland, California

### 1. Introduction

On behalf of Chevron Environmental Management Company's affiliate, Union Oil Company of California ("Union Oil"), ARCADIS U.S., Inc. (ARCADIS) prepared this Conceptual Site Model and Closure Request (request) for Unocal Station No. 0746, located at 3943 Broadway in Oakland, California (site; Figure 1). This request summarizes existing site data used to support a request for low-threat case closure. The site qualifies for closure as a low-threat fuel site, as described in the State Water Resources Control Board's (SWRCB's) Low-Threat Underground Storage Tank Case Closure Policy (Low-Threat Closure Policy) adopted by the SWRCB on May 1, 2012 and effective August 17, 2012 (SWRCB 2012a). A completed Low-Threat Closure Checklist is included as Appendix A.

This request includes a comprehensive site assessment and remediation history, regional and site-specific geology and hydrogeology, review of soil and groundwater conditions at the site (including the distribution of constituents of potential concern [COPCs]), and evaluation of human health exposure from site-related COPCs. Based on the information provided in the following sections, the site meets General and Media-Specific Criteria of the Low-Threat Closure Policy (SWRCB 2012a); therefore, ARCADIS requests the site be considered for low-threat closure.



## Conceptual Site Model and Closure Request

Unocal Station No. 0746  
Oakland, California

### 2. Site Description

The site is an operating 76-branded gas station located in a mixed commercial and residential area at 3943 Broadway in Oakland, California (Alameda County Assessor's Parcel #12-982-2-4; Figure 1). The site currently consists of two 12,000-gallon double-wall steel gasoline underground storage tanks (USTs), one 520-gallon waste oil UST, one station building including a service bay, one car wash building, and two product dispenser islands. There are no plans to redevelop the site. A Site Map is presented on Figure 2.

The nearest sensitive receptors are the Duck's Nest Preschool, which is located approximately 750 feet northeast and hydraulically upgradient from the site, and the Oakland Medical Center, which is located approximately 800 feet southeast and hydraulically crossgradient from the site. Sensitive populations include people who may potentially have increased susceptibility to risks resulting from exposure to site-related petroleum hydrocarbons, such as school-age children, medically compromised people, and the elderly.

### **3. Conceptual Site Model**

This section summarizes the conceptual site model (CSM), including the regional setting, regional and site geology and hydrogeology, previous work, offsite sources, distribution of fuel hydrocarbons and oxygenates in the subsurface, linear regression analysis and plume stability, an evaluation of risks to human health and the environment, and a summary of potential exposure pathways.

#### **3.1 Regional Setting**

##### **3.1.1 Topography and Site Elevation**

The site is located on relatively flat land at an elevation of approximately 80 feet above mean sea level.

##### **3.1.2 Geography**

The site is located on the southwest corner of the intersection of 40<sup>th</sup> Street and Broadway in Oakland, California (Figure 1). The site is bounded to the north by 40<sup>th</sup> Street, east by Broadway, south and southwest by commercial property, and west by Manila Avenue.

##### **3.1.3 Surface-Water Drainage**

The nearest surface-water body is the Glen Echo Creek, which is located approximately 1,630 feet southeast of the site (Figure 1).

##### **3.1.4 Climate**

The average rainfall for the area is approximately 23 inches per year. The average high temperature is 67 degrees Fahrenheit (°F) and the average low temperature is 52°F.

##### **3.1.5 Vegetation**

The site is completely paved with asphalt. The offsite areas are also paved, except for small areas used for landscaping.

### **3.2 Regional and Site Geology and Hydrogeology**

The site is located in the East Bay Plain Subbasin of the Santa Clara Valley Groundwater Basin (U.S. Geological Survey [USGS] 2006). The site is underlain by Holocene and Pleistocene-age eolian sand deposits referred to as the Merrit Sand. The Merrit Sand is described as typically consisting of fine-grained, very well-sorted, well-drained eolian sand, interfingering with Holocene Bay Mud. The sand deposits can extend to a depth of approximately 50 feet below ground surface (bgs) in the Oakland area (USGS 2000). Soils encountered beneath the site are predominantly alternating layers of silt and clay.

The site is underlain by fill material ranging from 2 to 4 feet in thickness. Beneath the fill soils are primarily interlayered clayey/silty deposits and silty/clayey sand. A continuous sand layer extends from approximately 6 to 12 feet bgs. A deeper saturated sand layer extends from 14 to 16 feet bgs. Monitoring wells are typically screened into both the 6 to 12 and 14 to 16 feet bgs sand layers. Geologic cross sections are provided on Figures 3, 4, and 5. Copies of available boring logs are provided in Appendix B.

Thirteen active groundwater monitoring wells are present at the site (MW-1 through MW-12 and RW-1). Historically, the depth to groundwater at the site ranged from approximately 3.61 to 15.79 feet below top of casing (btoc), with both depths to groundwater recorded in June 2011. The most recent monitoring and sampling event was conducted at the site on June 23, 2014. The measured depth to groundwater ranged from 7.87 (onsite well MW-6) to 14.10 (offsite well MW-10) feet btoc. The groundwater flow direction was southwest at a gradient of approximately 0.01 feet per foot (ARCADIS 2013). Historical water levels are provided in Table 1. The groundwater elevation contour map for the June 2014 sampling event is presented on Figure 6.

### **3.3 Summary of Previous Work**

Investigation activities at the site commenced in 1989 after routine UST replacement activities. This section summarizes previous work, including release history, site assessment, and site remediation activities.

#### **3.3.1 Release History**

On August 24, 1989, one steel 10,000-gallon regular unleaded gasoline UST, one steel 10,000-gallon super unleaded gasoline UST, and one single-walled steel 280-gallon waste oil UST were excavated and removed from the site. Associated product lines

were also removed and replaced. Following removal of the tanks, Kaprealian Engineering, Inc. (KEI) collected soil samples from the UST pit and from the product pipe trenches. Analytical results indicate gasoline had been released to the subsurface (KEI 1989a).

On February 19, 1998, product piping and associated dispensers were removed and replaced from the site. Gettler-Ryan Inc. (GRI) collected soil samples at each end of the product piping. Based on the presence of total petroleum hydrocarbons as gasoline (TPH-g), benzene, and methyl tertiary butyl ether (MTBE) in soil beneath the product piping near the fuel dispenser islands during the February 1998 dispenser upgrade activities, a release of an unknown amount of petroleum hydrocarbons was suspected to have occurred (GRI 1998).

### 3.3.2 Site Assessment History

During the August 1989 UST removal activities, 12 soil samples and two groundwater samples were collected. Seven of the soil samples were collected from the sidewalls of the fuel tank pit at a depth of 9.5 feet. Four soil samples were collected from the product pipe trenches at depths ranging from 5 to 6.5 feet bgs. One soil sample of native material, located beneath the waste oil tank, was collected at a depth of 8 feet bgs. Two groundwater samples were collected at a depth of 10.5 feet bgs. Groundwater concentrations of TPH-g and benzene were reported to be 1,200 and 12 micrograms per liter ( $\mu\text{g/L}$ ), respectively (KEI 1989a).

On October 17, 1989, KEI oversaw the installation of three onsite monitoring wells (MW-1, MW-2, and MW-3) to estimate groundwater flow direction and the extent of impacts. The wells were installed to depths ranging from 20 to 22.5 feet bgs. Soil samples were collected during installation (KEI, 1989b).

On November 1, 1989, quarterly groundwater monitoring activities began and included the three site monitoring wells (MW-1, MW-2, and MW-3).

On January 26, 1990, two additional onsite monitoring wells (MW-4 and MW-5) were installed under KEI's supervision to assist in determining the extent of petroleum hydrocarbon groundwater impacts. Wells were installed to a depth of 20 feet bgs and soil samples were collected between 5 and 11.5 feet bgs for each well (KEI 1990a).

On October 23, 1990, KEI oversaw the installation of two onsite monitoring wells (MW-6 and MW-7) and two offsite monitoring wells (MW-8 and MW-9) to delineate the extent



## Conceptual Site Model and Closure Request

Unocal Station No. 0746  
Oakland, California

of petroleum hydrocarbon impacts. Wells were installed to depths ranging from 20 to 22 feet bgs. Soil samples were collected during installation of each well at depths ranging from 5 to 12 feet bgs (KEI 1990b).

On January 7, 1992, KEI oversaw the installation of two additional offsite monitoring wells (MW-10 and MW-11) to delineate the extent of petroleum hydrocarbon impacts. Wells were installed to depths of 22 and 19 feet bgs, respectively. Soil samples were collected from each well at depths ranging from 5 to 19.5 feet bgs (KEI 1992a).

On June 25 and 26, 1992, KEI oversaw the installation of one offsite monitoring well (MW-12) and one onsite recovery well (RW-1). MW-12 and RW-1 were installed to depths of 17.5 and 17 feet bgs, respectively. Soil samples were collected from the MW-12 boring at depths ranging from 5 to 11.5 feet bgs (KEI 1992b).

In 1996, groundwater sampling frequency was reduced from quarterly to semiannually.

In February 1998, GRI oversaw the replacement of product piping and associated dispenser islands. Soil samples were collected from a depth of 4 feet bgs. Results indicated the presence of petroleum hydrocarbons; 30.2 tons of soil were excavated and disposed of at the Forward Inc. Landfill in Stockton, California (GRI 1998).

In 2007, TRC performed a sensitive receptor survey to evaluate the location of public and municipal wells within ½ mile of the site and an evaluation of nearby surface-water bodies (TRC 2007). The survey identified two irrigation wells and one domestic well. The nearest well was an irrigation well located approximately 1,300 feet east of the site (crossgradient).

On August 27, 2009, Delta Consultants (Delta) performed a soil and groundwater investigation. Two onsite cone penetration tests (B-1 and B-2) were advanced to 36 feet bgs and soil samples were collected from 6 to 35 feet bgs. Low levels of petroleum hydrocarbons were detected using a photo-ionization detector; however, concentrations did not warrant further investigation or active remediation (Delta 2009).

On June 23, 2014, the most recent semiannual groundwater monitoring event was conducted (ARCADIS 2014). The current monitoring well network consists of 12 groundwater monitoring wells and one recovery well. Monitoring wells MW-1 through MW-12 and recovery well RW-1 are sampled semiannually during the second and fourth quarters.

During historical groundwater monitoring activities, light nonaqueous phase liquid (LNAPL) was observed in monitoring wells MW-3 and MW-5 as indicated below:

- MW-3 – from February 1993 through October 1994.
- MW-5 – periodically since August 1991.
- MW-5 – 0.21 foot of LNAPL was measured in June 2014 (the most recent groundwater monitoring event).

In June 2014, ARCADIS performed a Department of Water Resources (DWR) well search which identified four wells within 2,000 feet of the site (Figure 7): two irrigation wells and two cathodic protection wells. The nearest well is an irrigation well located approximately 1,300 feet east of the site (crossgradient).

### 3.3.3 Remediation History

One steel 10,000-gallon regular unleaded gasoline UST, one steel 10,000-gallon super unleaded gasoline UST, one steel 280-gallon waste oil UST, and associated product piping were removed from the site and replaced in August 1989. During tank removal, 350 cubic yards of soil were removed from the site to facilitate the installation of larger USTs. Under KEI's oversight, approximately 6,500 gallons of groundwater were pumped from the UST cavity and disposed of offsite.

In October 1991, a water recovery test was performed at four wells onsite to estimate the water recovery rate and potential locations of recovery wells. Wells tested required between approximately 0.5 to 1.5 hours for full recovery. KEI recommended three of the four wells be purged on a bi-weekly basis. Purging would reduce contamination levels in the vicinity of the wells (KEI 1991).

During April 1993, KEI performed a soil vapor extraction (SVE) pilot test using onsite well RW-1. A maximum concentration of 8.6 µg/L TPH-g was reported in the influent vapor stream. The calculated maximum hydrocarbon extraction rate during the test was 0.00049 pound per hour (KEI 1993). Based on the low extraction rate, relatively high groundwater levels, and fine-grained soil beneath the site, KEI concluded SVE was not a feasible remedial option.

During product piping and dispenser island replacement in March 1998, petroleum hydrocarbon impacted soil was discovered. A total of 30.2 tons of stockpiled soil from



the site were excavated and disposed of at the Forward Inc. Landfill in Stockton, California (GRI 1998).

In April 2005, TRC conducted a 68-hour dual-phase extraction (DPE) test. A mobile treatment system was used to remove vapors and liquids from three onsite wells (RW-1, MW-3, and MW-5). A total of 39.03 pounds of hydrocarbons were recovered with 6,500 gallons of water (Delta 2008).

### **3.4 Offsite Sources**

Based on a review of the Geotracker Environmental Information Management System (<http://geotracker.waterboards.ca.gov>), seven closed and two open leaking underground storage tank (LUST) cleanup sites are located within 1,000 feet of the site. Each site is summarized below:

- Accutune, located at 4045 Broadway, approximately 330 feet northeast of the site, was a LUST cleanup site with waste oil impacts. The case was opened on June 26, 1996. Impacted soil was excavated and the site was closed on February 20, 2001.
- Five C Group, located at 4101 Broadway, approximately 510 feet northeast of the site, was a LUST cleanup site with gasoline impacts. The case was opened on June 12, 1991. Impacted soil was excavated and the site was closed on December 16, 1998.
- 7-Eleven, located at 4100 Broadway, approximately 615 feet northeast of the site, was a LUST cleanup site with gasoline impacts. The case was opened on August 29, 1986. Impacted soil was excavated and the site was closed on May 27, 1998.
- Downtown Toyota, located at 4145 Broadway, approximately 900 feet northeast of the site, was a LUST cleanup site with waste oil impacts. During removal of a 500-gallon waste oil tank on February 7, 1992, oil and grease impacts were detected. Subsequently, the case was opened. Soil samples collected in 2013 indicated the area was free of petroleum hydrocarbons. The site was closed on September 24, 2014.
- Glovatorium, located at 3820 Manila Avenue, approximately 440 feet south-southwest of the site, is an open remediation LUST cleanup site with Stoddard solvent, fuel oil, and waste oil impacts. Reportedly, a significant amount of

Stoddard solvent was released in the 1970s. The current LUST case was opened on May 31, 1990. Six USTs onsite were abandoned in 1997 by backfilling with either cement-sand slurry or pea gravel. During these activities, holes were noticed in two of the tanks containing Stoddard solvent. Remediation activities included free product removal from 2002 to 2008 and multiphase extraction from 2008 to 2011.

- Earl Thompson Property, located at 316 38<sup>th</sup> Street, approximately 450 feet south-southwest of the site, is an open remediation LUST cleanup site with Stoddard solvent, diesel and gasoline impacts. During tank removal in November 2008, one of the tanks was found to have a small hole. The site is currently in the site assessment phase.
- Chevron #21-1283/Express Auto Clinic, located at 3810 Broadway, approximately 570 feet south of the site, was a remediation LUST cleanup site with gasoline and waste oil impacts. The site was a Texaco Service Station from 1963 to 1980 (<http://geotracker.waterboards.ca.gov>). Four 6,000-gallon leaded gasoline USTs were removed in February 1980. A 550-gallon waste oil UST remained onsite until removal in May 1991. During removal of this UST, impacted soil was discovered and excavated. The site was opened May 15, 1991. Further excavation occurred in 2000; removing approximately 1,400 cubic yards of petroleum hydrocarbon impacted soil. The site was closed on May 16, 2014.
- Firestone #3658, located at 3785 Broadway, approximately 530 feet southwest of the site, was a LUST cleanup site with waste oil impacts. The site was opened on December 10, 1990; impacted soil was excavated and the site was closed on February 22, 1994.
- Kaiser Development/Val Strough Honda, located at 3735-3799 Broadway, approximately 500 feet southwest of the site, was a LUST cleanup site with chromium, diesel, gasoline, lead, nickel, and waste oil impacts. The initial release was reported on February 27, 1987. The site consists of multiple parcels, which were formerly a car wash, Honda dealership, automotive service facility, office space, Firestone automotive service facility, and Midas automotive service facility. The site was excavated to remove impacted soil. During excavation, groundwater was encountered and dewatering was performed. The encountered groundwater was treated onsite prior to discharge to the sanitary sewer. The site was closed on November 7, 2012.

### **3.5 Current and Historical Distribution of Residual Hydrocarbons and Oxygenates**

COPCs at the site include TPH-g; benzene, toluene, ethylbenzene, and total xylenes (BTEX); and MTBE. The current distribution of residual petroleum hydrocarbons and fuel oxygenates in soil, LNAPL, groundwater, and soil vapor is described in Sections 3.5.1 through 3.5.4.

#### **3.5.1 Soil**

Sixty-one soil samples were collected at the site from 1989 to 2009 at depths ranging from 4 to 35 feet bgs to characterize concentrations of fuel hydrocarbons and oxygenates in site soil. Soil analytical results are summarized in Table 2.

Detectable petroleum hydrocarbon impacts were identified at depths between 4 and 34.5 feet bgs. Soil samples collected below approximately 5 feet bgs represent saturated soil conditions. Petroleum hydrocarbon impacts were reported in vadose and saturated zone soil samples collected underneath the USTs, dispenser islands, and product lines. Generally, the highest concentrations of COPCs were reported in the vadose zone and capillary fringe soil near the product dispensers and the southeastern portion of the site near MW-5.

Maximum historical concentrations of fuel hydrocarbons and oxygenates in soil extending to 10 feet bgs include:

- TPH-g at 4,300 milligrams per kilogram (mg/kg) from UT-2-4 at 4 feet bgs
- Benzene at 1.5 mg/kg from MW-5 at 10 feet bgs
- Toluene at 8.7 mg/kg from SW2 at 9.5 feet bgs
- Ethylbenzene at 58 mg/kg from UT-2-4 at 4 feet bgs
- Total xylenes at 410 mg/kg from UT-2-4 at 4 feet bgs
- MTBE at 2.9 mg/kg from UT-3-4 at 4 feet bgs.

Soil borings UT-2-4 and UT-3-4 were located below the western side of the south dispenser island and eastern side of the north dispenser island, respectively. Boring SW2 was located in the UST pit area and was subsequently excavated to facilitate the installation of larger USTs.

The site soil analytical data were compared to the commercial/industrial and utility worker soil screening levels presented in Table 1 of the Low-Threat Closure Policy

(SWRCB 2012a). The maximum benzene and ethylbenzene concentrations in soil between 0 and 10 feet bgs do not exceed these screening levels.

The majority of the soil analytical results are from investigations conducted 16 to 25 years ago. These data allowed for a comprehensive analysis of site conditions. However, it is reasonable to assume current concentrations of COPCs in soil are significantly lower relative to historical data, as reflected in the lower concentrations of COPCs currently observed in groundwater. Natural attenuation processes have likely lowered current concentrations to some degree since the collection of the older soil data.

The lateral extent of the site COPCs are defined by boring locations MW-11 (offsite) to the southwest, MW-12 (offsite) to the south, and monitoring well MW-2 (onsite) to the west (Figure 2). The soil samples collected from these locations had no detectable concentrations of site COPCs. In monitoring well MW-6, located in the north-northwest corner of the site, total xylenes were detected at a concentration of 0.01 mg/kg at 9 feet bgs.

Offsite monitoring well MW-9 contained detectable concentrations of site COPCs in soil at depths of 10 and 12 feet bgs. Offsite monitoring wells MW-8 and MW-10 had detectable concentrations of total xylenes at depths of 10 and 5 feet bgs, respectively. These data are summarized in Table 2.

### 3.5.2 Light Nonaqueous Phase Liquid

Measurable amounts of LNAPL were detected in MW-3 from 1993 to 1994 and in MW-5 from 1991 to 2014. Currently, LNAPL gauging is performed during groundwater monitoring events. Historically, any LNAPL found was removed via bail down methods. From 1999 through 2011, 4 gallons of LNAPL were removed from MW-5. Site-wide, LNAPL has been recovered to the maximum extent possible. Table 1 presents the historical groundwater analytical data.

### 3.5.3 Groundwater

COPCs in groundwater at the site have been monitored since November 1989. The monitoring well network consists of 13 wells (MW-1 through MW-12 and RW-1). The wells are sampled semiannually during the second and fourth quarters. Groundwater analytical results and well construction details are presented in Tables 1 and 3, respectively.

Dissolved-phase COPC concentrations in groundwater samples collected as of second quarter 2014 indicate the following:

- *TPH-g*. TPH-g concentrations at the site ranged from less than the method reporting limit (MRL) of 50 µg/L to 4,200 µg/L in well MW-3, which is located on the southeastern part of the site. The historical maximum concentration of TPH-g was 1,100,000 µg/L in MW-3 on November 20, 1992.
- *Benzene*. Benzene concentrations ranged from less than the MRL of 0.50 µg/L to 87 µg/L in well MW-3. The historical maximum concentration of benzene was 34,000 µg/L in MW-5 on February 1, 2011.
- *Toluene*. Toluene was not detected above the MRL of 0.50 µg/L in any monitoring wells. The historical maximum concentration of toluene was 6,400 µg/L in MW-3 on November 20, 1992.
- *Ethylbenzene*. Ethylbenzene concentrations ranged from less than the MRL of 0.50 µg/L to 76 µg/L in well MW-3. The historical maximum concentration of ethylbenzene was 18,000 µg/L in MW-5 on May 22, 2000.
- *Total xylenes*. Total xylenes ranged from less than the MRL of 1.0 µg/L to 13 µg/L in well MW-3. The maximum concentration of total xylenes was 59,000 µg/L in MW-5 on May 22, 2000.
- *MTBE*. MTBE concentrations ranged from less than the MRL of 0.50 µg/L to 7.6 µg/L in well MW-3. MTBE was reported at a historical maximum concentration of 2,700 µg/L in MW-2 on May 25, 1993.

The data presented above establishes that the groundwater plume is stable or decreasing. Isoconcentration maps for TPH-g, benzene, and MTBE are shown on Figures 8, 9, and 10, respectively. Three monitoring wells were not accessible for groundwater sampling during the second quarter 2014 event, MW-8, MW-9 and MW-11. Subsequently, reasonably expected monitoring well concentrations, based on a review of historical trend graphs to present, were used in contouring. The historical trend graphs displaying site COPCs in monitoring wells are displayed in Appendix C.

During the December 9, 2011 groundwater monitoring event, four samples (MW-1, MW-4, MW-11 and MW-12) were collected and analyzed for natural attenuation parameters. The wells sampled represent upgradient (MW-1), plume area (MW-4) and

downgradient (MW-11 and MW-12). The electron acceptors analyzed were nitrate as nitrogen and sulfate. These electron acceptors are consumed during biodegradation of LNAPL and dissolved constituents. A comparison of nitrate and sulfate concentrations (Table 4) indicates that there are lower nitrate and sulfate concentrations in the plume area than in the upgradient and downgradient areas. This suggests that biodegradation is occurring in the plume area and creating a stable and decreasing plume.

The lateral extent of the groundwater plume is defined by MW-2 and MW-6 to the northwest, MW-1 and MW-7 to the north, MW-10 (offsite) to the east, MW-11 (offsite) to the southwest and MW-12 (offsite) to the south. COPC concentrations in these monitoring wells are non-detect or below water quality objectives (WQOs), defined as the relevant San Francisco Regional Water Quality Control Board (SFRWQCB) groundwater environmental screening levels (ESLs). Section 3.6 further discusses groundwater impacts through the use of linear regression analysis.

The plume travel path for TPH-g is presented on Figure 7. The average and 90<sup>th</sup> percentile plume lengths are based on the SWRCB's Technical Justification for Groundwater Media-Specific Criteria dated April 24, 2012. Using the plume lengths presented in the SWRCB document in conjunction with the rose diagram for groundwater flow direction, an area of potential plume migration was defined. As shown on the figure, there are no known irrigation, domestic, other private-owned, or municipal supply wells within the area of potential migration.

#### 3.5.4 Soil Vapor

Under the Low-Threat Closure Policy (SWRCB 2012a), active commercial service stations are not required to meet vapor intrusion criteria unless underground releases can reasonably be believed to pose unacceptable risk. This site is an active station and exposure to volatile petroleum hydrocarbon constituents associated with historical fuel system releases are deemed insignificant relative to typical exposures from surface spills and fugitive vapors at service stations. Offsite monitoring wells sampled during the June 23, 2014 sampling event did not have any COPC detections above the MRL (ARCADIS 2013) and do not pose a soil vapor threat.

### 3.6 Linear Regression Analysis and Plume Stability

A statistical analysis of historical groundwater monitoring data was completed to assess trends in COPC concentrations through time. Graphs of log-normalized concentration data versus time were created and a linear regression trend test was

used to evaluate the statistical significance of COPC concentration trends (Appendix D). The statistical analysis used historical groundwater monitoring data collected following completion of source removal and soil excavation in 1998 for 12 monitoring wells (MW-1 through MW-4, MW-6 through MW-12, and RW-1). Monitoring well MW-5 was excluded from the linear regression analysis due to the presence of LNAPL. The LNAPL in this well does not appear to be migrating downgradient, suggesting that the LNAPL exists only in the well and filter pack.

COPC concentrations were screened against WQOs, which were defined as the relevant SFRWQCB ESLs for shallow soils that are not a current or potential source of drinking water. The site COPCs and WQOs are listed below:

- TPH-g – 500 µg/L
- Benzene – 27 µg/L
- Toluene – 130 µg/L
- Ethylbenzene – 43 µg/L
- Total Xylenes – 100 µg/L
- MTBE – 1,800 µg/L

Linear regression analysis was completed for those monitoring wells and COPC pairs where:

1. Concentrations of COPCs were above the respective MRL limit for at least 50 percent of the data collected since 1999.
2. Concentrations of COPCs greater than the relevant WQO have occurred at least once during the last 2 years.
3. At least eight data points above detection were present in the dataset.

The linear regression analysis used the first monitoring event after 1998, when remedial activities were completed at the site (except for a short-term DPE event). The trend analysis is reflective of the natural attenuation of COPCs and is representative of ongoing attenuation rates in the foreseeable future.

### 3.6.1 Linear Regression Methodology

Linear regression analyses using natural log-normalized concentration data were conducted to estimate trend direction, attenuation rates, and approximate time to

achieve WQOs for the selected locations and COPCs (USEPA 2002). Results of the linear regression analyses, including coefficients of determination ( $R^2$  values), p-values of the correlation, and trend directions, are summarized in Table 5; individual analyses are included in Appendix D. The  $R^2$  value is a measure of how well the linear regression model fits the site data.  $R^2$  values less than 0.1 indicate a weak model fit while  $R^2$  values greater than 0.5 indicate a stronger model fit. The p-value of the correlation provides a measure of the level of significance of the slope of the trend line. Trends were accepted as significant for p-values less than or equal to 0.05 (95 percent confidence level) and were considered not significant for p-values greater than 0.05. For this analysis, datasets with  $R^2$  values less than 0.1 and p-values greater than 0.05 were defined as having no apparent trend (no trend). The trend direction was defined as decreasing if the slope of the linear regression was negative and increasing if the slope of the regression was positive.

Where concentrations were below the method reporting limit (MRL; non-detect), the concentrations were set equal to the MRL. If the MRL was not provided, the non-detect value was not used in the analysis. Use of the MRL for concentrations that were non-detect provides a conservative estimate for evaluating the concentration trends through time.

Based on the criteria outlined above, linear regression analysis was completed for the following monitoring well and COPC pairs:

- TPH-g: MW-3, MW-4, RW-1
- Benzene: MW-3
- Ethylbenzene: MW-3

Concentrations of COPCs at all other monitoring locations did not meet the linear regression analysis criteria. Groundwater samples were collected from monitoring well MW-5 when LNAPL was detected (February 2011, December 2013, and June 2013); these samples are not considered representative of COPC concentrations. Subsequently, MW-5 did not meet the linear regression analysis criteria.

### 3.6.2 Linear Regression Results

Results of the linear regression analyses are summarized in Table 5, and the distributions of COPCs in groundwater are presented on Figures 8, 9, and 10. Results from the linear regression analyses indicate the following:



- There is evidence of natural attenuation of COPCs at the site.
- The majority of monitoring well and COPC pairs exhibit statistically significant decreasing trends, or no apparent trend with concentrations likely to be stable.
- The most recent concentrations of COPCs at monitoring wells sampled during June 2014 were below the relevant WQOs, except:
  - TPH-g at MW-3 (4,200 µg/L) and MW-4 (2,600 µg/L)
  - Benzene at MW-3 (87 µg/L)
  - Ethylbenzene at MW-3 (76 µg/L)

Monitoring wells MW-8 and MW-9 (downgradient) were last measured during December 2010 and the concentrations for all constituents were below the relevant WQOs at that time.

Concentration trends specific to each COPC are discussed below.

#### *3.6.2.1 Total Petroleum Hydrocarbons as Gasoline*

A statistically significant decreasing trend in concentrations of TPH-g was observed at recovery well RW-1, with concentrations predicted to reach the WQO of 500 µg/L during 2016. TPH-g in groundwater at RW-1 was non-detect below the WQO in June 2014.

Monitoring well MW-3 exhibited no apparent trend; TPH-g concentrations at this location appear to be stable. Historically, the highest concentrations of TPH-g have been detected at monitoring well MW-3. Concentrations observed at MW-3 continue to be detected above the WQO. However, concentrations are lower than historical detections in groundwater, indicative of stable to decreasing conditions.

Concentrations of TPH-g at monitoring well MW-4 exhibited a statistically significant increasing trend when all data post-excavation were included in the evaluation. The increasing trend in TPH-g concentrations at monitoring well MW-4 is a result of non-detect concentrations recorded prior to December 2009. Since December 2009, concentrations at monitoring well MW-4 showed no apparent trend, and appear to be stable.

### 3.6.2.2 Benzene

A statistically significant decreasing trend in benzene concentrations was observed at monitoring well MW-3, with concentrations above the WQO of 27 µg/L in June 2014 (87 µg/L). This data point may be an anomaly since concentrations have been below the WQO the five preceding monitoring events.

### 3.6.2.3 Ethylbenzene

A statistically significant decreasing trend in ethylbenzene concentrations was observed at monitoring well MW-3. Linear regression projected ethylbenzene to reach the WQO in 2013, however, ethylbenzene was detected above the WQO of 43 µg/L in June 2014 (76 µg/L). Based on the statistical trend, concentrations should continue to decrease and reach the WQO in the near future.

### 3.6.3 Summary

There is evidence to support that natural attenuation of COPCs is occurring and has resulted in an overall stable to decreasing groundwater plume. Natural attenuation is expected to further reduce concentrations of COPCs at the site. At monitoring locations with stable concentrations trends, it is expected that trends will shift to decreasing trends as the plume continues to shrink. Where locations were statistically significantly decreasing, COPCs are projected to reach their WQOs by 2016.

## **3.7 Assessment of Impacts of Residual Constituents on Public Health and the Environment**

Based on the assessment of data presented in this request, the residual concentrations of COPCs in site environmental media are unlikely to pose adverse effects to human health and the environment. This section summarizes sensitive receptors observed near the site, including a water supply well survey, potential exposure pathways, and comparison of residual COPC concentrations in site media to human health risk-based screening levels.

### 3.7.1 Sensitive Receptors and Water Supply Well Survey

The site is an operating service station surrounded by commercial and residential properties. Potential receptors were identified based on current and expected future

land use(s) at the site. Current and reasonably anticipated future land use of the site is commercial (i.e., continued operation as a gasoline service station).

The site is located within the city limits of Oakland, California. Existing land use in this area is mostly commercial property with some single- and multi-family residential property. The closest residences are located approximately 100 feet from the southern site boundary. Residential development in Oakland is expected to increase with the addition of 2,375 new homes between 2010 and 2015 (City of Oakland 2010). The new residences will be throughout Oakland, some located near the site. However, it is unlikely that the site would be redeveloped as residential property.

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. The East Bay Municipal Utilities District (EBMUD) currently supplies water to the site and surrounding properties and is expected to provide water to these areas in the future (EBMUD 2013). Ninety percent of the water used within the EBMUD public water system, which includes drinking water at the site, is imported water from the Mokelumne River watershed in the Sierra Nevada Mountains (EBMUD 2013).

A California DWR well search was performed by TRC in 2007 (TRC 2007) and ARCADIS in 2014. Both searches identified the nearest well as an irrigation well located approximately 1,300 feet east of the site (crossgradient). All wells identified in the two well searches are located upgradient or crossgradient from the site and more than 1,000 feet from the site. Therefore, the wells are unlikely to be impacted by historical or current operations at the site.

Glen Echo Creek is the nearest surface-water body to the site and is located approximately 1,630 feet southeast of the site (Figure 1). Glen Echo Creek is crossgradient from the site and is unlikely to be impacted by historical or current operations at the site.

The site is devoid of ecological receptors and is not immediately adjacent or upgradient to known sensitive receptors or water-supply wells. Based on this information, potential exposure pathways for sensitive receptors are considered insignificant.

### 3.7.2 Potential Transport and Release Mechanisms and Receptors

The site is an active commercial petroleum fueling and service station. In the reasonably anticipated future, the site is expected to remain an active commercial

gasoline service station. This section discusses the potential transport and release mechanisms and receptors at the site.

#### *3.7.2.1 Volatilization*

A potential release mechanism at the site may include the volatilization of COPCs in subsurface soil or groundwater to indoor air of onsite commercial buildings, outdoor air, air within a trench used by a future onsite utility worker, or groundwater to indoor air of current and future offsite residential or commercial buildings.

Exposure to petroleum vapors migrating from soil or groundwater to indoor air may pose unacceptable human health risks. However, under the Low-Threat Closure Policy (SWRCB 2012a), active commercial service stations are not required to meet vapor intrusion criteria unless underground releases can reasonably be believed to pose unacceptable risk, which is not the case for the site based on available data. Exposure to volatile petroleum hydrocarbon constituents associated with historical fuel system releases are deemed insignificant relative to typical exposure from surface spills and fugitive vapors at service stations. Additionally, in many petroleum release cases, potential human exposures to vapors are mitigated by bioattenuation processes as vapors migrate toward the ground surface.

Vapor migration from subsurface (i.e., soil and groundwater) to indoor air is considered to be an unlikely and insignificant exposure pathway for current and future onsite workers. Vapor migration into trench air or outdoor air is unlikely due to the potential for dilution in outdoor areas with high ventilation.

Groundwater analytical results for offsite monitoring well samples collected on June 23, 2014 showed no COPC detections above the MRL. Therefore, potential vapor migration into offsite commercial or residential buildings is not expected to be a health risk for current and future offsite commercial workers and residences.

#### *3.7.2.2 Leaching to Groundwater*

The release of petroleum hydrocarbons from former USTs and associated piping can leach from soil to groundwater. This release mechanism is likely responsible for the majority of historical groundwater impacts. However, decreasing or stable petroleum hydrocarbon trends in groundwater (Section 3.6) indicate that this release mechanism has likely been mitigated through remediation, weathering, and natural attenuation.

### 3.7.2.3 *Direct Contact with Groundwater*

As described in Section 3.7.1, drinking water is supplied to the site by the EBMUD. Well surveys completed in 2007 (TRC 2007) and 2014 identified three water-supply wells within ½ mile of the site; two cathodic protection wells identified, but are not classified as water supply wells. All three water supply wells are greater than 1,000 feet from the site, with the closest well (an irrigation well) identified approximately 1,300 feet east of the site. All wells are located upgradient or crossgradient from the site. Therefore, direct contact with groundwater through supply wells is not expected to be a complete or significant exposure pathway.

Historically, the depth to groundwater at the site ranged from approximately 3.61 to 15.79 feet bgs, with both depths to groundwater recorded in June 2011. Groundwater depths recorded in June 2014 ranged from 7.87 feet (onsite well MW-6) to 14.10 feet (offsite well MW-10) btoc. There are no current plans for redevelopment or station upgrades; therefore, it is unlikely that future onsite utility workers will be directly exposed to residual petroleum hydrocarbons in groundwater. In the event subsurface work is required, dewatering will typically occur when water is exposed in excavation trenches. Therefore, the direct contact with groundwater pathway for future onsite utility workers is considered complete but insignificant.

### 3.7.2.4 *Direct Contact with Soil*

The site is completely covered with buildings, fuel dispensers, concrete and asphalt paving, and perimeter landscaping. Current and future onsite commercial workers will likely not be exposed to COPCs in soil via direct contact exposure pathways (i.e., incidental ingestion, dermal contact, and inhalation of particulates). Therefore, the risk for direct contact with surface and subsurface soil for the current and future onsite commercial worker is likely insignificant.

Future onsite utility workers may be directly exposed to petroleum hydrocarbon constituents in subsurface soil during intrusive soil activities. Impacted soil appears at depths of approximately 4 to 34.5 feet bgs. Typically, utility trenches are located at a depth of no greater than 8 feet bgs. These depths may be encountered by construction, excavation, and utility workers. However, there are currently no plans for redevelopment or station upgrades in the near future. Therefore, future onsite utility workers' potential direct contact exposure to constituents in surface and subsurface soil is considered to be complete but insignificant.

### 3.7.2.5 Potential Ecological Receptors

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 (Glen Echo Creek) is located 1,630 feet southeast of the site. The possible impacts to the nearest surface-water body are unlikely because the creek is located crossgradient from the site and due to the sizable distance of the water body from the site. Based on this information, potential exposure pathways for ecological receptors are incomplete.

### 3.8 Summary of Potential Exposure Pathways

Potential human receptors at the site were identified based on current and future land use(s) at and near the site. As discussed previously, current and reasonably anticipated future land use at the site is commercial (i.e., continued operation of the service station). Potential receptors include current and future onsite and offsite commercial workers, current and future offsite residents, and future onsite utility/construction workers. As described above, no complete and potentially significant exposure pathways were identified. Potentially complete but insignificant human health exposure pathways include:

- Current and future onsite and offsite commercial workers: inhalation of COPCs migrating to indoor air
- Current and future offsite residents: COPCs migrating to indoor air from groundwater
- Future onsite utility workers:
  - Inhalation (outdoor air) of air vapors
  - Inhalation (outdoor air) of dust particles
  - Ingestion of surface and subsurface soil
  - Dermal contact with groundwater
  - Dermal contact with surface and subsurface soil

#### **4. Assessment of Site Conditions Relative to Low-Threat Closure Policy**

The Low-Threat Closure Policy (SWRCB 2012a) outlines eight General Criteria to assess whether sites are candidates for low-threat case closure and three categories of Media-Specific Criteria (groundwater, petroleum vapor intrusion to indoor air, and direct contact and outdoor air exposure) that also must be met. This section evaluates current site conditions against the General and Media-Specific Criteria. Based on this evaluation, ARCADIS concludes that the site meets the General and Media-Specific Criteria requirements for low-threat case closure.

##### **4.1 Evaluation of Low-Threat Closure General Criteria**

This section evaluates the site conditions related to each of the eight General Criteria.

###### **4.1.1 Criteria A – The unauthorized release is located within the service area of a public water system**

The site lies within the East Bay Plain Subbasin of the Santa Clara Valley Groundwater Basin. The site is located within the service area of the City of Oakland public water system. Water used within the City of Oakland public water system, which includes drinking water at the site, is imported water supplied by the EBMUD. Approximately 90 percent of the EBMUD's water supply comes from the Mokelumne River watershed in the Sierra Nevada Mountains (EBMUD 2013). As discussed in Section 3.7.1, well survey results for active and inactive wells identified four water-supply wells located within a ½-mile radius of the site. All wells are located either upgradient or crossgradient from the site. The nearest well identified is an irrigation well located 1,300 feet north (upgradient) of the site.

###### **4.1.2 Criteria B – The unauthorized release consists only of petroleum**

Soil and groundwater impacts occurred as a result of unauthorized historical releases from USTs, dispenser islands, and/or product piping. COPCs at the site include TPH-g, BTEX, and MTBE, which are indicative of a petroleum release. There have been no non-petroleum impacts or releases documented at the site.

###### **4.1.3 Criteria C – The unauthorized (“primary”) release from the UST system has been stopped**

In August, 1989, the USTs and associated product lines were removed and replaced. During UST replacement, 350 cubic yards of soil were removed from the site to make

room for the larger tanks. Approximately 6,500 gallons of groundwater were pumped from the UST cavity and disposed of offsite. During product piping and dispenser island replacement in March 1998, petroleum hydrocarbon-impacted soil was discovered. A total of 30.2 tons of stockpiled soil from the site were transported and disposed of at the Forward Inc. Landfill in Stockton, California. The unauthorized releases ceased with the replacement of this infrastructure.

4.1.4 Criteria D – Free product has been removed to the maximum extent practicable

Site monitoring wells have been screened for free product accumulation during groundwater monitoring events from 1992 to the present. LNAPL has been observed at the site in MW-3 and MW-5. Historically, any free product found was removed via baildown methods. From 1999 through 2011, 4 gallons of free product were removed from MW-5. Currently, monitoring wells are gauged for product monthly. Site-wide, free product has been recovered to the maximum extent practicable (Section 3.5.2). In addition, geochemical analyses indicate the biodegradation is occurring in the area (Section 3.5.3). Biodegradation will reduce residual LNAPL on site.

4.1.5 Criteria E – A conceptual site model that assesses the nature, extent, and mobility of the release has been developed

A CSM that includes a comprehensive site assessment and remediation history, regional and site-specific geology and hydrogeology, review of the soil and groundwater conditions at the site, and evaluation of potential human health exposure from site-related COPCs is presented in Section 3 of this request.

4.1.6 Criteria F – Secondary source has been removed to the extent practicable

As detailed in Section 3.6, results of the regression analysis indicate attenuation or stable trends of all COPCs in groundwater beneath the site. The decreasing trends provide evidence that secondary source removal at the site has likely been achieved to the extent practicable through biodegradation and remediation efforts.

4.1.7 Criteria G – Soil and groundwater have been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15

Soil samples collected in 1998 and 2009 (Table 2) and groundwater samples collected during site investigation and monitoring events from 1995 to 2002 were analyzed for MTBE using USEPA Method 8021B; groundwater samples collected from 1999 to the



present were analyzed for MTBE using USEPA Method 8021B and/or 8260B (Table 1). During the most recent monitoring event in June 2014, the maximum MTBE concentration of 7.6 µg/L was detected in the groundwater sample collected from monitoring well MW-3.

4.1.8 Criteria H – Nuisance as defined by Water Code Section 13050 does not exist at the site

No nuisance exists at the site, as defined by Water Code Section 13050. Site conditions and the treatment and disposal of site wastes are not injurious to health, are not indecent or offensive to the senses, and 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.

#### **4.2 Evaluation of Low-Threat Closure: Media-Specific Criteria**

This section evaluates the site conditions related to each of the three categories of Media-Specific Criteria.

##### 4.2.1 Groundwater

Groundwater at the site does not currently pose a risk to existing or anticipated future beneficial uses of groundwater and meets the groundwater-specific criteria outlined in the Low-Threat Closure Policy (SWRCB 2012a). The Low-Threat Closure Policy (SWRCB 2012a) 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.”

###### *4.2.1.1 Plume Stability*

According to the Technical Justification for Groundwater Media Specific Criteria (SWRCB 2012b), plume stability can be demonstrated in two ways:

- “[R]outinely observed non-detect values for groundwater parameters in down-gradient wells”
- “[S]table or decreasing concentration levels in down-gradient wells.”

Plume stability is discussed in Section 3.6. The results of the linear regression analyses are summarized in Table 5 and the individual analyses are included in Appendix D. Results of the regression analysis indicate attenuation of the COPCs in groundwater beneath the site (Section 3.6.1). Evaluation of groundwater monitoring data indicate plume stability at the site as defined by the Technical Justification for Groundwater Media-Specific Criteria (SWRCB 2012b).

#### *4.2.1.2 Additional Groundwater-Specific Criteria*

As described in the Low-Threat Closure Policy (SWRCB 2012a), a site can meet the Groundwater -Specific Criteria through one of five main classes. This site falls into **Class 3** as described below.

#### ***3a. The contaminant plume that exceeds water quality objectives is less than 250 feet in length***

To determine the classification of groundwater impacts, the length of the plume exceeding WQOs for each of the current site COPCs was measured using the most recent isoconcentration maps included on Figures 8, 9, and 10. Plume lengths were conservatively measured from the north corner of the USTs (i.e., source area) to the furthest downgradient isoconcentration contour:

- The TPH-g plume exceeding 500 µg/L is approximately 120 feet long.
- The benzene plume exceeding 27 µg/L is approximately 120 feet long.
- MTBE does not exceed the SFRWQCB ESL of 1,800 µg/L.

#### ***3b. Free product has been removed to the maximum extent practicable, may still be present below the site where the release originated, but does not extend offsite***

Free product has been observed in site monitoring wells MW-3 and MW-5, as detailed in General Criteria (D) and Section 3.5.2. Free product has been observed onsite but has been removed to the maximum extent practicable and does not extend offsite.

#### ***3c. The plume has been stable or decreasing for a minimum of five years***

As described in Sections 3.5.3 and 3.6, the plume continues to decrease in size. According to the linear regression, the COPCs have decreasing or stable trends, indicating a stable plume.

***3d. The nearest existing water supply well or surface-water body is greater than 1,000 feet from the defined plume boundary***

As described in General Criteria A and Section 3.7.1, no water supply wells were identified within 1,000 feet from the site or the defined plume boundary. Glen Echo Creek is the nearest surface-water body and is located approximately 1,630 feet southeast of the site (Section 3.7.1) and greater than 1,000 feet from the defined plume boundary.

***3e. The property owner is willing to accept a land use restriction if the regulatory agency requires a land use restriction as a condition of closure***

Current site zoning is commercial. The future land use of the property is not expected to change. However, if zoning changes, land use restrictions may be required by the oversight agency.

4.2.2 Petroleum Vapor Intrusion to Indoor Air

As described in the Low-Threat Closure Policy (SWRCB 2012a), 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; therefore, the site is exempt from the Media-Specific Criteria.

The benzene plume exceeding 27 µg/L that seems to be originating from the site (MW-5) does not extend beneath buildings or roads offsite (Figure 9). Therefore, this criterion is met and the site is exempt.

4.2.3 Direct Contact and Outdoor Air Exposure

As described in the Low-Threat Closure Policy (SWRCB 2012a), sites will meet the Media-Specific Criteria for direct contact with contaminated soil or inhalation of contaminants volatilized to outdoor air if any of the following apply:

- The maximum concentrations of COPCs in soil are less than or equal to those listed in Table 1 of the Low-Threat Closure Policy (SWRCB 2012a).

- A site-specific risk assessment shows that COPCs present in soil will not adversely affect human health.
- Exposure to COPCs is mitigated through engineering controls.

This site meets the first criteria as summarized below:

- The site is completely covered with a building and pavement and there is little or no potential for direct human contact with site soil or for offsite wind dispersion of soil. Therefore, direct contact exposure pathways (i.e., ingestion, dermal contact, and inhalation of particulates) with soil are considered incomplete and are expected to remain the same in the future.
- Historical soil data are included in Table 2. Benzene and ethylbenzene concentrations were evaluated using concentrations for commercial/industrial exposure because the site is not anticipated to be developed for residential use (Table 1 of SWRCB 2012a). Polycyclic aromatic hydrocarbons, including naphthalene, are not considered COPCs at the site.



## Conceptual Site Model and Closure Request

Unocal Station No. 0746  
Oakland, California

Chemical	Commercial/Industrial				Utility Worker	
	0 to 5 feet bgs mg/kg		Volatilization to outdoor air (5 to 10 feet bgs) mg/kg		0 to 10 feet bgs mg/kg	
	Low- Threat Closure Policy Table 1	Site Maximum	Low- Threat Closure Policy Table 1	Site Maximum	Low- Threat Closure Policy Table 1	Site Maximum
Benzene	8.2	0.3 (P3)	12	1.5 (MW5)	14	1.5 (MW5)
Ethylbenzene	89	58 (UT-2-4)	134	7.6 (SW2)	314	58 (UT-2-4)

As shown in the table above, the maximum concentrations of benzene and ethylbenzene are below the No Significant Risk Values (Table 1 of SWRCB 2012a) for commercial/industrial direct contact and volatilization to outdoor air and utility worker direct contact in soil samples collected from 0 to 10 feet bgs.



## **5. Recommendations**

ARCADIS respectfully requests that Alameda County Environmental Health (ACEH) grant low-threat site closure because site conditions meet all General and Media-Specific Criteria established in the Low-Threat Closure Policy (SWRCB 2012a). The site poses a low threat to human health, safety, and the environment, and satisfies the case closure requirements of Health and Safety Code Section 25296.10. In addition, case closure is consistent with Resolution 92-49, which requires that WQOs be met within a reasonable timeframe.

Groundwater data presented in this request support a conclusion that the site and the impacted groundwater are not expected to pose a significant threat to human health or the environment.

ARCADIS recommends no further action and that the site be granted regulatory closure. Suspension of groundwater monitoring and reporting is also recommended during the low-threat case closure evaluation process.

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## Tables

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-1</b>															
	11/1/1989	--	--	--	--	--	ND	--	ND	ND	ND	0.3	--	--	
	2/15/1990	--	--	--	--	--	170	--	7.9	ND	2.2	2.8	--	--	
	8/16/1990	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/7/1990	--	--	--	--	--	45	--	ND	ND	ND	ND	--	--	
	2/25/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	5/28/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	8/28/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/19/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	2/6/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	5/23/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	8/26/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/20/1992	--	--	--	--	--	ND	--	0.75	ND	ND	ND	--	--	
	12/21/1992	81.07	8.12	0	72.95	--	--	--	--	--	--	--	--	--	
	1/30/1993	81.07	7.63	0	73.44	0.49	--	--	--	--	--	--	--	--	
	2/24/1993	81.07	7.16	0	73.91	0.47	1100	--	280	4.9	120	140	--	--	
	3/22/1993	81.07	6.26	0	74.81	0.90	--	--	--	--	--	--	--	--	
	4/28/1993	81.07	7.91	0	73.16	-1.65	--	--	--	--	--	--	--	--	
	5/25/1993	81.07	7.87	0	73.20	0.04	260	--	27	4.9	2.6	54	--	--	
	6/23/1993	80.54	7.66	0	72.88	-0.32	--	--	--	--	--	--	--	--	
	7/22/1993	80.54	7.87	0	72.67	-0.21	--	--	--	--	--	--	--	--	
	8/25/1993	80.54	8.00	0	72.54	-0.13	ND	--	ND	ND	ND	ND	--	--	
	9/22/1993	80.54	8.10	0	72.44	-0.10	--	--	--	--	--	--	--	--	
	10/28/1993	80.54	8.15	0	72.39	-0.05	--	--	--	--	--	--	--	--	
	11/30/1993	80.54	7.65	0	72.89	0.50	--	--	--	--	--	--	--	--	
	2/16/1994	80.54	7.46	0	73.08	0.19	ND	--	0.84	ND	ND	0.59	--	--	
	5/31/1994	80.54	7.80	0	72.74	-0.34	--	--	--	--	--	--	--	--	
	8/31/1994	80.54	8.27	0	72.27	-0.47	ND	--	ND	0.98	ND	0.84	--	--	
	9/27/1994	80.54	8.37	0	72.17	-0.10	--	--	--	--	--	--	--	--	
	10/11/1994	80.54	8.36	0	72.18	0.01	--	--	--	--	--	--	--	--	
	11/10/1994	80.54	6.43	0	74.11	1.93	--	--	--	--	--	--	--	--	
	2/7/1995	80.54	7.06	0	73.48	-0.63	6100	--	670	ND	120	60	--	--	
	5/3/1995	80.54	6.85	0	73.69	0.21	260	--	21	39	17	24	--	--	

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**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-1 (cont.)	8/3/1995	80.54	7.69	0	72.85	-0.84	--	--	--	--	--	--	--	--	
	11/7/1995	80.54	8.15	0	72.39	-0.46	ND	--	ND	ND	ND	ND	--	--	
	5/6/1996	80.54	7.40	0	73.14	0.75	170	--	1.0	20	2.3	17	55	--	
	11/5/1996	80.54	7.90	0	72.64	-0.50	ND	--	ND	ND	ND	ND	5.2	--	
	5/15/1997	80.54	7.77	0	72.77	0.13	ND	--	ND	ND	ND	ND	16	--	
	11/12/1997	80.54	7.48	0	73.06	0.29	ND	--	ND	ND	ND	ND	11	--	
	5/4/1998	80.54	7.39	0	73.15	0.09	ND	--	ND	ND	ND	ND	320	--	
	11/11/1998	80.54	7.37	0	73.17	0.02	ND	--	ND	ND	ND	ND	200	--	
	5/20/1999	80.54	7.41	0	73.13	-0.04	ND	--	ND	ND	ND	ND	89	47	
	11/15/1999	80.54	7.84	0	72.70	-0.43	ND	--	ND	ND	ND	ND	8.12	7.19	
	5/22/2000	80.54	7.53	0	73.01	0.31	ND	--	0.89	ND	ND	ND	220	290	
	11/22/2000	80.54	7.35	0	73.19	0.18	ND	--	ND	ND	ND	ND	105	142	
	5/15/2001	80.54	7.48	0	73.06	-0.13	345	--	ND	3.41	2.77	25.2	178	374	
	11/23/2001	80.54	7.57	0	72.97	-0.09	<50	--	<0.50	<0.50	<0.50	<0.50	350	350	
	5/24/2002	80.54	7.10	0	73.44	0.47	70	--	<0.50	<0.50	<0.50	<0.50	200	240	
	11/29/2002	80.54	7.96	0	72.58	-0.86	<250	--	<2.5	<2.5	<2.5	<5.0	--	330	
	5/15/2003	80.54	7.22	0	73.32	0.74	<250	--	<2.5	<2.5	<2.5	<5.0	--	210	
	11/4/2003	80.54	7.94	0	72.60	-0.72	--	120	<1.0	<1.0	<1.0	<2.0	--	140	
	5/24/2004	80.54	7.54	0	73.00	0.40	--	<50	<0.50	<0.50	<0.50	<1.0	--	26	
	11/29/2004	80.54	7.27	0	73.27	0.27	--	58	<0.50	<0.50	<0.50	<1.0	--	44	
	6/24/2005	80.54	7.06	0	73.48	0.21	--	87	<0.50	<0.50	<0.50	<1.0	--	80	
	12/15/2005	80.54	7.35	0	73.19	-0.29	--	<50	<0.50	<0.50	<0.50	<1.0	--	32	
	6/14/2006	80.54	7.06	0	73.48	0.29	--	<50	<0.50	<0.50	<0.50	<1.0	--	44	
	12/21/2006	80.54	7.12	0	73.42	-0.06	--	<50	<0.50	<0.50	<0.50	<0.50	--	16	
	6/28/2007	80.54	7.79	0	72.75	-0.67	--	<50	<0.50	<0.50	<0.50	<0.50	--	5.6	
	12/13/2007	80.54	7.94	0	72.60	-0.15	--	<50	<0.50	<0.50	<0.50	<1.0	--	10	
	6/9/2008	80.54	8.00	0	72.54	-0.06	--	<50	<0.50	<0.50	<0.50	<1.0	--	29	
	12/30/2008	80.54	7.51	0	73.03	0.49	--	<50	<0.50	<0.50	<0.50	<1.0	--	3.2	
	9/28/2009	80.54	8.10	0	72.44	-0.59	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.98	
	12/15/2009	80.54	7.32	0	73.22	0.78	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/28/2010	80.54	7.80	0	72.74	-0.48	--	<50	<0.50	<0.50	<0.50	<1.0	--	8.1	
	12/29/2010	80.54	6.22	0	74.32	1.58	--	99	<0.50	<0.50	<0.50	<1.0	--	1.6	
	6/7/2011	80.54	6.25	0	74.29	-0.03	--	140	<0.50	<0.50	<0.50	<1.0	--	22	

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Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-1 (cont.)</b>	12/9/2011	80.54	7.97	0	72.57	-1.72	--	<50	<0.50	<0.50	<0.50	<1.0	--	4.2	
	6/1/2012	80.54	7.63	0	72.91	0.34	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.87	
	12/27/2012	80.54	6.22	0	74.32	1.41	--	<50	<0.50	<0.50	<0.50	<1.0	--	4.7	
	6/6/2013	80.54	7.88	0	72.66	-0.25	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.51	
	12/13/2013	80.54	8.34	0	72.20	-0.46	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/23/2014	80.54	8.27	0	72.27	0.07	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
<b>MW-2</b>															
	11/1/1989	--	--	--	--	--	200	--	ND	ND	3.0	1.2	--	--	
	2/15/1990	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	8/16/1990	--	--	--	--	--	ND	--	ND	6.7	ND	ND	--	--	
	11/7/1990	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	2/25/1991	--	--	--	--	--	ND	--	0.68	0.42	ND	0.86	--	--	
	5/28/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	8/28/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/19/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	2/6/1992	--	--	--	--	--	ND	--	0.36	0.66	ND	0.62	--	--	
	5/23/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	8/26/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/20/1992	--	--	--	--	--	510	--	ND	ND	ND	ND	--	--	
	12/21/1992	81.62	9.14	0	72.48	--	--	--	--	--	--	--	--	--	
	1/30/1993	81.62	8.99	0	72.63	0.15	--	--	--	--	--	--	--	--	
	2/24/1993	81.62	8.03	0	73.59	0.96	11000J	--	ND	ND	ND	ND	--	--	
	3/22/1993	81.62	9.50	0	72.12	-1.47	--	--	--	--	--	--	--	--	
	4/28/1993	81.62	8.87	0	72.75	0.63	--	--	--	--	--	--	--	--	
	5/25/1993	81.62	9.04	0	72.58	-0.17	1300J	--	ND	ND	ND	ND	2700	--	
	6/23/1993	81.32	9.17	0	72.15	-0.43	--	--	--	--	--	--	--	--	
7/22/1993	81.32	9.42	0	71.90	-0.25	--	--	--	--	--	--	--	--		
8/25/1993	81.32	9.53	0	71.79	-0.11	190J	--	ND	ND	ND	ND	--	--		
9/22/1993	81.32	9.67	0	71.65	-0.14	--	--	--	--	--	--	--	--		
10/28/1993	81.32	9.65	0	71.67	0.02	--	--	--	--	--	--	--	--		
11/30/1993	81.32	9.18	0	72.14	0.47	480J	--	ND	ND	ND	ND	--	--		
2/16/1994	81.32	8.91	0	72.41	0.27	3200J	--	ND	ND	ND	ND	--	--		
5/31/1994	81.32	9.36	0	71.96	-0.45	1100J	--	ND	ND	ND	ND	--	--		

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Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-2 (cont.)	8/31/1994	81.32	9.85	0	71.47	-0.49	310J	--	ND	ND	ND	ND	--	--	
	9/27/1994	81.32	9.95	0	71.37	-0.10	--	--	--	--	--	--	--	--	
	11/10/1994	81.32	7.47	0	73.85	2.48	95J	--	ND	ND	ND	ND	--	--	
	2/7/1995	81.32	8.29	0	73.03	-0.82	1600J	--	ND	ND	ND	ND	--	--	
	5/3/1995	81.32	8.12	0	73.20	0.17	ND	--	ND	ND	ND	ND	--	--	
	8/3/1995	81.32	9.35	0	71.97	-1.23	ND	--	ND	ND	ND	ND	--	--	
	8/19/1995	81.32	--	0	--	--	--	--	--	--	--	--	--	--	
	10/11/1995	81.32	9.95	0	71.37	--	--	--	--	--	--	--	--	--	
	11/7/1995	81.32	9.65	0	71.67	0.30	ND	--	ND	ND	ND	ND	160	--	
	5/6/1996	81.32	8.90	0	72.42	0.75	--	--	--	--	--	--	--	--	
	11/5/1996	81.32	10.98	0	70.34	-2.08	--	--	--	--	--	--	--	--	
	5/15/1997	81.32	9.13	0	72.19	1.85	--	--	--	--	--	--	--	--	
	11/12/1997	81.32	9.84	0	71.48	-0.71	--	--	--	--	--	--	--	--	
	5/4/1998	81.32	9.26	0	72.06	0.58	--	--	--	--	--	--	--	--	
	11/11/1998	81.32	8.88	0	72.44	0.38	--	--	--	--	--	--	--	--	
	5/20/1999	81.32	8.68	0	72.64	0.20	--	--	--	--	--	--	--	--	
	11/15/1999	81.32	8.91	0	72.41	-0.23	--	--	--	--	--	--	--	--	
	5/22/2000	81.32	8.61	0	72.71	0.30	--	--	--	--	--	--	--	--	
	11/22/2000	81.32	8.64	0	72.68	-0.03	--	--	--	--	--	--	--	--	
	5/15/2001	81.32	8.73	0	72.59	-0.09	--	--	--	--	--	--	--	--	
	11/23/2001	81.32	8.61	0	72.71	0.12	--	--	--	--	--	--	--	--	
	5/24/2002	81.32	8.03	0	73.29	0.58	--	--	--	--	--	--	--	--	
	11/29/2002	81.32	8.79	0	72.53	-0.76	--	--	--	--	--	--	--	--	
	5/15/2003	81.32	8.21	0	73.11	0.58	--	--	--	--	--	--	--	--	
	11/4/2003	81.32	--	--	--	--	--	--	--	--	--	--	--	--	Unable to open due to stripped bolts
	5/24/2004	81.32	--	--	--	--	--	--	--	--	--	--	--	--	Unable to open due to stripped bolts
	11/29/2004	81.32	--	--	--	--	--	--	--	--	--	--	--	--	Unable to open due to stripped bolts

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MW-2 (cont.)	6/24/2005	81.32	--	--	--	--	--	--	--	--	--	--	--	--	Unable to open due to stripped bolts
	12/15/2005	81.32	--	--	--	--	--	--	--	--	--	--	--	--	Unable to open due to stripped bolts
	6/14/2006	81.32	8.56	0	72.76	--	--	140	<0.50	<0.50	<0.50	<1.0	--	190	
	12/21/2006	81.32	8.38	0	72.94	0.18	--	<50	<0.50	<0.50	<0.50	<0.50	--	32	
	6/28/2007	81.32	9.23	0	72.09	-0.85	--	<50	<0.50	<0.50	<0.50	<0.50	--	8.3	
	12/13/2007	81.32	9.10	0	72.22	0.13	--	<50	<0.50	1.1	<0.50	1.4	--	10	
	6/9/2008	81.32	10.01	0	71.31	-0.91	--	<50	<0.50	<0.50	<0.50	<1.0	--	12	
	12/30/2008	81.32	--	--	--	--	--	--	--	--	--	--	--	--	Unable to locate due to debris
	9/28/2009	81.32	--	--	--	--	--	--	--	--	--	--	--	--	Unable to open due to stripped bolts
	12/15/2009	81.32	8.93	0	72.39	--	--	69	<0.50	<0.50	<0.50	<1.0	--	5.9	
	6/28/2010	81.32	9.65	0	71.67	-0.72	--	<50	<0.50	<0.50	<0.50	<1.0	--	4.3	
	12/29/2010	81.32	7.91	0	73.41	1.74	--	67	<0.50	<0.50	<0.50	<1.0	--	2.1	
	6/7/2011	81.32	7.75	0	73.57	0.16	--	73	0.97	<0.50	<0.50	<1.0	--	14	
	12/9/2011	81.32	8.95	0	72.37	-1.20	--	<50	<0.50	<0.50	<0.50	<1.0	--	7.9	
	6/1/2012	81.32	9.18	0	72.14	-0.23	--	<50	<0.50	<0.50	<0.50	<1.0	--	2.9	
	12/27/2012	81.32	7.26	0	74.06	1.92	--	<50	<0.50	<0.50	<0.50	<1.0	--	1.5	
	6/6/2013	81.32	9.40	0	71.92	-0.22	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.95	
	12/13/2013	81.32	9.68	0	71.64	-0.28	--	<50	<0.50	<0.50	<0.50	3.1	--	1.1	
	6/23/2014	81.32	9.69	0	71.63	-0.01	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.82	
<b>MW-3</b>															
	11/1/1989	--	--	--	--	--	13000	--	57	48	1.7	120	--	--	
	2/15/1990	--	--	--	--	--	20000	--	1700	2100	750	3100	--	--	
	8/16/1990	--	--	--	--	--	6800	--	600	660	760	160	--	--	
	11/7/1990	--	--	--	--	--	42000	--	1400	5000	1800	7500	--	--	
	2/25/1991	--	--	--	--	--	37000	--	730	2900	1300	7300	--	--	
	5/28/1991	--	--	--	--	--	24000	--	570	1100	810	4200	--	--	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-3 (cont.)	8/28/1991	--	--	--	--	--	16000	--	650	2200	1100	5400	--	--	
	11/19/1991	--	--	--	--	--	22000	--	250	440	660	3000	--	--	
	2/6/1992	--	--	--	--	--	24000	--	600	1800	1200	5800	--	--	
	5/23/1992	--	--	--	--	--	25000	--	300	130	880	4900	--	--	
	8/26/1992	--	--	--	--	--	20000	--	690	1900	1300	5700	--	--	
	11/20/1992	--	--	--	--	--	1100000	--	1800	6400	3000	15000	--	--	
	12/4/1992	82.01	10.30	0	71.71	--	--	--	--	--	--	--	--	--	
	12/21/1992	82.01	9.78	0	72.23	0.52	--	--	--	--	--	--	--	--	Sheen
	1/9/1993	82.01	8.55	0	73.46	1.23	--	--	--	--	--	--	--	--	
	1/30/1993	82.01	8.90	0	73.11	-0.35	--	--	--	--	--	--	--	--	
	2/10/1993	82.01	9.01	0.01	73.01	-0.10	--	--	--	--	--	--	--	--	LPH in well
	2/24/1993	82.01	8.26	0.01	73.76	0.75	--	--	--	--	--	--	--	--	LPH in well
	3/9/1993	82.01	9.18	0.02	72.85	-0.91	--	--	--	--	--	--	--	--	LPH in well
	3/22/1993	82.01	8.81	0.02	73.22	0.37	--	--	--	--	--	--	--	--	LPH in well
	4/8/1993	82.01	9.14	0.02	72.89	-0.33	--	--	--	--	--	--	--	--	LPH in well
	4/28/1993	82.01	9.44	0.03	72.59	-0.29	--	--	--	--	--	--	--	--	LPH in well
	5/12/1993	82.01	9.57	0.03	72.46	-0.13	--	--	--	--	--	--	--	--	LPH in well
	5/25/1993	82.01	9.45	0.03	72.58	0.12	--	--	--	--	--	--	--	--	LPH in well
	6/7/1993	81.41	8.94	0	72.47	-0.11	--	--	--	--	--	--	--	--	
	6/23/1993	81.41	9.20	0.02	72.23	-0.24	--	--	--	--	--	--	--	--	LPH in well
	7/8/1993	81.41	9.31	0.03	72.12	-0.10	--	--	--	--	--	--	--	--	LPH in well
	7/22/1993	81.41	9.47	0	71.94	-0.18	--	--	--	--	--	--	--	--	
	8/11/1993	81.41	9.59	0	71.82	-0.12	--	--	--	--	--	--	--	--	
	8/25/1993	81.41	9.67	0.03	71.76	-0.06	--	--	--	--	--	--	--	--	LPH in well
	9/8/1993	81.41	10.34	0	71.07	-0.69	--	--	--	--	--	--	--	--	
	9/22/1993	81.41	9.84	0.02	71.59	0.51	--	--	--	--	--	--	--	--	LPH in well
	10/7/1993	81.41	9.87	0	71.54	-0.05	--	--	--	--	--	--	--	--	
	10/28/1993	81.41	10.03	0	71.38	-0.16	--	--	--	--	--	--	--	--	
	11/12/1993	81.41	9.76	0	71.65	0.27	--	--	--	--	--	--	--	--	
	11/30/1993	81.41	9.66	0.02	71.76	0.11	--	--	--	--	--	--	--	--	LPH in well
	2/16/1994	81.41	8.87	0	72.54	0.78	57000	--	910	2500	2100	9000	--	--	Sheen
	5/31/1994	81.41	9.48	0	71.93	-0.61	39000	--	670	630	1500	6200	--	--	
	8/31/1994	81.41	10.08	0	71.33	-0.60	44000	--	500	240	1400	5700	--	--	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-3 (cont.)	9/24/1994	81.41	10.22	0	71.19	-0.14	--	--	--	--	--	--	--	--	
	10/11/1994	81.41	10.41	0.01	71.01	-0.18	--	--	--	--	--	--	--	--	LPH in well
	11/10/1994	81.41	7.47	0	73.94	2.93	86000	--	3300	3800	1800	8300	--	--	Sheen
	2/7/1995	81.41	8.05	0	73.36	-0.58	45000	--	1400	1300	1500	5600	--	--	
	3/14/1995	81.41	7.05	0	74.36	1.00	--	--	--	--	--	--	--	--	
	5/3/1995	81.41	7.91	0	73.50	-0.86	26000	--	740	990	1100	4400	--	--	
	8/3/1995	81.41	9.28	0	72.13	-1.37	18000	--	59	ND	530	1900	--	--	
	8/19/1995	81.41	--	0	--	--	--	--	--	--	--	--	--	--	
	11/7/1995	81.41	10.79	0	70.62	--	17000	--	110	26	400	1500	880	--	
	5/6/1996	81.41	9.44	0	71.97	1.35	5100	--	48	ND	87	210	370	--	Sheen
	11/5/1996	81.41	10.64	0	70.77	-1.20	35000	--	2200	ND	1200	2800	460	--	
	5/15/1997	81.41	9.61	0	71.80	1.03	2400	--	110	ND	ND	140	100	--	
	11/12/1997	81.41	9.18	0	72.23	0.43	29000	--	2000	ND	1800	3000	ND	--	
	5/4/1998	81.41	9.50	0	71.91	-0.32	8200	--	430	ND	310	320	ND	--	
	11/11/1998	81.41	9.25	0	72.16	0.25	8700	--	500	ND	330	310	ND	--	
	5/20/1999	81.41	8.95	0	72.46	0.30	4300	--	250	ND	ND	86	ND	--	
	11/15/1999	81.41	10.35	0	71.06	-1.40	6720	--	326	ND	398	226	120	45.1	
	5/22/2000	81.41	9.14	0	72.27	1.21	4000	--	99	4.5	190	75	100	94	
	11/22/2000	81.41	9.33	0	72.08	-0.19	6130	--	93.7	6.71	174	47.8	212	131	
	5/15/2001	81.41	9.25	0	72.16	0.08	4490	--	229	7.09	160	31.6	97.1	75.5	
	11/23/2001	81.41	9.12	0	72.29	0.13	3500	--	41	<5.0	120	8.0	320	390	
	5/24/2002	81.41	8.58	0	72.83	0.54	4000	--	86	6.0	120	5.8	120	73	
	11/29/2002	81.41	9.81	0	71.60	-1.23	5300	--	<25	<25	65	<50	--	340	
	5/15/2003	81.41	8.76	0	72.65	1.05	5600	--	<5.0	<5.0	81	<10	--	440	
	11/4/2003	81.41	9.90	0	71.51	-1.14	--	13000	<20	<20	72	56	--	530	
	5/24/2004	81.41	9.29	0	72.12	0.61	--	10000	14	<10	81	<20	--	1200	
	11/29/2004	81.41	9.15	0	72.26	0.14	--	9000	5.9	<5.0	45	<10	--	550	
	6/24/2005	81.41	8.65	0	72.76	0.50	--	5600	31	4.1	97	220	--	400	
	12/15/2005	81.41	9.27	0	72.14	-0.62	--	6800	81	45	110	220	--	280	
	6/14/2006	81.41	8.73	0	72.68	0.54	--	10000	38	<2.5	130	170	--	160	
	12/21/2006	81.41	8.95	0	72.46	-0.22	--	6600	36	<2.5	150	120	--	96	
	6/28/2007	81.41	10.01	0	71.40	-1.06	--	6700	33	<0.50	70	24	--	75	
	12/13/2007	81.41	10.22	0	71.19	-0.21	--	4000	20	<1.0	51	19	--	27	



**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-3 (cont.)</b>	6/9/2008	81.41	10.25	0	71.16	-0.03	--	9700	190	<2.5	170	48	--	19	
	12/30/2008	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Unable to locate due to debris
	9/28/2009	81.41	10.15	0	71.26	--	--	6200	39	<2.5	170	12	--	18	
	12/15/2009	81.41	9.18	0	72.23	0.97	--	3300	9.1	<2.5	47	5.6	--	13	
	6/28/2010	81.41	9.82	0	71.59	-0.64	--	10000	13	<0.50	92	14	--	17	
	12/29/2010	81.41	7.84	0	73.57	1.98	--	3900	16	<0.50	36	5.2	--	28	
	6/7/2011	81.41	6.10	0	75.31	1.74	--	3700	170	<1.0	150	40	--	5.7	
	12/9/2011	81.41	10.08	0	71.33	-3.98	--	9900	11	<2.5	98	47	--	9.3	A01
	6/1/2012	81.41	9.92	0	71.49	0.16	--	4300	4.6	<0.50	17	3.4	--	19	A01
	12/27/2012	81.41	7.54	0	73.87	2.38	--	7100	1.7	<1.0	86	12	--	11	A01
	6/6/2013	81.41	9.78	0	71.63	0.14	--	2000	1.3	<0.50	12	<1.0	--	11	A01
	12/13/2013	81.41	10.39	0	71.02	-0.61	--	1100	<0.50	<0.50	23	4.2	--	6	
	6/23/2014	81.41	10.28	0	71.13	0.11	--	4200	87	<0.50	76	13	--	7.6	
<b>MW-4</b>															
	2/15/1990	--	--	--	--	--	150	--	8.0	8.0	10	45	--	--	
	8/16/1990	--	--	--	--	--	3600	--	480	17	230	260	--	--	
	11/7/1990	--	--	--	--	--	180	--	1.5	0.37	6.3	26	--	--	
	2/25/1991	--	--	--	--	--	22000	--	600	1300	780	2800	--	--	
	5/28/1991	--	--	--	--	--	38	--	ND	ND	ND	1.9	--	--	
	8/28/1991	--	--	--	--	--	2000	--	1500	20	120	300	--	--	
	11/19/1991	--	--	--	--	--	55	--	9.2	4.5	1.4	6.7	--	--	
	2/6/1992	--	--	--	--	--	5700	--	2200	140	57	980	--	--	
	5/23/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	8/26/1992	--	--	--	--	--	120	--	86	0.52	0.57	1.6	--	--	
	11/20/1992	--	--	--	--	--	ND	--	6.2	ND	1.2	0.52	--	--	
	1/30/1993	81.48	8.35	0	73.13	--	--	--	--	--	--	--	--	--	
	2/24/1993	81.48	8.17	0	73.31	0.18	140	--	12	0.64	9.4	3.7	--	--	
	3/22/1993	81.48	8.12	0	73.36	0.05	--	--	--	--	--	--	--	--	
	4/28/1993	81.48	9.36	0	72.12	-1.24	--	--	--	--	--	--	--	--	
	5/25/1993	81.48	8.75	0	72.73	0.61	74	--	10	ND	4.6	1.8	--	--	
	6/23/1993	81.29	8.90	0	72.39	-0.34	--	--	--	--	--	--	--	--	
	7/22/1993	81.29	9.26	0	72.03	-0.36	--	--	--	--	--	--	--	--	

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**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-4 (cont.)	8/25/1993	81.29	9.45	0	71.84	-0.19	640	--	100	1.1	100	22	--	--	
	9/22/1993	81.29	9.63	0	71.66	-0.18	--	--	--	--	--	--	--	--	
	10/28/1993	81.29	9.62	0	71.67	0.01	--	--	--	--	--	--	--	--	
	11/30/1993	81.29	9.40	0	71.89	0.22	200	--	28	ND	17	8.1	--	--	
	12/21/1993	81.48	9.10	0	72.38	0.49	--	--	--	--	--	--	--	--	
	2/16/1994	81.29	9.21	0	72.08	-0.30	190	--	11	0.98	21	6.6	--	--	
	5/31/1994	81.29	9.11	0	72.18	0.10	1100	--	190	ND	100	58	--	--	
	8/31/1994	81.29	10.01	0	71.28	-0.90	400	--	17	0.94	14	5.2	--	--	
	9/27/1994	81.29	10.09	0	71.20	-0.08	--	--	--	--	--	--	--	--	
	10/11/1994	81.29	11.50	0	69.79	-1.41	--	--	--	--	--	--	--	--	
	11/10/1994	81.29	9.21	0	72.08	2.29	7700	--	1800	280	460	1300	--	--	
	2/7/1995	81.29	7.66	0	73.63	1.55	540	--	47	ND	17	2.5	--	--	
	5/3/1995	81.29	8.29	0	73.00	-0.63	160	--	8.3	0.52	1.5	3.7	--	--	
	8/3/1995	81.29	8.60	0	72.69	-0.31	57	--	2.0	ND	ND	ND	--	--	
	8/19/1995	81.29	--	0	--	--	--	--	--	--	--	--	--	--	
	11/7/1995	81.29	10.28	0	71.01	--	ND	--	0.71	ND	ND	ND	0.86	--	
	5/6/1996	81.29	8.70	0	72.59	1.58	1200	--	12	11	15	36	ND	--	
	11/5/1996	81.29	10.00	0	71.29	-1.30	700	--	32	0.71	1.8	1.3	6.5	--	
	5/15/1997	81.29	9.37	0	71.92	0.63	51	--	ND	ND	ND	ND	ND	--	
	11/12/1997	81.29	8.92	0	72.37	0.45	74	--	1.7	ND	ND	ND	ND	--	
	5/4/1998	81.29	9.48	0	71.81	-0.56	ND	--	ND	ND	ND	ND	ND	--	
	11/11/1998	81.29	9.13	0	72.16	0.35	ND	--	0.63	ND	ND	ND	ND	--	
	5/20/1999	81.29	8.41	0	72.88	0.72	ND	--	ND	ND	ND	ND	ND	--	
	11/15/1999	81.29	9.68	0	71.61	-1.27	ND	--	ND	ND	ND	ND	ND	--	
	5/22/2000	81.29	8.60	0	72.69	1.08	ND	--	ND	ND	ND	ND	ND	--	
	11/22/2000	81.29	8.91	0	72.38	-0.31	ND	--	ND	ND	ND	ND	ND	--	
	5/15/2001	81.29	8.66	0	72.63	0.25	ND	--	ND	1.10	ND	1.16	ND	--	
	11/23/2001	81.29	8.84	0	72.45	-0.18	<50	--	<0.50	<0.50	<0.50	<0.50	<5.0	--	
	5/24/2002	81.29	7.93	0	73.36	0.91	<50	--	<0.50	<0.50	<0.50	<0.50	9.6	3.5	
	11/29/2002	81.29	9.34	0	71.95	-1.41	<50	--	<0.50	<0.50	<0.50	<1.0	--	2.6	
	5/15/2003	81.29	7.87	0	73.42	1.47	<50	--	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	11/4/2003	81.48	9.45	0	72.03	-1.39	--	61	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	5/24/2004	81.48	8.49	0	72.99	0.96	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	

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Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-4 (cont.)</b>	11/29/2004	81.48	9.01	0	72.47	-0.52	--	120	<0.50	<0.50	0.52	<1.0	--	0.55	
	6/24/2005	81.48	7.81	0	73.67	1.20	--	90	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/15/2005	81.48	8.73	0	72.75	-0.92	--	170	<0.50	<0.50	<0.50	<1.0	--	0.65	
	6/14/2006	81.48	7.43	0	74.05	1.30	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/21/2006	--	7.04	0	--	--	--	62	<0.50	<0.50	<0.50	<0.50	--	0.67	Casing elevation modified on 6/21/2006
	6/28/2007	--	11.49	0	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	--	0.61	
	12/13/2007	--	11.79	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.62	
	6/9/2008	--	12.24	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.99	
	12/30/2008	--	9.34	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	1.1	
	9/28/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	12/15/2009	--	10.22	0	--	--	--	1800	4.4	<0.50	8.5	<1.0	--	4.0	
	6/28/2010	--	11.74	0	--	--	--	230	<0.50	<0.50	<0.50	<1.0	--	2.7	
	12/29/2010	--	9.33	0	--	--	--	5300	0.72	0.55	35	<1.0	--	0.78	
	6/7/2011	--	8.68	0	--	--	--	3900	<2.5	<2.5	46	<5.0	--	<2.5	
	12/9/2011	--	9.04	0	--	--	--	1900	<0.50	<0.50	1.4	<1.0	--	<0.50	
	6/1/2012	--	9.92	0	--	--	--	680	<2.5	<2.5	<2.5	<5.0	--	<2.5	
	12/27/2012	--	9.66	0	--	--	--	1100	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/6/2013	--	9.17	0	--	--	--	410	0.52	<0.50	<0.50	<1.0	--	<0.50	
	12/13/2013	--	10.05	0	--	--	--	3200	2.1	<0.50	3.2	<1.0	--	<0.50	
	6/23/2014	--	10.28	0	--	--	--	2600	2.5	<0.50	9.1	<1.0	--	<0.50	
<b>MW-5</b>															
	2/15/1990	--	--	--	--	--	24000	--	1500	1700	260	3600	--	--	
	8/16/1990	--	--	--	--	--	16000	--	1400	1900	2800	660	--	--	
	11/7/1990	--	--	--	--	--	20000	--	640	1100	670	3000	--	--	
	2/25/1991	--	--	--	--	--	25000	--	950	1300	900	3500	--	--	
	5/28/1991	--	--	--	--	--	24000	--	2300	3400	1300	6000	--	--	
	8/28/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	LPH in well
	11/19/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	LPH in well
	2/6/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	LPH in well
	5/23/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	LPH in well

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-5 (cont.)	8/26/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	LPH in well
	11/20/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	LPH in well
	12/4/1992	81.59	10.03	0.08	71.62	--	--	--	--	--	--	--	--	--	LPH in well
	12/21/1992	81.59	9.50	0.01	72.10	0.48	--	--	--	--	--	--	--	--	LPH in well
	1/9/1993	81.59	8.22	0	73.37	1.27	--	--	--	--	--	--	--	--	
	1/30/1993	81.59	8.58	0	73.01	-0.36	--	--	--	--	--	--	--	--	Sheen
	2/10/1993	81.59	8.68	0	72.91	-0.10	--	--	--	--	--	--	--	--	Sheen
	2/24/1993	81.59	7.91	0.01	73.69	0.78	--	--	--	--	--	--	--	--	LPH in well
	3/9/1993	81.59	8.87	0.01	72.73	-0.96	--	--	--	--	--	--	--	--	LPH in well
	3/22/1993	81.59	8.46	0.01	73.14	0.41	--	--	--	--	--	--	--	--	LPH in well
	4/8/1993	81.59	8.84	0.01	72.76	-0.38	--	--	--	--	--	--	--	--	LPH in well
	4/28/1993	81.59	9.14	0.02	72.46	-0.29	--	--	--	--	--	--	--	--	LPH in well
	5/12/1993	81.59	9.28	0.02	72.32	-0.14	--	--	--	--	--	--	--	--	LPH in well
	5/25/1993	81.59	9.63	0.13	72.06	-0.27	--	--	--	--	--	--	--	--	LPH in well
	6/7/1993	81.38	9.75	0.01	71.64	-0.42	--	--	--	--	--	--	--	--	LPH in well
	6/23/1993	81.38	9.32	0.03	72.08	0.44	--	--	--	--	--	--	--	--	LPH in well
	7/8/1993	81.38	9.48	0.04	71.93	-0.15	--	--	--	--	--	--	--	--	LPH in well
	7/22/1993	81.38	9.73	0.16	71.77	-0.16	--	--	--	--	--	--	--	--	LPH in well
	8/11/1993	81.38	9.84	0.04	71.57	-0.20	--	--	--	--	--	--	--	--	LPH in well
	8/25/1993	81.38	9.81	0.02	71.58	0.02	--	--	--	--	--	--	--	--	LPH in well
	9/8/1993	81.38	10.09	0.03	71.31	-0.27	--	--	--	--	--	--	--	--	LPH in well
	9/22/1993	81.38	10.01	0.05	71.41	0.10	--	--	--	--	--	--	--	--	LPH in well
	10/7/1993	81.38	9.94	0.03	71.46	0.06	--	--	--	--	--	--	--	--	LPH in well
	10/28/1993	81.38	10.04	0.02	71.35	-0.11	--	--	--	--	--	--	--	--	LPH in well
	11/12/1993	81.38	9.79	0	71.59	0.24	--	--	--	--	--	--	--	--	
	11/30/1993	81.38	9.62	0	71.76	0.17	--	--	--	--	--	--	--	--	
	2/16/1994	81.38	8.95	0.02	72.44	0.69	--	--	--	--	--	--	--	--	LPH in well
	5/31/1994	81.38	9.63	0	71.75	-0.69	43000	--	1500	1200	1600	6700	--	--	
	8/31/1994	81.38	10.25	0.02	71.14	-0.61	--	--	--	--	--	--	--	--	LPH in well
	9/27/1994	81.38	10.38	0	71.00	-0.14	--	--	--	--	--	--	--	--	
	10/11/1994	81.38	10.45	0.02	70.94	-0.06	--	--	--	--	--	--	--	--	LPH in well
	11/10/1994	81.38	7.54	0.08	73.90	2.95	--	--	--	--	--	--	--	--	LPH in well
	2/7/1995	81.38	8.10	0	73.28	-0.62	25000	--	1400	740	990	3000	--	--	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-5 (cont.)	3/14/1995	81.38	7.04	0	74.34	1.06	--	--	--	--	--	--	--	--	
	5/3/1995	81.38	7.98	0	73.40	-0.94	12000	--	680	160	600	1800	--	--	
	8/3/1995	81.38	9.25	0	72.13	-1.27	23000	--	940	280	810	2700	--	--	
	8/19/1995	81.38	--	0	--	--	--	--	--	--	--	--	--	--	
	11/7/1995	81.38	10.00	0	71.38	--	40000	--	510	280	1000	5700	630	--	
	5/6/1996	81.38	9.03	0	72.35	0.97	13000	--	200	ND	180	610	170	--	Sheen
	11/5/1996	81.38	10.41	0	70.97	-1.38	35000	--	1800	ND	1300	4900	580	--	
	5/15/1997	81.38	9.41	0	71.97	1.00	10000	--	490	ND	ND	1300	ND	--	Sheen
	11/12/1997	81.38	9.27	0	72.11	0.14	100	--	5.1	ND	ND	ND	74	--	
	5/4/1998	81.38	9.18	0	72.20	0.09	39000	--	1600	230	1000	3200	ND	--	
	11/11/1998	81.38	9.23	0.37	72.43	0.23	--	--	--	--	--	--	--	--	LPH in well
	2/22/1999	81.38	7.69	0.25	73.88	1.45	--	--	--	--	--	--	--	--	LPH in well
	4/2/1999	81.38	8.19	0.28	73.40	-0.48	--	--	--	--	--	--	--	--	LPH in well
	5/4/1999	81.38	8.44	0.01	72.95	-0.45	--	--	--	--	--	--	--	--	LPH in well
	5/20/1999	81.38	8.73	0.04	72.68	-0.27	--	--	--	--	--	--	--	--	LPH in well
	6/29/1999	81.38	8.91	0.05	72.51	-0.17	--	--	--	--	--	--	--	--	LPH in well
	7/29/1999	81.38	9.12	0.07	72.31	-0.20	--	--	--	--	--	--	--	--	LPH in well
	8/24/1999	81.38	9.37	0.09	72.08	-0.24	--	--	--	--	--	--	--	--	LPH in well
	9/27/1999	81.38	9.51	0.06	71.91	-0.16	--	--	--	--	--	--	--	--	LPH in well
	10/28/1999	81.38	--	0.05	--	--	--	--	--	--	--	--	--	--	LPH in well
	11/15/1999	81.38	9.29	0	72.09	--	--	--	--	--	--	--	--	--	Sheen
	12/20/1999	81.38	9.14	0	72.24	0.15	--	--	--	--	--	--	--	--	
	1/20/2000	81.38	9.08	0	72.30	0.06	--	--	--	--	--	--	--	--	
	2/26/2000	81.38	8.69	0	72.69	0.39	--	--	--	--	--	--	--	--	
	3/31/2000	81.38	8.48	0	72.90	0.21	--	--	--	--	--	--	--	--	
	4/13/2000	81.38	8.66	0	72.72	-0.18	--	--	--	--	--	--	--	--	
	5/22/2000	81.38	9.06	0	72.32	-0.40	240000	--	33000	5000	18000	59000	640	21	
	11/22/2000	81.38	9.24	0.67	72.64	0.32	--	--	--	--	--	--	--	--	LPH in well
	2/14/2001	81.38	7.63	0.33	74.00	1.35	--	--	--	--	--	--	--	--	LPH in well
	3/28/2001	81.38	8.82	0	72.56	-1.44	--	--	--	--	--	--	--	--	
	4/28/2001	81.38	8.66	0	72.72	0.16	--	--	--	--	--	--	--	--	
	5/15/2001	81.38	8.97	0	72.41	-0.31	--	--	--	--	--	--	--	--	
	6/29/2001	81.38	8.73	0	72.65	0.24	--	--	--	--	--	--	--	--	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-5 (cont.)	7/17/2001	81.38	8.92	0.02	72.47	-0.17	--	--	--	--	--	--	--	--	LPH in well
	8/30/2001	81.38	8.85	0	72.53	0.06	--	--	--	--	--	--	--	--	
	9/24/2001	81.38	8.89	0	72.49	-0.04	--	--	--	--	--	--	--	--	
	10/15/2001	81.38	9.11	0.03	72.29	-0.20	--	--	--	--	--	--	--	--	LPH in well
	11/23/2001	81.38	8.77	0	72.61	0.32	29000	--	3900	450	1400	3500	<500	--	
	12/10/2001	81.38	8.75	0	72.63	0.02	--	--	--	--	--	--	--	--	
	1/14/2002	81.38	8.26	0	73.12	0.49	--	--	--	--	--	--	--	--	
	2/22/2002	81.38	6.30	0	75.08	1.96	--	--	--	--	--	--	--	--	
	3/11/2002	81.38	6.47	0	74.91	-0.17	--	--	--	--	--	--	--	--	
	4/15/2002	81.38	6.56	0	74.82	-0.09	--	--	--	--	--	--	--	--	
	5/24/2002	81.38	8.32	0.15	73.17	-1.65	--	--	--	--	--	--	--	--	LPH in well
	6/17/2002	81.38	8.41	0.2	73.12	-0.05	--	--	--	--	--	--	--	--	LPH in well
	7/15/2002	81.38	8.63	0.2	72.90	-0.22	--	--	--	--	--	--	--	--	LPH in well
	8/19/2002	81.38	8.76	0.31	72.85	-0.05	--	--	--	--	--	--	--	--	LPH in well
	9/5/2002	81.38	8.73	0.16	72.77	-0.08	--	--	--	--	--	--	--	--	LPH in well
	10/7/2002	81.38	8.79	0.09	72.66	-0.11	--	--	--	--	--	--	--	--	LPH in well
	11/29/2002	81.38	9.18	0.05	72.24	-0.42	--	--	--	--	--	--	--	--	LPH in well
	12/12/2002	81.38	9.12	0.04	72.29	0.05	--	--	--	--	--	--	--	--	LPH in well
	1/6/2003	81.38	9.05	0.03	72.35	0.06	--	--	--	--	--	--	--	--	LPH in well
	2/12/2003	81.38	8.87	0.04	72.54	0.19	--	--	--	--	--	--	--	--	LPH in well
	3/13/2003	81.38	8.25	0.03	73.15	0.61	--	--	--	--	--	--	--	--	LPH in well
	4/7/2003	81.38	8.31	0.02	73.08	-0.07	--	--	--	--	--	--	--	--	LPH in well
	5/15/2003	81.38	8.58	0.03	72.82	-0.26	--	--	--	--	--	--	--	--	LPH in well
	6/12/2003	81.38	8.63	0.02	72.76	-0.06	--	--	--	--	--	--	--	--	LPH in well
	7/7/2003	81.38	8.59	0.02	72.80	0.04	--	--	--	--	--	--	--	--	LPH in well
	8/14/2003	81.38	8.65	0.03	72.75	-0.05	--	--	--	--	--	--	--	--	LPH in well
	9/12/2003	81.38	8.82	0.03	72.58	-0.17	--	--	--	--	--	--	--	--	LPH in well
	11/4/2003	81.38	9.90	0.25	71.67	-0.92	--	--	--	--	--	--	--	--	LPH in well
	5/24/2004	81.38	9.33	0.25	72.24	0.57	--	--	--	--	--	--	--	--	LPH in well
	11/29/2004	81.38	9.16	0.21	72.38	0.14	--	--	--	--	--	--	--	--	LPH in well
	6/24/2005	81.38	8.41	0	72.97	0.59	--	53000	560	230	1600	5100	--	82	
	12/15/2005	81.38	8.96	0	72.42	-0.55	--	27000	130	<25	560	1800	--	120	
	6/14/2006	81.38	8.41	0	72.97	0.55	--	11000	110	<12	360	640	--	48	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-5 (cont.)</b>	12/21/2006	81.38	9.65	0	71.73	-1.24	--	78000	490	43	1400	4300	--	96	
	6/28/2007	81.38	9.99	0.29	71.61	-0.12	--	--	--	--	--	--	--	--	LPH in well
	12/13/2007	81.38	10.12	0.17	71.39	-0.22	--	--	--	--	--	--	--	--	LPH in well
	6/9/2008	81.38	10.12	0.17	71.39	0.00	--	--	--	--	--	--	--	--	LPH in well
	12/30/2008	81.38	9.33	0.13	72.15	0.76	--	--	--	--	--	--	--	--	LPH in well
	9/28/2009	81.38	9.77	0.01	71.62	-0.53	--	--	--	--	--	--	--	--	LPH in well
	12/15/2009	81.38	8.87	0.01	72.52	0.90	--	--	--	--	--	--	--	--	LPH in well
	6/28/2010	81.38	9.82	0.5	71.93	-0.58	--	--	--	--	--	--	--	--	LPH in well
	12/29/2010	81.38	8.69	1.49	73.81	1.87	--	--	--	--	--	--	--	--	LPH in well
	2/1/2011	81.38	8.30	1.35	74.09	0.28	--	--	34000	--	--	--	--	--	LPH in well
	6/7/2011	81.38	5.43	0	75.95	1.86	--	37000	<12	<12	190	450	--	<12	
	9/13/2011	81.38	6.70	0	74.68	-1.27	--	--	--	--	--	--	--	--	
	10/21/2011	81.38	6.72	0	74.66	-1.29	--	--	--	--	--	--	--	--	
	11/4/2011	81.38	6.64	0	74.74	-1.21	--	--	--	--	--	--	--	--	
	12/9/2011	81.38	10.02	0.21	71.36	-3.30	--	--	--	--	--	--	--	--	
	1/12/2012	81.38	10.12	0.02	71.26	-0.10	--	--	--	--	--	--	--	--	
	6/1/2012	81.38	8.22	0.02	73.16	1.90	--	--	--	--	--	--	--	--	
	12/27/2012	81.38	7.31	0.02	74.07	0.91	--	23000	190	<12	1100	1700	--	<12	A01
	6/6/2013	81.38	9.75	0.02	71.63	-1.53	--	30000	410	6.6	970	1300	--	2.5	A01
12/13/2013	81.38	10.30	0.21	71.08	-0.55	--	--	--	--	--	--	--	--	--	
6/23/2014	81.38	10.26	0.21	71.12	0.04	--	--	--	--	--	--	--	--	--	
<b>MW-6</b>															
	11/7/1990	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	2/25/1991	--	--	--	--	--	ND	--	0.37	0.4	0.35	1.5	--	--	
	5/28/1991	--	--	--	--	--	ND	--	ND	ND	ND	0.42	--	--	
	8/28/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/19/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	2/6/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	5/23/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	8/26/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/20/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
12/21/1992	80.47	7.71	0	72.76	--	--	--	--	--	--	--	--	--		
1/30/1993	80.47	7.25	0	73.22	0.46	--	--	--	--	--	--	--	--		

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**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-6 (cont.)	2/24/1993	80.47	6.74	0	73.73	0.51	ND	--	ND	ND	ND	ND	--	--	
	3/22/1993	80.47	5.85	0	74.62	0.89	--	--	--	--	--	--	--	--	
	4/28/1993	80.47	7.58	0	72.89	-1.73	--	--	--	--	--	--	--	--	
	5/25/1993	80.47	7.48	0	72.99	0.10	ND	--	ND	ND	ND	ND	--	--	
	6/23/1993	79.94	7.34	0	72.60	-0.39	--	--	--	--	--	--	--	--	
	7/22/1993	79.94	7.53	0	72.41	-0.19	--	--	--	--	--	--	--	--	
	8/25/1993	79.94	7.66	0	72.28	-0.13	ND	--	ND	ND	ND	ND	--	--	
	9/22/1993	79.94	7.76	0	72.18	-0.10	--	--	--	--	--	--	--	--	
	10/28/1993	79.94	8.30	0	71.64	-0.54	--	--	--	--	--	--	--	--	
	11/30/1993	79.94	7.40	0	72.54	0.90	--	--	--	--	--	--	--	--	
	2/16/1994	79.94	7.13	0	72.81	0.27	ND	--	ND	ND	ND	ND	--	--	
	5/31/1994	79.94	7.49	0	72.45	-0.36	--	--	--	--	--	--	--	--	
	8/31/1994	79.94	7.93	0	72.01	-0.44	ND	--	ND	1.5	ND	1.6	--	--	
	9/27/1994	79.94	8.03	0	71.91	-0.10	--	--	--	--	--	--	--	--	
	10/11/1994	79.94	8.05	0	71.89	-0.02	--	--	--	--	--	--	--	--	
	11/10/1994	79.94	6.12	0	73.82	1.93	--	--	--	--	--	--	--	--	
	2/7/1995	79.94	6.65	0	73.29	-0.53	ND	--	ND	ND	ND	ND	--	--	
	5/3/1995	79.94	6.47	0	73.47	0.18	ND	--	ND	ND	ND	1.0	--	--	
	8/3/1995	79.94	7.28	0	72.66	-0.81	--	--	--	--	--	--	--	--	
	11/7/1995	79.94	7.98	0	71.96	-0.70	ND	--	ND	ND	ND	ND	--	--	
	5/6/1996	79.94	7.80	0	72.14	0.18	--	--	--	--	--	--	--	--	
	11/5/1996	79.94	7.63	0	72.31	0.17	--	--	--	--	--	--	--	--	
	5/15/1997	79.94	7.41	0	72.53	0.22	--	--	--	--	--	--	--	--	
	11/12/1997	79.94	7.51	0	72.43	-0.10	--	--	--	--	--	--	--	--	
	5/4/1998	79.94	7.15	0	72.79	0.36	--	--	--	--	--	--	--	--	
	11/11/1998	79.94	7.04	0	72.90	0.11	--	--	--	--	--	--	--	--	
	5/20/1999	79.94	7.00	0	72.94	0.04	--	--	--	--	--	--	--	--	
	11/15/1999	79.94	7.42	0	72.52	-0.42	--	--	--	--	--	--	--	--	
	5/22/2000	79.94	7.24	0	72.70	0.18	--	--	--	--	--	--	--	--	
	11/22/2000	79.94	7.40	0	72.54	-0.16	--	--	--	--	--	--	--	--	
	5/15/2001	79.94	7.12	0	72.82	0.28	--	--	--	--	--	--	--	--	
	11/23/2001	79.94	7.19	0	72.75	-0.07	--	--	--	--	--	--	--	--	
	5/24/2002	79.94	6.54	0	73.40	0.65	--	--	--	--	--	--	--	--	



**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-6 (cont.)</b>	11/29/2002	79.94	7.26	0	72.68	-0.72	--	--	--	--	--	--	--	--	
	5/15/2003	79.94	6.26	0	73.68	1.00	--	--	--	--	--	--	--	--	
	11/4/2003	79.94	7.80	0	72.14	-1.54	--	<50	<0.50	<0.50	<0.50	<1.0	--	2.4	
	5/24/2004	79.94	7.54	0	72.40	0.26	--	<50	<0.50	<0.50	<0.50	<1.0	--	2.8	
	11/29/2004	79.94	7.01	0	72.93	0.53	--	<50	<0.50	<0.50	<0.50	<1.0	--	4.8	
	6/24/2005	79.94	7.68	0	72.26	-0.67	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.47	
	12/15/2005	79.94	7.49	0	72.45	0.19	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.88	
	6/14/2006	79.94	6.45	0	73.49	1.04	--	<50	<0.50	<0.50	<0.50	<1.0	--	3.0	
	12/21/2006	79.94	6.91	0	73.03	-0.46	--	<50	<0.50	<0.50	<0.50	<0.50	--	1.0	
	6/28/2007	79.94	7.46	0	72.48	-0.55	--	<50	<0.50	<0.50	<0.50	<0.50	--	1.2	
	12/13/2007	79.94	7.41	0	72.53	0.05	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.64	
	6/9/2008	79.94	8.20	0	71.74	-0.79	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.65	
	12/30/2008	79.94	7.47	0	72.47	0.73	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	9/28/2009	79.94	7.96	0	71.98	-0.49	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.67	
	12/15/2009	79.94	7.22	0	72.72	0.74	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/28/2010	79.94	7.68	0	72.26	-0.46	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/29/2010	79.94	5.93	0	74.01	1.75	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/7/2011	79.94	6.24	0	73.70	-0.31	--	<50	<0.50	<0.50	<0.50	<1.0	--	12	
	12/9/2011	79.94	6.75	0	73.19	-0.51	--	<50	<0.50	<0.50	<0.50	<1.0	--	2.0	
	6/1/2012	79.94	7.32	0	72.62	-0.57	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.64	
12/27/2012	79.94	5.78	0	74.16	0.54	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.6		
6/6/2013	79.94	7.50	0	72.44	-0.18	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
12/13/2013	79.94	8.02	0	71.92	-0.52	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
6/23/2014	79.94	7.87	0	72.07	0.15	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
<b>MW-7</b>															
	11/7/1990	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	2/25/1991	--	--	--	--	--	70	--	ND	ND	ND	0.52	--	--	
	5/28/1991	--	--	--	--	--	39	--	ND	ND	ND	0.73	--	--	
	8/28/1991	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/19/1991	--	--	--	--	--	32	--	ND	ND	ND	ND	--	--	
	2/6/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
5/23/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--		
8/26/1992	--	--	--	--	--	ND	--	ND	ND	0.73	ND	--	--		

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-7 (cont.)	11/20/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	12/21/1992	81.83	8.42	0	73.41	--	--	--	--	--	--	--	--	--	
	1/30/1993	81.83	8.21	0	73.62	0.21	--	--	--	--	--	--	--	--	
	2/24/1993	81.83	7.85	0	73.98	0.36	ND	--	ND	ND	ND	ND	--	--	
	3/22/1993	81.83	6.97	0	74.86	0.88	--	--	--	--	--	--	--	--	
	4/28/1993	81.83	8.39	0	73.44	-1.42	--	--	--	--	--	--	--	--	
	5/25/1993	81.83	8.43	0	73.40	-0.04	ND	--	ND	ND	ND	ND	--	--	
	6/23/1993	81.64	8.47	0	73.17	-0.23	--	--	--	--	--	--	--	--	
	7/22/1993	81.64	8.83	0	72.81	-0.36	--	--	--	--	--	--	--	--	
	8/25/1993	81.64	8.81	0	72.83	0.02	ND	--	ND	ND	ND	ND	--	--	
	9/22/1993	81.64	8.96	0	72.68	-0.15	--	--	--	--	--	--	--	--	
	10/28/1993	81.64	8.98	0	72.66	-0.02	--	--	--	--	--	--	--	--	
	11/30/1993	81.64	8.65	0	72.99	0.33	--	--	--	--	--	--	--	--	
	2/16/1994	81.64	8.36	0	73.28	0.29	ND	--	ND	ND	ND	0.7	--	--	
	5/31/1994	81.64	8.67	0	72.97	-0.31	--	--	--	--	--	--	--	--	
	8/31/1994	81.64	9.12	0	72.52	-0.45	ND	--	ND	0.8	ND	0.75	--	--	
	9/27/1994	81.64	9.22	0	72.42	-0.10	--	--	--	--	--	--	--	--	
	10/11/1994	81.64	9.23	0	72.41	-0.01	--	--	--	--	--	--	--	--	
	11/10/1994	81.64	7.66	0	73.98	1.57	--	--	--	--	--	--	--	--	
	2/7/1995	81.64	7.88	0	73.76	-0.22	ND	--	ND	ND	ND	ND	--	--	
	5/3/1995	81.64	7.71	0	73.93	0.17	ND	--	ND	ND	ND	1.0	--	--	
	8/3/1995	81.64	8.40	0	73.24	-0.69	--	--	--	--	--	--	--	--	
	11/7/1995	81.64	8.95	0	72.69	-0.55	ND	--	ND	ND	ND	ND	--	--	
	5/6/1996	81.64	8.15	0	73.49	0.80	--	--	--	--	--	--	--	--	
	11/5/1996	81.64	8.67	0	72.97	-0.52	--	--	--	--	--	--	--	--	
	5/15/1997	81.64	8.47	0	73.17	0.20	--	--	--	--	--	--	--	--	
	11/12/1997	81.64	7.88	0	73.76	0.59	--	--	--	--	--	--	--	--	
	5/4/1998	81.64	7.93	0	73.71	-0.05	--	--	--	--	--	--	--	--	
	11/11/1998	81.64	8.20	0	73.44	-0.27	--	--	--	--	--	--	--	--	
	5/20/1999	81.64	8.04	0	73.60	0.16	--	--	--	--	--	--	--	--	
	11/15/1999	81.64	8.17	0	73.47	-0.13	--	--	--	--	--	--	--	--	
	5/22/2000	81.64	8.10	0	73.54	0.07	--	--	--	--	--	--	--	--	
	11/22/2000	81.64	8.30	0	73.34	-0.20	--	--	--	--	--	--	--	--	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-7 (cont.)</b>	5/15/2001	81.64	8.09	0	73.55	0.21	--	--	--	--	--	--	--	--	
	11/23/2001	81.64	8.14	0	73.50	-0.05	--	--	--	--	--	--	--	--	
	5/24/2002	81.64	7.56	0	74.08	0.58	--	--	--	--	--	--	--	--	
	11/29/2002	81.64	8.23	0	73.41	-0.67	--	--	--	--	--	--	--	--	
	5/15/2003	81.64	7.25	0	74.39	0.98	--	--	--	--	--	--	--	--	
	11/4/2003	81.64	8.76	0	72.88	-1.51	--	70	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	5/24/2004	81.64	8.32	0	73.32	0.44	--	<50	<0.50	<0.50	<0.50	<1.0	--	1.4	
	11/29/2004	81.64	8.21	0	73.43	0.11	--	62	<0.50	<0.50	<0.50	<1.0	--	3.6	
	6/24/2005	81.64	7.84	0	73.80	0.37	--	85	<0.50	<0.50	<0.50	<1.0	--	1.6	
	12/15/2005	81.64	8.15	0	73.49	-0.31	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.72	
	6/14/2006	81.64	7.76	0	73.88	0.39	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/21/2006	--	7.64	0	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	--	0.75	Casing elevation modified on 6/21/2006
	6/28/2007	--	8.18	0	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	--	0.51	
	12/13/2007	--	8.52	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.58	
	6/9/2008	--	8.67	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.54	
	12/30/2008	--	8.46	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	1.0	
9/28/2009	--	8.30	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.52		
12/15/2009	--	8.22	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	1.6		
6/28/2010	--	8.02	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
12/29/2010	--	7.18	0	--	--	--	56	<0.50	<0.50	<0.50	<1.0	--	6.0		
6/7/2011	--	6.97	0	--	--	--	790	11	<0.50	6.5	<1.0	--	19		
12/9/2011	--	8.54	0	--	--	--	120	<0.50	<0.50	<0.50	<1.0	--	4.5		
6/1/2012	--	8.22	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.71		
12/27/2012	--	7.12	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	4.5		
6/6/2013	--	8.56	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
12/13/2013	--	9.09	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
6/23/2014	--	9.01	0	--	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
<b>MW-8</b>															
	11/7/1990	--	--	--	--	--	4700	--	28	38	86	7200	--	--	
	2/25/1991	--	--	--	--	--	5300	--	17	6.1	53	300	--	--	
5/28/1991	--	--	--	--	--	4800	--	4.2	1.3	5.1	170	--	--		

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-8 (cont.)</b>	8/28/1991	--	--	--	--	--	1800	--	3.2	1.9	19	74	--	--	
	11/19/1991	--	--	--	--	--	1600	--	8.1	1.8	19	52	--	--	
	2/6/1992	--	--	--	--	--	2600	--	4.1	7.0	31	93	--	--	
	5/23/1992	--	--	--	--	--	2100	--	8.6	1.6	1.7	28	--	--	
	8/26/1992	--	--	--	--	--	1800	--	12	8.0	4.0	13	--	--	
	11/20/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	12/21/1992	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	1/9/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	1/30/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	2/10/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	2/24/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	3/9/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	3/22/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	4/8/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	4/28/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	5/12/1993	81.71	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	5/25/1993	81.71	10.12	0	71.59	--	1200	--	5.4	ND	9.0	21	--	--	
	6/7/1993	81.41	9.98	0	71.43	-0.16	--	--	--	--	--	--	--	--	
	6/23/1993	81.41	10.36	0	71.05	-0.38	--	--	--	--	--	--	--	--	
	7/8/1993	81.41	10.52	0	70.89	-0.16	--	--	--	--	--	--	--	--	
	7/22/1993	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	8/11/1993	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	8/25/1993	81.41	10.95	0	70.46	--	1800	--	11	17	8.9	29	--	--	
	9/8/1993	81.41	11.34	0	70.07	-0.39	--	--	--	--	--	--	--	--	
	9/22/1993	81.41	11.13	0	70.28	0.21	--	--	--	--	--	--	--	--	
	10/7/1993	81.41	10.96	0	70.45	0.17	--	--	--	--	--	--	--	--	
	10/28/1993	81.41	11.19	0	70.22	-0.23	--	--	--	--	--	--	--	--	
	11/12/1993	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	11/30/1993	81.41	10.42	0	70.99	--	3500	--	18	ND	ND	ND	--	--	
	2/16/1994	81.41	9.86	0	71.55	0.56	990	--	4.9	1.8	2.4	4.5	--	--	
	5/31/1994	81.41	10.61	0	70.80	-0.75	350	--	3.0	1.0	0.73	1.7	--	--	
	8/31/1994	81.41	11.37	0	70.04	-0.76	1800	--	ND	ND	ND	ND	--	--	

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**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-8 (cont.)	9/27/1994	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	10/11/1994	81.41	11.50	0	69.91	--	--	--	--	--	--	--	--	--	
	11/10/1994	81.41	7.81	0	73.60	3.69	940	--	6.7	6.3	ND	16	--	--	
	2/7/1995	81.41	8.69	0	72.72	-0.88	230	--	1.4	0.95	0.9	1.1	--	--	
	5/3/1995	81.41	8.60	0	72.81	0.09	75	--	ND	ND	ND	1.0	--	--	
	8/3/1995	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	11/7/1995	81.41	11.05	0	70.36	--	210	--	1.3	1.2	ND	ND	--	--	
	5/6/1996	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	11/5/1996	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	5/15/1997	81.41	10.46	0	70.95	--	ND	--	ND	ND	ND	ND	43	--	
	11/12/1997	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	5/4/1998	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	11/11/1998	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	5/20/1999	81.41	9.75	0	71.66	--	ND	--	ND	ND	ND	ND	23	10	
	11/15/1999	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	5/22/2000	81.41	9.80	0	71.61	--	ND	--	ND	1.9	ND	3.3	ND	--	
	11/22/2000	81.41	9.76	0	71.65	0.04	ND	--	ND	1.16	ND	1.22	ND	--	
	5/15/2001	81.41	9.87	0	71.54	-0.11	ND	--	ND	ND	ND	ND	ND	--	
	11/23/2001	81.41	9.92	0	71.49	-0.05	<50	--	<0.50	<0.50	<0.50	<0.50	<5.0	--	
	5/24/2002	81.41	9.26	0	72.15	0.66	<50	--	<0.50	<0.50	<0.50	<0.50	<5.0	--	
	11/29/2002	81.41	9.71	0	71.70	-0.45	<50	--	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	5/15/2003	81.41	9.04	0	72.37	0.67	<50	--	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	11/4/2003	81.41	10.20	0	71.21	-1.16	--	690	<1.0	<1.0	3.3	<2.0	--	190	
	5/24/2004	81.41	10.04	0	71.37	0.16	--	450	<2.5	<2.5	<2.5	<5.0	--	750	
	11/29/2004	81.41	9.88	0	71.53	0.16	--	1500	<10	<10	<10	<20	--	1600	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-8 (cont.)	6/24/2005	81.41	9.40	0	72.01	0.48	--	150	<0.50	<0.50	<0.50	<1.0	--	190	
	12/15/2005	81.41	10.01	0	71.40	-0.61	--	520	<0.50	<0.50	<0.50	<1.0	--	1000	
	6/14/2006	81.41	5.91	0	75.50	4.10	--	230	<0.50	<0.50	0.60	<1.0	--	39	
	12/21/2006	81.41	9.65	0	71.76	-3.74	--	260	2.5	<0.50	12	43	--	15	
	6/28/2007	81.41	11.10	0	70.31	-1.45	--	<50	<0.50	<0.50	<0.50	<0.50	--	8.4	
	12/13/2007	81.41	11.18	0	70.23	-0.08	--	<50	<0.50	<0.50	<0.50	<1.0	--	6.8	
	6/9/2008	81.41	11.25	0	70.16	-0.07	--	<50	<0.50	<0.50	<0.50	<1.0	--	6.5	
	12/30/2008	81.41	10.05	0	71.36	1.20	--	<50	<0.50	<0.50	<0.50	<1.0	--	2.9	
	9/28/2009	81.41	11.10	0	70.31	-1.05	--	<50	<0.50	<0.50	<0.50	<1.0	--	3.1	
	12/15/2009	81.41	10.00	0	71.41	1.10	--	<50	<0.50	<0.50	<0.50	<1.0	--	2.9	
	6/28/2010	81.41	10.86	0	70.55	-0.86	--	<50	<0.50	<0.50	<0.50	<1.0	--	3.6	
	12/29/2010	81.41	8.57	0	72.84	2.29	--	<50	<0.50	<0.50	<0.50	<1.0	--	2.7	
	6/7/2011	81.41	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	12/9/2011	81.41	--	--	--	--	--	--	--	--	--	--	--	--	
6/1/2012	81.41	--	--	--	--	--	--	--	--	--	--	--	--		
12/27/2012	81.41	--	--	--	--	--	--	--	--	--	--	--	--		
6/6/2013	81.41	--	--	--	--	--	--	--	--	--	--	--	--		
12/13/2013	81.41	--	--	--	--	--	--	--	--	--	--	--	--		
6/23/2014	81.41	--	--	--	--	--	--	--	--	--	--	--	--		
MW-9															
	11/7/1990	--	--	--	--	--	480	--	7.8	1.2	13	47	--	--	
	2/25/1991	--	--	--	--	--	390	--	13	1.1	2.8	14	--	--	
	5/28/1991	--	--	--	--	--	590	--	6.0	0.43	6.8	1.4	--	--	
	8/28/1991	--	--	--	--	--	450	--	17	0.9	13	14	--	--	
	11/19/1991	--	--	--	--	--	360	--	17	0.45	15	11	--	--	
	2/6/1992	--	--	--	--	--	660	--	41	1.0	33	15	--	--	
	5/23/1992	--	--	--	--	--	460	--	18	0.66	1.4	3.2	--	--	
	8/26/1992	--	--	--	--	--	250	--	13	ND	8.6	3.8	--	--	
	11/20/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
12/21/1992	81.13	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible	
1/30/1993	81.13	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible	
2/24/1993	81.13	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible	
3/22/1993	81.13	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-9 (cont.)	4/28/1993	81.13	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	5/25/1993	81.13	11.50	0	69.63	--	160	--	6.1	ND	7.4	1.1	--	--	
	6/23/1993	80.53	9.78	0	70.75	1.12	--	--	--	--	--	--	--	--	
	7/22/1993	80.53	10.10	0	70.43	-0.32	--	--	--	--	--	--	--	--	
	8/25/1993	80.53	10.44	0	70.09	-0.34	220	--	10	ND	6.8	1.4	--	--	
	9/22/1993	80.53	10.64	0	69.89	-0.20	--	--	--	--	--	--	--	--	
	10/28/1993	80.53	10.68	0	69.85	-0.04	--	--	--	--	--	--	--	--	
	11/30/1993	80.53	9.87	0	70.66	0.81	200	--	5.6	ND	2.9	2.7	--	--	
	2/16/1994	80.53	9.21	0	71.32	0.66	250	--	5.1	1.3	4.4	1.5	--	--	
	5/31/1994	80.53	10.15	0	70.38	-0.94	360	--	7.8	0.97	4.6	2.2	--	--	
	8/31/1994	80.53	10.97	0	69.56	-0.82	650	--	7.7	2.8	4.4	5.0	59	--	
	9/27/1994	80.53	11.10	0	69.43	-0.13	--	--	--	--	--	--	--	--	
	10/11/1994	80.53	11.20	0	69.33	-0.10	--	--	--	--	--	--	--	--	
	11/10/1994	80.53	7.25	0	73.28	3.95	ND	--	ND	ND	ND	ND	--	--	
	2/7/1995	80.53	7.76	0	72.77	-0.51	57	--	0.7	ND	0.86	ND	--	--	
	5/3/1995	80.53	7.82	0	72.71	-0.06	ND	--	0.85	0.67	1.3	1.0	--	--	
	8/3/1995	80.53	9.70	0	70.83	-1.88	91	--	1.1	ND	ND	ND	--	--	
	11/7/1995	80.53	10.64	0	69.89	-0.94	130	--	1.5	0.62	0.71	ND	60	--	
	5/6/1996	80.53	9.01	0	71.52	1.63	860	--	6.1	13	6.0	25	ND	--	
	11/5/1996	80.53	11.42	0	69.11	-2.41	84	--	0.74	ND	1.2	4.5	ND	--	
	5/15/1997	80.53	9.89	0	70.64	1.53	ND	--	ND	ND	ND	ND	ND	--	
	11/12/1997	80.53	10.22	0	70.31	-0.33	ND	--	0.55	ND	ND	ND	74	--	
	5/4/1998	80.53	10.05	0	70.48	0.17	ND	--	ND	ND	ND	ND	45	--	
	11/11/1998	80.53	9.23	0	71.30	0.82	ND	--	ND	ND	ND	ND	ND	--	
	5/20/1999	80.53	8.78	0	71.75	0.45	ND	--	ND	ND	ND	ND	ND	--	
	11/15/1999	80.53	9.12	0	71.41	-0.34	ND	--	ND	ND	ND	ND	ND	--	
	5/22/2000	80.53	9.17	0	71.36	-0.05	ND	--	ND	1.9	ND	3.5	ND	--	
	11/22/2000	80.53	9.08	0	71.45	0.09	ND	--	ND	1.18	ND	1.16	ND	--	
	5/15/2001	80.53	8.85	0	71.68	0.23	ND	--	ND	ND	ND	ND	ND	--	
	11/23/2001	80.53	9.10	0	71.43	-0.25	<50	--	<0.50	<0.50	<0.50	<0.50	<5.0	--	
	5/24/2002	80.53	8.79	0	71.74	0.31	<50	--	<0.50	<0.50	<0.50	<0.50	<5.0	--	
	11/29/2002	80.53	9.24	0	71.29	-0.45	<50	--	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	5/15/2003	80.53	8.56	0	71.97	0.68	<50	--	<0.50	<0.50	<0.50	<1.0	--	<2.0	

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**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
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Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-9 (cont.)</b>	11/4/2003	80.53	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	5/24/2004	80.53	9.38	0	71.15	--	--	330	1.8	<0.50	<0.50	<1.0	--	160	
	11/29/2004	80.53	9.55	0	70.98	-0.17	--	690	0.72	<0.50	1.3	<1.0	--	160	
	6/24/2005	80.53	8.65	0	71.88	0.90	--	240	0.80	<0.50	0.55	<1.0	--	67	
	12/15/2005	80.53	9.43	0	71.10	-0.78	--	400	<0.50	<0.50	<0.50	<1.0	--	82	
	6/14/2006	80.53	9.43	0	71.10	0.00	--	<50	<0.50	<0.50	<0.50	<1.0	--	5.2	
	12/21/2006	80.53	9.01	0	71.52	0.42	--	580	<0.50	<0.50	0.71	<0.50	--	36	
	6/28/2007	80.53	11.64	0	68.89	-2.63	--	1200	0.81	<0.50	<0.50	0.54	--	52	
	12/13/2007	80.53	11.18	0	69.35	0.46	--	1100	<0.50	<0.50	<0.50	<1.0	--	31	
	6/9/2008	80.53	11.10	0	69.43	0.08	--	1500	<0.50	<0.50	<0.50	<1.0	--	27	
	12/30/2008	80.53	9.66	0	70.87	1.44	--	970	<0.50	<0.50	0.84	<1.0	--	5.0	
	9/28/2009	80.53	10.83	0	69.70	-1.17	--	860	<0.50	<0.50	<0.50	<1.0	--	7.5	
	12/15/2009	80.53	10.00	0	70.53	0.83	--	870	<0.50	<0.50	<0.50	<1.0	--	3.7	
	6/28/2010	80.53	10.45	0	70.08	-0.45	--	360	<0.50	<0.50	1.0	<1.0	--	2.2	
	12/29/2010	80.53	7.72	0	72.81	2.73	--	53	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/7/2011	80.53	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	12/9/2011	80.53	--	--	--	--	--	--	--	--	--	--	--	--	
	6/1/2012	80.53	--	--	--	--	--	--	--	--	--	--	--	--	
	12/27/2012	80.53	--	--	--	--	--	--	--	--	--	--	--	--	
	6/6/2013	80.53	--	--	--	--	--	--	--	--	--	--	--	--	
	12/13/2013	80.53	--	--	--	--	--	--	--	--	--	--	--	--	
	6/23/2014	80.53	--	--	--	--	--	--	--	--	--	--	--	--	
<b>MW-10</b>															
	2/6/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	5/23/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	8/26/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/20/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	12/21/1992	81.90	13.41	0	68.49	--	--	--	--	--	--	--	--	--	
	1/30/1993	81.90	11.60	0	70.30	1.81	--	--	--	--	--	--	--	--	
	2/24/1993	81.90	11.23	0	70.67	0.37	ND	--	ND	ND	ND	ND	--	--	
	3/22/1993	81.90	10.89	0	71.01	0.34	--	--	--	--	--	--	--	--	
	4/28/1993	81.90	12.11	0	69.79	-1.22	--	--	--	--	--	--	--	--	



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3943 Broadway  
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Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-10 (cont.)	5/25/1993	81.90	12.02	0	69.88	0.09	ND	--	ND	ND	ND	ND	--	--	
	6/23/1993	81.61	12.11	0	69.50	-0.38	--	--	--	--	--	--	--	--	
	7/22/1993	81.61	12.49	0	69.12	-0.38	--	--	--	--	--	--	--	--	
	8/25/1993	81.61	12.78	0	68.83	-0.29	ND	--	ND	ND	ND	ND	--	--	
	9/22/1993	81.61	13.06	0	68.55	-0.28	--	--	--	--	--	--	--	--	
	10/28/1993	81.61	13.23	0	68.38	-0.17	--	--	--	--	--	--	--	--	
	11/30/1993	81.61	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
	2/16/1994	81.61	12.43	0	69.18	--	ND	--	ND	ND	ND	ND	--	--	
	5/31/1994	81.61	12.69	0	68.92	-0.26	ND	--	ND	0.9	ND	0.91	--	--	
	8/31/1994	81.61	13.47	0	68.14	-0.78	ND	--	ND	0.64	ND	0.54	--	--	
	9/27/1994	81.61	13.72	0	67.89	-0.25	--	--	--	--	--	--	--	--	
	10/11/1994	81.61	14.80	0	66.81	-1.08	--	--	--	--	--	--	--	--	
	11/10/1994	81.61	12.64	0	68.97	2.16	ND	--	ND	ND	ND	ND	--	--	
	2/7/1995	81.61	10.29	0	71.32	2.35	--	--	--	--	--	--	--	--	
	5/3/1995	81.61	10.22	0	71.39	0.07	ND	--	ND	ND	ND	0.65	--	--	
	8/3/1995	81.61	11.73	0	69.88	-1.51	--	--	--	--	--	--	--	--	
	11/7/1995	81.61	12.98	0	68.63	-1.25	ND	--	ND	ND	ND	ND	--	--	
	5/6/1996	81.61	10.90	0	70.71	2.08	--	--	--	--	--	--	--	--	
	11/5/1996	81.61	11.96	0	69.65	-1.06	--	--	--	--	--	--	--	--	
	5/15/1997	81.61	10.79	0	70.82	1.17	--	--	--	--	--	--	--	--	
	11/12/1997	81.61	10.07	0	71.54	0.72	--	--	--	--	--	--	--	--	
	5/4/1998	81.61	10.01	0	71.60	0.06	--	--	--	--	--	--	--	--	
	11/11/1998	81.61	12.03	0	69.58	-2.02	--	--	--	--	--	--	--	--	
	5/20/1999	81.61	10.05	0	71.56	1.98	--	--	--	--	--	--	--	--	
	11/15/1999	81.61	10.16	0	71.45	-0.11	--	--	--	--	--	--	--	--	
	5/22/2000	81.61	10.06	0	71.55	0.10	--	--	--	--	--	--	--	--	
	11/22/2000	81.61	10.12	0	71.49	-0.06	--	--	--	--	--	--	--	--	
	5/15/2001	81.61	10.08	0	71.53	0.04	--	--	--	--	--	--	--	--	
	11/23/2001	81.61	10.14	0	71.47	-0.06	--	--	--	--	--	--	--	--	
	5/24/2002	81.61	9.48	0	72.13	0.66	--	--	--	--	--	--	--	--	
	11/29/2002	81.61	10.11	0	71.50	-0.63	--	--	--	--	--	--	--	--	
	5/15/2003	81.61	9.22	0	72.39	0.89	--	--	--	--	--	--	--	--	
	11/4/2003	81.61	12.82	0	68.79	-3.60	--	<50	<0.50	<0.50	<0.50	<1.0	--	<2.0	

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Unocal Service Station No. 0746  
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Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments	
<b>MW-10 (cont.)</b>	5/24/2004	81.61	11.52	0	70.09	1.30	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.75		
	11/29/2004	81.61	12.58	0	69.03	-1.06	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.72		
	6/24/2005	81.61	10.70	0	70.91	1.88	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
	12/15/2005	81.61	12.09	0	69.52	-1.39	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
	6/14/2006	81.61	9.77	0	71.84	2.32	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
	12/21/2006	81.61	11.57	0	70.04	-1.80	--	<50	<0.50	<0.50	<0.50	<0.50	--	<0.50		
	6/28/2007	81.61	14.11	0	67.50	-2.54	--	<50	<0.50	<0.50	<0.50	<0.50	--	<0.50		
	12/13/2007	81.61	15.72	0	65.89	-1.61	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/9/2008	81.61	14.93	0	66.68	0.79	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/30/2008	81.61	13.56	0	68.05	1.37	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	9/28/2009	81.61	13.52	0	68.09	0.04	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/15/2009	81.61	14.02	0	67.59	-0.50	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/28/2010	81.61	13.55	0	68.06	0.47	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/29/2010	81.61	13.23	0	68.38	0.32	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/7/2011	81.61	12.36	0	69.25	0.87	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/9/2011	81.61	14.41	0	67.20	-2.05	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/1/2012	81.61	12.65	0	68.96	1.76	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	1.1	
12/27/2012	81.61	11.87	0	69.74	0.78	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	1.6		
6/6/2013	81.61	13.28	0	68.33	-0.63	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	0.92		
12/13/2013	81.61	14.48	0	67.13	-1.20	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	0.92		
6/23/2014	81.61	14.10	0	67.51	0.38	--	<50	<0.50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
<b>MW-11</b>	2/6/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--		
	5/23/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--		
	8/26/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--		
	11/20/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--		
	12/21/1992	78.43	12.34	0	66.09	--	--	--	--	--	--	--	--	--		
	1/30/1993	78.43	14.17	0	64.26	-1.83	--	--	--	--	--	--	--	--		
	2/24/1993	78.43	12.70	0	65.73	1.47	ND	--	ND	ND	ND	ND	--	--		
	3/22/1993	78.43	8.95	0	69.48	3.75	--	--	--	--	--	--	--	--		
	4/28/1993	78.43	13.87	0	64.56	-4.92	--	--	--	--	--	--	--	--		
5/25/1993	78.43	15.14	0	63.29	-1.27	ND	--	ND	0.75	ND	1.0	--	--			
6/23/1993	78.43	15.08	0	63.10	-0.19	--	--	--	--	--	--	--	--			

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-11 (cont.)	7/22/1993	78.43	15.46	0	62.72	-0.38	--	--	--	--	--	--	--	--	
	8/25/1993	78.43	14.10	0	64.08	1.36	ND	--	ND	ND	ND	ND	--	--	
	9/22/1993	78.43	15.03	0	63.15	-0.93	--	--	--	--	--	--	--	--	
	10/28/1993	78.43	13.84	0	64.34	1.19	--	--	--	--	--	--	--	--	
	11/30/1993	78.43	13.04	0	65.14	0.80	ND	--	ND	ND	ND	ND	--	--	
	2/16/1994	78.43	12.76	0	65.42	0.28	ND	--	ND	ND	ND	ND	--	--	
	5/31/1994	78.43	12.79	0	65.39	-0.03	ND	--	ND	ND	ND	ND	--	--	
	8/31/1994	78.43	12.97	0	65.21	-0.18	ND	--	ND	1.5	ND	1.8	--	--	
	9/27/1994	78.43	14.88	0	63.30	-1.91	--	--	--	--	--	--	--	--	
	10/11/1994	78.43	13.40	0	64.78	1.48	--	--	--	--	--	--	--	--	
	11/10/1994	78.43	13.57	0	64.61	-0.17	ND	--	ND	ND	ND	ND	--	--	
	2/7/1995	78.43	12.28	0	65.90	1.29	--	--	--	--	--	--	--	--	
	5/3/1995	78.43	9.28	0	68.90	3.00	ND	--	ND	ND	ND	ND	--	--	
	8/3/1995	78.43	12.67	0	65.51	-3.39	--	--	--	--	--	--	--	--	
	11/7/1995	78.43	12.28	0	65.90	0.39	ND	--	ND	ND	ND	ND	--	--	
	5/6/1996	78.43	13.30	0	64.88	-1.02	--	--	--	--	--	--	--	--	
	11/5/1996	78.43	10.90	0	67.28	2.40	--	--	--	--	--	--	--	--	
	5/15/1997	78.43	11.65	0	66.53	-0.75	--	--	--	--	--	--	--	--	
	11/12/1997	78.43	9.66	0	68.52	1.99	--	--	--	--	--	--	--	--	
	5/4/1998	78.43	10.87	0	67.31	-1.21	--	--	--	--	--	--	--	--	
	11/11/1998	78.43	11.40	0	66.78	-0.53	--	--	--	--	--	--	--	--	
	5/20/1999	78.43	10.71	0	67.47	0.69	ND	--	ND	ND	ND	ND	ND	--	
	11/15/1999	78.43	11.32	0	66.86	-0.61	ND	--	ND	1.04	ND	ND	ND	--	
	5/22/2000	78.43	10.98	0	67.20	0.34	ND	--	ND	ND	ND	ND	ND	--	
	11/22/2000	78.43	11.17	0	67.01	-0.19	ND	--	ND	ND	ND	ND	ND	--	
	5/15/2001	78.43	10.93	0	67.25	0.24	ND	--	ND	ND	ND	ND	ND	--	
	11/23/2001	78.43	11.08	0	67.10	-0.15	<50	--	<0.50	<0.50	<0.50	<0.50	<5.0	--	
	5/24/2002	78.43	10.58	0	67.60	0.50	<50	--	<0.50	<0.50	<0.50	<0.50	<5.0	--	
	11/29/2002	78.43	11.27	0	66.91	-0.69	<50	--	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	5/15/2003	78.43	10.25	0	67.93	1.02	<50	--	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	11/4/2003	78.43	11.23	0	66.95	-0.98	--	<50	<0.50	<0.50	<0.50	<1.0	--	<2.0	
	5/24/2004	78.43	10.10	0	68.08	1.13	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	11/29/2004	78.43	10.96	0	67.22	-0.86	--	63	<0.50	<0.50	1.0	2.5	--	<0.50	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-11 (cont.)</b>	6/24/2005	78.43	14.07	0	64.11	-3.11	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/15/2005	78.43	13.28	0	64.90	0.79	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/14/2006	78.43	12.53	0	65.65	0.75	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/21/2006	78.43	12.78	0	65.40	-0.25	--	<50	<0.50	<0.50	<0.50	<0.50	--	<0.50	
	6/28/2007	78.43	--	--	--	--	--	--	--	--	--	--	--	--	Bus parked over well
	12/13/2007	78.43	15.37	0	62.81	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/9/2008	78.43	14.80	0	63.38	0.57	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/30/2008	78.43	12.90	0	65.28	1.90	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	9/28/2009	78.43	12.57	0	65.61	0.33	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/15/2009	78.43	--	--	--	--	--	--	--	--	--	--	--	--	Car parked over well
	6/28/2010	78.43	14.42	0	63.76	--	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/29/2010	78.43	15.40	0	62.78	-0.98	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/7/2011	78.43	15.79	0	62.39	-0.39	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/9/2011	78.43	13.27	0	64.91	2.52	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/1/2012	78.43	14.50	0	63.68	-1.23	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
12/27/2012	78.43	14.49	0	63.69	0.01	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
6/6/2013	78.43	15.32	0	62.86	-0.82	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
12/13/2013	78.18	15.04	0	63.14	0.28	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
6/23/2014	78.18	--	--	--	--	--	--	--	--	--	--	--	--	Inaccessible	
<b>MW-12</b>															
	8/26/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	11/20/1992	--	--	--	--	--	ND	--	ND	ND	ND	ND	--	--	
	12/21/1992	79.89	12.11	0	67.78	--	--	--	--	--	--	--	--	--	
	1/30/1993	79.89	13.18	0	66.71	-1.07	--	--	--	--	--	--	--	--	
	2/24/1993	79.89	12.13	0	67.76	1.05	ND	--	ND	ND	ND	ND	--	--	
	3/22/1993	79.89	11.22	0	68.67	0.91	--	--	--	--	--	--	--	--	
	4/28/1993	79.89	13.42	0	66.47	-2.20	--	--	--	--	--	--	--	--	
	5/25/1993	79.89	13.68	0	66.21	-0.26	ND	--	ND	ND	ND	ND	--	--	
	6/23/1993	79.61	14.56	0	65.05	-1.16	--	--	--	--	--	--	--	--	
	7/22/1993	79.61	14.96	0	64.65	-0.40	--	--	--	--	--	--	--	--	
	8/25/1993	79.61	13.61	0	66.00	1.35	ND	--	ND	ND	ND	ND	--	--	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
MW-12 (cont.)	9/22/1993	79.61	15.02	0	64.59	-1.41	--	--	--	--	--	--	--	--	
	10/28/1993	79.61	14.04	0	65.57	0.98	--	--	--	--	--	--	--	--	
	11/30/1993	79.61	13.28	0	66.33	0.76	ND	--	ND	ND	ND	ND	--	--	
	2/16/1994	79.61	12.76	0	66.85	0.52	ND	--	ND	ND	ND	ND	--	--	
	5/31/1994	79.61	12.64	0	66.97	0.12	ND	--	ND	0.81	ND	0.82	--	--	
	8/31/1994	79.61	12.82	0	66.79	-0.18	ND	--	ND	1.0	ND	1.0	--	ND	
	9/27/1994	79.61	14.66	0	64.95	-1.84	--	--	--	--	--	--	--	--	
	10/11/1994	79.61	14.25	0	65.36	0.41	--	--	--	--	--	--	--	--	
	11/10/1994	79.61	13.40	0	66.21	0.85	ND	--	ND	ND	ND	ND	--	--	
	2/7/1995	79.61	11.72	0	67.89	1.68	--	--	--	--	--	--	--	--	
	5/3/1995	79.61	13.38	0	66.23	-1.66	ND	--	ND	ND	ND	ND	--	--	
	8/3/1995	79.61	13.47	0	66.14	-0.09	--	--	--	--	--	--	--	--	
	11/7/1995	79.61	12.78	0	66.83	0.69	ND	--	ND	ND	ND	ND	--	--	
	5/6/1996	79.61	13.25	0	66.36	-0.47	--	--	--	--	--	--	--	--	
	11/5/1996	79.61	11.88	0	67.73	1.37	--	--	--	--	--	--	--	--	
	5/15/1997	79.61	11.72	0	67.89	0.16	--	--	--	--	--	--	--	--	
	11/12/1997	79.61	10.01	0	69.60	1.71	--	--	--	--	--	--	--	--	
	5/4/1998	79.61	10.96	0	68.65	-0.95	--	--	--	--	--	--	--	--	
	11/11/1998	79.61	11.53	0	68.08	-0.57	--	--	--	--	--	--	--	--	
	5/20/1999	79.61	10.84	0	68.77	0.69	--	--	--	--	--	--	--	--	
	11/15/1999	79.61	11.36	0	68.25	-0.52	--	--	--	--	--	--	--	--	
	5/22/2000	79.61	11.19	0	68.42	0.17	--	--	--	--	--	--	--	--	
	11/22/2000	79.61	11.36	0	68.25	-0.17	--	--	--	--	--	--	--	--	
	5/15/2001	79.61	11.04	0	68.57	0.32	--	--	--	--	--	--	--	--	
	11/23/2001	79.61	11.14	0	68.47	-0.10	--	--	--	--	--	--	--	--	
	5/24/2002	79.61	10.69	0	68.92	0.45	--	--	--	--	--	--	--	--	
	11/29/2002	79.61	11.23	0	68.38	-0.54	--	--	--	--	--	--	--	--	
	5/15/2003	79.61	10.38	0	69.23	0.85	--	--	--	--	--	--	--	--	
	11/4/2003	79.61	11.34	0	68.27	-0.96	--	<50	<0.50	<0.50	<0.50	<1.0	--	4.4	
	5/24/2004	79.61	9.84	0	69.77	1.50	--	<50	<0.50	<0.50	<0.50	<1.0	--	1.7	
	11/29/2004	79.61	12.17	0	67.44	-2.33	--	64	0.68	<0.50	1.2	3.0	--	0.71	
	6/24/2005	79.61	13.16	0	66.45	-0.99	--	53	<0.50	<0.50	0.13	0.42	--	<0.50	
	12/15/2005	79.61	13.94	0	65.67	-0.78	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
<b>MW-12 (cont.)</b>	6/14/2006	79.61	13.11	0	66.50	0.83	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/21/2006	79.61	9.03	0	70.58	4.08	--	<50	<0.50	<0.50	<0.50	<0.50	--	<0.50	
	6/28/2007	79.61	11.75	0	67.86	-2.72	--	<50	<0.50	<0.50	<0.50	<0.50	--	<0.50	
	12/13/2007	79.61	14.83	0	64.78	-3.08	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/9/2008	79.61	14.84	0	64.77	-0.01	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	12/30/2008	79.61	13.22	0	66.39	1.62	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	9/28/2009	79.61	10.55	0	69.06	2.67	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.55	
	12/15/2009	79.61	9.33	0	70.28	1.22	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.56	
	6/28/2010	79.61	9.31	0	70.30	0.02	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.97	
	12/29/2010	79.61	9.51	0	70.10	-0.20	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.95	
	6/7/2011	79.61	7.33	0	72.28	2.18	--	<50	<0.50	<0.50	<0.50	<1.0	--	2.0	
	12/9/2011	79.61	9.42	0	70.19	-2.09	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
	6/1/2012	79.61	10.13	0	69.48	-0.71	--	<50	<0.50	<0.50	<0.50	<1.0	--	1.2	
	12/27/2012	79.61	7.80	0	71.81	2.33	--	<50	<0.50	<0.50	<0.50	<1.0	--	0.88	
	6/6/2013	79.61	9.52	0	70.09	0.61	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50	
12/13/2013	79.61	10.96	0	68.65	-1.44	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
6/23/2014	79.61	11.11	0	68.50	-0.15	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		
<b>RW-1</b>															
	2/24/1993	81.20	7.19	0	74.01	--	--	--	--	--	--	--	--	--	
	5/12/1993	81.20	8.82	0	72.38	-1.63	--	--	--	--	--	--	--	--	
	5/25/1993	81.20	8.58	0	72.62	0.24	--	--	--	--	--	--	--	--	
	6/7/1993	80.63	8.16	0	72.47	-0.15	--	--	--	--	--	--	--	--	
	6/23/1993	80.63	8.53	0	72.10	-0.37	--	--	--	--	--	--	--	--	
	7/8/1993	80.63	8.69	0	71.94	-0.16	--	--	--	--	--	--	--	--	
	8/11/1993	80.63	9.00	0	71.63	-0.31	--	--	--	--	--	--	--	--	
	8/25/1993	80.63	9.07	0	71.56	-0.07	--	--	--	--	--	--	--	--	
	9/8/1993	80.63	9.71	0	70.92	-0.64	--	--	--	--	--	--	--	--	
	9/22/1993	80.63	9.25	0	71.38	0.46	--	--	--	--	--	--	--	--	
	11/12/1993	80.63	9.00	--	71.63	0.25	--	--	--	--	--	--	--	--	
	2/16/1994	80.63	7.82	0	72.81	1.18	--	--	--	--	--	--	--	--	
	5/31/1994	80.63	8.81	0	71.82	-0.99	--	--	--	--	--	--	--	--	
	8/31/1994	80.63	9.61	0	71.02	-0.80	--	--	--	--	--	--	--	--	
11/10/1994	80.63	6.34	0	74.29	3.27	--	--	--	--	--	--	--	--		

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
RW-1 (cont.)	2/7/1995	80.63	7.18	0	73.45	-0.84	--	--	--	--	--	--	--	--	
	3/14/1995	80.63	6.01	0	74.62	1.17	--	--	--	--	--	--	--	--	
	11/7/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	
	10/15/2001	80.63	8.43	0	72.20	--	--	--	--	--	--	--	--	--	
	11/23/2001	80.63	8.57	0	72.06	-0.14	--	--	--	--	--	--	--	--	
	12/10/2001	80.63	8.51	0	72.12	0.06	--	--	--	--	--	--	--	--	
	1/14/2002	80.63	8.13	0	72.50	0.38	--	--	--	--	--	--	--	--	
	2/22/2002	80.63	6.18	0	74.45	1.95	--	--	--	--	--	--	--	--	
	3/11/2002	80.63	6.31	0	74.32	-0.13	--	--	--	--	--	--	--	--	
	4/15/2002	80.63	6.39	0	74.24	-0.08	--	--	--	--	--	--	--	--	
	5/24/2002	80.63	8.14	0	72.49	-1.75	--	--	--	--	--	--	--	--	
	6/17/2002	80.63	8.18	0	72.45	-0.04	--	--	--	--	--	--	--	--	
	7/15/2002	80.63	8.29	0	72.34	-0.11	--	--	--	--	--	--	--	--	
	8/19/2002	80.63	8.44	0	72.19	-0.15	--	--	--	--	--	--	--	--	
	9/5/2002	80.63	8.47	0	72.16	-0.03	--	--	--	--	--	--	--	--	
	10/7/2002	80.63	8.43	0	72.20	0.04	--	--	--	--	--	--	--	--	
	11/29/2002	80.63	8.92	0	71.71	-0.49	--	--	--	--	--	--	--	--	
	12/12/2002	80.63	8.87	0	71.76	0.05	--	--	--	--	--	--	--	--	
	1/6/2003	80.63	8.66	0	71.97	0.21	--	--	--	--	--	--	--	--	
	2/12/2003	80.63	8.39	0	72.24	0.27	--	--	--	--	--	--	--	--	
	3/13/2003	80.63	8.06	0	72.57	0.33	--	--	--	--	--	--	--	--	
	4/7/2003	80.63	8.09	0	72.54	-0.03	--	--	--	--	--	--	--	--	
	5/15/2003	80.63	8.07	0	72.56	0.02	--	--	--	--	--	--	--	--	
	6/12/2003	80.63	8.11	0	72.52	-0.04	--	--	--	--	--	--	--	--	
	7/7/2003	80.63	8.13	0	72.50	-0.02	--	--	--	--	--	--	--	--	
	8/14/2003	80.63	8.23	0	72.40	-0.10	--	--	--	--	--	--	--	--	
9/12/2003	80.63	8.29	0	72.34	-0.06	--	--	--	--	--	--	--	--		
11/4/2003	80.63	9.97	0	70.66	-1.68	--	2600	11	<10	<10	<20	--	210		
5/24/2004	80.63	8.31	0	72.32	1.66	--	3100	20	<5.0	16	<10	--	200		
11/29/2004	80.63	8.23	0	72.40	0.08	--	4500	46	<1.0	34	3.6	--	140		
6/24/2005	80.63	7.53	0	73.10	0.70	--	2000	20	0.87	50	3.0	--	56		
12/15/2005	80.63	8.11	0	72.52	-0.58	--	3300	37	0.70	35	4.7	--	44		
6/14/2006	80.63	7.41	0	73.22	0.70	--	1500	2.0	0.95	6.9	<1.0	--	21		

**Table 1**  
**Groundwater Gauging and Analytical Results**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Date Sampled	TOC Elevation (feet amsl)	Depth to Water (feet btoc)	LPH Thickness (feet)	Ground-Water Elevation (feet amsl)	Change in Elevation (feet)	TPH-g 8015 (µg/l)	TPH-g (GC/MS) (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (8021B) (µg/l)	MTBE (8260B) (µg/l)	Comments
RW-1 (cont.)	12/21/2006	80.63	7.78	0	72.85	-0.37	--	3100	21	0.65	56	5.4	--	27	
	6/28/2007	80.63	9.09	0	71.54	-1.31	--	2800	46	0.96	44	2.6	--	65	
	12/13/2007	80.63	9.21	0	71.42	-0.12	--	9100	190	2.1	400	81	--	30	
	6/9/2008	80.63	9.30	0	71.33	-0.09	--	5400	23	<2.5	330	13	--	39	
	12/30/2008	80.63	8.23	0	72.40	1.07	--	5800	130	<2.5	270	58	--	22	
	9/28/2009	80.63	9.10	0	71.53	-0.87	--	3400	3.8	<2.5	23	5.0	--	21	
	12/15/2009	80.63	7.96	0	72.67	1.14	--	9100	18	<2.5	450	160	--	<2.5	
	6/28/2010	80.63	8.68	0	71.95	-0.72	--	2300	20	1.0	56	<1.0	--	5.6	
	12/29/2010	80.63	6.04	0	74.59	2.64	--	4100	9.3	1.3	6.8	<1.0	--	1.6	
	6/7/2011	80.63	3.61	0	77.02	2.43	--	730	4.1	<0.50	16	<1.0	--	<0.50	
	10/21/2011	80.63	5.45	0	75.18	-1.84	--	--	--	--	--	--	--	--	
	12/9/2011	80.63	9.28	0	71.35	-3.83	--	2900	240	1.2	180	30	--	<0.50	A01
	1/12/2012	80.63	9.53	0	71.10	-0.25	--	--	--	--	--	--	--	--	
	6/1/2012	80.63	8.48	0	72.15	1.05	--	3600	140	<2.5	56	<5.0	--	<2.5	A01
	12/27/2012	80.63	6.11	0	74.52	2.37	--	780	<0.50	<0.50	0.93	<1.0	--	<0.50	
	6/6/2013	80.63	8.73	0	71.90	-0.25	--	1300	1.2	1.4	5.8	<1.0	--	<0.50	
12/13/2013	80.63	9.20	0	71.43	-0.47	--	150	0.81	<0.50	<0.50	<1.0	--	<0.50		
6/23/2014	80.63	9.20	0	71.43	0.00	--	<50	<0.50	<0.50	<0.50	<1.0	--	<0.50		

**Notes:**

amsl = above mean sea level

btoc = below top of casing

A01 = method detection limit is raised due to sample dilution

GC/MS = gas chromatography / mass spectrometer

LPH = liquid phase hydrocarbons

LPH in well = sample not collected due to the presence of LPH

MTBE = methyl tertiary butyl ether

ND = not detected above the method reporting limit

TOC = top of casing

TPH-g = total petroleum hydrocarbons as gasoline

µg/L = micrograms per liter

< = not detected above the method reporting limit

-- = not analyzed



**Table 2**  
**Historical Soil Analytical Summary**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Sample	Date	Depth (feet)	TPH-g (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)
SW1	8/24/1989	9.5	13	ND	0.13	0.15	0.39	--	--
SW2	8/24/1989	9.5	290	0.82	8.7	7.6	44	--	--
SW2(R)	8/24/1989	9.5	ND	ND	ND	ND	ND	--	--
SW3	8/24/1989	9.5	ND	ND	ND	ND	ND	--	--
SW4	8/24/1989	9.5	ND	ND	ND	ND	ND	--	--
SW5	8/24/1989	9.5	ND	ND	ND	ND	ND	--	--
SW6	8/24/1989	9.5	ND	ND	ND	ND	ND	--	--
P1	8/24/1989	6.5	6.1	ND	ND	ND	ND	--	--
P2	8/24/1989	6.5	36	0.52	4.4	1.4	8	--	--
P3	8/24/1989	5	20	0.3	2.5	1.1	5.6	--	--
P4	8/24/1989	5	3.8	0.11	0.19	0.1	0.23	--	--
WO1	8/24/1989	8	1.6	ND	1.3	ND	ND	--	--
MW1(5)	10/17/1989	5	8.5	ND	ND	ND	0.14	--	--
MW1(10)	10/17/1989	10	ND	ND	ND	ND	ND	--	--
MW2(5)	10/17/1989	5	ND	ND	ND	ND	ND	--	--
MW2(10)	10/17/1989	10	ND	ND	ND	ND	ND	--	--
MW2(12.5)	10/17/1989	12.5	ND	ND	ND	ND	ND	--	--
MW3(5)	10/17/1989	5	3.1	0.068	ND	ND	ND	--	--
MW3(10)	10/17/1989	10	69	0.89	2.6	2	7.9	--	--
MW3(11)	10/17/1989	11	1100	16	85	35	150	--	--
MW4(5)	1/26/1990	5	22	0.059	ND	ND	ND	--	--
MW4(7)	1/26/1990	7	2.5	ND	ND	ND	ND	--	--
MW4(10)	1/26/1990	10	250	1.2	0.66	1.4	20	--	--
MW4(11)	1/26/1990	11	280	1	4	7.6	36	--	--
MW5(5)	1/26/1990	5	25	0.21	ND	ND	ND	--	--
MW5(7.5)	1/26/1990	7.5	46	0.25	0.28	0.46	0.2	--	--
MW5(10)	1/26/1990	10	140	1.5	1.7	4	10	--	--
MW5(11.5)	1/26/1990	11.5	370	1.8	14	11	51	--	--
MW6(5)	10/23/1990	5	ND	ND	ND	ND	ND	--	--
MW6(9)	10/23/1990	9	ND	ND	ND	ND	0.01	--	--
MW6(11.5)	10/23/1990	11.5	ND	ND	ND	ND	ND	--	--
MW7(5)	10/23/1990	5	11	ND	ND	0.0064	0.032	--	--
MW7(8.5)	10/23/1990	8.5	ND	ND	ND	ND	0.019	--	--
MW7(11.5)	10/23/1990	11.5	ND	ND	ND	ND	0.036	--	--

**Table 2**  
**Historical Soil Analytical Summary**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Sample	Date	Depth (feet)	TPH-g (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)
MW8(5)	10/23/1990	5	ND	ND	ND	ND	ND	--	--
MW8(10)	10/23/1990	10	ND	ND	ND	ND	0.008	--	--
MW9(5.5)	10/23/1990	5.5	ND	ND	ND	ND	ND	--	--
MW9(10)	10/23/1990	10	84	0.32	0.27	0.63	0.51	--	--
MW9(12)	10/23/1990	12	120	0.19	0.11	0.14	0.69	--	--
MW10(5)	1/7/1992	5	ND	ND	ND	ND	0.021	--	--
MW10(7)	1/7/1992	7	ND	ND	ND	ND	ND	--	--
MW10(11.5)	1/7/1992	11.5	ND	ND	ND	ND	ND	--	--
MW10(14.5)	1/7/1992	14.5	ND	ND	ND	ND	ND	--	--
MW10(19.5)	1/7/1992	19.5	ND	ND	ND	ND	ND	--	--
MW11(5)	1/7/1992	5	ND	ND	ND	ND	ND	--	--
MW11(10)	1/7/1992	10	ND	ND	ND	ND	ND	--	--
MW11(12.5)	1/7/1992	12.5	ND	ND	ND	ND	ND	--	--
MW12(5)	6/26/1992	5	ND	ND	ND	ND	ND	--	--
MW12(10)	6/26/1992	10	ND	ND	ND	ND	ND	--	--
MW12(11.5)	6/26/1992	11.5	ND	ND	ND	ND	ND	--	--
UT-1-4	2/19/1998	4	2400	ND	ND	8.8	56	<0.5	--
UT-2-4	2/19/1998	4	4300	ND	6.3	58	410	<0.5	--
UT-3-4	2/19/1998	4	23	0.039	0.077	0.22	0.051	2.9	--
UT-4-4	2/19/1998	4	ND	ND	ND	ND	ND	<0.5	--
US-1	2/19/1998	composite	4	ND	0.016	0.009	0.13	0.31	--
B-1	8/27/2009	12.5-15.5	1700	<0.5	<0.5	<0.5	<1.0	9.2	47
B-1	8/27/2009	22-24	1100	<1.0	<1.0	<1.0	<2.0	1	<20
B-1	8/27/2009	33-35	<50	<0.5	<0.5	<0.5	<1.0	<0.5	<10
B-2	8/27/2009	12-15	3200	8.9	<5.0	26	74	59	<100
B-2	8/27/2009	23-25	770	39	<0.5	83	240	2.3	<10
B-2	8/27/2009	32-34.5	370	11	<0.5	11	22	<0.5	<10

**Table 2**  
**Historical Soil Analytical Summary**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Sample	Date	Depth (feet)	TPH-g (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	TBA (mg/kg)
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**Notes:**

..... sample location removed during excavation

-- = not analyzed

mg/kg = milligrams per kilogram

MTBE = methyl tertiary butyl ether

TBA = tertiary butyl alcohol

TPH-g = total petroleum hydrocarbons as gasoline

**Table 3  
Well Construction Details**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Installation Date	TOC (feet amsl)	Boring Depth (feet bgs)	Well Depth (feet bgs)	Boring Diameter (inches)	Well Diameter (inches)	Screen Interval (feet bgs)	Screen Size (inches)	Sand Filter Pack	Screen Zone Within Soil Type	Location	Status
MW-1	10/17/1989	81.07	20	20	9	2	5-20	0.020	#3	(5-7.5)CH (7.5-10)SC (10-12)GC (12-14)GP/GC (14-19)CH (19-20)GC	Onsite	Active
MW-2	10/17/1989	81.62	20	20	9	2	5-20	0.020	#3	(5-6.5)CH (6.5-10)CL/CH (10-13)SC (13-15)GW/GC (15-20)CL/CH	Onsite	Active
MW-3	10/17/1989	82.01	22.5	22.5	9	2	5-22.5	0.020	#3	(5-7.5)CH (7.5-11)CL/CH (11-14)SC (14-22.5)CL/CH	Onsite	Active
MW-4	1/26/1990	81.48	20	20	9	2	5-20	0.020	#3	(5-6.5)MH (6.5-10)CH (10-11.5)GC (11.5-12.5)CH (12.5-13)GC (13-20)CH	Onsite	Active
MW-5	1/26/1990	81.59	20	20	9	2	5-20	0.020	#3	(5-6.5)MH (6.5-11)CH (11-13.5)SC (13.5-15.5)GW/GC (15.5-20)CH	Onsite	Active
MW-6	10/22/1990	80.47	20	20	9	2	5-20	0.020	#3	(5-7)CL/CH (7-10)GC (10-17)CL/CH (17-20)ML/MH	Onsite	Active

**Table 3  
Well Construction Details**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Installation Date	TOC (feet amsl)	Boring Depth (feet bgs)	Well Depth (feet bgs)	Boring Diameter (inches)	Well Diameter (inches)	Screen Interval (feet bgs)	Screen Size (inches)	Sand Filter Pack	Screen Zone Within Soil Type	Location	Status
MW-7	10/22/1990	81.83	20	20	9	2	5-20	0.020	#3	(5-7)CH (7-10)CL/CH (10-11.5)SC (11.5-12.5)GW (12.5-14)GC (14-20)ML/MH	Onsite	Active
MW-8	10/22/1990	81.71	22	22	9	2	5-22	0.020	#3	(5-8.5)CL/CH (8.5-12)GC (12-22)CL/CH	Offsite	Active
MW-9	10/23/1990	81.13	22	22	9	2	5-22	0.020	#3	(5-5.5)MH (5.5-11.5)CL/CH (11.5-15.5)GC (15.5-22)CL/CH	Offsite	Active
MW-10	1/7/1992	81.90	22	22	9	2	6-22	0.010	#2/16	(6-7)SM (7-10)CH (10-12)GC (12-19)CL (19-20)ML (20-22)SC	Offsite	Active
MW-11	1/7/1992	78.43	21	19	9	2	5-19	0.010	#2/16	(5-8)SC (8-10)GC (10-20)CH (20-21)SW/SM	Offsite	Active
MW-12	6/26/1992	79.89	17.5	17.5	8	2	5-17.5	0.010	#2/12	(5-5.5)MH (5.5-6.5)CL/SC (6.5-8.5)CH (8.5-11.5)GC (11.5-17.5)CL	Offsite	Active

**Table 3  
Well Construction Details**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

Well ID	Installation Date	TOC (feet amsl)	Boring Depth (feet bgs)	Well Depth (feet bgs)	Boring Diameter (inches)	Well Diameter (inches)	Screen Interval (feet bgs)	Screen Size (inches)	Sand Filter Pack	Screen Zone Within Soil Type	Location	Status
RW-1	6/25/1992	81.20	17.5	17.5	13.5	6	5-15	0.010	#2/12	(5-6.5)MH (6.5-10)CH (10-11)SC (11-12.5)GC (12.5-17)CL (17-17.5)SC	Onsite	Active

**Notes:**

amsl = above mean sea level  
bgs = below ground surface  
CH = silty clay  
CL = clay  
GC = clayey gravel  
GP = poorly-graded gravel  
GW = well-graded gravel  
ML = silty gravel  
MH = clayey silt  
SC = clayey sand  
SM = silty sand  
SW = well-graded sand  
TOC = top of casing

**Table 4**  
**Geochemical Parameters**

Unocal Service Station No. 0746  
3943 Broadway  
Oakland, California

<b>Well ID</b>	<b>Date</b>	<b>Total Iron (µg/L)</b>	<b>Total Alkalinity as CaCO<sub>3</sub> (mg/L)</b>	<b>Nitrate as Nitrogen (mg/L)</b>	<b>Sulfate (mg/L)</b>	<b>Total Sulfide (mg/L)</b>
MW-1	12/9/2011	6200	230	2.4	21	<0.10
MW-4	12/9/2011	12000	130	<0.090	<0.12	<0.40
MW-11	12/9/2011	600	270	9.8	69	<0.10
MW-12	12/9/2011	1000	390	0.77	10	<0.10

**Notes:**

CaCO<sub>3</sub> = calcium carbonate

mg/L = milligram per liter

µg/L = microgram per liter

**Table 5**  
**Summary of Statistical Analysis of Groundwater Analytical Data**

Unocal Service Station 0746  
 3943 Broadway  
 Oakland, California

Constituent	Well	Water Quality Objective (µg/L) <sup>1</sup>	Data Range						Linear Regression Analysis					
			Minimum Concentration (µg/L)	Maximum Concentration (µg/L)	Most Recent Concentration (µg/L)	% of Data Above Laboratory Reporting Limit	Start Date	End Date	Coefficient of Determination, R-squared <sup>2</sup>	p-value of Correlation (Significance of Slope)	Attenuation Half-life (days)	Trend Direction	Significance of Trend <sup>3</sup>	Projected Year to WQO
TPH-g	MW-3	500	1,100	13,000	4,200	100	5/20/1999	6/23/2014	<0.01	0.19	NA	No Trend	NS	NA
	MW-4	500	<i>50</i>	5,300	2,600	60	11/23/2001	6/23/2014	0.64	<0.01	NA	Increasing	Significant	NA
	MW-4 (2009 Onwards)	500	230	5,300	2,600	100	12/15/2009	6/23/2014	<0.01	0.84	NA	No Trend	NS	NA
	RW-1	500	50	9,100	50	95	11/4/2003	6/23/2014	0.30	<0.01	1,233	Decreasing	Significant	2016
Benzene	MW-3	27	<i>0.5</i>	326	87.0	87	5/20/1999	6/23/2014	0.33	<0.01	1,267	Decreasing	Significant	2006
Ethylbenzene	MW-3	43	12	398	76	100	11/15/1999	6/23/2014	0.34	<0.01	2,585	Decreasing	Significant	2013

**Notes:**

µg/L = micrograms per liter

BWQO = Below Water Quality Objective since the data shown (as month/year)

NS = not significant

NA = not applicable due to increasing trend, non-significant trend or no apparent trend

TPH-g = Total Petroleum Hydrocarbons, Gasoline

WQO = Water Quality Objective

<sup>1</sup> San Francisco ESLs for all contaminants

<sup>2</sup> Linear regression analysis with R<sup>2</sup> values <0.1 and p-values > 0.05 were defined as having no apparent trend (No Trend).

<sup>3</sup> Statistically significant trend defined as having p-value ≤ 0.05

*Italicized* = value below the laboratory detection limit

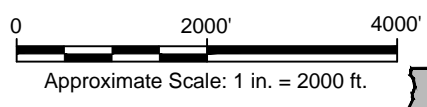




**Figures**



REFERENCE: BASE MAP USGS 7.5 MIN. TOPO. QUAD., OAKLAND WEST, CALIFORNIA, 1993, AND OAKLAND EAST, CALIFORNIA, 1997.

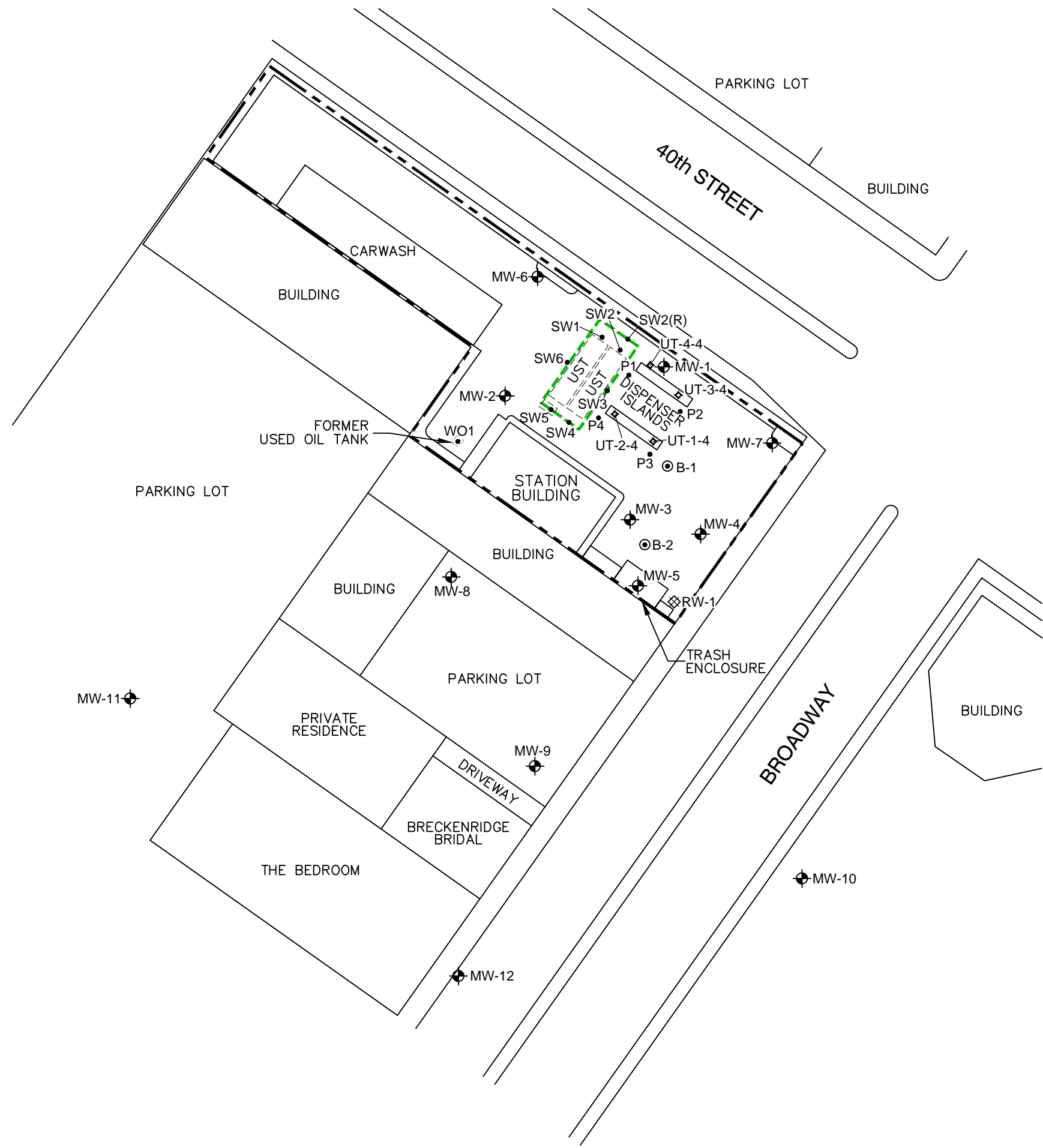


UNION OIL  
 STATION NO. 0746  
 3943 BROADWAY  
 OAKLAND, CALIFORNIA

**SITE LOCATION MAP**



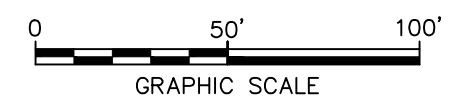
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 XREFS: IMAGES: PROJECTNAME: ...  
 47338X01



**LEGEND**

- PROPERTY BOUNDARY
- MW-1 MONITORING WELL
- RW-1 RECOVERY WELL
- B-1 CPT BORING
- SW1 SAMPLE POINT (KAPREALIAN ENGINEERING, INC.)
- UT-1-4 SOIL SAMPLE (GETTLER-RYAN, INC.)
- - - - - APPROXIMATE EXCAVATION AREA (KAPREALIAN ENGINEERING, INC.)

- NOTES:**
1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 09/14/09, AT A SCALE OF 1"=50'.
  2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.



UNION OIL  
 STATION NO. 0746  
 3943 BROADWAY  
 OAKLAND, CALIFORNIA

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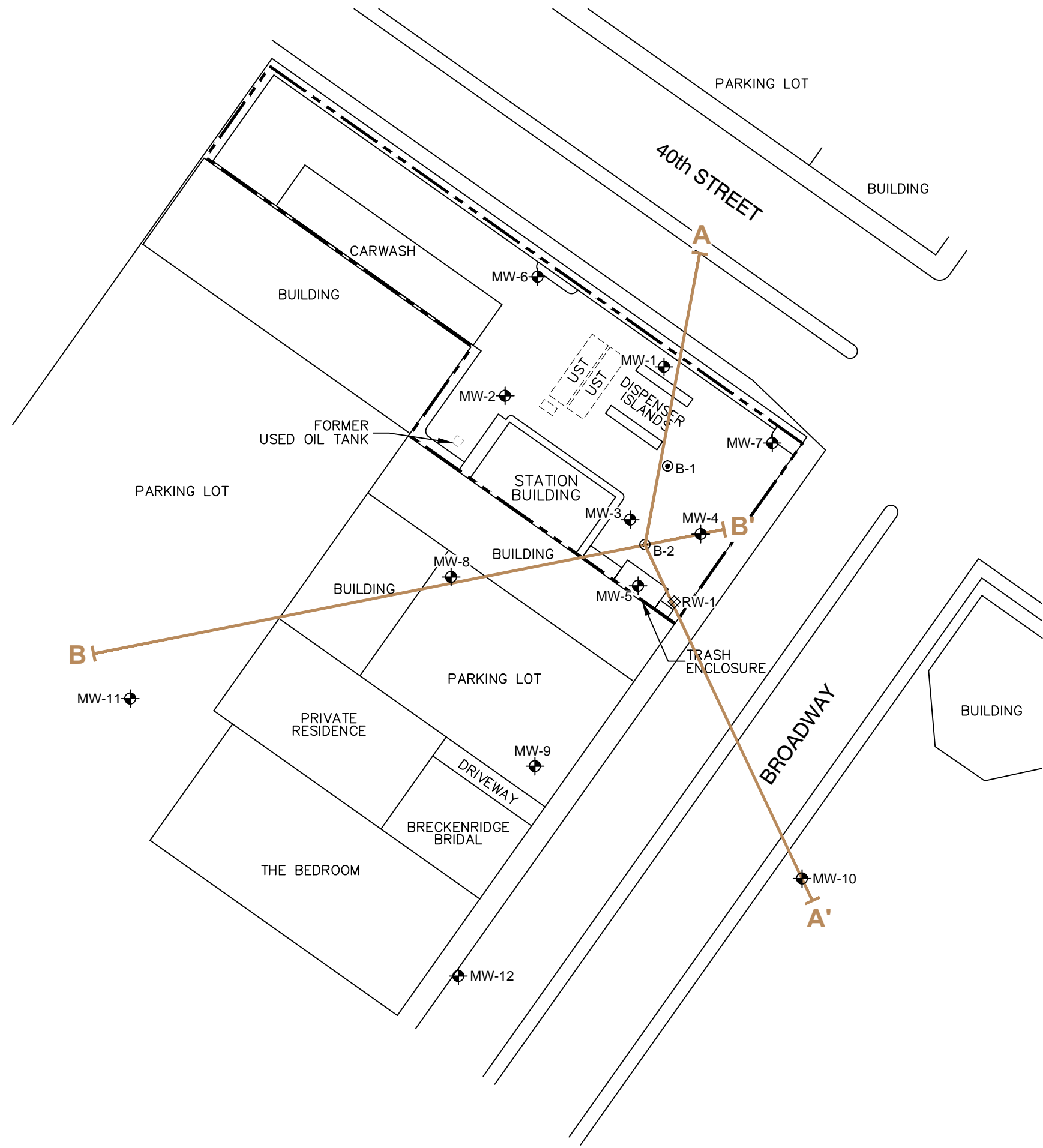
**SITE MAP**

---

FIGURE  
**2**



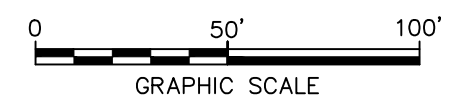
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**LEGEND**

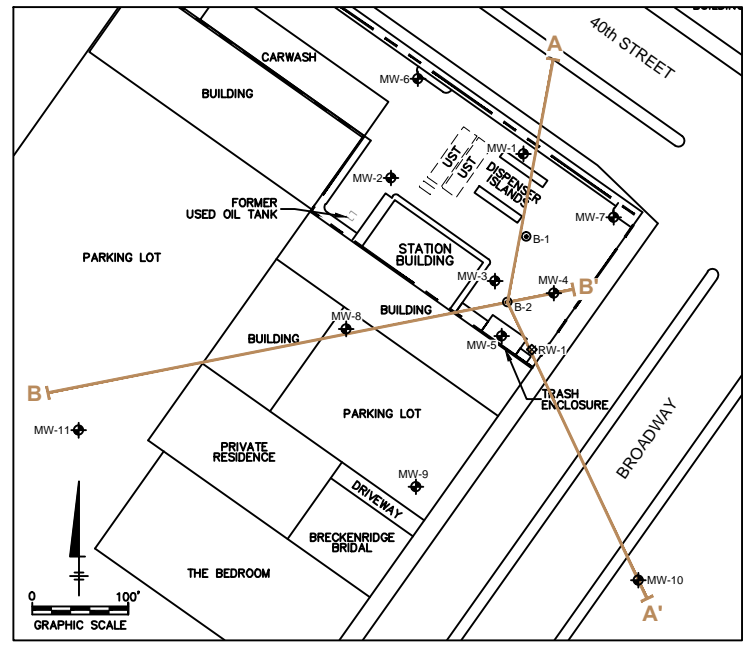
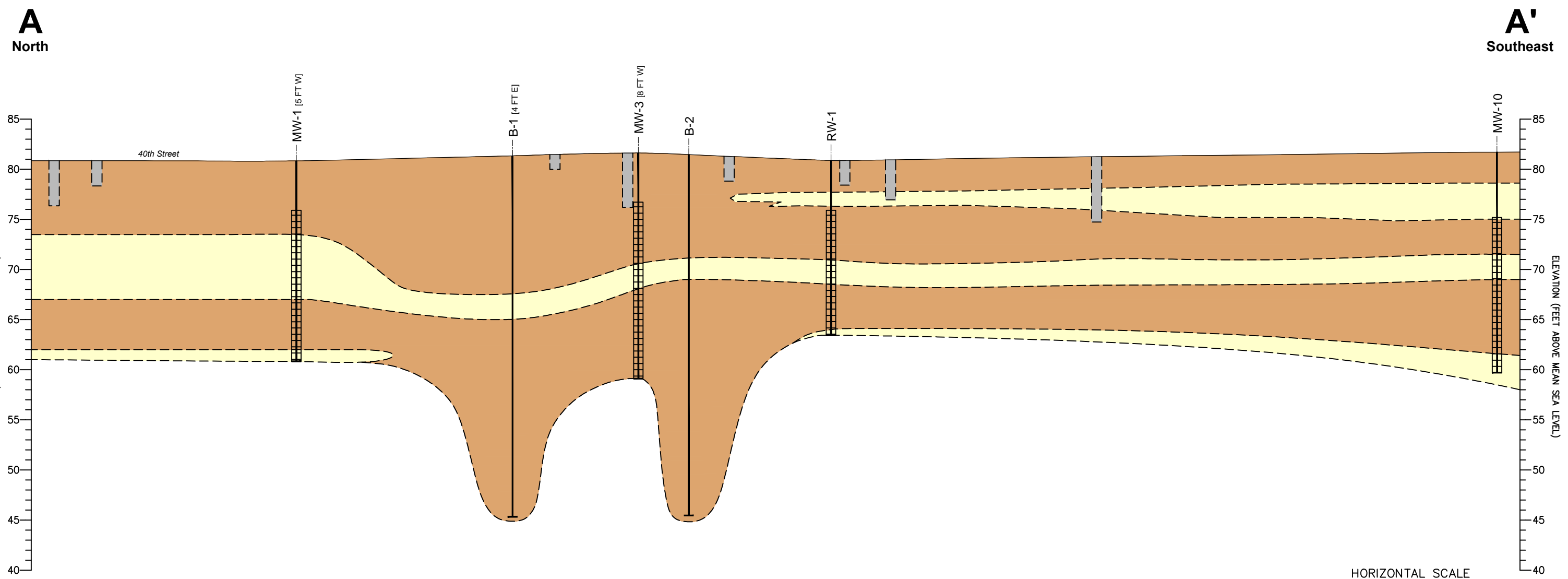
- PROPERTY BOUNDARY
- MW-1 MONITORING WELL
- RW-1 RECOVERY WELL
- B-1 CPT BORING
- CROSS SECTION LOCATION

- NOTES:**
1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 09/14/09, AT A SCALE OF 1"=50'.
  2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.



UNION OIL STATION NO. 0746 3943 BROADWAY OAKLAND, CALIFORNIA	
<b>CROSS SECTION LOCATION MAP</b>	
	FIGURE <b>3</b>

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS  
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 XREFS: IMAGES: PROJECTNAME: 47338X01

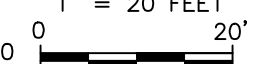


**LEGEND**

- BORING ID  
[PROJECTED DISTANCE IN FEET AND DIRECTION FROM CROSS-SECTION LINE]
- GROUND SURFACE
- APPROXIMATE STRATIGRAPHIC BOUNDARY
- SCREEN INTERVAL
- BOTTOM OF BORING

- LOW PERMEABILITY  
(LEAN CLAY, SILT, SANDY SILT, SANDY CLAY, LEAN CLAY WITH SAND, SILT WITH SAND)
- MEDIUM PERMEABILITY  
(SILTY SAND, CLAYEY SAND)
- UTILITY TRENCH FILL

HORIZONTAL SCALE  
1" = 20 FEET



VERTICAL SCALE  
1" = 10 FEET



**NOTES:**

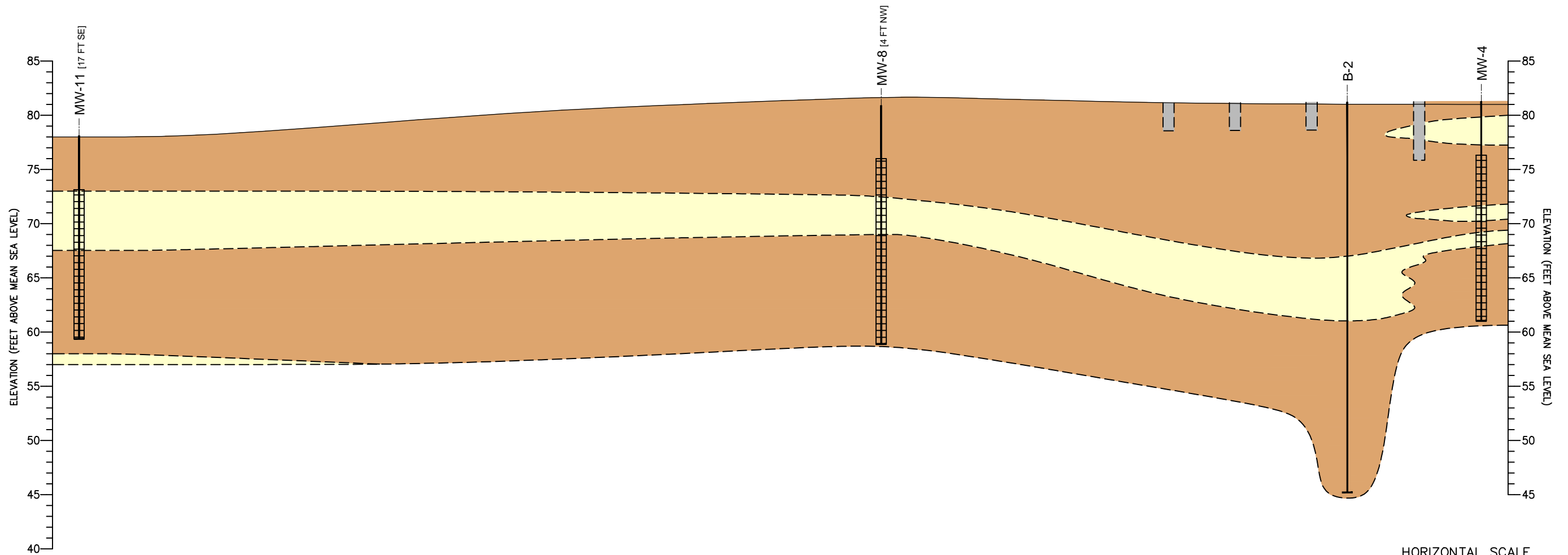
1. CROSS SECTION PROVIDED BY DELTA, DATED 10/08/09, TITLED GEOLOGIC CROSS SECTION A-A'.
2. ALL DISTANCES ARE APPROXIMATE.

UNION OIL STATION NO. 0746 3943 BROADWAY OAKLAND, CALIFORNIA	
CROSS SECTION A-A'	
	FIGURE <b>4</b>

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS  
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**B**  
 Southwest

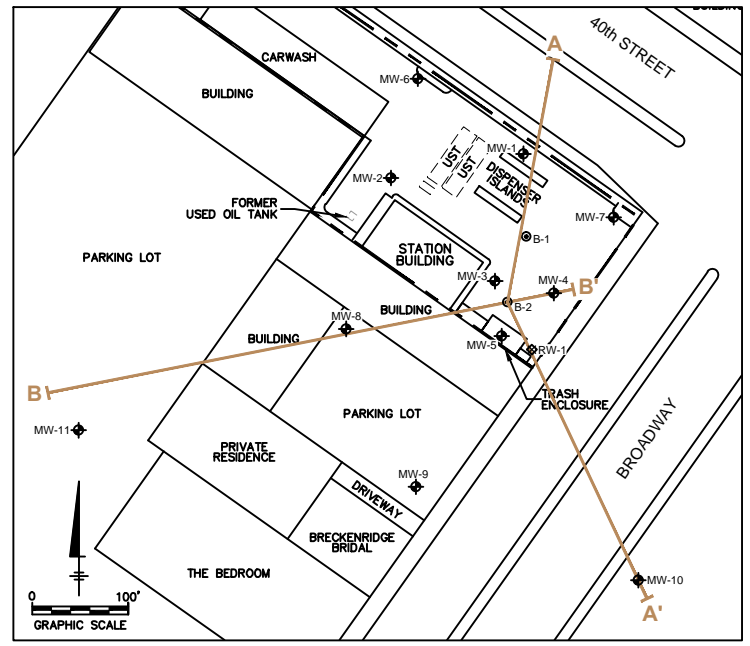
**B'**  
 Northeast



HORIZONTAL SCALE  
 1" = 20 FEET  
 0 20'

VERTICAL SCALE  
 1" = 10 FEET  
 0 10'

- NOTES:
- CROSS SECTION PROVIDED BY DELTA, DATED 10/08/09, TITLED GEOLOGIC CROSS SECTION B-B'.
  - ALL DISTANCES ARE APPROXIMATE.



LEGEND

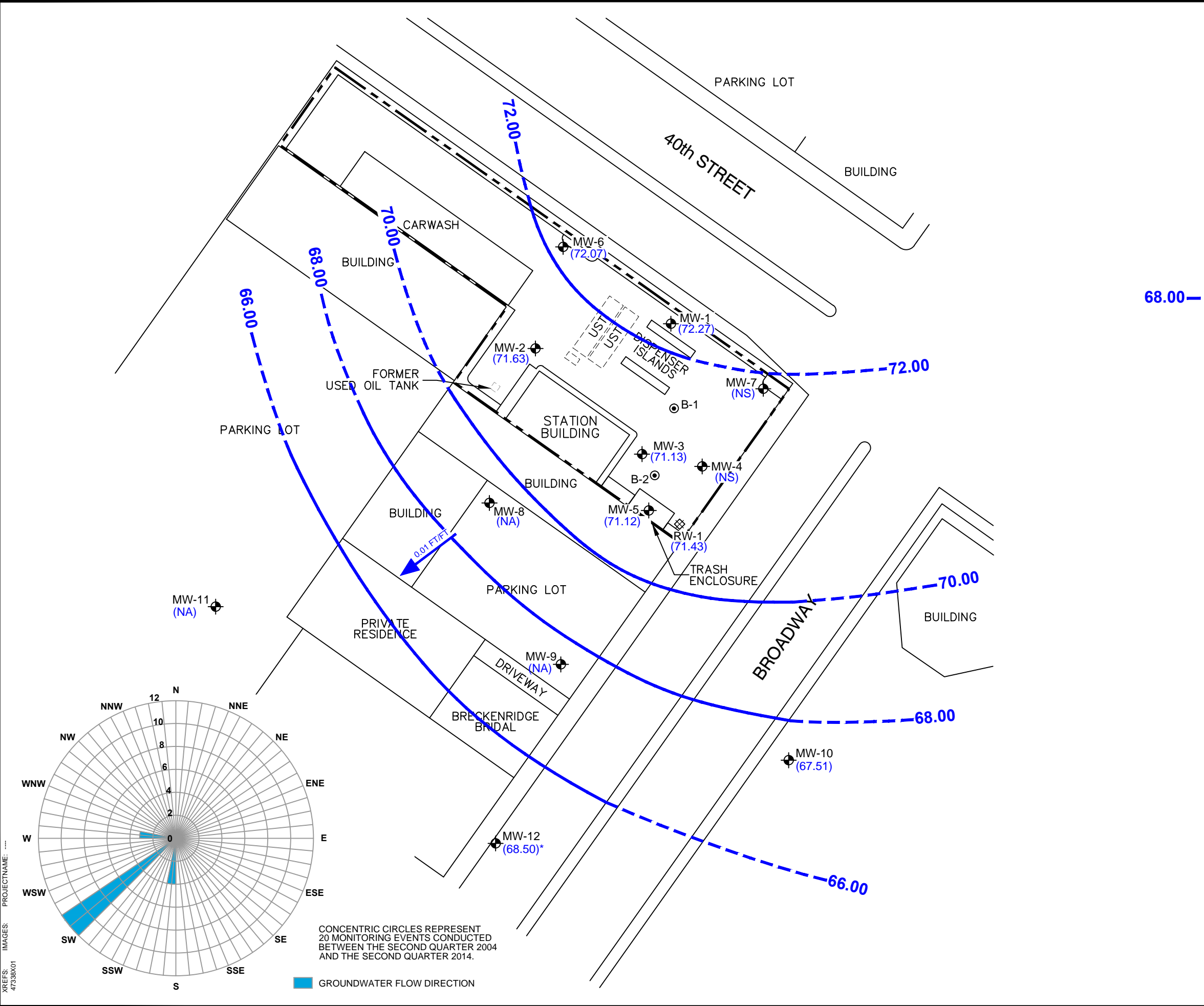
- BORING ID  
 [PROJECTED DISTANCE IN FEET AND DIRECTION FROM CROSS-SECTION LINE]
- GROUND SURFACE
- APPROXIMATE STRATIGRAPHIC BOUNDARY
- SCREEN INTERVAL
- BOTTOM OF BORING
- LOW PERMEABILITY  
 (LEAN CLAY, SILT, SANDY SILT, SANDY CLAY, LEAN CLAY WITH SAND, SILT WITH SAND)
- MEDIUM PERMEABILITY  
 (SILTY SAND, CLAYEY SAND)
- UTILITY TRENCH FILL

UNION OIL  
 STATION NO. 0746  
 3943 BROADWAY  
 OAKLAND, CALIFORNIA

**CROSS SECTION B-B'**

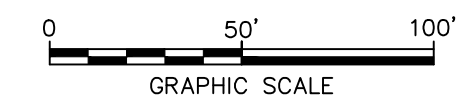


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- LEGEND**
- PROPERTY BOUNDARY
  - MW-1 MONITORING WELL
  - RW-1 RECOVERY WELL
  - B-1 CPT BORING
  - (71.12) GROUNDWATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL (FT MSL)
  - 68.00 GROUNDWATER ELEVATION CONTOUR (FT MSL; DASHED WHERE INFERRED)
  - 0.01 FT/FT GROUNDWATER FLOW DIRECTION AND GRADIENT (FOOT PER FOOT)
  - (NA) NOT ACCESSIBLE
  - (NS) NOT SURVEYED
  - \* NOT USED IN CONTOURING

- NOTES:**
1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 09/14/09, AT A SCALE OF 1"=50'.
  2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
  3. GROUNDWATER MONITORING WELLS WERE GAUGED AND SAMPLED ON JUNE 23, 2014.
  4. HISTORICAL DATA FOR MW-11 WAS USED FOR CONTOURING.

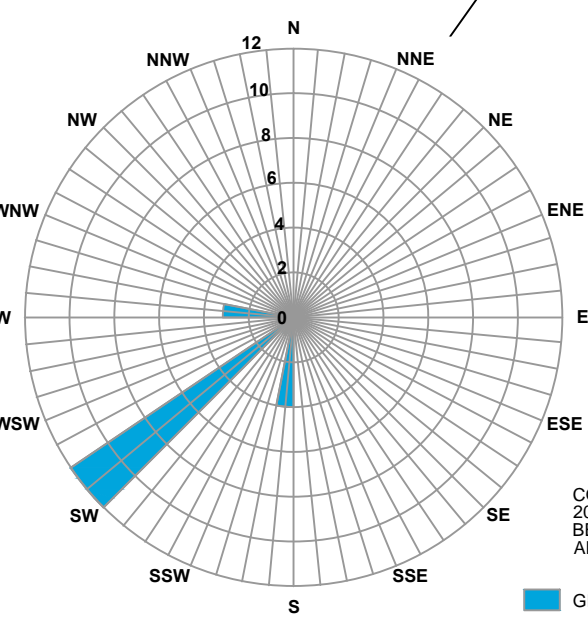


UNION OIL  
 STATION NO. 0746  
 3943 BROADWAY  
 OAKLAND, CALIFORNIA

**GROUNDWATER ELEVATION  
 CONTOUR MAP**

**ARCADIS**

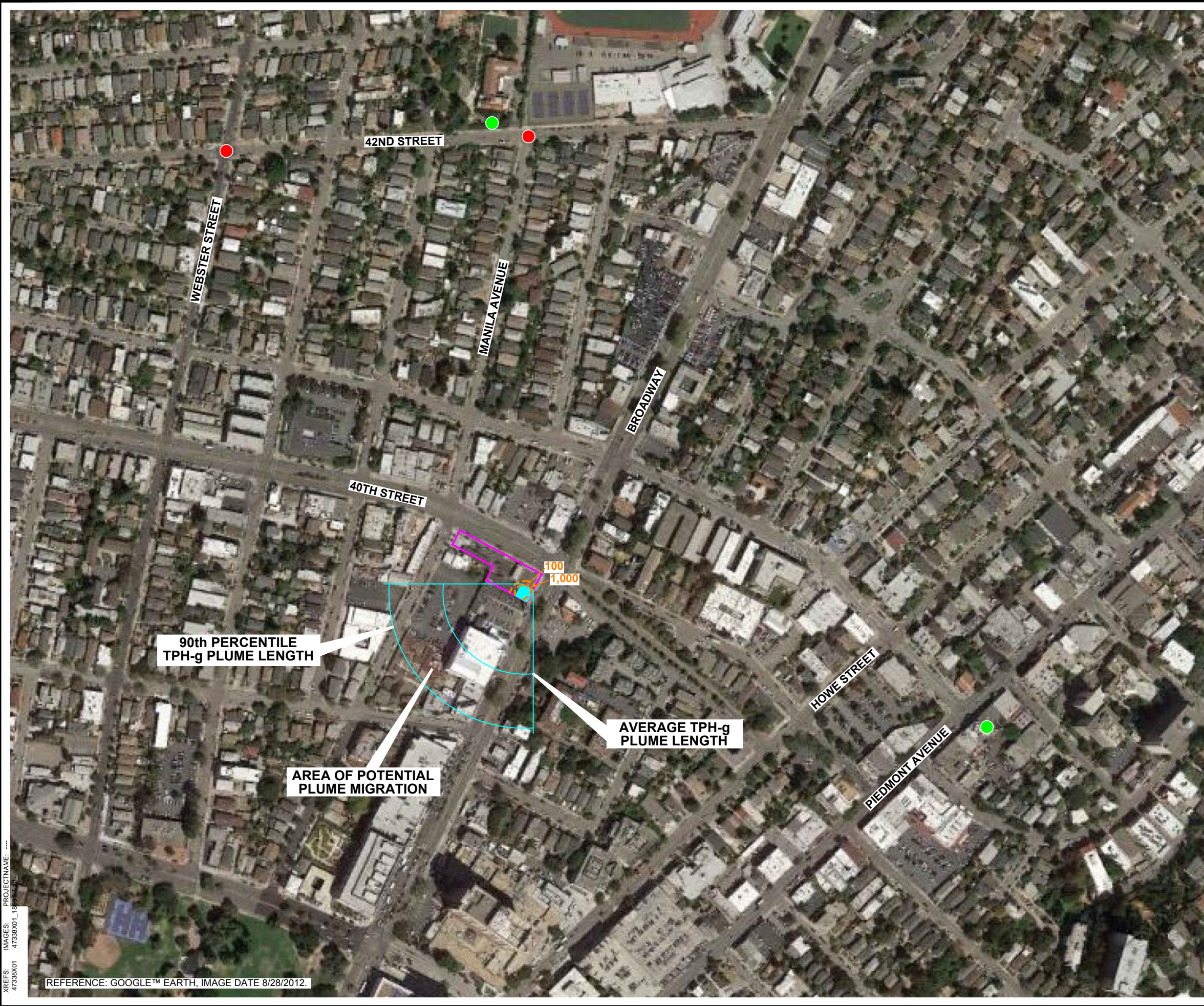
FIGURE  
**6**



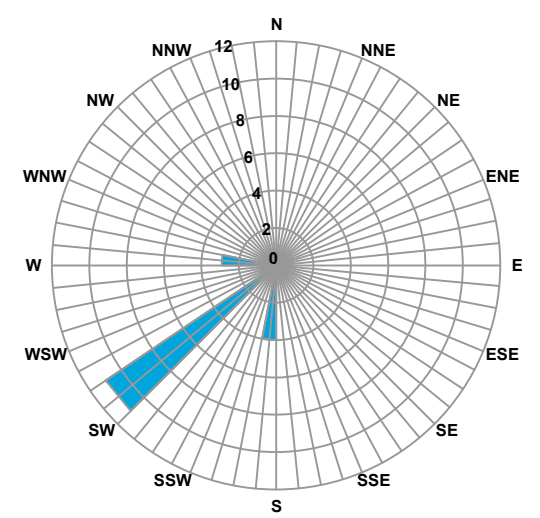
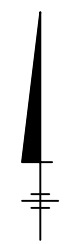
CONCENTRIC CIRCLES REPRESENT 20 MONITORING EVENTS CONDUCTED BETWEEN THE SECOND QUARTER 2004 AND THE SECOND QUARTER 2014.

GROUNDWATER FLOW DIRECTION

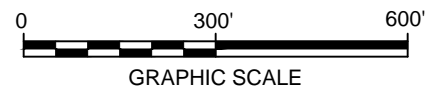
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- LEGEND
- SITE BOUNDARY
  - IRRIGATION WELL
  - CATHODIC PROTECTION WELL
  - - - TPH-g CONCENTRATION CONTOUR (µg/L)
  - TPH-g TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (C6-C12)
  - µg/L MICROGRAMS PER LITER
  - SOURCE AREA



- NOTES:
1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 09/14/09, AT A SCALE OF 1"=50'.
  2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
  3. REFERENCE FOR PLUME LENGTH: STATE WATER RESOURCES CONTROL BOARD. 2012. *TECHNICAL JUSTIFICATION FOR GROUNDWATER MEDIA-SPECIFIC CRITERIA*. APRIL 24.



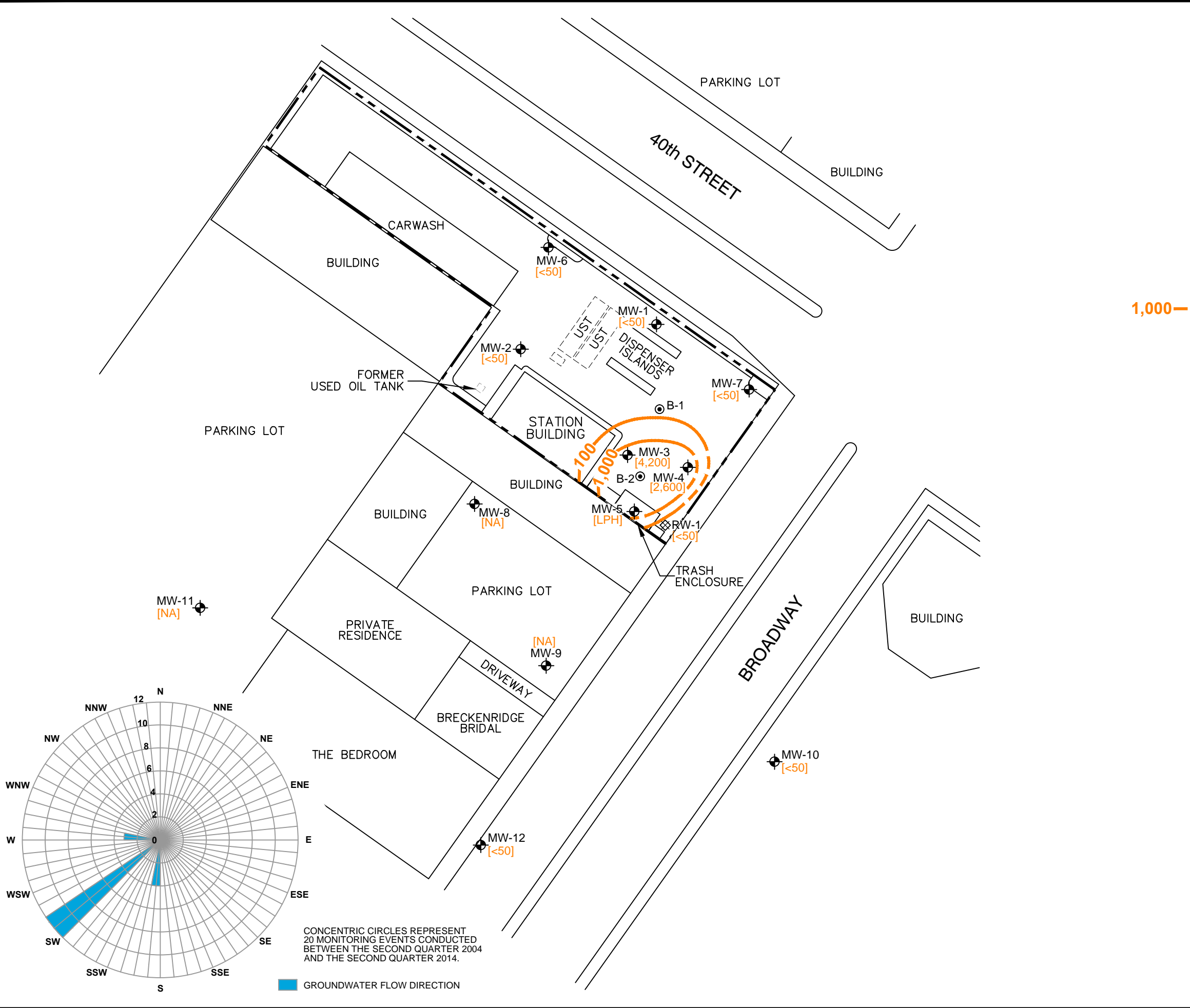
UNION OIL  
 STATION NO. 0746  
 3943 BROADWAY  
 OAKLAND, CALIFORNIA

**RESEARCH-BASED TPH-g PLUME  
 MIGRATION ANALYSIS**

REFERENCE: GOOGLE™ EARTH, IMAGE DATE 8/28/2012.



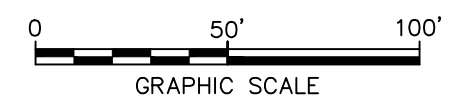
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 XREFS: IMAGES: PROJECTNAME: ... 47338X01



**LEGEND**

- PROPERTY BOUNDARY
- MW-1 MONITORING WELL
- RW-1 RECOVERY WELL
- B-1 CPT BORING
- [TPH-g] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (C6-C12) CONCENTRATION IN MICROGRAMS PER LITER ( $\mu\text{g/L}$ )
- 1,000 TPH-g ISOCONCENTRATION CONTOUR ( $\mu\text{g/L}$ ; DASHED WHERE INFERRED)
- < DENOTES LESS THAN LABORATORY REPORTING LIMIT
- [NA] NOT ACCESSIBLE
- [LPH] LIQUID PHASE HYDROCARBON

- NOTES:**
1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 09/14/09, AT A SCALE OF 1"=50'.
  2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
  3. GROUNDWATER MONITORING WELLS WERE GAUGED AND SAMPLED ON JUNE 23, 2014.



UNION OIL  
 STATION NO. 0746  
 3943 BROADWAY  
 OAKLAND, CALIFORNIA

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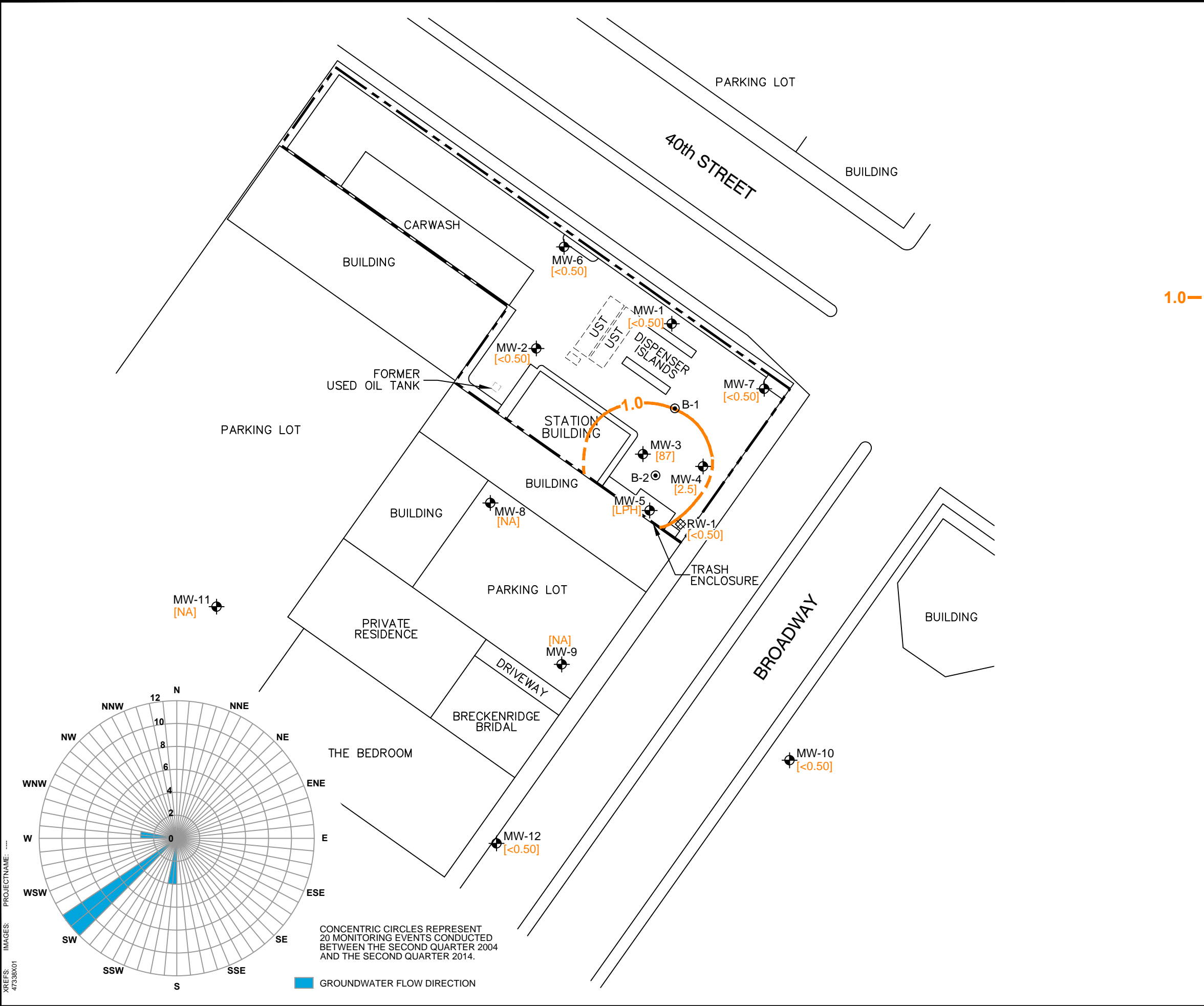
**TPH-g CONCENTRATION MAP**

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**ARCADIS**

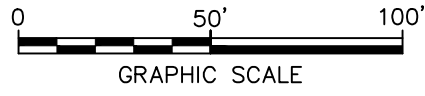
FIGURE  
**8**

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PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 12/29/2014 9:32 AM BY: HARRIS, JESSICA



- LEGEND
- PROPERTY BOUNDARY
  - MW-1 MONITORING WELL
  - RW-1 RECOVERY WELL
  - B-1 CPT BORING
  - [BENZ] BENZENE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
  - 1.0 BENZENE ISOCONCENTRATION CONTOUR (µg/L; DASHED WHERE INFERRED)
  - < DENOTES LESS THAN LABORATORY REPORTING LIMIT
  - [NA] NOT ACCESSIBLE
  - [LPH] LIQUID PHASE HYDROCARBON

- NOTES:
1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 09/14/09, AT A SCALE OF 1"=50'.
  2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
  3. GROUNDWATER MONITORING WELLS WERE GAUGED AND SAMPLED ON JUNE 23, 2014.



UNION OIL  
STATION NO. 0746  
3943 BROADWAY  
OAKLAND, CALIFORNIA

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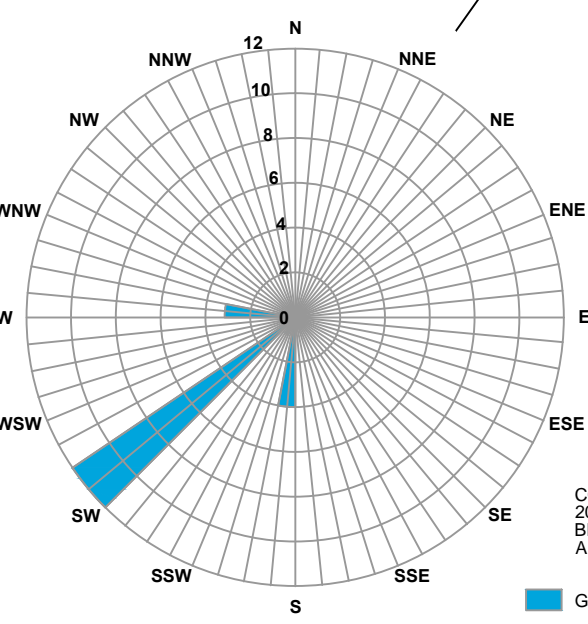
**BENZENE CONCENTRATION MAP**

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**ARCADIS**

---

FIGURE **9**



CONCENTRIC CIRCLES REPRESENT 20 MONITORING EVENTS CONDUCTED BETWEEN THE SECOND QUARTER 2004 AND THE SECOND QUARTER 2014.

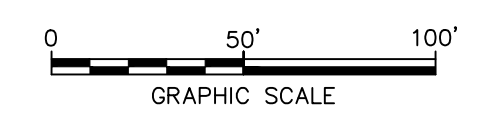
GROUNDWATER FLOW DIRECTION

CITY: SAN RAFAEL, CA (POTALUMA) DIV/GROUP: ENV/CAD DB: J. HARRIS  
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 XREFS: IMAGES: PROJECTNAME: ... 47338X01



- LEGEND**
- PROPERTY BOUNDARY
  - MW-1 MONITORING WELL
  - RW-1 RECOVERY WELL
  - B-1 CPT BORING
  - [MTBE] METHYL TERTIARY BUTYL ETHER CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
  - 5 --- MTBE ISOCONCENTRATION CONTOUR (µg/L; DASHED WHERE INFERRED)
  - < DENOTES LESS THAN LABORATORY REPORTING LIMIT
  - [NA] NOT ACCESSIBLE
  - [LPH] LIQUID PHASE HYDROCARBON

- NOTES:**
1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 09/14/09, AT A SCALE OF 1"=50'.
  2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
  3. GROUNDWATER MONITORING WELLS WERE GAUGED AND SAMPLED ON JUNE 23, 2014.



UNION OIL  
 STATION NO. 0746  
 3943 BROADWAY  
 OAKLAND, CALIFORNIA

**MTBE CONCENTRATION MAP**

**ARCADIS**

FIGURE  
**10**



## **Appendix A**

Low-Threat Closure Checklist

Site Name:  
 Site Address:

**Site meets the criteria of the Low-Threat Underground Storage Tank (UST) Case Closure Policy as described below.<sup>1</sup>**

<p><b><u>General Criteria</u></b>          General criteria that must be satisfied by all candidate sites:</p> <p><b>Is the unauthorized release located within the service area of a public water system?</b></p> <p><b>Does the unauthorized release consist only of petroleum?</b></p> <p><b>Has the unauthorized (“primary”) release from the UST system been stopped?</b></p> <p><b>Has free product been removed to the maximum extent practicable?</b></p> <p><b>Has a conceptual site model that assesses the nature, extent, and mobility of the release been developed?</b></p> <p><b>Has secondary source been removed to the extent practicable?</b></p> <p><b>Has soil or groundwater been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15?</b></p> <p><b>Does nuisance as defined by Water Code section 13050 exist at the site?</b></p> <p><b>Are there unique site attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?</b></p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p><b><u>Media-Specific Criteria</u></b>          Candidate sites must satisfy all three of these media-specific criteria:</p> <p><b>1. Groundwater:</b>          To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites:</p> <p><b>Is the contaminant plume that exceeds water quality objectives stable or decreasing in areal extent?</b></p> <p><b>Does the contaminant plume that exceeds water quality objectives meet all of the additional characteristics of one of the five classes of sites?</b></p> <p>If YES, check applicable class: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>

<sup>1</sup> Refer to the Low-Threat Underground Storage Tank Case Closure Policy for closure criteria for low-threat petroleum UST sites.

Site Name:  
 Site Address:

<p><b>For sites with releases that have not affected groundwater, do mobile constituents (leachate, vapors, or light non-aqueous phase liquids) contain sufficient mobile constituents to cause groundwater to exceed the groundwater criteria?</b></p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>
<p><b>2. Petroleum Vapor Intrusion to Indoor Air:</b>          The site is considered low-threat for vapor intrusion to indoor air if site-specific conditions satisfy all of the characteristics of one of the three classes of sites (a through c) or if the exception for active commercial fueling facilities applies.</p> <p><b>Is the site an active commercial petroleum fueling facility?</b>          Exception: Satisfaction of the media-specific criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk.</p> <p><b>a. Do site-specific conditions at the release site satisfy all of the applicable characteristics and criteria of scenarios 1 through 3 or all of the applicable characteristics and criteria of scenario 4?</b>          If YES, check applicable scenarios: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4</p> <p><b>b. Has a site-specific risk assessment for the vapor intrusion pathway been conducted and demonstrates that human health is protected to the satisfaction of the regulatory agency?</b></p> <p><b>c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health?</b></p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>
<p><b>3. Direct Contact and Outdoor Air Exposure:</b>          The site is considered low-threat for direct contact and outdoor air exposure if site-specific conditions satisfy one of the three classes of sites (a through c).</p> <p><b>a. Are maximum concentrations of petroleum constituents in soil less than or equal to those listed in Table 1 for the specified depth below ground surface (bgs)?</b></p> <p><b>b. Are maximum concentrations of petroleum constituents in soil less than levels that a site specific risk assessment demonstrates will have no significant risk of adversely affecting human health?</b></p> <p><b>c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health?</b></p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>



## **Appendix B**

Boring Logs/Well Construction  
Diagrams

**B O R I N G   L O G**

<b>Project No.</b> KEI-P89-0805	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L.
<b>Project Name</b> Unocal Oakland - Broadway	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 10/17/89
<b>Boring No.</b> MW1	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement Clay, sand and gravel: fill.
5/7/15		5	CH	Silty clay, high plasticity, very stiff, moist, black, trace gravel.  Sandy clay, high plasticity, trace gravel, very stiff, moist, dark olive gray.
7/10/16	▽	10	SC	Clayey sand, 30-40% clay, medium dense, very moist, grayish brown, mottled.
10/15/12			GC	Clayey gravel with sand, medium dense, very moist, olive brown and strong brown, mottled.
			GP/ GC	Poorly graded gravel with clay and sand, medium dense, wet, dark yellowish brown.
11/17/23		15	CH	Clay, high plasticity, very stiff, moist, greenish gray and olive brown.  Clayey gravel with sand, very dense, moist, dark greenish gray, gravel to 1".
10/16/19		20	GC MH	Clayey silt, very stiff, moist, dark greenish gray. <b>TOTAL DEPTH 20'</b>



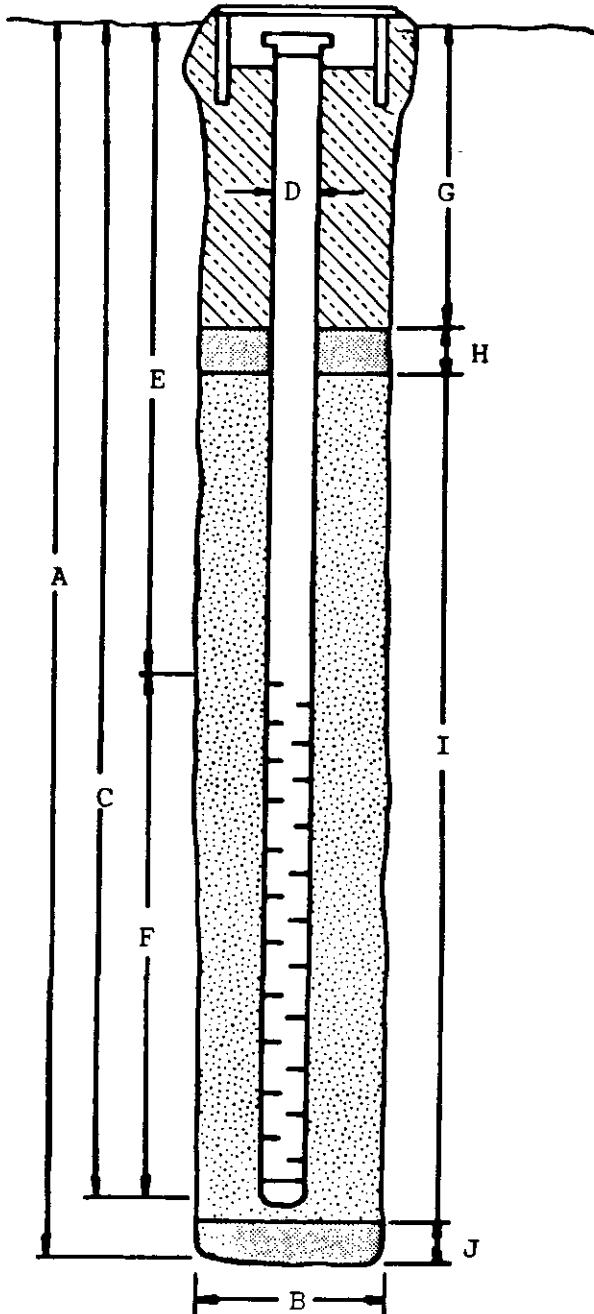
## W E L L   C O M P L E T I O N   D I A G R A M

PROJECT NAME: Unocal - Oakland - Broadway      BORING/WELL NO. MW1

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: 89456


Flush-mounted Well Cover



- A. Total Depth: 20'
- B. Boring Diameter\*: 9"  
Drilling Method: Hollow Stem Auger
- C. Casing Length: 20'  
Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 5'
- F. Perforated Length: 15'  
Perforation Type: Machined Slot  
Perforation Size: 0.020"
- G. Surface Seal: 2'  
Seal Material: Concrete
- H. Seal: 2'  
Seal Material: Bentonite
- I. Gravel Pack: 16'  
Pack Material: RMC Lonestar Sand  
Size: #3
- J. Bottom Seal: None  
Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

## BORING LOG

Project No. KEI-P89-0805		Boring & Casing Diameter 9"                      2"		Logged By D.L.	
Project Name Unocal Oakland - Broadway		Well Head Elevation N/A		Date Drilled 10/17/89	
Boring No. MW2		Drilling Method Hollow-stem Auger		Drilling Company EGI	
Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description	
		0		A.C. Pavement Clay, sand and gravel: fill.	
6/9/15		5	CH	Silty clay, high plasticity, stiff, moist, black, organic odor, trace - 15% gravel below 3.5 feet.	
			CL/ CH	Sandy clay, 5-10% gravel, very stiff, moist, dark olive gray.	
7/8/11		10		Gravelly clay, 15-30% gravel to 5/8", stiff to very stiff, moist, dark brown.	
6/7/10			SC	Clayey sand, medium dense, moist to very moist, olive brown and strong brown, mottled.	
12/22/28			GW/ GC	Well graded gravel with clay and sand, gravel to 2 1/2", dense to very dense.	
		15		Clay, very stiff to hard, olive brown to yellowish brown, mottled.	
9/20/18			CL/ CH	Clay, as above, yellowish brown, 10% silt, trace - 15% sand.	
		20		TOTAL DEPTH 20'	

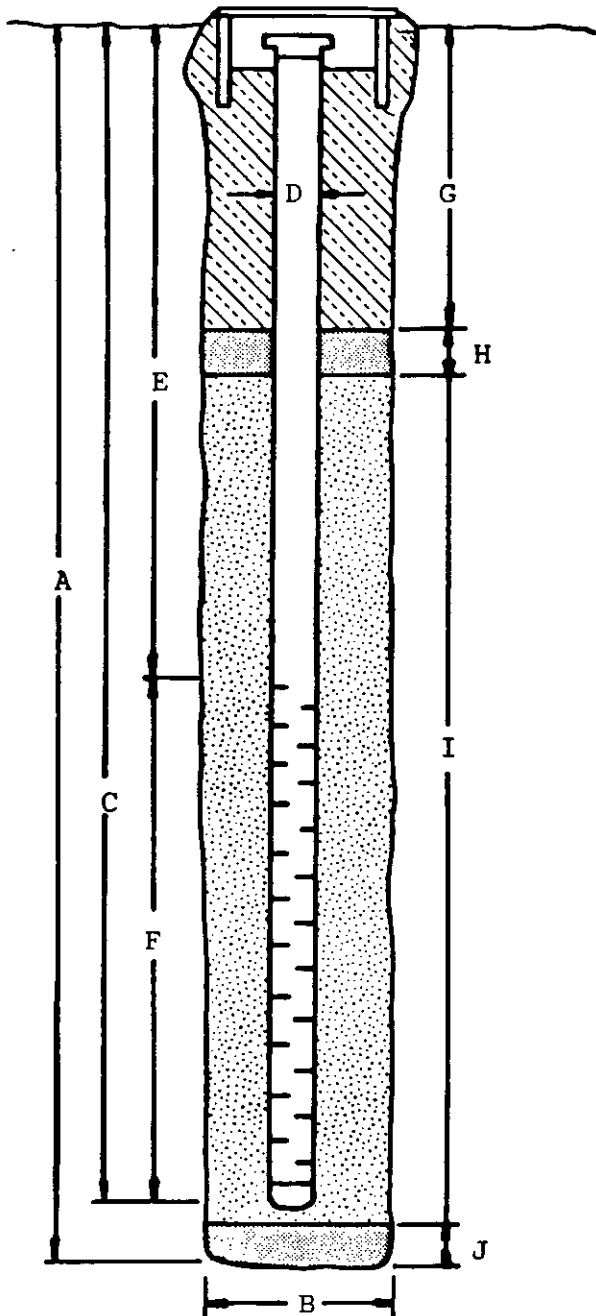
**W E L L   C O M P L E T I O N   D I A G R A M**

PROJECT NAME: Unocal - Oakland - Broadway      BORING/WELL NO. MW2

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: 89456

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter\*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 20'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"  
ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 15'

Perforation Type: Machined Slot  
Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 16'

Pack Material: RMC Lonestar Sand  
Size: #3

J. Bottom Seal: None

Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

15/4W 24L6

BORING LOG					01-449L
Project No. KEI-P89-0805		Boring & Casing Diameter 9" 2"		Logged By D.L.	
Project Name Unocal Oakland - Broadway		Well Head Elevation N/A		Date Drilled 10/17/89	
Boring No. MW3		Drilling Method Hollow-stem Auger		Drilling Company EGI	
Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description	
		0		A.C. Pavement Clay, sand and gravel: fill.	
5/5/11		5	CH	Sandy clay, high plasticity with gravel, firm, moist, olive gray and black, mottled with debris, disturbed.	
			CL/ CH	Silty clay, high plasticity, 5-10% sand, firm, moist, black.	
5/7/12		10		Gravelly clay, 30% gravel to 1/2", firm, moist, very dark grayish brown, gray root holes.	
3/9/11	▽		SC	Sandy clay, stiff, moist, olive brown and gray, mottled.	
6/17/16				Clayey sand, medium dense, very moist, 40% clay, olive gray and olive brown, mottled.	
7/9/13		15		Clayey sand w/gravel, 15% clay, dense, very moist.	
			CL/ CH	Clay, very stiff, moist, grayish green and olive brown, mottled. brown, mottled.	
9/11/14		20		Clay, as above, greenish gray and light olive brown.	

1S/4W 24L6

B O R I N G   L O G

01-449L

Project No. KEI-P89-0805	Boring & Casing Diameter 9"                      2"	Logged By D.L.
Project Name Unocal Oakland - Broadway	Well Head Elevation N/A	Date Drilled 10/17/89
Boring No. MW3	Drilling Method      Hollow-stem Auger	Drilling Company EGI

Penetra- tion blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
9/12/15			CL/ CH	<p>Sandy clay, with gravel to 1/2", very stiff, moist, light olive brown.</p> <hr/> <p>Clay with silt, high plasticity, very stiff, moist light olive brown.</p>
				TOTAL DEPTH 22.5'

15/4W 24L6  
01-449L

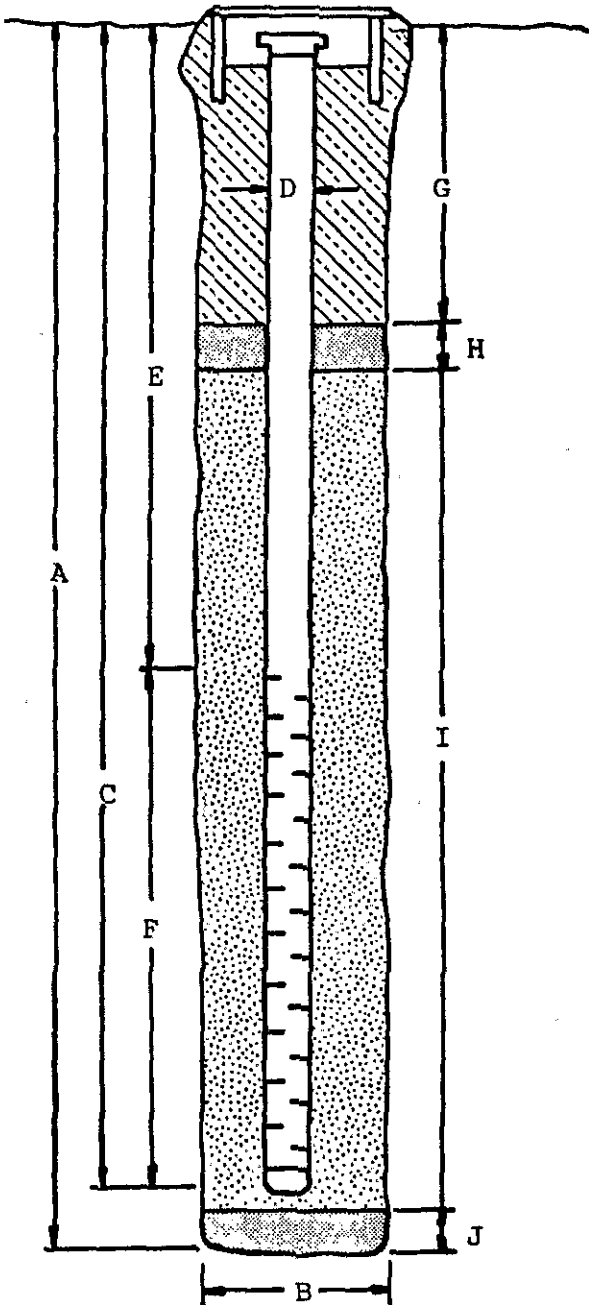
### WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - Oakland - Broadway BORING/WELL NO. MW3

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: 89456

Flush-mounted Well Cover



A. Total Depth: 22.5'

B. Boring Diameter\*: 9"

Drilling Method: Hollow Stem  
Auger

C. Casing Length: 22.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 17.5'

Machined  
Perforation Type: Slot

Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 18.5'

RMC Lonestar  
Pack Material: Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

15/4W 24L2

BORING LOG				308393A
Project No. KEI-P89-0805		Boring & Casing Diameter 9" 2"		Logged By D.L. <i>Don Brown</i> CEG 1310
Project Name Unocal Oakland - Broadway		Well Head Elevation N/A		Date Drilled 1-26-90
Boring No. MW4		Drilling Method Hollow-stem Auger		Drilling Company EGI
Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement. Sand and gravel: Fill Clay
			SW- SC	Well graded sand with clay and silt medium dense, moist, dark greenish gray.
6/5/11		5	MH	Clayey elastic silt, 5-10% sand, stiff, moist, black.
16/21/24			CH	Clay, with gravel, 10-15% sand gravel to 1/4", very stiff, moist, very dark grayish brown and black, mottled with root holes.
15/24/28		10	GC	Clayey gravel with sand, 15-20% clay, gravel to 3/4", medium dense, moist, dark greenish gray.
8/10/11	▼		CH	Clay, olive brown and dark greenish gray, mottled.
8/7/14			GC	Clayey gravel with with sand, olive brown and dark greenish gray.
10/16/21		15	CH	Clay high plasticity, with silt, 5-10% sand, very stiff, moist, dark yellowish brown and light olive brown, mottled.
10/10/14				Silty clay, high plasticity, 5-10% sand stiff, moist, light olive brown.
		20		TOTAL DEPTH: 20'

15/AW 24L2

308393A

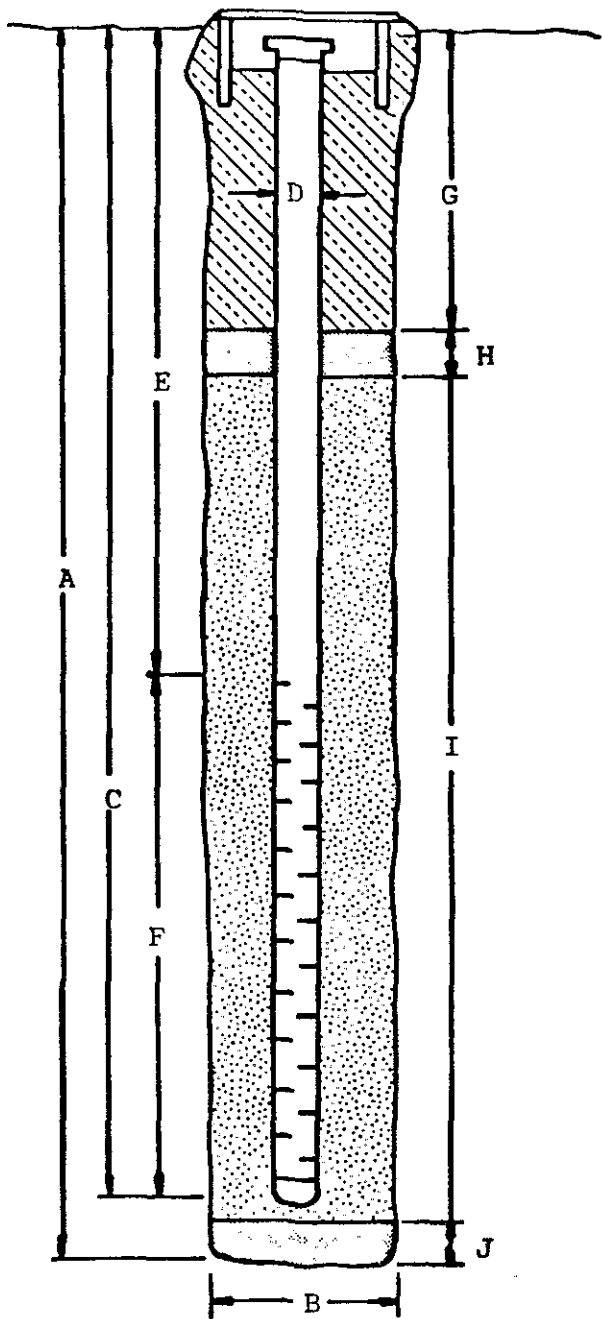
### WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - Oakland - Broadway BORING/WELL NO. MW4

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



- A. Total Depth: 20'
- B. Boring Diameter\*: 9"  
Drilling Method: Hollow Stem Auger
- C. Casing Length: 20'  
Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 5'
- F. Perforated Length: 15'  
Perforation Type: Machined Slot  
Perforation Size: 0.020"
- G. Surface Seal: 2'  
Seal Material: Neat Cement
- H. Seal: 2'  
Seal Material: Bentonite
- I. Gravel Pack: 16'  
Pack Material: RMC Lonestar Sand  
Size: #3
- J. Bottom Seal: None  
Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.




15/4W 29L3

BORING LOG

308393B

Project No. KEI-P89-0805	Boring & Casing Diameter 9" 2"	Logged By D.L. <i>John P. Brown</i> CFG 1310
Project Name Unocal Oakland - Broadway	Well Head Elevation N/A	Date Drilled 1-26-90
Boring No. MW5	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement. Sand and gravel to 9": Fill
			CH	Silty clay, high plasticity, 5-15% sand stiff, moist, dark greenish gray and black, mottled.
5/4/5		5	MH	Clayey elastic silt, 5-10% sand, firm, very moist black.
			CH	Silty clay, high plasticity 10-15% sand stiff, moist, dark olive gray.
8/17/24				Clay, high plasticity, with gravel, 15-30% gravel to 1/2", trace silt, very stiff, moist, dark brown and black, mottled, with root holes.
8/15/23		10		Sandy below 10 feet, olive gray grades to clayey sand.
7/10/12			SC	Clayey sand, 10-15% silt, dense, moist to very moist, dark greenish gray and olive gray, mottled with gravel below 13'.
6/10/18				
6/10/11		15	GW-GC	Well graded gravel with clay and sand, medium dense, wet, dark greenish gray, gravel to >2" diameter.
8/15/18			CH	Clay, high plasticity, trace silt, stiff, moist, dark greenish gray and light olive brown, mottled, dark greenish gray in voids/fissures. Silty clay, high plasticity, stiff, moist to wet, light olive brown and dark greenish gray, mottled, olive greenish gray below 19.5 feet.
		20		TOTAL DEPTH: 20'

15/4W 24L3

308393B

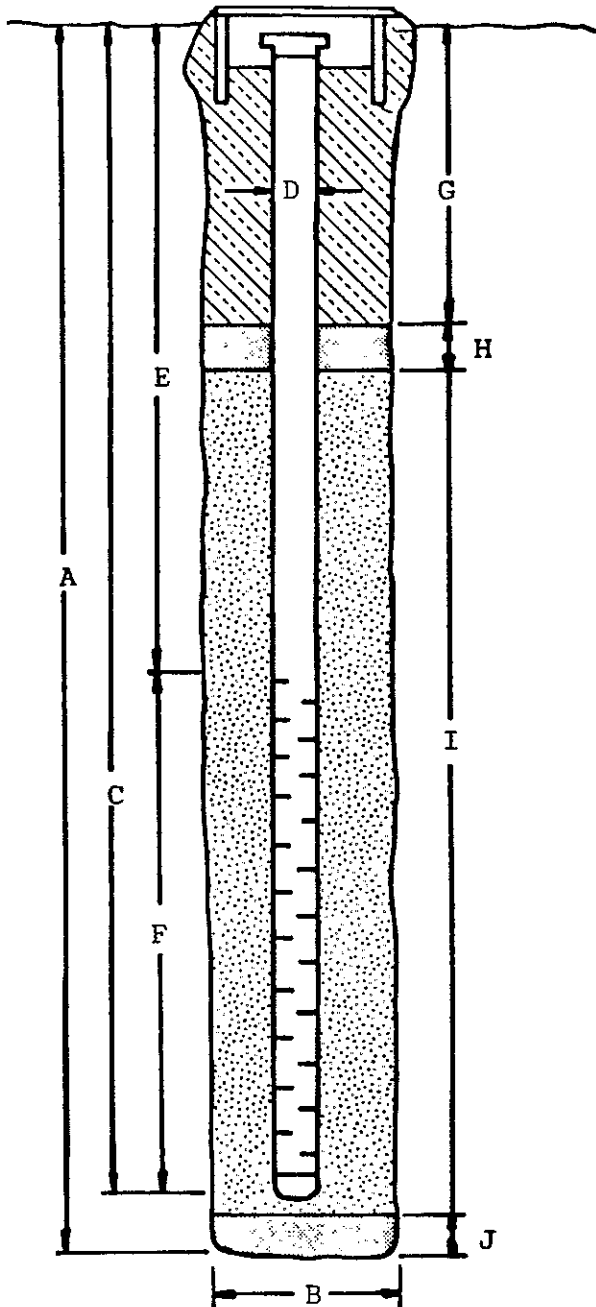
### W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Unocal - Oakland - Broadway BORING/WELL NO. MW5

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



A. Total Depth: 20'

B. Boring Diameter\*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 20'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 15'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 16'

Pack Material: RMC Lonestar Sand

Size: #3


J. Bottom Seal: None

Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

## BORING LOG

15/4W 2417

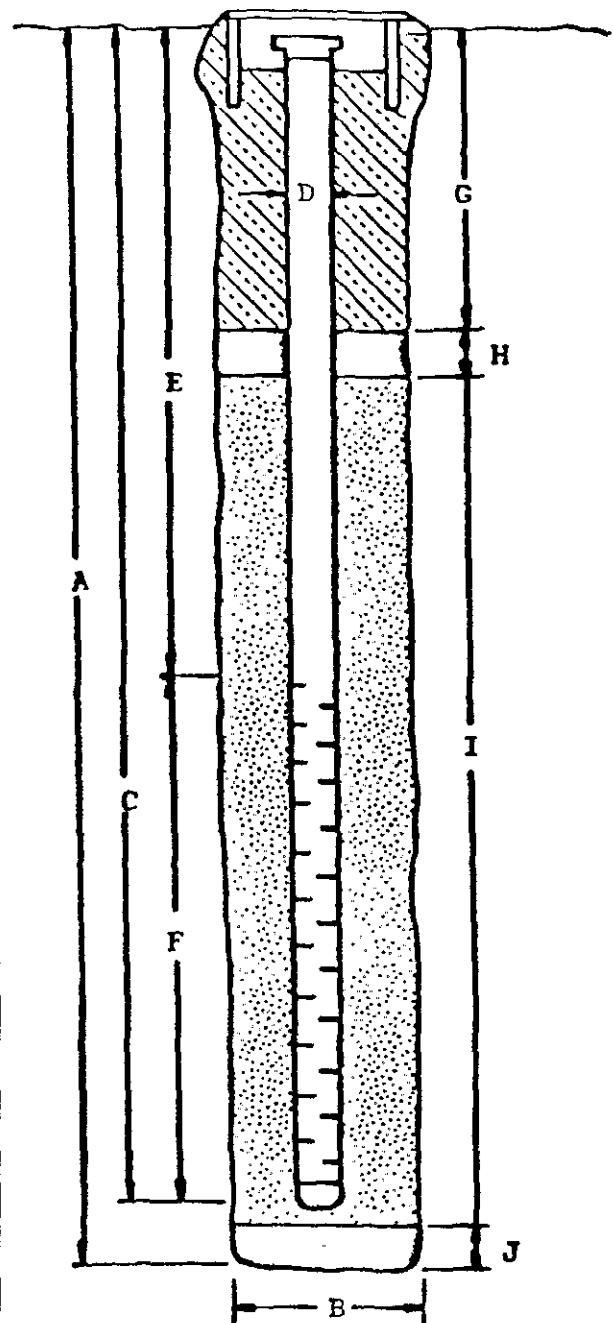
Project No. KEI-P89-0805		Boring & Casing Diameter 9"                      2"		Logged By W.W.	
Project Name Unocal 3943 Broadway, Oaklnd		Well Head Elevation N/A		Date Drilled 10/22/90	
Boring No. MW6		Drilling Method Hollow-stem Auger		Drilling Company EGI	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description	
		0		Asphalt over sand and gravel base.	
			CL/ CH	Silty clay, trace fine sand, moist, stiff, orange brown. Base of Fill Materials	
			CH	Silty clay, trace fine sand, moist, moist, firm, black.	
4/9/13		5	CL/ CH	Clay, 5% silt, trace rootlets, moist, very stiff, dark grayish brown, trace gravel to 3/8" diameter.	
8/10/15			GC	Clayey gravel, trace sand, subangular gravel to 1-1/8" diameter, moist, very stiff, dark grayish brown, trace orange brown.	
5/6/12		10	CL/ CH	Clay, trace gravel to 3/8" diameter, trace very fine sand, trace organic matter, moist to very moist, very stiff, light yellowish brown with trace pale olive mottling.	
4/7/11		15		Clay, 5% silt, trace organic matter, trace caliche, slightly moist, very moist, very stiff, light yellowish brown.	
5/8/14			ML/ MH	Clayey silt, trace sand, saturated, very stiff, light yellowish brown light yellowish brown mottled with orange brown and light greenish gray.	
		20		TOTAL DEPTH: 20'	

364640A  
15/4W 24L.7

WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - 3943 Broadway St., Oakland BORING/WELL NO. MW6  
 PROJECT NUMBER: KEI-P89-0805  
 WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



- A. Total Depth: 20'
- B. Boring Diameter\*: 9"  
 Drilling Method: Hollow Stem Auger
- C. Casing Length: 20'  
 Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 5'
- F. Perforated Length: 15'  
 Perforation Type: Machined Slot  
 Perforation Size: 0.020"
- G. Surface Seal: 2'  
 Seal Material: Neat Cement
- H. Seal: 2'  
 Seal Material: Bentonite
- I. Gravel Pack: 16'  
 Pack Material: RMC Lonestar Sand  
 Size: #3
- J. Bottom Seal: None  
 Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

364640 B  
15/4W 2AL8

BORING LOG					
Project No. KEI-P89-0805		Boring & Casing Diameter 9"                      2"		Logged By W.W.	
Project Name Unocal 3943 Broadway, Oaklnd		Well Head Elevation N/A		Date Drilled 10/22/90	
Boring No. MW7		Drilling Method Hollow-stem Auger		Drilling Company EGI	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description	
		0		Asphalt over sand and gravel base with cobbles to 6" diameter.	
			CL/ CH	Silty clay with gravel, trace sand, gravel to 1-1/4" diameter, moist, firm, brown. Clay, 5-10% fine sand, trace silt, moist, stiff, dark yellowish brown. Base of fill?	
3/4/5		5	CH	Silty clay, highly organic, trace subangular gravel to 1" diameter, moist, firm to stiff, moist, black.	
5/10/12			CL/ CH	Clay, trace rootlets, trace silt, trace sand, moist, very stiff, olive brown.	
		10	SC	Clayey sand, trace gravel to 3/8" dia., fine to medium grained, very moist, medium dense, bluish gray.	
6/9/15			GW	Sandy gravel, 5% clay, trace rootlets, gravel to 1" diameter, saturated, medium dense, yellowish brown.	
			GC	Clayey gravel with sand, slight odor, gravel to 1" diameter, saturated, medium dense, bluish gray.	
		15	ML/ MH	Clayey silt, 5% very fine sand, trace organic matter, stiff to very stiff, very moist to saturated, pale olive mottled with light olive brown.	
4/7/9		20		TOTAL DEPTH: 20'	

364640B  
15/4W 2/28

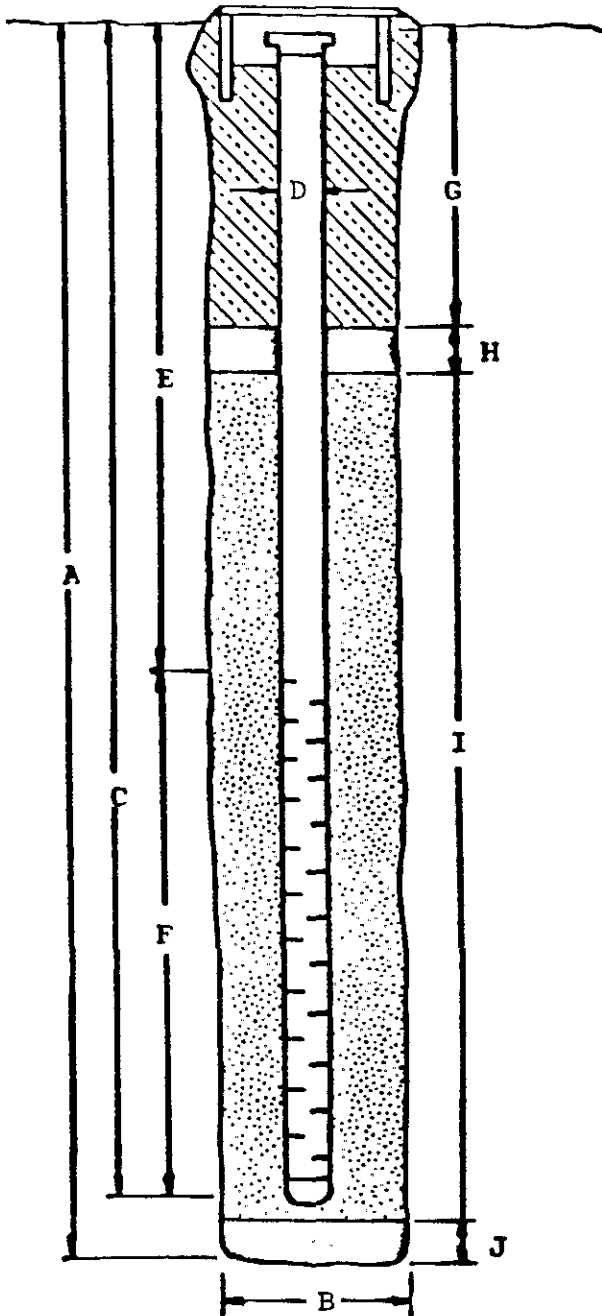
### WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - 3943 Broadway St, Oakland BORING/WELL NO. MW7

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



- A. Total Depth: 20'
- B. Boring Diameter\*: 9"  
Drilling Method: Hollow Stem Auger
- C. Casing Length: 20'  
Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 5'
- F. Perforated Length: 15'  
Perforation Type: Machined Slot  
Perforation Size: 0.020"
- G. Surface Seal: 2'  
Seal Material: Neat Cement
- H. Seal: 2'  
Seal Material: Bentonite
- I. Gravel Pack: 16'  
Pack Material: RMC Lonestar Sand  
Size: #3
- J. Bottom Seal: None  
Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

364640C

15/4W 24L9

BORING LOG

Project No. KEI-P89-0805		Boring & Casing Diameter 9"                      2"		Logged By W.W./J.E.
Project Name Unocal 3943 Broadway, Oaklnd		Well Head Elevation N/A		Date Drilled 10/22/90
Boring No. MW8		Drilling Method	Hollow-stem Auger	Drilling Company EGI - Dave Yager

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		6" concrete slab over sand and gravel.
				Clayey gravel with concrete cobbles, moist, reddish brown.
				Base of fill materials.
3/3/5		5	CL/ CH	Silty clay, trace organic matter, trace gravel, stiff, very dark brown to black, moist.
12/13/15		10	GC	Clayey gravel, highly weathered sand- stone, trace sand, medium dense, mottled, light brown to dark brown, very moist to wet.
5/10/13		15	CL/ CH	Gravelly clay, gravel is subrounded to rounded, very stiff, trace sand, gray to light brown, grading to sandy clay, moist.
5/9/14		20		Sandy clay, trace gravel, very stiff light brown, moist.

364640C

1S/4W 2#L9

BORING LOG

Project No. KEI-P89-0805		Boring & Casing Diameter 9"                      2"		Logged By W.W./J.E.
Project Name Unocal 3943 Broadway, Oaklnd		Well Head Elevation N/A		Date Drilled 10/22/90
Boring No. MW8		Drilling Method Hollow-stem Auger	Drilling Company EGI - Dave Yager	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
			CL/ CH	Sandy clay, trace gravel, very stiff, moist, light brown.
				TOTAL DEPTH: 22'



364640C

WELL COMPLETION DIAGRAM

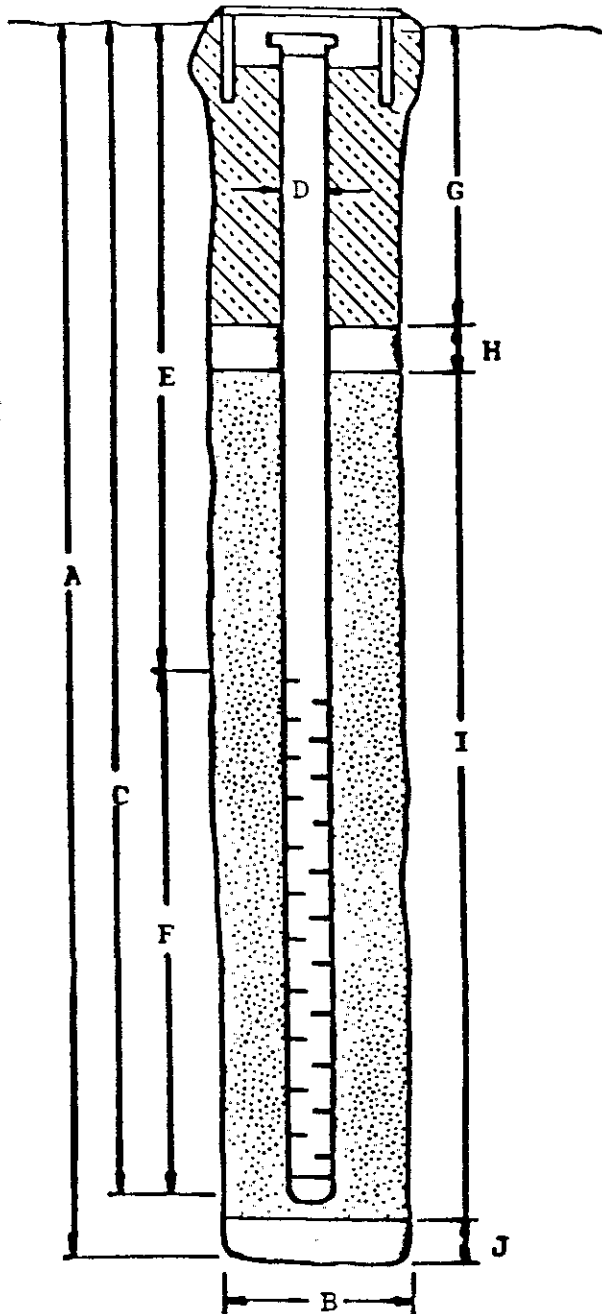
15/11/24L9

PROJECT NAME: Unocal, 3943 Broadway St., Oakland BORING/WELL NO. MW8

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



A. Total Depth: 22'

B. Boring Diameter\*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 22'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 17'

Perforation Type: Machined Slot  
Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 18'

Pack Material: RMC Lonestar Sand  
Size: #3

J. Bottom Seal: None


Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

364640D  
IS/4W 24L10

B O R I N G   L O G

Project No. KEI-P89-0805		Boring & Casing Diameter 9"                      2"		Logged By W.W.
Project Name Unocal 3943 Broadway, Oaklnd		Well Head Elevation N/A		Date Drilled 10/23/90
Boring No. MW9		Drilling Method Hollow-stem Auger	Drilling Company EGI	

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
		0		Asphalt over sand and gravel baserock.
			GC	Clayey gravel with asphalt and concrete cobbles, moist, brown.
3/4/6		5	MH	Clayey silt, 5% fine sand, trace coarse sand, very moist, stiff, pale brown. Base of fill material.
			CL/CH	Silty clay, trace fine sand, trace gravel to 3/8" diameter, moist, stiff, very dark brown to black, trace of red iron oxide staining.
5/9/14		10		Clay, trace silt and sand, trace organic matter, moist, very stiff, slight odor, dark grayish brown mottled with dark yellowish brown.
5/9/12			GC	Clayey gravel with sand, gravel to 3/4" diameter, some highly weathered, trace organic matter, strong odor, very moist to saturated, greenish gray and bluish gray.
		15		
			CL/CH	Sandy clay, trace silt, trace gravel to 3/8" diameter, very moist, very stiff, pale olive to pale yellow.
6/9/15		20		

364640D

B O R I N G   L O G

15/4W 24L10

Project No. KEI-P89-0805		Boring & Casing Diameter 9"                      2"	Logged By W.W.
Project Name Unocal 3943 Broadway, Oaklnd		Well Head Elevation N/A	Date Drilled 10/23/90
Boring No. MW9		Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
			CL/ CH	Sandy clay, trace silt, trace gravel to 3/8" diameter, very moist, very stiff, pale olive to pale yellow.
		25		
		30		
		35		
		40		
				TOTAL DEPTH: 22'

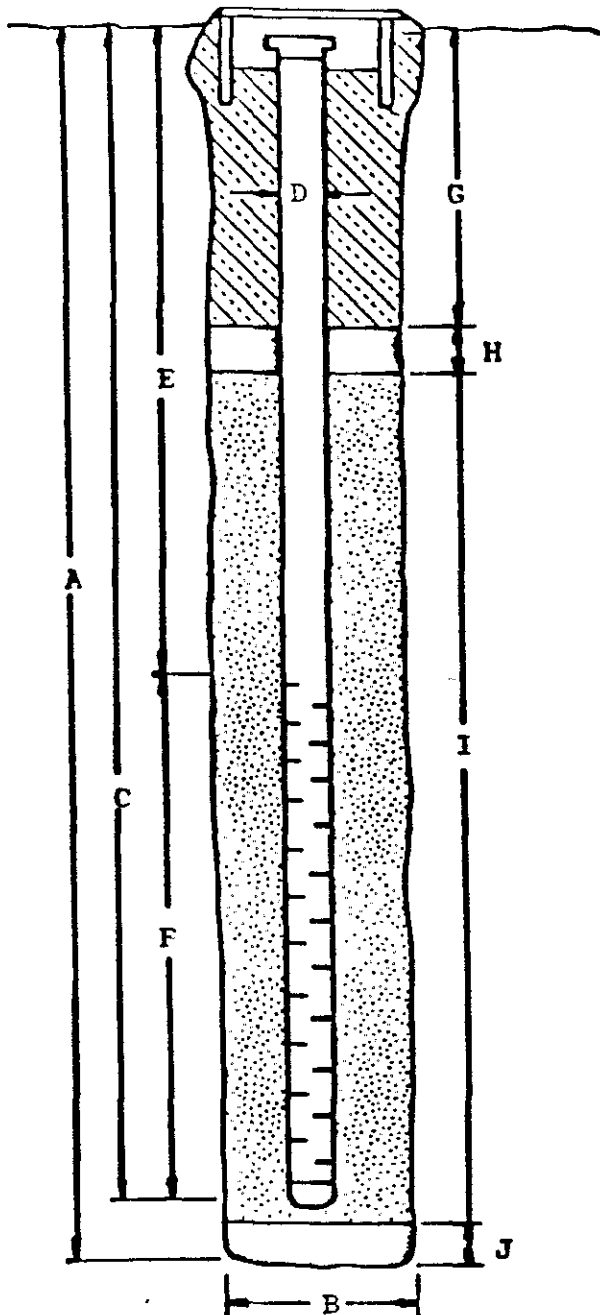
1S/4W 24L10

## WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal, 3943 Broadway St., Oakland BORING/WELL NO. MW9PROJECT NUMBER: KEI-P89-0805


WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover

A. Total Depth: 22'B. Boring Diameter\*: 9"Drilling Method: Hollow Stem  
AugerC. Casing Length: 22'Material: Schedule 40 PVCD. Casing Diameter: OD = 2.375"ID = 2.067"E. Depth to Perforations: 5'F. Perforated Length: 17'Machined  
Perforation Type: SlotPerforation Size: 0.020"G. Surface Seal: 2'Seal Material: Neat CementH. Seal: 2'Seal Material: BentoniteI. Gravel Pack: 18'RMC Lonestar  
Pack Material: SandSize: #3J. Bottom Seal: NoneSeal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

422134A OIS OAW 24214

BORING LOG				
Project No. KEI-P89-0805		Boring & Casing Diameter 9"      2"		Logged By D.L.
Project Name Unocal Oakland, Broadway		Well Cover Elevation		Date Drilled 1/7/92
Boring No. MW10		Drilling Method Hollow-stem Auger	Drilling Company Woodward Drilling	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Asphalt pavement over sand and gravel.
				Silty clay with minor sand, stiff, moist, dark greenish gray and black mottled (fill).
				Clayey sand with gravel, very stiff, moist, brown, pocketed with silty clay as above (fill).
8/11/14		5	SM	Silty sand with gravel, estimated at 5 to 10% clay content, gravel is angular to rounded, to 3/4" diameter, medium dense, moist, brown.
11/12/14				
6/11/19			CH	Sandy clay, variable clay content estimated at 15 to 30%, trace gravel below 9', very stiff, moist, olive brown,
7/16/24		10	GC	Clayey gravel with sand, gravel to 1" diameter, some gravel is decomposed, medium dense to dense, moist, dark yellowish brown.
11/17/32				Gravelly clay with sand, gravel to 3/4" diameter, hard, moist, brown.
		15	CL	Clay with silt and trace sand, clay is slickensided, hard, moist, olive.
13/20/20				Sandy clay with trace gravel, very stiff, moist, pale olive.
				Silty clay with organic matter, very stiff to hard, moist, pale olive, locally grades to clayey silt.
7/11/17		20	ML	Sandy silt, stiff, moist, olive brown.
			SC	Clayey sand, est. at 15 to 20% clay, med. dense, moist, olive brown, lenses of well graded sand, gravel at 20'. TOTAL DEPTH: 22'

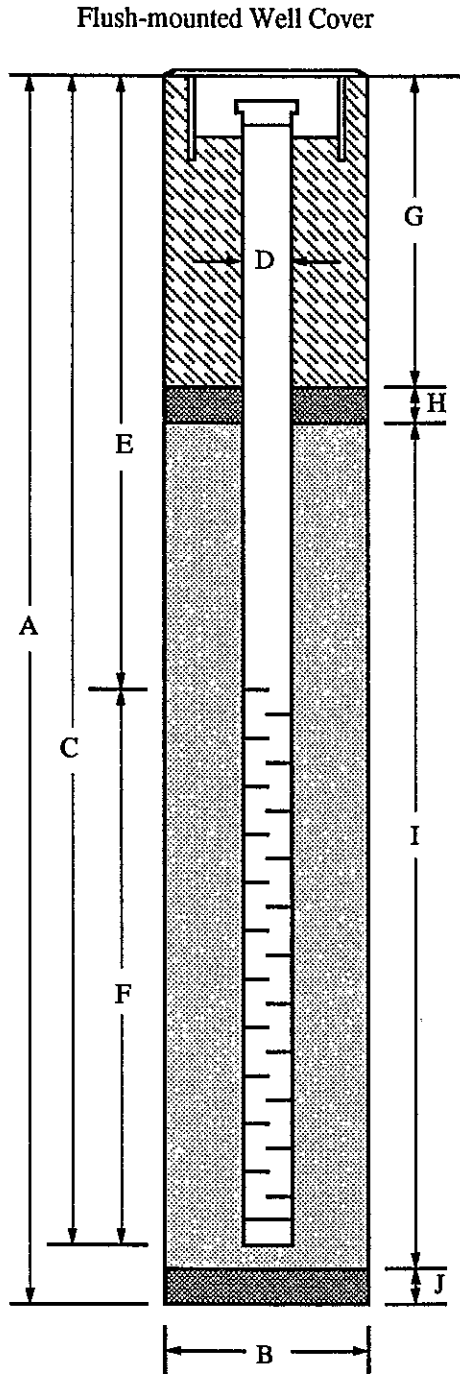
472734A  
 OIS of W 24/14

### WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - Oakland, Broadway WELL NO. MW10

PROJECT NUMBER: KEI-P89-0805

WELL PERMIT NO.: ACFD&WCD 91219



- A. Total Depth : 22'
- B. Boring Diameter\* : 9"  
 Drilling Method: Hollow Stem Auger
- C. Casing Length: 22'  
 Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 6'
- F. Perforated Length: 16'  
 Perforation Type: Machined Slot  
 Perforation Size: 0.010"
- G. Surface Seal: 2'  
 Seal Material: Neat Cement
- H. Seal: 2'  
 Seal Material: Bentonite
- I. Filter Pack: 18'  
 Pack Material: RMC Lonestar Sand  
 Size: #2/16
- J. Bottom Seal: none  
 Seal Material: N/A

\* Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

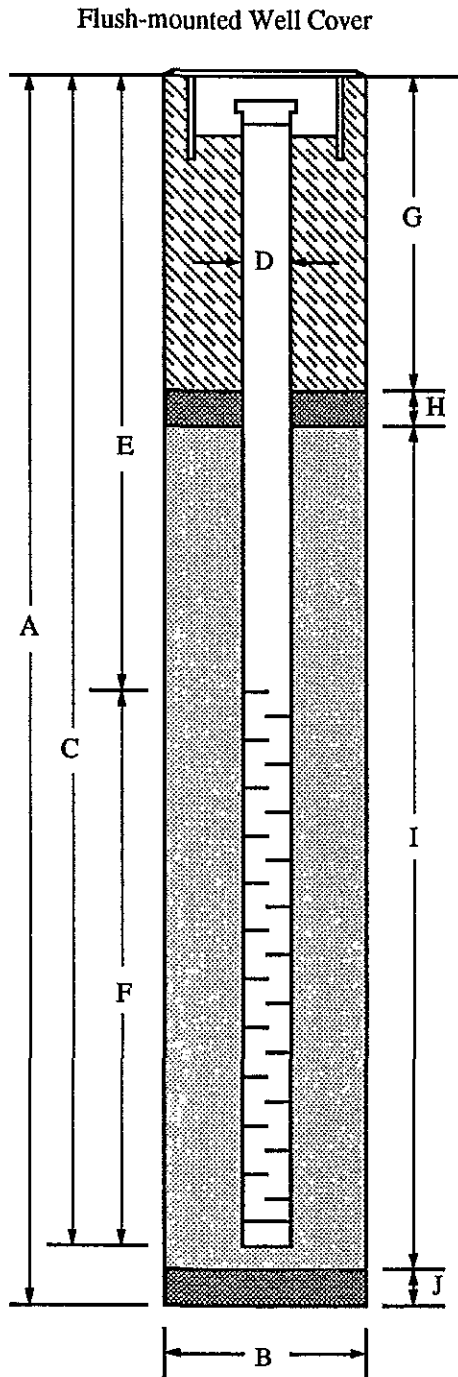
422134B OIS 04/24/15

BORING LOG				
Project No. KEI-P89-0805		Boring & Casing Diameter 9"                      2"		Logged By D.L.
Project Name Unocal Oakland, Broadway		Well Cover Elevation		Date Drilled 1/7/92
Boring No. MW11		Drilling Method Hollow-stem Auger	Drilling Company Woodward Drilling	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Asphalt pavement over sand and gravel.
				Silty gravel with sand, bricks and concrete, dense, moist to very moist, black (fill).
9/14/19		5	CH	Sandy clay, estimated at 5 to 10% gravel to 1-1/4" diameter, very stiff, very moist, very dark grayish brown.
			SC	Clayey sand with gravel, estimated at 15 to 20% clay, sand is coarse- to fine-grained, dense, moist, very dark grayish brown and dark brown, mottled.
5/11/14		10	GC	Clayey gravel with sand, angular gravel to 1-1/2" diameter, medium dense, moist to very moist, dark greenish gray and olive brown.
4/8/14				Clay, high plasticity, trace silt and sand, stiff to very stiff, moist, olive brown and dark yellowish brown.
6/13/29		15	CH	Silty clay with trace organic matter, very stiff to hard, moist, olive and olive brown mottled.
13/16/21				Clay, with trace organic matter, slickensided, very stiff to hard, moist, olive and olive brown mottled.
9/17/28		20	SW/ SM	Well graded sand with silt and gravel, estimated at 15 to 20% gravel to 1/4" diameter, medium dense to dense, wet, dark yellowish brown. TOTAL DEPTH: 21'

015 04W 24/15  
422/34B

### WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - Oakland, Broadway WELL NO. MW11  
PROJECT NUMBER: KEI-P89-0805  
WELL PERMIT NO.: ACFD&WCD 91219



- A. Total Depth : 21'
- B. Boring Diameter\*: 9"  
Drilling Method: Hollow Stem Auger
- C. Casing Length: 19'  
Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 5'
- F. Perforated Length: 14'  
Perforation Type: Machined Slot  
Perforation Size: 0.010"
- G. Surface Seal: 2'  
Seal Material: Neat Cement
- H. Seal: 2'  
Seal Material: Bentonite
- I. Filter Pack: 15'  
Pack Material: RMC Lonestar Sand  
Size: #2/16
- J. Bottom Seal: 2'  
Seal Material: Bentonite

\* Boring diameter can vary from 8-1/4" to 9" depending on bit wear.



413608A

15/4W 24219

**BORING LOG**

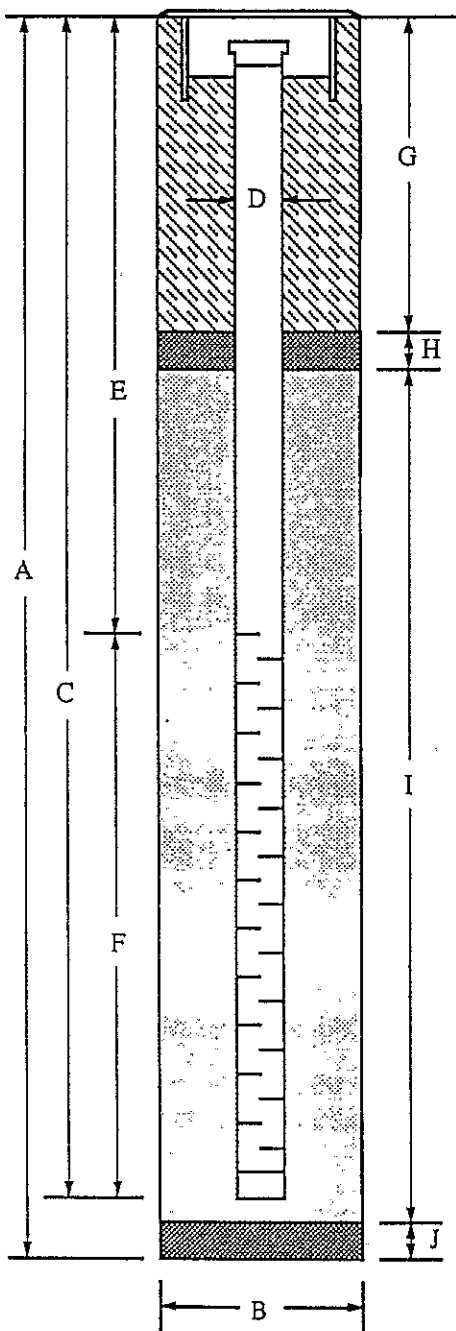
Project No. KEI-P89-0805		Boring & Casing Diameter 8'                      2'	Logged By <i>JGG</i> D.L. <i>CEG 1633</i>
Project Name Unocal S/S #0746 3943 Broadway, Oakland		Well Cover Elevation	Date Drilled 6/26/92
Boring No. MW12		Drilling Method Hollow-stem Auger	Drilling Company Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Concrete pavement.
				Clayey sand and gravel and disturbed soil (fill).
			SC	Clayey sand with trace silt, medium dense, moist, dark greenish gray.
2/3/5		5	MH	Clayey silt, trace fine grained sand, firm, very moist, black.
			CL/SC	Sandy clay, firm, moist, dark greenish gray, lensed with clayey sand.
4/7/10			CH	Clay, estimated at 10-15% gravel to 1/2 inch in diameter, trace sand, stiff to very stiff, moist, black with root holes.
11/22/19		10	GC	Clayey gravel with sand, angular to rounded gravel to 1-1/2 inches in diameter, dense, moist, very dark grayish brown.
6/9/13				Clayey gravel with sand as above, except dark grayish brown and olive brown, mottled.
5/7/12				Sandy clay, trace gravel to 1/4 inch in diameter, very stiff, moist, dark yellowish brown and olive brown, mottled.
		15	CL	Clay, trace gravel to 3/8 inch in diameter, stiff to very stiff, moist, olive and light olive brown, mottled.
9/14/20				Clay, as above, stiff to very stiff, friable.
				TOTAL DEPTH 17.5'
		20		

**WELL COMPLETION DIAGRAM**

PROJECT NAME: Unocal S/S #0746, 3943 Broadway, Oakland WELL NO. MW12  
 PROJECT NUMBER: KEI-P89-0805  
 WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



- A. Total Depth : 17.5'
- B. Boring Diameter: 8"  
 Drilling Method: Hollow Stem Auger
- C. Casing Length: 17.5'  
 Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 5'
- F. Perforated Length: 12.5'  
 Perforation Type: Machined Slot  
 Perforation Size: 0.010"
- G. Surface Seal: 2'  
 Seal Material: Neat Cement
- H. Seal: 1.5'  
 Seal Material: Bentonite
- I. Filter Pack: 14'  
 Pack Material: RMC Lonestar Sand  
 Size: #2/12
- J. Bottom Seal: None  
 Seal Material: N/A

413608B

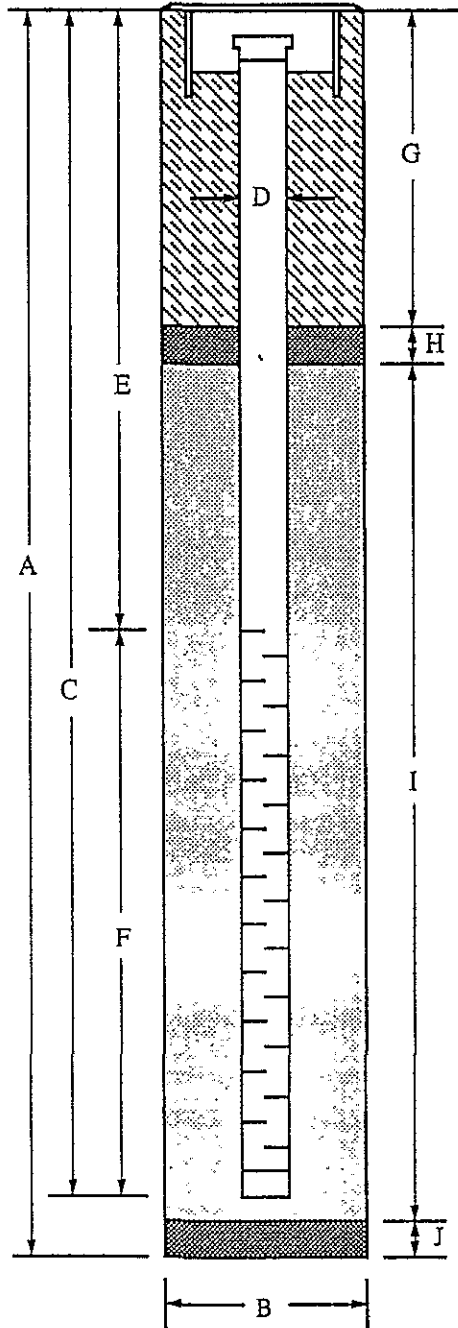
15/4w 24220

BORING LOG					
Project No. KEI-P89-0805		Boring & Casing Diameter 13.5'          6'		Logged By <i>JGG</i> D.L. <i>LEG 1633</i>	
Project Name Unocal S/S #0746 3943 Broadway, Oakland		Well Cover Elevation		Date Drilled 6/25/92	
Boring No. RW1		Drilling Method Hollow-stem Auger		Drilling Company Woodward Drilling	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description	
		0		A.C. pavement over sand and gravel base.	
				Clayey sand and gravel with cobbles to 10 inches in diameter, very stiff, moist (fill).	
			CH	Sandy clay, stiff, moist, dark greenish gray.	
			SC	Clayey sand with trace silt, medium dense, moist, dark greenish gray.	
No blow count data - samples continuously cored		5	MH	Clayey silt, trace fine grained sand, very stiff, moist, black, with organic matter.	
			CH	Clay, estimated at 10-15% gravels to 4 inches in diameter, trace sand, stiff to very stiff, moist, dark olive gray and very dark grayish brown, mottled.	
				Grades to gravelly clay with sand, gravels to 1 inch in diameter, very stiff, moist, dark olive gray and very dark grayish brown mottled.	
		10	SC	Clayey sand, estimated at 10-15% gravel to 1 inch in diameter, medium dense, moist, dark greenish gray and dark olive gray mottled.	
			GC	Clayey gravel with sand, gravels to 3-1/2 inches in diameter, medium dense, moist, dark greenish gray.	
	No recovery from 11.25 to 12.5 feet.			CL	Clay, estimated at 10-15% gravel, stiff, moist, olive brown and dark greenish gray, mottled, fissured.
			15		Silty clay, trace fine-grained sand, stiff, moist, olive brown and dark greenish gray mottled, fissured.
				SC	Clayey sand, minor silt, medium dense, moist, olive brown and dark greenish gray, mottled.
					TOTAL DEPTH 17.5' No ground water encountered.
			20		

**WELL COMPLETION DIAGRAM**

PROJECT NAME: Unocal S/S #0746, 3943 Broadway, Oakland WELL NO. RW1  
 PROJECT NUMBER: KEI-P89-0805  
 WELL PERMIT NO.: ACFC & WCD 92270

Flush-mounted Well Cover



- A. Total Depth : 17.5'
- B. Boring Diameter\* : 13.5"  
 Drilling Method: Hollow Stem Auger
- C. Casing Length: 17'  
 Material: Schedule 40 PVC
- D. Casing Diameter: OD = 6.625"  
ID = 6.065"
- E. Depth to Perforations: 5'
- F. Perforated Length: 10' (2' Blank on bottom)  
 Perforation Type: Machined Slot  
 Perforation Size: 0.010"
- G. Surface Seal: 3'  
 Seal Material: Neat Cement
- H. Seal: 1'  
 Seal Material: Bentonite
- I. Filter Pack: 13'  
 Pack Material: RMC Lonestar Sand  
 Size: #2/12
- J. Bottom Seal: 6"  
 Seal Material: Bentonite

# Delta Consultants

Project No: c100746006  
 Logged By: A. Buehler  
 Driller: Gregg Drilling and Testing  
 Drilling Method: CPT  
 Sampling Method: Direct Push  
 Casing Type: NA  
 Slot Size: NA  
 Gravel Pack: NA

Client: ConocoPhillips  
 Location: 3943 Broadway, Oakland, CA  
 Date Drilled: 8/27/09  
 Hole Diameter: 1 3/4 inches  
 Hole Depth: 36  
 Well Diameter: NA  
 Well Depth: NA  
 Casing Stickup: NA

B-1  
 Page 1 of 2

Location Map

Please see site map  
 ▽ = First Water

▼ = Measured Water Level  
 Prior to Grouting Borehole

Elevation	Northing	Easting
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Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
						↑		<b>Hand Augered to 5 feet</b>
					1		CL	Lean Clay, black, medium plasticity
					2			
					3		CL	Sandy Lean Clay, grey-green, low-medium plasticity
					4			
					5	▼		
		Moist	26		6		CL	Lean Clay, very dark brown
		Moist	2.5		7			As above: 5% sand
		Moist	92.8		8			As above: medium plasticity
		Moist	16.7		9			As above: mottled brown/gray
	▼ 10.2	Moist	26.2		10			As above
		Moist	40.0		11			As above: brown, low plasticity
		Moist	129		12		CL	Lean Clay with Sand, brown/gray, 20 % sand, low plasticity
		Damp	154		13		CL	Lean Clay, brown, medium plasticity
	▽	Wet	116		14		SM	Silty Sand, brown, sand is coarse
					15			No Recovery
					16			
					17			
					18			
					19			
		Wet	2.0		20		ML	Sandy Silt, light brown, 35% fine sand
					21			
					22			

# Delta Consultants

Project No: c100746006  
 Logged By: A. Buehler  
 Driller: Gregg Drilling and Testing  
 Drilling Method: CPT  
 Sampling Method: Direct Push  
 Casing Type: NA  
 Slot Size: NA  
 Gravel Pack: NA

Client: ConocoPhillips  
 Location: 3943 Broadway, Oakland, CA  
 Date Drilled: 8/27/09  
 Hole Diameter: 1 3/4 inches  
 Hole Depth: 36  
 Well Diameter: NA  
 Well Depth: NA  
 Casing Stickup: NA

B-1  
 Page 2 of 2

Location Map

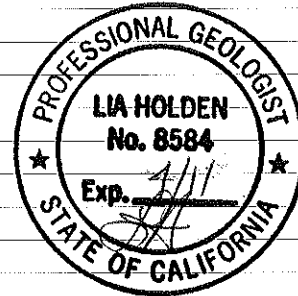
Please see site map

▽ = First Water

▼ = Measured Water Level  
 Prior to Grouting Borehole

Elevation                      Northing                      Easting

Well Completion	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill Casing					23			Sandy Silt continued
		Wet	67.6		24			
					25		CH	Fat Clay with Sand, light brown, 15-20% sand
					26			
					27			
					28			
		Damp	0.0		29			
					30		CL	Lean Clay, light brown, medium plasticity
					31			
					32			
					33			
		Damp	17.2		34			
					35			As above: 5-10% fine sand
					36			
					37			Bottom of boring = 36 feet
					38			
					39			
					40			
					41			
					42			
					43			
					44			



# Delta Consultants

Project No: c100746006  
 Logged By: E. Chantikian  
 Driller: Gregg Drilling and Testing  
 Drilling Method: CPT  
 Sampling Method: Direct Push  
 Casing Type: NA  
 Slot Size: NA  
 Gravel Pack: NA

Client: ConocoPhillips  
 Location: 3943 Broadway, Oakland, CA  
 Date Drilled: 8/27/09  
 Hole Diameter: 1 3/4 inches  
 Hole Depth: 36  
 Well Diameter: NA  
 Well Depth: NA  
 Casing Stickup: NA

B-2  
 Page 1 of 2

Location Map  
 Please see site map  
 ▽ = First Water  
 ▼ = Measured Water Level  
 Prior to Grouting Borehole

Elevation                      Northing                      Easting

Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample		Soil Type	LITHOLOGY / DESCRIPTION
						Recovery	Interval		
									<b>Hand Augered to 5 feet</b>
					1			CL	Lean Clay, black, medium plasticity
					2				
					3			CL	Sandy Lean Clay, grey-green, low-medium plasticity
					4				
					5				
		Moist	20.2		6			CL	Lean Clay, black, 5-10% fine sand, medium plasticity
		Moist	76.8		7			CL	Lean Clay with Sand, dark brown, 10-20% fine sand, low plasticity
	▼ 8.2	Moist	161		8				As above: brown
		Moist	925		9				As above: 15-25% fine sand
		Moist	1093		10				As above: 10-20% fine sand
		Moist	311.0		11				As above: 20-25% fine sand
		Moist	508		12			CL	Sandy Lean Clay, brown, 20-30% fine sand, low plasticity
	▽	Wet	195		13				As above: dark gray, 30-40% fine sand
		Wet	172		14			SC	Clayey Sand, dark gray, trace fine gravel, 20-30% plastic fines
			56.7		15				As above: 4 inch thick lense of lean clay at 15.5 feet
					16				No recovery
					17				No recovery
					18				
					19				
		Wet	58.6		20			CL	Sandy Lean Clay, gray, 20-30% fine sand, low to medium plasticity
					21				
					22				

# Delta Consultants

Project No: c100746006  
 Logged By: E. Chantikian  
 Driller: Gregg Drilling and Testing  
 Drilling Method: CPT  
 Sampling Method: Direct Push  
 Casing Type: NA  
 Slot Size: NA  
 Gravel Pack: NA

Client: ConocoPhillips  
 Location: 3943 Broadway, Oakland, CA  
 Date Drilled: 8/27/09  
 Hole Diameter: 1 3/4 inches  
 Hole Depth: 36  
 Well Diameter: NA  
 Well Depth: NA  
 Casing Stickup: NA

B-2  
 Page 2 of 2

Location Map

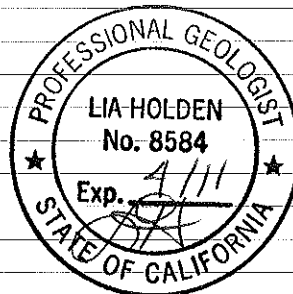
Please see site map

▽ = First Water

▼ = Measured Water Level  
 Prior to Grouting Borehole

Elevation                      Northing                      Easting

Well Completion Backfill Casing	Static Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/6")	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
					23			Lean Clay with Sand continued
		Wet	49.9		24			
					25		CL	Sandy Lean Clay, dark brown mottled with light brown, 20-30% fine sand, low to medium plasticity
					26			
					27			
					28			
					29			
		Damp	30.7		30		CL	Lean Clay with Sand, light brown, 15-20% fine sand, low to medium plasticity
					31			
					32			
					33			
					34			
		Damp	0.0		35		CL	Sandy Lean Clay, light brown, 35-40% fine sand, low plasticity
					36			
					37			Bottom of boring = 36 feet
					38			
					39			
					40			
					41			
					42			
					43			
					44			





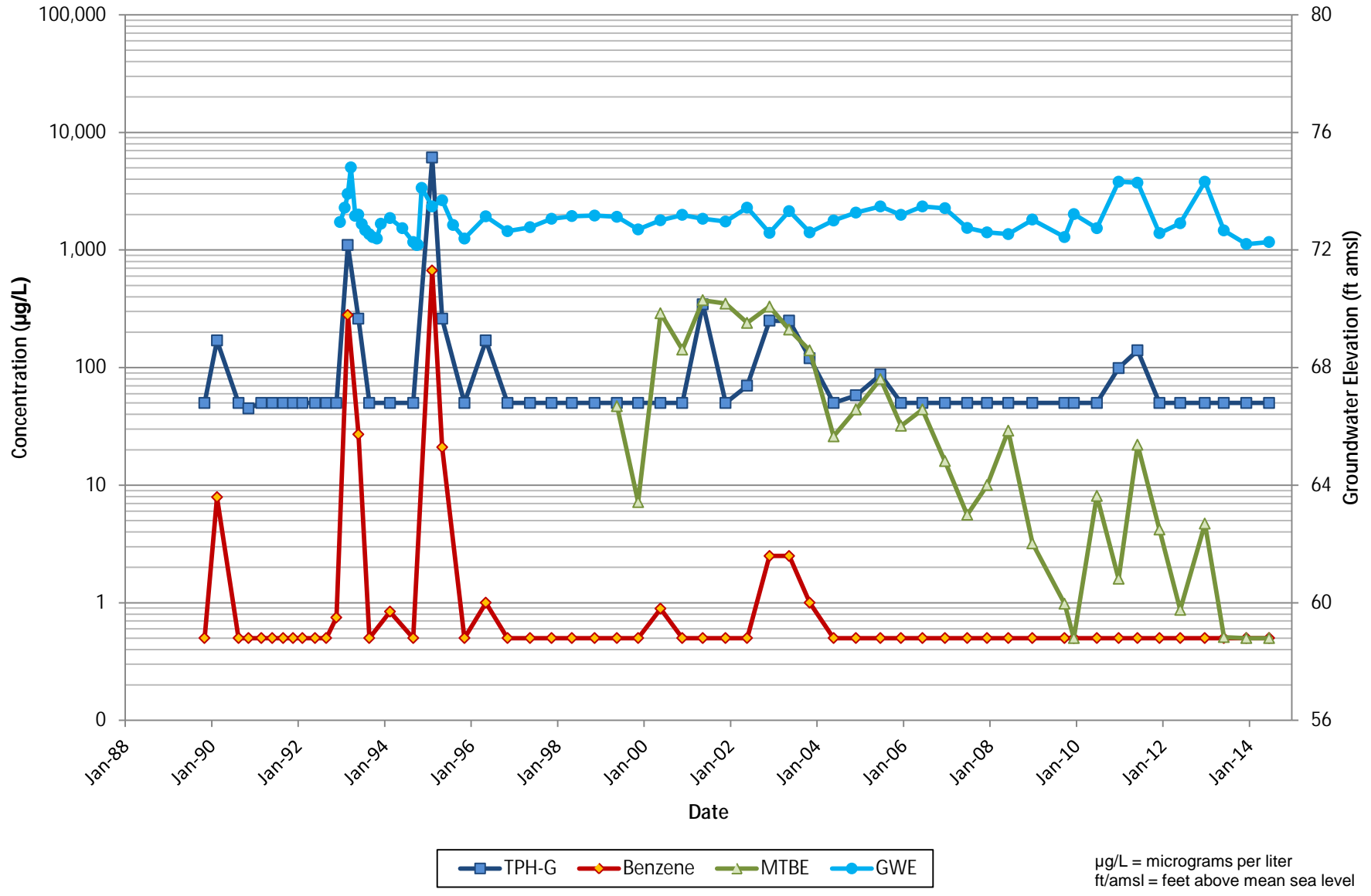


## **Appendix C**

Historical Trend Graphs

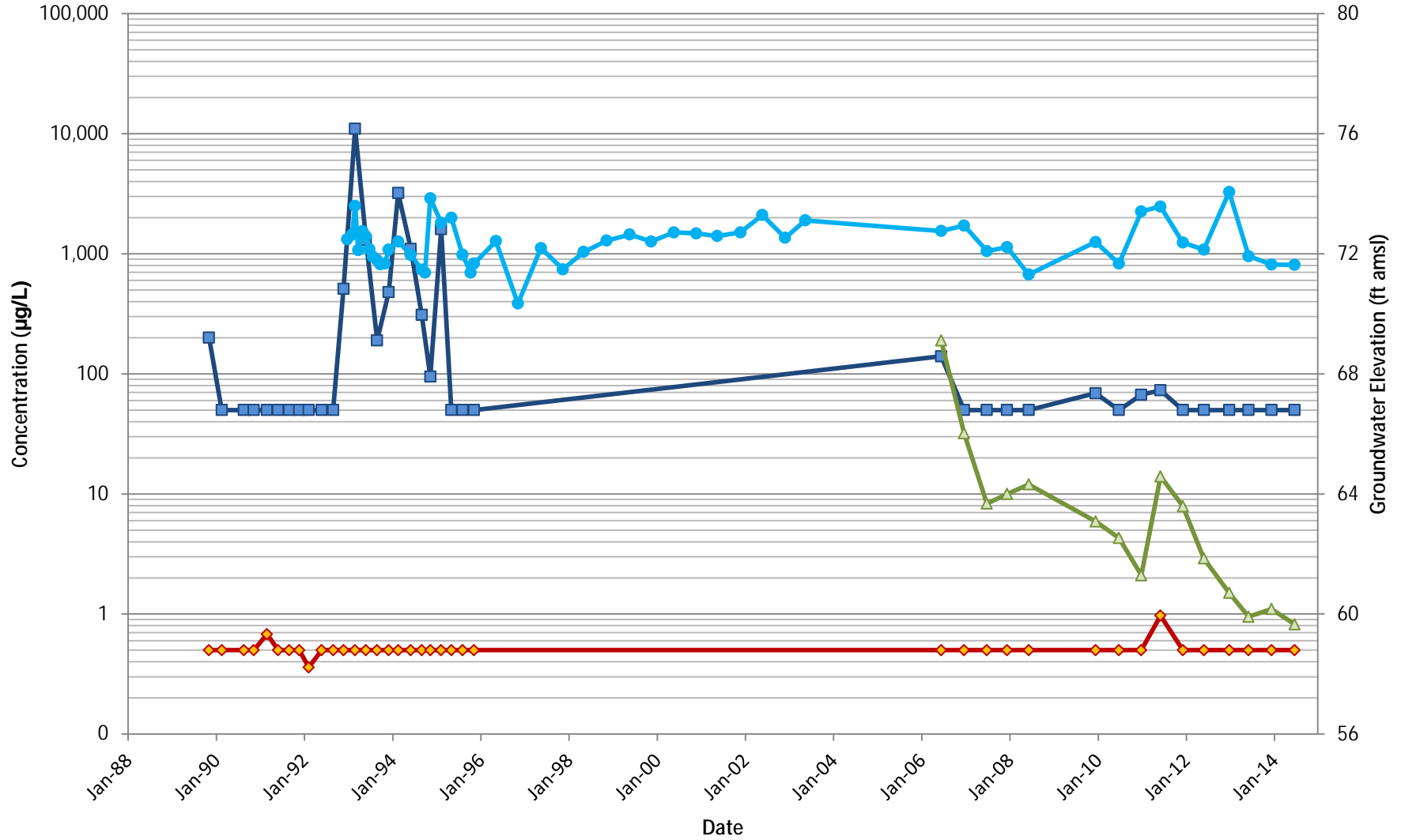
# Temporal Monitoring Trends for MW-1

Chevron Facility #351647  
3943 Broadway, CA



# Temporal Monitoring Trends for MW-2

Chevron Facility #351647  
3943 Broadway, CA

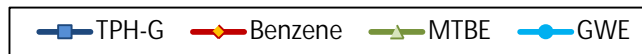
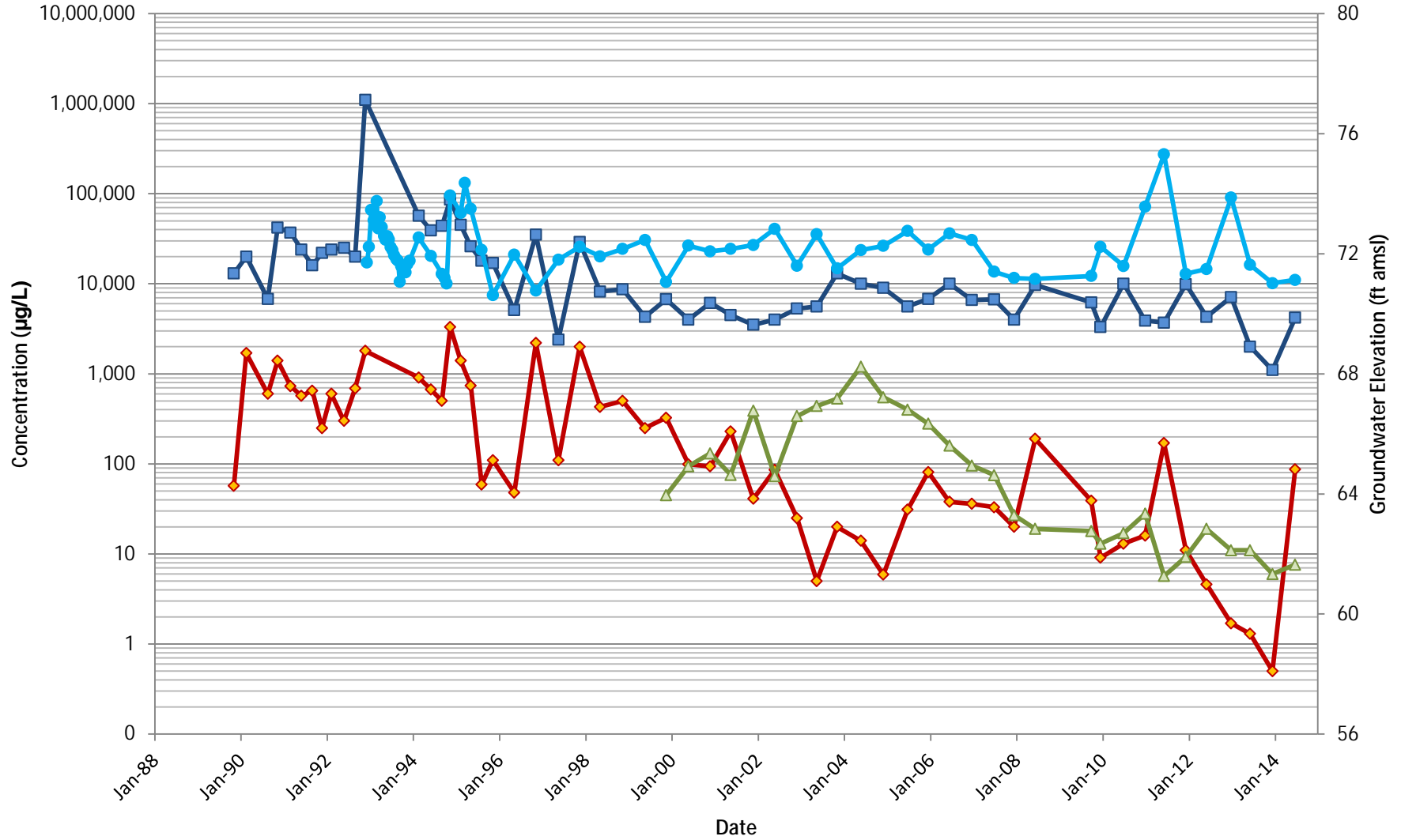


TPH-G Benzene MTBE GWE

µg/L = micrograms per liter  
ft/amsl = feet above mean sea level

# Temporal Monitoring Trends for MW-3

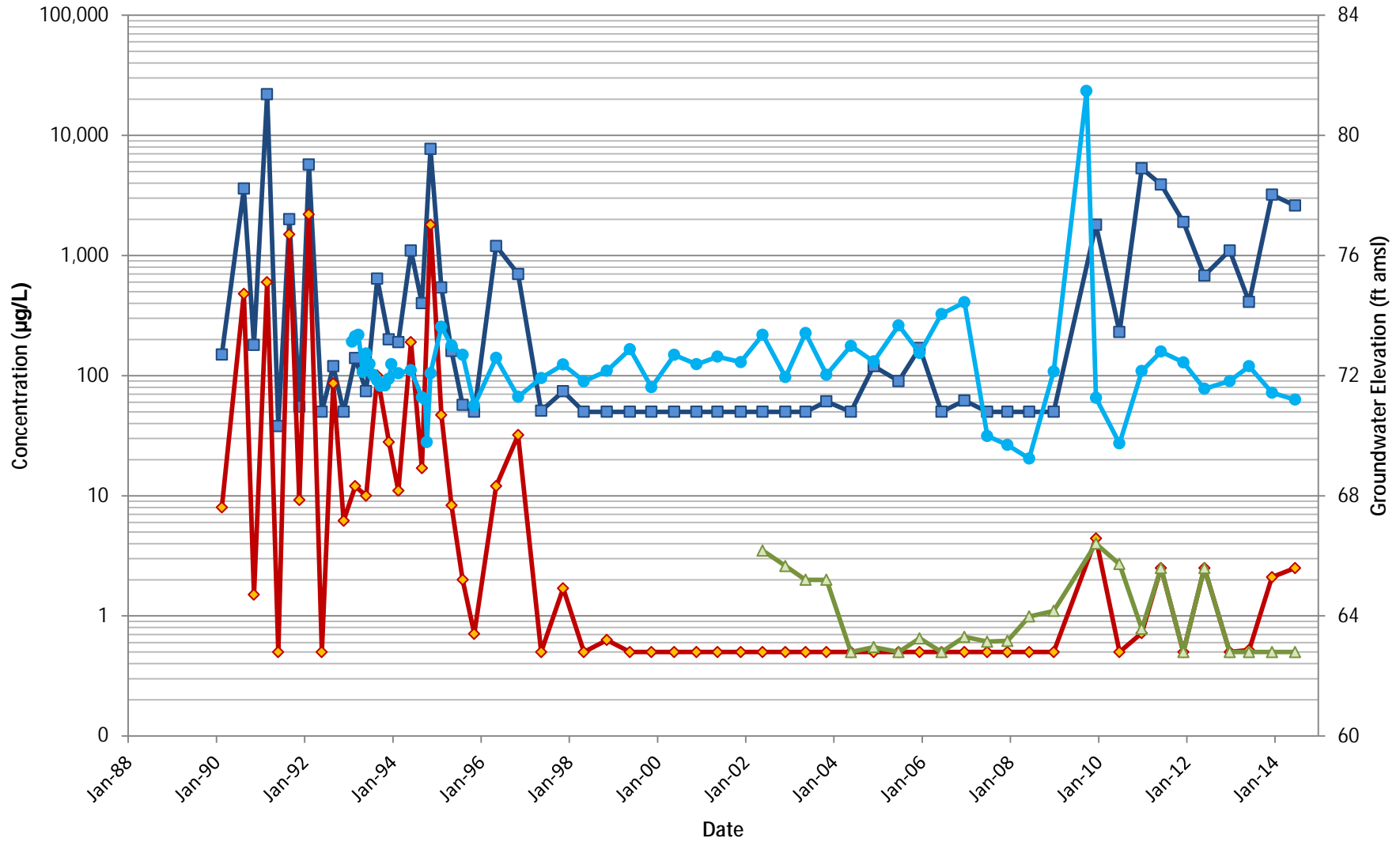
Chevron Facility #351647  
3943 Broadway, CA



µg/L = micrograms per liter  
ft/amsl = feet above mean sea level

# Temporal Monitoring Trends for MW-4

Chevron Facility #351647  
3943 Broadway, CA

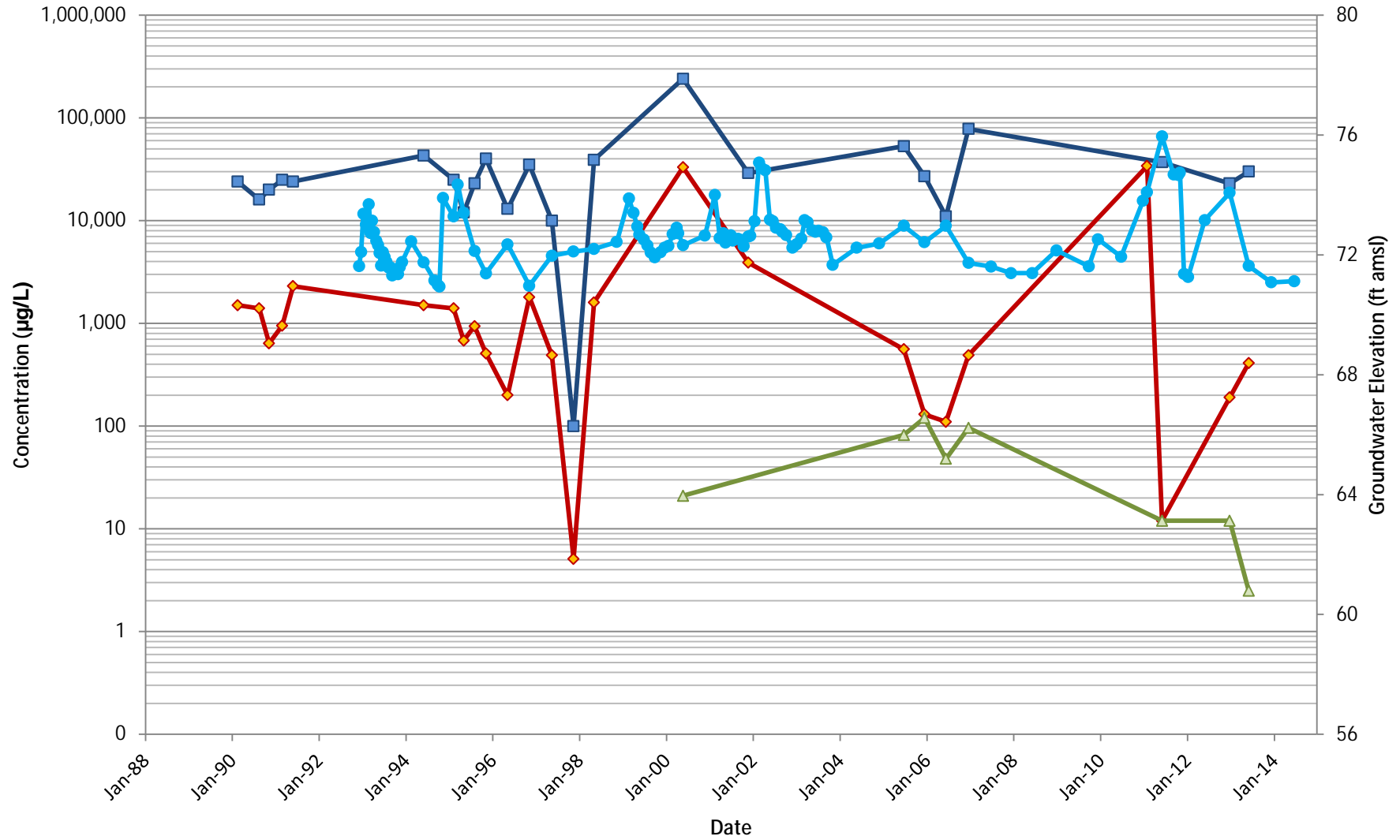


■ TPH-G    ◆ Benzene    ▲ MTBE    ● GWE

µg/L = micrograms per liter  
ft/amsl = feet above mean sea level

# Temporal Monitoring Trends for MW-5

Chevron Facility #351647  
3943 Broadway, CA



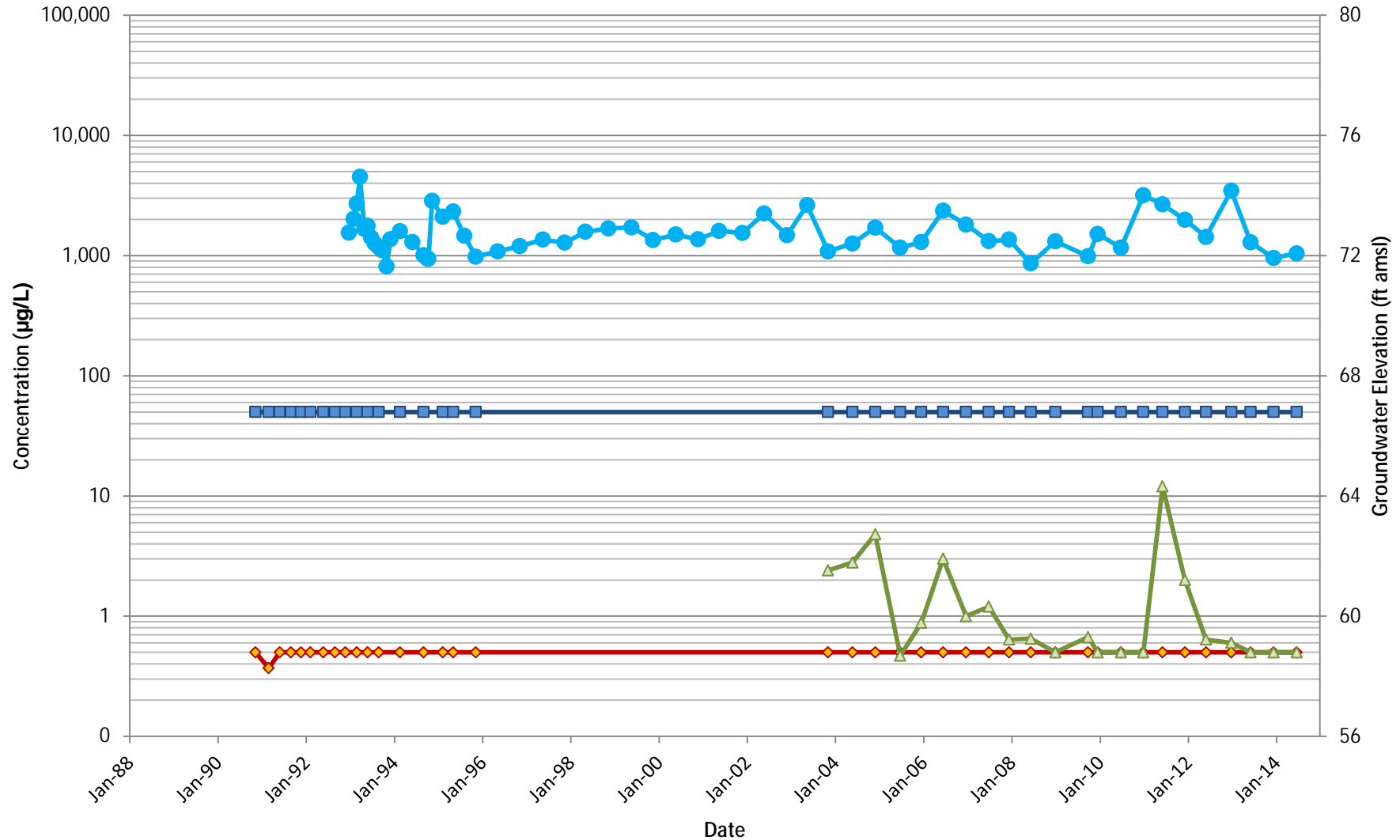
TPH-G Benzene MTBE GWE

µg/L = micrograms per liter  
ft/amsl = feet above mean sea level



# Temporal Monitoring Trends for MW-6

Chevron Facility #351647  
3943 Broadway, CA



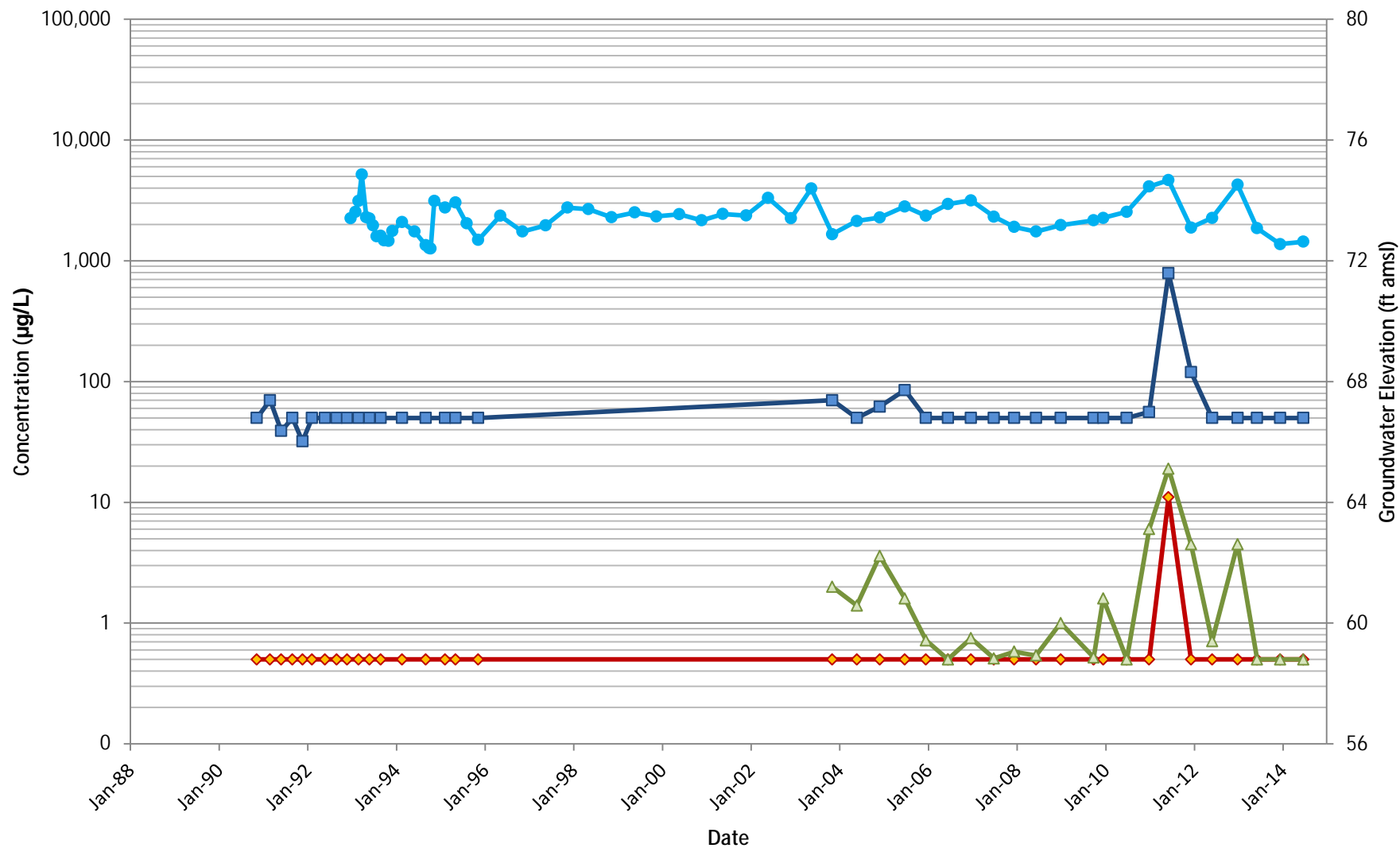
■ TPH-G    ◆ Benzene    ▲ MTBE    ● GWE

µg/L = micrograms per liter  
ft/amsl = feet above mean sea level



# Temporal Monitoring Trends for MW-7

Chevron Facility #351647  
3943 Broadway, CA



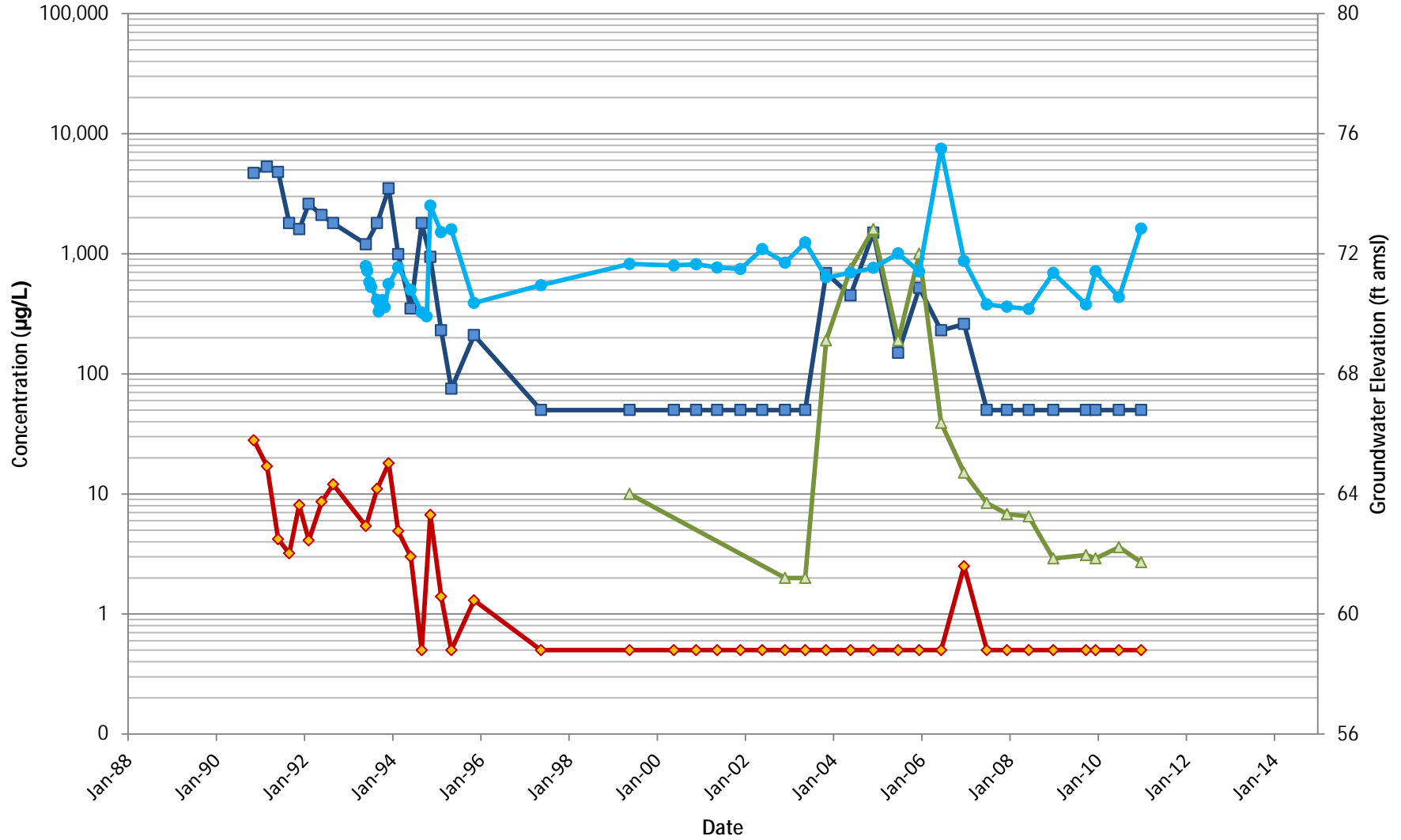
■ TPH-G    ◆ Benzene    ▲ MTBE    ● GWE

µg/L = micrograms per liter  
ft/amsl = feet above mean sea level



# Temporal Monitoring Trends for MW-8

Chevron Facility #351647  
3943 Broadway, CA

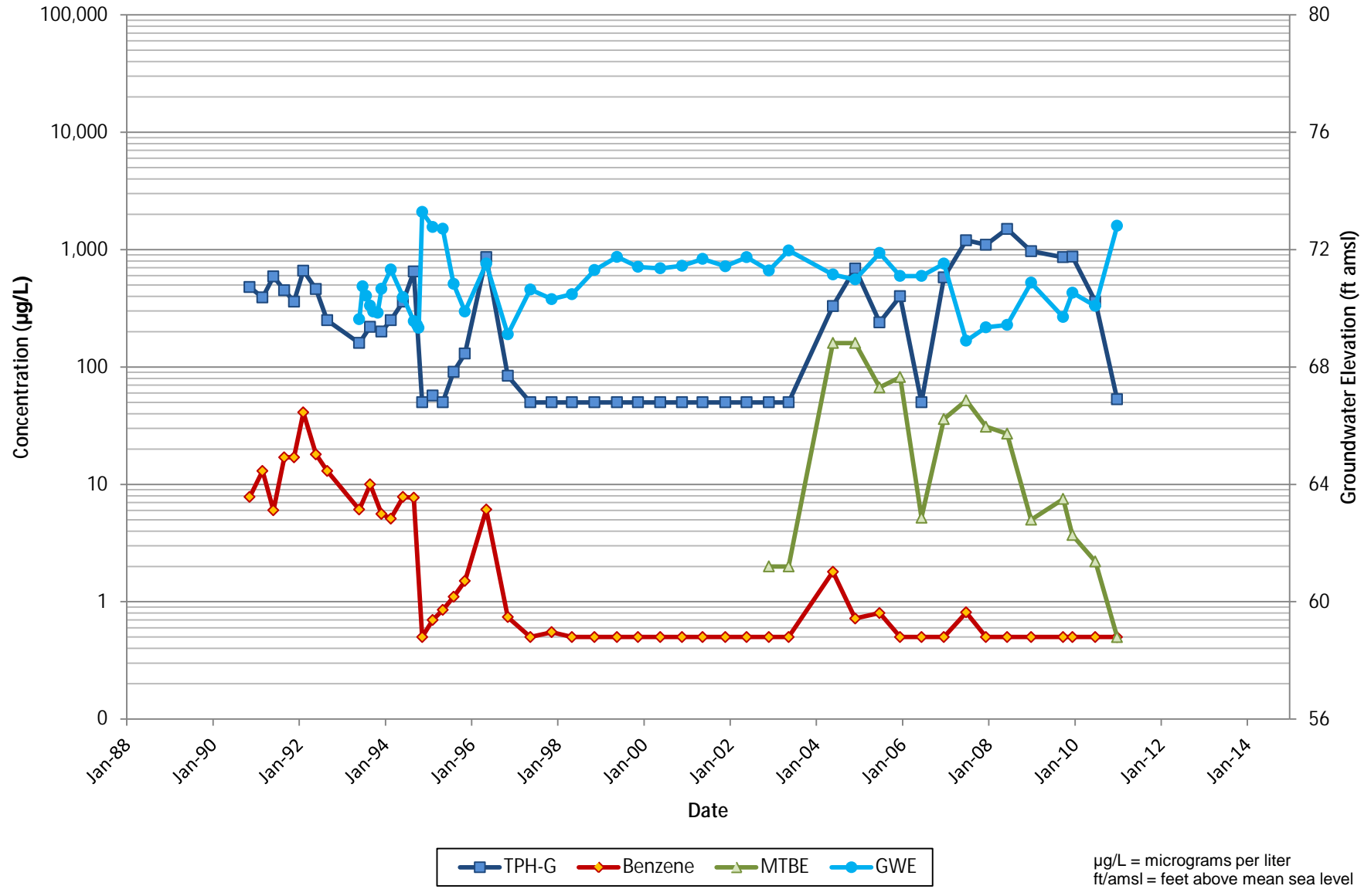


■ TPH-G    ◆ Benzene    ▲ MTBE    ● GWE

µg/L = micrograms per liter  
ft/amsl = feet above mean sea level

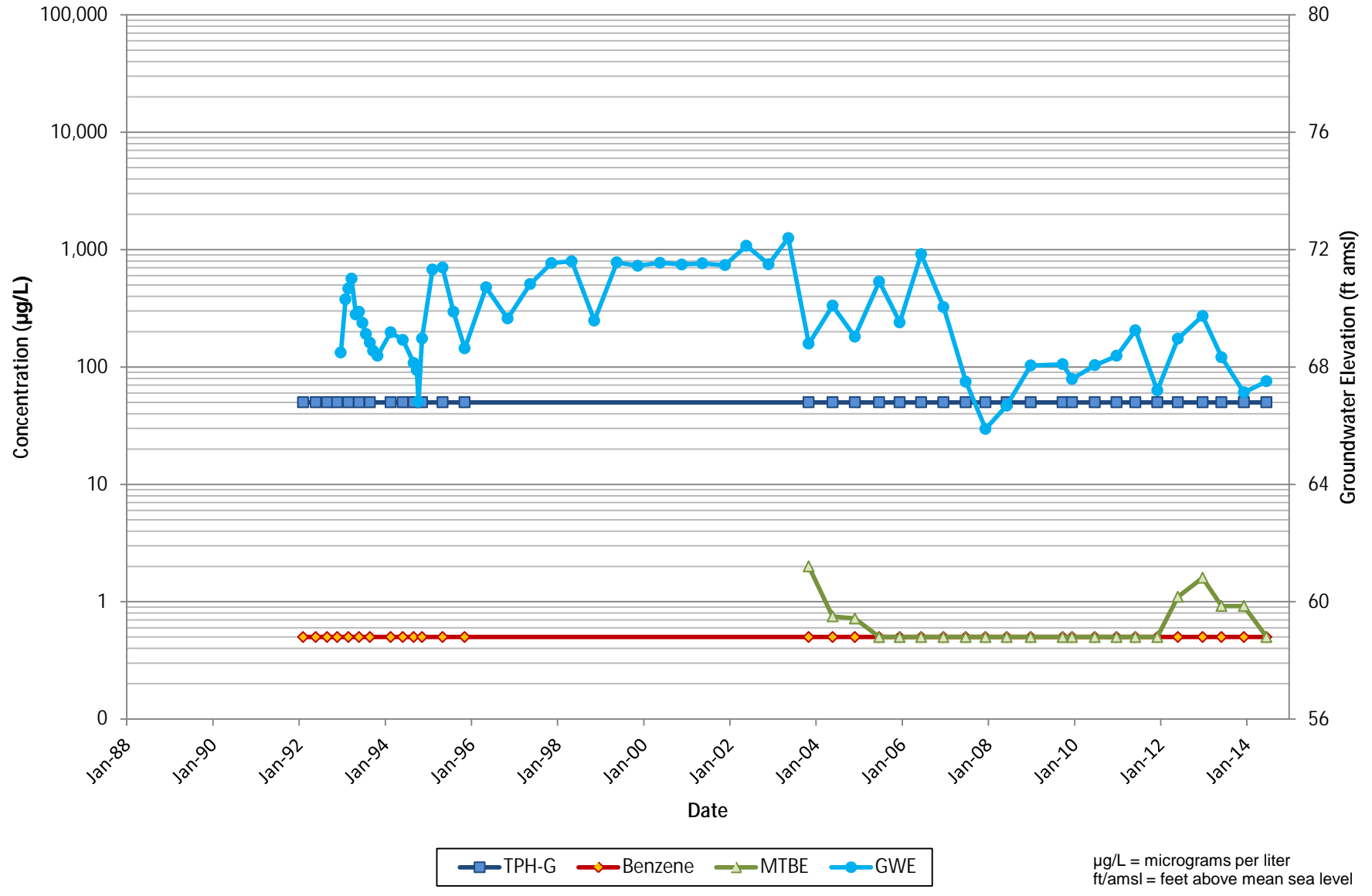
# Temporal Monitoring Trends for MW-9

Chevron Facility #351647  
3943 Broadway, CA



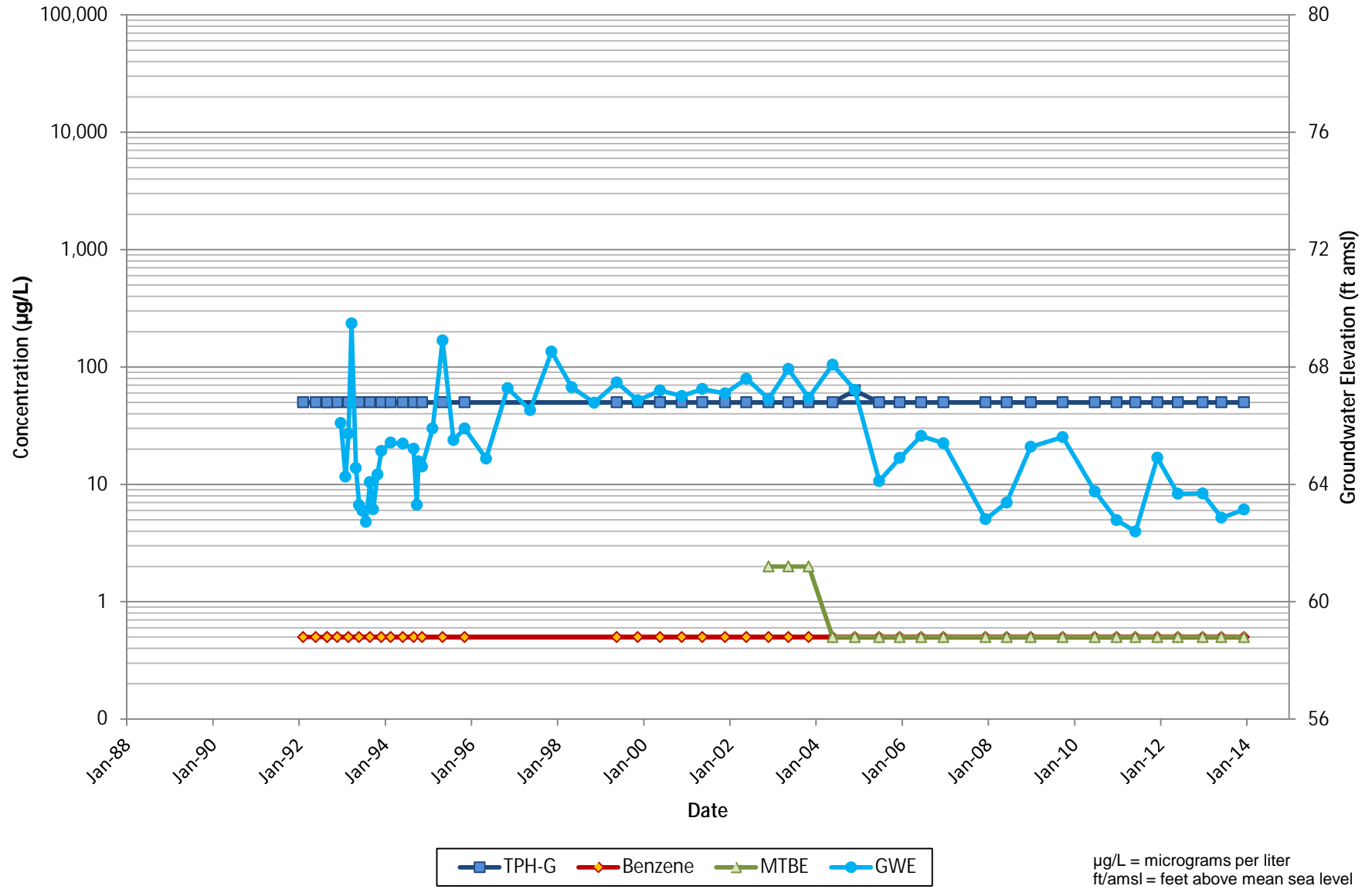
# Temporal Monitoring Trends for MW-10

Chevron Facility #351647  
3943 Broadway, CA



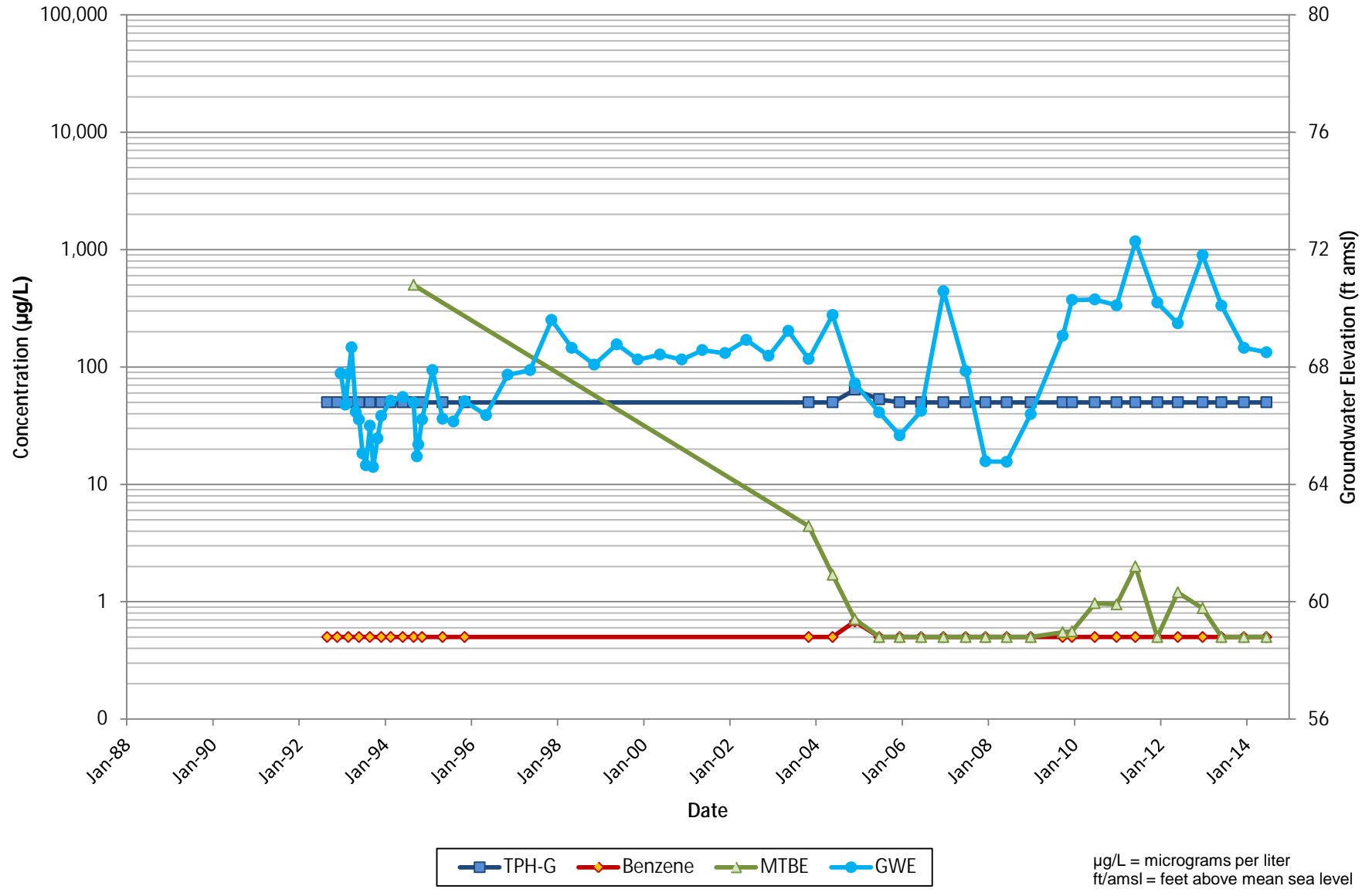
# Temporal Monitoring Trends for MW-11

Chevron Facility #351647  
3943 Broadway, CA



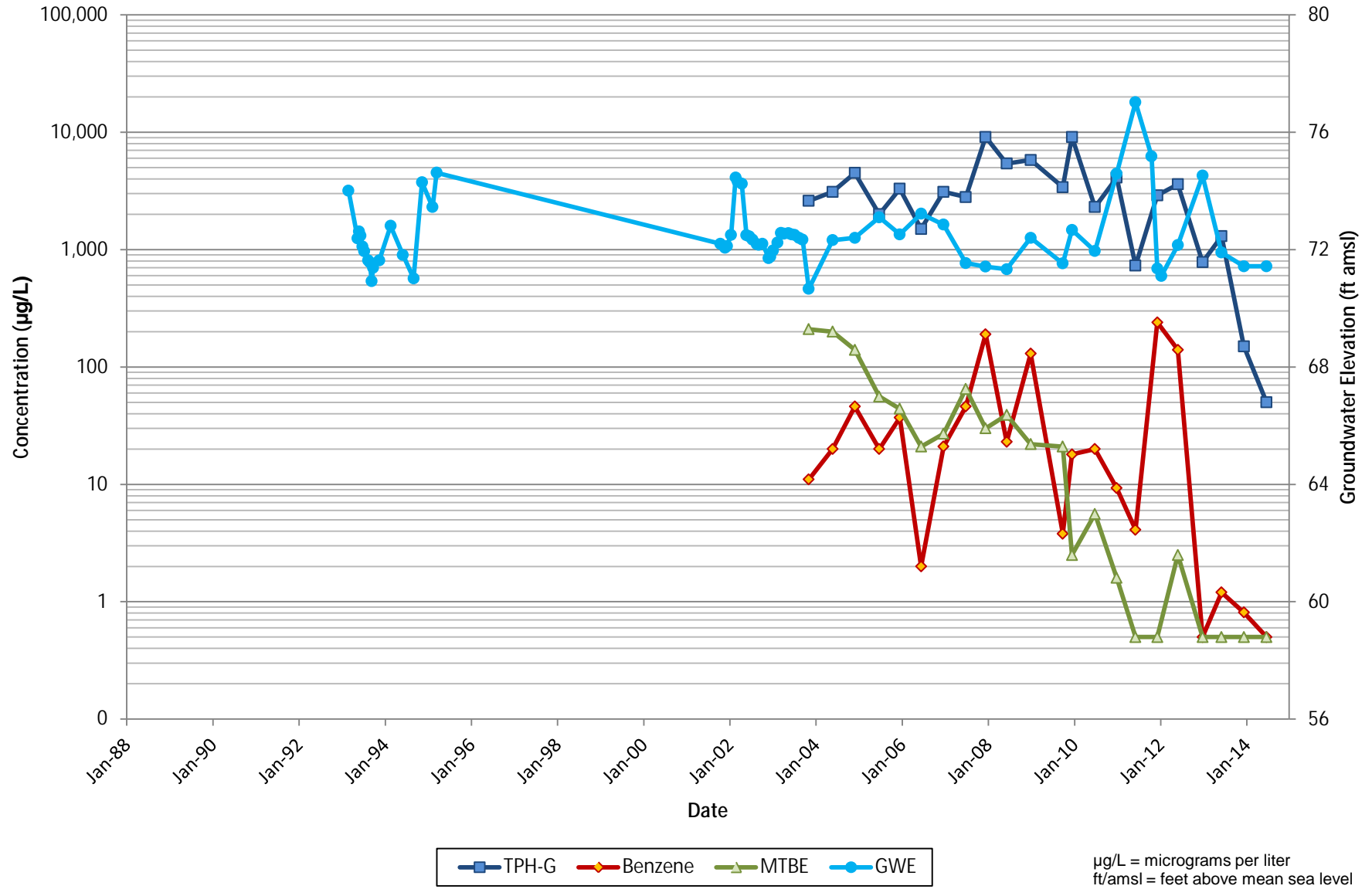
# Temporal Monitoring Trends for MW-12

Chevron Facility #351647  
3943 Broadway, CA



# Temporal Monitoring Trends for RW-1

Chevron Facility #351647  
3943 Broadway, CA





## **Appendix D**

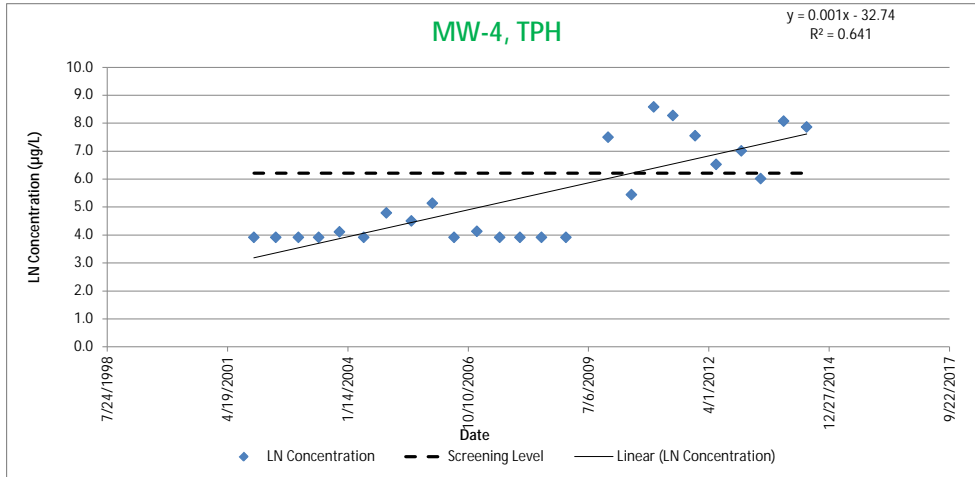
Linear Regression Analysis  
Outputs





Sample Information  
 Sample Location MW-4  
 Constituent TPH-g

Sample Date	Concentration (ug/L)	LN Concentration
11/23/2001	50	3.91
5/24/2002	50	3.91
11/29/2002	50	3.91
5/15/2003	50	3.91
11/4/2003	61	4.11
5/24/2004	50	3.91
11/29/2004	120	4.79
6/24/2005	90	4.50
12/15/2005	170	5.14
6/14/2006	50	3.91
12/21/2006	62	4.13
6/28/2007	50	3.91
12/13/2007	50	3.91
6/9/2008	50	3.91
12/30/2008	50	3.91
12/15/2009	1800	7.50
6/28/2010	230	5.44
12/29/2010	5300	8.58
6/7/2011	3900	8.27
12/9/2011	1,900	7.55
6/1/2012	680	6.52
12/27/2012	1100	7.00
6/6/2013	410	6.02
12/13/2013	3200	8.07
6/23/2014	2600	7.86



**Notes:**

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

**Data quality**

Total # of data points used in regression	25
# of nondetects	10
% of data as detects	60

Less than 75% data above reporting limits.

**Results**

Coefficient of Determination ( $R^2$ ) =	0.6410
p-Value =	1.54E-06
Attenuation Rate in Groundwater (K) =	-0.0010 days <sup>-1</sup>
Attenuation Rate in Groundwater at 90% confidence (K) =	-0.0012 days <sup>-1</sup>
Chemical Half Life in Groundwater ( $t_{1/2}$ ) =	NA days

**Date Screening Level Reached**

Screening Level	500
LN Screening Level	6.2
Intercept	-32.740
Slope	0.0010
Date to Screening Level	NA

**Abbreviations and Notes**

ug/l = micrograms per liter  
 LN = Natural Logarithm

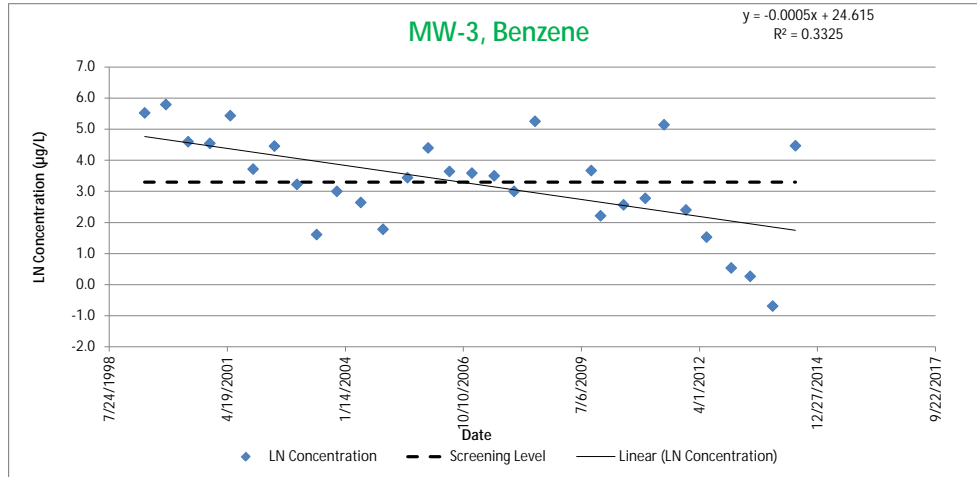




Sample Information  
 Sample Location  
 Constituent

MW-3  
 Benzene

Sample Date	Concentration (ug/L)	LN Concentration
5/20/1999	250	5.52
11/15/1999	326	5.79
5/22/2000	99	4.60
11/22/2000	93.7	4.54
5/15/2001	229	5.43
11/23/2001	41	3.71
5/24/2002	86	4.45
11/29/2002	25	3.22
5/15/2003	5.0	1.61
11/4/2003	20	3.00
5/24/2004	14	2.64
11/29/2004	5.9	1.77
6/24/2005	31	3.43
12/15/2005	81	4.39
6/14/2006	38	3.64
12/21/2006	36	3.58
6/28/2007	33	3.50
12/13/2007	20	3.00
6/9/2008	190	5.25
9/28/2009	39	3.66
12/15/2009	9.1	2.21
6/28/2010	13	2.56
12/29/2010	16	2.77
6/7/2011	170	5.14
12/9/2011	11	2.40
6/1/2012	4.6	1.53
12/27/2012	1.7	0.53
6/6/2013	1.3	0.26
12/13/2013	0.50	-0.69
6/23/2014	87	4.47



**Notes:**

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

Data quality	
Total # of data points used in regression	30
# of nondetects	4
% of data as detects	87

Results		
Coefficient of Determination (R <sup>2</sup> ) =	0.3325	
p-Value =	8.52E-04	
Attenuation Rate in Groundwater (K) =	0.0005	days <sup>-1</sup>
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0004	days <sup>-1</sup>
Chemical Half Life in Groundwater (t <sub>1/2</sub> ) =	1.27E+03	days

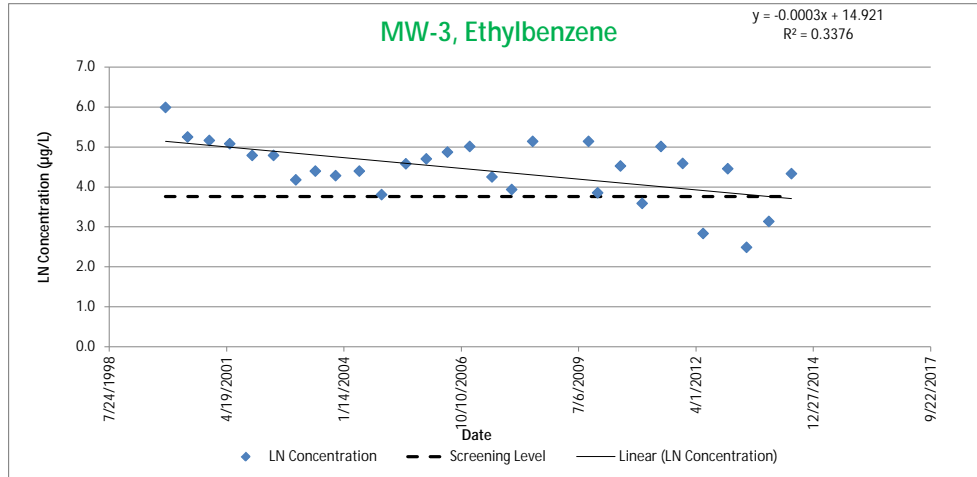
Date Screening Level Reached	
Screening Level	27
LN Screening Level	3.3
Intercept	24.615
Slope	-0.0005
Date to Screening Level	9/16/2006

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

Sample Information  
Sample Location  
Constituent

MW-3  
Ethylbenzene

Sample Date	Concentration (ug/L)	LN Concentration
11/15/1999	398	5.99
5/22/2000	190	5.25
11/22/2000	174	5.16
5/15/2001	160	5.08
11/23/2001	120	4.79
5/24/2002	120	4.79
11/29/2002	65	4.17
5/15/2003	81	4.39
11/4/2003	72	4.28
5/24/2004	81	4.39
11/29/2004	45	3.81
6/24/2005	97	4.57
12/15/2005	110	4.70
6/14/2006	130	4.87
12/21/2006	150	5.01
6/28/2007	70	4.25
12/13/2007	51	3.93
6/9/2008	170	5.14
9/28/2009	170	5.14
12/15/2009	47	3.85
6/28/2010	92	4.52
12/29/2010	36	3.58
6/7/2011	150	5.01
12/9/2011	98	4.58
6/1/2012	17	2.83
12/27/2012	86	4.45
6/6/2013	12	2.48
12/13/2013	23	3.14
6/23/2014	76	4.33



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

Data quality	
Total # of data points used in regression	29
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination ( $R^2$ ) =	0.3376	
p-Value =	9.50E-04	
Attenuation Rate in Groundwater (K) =	0.0003	days <sup>-1</sup>
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0002	days <sup>-1</sup>
Chemical Half Life in Groundwater ( $t_{1/2}$ ) =	2.58E+03	days

Date Screening Level Reached	
Screening Level	43
LN Screening Level	3.8
Intercept	14.921
Slope	-0.0003
Date to Screening Level	12/18/2013

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