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Re: Case Closure Summary Report
Former British Petroleum Station #11127
5425 Martin Luther King Jr. Way
Oakland, California 94609
ACEH Case # RO0000241

ENVIRONMENT

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

Date:
August 6, 2010

Submitted by:

ARCADIS U.S., Inc

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Case Closure Summary Report

Former British Petroleum Station #11127
5425 Martin Luther King Jr. Way
Oakland, California

August 6, 2010

ARCADIS

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Case Closure Summary Report

Former British Petroleum Station
#11127

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Atlantic Richfield Company

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Acronyms

ACHCS	Alameda County Health Care Services Agency
ACPWA	Alameda County Public Works Agency
Alisto	Alisto Engineering Group
Basin Plan	*San Francisco Bay Basin (Region 2) Water Quality Control Plan*
bgs	below ground surface
BP	British Petroleum
BTEX	benzene, toluene, ethylbenzene and xylene
btoc	below top of casing
COC	constituent of concern
CP	ConocoPhillips
DTW	depth to water
ESL	environmental screening level
MCL	maximum contaminant level
mg/kg	milligram per kilogram
MTBE	methyl tertiary butyl ether
PSA	preliminary site assessment
report	*Case Closure Summary Report*
RWQCB	Regional Water Quality Control Board
site	former British Petroleum station #11107 located at 18501 Hesperian Blvd. San Lorenzo, California

SRS	sensitive receptor survey
Stratus	Stratus Environmental, Inc.
TPHg	total petroleum hydrocarbons as gasoline
UST	underground storage tank
µg/L	microgram per liter

1. Introduction

ARCADIS has prepared this *Case Closure Summary Report* (report) for the former British Petroleum (BP) station #11127 located at 5425 Martin Luther King Jr. Way, Oakland, California (site), Alameda County Environmental Health Department Case #RO0000241. Case closure is warranted for the site based on the following information:

- Petroleum hydrocarbon sources and other potential secondary sources have been removed, as evidenced by current site conditions.
- Current groundwater concentrations for total petroleum hydrocarbons as gasoline (TPHg), and benzene, toluene, ethylbenzene and xylene (BTEX) are all below laboratory reporting limits, while the maximum concentration of methyl tertiary butyl ether (MTBE) is slightly above the California primary maximum contaminant level (MCL) and Drinking Water Screening level (Toxicity) of 13 micrograms per liter (µg/L) at 16 µg/L.
- The site has been adequately characterized.
- The plume appears to no longer be present.
- Sensitive receptors are not likely to be impacted, including surface-water bodies, municipal wells and drinking water sources.
- The site presents no current or potential risk to human health or the environment.

This report is organized into the following sections:

- Section 1 provides site background information.
- Section 2 discusses the extent of soil and groundwater contamination.
- Section 3 describes beneficial uses of the site groundwater and a site conceptual model.
- Section 4 describes remedial actions conducted at the site.
- Section 5 discusses the effectiveness of remedial activities at the site.
- Section 6 presents conclusions with recommendations for case closure.
- Appendix A includes monitoring well construction details and soil boring logs Appendix B includes groundwater sampling protocols, Appendix C is the Alameda

County Environmental Health Case Closure Summary, and Appendix D includes concentration versus time graphs for TPHg and MTBE.

1.1 Site Background

The site is an active 76-branded service station located on the southwest corner of Martin Luther King Jr. Way and 55th Street in Oakland, California (Figure 1). The service station consists of a station building and four dispenser islands with a concrete drive slab and a canopy, three 12,000 gallon gasoline underground storage tanks (USTs), one 1,000 gallon waste-oil UST, and associated piping and dispensers. BP acquired the property from Mobil Oil Corporation in 1989. The site is currently operated as a Union 76 (ConocoPhillips [CP]) service station. The date of transfer between BP and CP is unknown; however, it occurred sometime before 2004 when CP collected a round of groundwater samples as part of a planned property divestment (TRC 2004). The site is located in a mixed commercial/residential area (Figure 2). A gas station is located north of the site. A retail strip mall is located east of the site and a residential community is located west of the site.

1.2 Site Characterization Activities

Alameda County Health Care Services Agency (ACHCS) requested BP complete a preliminary site assessment to determine the extent of contamination in soil and groundwater beneath the site as a result of a waste oil release in 1986 and an unknown release in 1987, both occurring while the site was operating as a Mobil service station (ACHCS 1990). BP retained Weiss Associates (Weiss) to conduct a subsurface investigation in October 1990.On October 18, 1990, two borings (BH-A and BH-B) were drilled using a hollow-stem auger and was completed as groundwater monitoring wells MW-1 and MW-2, respectively. MW-1 is located directly over the former USTs while MW-2 is located immediately southwest of the waste oil tank (Figure 3). Both borings were installed to a total depth of 32 feet below ground surface (bgs) with soil samples collected every five feet using a split-barrel sampler lined with brass sleeves. The soil samples were screened using a photo ionization detector (PID) to determine which samples would be submitted for laboratory analysis. Three soil samples (6, 11 and 12.5 feet bgs) were submitted from MW-1 and two soil samples (5 and 10 feet bgs) were submitted from MW-2. All samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene and xylenes (BTEX); additionally samples collected from BH-B were analyzed for total petroleum hydrocarbons as diesel (TPHd), halogenated volatile organic compounds

(HVOCs) and total oil and gas (TOG). Results for all analytes at all soil sample locations were below laboratory reporting limits (Table 1) (Weiss 1991).

Groundwater samples collected from MW-1 and MW-2 were analyzed for TPHg and BTEX, while the sample from MW-2 was also analyzed for TPHd, HVOCs and TOG. Well MW-1 was purged dry after removing approximately 22 gallons of water; the well was given two hours to recover before samples were collected. It is believed that there was not enough volume in MW-1 to also analyze for HVOC and TOG. Approximately 45 gallons of water were purged from well MW-2 prior to sample collection. Results from MW-1 indicated TPHg, toluene, ethylbenzene and xylenes were below laboratory reporting limits while benzene was at 2.0 µg/L. Results from MW-2 indicated the following concentrations: TPHg at 88 µg/L, benzene at 1 µg/L, toluene at 0.3 µg/L, ethylbenzene at 28 µg/L, xylenes at 110 µg/L, HVOCs at 2 µg/L and TOG was below laboratory reporting limits (Table 2) (Weiss 1991).

On October 28, 1992, Alisto Engineering Group (Alisto) advanced two exploratory borings (B-1 and B-2) using a hollow-stem auger rig and were completed as groundwater monitoring wells MW-3 and MW-4, respectively. MW-3 is located north of the existing dispenser islands and MW-4 is located north of the former and existing UST pits (Figure 3). Both borings were advanced to 25 feet bgs with two soil samples collected from each boring at 11 and 13 feet bgs using a split-barrel sampler. The soil samples were analyzed for TPHg and BTEX; results from both locations and all depths indicated results were below laboratory reporting limits for all analytes (Table 1). The groundwater results collected from MW-3 and MW-4 also indicated all analytes (TPHg and BTEX) were below laboratory reporting limits (Table 2) (Alisto 1993).

Groundwater monitoring began in October 1990 for wells MW-1 and MW-2 and in November 1992 for wells MW-3 and MW-4 and continued for all four wells until July 1996. All groundwater monitoring halted in July 1996 when Alisto submitted the *Groundwater Monitoring and Sampling Report* (1996) requesting the site be closed and that all sampling would cease until a confirmation letter was received by ACHCS. A one-time groundwater monitoring event was conducted in April 2008; however, MW-3 could not be located at the time of sampling. In preparation of this closure report, a one-time sampling event was conducted on all four monitoring wells in April 2010. Monitoring well construction details are presented in Appendix A.

1.3 Investigation Methods

Soil and groundwater samples appear to have been collected appropriately for environmental investigation and data gathering purposes. Soil and groundwater samples were analyzed by a California-certified laboratory. Anomalous inconsistencies were not reported from previous soil sampling events. Groundwater samples have been withdrawn from the site's monitoring wells using disposable polyethylene bailers. Weiss, Alisto and Stratus Environmental, Inc. have completed groundwater sampling at the site since 1990 in accordance with applicable sampling guidelines. A copy of their sampling procedures is included in Appendix B with the exception of Weiss', which could not be located.

2. Extent of Soil and Groundwater Pollution

2.1 Soil

The likely extent of soil contamination was evaluated by reviewing historical soil sample results collected from the vadose zone. The vadose zone has been defined as soil shallower than 12.5 feet bgs. This depth was determined based on historical depth-to-water (DTW) readings from 1990 to present, which showed the maximum DTW recorded as 12.46 feet below top of casing (btoc). Any soil results referred to in the text will only be from samples collected from depths not exceeding 12.5 feet bgs. Although saturated soil samples have been collected (depths exceeding 12.5 feet bgs), it is our assumption that these concentrations may not accurately represent vadose zone soil conditions due to potential interactions with groundwater.

Impacted soil has not been encountered during soil boring and monitoring well installation events. Based on previous investigations conducted in October 1990 and October 1992, all analyte results were below laboratory reporting limits from depths ranging from 5 to 11 feet bgs. Historical soil data is provided in Table 1. Cross sections are presented in Figures 4 and 5. Soil borings and well construction logs are included as Appendix A.

2.2 Groundwater

TPHg, BTEX and MTBE have historically been detected at wells MW-1, MW-2, and MW-4. Currently, all constituents are below laboratory reporting limits, with the exception of MTBE which has a maximum concentration of 16 µg/L at well MW-1.

The maximum concentration of TPHg observed at the site was 2,300 µg/L at MW-2 in February 1992. Concentrations declined steadily from that point on until they reached nondetect levels in January 1996 (Table 2).

The maximum concentration of BTEX observed at the site were: benzene at 6.7 µg/L at MW-1 in February 1992, toluene at 3.8 µg/L at MW-1 in September 1992, ethylbenzene and xylene at 47 and 360 µg/L, respectively, at MW-2 in February 1992. All BTEX constituents steadily declined to nondetect levels and have been since July 1995 (Table 2).

The maximum concentration of MTBE observed at the site was 480 µg/L at MW-1 in July 1996. MTBE concentrations steadily declined from March 1996 to April 2010, where concentrations are currently at 16 µg/L (Table 2).

All historical groundwater data is presented in Table 2 and Appendix D presents graphical representation of TPHg and MTBE concentration trends for all on-site monitoring wells. Historic documents indicate no groundwater samples were collected between July 1996 and April 2008, with the exception of a one-time sampling event conducted in February 2004. The purpose of the event was verification sampling for the divestment of the property by CP. All wells were sampled except for MW-3 which was not found (TRC 2004). Figure 6 illustrates the groundwater results of MTBE for the most recent sampling event (April 2010).

2.3 Separate-Phase Hydrocarbon Status

Evidence of sheen was noted in well MW-1 in November 1992; however, separate-phase hydrocarbon has not been reported at the site in groundwater since.

2.4 Hydraulic Gradient Trends

Groundwater was typically encountered during drilling events from 10 feet bgs (MW-2; October 1990) to 14 feet bgs (MW-1; October 1990). The DTW in monitoring wells has ranged from 7.88 feet btoc (MW-1; December 1994) to 12.46 feet btoc (MW-3; Alisto 1993). Access to historical documents was limited for the site; however, documents that were reviewed indicated the groundwater gradient has ranged from 0.003 to 0.24 feet/foot. The groundwater flow direction is predominately east (Table 3). A potentiometric surface map of groundwater elevations in April 2010 is provided on Figure 7.

3. Beneficial Uses

3.1 San Francisco Bay RWQCB Basin Plan

Existing and potential beneficial uses for groundwater are presented in the *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (Basin Plan; Regional Water Quality Board [RWQCB] 2007). According to the Basin Plan (RWQCB 2007), the site is situated in the East Bay Plain groundwater sub-basin (basin number 2-9.04). Water supply uses, including municipal and domestic, industrial process, industrial service and agricultural, are identified in the Basin Plan (RWQCB 2007) as existing beneficial uses, based on best available information. The nearest surface-water body is the San Francisco Bay, located approximately 1.5 miles west of the site.

3.2 Sensitive Receptor Survey and Potential Exposure Pathways

To address the potentially complete exposure pathways (groundwater, soil and soil vapor), ARCADIS conducted a sensitive receptor survey (SRS) in January 2010. The objective of the SRS was to identify potential downgradient and aboveground risk receptors within 2,500 feet of the site. Potential risk receptors included water-producing wells, schools, hospitals and surface-water bodies and aquatic environments. The Alameda County Public Works Agency (ACPWA) was contacted for a survey of all subsurface wells within 2,500 feet (0.5 miles) of the site. An email reply from the ACPWA indicated that 1 irrigation well, 2 industrial wells, 58 monitoring wells, 5 wells for geotechnical investigations, 3 extraction/vapor wells, 4 test wells, and no municipal wells are present within 2,500 feet of the site. Results of the well survey are confidential and therefore are not presented in this report. However, many of the wells are not located downgradient of the site, and those that are downgradient of the site are located at the furthest extent of the 0.5 mile radius and are predominantly monitoring wells. The lone irrigation well is located approximately 0.2 miles (approximately 1,050 feet) southeast of the site.

A local internet search of the area surrounding the site yielded the presence of three schools within 2,500 feet of the site: Santa Fe Elementary School located approximately 1,200 feet southwest of the site; Oakland High School located approximately 1,700 feet southwest of the site, and Grace Children's Center located approximately 2,400 feet southwest of the site. The nearest surface-water body is the San Francisco Bay, located approximately 1.5 miles west of the site.

ARCADIS used the Revised May 2008 *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (Water Board 2008) to obtain current ESLs and assess potential human health risk associated with current site conditions. The ESLs were developed using USEPA and California's Department of Toxic Substances Control (DTSC) human health risk assessment methodologies. Under most circumstances, the presence of a chemical in soil or groundwater at concentrations below the corresponding ESL can be assumed to not pose a significant threat to human health or the environment.

To evaluate the potential long-term fate of contaminants associated with the site, the most recent and the maximum concentrations of contaminants detected in soil and groundwater have been compared to the appropriate ESLs (Table 4). The use of commercial/industrial screening levels is based on the assumption that land use at the site will remain unchanged.

Soil ESLs were obtained from *Table K-2 – Direct Contact to a Commercial/Industrial Receptor* (Water Board 2008). Because soil contamination has not been detected at the site direct contact to soil is not considered a complete pathway. Groundwater ESLs were obtained from *Table E-1 – Groundwater Screening Levels for Evaluation of Potential Vapor Intrusion Concerns* (Water Board 2008). The inhalation of vapors migrating from the subsurface to indoor air and potential ingestion of groundwater are the only identified complete potential exposure pathways. Current concentrations show that BTEX and MTBE are all below their applicable ESLs (Table 4) and therefore the exposure potential from groundwater through inhalation of volatile in indoor air and particulate emissions through outdoor ambient air is considered an insignificant pathway. Figure 8 illustrates the potential sources of exposure and the status of the corresponding pathways.

Soil vapor samples have not been collected at the site. A station building is currently present at the site and the entire site is paved, with no exposed soil present at the ground surface. As previously stated, the potential for soil vapor intrusion was evaluated and found to be an insignificant pathway.

An ESL for TPHg in groundwater, considering the vapor intrusion pathway, is currently not available. The DTSC rescinded its total petroleum hydrocarbon risk assessment guidance document in April 2010. However, TPHg was not detected above the reporting limit during the latest sampling event and should not be a vapor intrusion concern. Vapor intrusion potential was evaluated using groundwater BTEX data and found to be an insignificant pathway.

4. Remedial Activities

The following remedial activities were undertaken at the site:

- Soil borings and monitoring wells were installed to delineate and monitor the lateral and vertical extent of petroleum hydrocarbon impacts.
- It has been demonstrated through consistent sampling and analysis that petroleum hydrocarbon concentration trends have declined below laboratory reporting limits, or continue to decline in site monitoring wells due to natural attenuation occurring at the site.

5. Remedial Effectiveness

Remediation through natural attenuation has proven to be effective for substantially removing on-site contamination sources. Final cleanup levels at the site are consistent with San Francisco Water Resources Control Board Resolution 68-16 *"Statement of Policy with Respect to Maintaining High Quality Waters in California*.

Soil samples were collected in 1990 when monitoring wells MW-1 and MW-2 were installed and then again in 1992 when monitoring wells MW-3 and MW-4 were installed. Soil samples collected during installation of all four monitoring wells indicate TPHg, BTEX, and all other constituents infrequently analyzed for (TPHd, halogenated volatile organic compounds, and total oil and gas) were never detected above their respective laboratory reporting limits.

Groundwater sampling began in October 1990 for monitoring wells MW-1 and MW-2 and in November 1992 for monitoring wells MW-3 and MW-4; and continued on a regular basis until July 1996, at which time site closure was requested. Two additional sampling events were conducted in April 2008 and April 2010 to evaluate conditions and support case closure. Currently, all analytes are below laboratory reporting limits with the exception of MTBE which is currently at 16 µg/L in well MW-1. Concentration trend charts illustrate the declining trends observed for TPHg and MTBE in each monitoring well (Appendix D).

6. Conclusions

The site meets all published criteria and qualifies as low risk, as described in the *Supplemental Instructions to State Water Board December 18, 1995 Interim Guidance of Required Cleanup at Low-Risk Fuel Sites* (RWQCB 1996). Therefore, ARCADIS requests approval for case closure and no further action at this site based on the following:

- The site has been adequately characterized through soil samples and regular groundwater monitoring.
- There is no longer a plume on site, as evidenced by analytical results from the on-site monitoring wells.
- No deeper drinking water aquifers, surface water or other sensitive receptors are likely to be impacted, with the exception of one irrigation well within 0.5 mile radius, as presented in Section 3.2.
- The site currently presents no significant risk to human health. The most current soil concentrations collected in 1992 indicate that TPHg and BTEX were below laboratory reporting limits, and therefore below their respective ESLs.
- The site currently presents no significant risk to the environment: TPHg and BTEX constituents are currently below laboratory reporting limits; MTBE is currently at 16 µg/L, which is only slightly above the California primary MCL and Drinking Water Screening level (Toxicity) of 13 µg/L, but well below the RWQCB ESL for the protection of indoor air (80,000 µg/L).

7. References

Alameda County Health Care Services Agency. 1990. Correspondence from ACHCS Hazardous Materials Specialist, Susan Hugo to William J. Hollis of BP Oil Co. requesting preliminary site assessment at 5425 Martin Luther King Jr. Way, Oakland, California, August 29, 1990.

Alisto Engineering Group. 1993. Supplemental Site Assessment Report prepared for BP Oil Company. January.

Alisto Engineering Group. 1996. Groundwater Monitoring and Sampling Report prepared for BP Oil Company. October 22, 1996.

California Regional Water Quality Control Board. 1996. *Supplemental Instructions to State Water Board December 18, 1995 Interim Guidance of Required Cleanup at Low-Risk Fuel Sites.*

California Regional Water Quality Control Board. 2007. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).* January 18.

California Regional Water Quality Control Board. 2008. *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater.*

TRC. 2004. *Baseline Site Assessment Report*. July 15.

Weiss Associates. 1991. *Subsurface Investigation at BP Service Station #11127 5425 Martin Luther King Jr. Way Oakland, California* prepared for BP Oil Company. February 28.

Table 1: Historical Soil Results
BP # 11127
5425 Martin Luther King Jr. Way, Oakland, CA
Local Case # RO0000241

Location	Sample Depth (ft bgs)	Sample Date	TPHg		TPHd		Benzene		Toulene		Ethylbenzene		Xylene		HVOCs		TOG	
BH-A (MW-1)	6.0	10/18/1990	<1	mg/kg	--	--	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	--	--	--	--
BH-A (MW-1)	11.0	10/18/1990	<1	mg/kg	--	--	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	--	--	--	--
BH-A (MW-1)	12.5	10/18/1990	<1	mg/kg	--	--	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	--	--	--	--
BH-B (MW-2)	5.0	10/18/1990	<1	mg/kg	<10	mg/kg	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	ND	mg/kg	<20	mg/kg
BH-B (MW-2)	10.0	10/18/1990	<1	mg/kg	<10	mg/kg	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	<0.003	mg/kg	ND	mg/kg	<20	mg/kg
B-1 (MW-3)	11.0	10/28/1992	<1	mg/kg	--	--	<0.005	mg/kg	<0.005	mg/kg	<0.005	mg/kg	<0.005	mg/kg	--	--	--	--
B-1 (MW-3)	13.0	10/28/1992	<1	mg/kg	--	--	<0.005	mg/kg	<0.005	mg/kg	<0.005	mg/kg	<0.005	mg/kg	--	--	--	--
B-2 (MW-4)	11.0	10/28/1992	<1	mg/kg	--	--	<0.005	mg/kg	<0.005	mg/kg	<0.005	mg/kg	<0.005	mg/kg	--	--	--	--
B-2 (MW-4)	13.0	10/28/1992	<1	mg/kg	--	--	<0.005	mg/kg	<0.005	mg/kg	<0.005	mg/kg	<0.005	mg/kg	--	--	--	--

Notes:
ft bgs = feet below ground surface
mg/kg = milligrams per kilogram
HVOCs = Halogenated Volatile Organic Compounds
ND = Not detected at detection limits ranging from 0.005 to 0.01
TOG = Total Oil and Gas
TPHg = Total Petroleum Hydrocarbons as Gasoline
TPHd = Total Petroleum Hydrocarbons as Diesel
< = Analyte was not detected above the specified method reporting limit
-- = Not Analyzed

Table 2: Historical Groundwater Results
BP # 11127
5425 Martin Luther King Jr. Way, Oakland, CA
Local Case # RO0000241

Location	Sample Date	TOC Elevation	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation	TPHg	TPHd	Benzene	Toulene	Ethylbenzene	Xylenes	MTBE	HVOCs	Oil & Grease	TBA	DIPE	ETBE	TAME	Ethanol	1,2-DCA	EDB	1,1-DCA	1,1-DCE	1,1,1-TCA	PCE	Chloroform
						µg/L																				
MW-1	24-Oct-90	82.35	10.85	--	71.50	<50	--	2.0	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	29-Aug-91	82.35	10.54	--	71.81	<50	--	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	20-Nov-91	82.35	10.24	--	72.11	55	--	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	28-Feb-92	82.35	8.17	--	74.18	400	--	6.7	0.7	11	170	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	08-Jun-92	82.35	10.25	--	72.10	250	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	<0.5	--	<0.5	<0.5	<0.5	<0.5	--
MW-1	03-Sep-92	82.35	10.68	--	71.67	160	--	1.2	3.8	1.7	5.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	12-Nov-92	82.35	10.22	sheen	72.13	<50	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	05-Feb-93	82.35	8.77	--	73.58	<50	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	16-Aug-93	82.35	10.25	--	72.10	300	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	14-Mar-94	82.35	9.53	--	72.82	130	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	15-Dec-94	82.35	7.88	--	74.47	--	--	--	999 [1]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	06-Jul-95	82.35	10.84	--	71.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	17-Jan-96	82.35	9.46	--	72.89	--	--	--	--	--	999 [1]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	19-Jan-96	82.35	--	--	--	410	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	23-Jul-96	82.35	10.1	--	72.25	<50	--	<1	<1	<1	<1	480	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-1	24-Feb-04	82.35	6.56		75.79	--	--	<1	<1	<1	<2	280	--	--	<200	<4	<4	<4	<1,000	<4	<4	--	--	--	--	--
MW-1	29-Apr-08	--	9.22	--	--	1,700	--	<2.5	<2.5	<2.5	<2.5	330	--	--	<50	<2.5	<2.5	<2.5	<1,500	<2.5	<2.5	<2.5	--	--	--	--
MW-1	20-Apr-10	82.35	8.36	--	73.99	<50	--	<0.5	<0.5	<0.5	<1	16	--	--	<4	<0.5	<0.5	<0.5	<100	<0.5	<0.5	--	--	--	--	--
MW-2	24-Oct-90	83.49	11.84	--	71.65	88	170	1	0	28	110	--	2	<5,000	--	--	--	--	--	<555	--	--	--	--	--	--
MW-2	29-Aug-91	83.49	11.56	--	71.93	950	66	<0.3	<0.3	17	50	--	--	--	--	--	--	--	--	0.8	--	ND	ND	ND	ND	--
MW-2	20-Nov-91	83.49	11.25	--	72.24	1,400	<50	0.3	<0.3	32	90	--	--	--	--	--	--	--	--	<555	--	ND	ND	0.7	ND	--
MW-2	28-Feb-92	83.49	9.02	--	74.47	2,300	70	4.2	1.8	47	360	--	--	--	--	--	--	--	--	<0.5	--	ND	ND	4.1	ND	--
MW-2	08-Jun-92	83.49	11.37	--	72.12	470	--	<0.5	<0.5	7.7	12	--	--	--	--	--	--	--	--	<0.5	--	6.6	<0.5	4.2	<0.5	--
MW-2	03-Sep-92	83.49	11.81	--	71.68	530	--	1.6	3.5	23	46	--	--	--	--	--	--	--	--	<0.5	--	<0.5	<0.5	<0.5	<0.5	--
MW-2	12-Nov-92	83.48	11.27	--	72.21	250	88	<0.5	<0.5	5	10	--	--	<5,000	--	--	--	--	--	0.5	--	<0.5	<0.5	<0.5	<0.5	--
MW-2	05-Feb-93	83.48	9.85	--	73.63	330	<50	0.7	<0.5	3.6	15	--	--	--	--	--	--	--	--	0.9	--	<0.5	<0.5	8.3	<0.5	--
MW-2	16-Aug-93	83.48	11.33	--	72.15	270	--	<0.5	<0.5	<0.5	19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	14-Mar-94	83.48	10.8	--	72.68	<50	<50	<0.5	<0.5	0.6	3.1	--	--	<5,000	--	--	--	--	--	0.7	--	0.8	ND	1.3	ND	--
MW-2	15-Dec-94	83.48	8.66	--	74.82	79	<50	<0.5	0.6	1.3	1.6	--	--	<5,000	--	--	--	--	--	<0.5	--	<0.5	<0.5	4.8	<0.5	2.3
MW-2	06-Jul-95	83.48	11.12	--	72.36	120	160	<0.5	<0.5	0.52	<1	--	--	<50	--	--	--	--	--	0.24	--	0.28	ND	0.47	ND	<0.2
MW-2	17-Jan-96	83.48	9.76	--	73.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	19-Jan-96	83.48	--	--	--	<50	<50	<0.5	<0.5	<0.5	<1	<5	--	200	--	--	--	--	--	<0.2	--	1.3	0.65	18	0.4	<0.2
MW-2	23-Jul-96	83.48	11.31	--	72.17	<50	<50	<0.5	<1	<1	<1	18	--	<500	--	--	--	--	--	<1	--	<1	<1	<1	<1	<1
MW-2	24-Feb-04	83.48	6.9	--	76.58			<0.5	<0.5	4.7	2.6	<2	--	--	<100	<2	<2	<2	<500	<2	<2	--	--	--	--	--
MW-2	29-Apr-08	--	10.4	--	--	110	--	<0.5	<0.50	1.5	<0.5	3.1	--	--	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	--	--	--	--	--
MW-2	20-Apr-10	83.48	9.35	--	74.13	<50	--	<0.5	<0.5	<0.5	<1	<0.5	--	--	<4	<0.5	<0.5	<0.5	<100	<0.5	<0.5	--	--	--	--	--

Table 2: Historical Groundwater Results
BP # 11127
5425 Martin Luther King Jr. Way, Oakland, CA
Local Case # RO0000241

Location	Sample Date	TOC Elevation	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation	TPHg	TPHd	Benzene	Toulene	Ethylbenzene	Xylenes	MTBE	HVOCs	Oil & Grease	TBA	DIPE	ETBE	TAME	Ethanol	1,2-DCA	EDB	1,1-DCA	1,1-DCE	1,1,1-TCA	PCE	Chloroform
						µg/L																				
MW-3	12-Nov-92	84.96	12.24	--	72.72	<50	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	05-Feb-93	84.96	10.95	--	74.01	<50	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	16-Aug-93	84.96	12.46	--	72.5	<50	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	14-Mar-94	84.96	11.61	--	73.35	<50	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	15-Dec-94	84.96	10.08	--	74.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	06-Jul-95	84.96	11.93	--	73.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	17-Jan-96	84.96	10.54	--	74.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	19-Jan-96	--	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	23-Jul-96	84.96	11.54	--	73.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	20-Apr-10	84.96	10.6	--	74.36	<50	--	<0.5	<0.5	<0.5	<1	<0.5	--	--	<4	<0.5	<0.5	<0.5	<100	<0.5	<0.5	--	--	--	--	--
MW-4	12-Nov-92	82.7	10.44	--	72.26	<50	--	<0.5	<0.5	<0.5	<0.5		--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	05-Feb-93	82.7	9.14	--	73.56	92	--	0.7	<0.5	<0.5	1.2		--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	16-Aug-93	82.7	10.57	--	72.13	<50	--	<0.5	<0.5	<0.5	<0.5		--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	14-Mar-94	82.7	9.7	--	73	220	--	<0.5	<0.5	<0.5	<0.5		--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	15-Dec-94	82.7	8.39	--	74.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	06-Jul-95	82.7	10.03	--	72.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	17-Jan-96	82.7	8.67	--	74.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	19-Jan-96	--	--	--	--	71	--	2.6	<0.5	<0.5	<1	170	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	23-Jul-96	82.7	10.27	--	72.43	<50	--	<0.5	<0.5	<0.5	<0.5	<10	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	24-Feb-04	82.7	7.11	--	75.59	--	--	<0.5	<0.5	<0.5	<1	<2	--	--	<100	<2	<2	<2	<500	<2	<2	--	--	--	--	--
MW-4	29-Apr-08	--	9.75	--	--	<50	--	<0.5	<0.5	<0.5	<0.5	0.52	--	--	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	--	--	--	--	--
MW-4	20-Apr-10	82.7	8.7	--	74.0	<50	--	<0.5	<0.5	<0.5	<1	<0.5	--	--	<4	<0.5	<0.5	<0.5	<100	<0.5	<0.5	--	--	--	--	--

Notes:
All volatile organic compounds analyzed using EPA Method 8260B.
1,2-DCA = 1,2-Dichloroethane
DIPE = Di-isopropyl ether
DTW = Depth to water (ft below top of casing)
EDB = 1,2-Dibromoethane
ETBE = Ethyl tert-butyl ether
ft amsl = feet above mean sea level
ft btoc = Feet below top of casing (surveyed)
HVOCs = Halogenated volatile organic compounds
MTBE = Methyl tert-butyl ether
TAME = Tert-amyl methyl ether
TBA = Tert-butyl alcohol
TPHg = Total Petroleum Hydrocarbons as Gasoline
µg/L = Micrograms per liter
< = Analyte was not detected above the specified method reporting limit
-- = Not measured or analyzed
[1] = data is suspect, believed to be a non-detect result; however the lab report did not state as ND

Table 3: Historical Groundwater Flow Direction and Gradient
BP # 11127
5425 Martin Luther King Jr. Way, Oakland, CA
Local Case # RO0000241

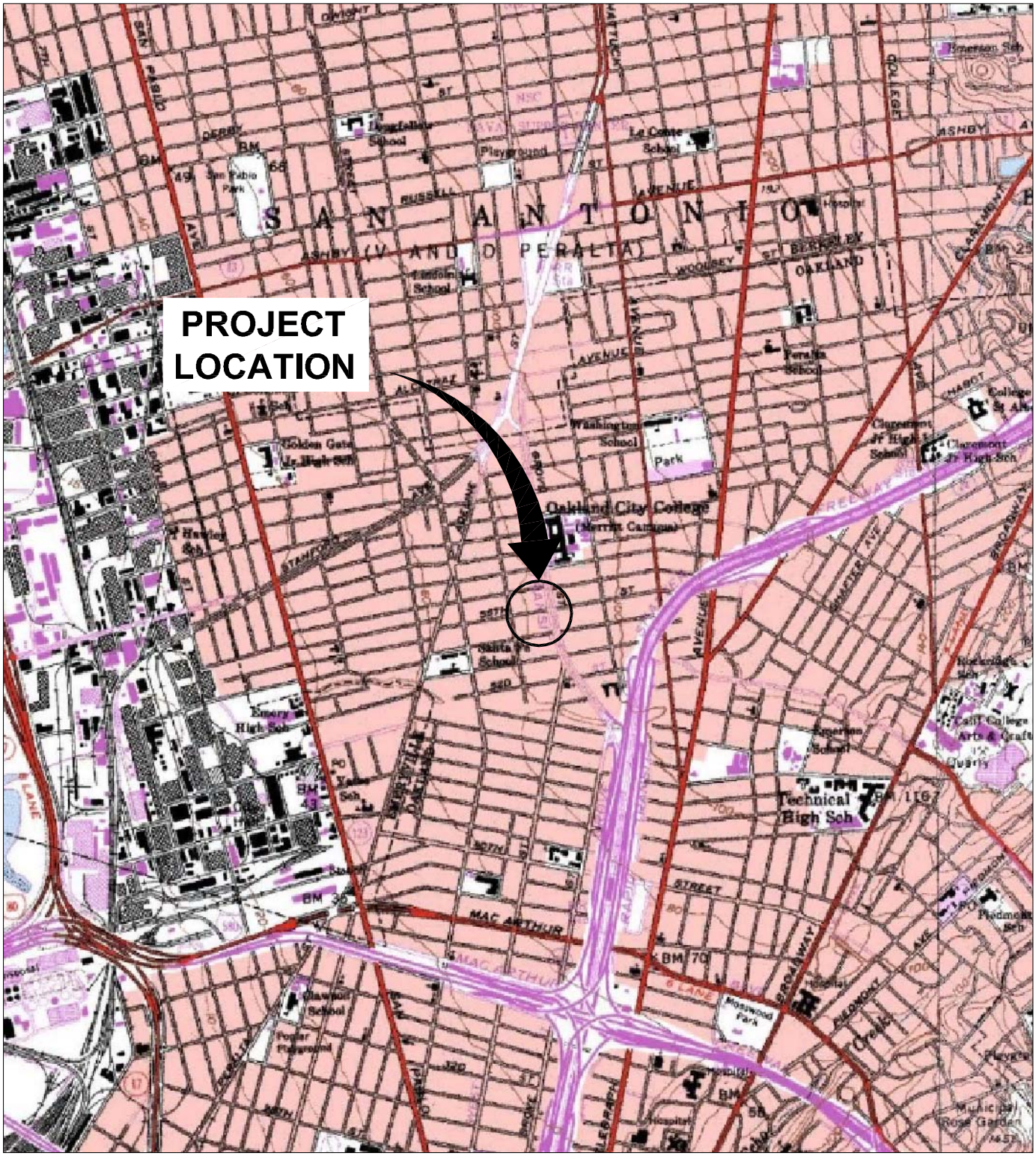
Sample Date	Approximate Flow Direction	Approximate Hydraulic Gradient (ft/ft)
11/12/1992	East	0.007
8/23/1996	Northwest	0.24
4/29/2008	North-northeast	0.003
4/20/2010	East	0.007

Note:
ft/ft = foot per foot

Table 4: Most Recent Maximum Concentration of Contaminants Detected in Soil and Groundwater
BP Station # 11127
5425 Martin Luther King Jr. Way, Emeryville, California
Local Case # RO0000241

Analyte	Soil [1]							Groundwater [2]					
	Most Recent Concentration Observed (mg/kg)	Sample Depth (feet bgs)	Sample Date	Maximum Concentration Observed (mg/kg)	Sample Depth (feet bgs)	Sample Date	Soil Direct Contact Commercial ESL [3] (mg/kg)	Most Recent Concentration Observed (µg/L)	Sample Date	Maximum Concentration Observed (µg/L)	Sample Date	Maximum Contaminant Level[3] (µg/L)	Protection on Indoor Air Commerical ESL (µg/L)
TPHg	NA	--	--	<1	6	10/18/1990	450	<50	4/20/2010	2,300	2/28/1992	NA	NA
Benzene	NA	--	--	<0.003	6	10/18/1990	0.27	<0.5	4/20/2010	6.7	2/28/1992	1	1,800
Toluene	NA	--	--	<0.003	6	10/18/1990	210	<0.5	4/20/2010	3.8	9/3/1992	150	530,000
Ethylbenzene	NA	--	--	<0.003	6	10/18/1990	5	<0.5	4/20/2010	47	2/28/1992	300	170,000
Xylenes	NA	--	--	<0.003	6	10/18/1990	100	<1	4/20/2010	360	2/28/1992	1800	170,000
MTBE	NA	--	--	--	--	--	65	16	4/20/2010	480	7/23/1996	13	80,000
TPHd	NA	--	--	<10	6	10/18/1990	450	<50	7/23/1996	170	10/24/1990	NA	NA

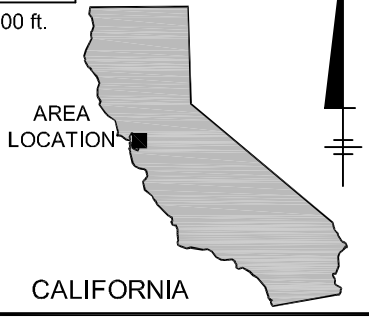
Notes:
[1] Soil results are reported from the vadose zone, which does not exceed 12 feet bgs.
[2] ESL values were taken from *Table K-2 – Direct Exposure Soil Screening Levels Commercial/Industrial Worker Exposure Scenario* , Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater (Water Board 2008).
[3] MCL values were taken from *Table F-3 – Summary of Drinking Water Screening Levels (µg/L),* Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater (Water Board 2008).
bgs = Below ground surface.
Bold = Exceedances of commercial ESL.
ESL = Environmental screening level.
mg/kg = Milligrams per kilogram.
MTBE = Methyl tert-butyl ether.
NA = Not applicable.
-- = Not Analyzed
TPHd = Total petroleum hydrocarbons as diesel.
TPHg = Total petroleum hydrocarbons as gasoline.



REFERENCE: MAP PROVIDED BY BROADBENT & ASSOCIATES, INC DATED 4/03/08

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.



FORMER BP SERVICE STATION NO. 11127
5425 MARTIN IUTHER kING JR. WAY
OAKLAND, CALIFORNIA

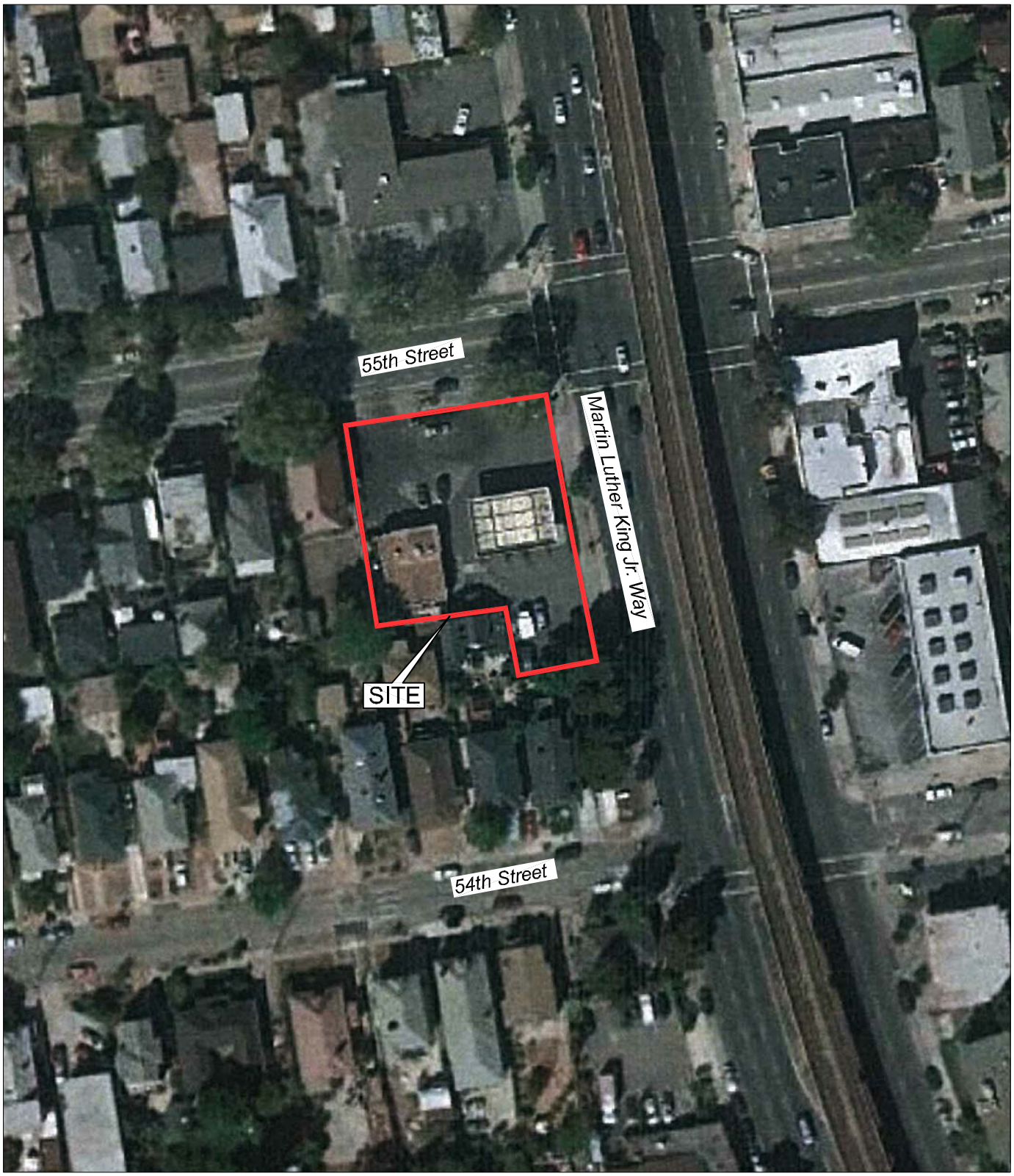
CASE CLOSURE SUMMARY REPORT

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD:— PIC:— PM: S. DAVIS TM: T. POTTER LYR:(Opt)ON=*;OFF=*REF*
G:\ENV\CAD\Emeryville\ACTIVITY\09BPNA\C109\XDAT\Closure Report\GP09BPB01.dwg LAYOUT: 1 SAVED: 6/17/2010 10:25 AM ACADVER: 17.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 6/17/2010 11:25 AM BY: BEARDSLEY, DANIEL
XREFS: IMAGES: PROJECTNAME: —
FLORIN.tif
Google Image.jpg
NASAWW3000R90.BMP



0 200' 400'

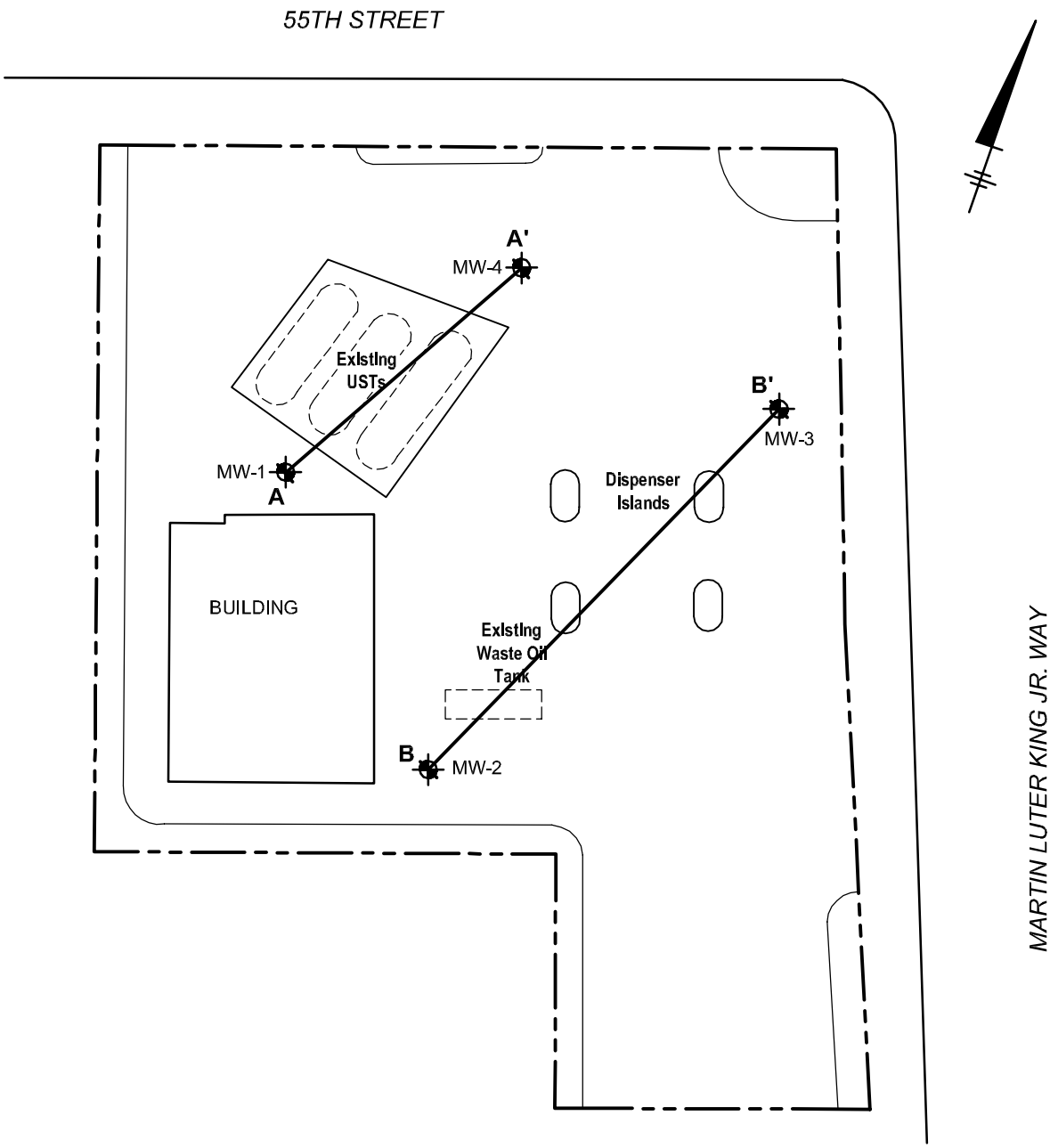
Approximate Scale: 1 in. = 200 ft.

FORMER BP SERVICE STATION NO. 11127
5425 MARTIN IUTHER kING JR. WAY
OAKLAND, CALIFORNIA
CASE CLOSURE SUMMARY REPORT

SITE VICINITY MAP

ARCADIS

FIGURE
2



LEGEND:

MW-1 GROUNDWATER MONITORING WELL

B B' CROSS SECTION LOCATION

0 30' 60'

Approximate Scale: 1 in. = 30 ft.

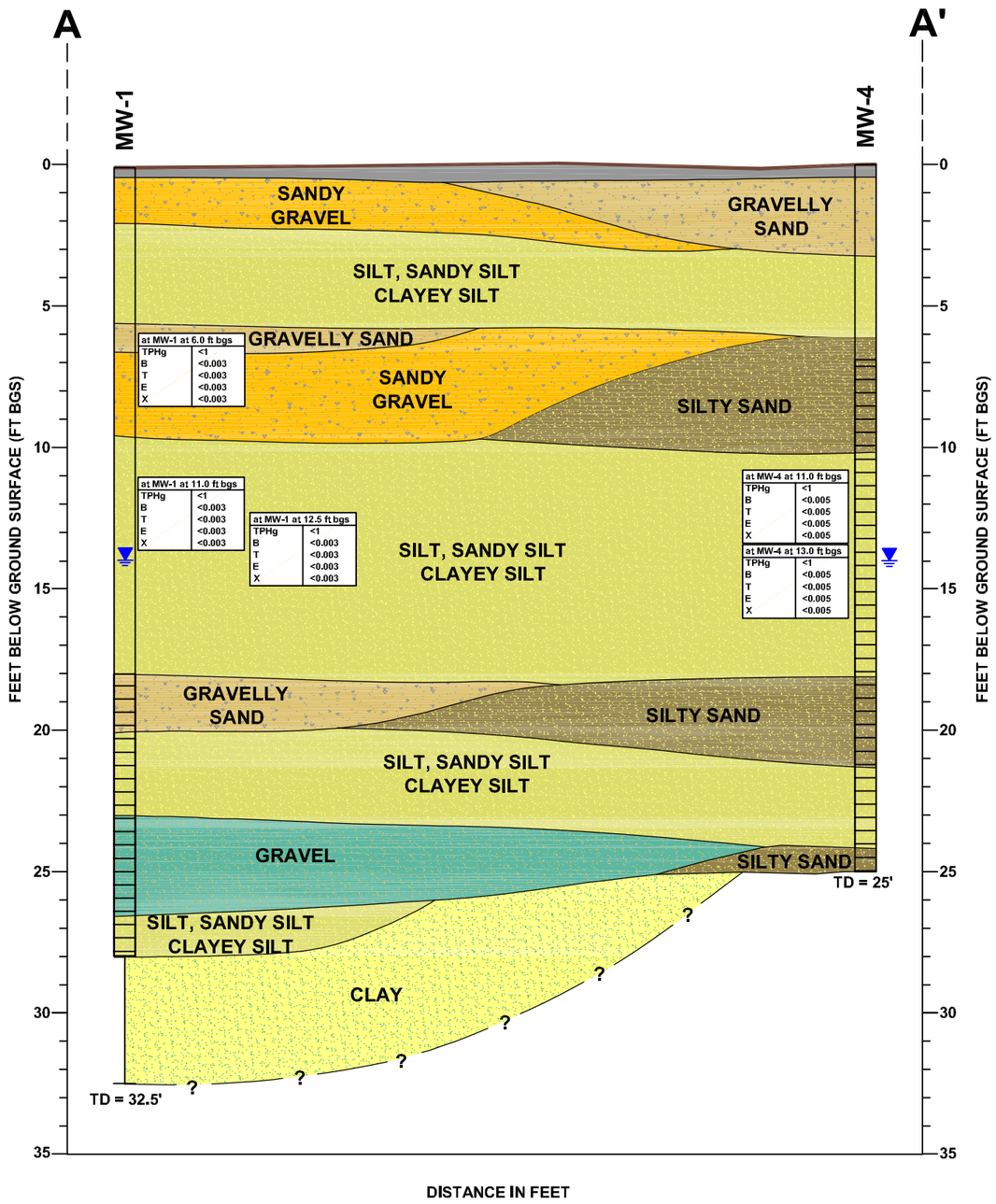
NOTE: SITE MAP ADAPTED FROM BROADBEMT & ASSOCIATES, INC. DATED 4/3/08. SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

FORMER BP SERVICE STATION NO. 11127
5425 MARTIN IUTHER kING JR. WAY
OAKLAND, CALIFORNIA
CASE CLOSURE SUMMARY REPORT

SITE MAP WITH HISTORICAL SOIL BORING AND CROSS SECTION LOCATIONS

ARCADIS

FIGURE
3



LEGEND

- CLAY (CH)
- SILT, SANDY SILT, CLAYEY SILT (ML)
- SILTY SAND (SM)
- GRAVELLY SAND (SW)
- SANDY GRAVEL (GW)
- GRAVEL (GP)
- ASPHALT
- —?— CONTACT INFERRED
- WELL SCREEN
- TD TOTAL DEPTH
- WATER LEVEL DURRING DRILLING
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- B BENZENE
- T TOLUENE
- E ETHYLBENZENE
- X XYLENE

0 5' 10'
VERTICAL SCALE

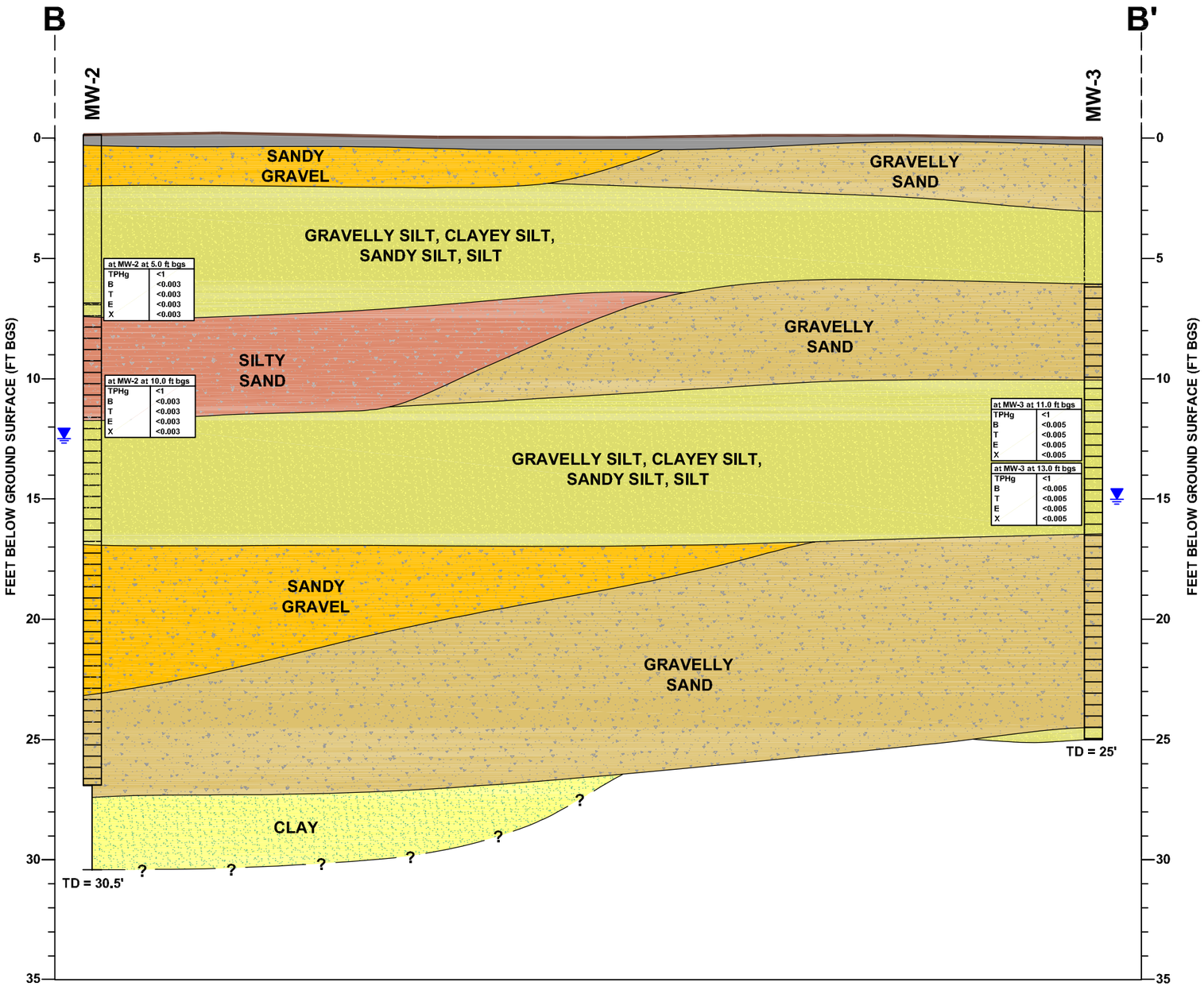
0 10' 20'
HORIZONTAL SCALE

FORMER BP STATION #11127
5425 MARTIN LUTHER KING, JR. WAY
OAKLAND, CALIFORNIA
CASE CLOSURE SUMMARY REPORT

GEOLOGIC CROSS SECTION A-A'

ARCADIS

FIGURE
4



LEGEND

- CLAY (CH)
- GRAVELLY SILT, CLAYEY SILT, SANDY SILT, SILT (ML)
- SILTY SAND (SW)
- GRAVELLY SAND (SW)
- SANDY GRAVEL (GW)
- ASPHALT
- —?— CONTACT INFERRED
- WELL SCREEN
- TD TOTAL DEPTH
- WATER LEVEL DURRING DRILLING
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- B BENZENE
- T TOLUENE
- E ETHYLBENZENE
- X XYLENE

0 5' 10'
VERTICAL SCALE

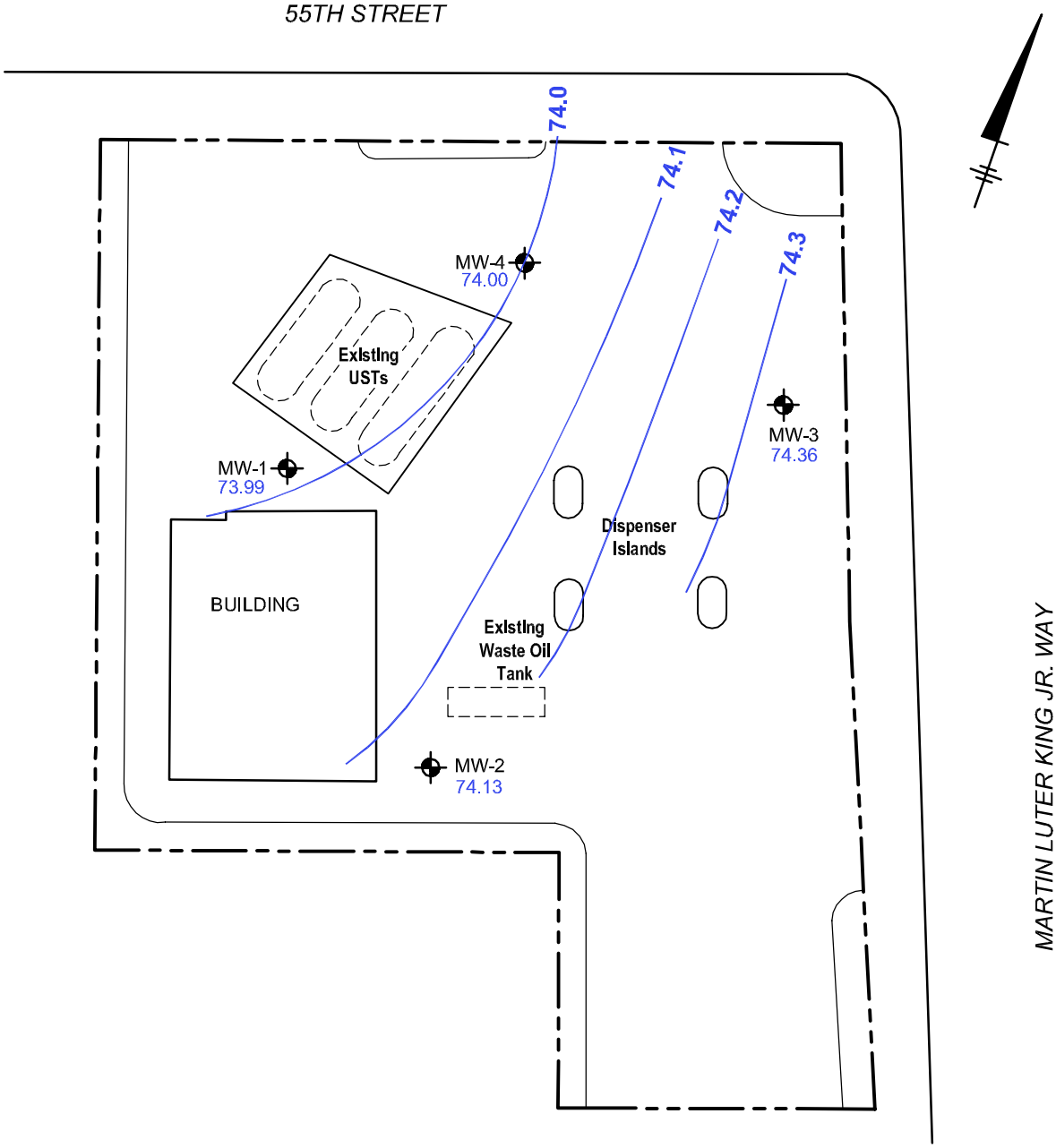
0 10' 20'
HORIZONTAL SCALE

FORMER BP STATION #11127
5425 MARTIN LUTHER KING, JR. WAY
OAKLAND, CALIFORNIA
CASE CLOSURE SUMMARY REPORT

GEOLOGIC CROSS SECTION B-B'

ARCADIS

FIGURE
5



LEGEND:

MW-1 GROUNDWATER MONITORING WELL

74.2 GROUNDWATER ELEVATION CONTOUR INTERVAL 0.1 FEET

73.99 GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (FT AMSL)

0 30' 60'

Approximate Scale: 1 in. = 30 ft.

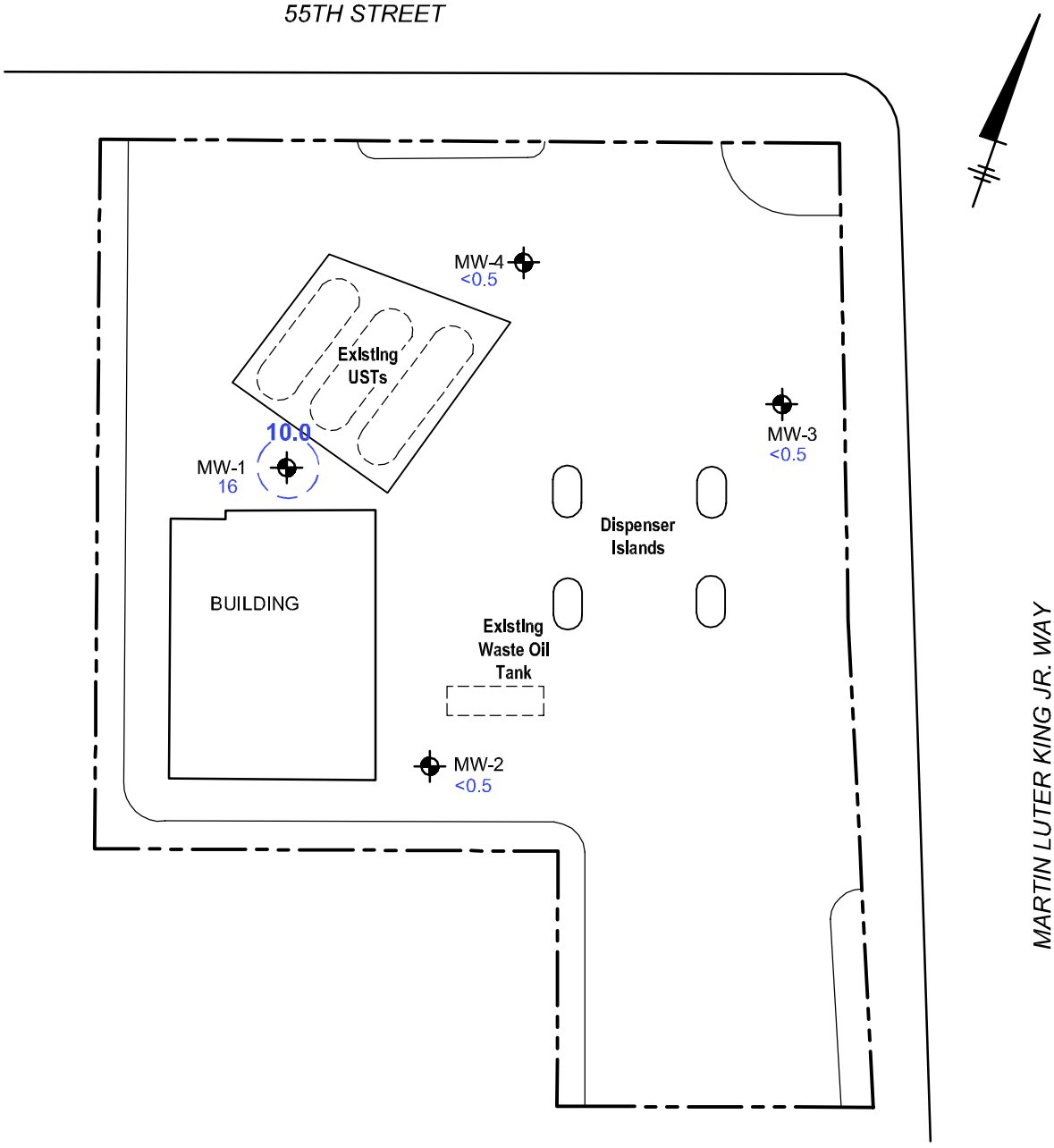
NOTE: SITE MAP ADAPTED FROM BROADBEMT & ASSOCIATES, INC. DATED 4/3/08. SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

FORMER BP SERVICE STATION NO. 11127
5425 MARTIN IUTHER kING JR. WAY
OAKLAND, CALIFORNIA
CASE CLOSURE SUMMARY REPORT

APRIL 2010 POTIOMETRIC SURFAC E CONTOURS

ARCADIS

FIGURE
6



LEGEND:

MW-1 GROUNDWATER MONITORING WELL

10 METHYL TERTIARY BUTYL ETHER (MTBE) ISOCONCENTRATION CONTOUR (10 µg/L)

16 MTBE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)

0 30' 60'

Approximate Scale: 1 in. = 30 ft.

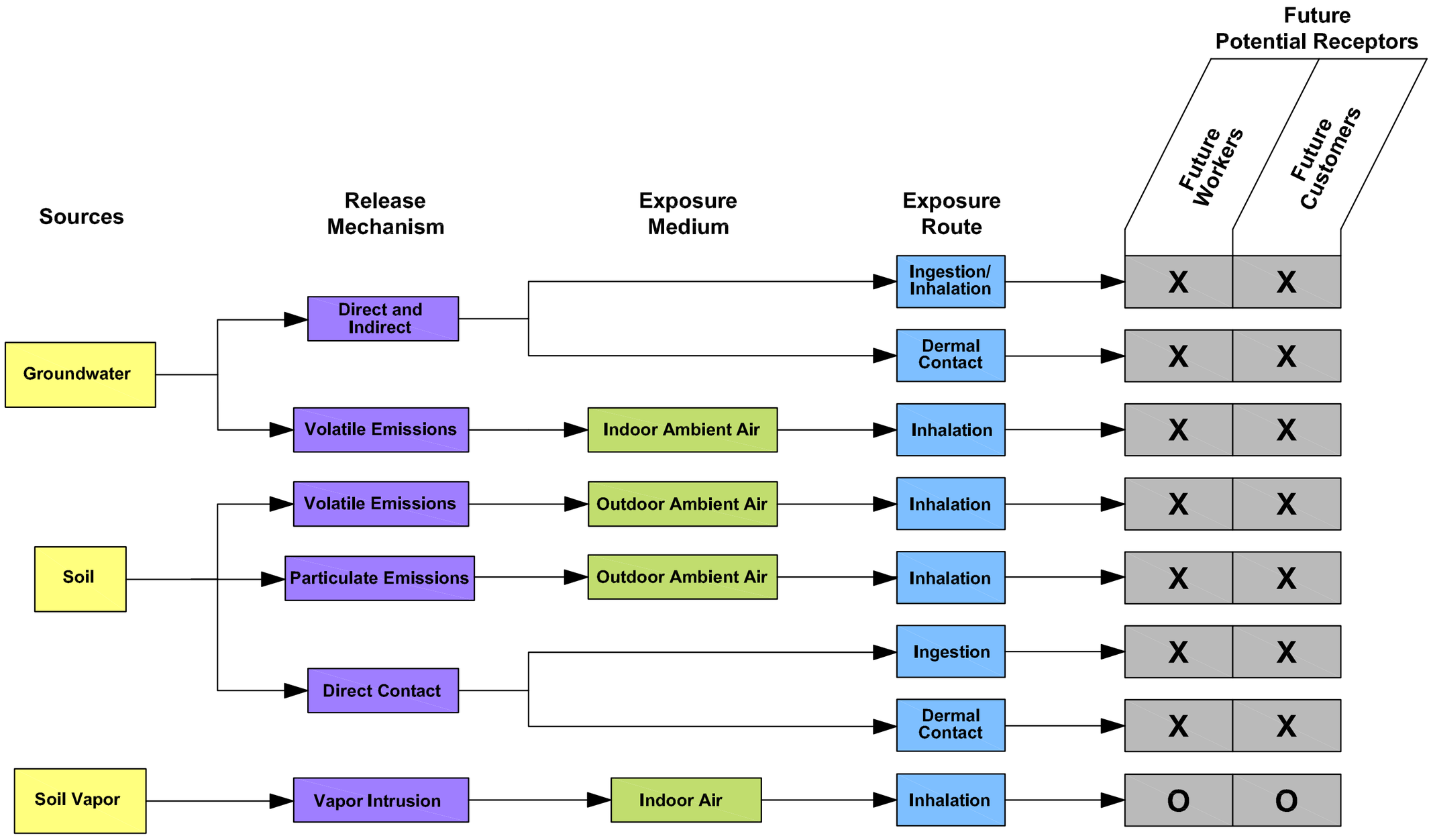
NOTE: SITE MAP ADAPTED FROM BROADBEMT & ASSOCIATES, INC. DATED 4/3/08. SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

FORMER BP SERVICE STATION NO. 11127
5425 MARTIN IUTHER kING JR. WAY
OAKLAND, CALIFORNIA
CASE CLOSURE SUMMARY REPORT

MTBE ISOCONCENTRATION CONTOURS (APRIL 2010)

ARCADIS

FIGURE 7



EXPLANATION

X INCOMPLETE PATHWAY

O COMPLETE PATHWAY

FORMER BP SERVICE STATION NO. 11127
5425 MARTIN IUTHER kING JR. WAY
OAKLAND, CALIFORNIA
CASE CLOSURE SUMMARY REPORT

CONCEPTUAL SITE MODEL

ARCADIS

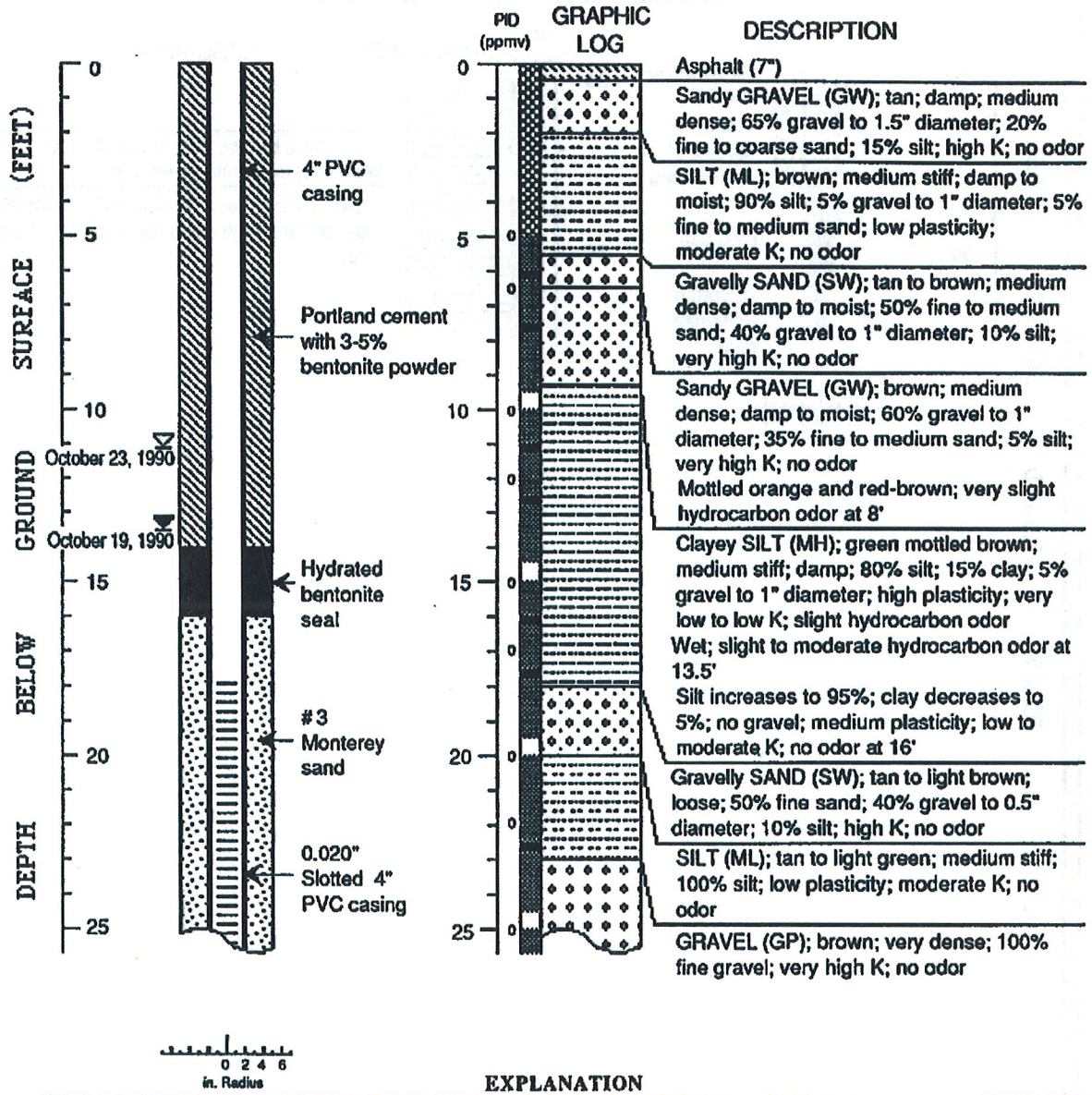
FIGURE 8

ARCADIS

Appendix **A**

Monitoring Well Construction Details and Soil Boring Logs

WELL MW-1 (BH-A)



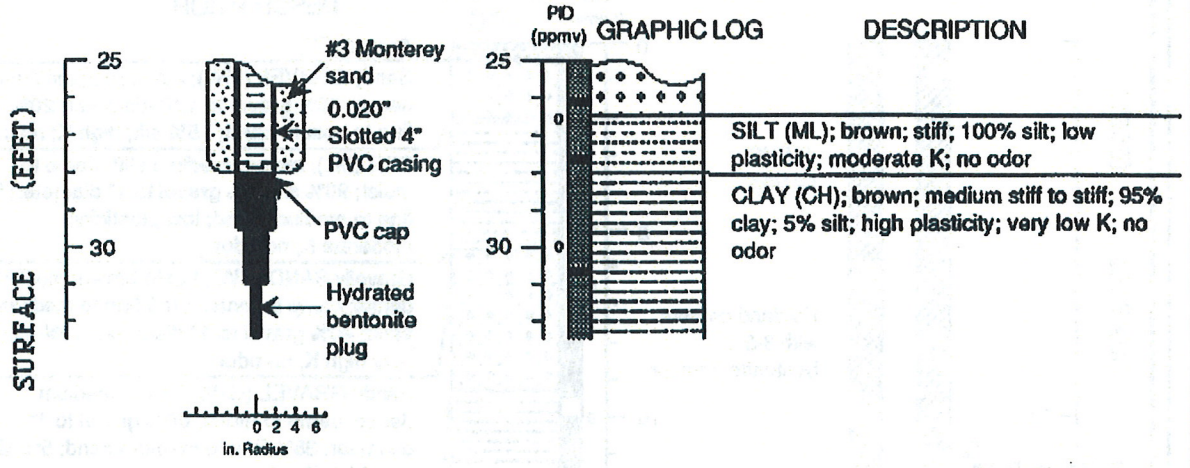
EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

Logged by:	Robert Kitay
Supervisor:	Joseph Theisen; RG 4981
Drilling Company:	Soils Exploration Services, Vacaville, CA
License Number:	C57-582696
Driller:	Rick Carr
Drilling Method:	Hollow stem auger
Date Drilled:	October 18, 1990
Well Head Completion:	4" locking well-plug with traffic-rated vaul
Type of Sampler:	Split barrel (1.5", 2", 2.5" ID)
Ground Surface Elevation:	83.12 feet above mean sea level

Boring Log and Well Construction Details - Well MW-1 (BH-A) BP Service Station #11127 Oakland, California

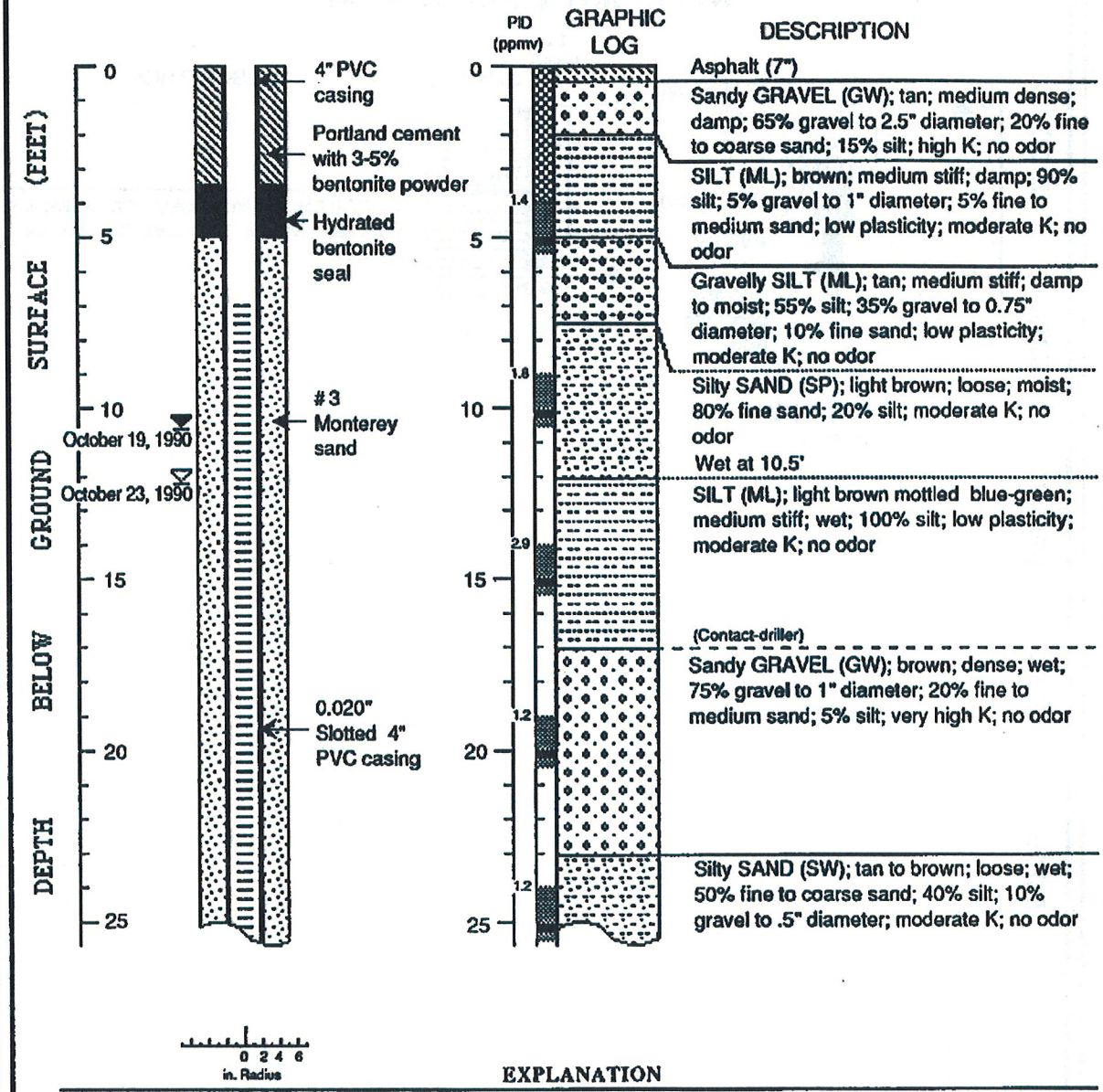
WELL MW-1 (BH-A) (cont.)



Boring Log and Well Construction Details - Well MW-1 (BH-A)

BP Service Station #11127
Oakland, California

WELL MW-2 (BH-B)



EXPLANATION

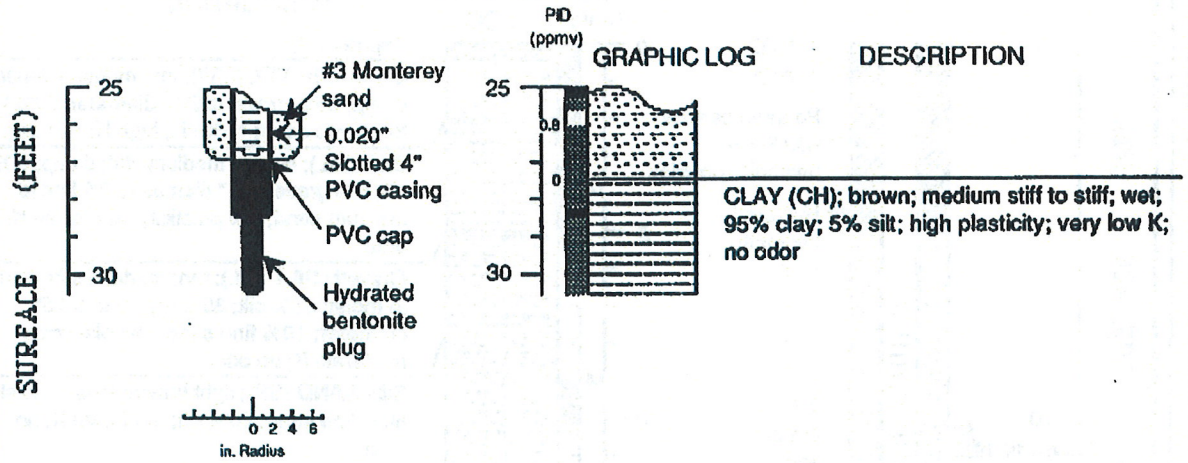
- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

Logged by:	Robert Kitay
Supervisor:	Joseph Theisen; RG 4981
Drilling Company:	Soils Exploration Services, Vacaville, CA
License Number:	C57-582696
Driller:	Rick Carr
Drilling Method:	Hollow stem auger
Date Drilled:	October 18, 1990
Well Head Completion:	4" locking well-plug with traffic-rated vaul
Type of Sampler:	Split barrel (1.5", 2", 2.5" ID)
Ground Surface Elevation:	83.89 feet above mean sea level

Boring Log and Well Construction Details - Well MW-2 (BH-B)

BP Service Station #11127
Oakland, California

WELL MW-2 (BH-B) (cont.)



Boring Log and Well Construction Details - Well MW-2 (BH-B)

BP Service Station #11127
Oakland, California

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

LOG OF BORING B-1/MW-3

SEE SITE PLAN

ALISTO PROJECT NO: 10-022-02 DATE DRILLED: 10/28/92

CLIENT: BP Oil Company

LOCATION: 5425 Martin Luther King, Jr. Way, Oakland, CA

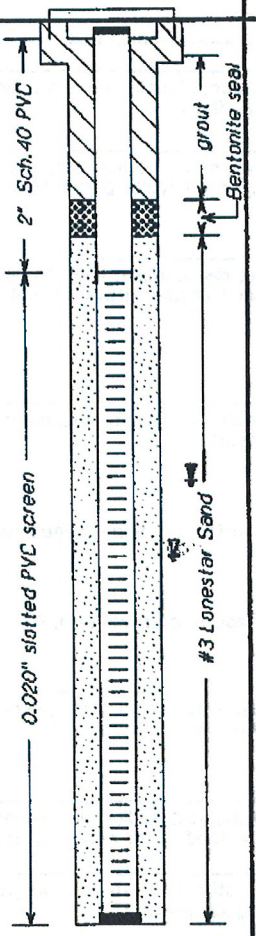
DRILLING METHOD: Hollow-stem Auger (8")

DRILLING COMPANY: Great Sierra Exploration CASING ELEVATION: 84.96 'MSL

LOGGED BY: Ted Moise APPROVED BY: A. Sevilla

BLOWS/6 IN.	PID VALUES	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
					SW	3" Asphalt. gravelly SAND: brown, damp, very loose, fine- to very coarse-grained sand, angular gravel to 1".
					ML	sandy SILT: dark brown, damp, soft, very fine- to fine-grained sand, minor clay, black at 3.5'.
8,4,4	1.3	5			SW	gravelly SAND: brown, damp, loose, fine- to coarse-grained sand, angular gravel to 1", minor fines.
4,4,5	1.4	10			ML	clayey SILT: gray/brown, damp, medium firm, minor very fine-grained sand.
4,5,7	1.3					Same: gray/green, stiff.
5,3,4	1.2	15				sandy SILT: gray/brown, wet, medium firm, very fine-grained sand, minor clay.
4,7,9	1.4				SW	gravelly SAND: brown/red, wet, medium dense, very fine- to very coarse-grained sand, gravel to 3/4", minor fines.
6,17,24		20				Same: dense.
3,8,8						(Insufficient Recovery 22-23.5 ').
5,8,8		25			ML	clayey SILT: gray/brown, wet, stiff, very fine-grained sand.
		30				

WELL DIAGRAM



ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

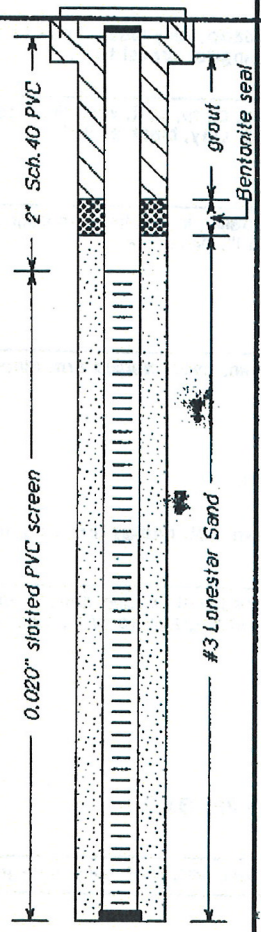
LOG OF BORING B-2/MW-4

SEE SITE PLAN

ALISTO PROJECT NO: 10-022-02 DATE DRILLED: 10/28/92
CLIENT: BP Oil Company
LOCATION: 5425 Martin Luther King, Jr. Way, Oakland, CA
DRILLING METHOD: Hollow-stem Auger (8")
DRILLING COMPANY: Great Sierra Exploration CASING ELEVATION: 82.70 'MSL
LOGGED BY: Ted Moise APPROVED BY: Al Sevilla

BLOWS/6 IN.	PID VALUES	DEPTH feet	SAMPLES	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
					SW	3" Asphalt. gravelly SAND: brown, damp, loose, fine- to coarse-grained sand, gravel to 1", minor fines.
					ML	sandy SILT: dark brown, damp, medium firm, fine- to coarse-grained sand, minor angular gravel to 3/4".
5,5,7	1.4	5			SM	silty SAND: dark brown, damp, loose, fine- to coarse-grained sand, abundant silt, minor angular gravel to 3/4".
1,2,2	1.2	10			ML	clayey SILT: gray/green, very moist, soft, minor very fine-grained sand, rootlets.
4,6,8	1.8					sandy SILT: tan, wet, stiff, very fine-grained sand, minor clay.
5,5,9		15				Same: gray/tan, minor rounded gravel to 3/4".
4,5,9					SM	silty SAND: brown/gray, wet, medium dense, very fine to fine-grained sand, abundant silt, minor clay.
3,5,8		20			ML	clayey SILT: brown/gray, wet, medium firm, abundant clay, minor very fine-grained sand, minor angular gravel to 1/2".
3,6,8		25			SM	silty SAND: brown, wet, stiff, fine- to coarse-grained sand, abundant silt, minor angular gravel to 1/2".
		30				

WELL DIAGRAM



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Appendix **B**

Groundwater Sampling Protocols

Alisto Field Procedures

Field activities were performed in accordance with the procedures and guidelines of the Alameda County Health Care Services Agency and the California Regional Water Quality Control Board, San Francisco Bay Region.

Before purging and sampling, the groundwater level in each well was measured from a permanent mark on top of the casing to the nearest 0.01 foot using an electronic sounder. The depth to groundwater and top of casing elevation data were used to calculate the groundwater elevation in each well.

Before sample collection, each well was purged 3 casing volumes, while recording field readings of pH, temperature, and electrical conductivity. Groundwater samples were collected for laboratory analysis by lowering a bottom-fill, disposable bailer to just below the water level in the well. The samples were transferred from the bailer into laboratory-supplied containers.

STRATUS ENVIRONMENTAL

FIELD PROCEDURES FOR GROUNDWATER SAMPLING

The sampling procedures for groundwater monitoring events are contained in this appendix.

Groundwater and Liquid-Phase Petroleum Hydrocarbon Depth Assessment

Prior to measuring the depth to liquid in the well, the well caps are removed and the liquid level is allowed to stabilize. A water/hydrocarbon interface probe is used to assess the liquid-phase petroleum hydrocarbon (LPH) thickness, if present, and a water level indicator is used to measure the groundwater depth in monitoring wells that do not contain LPH. Depth to groundwater or LPH is measured from a datum point at the top of each monitoring well casing. The datum point is typically a notch cut in the north side of the casing edge. If a water level indicator is used, the tip is subjectively analyzed for hydrocarbon sheen.

Subjective Analysis of Groundwater

Prior to purging, a water sample is collected from the monitoring well for subjective assessment. The sample is retrieved by gently lowering a clean, disposable bailer to approximately one-half the bailer length past the air/liquid interface. The bailer is then retrieved, and the sample contained within the bailer is examined for floating LPH and the appearance of a LPH sheen.

Monitoring Well Sampling

In many cases, determining whether to purge or not to purge wells prior to sample collection is made in the field and is often based on depth to water relative to the screen interval of the well. Site-specific field data sheets present details associated with the purge method and equipment used.

Monitoring wells, when purged, use a pump or bailer until pH, temperature, and conductivity of the purge water has stabilized and a minimum of three well volumes of water has been removed. Field measuring equipment is calibrated and maintained according d to the manufacturers' instructions. If three well volumes cannot be removed in one half hour's time, the well is allowed to recharge to 80% of original level. After recharging, a groundwater sample is then collected from each of the wells using disposable bailers.

A Teflon bailer, electric submersible or bladder pump will be the only equipment used for well sampling. When samples for volatile organic analysis are being collected, the pump flow will be regulated at approximately 100 milliliters per minute to minimize pump effluent turbulence and aeration. Glass bottles of at least 40 milliliters volume and fitted with Teflon-lined septa will be used in sampling for volatile organics. These bottles will be filled completely to prevent air accumulation in the bottle. A positive meniscus forms with the bottle is completely full. A convex Teflon septum will be placed over the positive meniscus to eliminate air. After the bottle is capped, it is inverted and tapped to verify that it contains no air bubbles. The sample containers for other parameters will be filled, filtered as required,

and capped. Glass and plastic bottles used by Stratus to collect groundwater samples are supplied by the laboratory.

Groundwater Sample Labeling and Preservation

Samples are collected in appropriate containers supplied by the laboratory. All required chemical preservation is added to the bottles prior to delivery to Stratus. Sample label information includes a unique sample identification number, job identification number, date and time. After labeling, all groundwater samples are placed in a Ziploc® type bags and placed in an ice chest cooled to approximately 4^{o} Celsius. Upon arriving at Stratus' office the samples are transferred to a locked refrigerator cooled to approximately 4^{o} Celsius. Chemical preservation is controlled by the required analysis and is noted on the chain-of-custody form. Trip and temperature blanks supplied by the laboratory accompany the groundwater sample containers and groundwater samples.

Sample Identification and Chain-of-Custody Procedures

Sample identification and chain-of-custody procedures document sample possession from the time of collection to ultimate disposal. Each sample container submitted for analysis has a label affixed to identify the job number, sampler, date and time of sample collection, and a sample number unique to that sample. This information, in addition to a description of the sample, field measurements made, sampling methodology, names of on-site personnel, and any other pertinent field observations, is recorded in the field records. The samples are analyzed by a California-certified laboratory.

A chain-of-custody formed is used to record possession of the sample from time of collection to its arrival at the laboratory. When the samples are shipped, the person in custody of them relinquishes the samples by signing the chain-of-custody form and noting the time. The sample-control officer at the laboratory verifies sample integrity and confirms that the samples are collected in the proper containers, preserved correctly, and contain adequate volumes for analysis. These conditions are noted on a Laboratory Sample Receipt Checklist that becomes part of the laboratory report upon request.

If these conditions are met, each sample is assigned a unique log number for identification throughout analysis and reporting. The log number is recorded on the chain-of-custody form and in the legally-required log book maintained by the laboratory. The sample description, date received, client's name, and other relevant information is also recorded.

Equipment Cleaning

All reusable sample equipment is cleaned using phosphate-free detergents and rinsed with de-ionized water.

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Appendix **C**

Alameda County Environmental Health Case Closure Summary

DRAFT

Alameda County Environmental Health

CASE CLOSURE SUMMARY
LEAKING UNDERGROUND FUEL STORAGE TANK – LOCAL OVERSIGHT PROGRAM

I. AGENCY INFORMATION Date: August 5, 2010

Agency Name: Alameda County Environmental Health	Address: 1131 Harbor Bay Parkway
City/State/Zip: Alameda, CA 94502-6577	Phone: 510.777.2478
Responsible Staff Person: Paresh Khatri	Title: Hazardous Materials Specialist

II. CASE INFORMATION

Site Facility Name: BP station #11127		
Site Facility Address: 5425 Martin Luther King Jr. Way, Oakland, CA		
RB Case No.: 01-0220	Local Case No.: RO0000241	LOP Case No.: RO0000241
URF Filing Date:	Global ID No.: T0600100206	APN: 14-1199-31-1

Responsible Parties	Addresses	Phone Numbers
Atlantic Richfield Company	P.O. Box 1257, San Ramon, CA 94583	(925) 275-3801

Tank I.D. No	Size in Gallons	Contents	Closed In Place/Removed?	Date
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
Piping			--	--

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and Type of Release: unknown	
Site characterization complete? Yes	Date Approved By Oversight Agency:

Monitoring wells installed? Yes	Number: 4	Proper screened interval? Yes
Highest GW Depth Below Ground Surface: 7.88 feet (below top of casing)	Lowest Depth: 12.46 feet (below top of casing)	Flow Direction: east
Most Sensitive Current Use: industrial		

Summary of Production Wells in Vicinity: One irrigation well and two industrial wells are located within a 2,500-foot radius of site. Alameda County Public Works Agency does not allow the distribution of the well IDs.	
Are drinking water wells affected? No	Aquifer Name: East Bay Plain groundwater sub-basin
Is surface water affected? No	Nearest SW Name: San Francisco Bay
Off-Site Beneficial Use Impacts (Addresses/Locations): None	
Reports on file? Yes	Where are reports filed? Alameda County 1131 Harbor Bay Parkway, Alameda, CA 94502

TREATMENT AND DISPOSAL OF AFFECTED MATERIAL

Material	Amount (Include Units)	Action (Treatment or Disposal w/Destination)	Date
Tank	--	--	--
Piping	--	--	--
Free Product	--	--	--
Soil	--	--	--
Groundwater	--	--	--

MAXIMUM DOCUMENTED CONTAMINANT CONCENTRATIONS BEFORE AND AFTER CLEANUP
(Please see Attachments for additional information on contaminant locations and concentrations)

Contaminant	Soil (mg/kg)		Water (µg/L)	
	Before	After[2]	Before[3]	After[4]
TPH (Gas)	Non-detect in soil samples	Not sampled	2,300 (MW-2; Feb 1992)	Non-detect in groundwater samples
TPH (Diesel)	Non-detect in soil samples	Not sampled	170 (MW-2; Oct 1990)	Non-detect in groundwater samples
TPH (Motor Oil)	Not sampled	Not sampled	Not sampled	Not sampled
TRPH	Not sampled	Not sampled	Not sampled	Not sampled
Benzene	Non-detect in soil samples	Not sampled	6.7 (MW-1; Feb 1992)	Non-detect in groundwater samples
Toluene	Non-detect in soil samples	Not sampled	3.8 (MW-1; Sept 1992)	Non-detect in groundwater samples
Ethylbenzene	Non-detect in soil samples	Not sampled	47 (MW-2; Feb 1992)	Non-detect in groundwater samples
Xylenes	Non-detect in soil samples	Not sampled	360 (MW-2; Feb 1992)	Non-detect in groundwater samples
MTBE	Not sampled	Not sampled	480 (MW-1; July 1996)	16 (MW-1)
Lead	Not sampled	Not sampled	Not sampled	Not sampled

Note: Soil results are from samples collected at depths of 13 feet bgs or shallower.
[2] "After" results are represented by the current maximum concentration at the site.
[3] Other fuel oxygenates (groundwater [µg/L] before cleanup): 1.2-DCA <0.5 µg/L,
[4] Other fuel oxygenates (groundwater [µg/L] after cleanup): TBA <4 µg/L, DIPE <0.5 µg/L, ETBE <0.5 µg/L, TAME <0.5 µg/L, 1.2-DCA <0.5 µg/L, EDB <0.5 µg/L, ethanol <100 µg/L

IV. CLOSURE

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? **Yes**		
Does completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? **Yes**		
Does corrective action protect public health for current land use? It does not appear that former contaminants present significant risk to human health based upon current land use and conditions.		
Site Management Requirements: Alameda County Environmental Health must be notified as required by Government Code Section 65850.2.2.		
Should corrective action be reviewed if land use changes? **No**		
Was a deed restriction or deed notification filed? **No**		Date Recorded: --
Monitoring Wells Decommissioned: **Upon Case Closure Approval**	Number Decommissioned: **All**	Number Retained: **None**
List Enforcement Actions Taken: **NA**		
List Enforcement Actions Rescinded: **NA**		

V. ADDITIONAL COMMENTS, DATA, ETC.

Considerations and/or Variances:

Very low concentrations of MTBE were detected in groundwater at concentrations up to 16 µg/L (April 2010), which does not exceed the ESLs where groundwater is a potential source for vapor intrusion.

Conclusion:

VI. LOCAL AGENCY REPRESENTATIVE DATA

Prepared by: Paresh Khatri	Title: Hazardous Materials Specialist
Signature:	Date:
Approved by: Donna L. Drogos, P.E.	Title: Supervising Hazardous Materials Specialist
Signature:	Date:

This closure approval is based upon the available information and with the provision that the information provided to this agency was accurate and representative of site conditions.

VII. REGIONAL BOARD NOTIFICATION

Regional Board Staff Name: Cherie McCaulou	Title: Engineering Geologist
RB Response:	Date Submitted to RB:
Signature:	Date:

VIII. MONITORING WELL DECOMMISSIONING

Date Requested by ACEH: TBD	Date of Well Decommissioning Report:	
All Monitoring Wells Decommissioned:	Number Decommissioned:	Number Retained:
Reason Wells Retained: No monitoring wells installed or retained		
Additional requirements for submittal of groundwater data from retained wells:		
ACEH Concurrence - Signature:		Date:

Attachments:

1. Tables 1 and 2 (comparison of maximum residual contamination to applicable ESLs or approved cleanup goals).
2. Site figures provided in Case Closure Summary Report.
3. Analytical data tables for soil, groundwater, depth to groundwater, etc. are provided in Case Closure Summary Report.
4. Boring logs/monitoring well construction details are provided in Appendix C of the Case Closure Summary Report.

This document and the related CASE CLOSURE LETTER & REMEDIAL ACTION COMPLETION CERTIFICATE shall be retained by the lead agency as part of the official site file.

Environmental Impacts in Soil
BP 11120
6400 Dublin Boulevard, Dublin, California

Table 1. Comparison of Maximum Residual Soil Concentrations at the Site to Relevant Cleanup Standards (mg/kg)

	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)
Maximum Residual Soil Concentrations at Site	<1	<0.003	<0.003	<0.003	<0.003	Not sampled
RWQCB, Region 2 ESLs[1]	83[2]	0.044[2]	2.9[2]	3.3[2]	2.3[2]	0.023[2]

Notes:

Depth to water ranges between 7.88 and 12.46 feet below top of casing; therefore, all soil results are from sample depths of 13 feet bgs or shallower (Tables 1 and 2).

[1]Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs) *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, May 2008. ESL value for shallow soils (≤ 3 meters bgs) where groundwater is a current or potential source of drinking water – Commercial/Industrial Land Use (Table A).

[2]ESL value for shallow soils (≤ 3 meters bgs) where groundwater is a current or potential source of drinking water – Commercial/Industrial Land Use (Table A).

Environmental Impacts in Groundwater
BP 11120
6400 Dublin Boulevard, Dublin, California

Table 2. Comparison of Most Current Maximum Residual Groundwater Concentrations at the Site to Relevant Cleanup Standards (µg/L)

	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TBA (µg/L)
Maximum Residual Groundwater Concentrations at Site	<50	<0.5	<0.5	<0.5	<1	16	<4
RWQCB, Region 2 ESLs[1]	100[2]	1[2]	40[2]	30[2]	20[2]	5[2]	100[2]

[1] Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs) *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, May 2008.
[2] ESL value for shallow soils (≤ 3 meters bgs) where groundwater is a current or potential source of drinking water – Commercial/Industrial Land Use (Table A).

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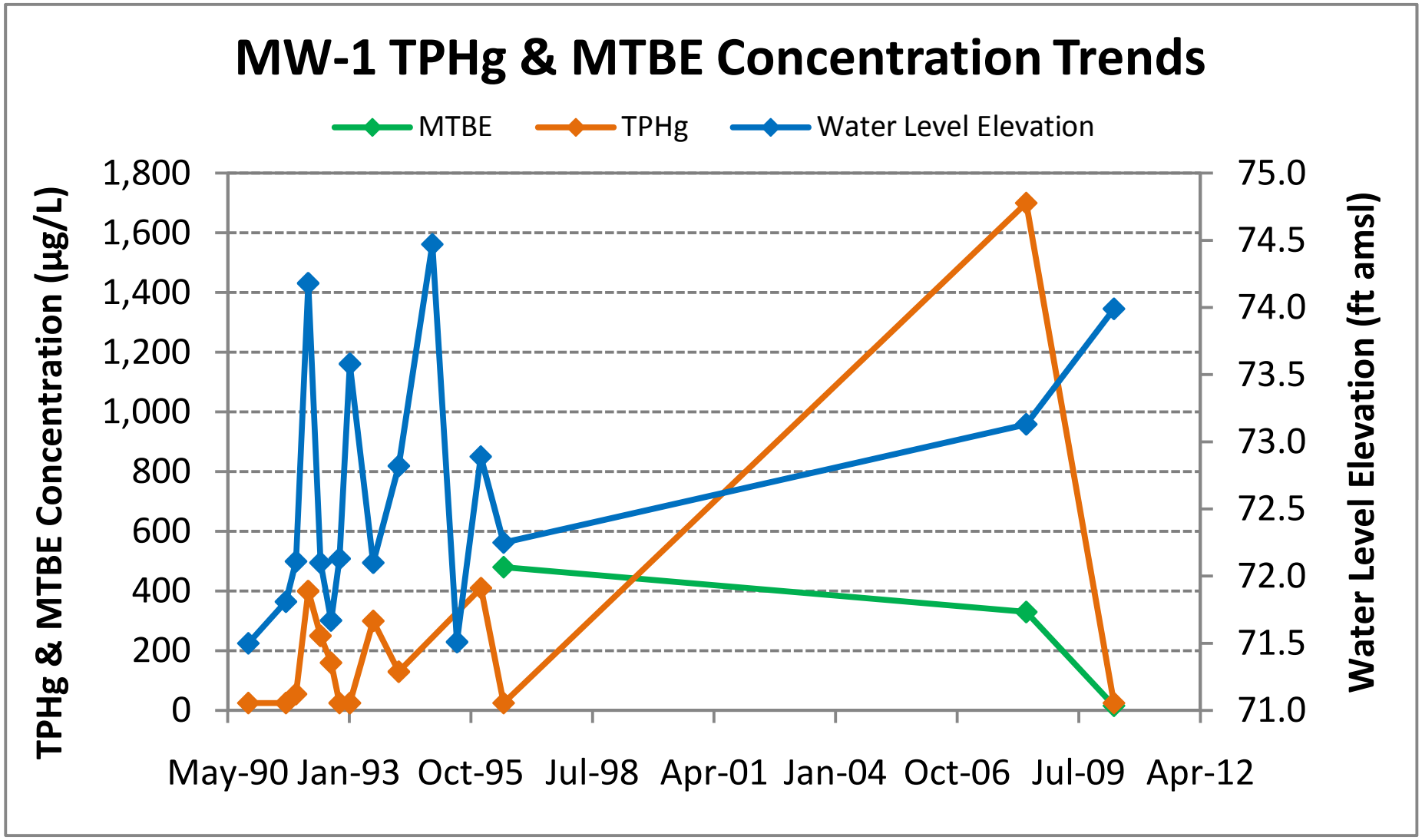
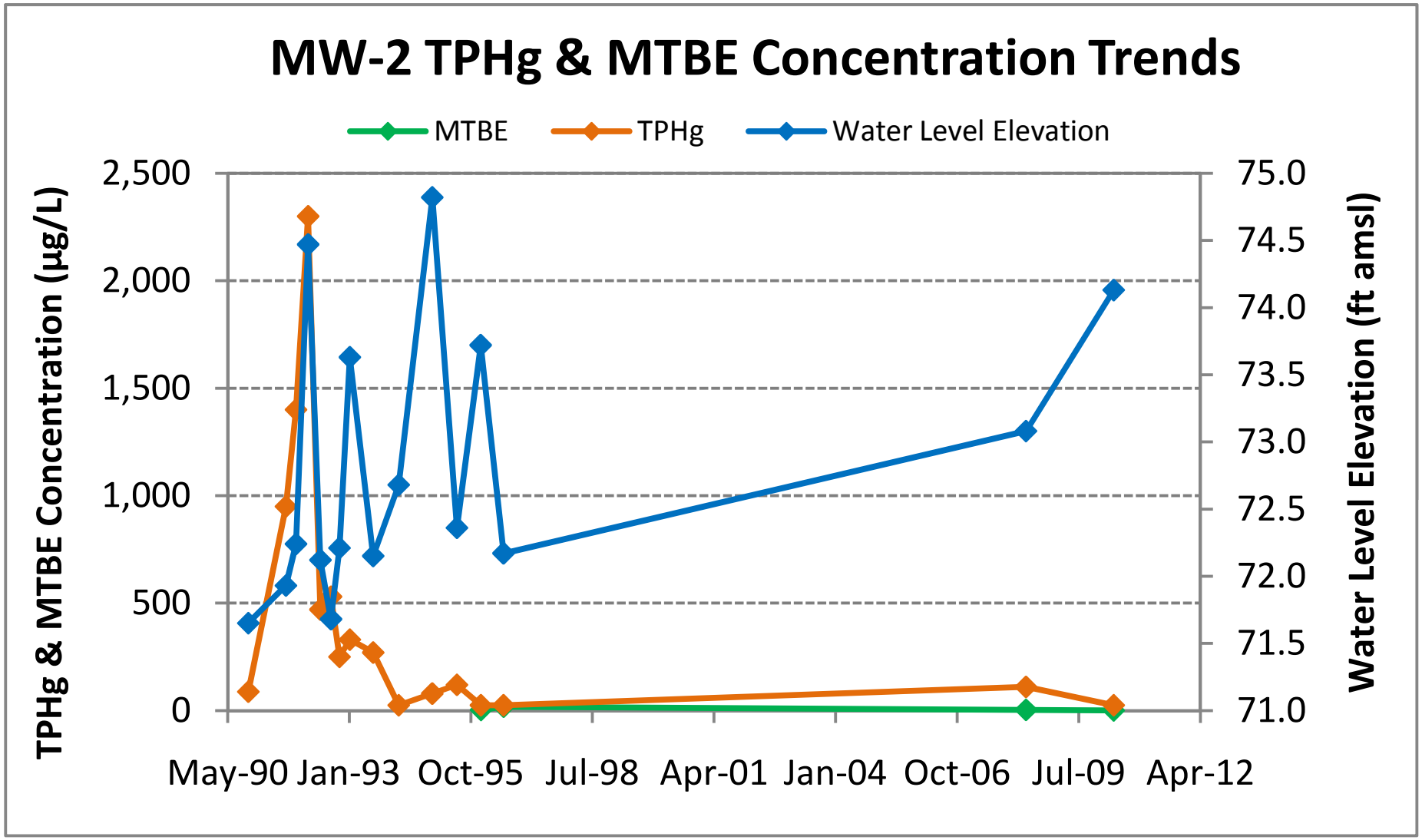
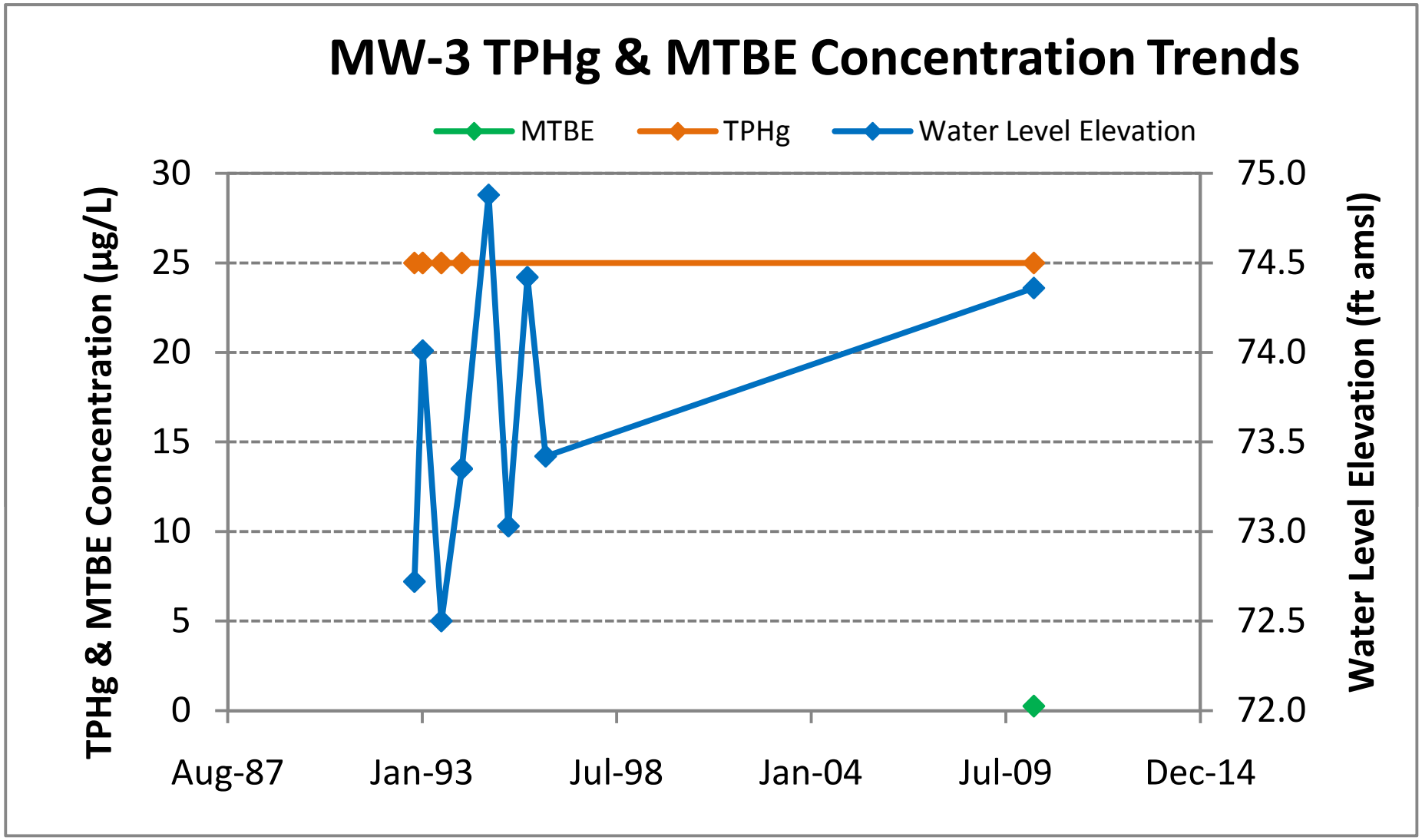
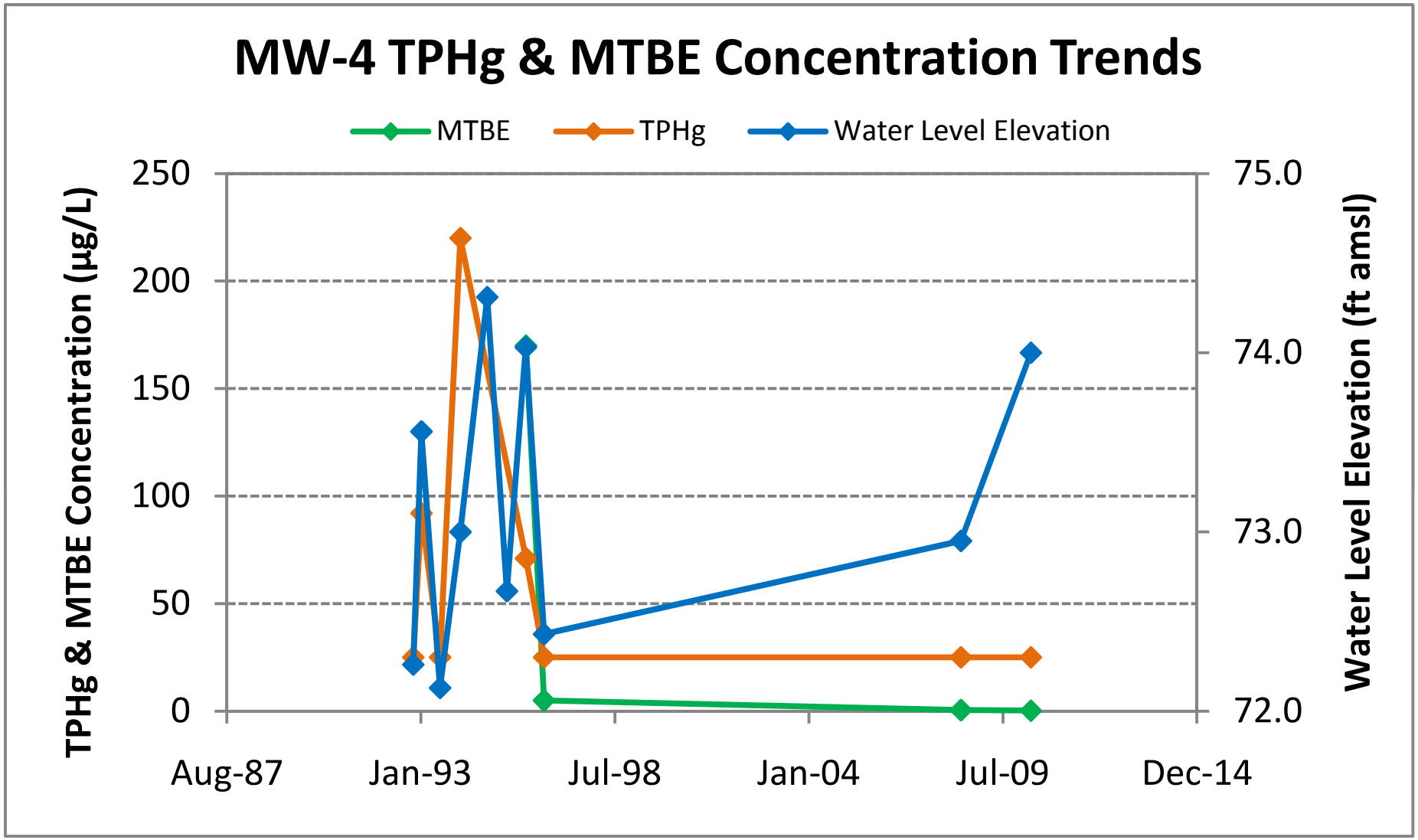
Appendix **D**

Concentration versus Time Graphs
for TPHg and MTBE


MW-1 TPHg & MTBE Concentration Trends
MTBE
TPHg
Water Level Elevation
TPHg & MTBE Concentration (µg/L)
Water Level Elevation (ft amsl)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
75.0
74.5
74.0
73.5
73.0
72.5
72.0
71.5
71.0
May-90
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12


MW-2 TPHg & MTBE Concentration Trends
MTBE
TPHg
Water Level Elevation
TPHg & MTBE Concentration (µg/L)
Water Level Elevation (ft amsl)
2,500
2,000
1,500
1,000
500
0
75.0
74.5
74.0
73.5
73.0
72.5
72.0
71.5
71.0
May-90
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12


MW-3 TPHg & MTBE Concentration Trends
MTBE
TPHg
Water Level Elevation
TPHg & MTBE Concentration (µg/L)
Water Level Elevation (ft amsl)
30
25
20
15
10
5
0
75.0
74.5
74.0
73.5
73.0
72.5
72.0
Aug-87
Jan-93
Jul-98
Jan-04
Jul-09
Dec-14


MW-4 TPHg & MTBE Concentration Trends
MTBE
TPHg
Water Level Elevation
TPHg & MTBE Concentration (µg/L)
Water Level Elevation (ft amsl)
250
200
150
100
50
0
75.0
74.0
73.0
72.0
Aug-87
Jan-93
Jul-98
Jan-04
Jul-09
Dec-14