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Alameda County
Environmental Health

ENVIRONMENT

Recommendation for Case Closure
Former Atlantic Richfield Company
Station No. 11102
100 MacArthur Boulevard
Oakland, California 94610
ACEH Case # RO0000456

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

Submitted by:

ARCADIS U.S., Inc

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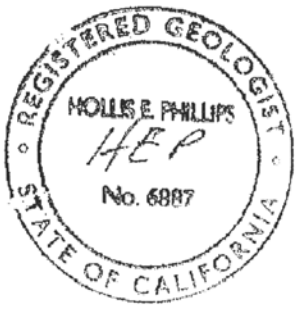
Hollis E. Phillips, P.G.
Project Manager/Principal Geologist



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Our ref:
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Atlantic Richfield Company

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March 12, 2012

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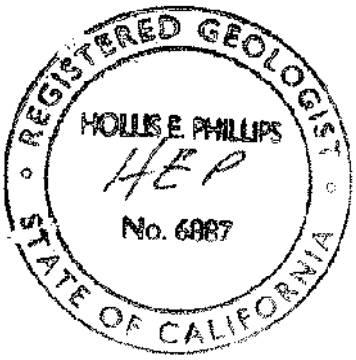

Recommendation for Case Closure

Former Atlantic Richfield Company Station No. 11102

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Tables

Figures

Appendices

Acronyms/Abbreviations

ACEH	Alameda County Environmental Health
Alton	Alton Geoscience Inc.
Alisto	Alisto Engineering Group
ARCADIS	ARCADIS U.S.
ARCO	Atlantic Richfield Company
BAI	Broadbent Associates, Inc
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
Cambria	Cambria Environmental Technology Inc.
COC	contaminant of concern
CPT	cone penetrometer testing
cy	cubic yard
DTSC	Department of Toxic Substances Control
DTW	depth to water
DWR	Department of Water Resources
ft	feet

EBMUD	East Bay Municipal Utility District
EMCON	EMCON Associates, Inc.
EPA	Environmental Protection Agency
ESL	Environmental Screening Level
Gph	gallons per hour
GSI	GeoStrategies, Inc
GWET	Groundwater extraction and treatment
HVOCs	Halogenated Volatile Organic Compounds
KEI	Kaprealian Engineering, Inc.
MDL	Method detection limit
mg/kg	milligram per kilogram
mg/L	milligram per liter
MTBE	methyl tertiary butyl ether
MW	monitoring well
Pacific	Pacific Environmental Group, Inc.
Ppb	parts per billion
Ppm	parts per million
Ppmv	parts per million volume
RESNA	RESNA Industries, Inc.
RWQCB	Regional Water Quality Control Board, San Francisco Bay

SECOR	Secor International, Inc.
Site	Former Atlantic Richfield Company Station No. 11266, located at 1541 Park Street, Alameda, California
SPH	separate phase hydrocarbon
SRS	Sensitive receptor survey
TBA	Tert-butyl alcohol
TCLP	Toxicity characteristic leaching procedure
TOG	total oil and grease
TPH	total petroleum hydrocarbons
TPHd	total petroleum hydrocarbons as diesel
TPHg	total petroleum hydrocarbons as gasoline
TPHo	total petroleum hydrocarbons as oil
URS	URS Corporation, Inc.
UST	underground storage tank
VOC	volatile organic compounds
Water Board	California Regional Water Quality Control Board
WDC	WDC Exploration & Wells
WET	Waste extraction test
µg/L	microgram per liter

1. Introduction

ARCADIS has prepared this *Recommendation for Case Closure* (Report) for the Former Atlantic Richfield Company (ARCO) Service Station No. 11102 (Site) located at 100 MacArthur Boulevard in Oakland California (**Figure 1**). Case closure is warranted for the site based on the following information:

- Free product has never been observed in any of the monitoring wells or excavated areas on-site.
- Current groundwater concentrations are orders of magnitude below historical maximums, are continuing to decrease with time, or are not detected above the detection limit, indicating that natural attenuation processes are occurring at the Site.
- The Site has been adequately characterized.
- The low-level plume is decreasing in size.
- No sensitive receptors are 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.

The report is organized into the following sections:

- Section 1 provides the Site background and Geology/Hydrogeology.
- Section 2 provides the Previous Site Investigations.
- Section 3 presents the Extent of Soil and Groundwater Impacts.
- Section 4 provides the Beneficial Uses.
- Section 5 presents Remedial Activities.
- Section 6 presents Remedial Effectiveness.

- Section 7 presents Conclusions with Recommendations for Case Closure
- Section 8 presents References.

1.1 Site Background

The Site is located at 100 MacArthur Boulevard in Oakland, California. It is an active 76-branded gasoline station. BP acquired the property from Mobil Oil Corporation in 1989. Although BP sold the property to TOSCO Marketing Corporation in 1994, it retained the environmental liability for contamination released prior to this transfer. Current improvements to the Site include three fiberglass gasoline underground storage tanks (USTs) (6,000-gallons, 10,000-gallons, and 12,000-gallons) believed to have been installed in 1990, one 1,000-gallon double-walled fiberglass underground waste oil storage tank installed in 1988, two fuel dispenser islands with a total of eight dispensers, and a convenience store building with three vehicle service bays. The majority of the Site surface is paved with cement and asphalt. A Site Location Map is provided as **Figure 1**. A Site map is included as **Figure 2**.

The Site is bound by MacArthur Boulevard to the southwest, Oakland Avenue to the southeast, Harrison Street to the northwest and single-family residential dwellings to the northeast (uphill from the Site and its retaining wall). Interstate 580 and the associated on- and off-ramps are located across MacArthur Boulevard to the southwest. A small parking lot and several small commercial buildings are located across Oakland Avenue to the southeast. A Quik Stop retail gasoline station is located across Harrison Street to the northwest at 96 West MacArthur Boulevard. The Quik Stop gasoline station is Former Unocal Station No.1871, an active fuel leak case (ACEH Case No.RO0000455 / GeoTracker Global ID No.T0600101493).

1.2 Site Geology and Hydrogeology

The Site is situated at an approximate elevation of 90 feet above mean sea level. The Site is relatively flat, but slopes slightly to the west, consistent with the local topography. Sediments encountered at the Site consist primarily of silty clays or clayey silts with small lenses of sand and gravel, extending from the ground surface to the total depth investigated, approximately 36 ft bgs.

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

Groundwater flow direction generally correlates to topography. Flow direction and velocity are also influenced by buried stream channels that typically are oriented in an east to west direction. Historic groundwater flow direction at the Site has varied between south and west/northwest, but has been predominantly southwest to west. The nearest natural drainage is Glen Echo Creek, located approximately 1,450 feet northwest of the Site. Glen Echo Creek flows generally northeast to southwest near the Site vicinity (BAI 2009).

2. Previous Site Investigations

Several investigations have been conducted at the site since 1988. Historical Soil Analytical Data is presented in **Table 1**. Historical Groundwater Analytical Data is presented in **Table 2**. Locations of soil borings and monitoring wells (MWs) are presented on **Figure 2**. The historical lateral extent of TPHg and benzene soil impacts in the vadose zone is provided on **Figures 3** and **4**, respectively. Geologic Cross Section Locations are presented on **Figure 5**. The vertical extent of TPHg and benzene soil impacts is provided on **Figure 6** and **7**. Monitoring Well Construction Details and Soil Boring Logs are presented in **Appendix A**

2.1.1 UST Removal – 1988

Kaprealian Engineering, Inc. (KEI) observed the removal of a steel underground waste oil storage tank, variously reported to have been of 550-gallon or 280-gallon capacity, on 19 September 1988. Work was performed for Mobil Oil Corporation prior to the sale of the property to BP. KEI reported that no holes or cracks were evident in the tank. However, upon UST removal a representative of Alameda County Environmental Health (ACEH) reportedly observed a hole in the UST and petroleum product “dripping” from the west sidewall (ERI 1998). Two soil samples were collected during the tank removal activities: sample WO was collected from the bottom of the tank pit and sample Comp WO was composed of two grab samples collected from the excavated soil stockpiled on-site, which equaled approximately 15 cubic yards (cy). Total petroleum hydrocarbons in the diesel range (TPHd) were reported at concentrations of 2.0 parts per million (ppm) and 1,700 ppm in samples WO and Comp WO, respectively. Total oil & grease (TOG) was reported at concentrations of 24 ppm and 65,000 ppm in samples WO and Comp WO, respectively. No volatile organic compounds (VOCs) were detected above the laboratory reporting limit in sample WO (KEI 1988).

2.1.2 Monitoring Well Installation – 1989

On 25 and 26 October 1989 Alton Geoscience, Inc. (Alton) observed the advancement of three soil borings onsite. Each boring was drilled to 33 feet below ground surface (ft bgs) and converted into 4-inch diameter groundwater monitoring wells (MW-1, MW-2, and MW-3). Refer to **Figure 2** for MW locations. The wells were completed to a total depth of 32 ft bgs and screened from 12 ft bgs to total depth. Three soil samples were collected from each boring at depths of approximately 5 ft bgs, 10 ft bgs, and 15 ft bgs. Soil samples were analyzed for total petroleum hydrocarbons in the gasoline range (TPHg), and benzene, toluene, ethylbenzene, and total xylenes (collectively referred to as BTEX). Soil samples from boring MW-1 adjacent to the former waste oil UST were also analyzed for TPHd and TOG. Benzene was detected in soil samples collected from boring MW-2 at depths of 5 ft bgs and 10 ft bgs at 6 micrograms per kilogram (• g/kg) and 8 • g/kg, respectively. Toluene and total xylenes were detected in the 5 ft bgs soil sample collected from boring MW-3 at 6 • g/kg and 13 • g/kg, respectively. Wells MW-1, MW-2, and MW-3 were developed on 4 November 1989 and groundwater samples collected on 11 November 1989. Groundwater samples were analyzed for TPHg and BTEX, with samples from MW-1 also being analyzed for TOG and halogenated VOCs (HVOCs). The groundwater sample collected from well MW-1 contained benzene at 3.4 micrograms per liter (• g/L), toluene at 0.6 • g/L, and 1,2-dichloroethane (1,2-DCA) at 0.9 • g/L. The groundwater sample collected from well MW-2 contained benzene at 6.5 • g/L. No other analytes were detected above their reporting limits (Alton 1989).

2.1.3 UST Removal/Replacement and Station Upgrades – 1990

The station underwent renovations in 1990 when new USTs, pump islands, and a new canopy were installed. Limited documentation was available regarding the renovation activities. No soil or groundwater investigation activities were conducted during the renovations.

2.1.4 Soil and Groundwater Investigation – 1994

On November 22, 1994 EMCON Associates, Inc. (EMCON) conducted a site assessment that consisted of collecting two discrete soil samples (TD-1 and TD-3) at approximately 0.5 feet bgs below the fuel dispensers at the northern and southern pump islands. Additionally, two soil borings, THP-1 and THP-2 were advanced to depth of 22 and 17.5 feet bgs, respectively with soil and groundwater samples collected. Refer to **Figure 2** for boring locations. .Soil samples were submitted for

analysis for TPHg, TPHd, total petroleum hydrocarbons as oil (TPHo), BTEX and HVOCs. TPHg was detected in the soil sample collected from THP-1 at 13 feet bgs at a concentration of 1.2 mg/Kg with no other concentrations reported from that boring. Soil analysis of THP-2 samples at depths of 7 and 10 feet bgs reported no concentrations above the laboratory detection limits. Soil sample analysis from TD-1 reported concentrations of TPHg at 1.4 mg/Kg, TPHd at 2,100 mg/Kg, toluene at 0.006 mg/Kg and total xylenes at 0.04 mg/Kg, no other concentrations were detected above the reporting limit in samples collected from TD-1. Soil sample analysis from TD-3 at 0.5 feet bgs reported concentrations of TPHd at 470 mg/Kg with no other analytes detected.

2.1.5 Well Recovery Test – 1999

Cambria Environmental Technology, Inc. (Cambria) performed a well recovery test on 6 May 1999 to estimate the hydraulic conductivity of the water-bearing zone beneath the site. Static water levels in wells MW-1 and MW-2 were observed to be above the screened intervals, while the water level in well MW-3 was within the screened interval. The pumping test resulted in an average of 10.5 to 11 feet of drawdown in the wells after three to four minutes of pumping at five gallons per minute. Cambria calculated the hydraulic gradient for well MW-1 to be between 9.9x10-5 centimeters per second (cm/sec) and 1.5x10-4 cm/sec. Wells MW-2 and MW-3 were calculated to be between 6.5x10-6 cm/sec and 1.7x10-5 cm/sec. The geometric mean of the hydraulic gradient for each well was calculated as 2.5x10-5 cm/sec (Cambria 2000).

2.1.6 Additional Soil & Groundwater Investigation – 2005

On 13 and 14 July 2005, URS Corporation (URS) observed the advancement of five soil borings (SB-4 through SB-8), completed by Gregg Drilling and Testing Inc. (Gregg), with the purpose of further characterizing the subsurface hydrocarbon contamination at the Site. Refer to **Figure 2** for boring locations. Borings SB-4, SB-5, and SB-7 were advanced using direct push drilling methods to a depth of 32 ft bgs, while borings SB-6 and SB-8 were advanced to a depth of 28 ft bgs. Soil samples were collected at five foot intervals from the soil borings. Hydropunch® borings were advanced on 13 and 14 July 2005, spaced one to two feet laterally from each of the five soil borings. Groundwater samples were not collected because water did not enter the boreholes. However, soil samples were collected from within the saturated zones. TPHg concentrations were detected in eleven samples collected from borings SB-4 through SB-7 at concentrations up to 1,300 mg/kg [SB-7 (2-2.5')]. Ethylbenzene was detected above laboratory reporting limits in three samples collected from borings SB-5

and SB-7 at concentrations up to 3.0 mg/kg [SB-7 (2-2.5')]. Total xylenes were detected in four samples collected from borings SB-6 and SB-7 at concentrations up to 3.9 mg/kg [SB-7 (5-5.5')]. Methyl tert-butyl ether (MTBE) was detected in ten samples collected from borings SB-4, SB-5, SB-6, and SB-8 at concentrations up to 3.7 mg/kg [SB-4 (29-29.5')]. Tert-butyl alcohol (TBA) was detected in two samples collected from borings SB-5 and SB-6 at concentrations up to 0.13 mg/kg [SB-6 (19.5-20')]. Other constituents analyzed for but not detected in the collected soil samples included benzene, toluene, ethanol, tert-amyl methyl ether (TAME), ethyl tert-butyl ether (ETBE), di-isopropyl ether (DIPE), 1,2-dibromoethane (EDB), and 1,2-DCA (URS 2005).

On 7 October 2005 URS observed the advancement of three off-site soil borings (SB-1, SB-2, and SB-3) and one on-site soil boring (SB-4A), completed by Gregg utilizing a combination of air knife, hand auger and hydropunch drilling methods. Refer to **Figure 2** for boring locations. Off-site borings SB-1, SB-2, and SB-3 were placed between the Site and the storm drain under MacArthur Boulevard approximately one to two feet into the street from the sidewalk curb. Each offsite boring was hand augered to depth due to the proximity of underground utilities. Borings SB-1 and SB-3 were hand augered to 12 ft bgs, while boring SB-2 was hand augered to eight ft bgs. Groundwater was not encountered in the three borings, and no soil samples were collected. Boring SB-4A was placed adjacent to previous boring SB-4 to confirm subsurface soil contaminant concentrations and lithology. Boring SB-4A was advanced using direct push technology to a total depth of 36 ft bgs with groundwater first being encountered at 24.5 ft bgs. Six soil samples were collected from the boring at approximately five foot intervals. TAME was detected in one sample (SB-4A@20') at a concentration of 0.12 mg/kg. MTBE was detected in each of the six samples collected at concentrations up to 5.0 mg/kg (SB-4A@20'). The remaining analytes TPHg, BTEX, TBA, DIPE, ETBE, 1,2-DCA, EDB, and Ethanol, were below laboratory reporting limits for each of the six samples collected (URS 2006).

Also on 7 October 2005, URS observed Gregg advance four Hydropunch® borings: one each within borings SB-1, SB-2, and SB-3, and one approximately one to two feet laterally from boring SB-4A. The Hydropunch® screen was exposed in borings SB-1, SB-2, and SB-3 at 12 ft to 14 ft bgs, 14 ft to 16 ft bgs, and 17 ft to 19 ft bgs, respectively. No groundwater was encountered in these borings and therefore, no samples were collected. One groundwater sample (SB-4A) was collected from the Hydropunch® boring adjacent to boring SB-4A at a depth of 24 ft bgs. Groundwater sample SB-4A was analyzed for TPHg, BTEX, MTBE, TAME, ETBE, DIPE, TBA, EDB, 1,2-DCA, and Ethanol. TPHg was detected in the sample at a concentration of 3,000

• g/L, TAME at 110 • g/L, TBA at 5,700 • g/L, and MTBE at 4,500 • g/L. The remaining analytes were below the laboratory reporting limits (URS, 2006).

2.1.7 Additional Monitoring Well Installation – 2010

In September 2010 ARCADIS observed WDC Exploration & Wells (WDC) install one downgradient monitoring well (MW-4) at the location shown in **Figure 2**. Two soil samples were collected at 6.5 and 11.5 feet bgs, respectively. Soil samples were analyzed for TPHg, BTEX, MTBE, TAME, ETBE, DIPE, TBA, EDB, 1,2-DCA, and Ethanol. No concentrations were reported in the soil samples collected. Groundwater samples were collected from the well and analyzed for TPHg, BTEX, MTBE, TAME, ETBE, DIPE, TBA, EDB, 1,2-DCA, and Ethanol. Concentrations of MTBE were reported at 95 • g/L, TBA at 6.9 • g/L and TAME at 0.75 • g/L. The remaining analytes were below the laboratory reporting limits (ARCADIS, 2010).

3. Extent of Soil and Groundwater Impacts

3.1 Soil Conditions

The vadose zone is estimated to be from grade to approximately 10 feet bgs, which is based on historical depth-to-water (DTW) readings from 1989 to present. Any soil results referred to in this section will only be for samples collected from depths not exceeding 10 feet bgs. Although saturated soil samples have been collected (at depths exceeding 10 feet bgs), it is our assumption that these concentrations may not accurately represent vadose zone soil conditions due to potential interactions with groundwater. A summary of all historical soil results is presented in **Table 1**.

Impacted soil has been encountered during removal of the waste oil USTs and associated infrastructure, and soil boring and monitoring well installation events. Based on previous investigations there appears to be two hotspots of soil contamination in the vicinity of SB-7, located in the northwestern portion of the property and TD-1 located adjacent to the northern dispenser island. The maximum concentration of all analytes detected in soil was observed in samples from SB-7, collected at 2 feet bgs (1,300 mg/kg of TPHg; 3 mg/kg ethylbenzene; 3 mg/kg of xylenes). Samples collected from 5, 9.5, and 14.5 feet bgs in SB-7 indicated 730 mg/kg, 340 mg/kg, and 0.11 mg/kg, respectively of TPHg indicating that soil contamination was isolated to shallow depths. Sample TD-1 collected under the northern pump island from 0.5 feet bgs contained 1.4 mg/kg of TPHg, 2,100 mg/Kg of TPHd and minor concentrations of fuel constituents

toluene (0.006 mg/kg), and total xylenes (0.04 mg/kg). Both these samples were collected in saturated soil.

ARCADIS used the Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater *(*RWQCB 2008) to obtain environmental screening level (ESL) values from Table A – *Shallow Soils (<3m bgs); Groundwater IS a Current or Potential Source of Drinking Water* (Water Board 2008) were used to compare environmental sample results (refer to Table 1) . The only samples to exceed the ESLs were TPHg collected from two and five feet bgs in SB-7.

The most recent soil samples taken from the vadose zone (10 feet bgs or shallower) were collected from monitoring well MW-4 in October 2010. Contaminants of concern were not detected above laboratory detection limits of from MW-4 at 6.5 feet bgs.

Historical soil data is provided in **Table 1**. The lateral extent of TPHg and MTBE soil impacts is provided on **Figures 3** and **4**, respectively. Geologic cross section locations are presented on **Figure 5** and the cross sections with the vertical extent of TPHg, benzene and MTBE soil impacts are provided on **Figures 6** and **7**.

3.2 Groundwater

Quarterly ground-water monitoring at the Site was initiated in April 1990 by Alton, and is currently performed by Broadbent and Associates Inc. (BAI). Monitoring wells MW-1, through MW-4 are currently sampled on a semi-annual basis in the first and third quarters. **Table 2** presents historical groundwater analytical data.

Historical groundwater analytical results from monitoring events are presented in **Table 2** and concentrations of TPHg and MTBE from the 2011 groundwater monitoring events are illustrated on **Figures 8** through **11**. Additionally, concentration trends for TPHg, benzene, MTBE, and TBA in wells MW-1 through MW-4 are provided in Charts 1 through 4 included in **Appendix B**.

3.2.1 TPHg

Historically TPHg has been reported at concentrations greater than laboratory reporting limits in all site wells with the exception of MW-4. The highest concentrations were reported in MW-2 (45,000 • g/L; February 2003) and MW-1 (32,000 • g/L; March 1999), which are located west and east of the USTs, respectively. TPHg has not been detected in any groundwater samples since the third quarter 2010 where MW-3

reported a concentration of 1,900 • g/L, which is an order of magnitude below the historical high. Concentrations of TPHg in MW-1 and MW-2 have not been reported since the third quarter 2009.

3.2.2 Benzene

Historically benzene has been reported at concentrations greater than laboratory detection limits in all site monitoring wells with the exception of MW-4. The highest concentrations were reported in MW-1 (440 • g/L; May 1992), which is located east (upgradient) of the USTs. Benzene has not been detected in MW-1 since the second quarter 2009 and has decreased three orders of magnitude to its current concentration of <0.50 • g/L which is below the ESL of 1.0 • g/L , *Table F-1 of Revised May 2008 Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater.* Historical maximum concentrations of benzene in downgradient well MW-2 were reported at 35.10 • g/L in the first quarter 2002. Benzene concentrations have not been detected in MW-2 since then.. Benzene has not been detected in any site wells since the the second quarter 2009.

3.2.3 MTBE

Concentrations of MTBE have been detected above the laboratory reporting limits in groundwater samples collected from all wells. The highest concentrations were reported in MW-1 (49,000 • g/L; March 1999) and MW-2 (39,000 • g/L; September 1999). Concentrations of MTBE in MW-1 have decreased four orders of magnitude to the current concentrations reported at 1.1 • g/L, which is below the ESLs of 5.0 • g/L. Concentrations of MTBE in MW-2 have decreased two orders of magnitude to the current concentrations reported at 170 • g/L. Concentrations of MTBE in MW-3 reported a historical maximum of 3,500 • g/L in the fourth quarter of 2007. The last sampling event reported a concentration of 1,700 • g/L in MW-3. MTBE concentrations in MW-4 have decreased two orders of magnitude from its historical high in February 2011 to its current concentrations reported at 3.7 • g/L which is below the ESLs of 5.0 • g/L.

3.2.4 TBA

Concentrations of TBA have been detected above the laboratory reporting limits in groundwater samples collected from all wells. The highest concentrations were reported in MW-2 (11,000 • g/L; April 2004). Concentrations of TBA in MW-2 have decreased an order of magnitude to the current concentrations reported at 2,600 • g/L.

Concentrations of TBA in MW-1 have decreased three orders of magnitude to the current concentrations reported at 6.5 • g/L. Concentrations of TBA in MW-3 reported a historical maximum of 200 • g/L in the first quarter of 2006. The last sampling event reported a concentration of 110 • g/L in MW-3. TBA concentrations in MW-4 have decreased two orders of magnitude from its historical high of 12 • g/L in February 2011, and have not been detected in MW-4 for the last three sampling events. Currently the TBA concentrations exceed the ESLs for TBA of 12 • g/L in MW-2 and MW-3. TBA concentrations in all wells have shown an overall decreasing trend in concentrations that is expected to continue.

3.3 Separate-Phase Hydrocarbon Status

Separate-phase hydrocarbon (SPH) has not been reported at the site in either soil or groundwater. Sheen has not been reported at the site in any groundwater sample.

3.4 Hydraulic Gradient Trends

Groundwater is typically encountered during drilling events from 7 feet bgs (SB-8; July 2005) to 29 feet bgs (SB-5; July 2005). The DTW in monitoring wells has ranged from 8.02 feet below top of casing (btoc) (MW-1; June 1998) to 17.97 feet btoc (MW-2; August 1991). Historically the groundwater gradient has ranged from 0.03 feet/foot to 0.09 feet/foot. The groundwater flow direction has been predominantly to the west/southwest.

Historical groundwater flow directions and gradients are provided in **Table 3** and shown on **Figure 12**. A potentiometric surface map of groundwater elevations in August 2011 is provided on **Figure 13**.

4. Beneficial Uses

4.1 San Francisco Bay RWQCB Basin Plan

Existing and potential beneficial uses for groundwater are presented in the Region 2 Water Board *San Francisco Bay Basin (Region 2) Water Quality Control Plan* (Basin Plan) dated January 18, 2007. According to the Basin Plan (Water Board 2007) the site is situated in the East Bay Plain groundwater sub-basin (basin number 2-9.04). Water supply uses including municipal, industrial process, industrial service and agricultural are identified in the Basin Plan as existing beneficial uses, based on best available information. The nearest natural drainage is Glen Echo Creek, located approximately

1,450 feet northwest of the Site. Glen Echo Creek flows generally northeast to southwest near the Site vicinity (BAI 2009).

4.2 Sensitive Receptor Survey

To address the potentially complete exposure pathways (groundwater, soil and soil vapor), Alisto conducted a sensitive receptor survey (SRS) in October 2000. The objective of the SRS was to identify potential downgradient and aboveground risk receptors in the vicinity of the site. Potential risk receptors included water-producing wells, schools, hospitals, surface-water bodies, and aquatic environments.

The local water supply was described as public and supplied by the East Bay Municipal Water District. The supplier's water source was said to be provided by Sierra snow melt and the Mokelumne River. Alisto identified no public water supply wells within three miles of the Site, and no private water supply wells within 0.5 mile of the site. Alisto reported that the California Department of Water Resources had no wells on record within a half mile radius of the site with the exception of the three monitoring wells associated with the site itself (Alisto 2000). However, it is known that there have since been several ground water monitoring wells installed associated with the Quick Stop/former Unocal Station No. 1871 located at the corner of MacArthur Blvd and Harrison Street. According to Conestoga Rovers and Associates' (CRA) Subsurface Investigation Report dated December 22, 2011, the current well network on the former Unocal site consists of 8 ozone sparge wells and 7 monitoring wells.

No schools are known to be located within 1,000 feet of the Site. The nearest natural drainage is Glen Echo Creek, located approximately 1,450 feet northwest of the Site. Glen Echo Creek flows generally northeast to southwest near the Site vicinity; according to the City of Oakland map it is a discontinuous creek. The nearest hospital is the Erica Breneman Kaiser Permanente Medical Center which is approximately 0.35 miles northwest (cross gradient) of the Site.

4.3 Utility Survey

In 2000 Cambria submitted a Historical Review, Utility Survey, and Recovery Testing Report which included the review of nine Sanborn fire insurance maps spanning from 1903 to 1970and ten aerial photographs spanning from 1930 to 1996. Cambria reported no visually significant historical impacts to the site or surrounding properties. Cambria also conducted a utility, or preferential pathway investigation utilizing information provided by or collected from TOSCO Corporation, Underground Service

Alert (USA), and a geophysical survey conducted by CU Surveys of San Ramon, California. Cambria reported that "the storm drain located beneath MacArthur Boulevard is believed to encounter groundwater at least seasonally" (Cambria 2000). A diagram of the historical utility survey is included in **Appendix C**.

4.4 Environmental Screening Levels

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 risks 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 COCs 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. The use of commercial/industrial screening levels is based on the assumption that land use at the site will remain unchanged. **Figure 18** illustrates the potential sources of exposure and the status of the corresponding pathways.

Soil ESLs were obtained from *Table K-2 – Direct Contact to a Commercial/Industrial Receptor* (Water Board 2008). The ESLs are presented in **Table 4**. The most recent soil data (2010) from the vadose zone (grade to 10 feet bgs) indicates that COCs were not detected above laboratory reporting limits. The maximum detected concentrations from 2005 (1,300 mg/kg of TPHg) were collected at 2 feet bgs. Currently the entire site is paved so direct contact with soil is not possible. If future construction activities are conducted the soil should be monitored for VOCs. However, based on historical concentrations of TPHg (the only analyte above ESLs), it is unlikely elevated concentrations of TPHg would be encountered. The highest historical concentration was detected at 1,300 mg/kg in 2005 and biodegradation has occurred. Therefore the exposure through direct contact with soil is not a pathway of potential health concern.

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 ground surface. The potential for soil vapor intrusion was evaluated by comparing current groundwater concentrations to groundwater ESLs obtained from Table E-1 –

Groundwater Screening Levels for Evaluation of Potential Vapor Intrusion Concerns (RWQCB 2008). Because groundwater does not have an active domestic use at the site, the inhalation of vapors migrating from the subsurface to indoor air is the only identified potential complete exposure pathway. Current concentrations of BTEX and MTBE are all below their applicable groundwater ESLs (Table E-1) for the protection of the indoor air pathway (**Table 4**). Concentrations of TPHg in MW-3 (1900 µg/L) are above the groundwater ESL (29 µg/L) for the protection of the indoor air pathway. TBA does not have an ESL for the groundwater screening levels for evaluation of potential vapor intrusion concerns. However, MW-3 is located downgradient of onsite structures and would therefore not be an issue for indoor air based on the current site configuration. Therefore, the exposure potential from groundwater through inhalation of volatile emissions is not a pathway of potential health concern.

4.5 Summary Factors Affecting Long-Term Fate of Contaminants

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

As shown in **Table 4**, all analytes recently sampled for soil were below their respective commercial ESLs for general soil quality with the exception of TPHd with a concentration of 2,100 mg/Kg at sample location TD-1. This sample was collected in 1994 from beneath a dispenser island. Additionally concentrations of TPHg were detected in samples collected from two (1,300 mg/kg) and five (730 mg/kg) feet bgs from SB-7 in 2005 (**Table 1**). The entire site is paved and the commercial/industrial worker would not come into contact with the soil. Therefore, the Site, under current or future commercial use, does not pose as a human health risk to the hypothetical on-site worker populations.

The most recent TPHg concentrations observed in a groundwater sample from MW-1 was 120 • g/L in September of 2009. Concentrations of TPHg in MW-1 have indicated decreasing trends since 1998 and are expected to continue to decline. The most recent TPHg concentrations observed at MW-2 and MW-3 were reported at less than the detection limits of 250 • g/L and 1,000 • g/L, respectively in February 2012. MW-2 has maintained a steadily declining trend of TPHg since 2003 and is expected to continue. The most recent TPHg concentrations observed at well MW-3 reported a detection of 1,900 • g/L in August 2010. Historically, concentration trends at MW-1 and MW-2 for

TPHg increased, fluctuated, and finally decreased to below (MW-1) or near ESLs (MW-2). MW-3 is located down/cross gradient of these wells and it is expected the concentrations will mimic this pattern. Currently concentrations are fluctuating and beginning to decrease. The concentrations in MW-1 and MW-2 were an order of magnitude higher than MW-3 so it is expected the ESL for the protection of the indoor air pathway will be reached in the near future. Concentrations of MTBE in MW-3 have continued to decline over its history to their current concentrations that are below the ESLs (**Appendix B**).

The most recent MTBE concentrations observed at well MW-1 reported a detection of 14 • g/L in February 2012. Concentrations of MTBE in MW-1 have maintained an overall decreasing trend which is expected to continue. The most recent MTBE concentrations observed at well MW-2 reported a detection of 300 • g/L in February 2012. Concentrations of MTBE in MW-2 have maintained an overall decreasing trend which is expected to continue. The most recent MTBE concentrations observed at well MW-3 reported a detection of 1,700 • g/L in February 2012. Concentrations of MTBE in MW-3 have recently exhibited an overall decreasing trend. Based on trend similarities between MW-1, MW-2 and MW-3 this trend is expected to continue. The most recent MTBE concentrations observed at well MW-4 reported a detection of 12 • g/L in February 2012. Concentrations of MTBE in MW-4 have maintained an overall decreasing trend which is expected to continue (**Appendix B**). As shown in **Table 4**, MTBE concentrations are below the ESL for the protection of the indoor air pathway.

The most recent TBA concentrations observed at well MW-2 reported a detection of 2,600 • g/L in February 2012. Concentrations of TBA in MW-2 have maintained an overall decreasing trend which is expected to continue. The most recent TBA concentrations observed at well MW-3 reported a detection of 110 • g/L in February 2012. Concentrations of TBA in MW-3 have maintained an overall decreasing trend which is expected to continue.

The historical maximum groundwater concentrations of MTBE from MW-2 were reported at 35,000 • g/L and the maximum historical MTBE concentration in MW-3 was reported at 3,500 • g/L. The location of MW-3 is approximately 70 feet north (down/cross gradient) of MW-2 and shows an order of magnitude reduction in MTBE concentrations in that distance. MW-4 is located approximately 70 feet down/cross gradient of MW-3 and contains two orders of magnitude less than the concentrations at MW-3. Based on the degradation of contaminants approximately one order of magnitude every 70 feet the contaminant plume is not expected to extend beyond the

underpass of Highway 580. The MTBE historic concentrations are also below the ESL for the protection of the indoor air pathway.

5. Remedial Activities

The potential source of hydrocarbons includes the UST complex in the southern portion of the Site, and the dispenser islands. The exact volume released from the UST complex and product piping are unknown.

The removal of the original waste oil UST in 1988 and UST and dispenser replacement 1990 was conducted as a release intervention. During removal of the waste oil UST approximately 15 cubic yards of contaminated soil was excavated and removed at the time of the waste oil UST removal (BAI, 2009).

Numerous soil borings and monitoring wells have been installed to delineate and monitor the lateral and vertical extent of petroleum hydrocarbon impacts. Remediation through site upgrades, equipment removal and associated over-excavations, and natural attenuation have proven to be effective for substantially removing on-site contamination sources. It has been demonstrated by declining petroleum hydrocarbon concentration trends in site monitoring wells that natural attenuation is occurring and should continue to occur at the site.

6. Remedial Effectiveness

Based upon the previous remedial activities detailed above, the impacts to soil and groundwater have been addressed and are evident by the low levels of soil impacts and decreasing concentration trends in groundwater. Downgradient groundwater samples from monitoring well MW-4 have largely been below laboratory detection limits since its installation in October 2010 with the exception of low level MTBE detections (**Table 2/ Appendix B**). The lack of concentrations seen in the downgradient wells indicates that any residual groundwater impacts are not migrating off site.

7. 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* (Water Board 1996). Therefore, ARCADIS requests approval for case closure and no further action at this site based on the following:

- Sources of petroleum hydrocarbons at the site have been adequately addressed. The absence of high concentrations of site COCs observed in soil samples suggests that secondary sources (residual hydrocarbons in soil) were identified and removed.

- Concentrations of TPHg are all below reporting limits.

- All the wells that contain MTBE concentrations in groundwater indicate a decreasing trend (**Appendix D**).

- All the wells that contain TBA concentrations in groundwater indicate a decreasing trend (**Appendix D**).

- Concentrations of BTEX in groundwater are all below the reporting limits.

- Current site conditions suggest that soil concentrations of TPHg are limited to the western portion of the site in the vicinity of SB-7 (**Figure 7**).

- Current site conditions suggest that soil concentrations of MTBE are limited to the western portion of the site in the vicinity of SB-7 (**Figure 7**).

- The plume does not appear to be migrating offsite, as evidenced by the results of groundwater samples collected in MW-4.

- The site has been adequately characterized.

- No sensitive receptors are 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.

ARCADIS recommends that case closure be granted and that all groundwater monitoring wells associated with the site be destroyed. A Case Closure Summary is included in **Appendix D**.

8. References

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ARCADIS

Tables

Table 1; Historical Soil Results
Former BP Service Station No. 11102
100 MacAurthur Blvd, Oakland, CA
Local Case #RO456

Location	Sample Depth (ft bgs)	Sample Date	TPHg		TPHd		Benzene		Toluene		Ethylbenzene		Xylene		MTBE		TBA		Total O & G		Lead	
Commercial ESLs (mg/Kg)[1]			**450**		**450**		**0.27**		**210**		**5.0**		**100**		**65**		**--**		**--**		**--**	
WO	9	9/19/1988	--	--	2.0	mg/Kg	<100	µg/Kg	<100	µg/Kg	<100	µg/Kg	<100	µg/Kg	--	--	--	--	**24**	mg/Kg	--	--
Comp WO	--	9/19/1988	--	--	**1,700**	mg/Kg	--	--	--	--	--	--	--	--	--	--	--	--	**65,000**	mg/Kg	--	--
MW-1	5	10/26/1989	--	--	<10	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	<30	mg/Kg	--	--
MW-1	10	10/26/1989	--	--	<10	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	<30	mg/Kg	--	--
MW-1	15	10/26/1989	--	--	<10	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	<30	mg/Kg	--	--
MW-2	5	10/25/1989	<1.0	mg/Kg	--	--	0.006	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	--	--	--	--
MW-2	10	10/25/1989	<1.0	mg/Kg	--	--	0.008	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	--	--	--	--
MW-2	15	10/25/1989	<1.0	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	--	--	--	--
MW-3	5	10/26/1989	<1.0	mg/Kg	--	--	<0.005	mg/Kg	0.006	mg/Kg	<0.005	mg/Kg	0.013	mg/Kg	--	--	--	--	--	--	--	--
MW-3	10	10/26/1989	<1.0	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	--	--	--	--
MW-3	15	10/26/1989	<1.0	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	--	--	--	--
MW-4	6.5	10/6/2010	<0.3	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.01	mg/Kg	<0.005	mg/Kg	<0.01	mg/Kg	--	--	--	--
MW-4	11.5	10/6/2010	<0.3	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.01	mg/Kg	<0.005	mg/Kg	<0.01	mg/Kg	--	--	--	--
TD-1	0.5	11/22/1994	1.4	mg/Kg	**2,100**	mg/Kg	<0.005	mg/Kg	0.006	mg/Kg	<0.005	mg/Kg	0.04	mg/Kg	--	--	--	--	<1.0	mg/Kg	--	--
TD-3	0.5	11/22/1994	<1.0	mg/Kg	**470**	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	<1.0	mg/Kg	--	--
THP-1	13	11/22/1994	1.2	mg/Kg	<1.0	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	<1.0	mg/Kg	--	--
THP-1	15.5	11/22/1994	<1.0	mg/Kg	<1.0	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	<1.0	mg/Kg	--	--
THP-2	7	11/22/1994	<1.0	mg/Kg	<1.0	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	<1.0	mg/Kg	--	--
THP-2	10	11/22/1994	<1.0	mg/Kg	<1.0	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	--	--	--	--	<1.0	mg/Kg	--	--
SB-1	--	10/7/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB-2	--	10/7/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB-3	--	10/7/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB-4	5	7/14/2005	<1.0	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-4	9.5	7/14/2005	<0.50	mg/Kg	--	--	<0.025	mg/Kg	<0.025	mg/Kg	<0.025	mg/Kg	<0.025	mg/Kg	0.37	mg/Kg	<0.10	mg/Kg	--	--	--	--
SB-4	14.5	7/14/2005	3.5	mg/Kg	--	--	<0.050	mg/Kg	<0.050	mg/Kg	<0.050	mg/Kg	<0.050	mg/Kg	1.1	mg/Kg	<5.0	mg/Kg	--	--	--	--
SB-4	19.5	7/14/2005	3.8	mg/Kg	--	--	<0.050	mg/Kg	<0.050	mg/Kg	<0.050	mg/Kg	<0.050	mg/Kg	2.4	mg/Kg	<5.0	mg/Kg	--	--	--	--
SB-4	20	7/14/2005	<12	mg/Kg	--	--	<0.25	mg/Kg	<0.25	mg/Kg	<0.25	mg/Kg	<0.25	mg/Kg	3.4	mg/Kg	<25	mg/Kg	--	--	--	--
SB-4	25	7/14/2005	<25	mg/Kg	--	--	<0.50	mg/Kg	<0.50	mg/Kg	<0.50	mg/Kg	<0.50	mg/Kg	3.5	mg/Kg	<25	mg/Kg	--	--	--	--
SB-4	29	7/14/2005	<25	mg/Kg	--	--	<0.50	mg/Kg	<0.50	mg/Kg	<0.50	mg/Kg	<0.50	mg/Kg	3.7	mg/Kg	<50	mg/Kg	--	--	--	--
SB-4A	6	10/7/2005	<0.25	mg/Kg	--	--	<0.012	mg/Kg	<0.012	mg/Kg	<0.012	mg/Kg	<0.012	mg/Kg	0.073	mg/Kg	<0.050	mg/Kg	--	--	--	--
SB-4A	10	10/7/2005	<2.5	mg/Kg	--	--	<0.050	mg/Kg	<0.050	mg/Kg	<0.050	mg/Kg	<0.050	mg/Kg	0.2	mg/Kg	<5.0	mg/Kg	--	--	--	--
SB-4A	20	10/7/2005	<5.0	mg/Kg	--	--	<0.10	mg/Kg	<0.10	mg/Kg	<0.10	mg/Kg	<0.10	mg/Kg	5.0	mg/Kg	<10	mg/Kg	--	--	--	--
SB-4A	25	10/7/2005	<2.5	mg/Kg	--	--	<0.050	mg/Kg	<0.050	mg/Kg	<0.050	mg/Kg	<0.050	mg/Kg	0.84	mg/Kg	<5.0	mg/Kg	--	--	--	--
SB-4A	30	10/7/2005	<0.010	mg/Kg	--	--	<0.0050	mg/Kg	<0.0050	mg/Kg	<0.0050	mg/Kg	<0.0050	mg/Kg	0.024	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-4A	35	10/7/2005	<0.10	mg/Kg	--	--	<0.0050	mg/Kg	<0.0050	mg/Kg	<0.0050	mg/Kg	<0.0050	mg/Kg	0.057	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-5	5	7/14/2005	<0.099	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-5	9.5	7/14/2005	0.15	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-5	14.5	7/14/2005	0.25	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-5	19.5	7/14/2005	61	mg/Kg	--	--	<0.025	mg/Kg	<0.025	mg/Kg	0.14	mg/Kg	<0.025	mg/Kg	<0.025	mg/Kg	<5.0	mg/Kg	--	--	--	--
SB-5	29	7/14/2005	0.1	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	0.053	mg/Kg	0.65	mg/Kg	--	--	--	--
SB-6	5	7/13/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-6	8.5	7/13/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-6	9.5	7/13/2005	0.14	mg/Kg	--	--	<0.0048	mg/Kg	<0.0048	mg/Kg	<0.0048	mg/Kg	<0.0048	mg/Kg	<0.0048	mg/Kg	<0.019	mg/Kg	--	--	--	--
SB-6	14.5	7/13/2005	<0.097	mg/Kg	--	--	<0.0048	mg/Kg	<0.0048	mg/Kg	<0.0048	mg/Kg	0.0082	mg/Kg	<0.0048	mg/Kg	<0.019	mg/Kg	--	--	--	--
SB-6	16.5	7/13/2005	<0.098	mg/Kg	--	--	<0.0049	mg/Kg	<0.0049	mg/Kg	<0.0049	mg/Kg	0.0054	mg/Kg	<0.0049	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-6	19.5	7/13/2005	<0.50	mg/Kg	--	--	<0.025	mg/Kg	<0.025	mg/Kg	<0.025	mg/Kg	<0.025	mg/Kg	0.15	mg/Kg	0.13	mg/Kg	--	--	--	--
SB-6	27.5	7/13/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-7	2	7/14/2005	**1300**	mg/Kg	--	--	<1.0	mg/Kg	<1.0	mg/Kg	3.0	mg/Kg	3.0	mg/Kg	<0.50	mg/Kg	<100	mg/Kg	--	--	--	--
SB-7	5	7/14/2005	**730**	mg/Kg	--	--	<1.0	mg/Kg	<1.0	mg/Kg	2.4	mg/Kg	3.9	mg/Kg	<0.50	mg/Kg	<100	mg/Kg	--	--	--	--
SB-7	9.5	7/14/2005	340	mg/Kg	--	--	<2.5	mg/Kg	<2.5	mg/Kg	<2.5	mg/Kg	<2.5	mg/Kg	<1.2	mg/Kg	<250	mg/Kg	--	--	--	--
SB-7	14.5	7/14/2005	0.11	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-7	19.5	7/14/2005	<0.099	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-7	25.5	7/14/2005	<0.099	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-7	28.5	7/14/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-7	30.5	7/14/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.020	mg/Kg	--	--	--	--
SB-8	5	7/13/2005	<0.099	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.20	mg/Kg	--	--	--	--
SB-8	7	7/13/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.20	mg/Kg	--	--	--	--
SB-8	9.5	7/13/2005	<0.099	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.20	mg/Kg	--	--	--	--
SB-8	11	7/13/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.20	mg/Kg	--	--	--	--
SB-8	14.5	7/13/2005	<0.099	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.20	mg/Kg	--	--	--	--
SB-8	17.5	7/13/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.20	mg/Kg	--	--	--	--
SB-8	19.5	7/13/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	0.066	mg/Kg	<0.20	mg/Kg	--	--	--	--
SB-8	20.5	7/13/2005	<0.10	mg/Kg	--	--	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	0.022	mg/Kg	<0.20	mg/Kg	--	--	--	--

Notes:
ft bgs = feet below ground surface
TPHg = Total Petroleum Hydrocarbons as Gasoline
TPHd = Total Petroleum Hydrocarbons as Diesel
mg/kg = milligrams per kilogram
µg/Kg = micrigrams per Kilogram
ppm = parts per million
MTBE = Methyl tert-butyl ether
- = not analyzed
< = analyte not detected, result is less than value provided
SB-1, SB-2 and SB-3 not sampled for soil
1 = Soil ESLs values are listed from Table K-2

Table 2: Historical Groundwater Results
Former BP Service Station No. 11102
100 MacArthur Blvd, Oakland, CA
Local Case # RO456

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA	TPHd
							µg/L							
MW-1	11/4/1989	GW	90.20	13.21		76.99	<500	3.4	0.6	<0.3	<0.3			<50
	4/3/1990	GW	90.20	12.46		77.74	820	64	1.9	23	34			
	7/30/1990	GW	90.20	12.92		77.28	190	11	<5	<5	<5			<50
	11/20/1990	GW	90.20	14.08		76.12	50	2.4	<0.3	<0.3	<0.3			79
	3/1/1991	GW	90.20	13.61		76.59	<100	0.9	<0.3	<0.3	0.3			<1,000
	8/19/1991	GW	90.20	15.74		74.46	370	35	0.73	6.4	5.6			<50
	11/13/1991	GW	90.20	14.08		76.12	60	0.68	<0.3	<0.3	<0.3			<50
	2/24/1992	GW	90.20	12.52		77.68	140	3.9	0.66	1.2	3.8			100
	5/19/1992	GW	90.20	11.80		78.40	4,200	440	21	250	37			910
	6/17/1992	GW	90.20	12.01		78.19	4,000	350	14	150	17			560
	7/22/1992	GW	90.20	12.42		77.78	4,000	<5	19	210	61			
	8/14/1992	GW	90.20	12.75		77.45	2,400	330	20	150	47			1,700
	11/11/1992	GW	90.20	13.69		76.51	260	30	3.4	7.6	6.8			92
	6/7/1993	GW	90.20	10.93		79.27	3,400	98	11	21	7.6			440
	12/2/1993	GW	90.20	12.72		77.48	1,100	8.3	3.6	0.6	1.5			120
	6/22/1994	GW	90.20	11.81		78.39	2,100	32	3.8	2.2	17	4,000		<50
	1/10/1995	GW	90.20	10.97		79.23	<500	120	<5	<5	<10			420
	6/21/1995	GW	90.20	9.38		80.82	4,700	16	<5	<5	<10			1,300
	12/27/1995	GW	90.20	11.55		78.65	430	<2.5	<2.5	<2.5	<5	1,200		2,100
	6/13/1996	GW	90.20	9.28		80.92	3,200	51	<12	<12	<12	4,000		920
	12/4/1996	GW	90.20	11.91		78.29	1,400	6.2	<5	<5	<5	2,600		280
	6/10/1997	GW	90.20	8.97		81.23	7,900	12	<10	<10	<10	15,000		1,700
	12/12/1997	GW	90.20	11.37		78.83	440	8.8	<1	2.6	9.4	6,700		760
	6/18/1998	GW	90.20	8.02		82.18	7,500	<2.5	<5	<5	<5	5,600		2,900
	3/9/1999	GW	90.20	9.80		80.40	32,000	100	16	72	110	49,000		
	9/28/1999	GW	90.20	10.78		79.42	1,000	<5	<5	<5	<5	730		
	10/14/1999	GW	90.20	10.84		79.36								660
	3/27/2000	GW	90.20	9.83		80.37	4,300	160	19	37	43	28,000		
	9/28/2000	GW	90.20	11.33		78.87	2,700	10	2.6	1.1	2.7	28,000		
	3/8/2001	GW	90.20	10.96		79.24	8,200	23.5	6.09	5.23	8.97	11,600		
	9/21/2001	GW	90.20	12.07		78.13	6,000	37.9	<0.5	<0.5	<1.5	7,370		
	2/28/2002	GW	90.20	10.48		79.72	6,400	60.8	<5	6.43	<10	7,750		
	9/6/2002	GW	90.20	11.20		79.00	1,400	<5	<5	<5	<5	6,000		
	2/19/2003	GW	90.20	11.29		78.91	<10,000	<100	110	<100	<100	4,500		
	7/14/2003	GW	90.20	11.18		79.02	710	11	<10	<10	<10	940	2,700	
	1/14/2004	GW	90.20	11.74		78.46	<500	<5	<5	<5	<5	220	2,500	
	4/23/2004	GW	90.20	11.95		78.25	470	3.4	<2.5	<2.5	<2.5	150	2,500	
	7/1/2004	GW	90.20	11.52		78.68	360	<2.5	<2.5	<2.5	<2.5	96	2,000	
	10/28/2004	GW	90.20	12.56		77.64	390	0.94	<0.5	<0.5	<0.5	43	1,500	
	1/10/2005	GW	90.20	11.85		78.35	490	17	<2.5	5.8	5.4	85	1,900	
	4/13/2005	GW	90.20	10.00		80.20	1,000	27	<2.5	<2.5	25	48	1,400	
	7/11/2005	GW	90.20	9.27		80.93	180	<0.5	<0.5	<0.5	<0.5	36	550	
	10/17/2005	GW	90.20	10.96		79.24	140	<0.5	<0.5	<0.5	<0.5	20	450	
	1/17/2006	GW	90.20	10.81		79.39	120	0.64	<0.5	<0.5	0.56	38	260	
	4/21/2006	GW	90.20	9.28		80.92	410	1.4	1	<0.5	<0.5	17	320	
	7/17/2006	GW	90.20	9.25		80.95	<50	<0.5	<0.5	<0.5	<0.5	5.5	32	
	7/26/2006	GW	90.20	8.57		81.63	<50	<0.5	<0.5	<0.5	<0.5	4.4	22	
	10/31/2006	GW	90.20	9.80		80.40	<50	<0.5	<0.5	<0.5	<0.5	2.8	<20	
	1/8/2007	GW	90.20	10.36		79.84	<50	2.2	<0.5	<0.5	<0.5	6.2	110	
	4/10/2007	GW	90.20	10.65		79.55	160	1.4	<0.5	<0.5	<0.5	9	210	
	7/10/2007	GW	90.20	10.52		79.68	120	<0.5	<0.5	<0.5	<0.5	4.9	110	160
	10/24/2007	GW	90.20	11.23		78.97	100	<0.5	<0.5	<0.5	<0.5	4.9	94	
	1/22/2008	GW	90.20	11.22		78.98	240	<0.5	<0.5	0.83	1.7	7.2	110	
	4/15/2008	GW	90.20	10.26		79.94	240	<0.5	<0.5	<0.5	0.73	5.5	84	
	7/8/2008	GW	90.20	11.10		79.10	78	<0.5	<0.5	<0.5	<0.5	5.8	64	
	11/19/2008	GW	90.20	12.51		77.69	150	<0.5	<0.5	<0.5	<0.5	3.4	110	
	2/10/2009	GW	90.20	12.71		77.49	<50	<0.5	<0.5	<0.5	<0.5	5.3	110	
	5/7/2009	GW	90.20	10.90		79.30	<50	1.6	<0.5	<0.5	<0.5	13	17	
	9/3/2009	GW	90.20	11.91		78.29	120	<0.5	<0.5	<0.5	0.89	3.8	260	
	10/29/2009	GW	90.20	12.54		77.66	<50	<0.5	<0.5	<0.5	<1	22	210	
	2/26/2010	GW	90.20	10.61		79.59	<50	<0.5	<0.5	<0.5	<1	8.1	240	
	8/16/2010	GW	90.20	10.12		80.08	<50	<0.5	<0.5	<0.5	<1	8.1	35	
	11/12/2010		90.20	10.53		79.67								

Table 2: Historical Groundwater Results
Former BP Service Station No. 11102
100 MacArthur Blvd, Oakland, CA
Local Case # RO456

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA	TPHd
							µg/L							
	2/3/2011	GW	90.20	11.88		78.32	<50	<0.5	<0.5	<0.5	<1	14	<250	
	6/23/2011		90.20	9.78		80.42								
	8/22/2011	GW	90.20	10.39		79.81	<50	<0.5	<0.5	<0.5	<1	1.1	<250	
	2/20/2012	GW	90.20	11.53		78.67	<50	<0.5	<0.5	<0.5	<1	14	6.5	
MW-2	11/4/1989	GW	87.91	15.84		72.07	<500	6.5	<0.3	<0.3	<0.3			
	4/3/1990	GW	87.91	15.25		72.66	<500	<0.5	<0.5	<0.5	<0.5			
	7/30/1990	GW	87.91	15.59		72.32	61	6.5	<0.5	<0.5	<0.5			
	11/20/1990	GW	87.91	17.81		70.10	<50	0.3	<0.3	<0.3	<0.3			
	3/1/1991	GW	87.91	17.11		70.80	<100	0.4	<0.3	<0.3	<0.3			
	8/19/1991	GW	87.91	17.97		69.94	<30	<0.3	<0.3	<0.3	<0.3			
	11/13/1991	GW	87.91	16.76		71.15	38	0.32	<0.3	<0.3	<0.3			
	2/24/1992	GW	87.91	15.07		72.84	<50	<0.5	<0.5	<0.5	0.58			
	5/19/1992	GW	87.91	14.70		73.21	<50	0.55	<0.5	<0.5	<0.5			
	7/22/1992	GW	87.91	15.60		72.31	90	1.3	0.6	0.9	1.9			
	11/11/1992	GW	87.91	16.19		71.72	52	2.8	<0.5	<0.5	0.9			
	6/7/1993	GW	87.91	14.42		73.49	1,200	14	2.8	1.9	1.71			
	12/2/1993	GW	87.91	14.94		72.97	790	3.4	0.5	10	<0.5	3,700		
	6/22/1994	GW	87.91	14.25		73.66	110	<0.5	<0.5	<0.5	<0.5	120		
	1/10/1995	GW	87.91	13.64		74.27	<50	<0.5	<0.5	0.6	1			
	6/21/1995	GW	87.91	11.66		76.25	4,700	<10	<10	<10	<20			
	12/27/1995	GW	87.91	13.11		74.80	6,100	<25	<25	<25	<50	20,000		
	6/13/1996	GW	87.91	10.86		77.05	8,300	<2.5	<2.5	<2.5	<2.5	13,000		
	12/4/1996	GW	87.91	13.03		74.88	5,900	<2.5	<5	<5	<5	11,000		
	6/10/1997	GW	87.91	10.04		77.87	<50	<0.5	<1	<1	<1	<10		
	12/12/1997	GW	87.91	12.44		75.47	<50	<0.5	<1	<1	<1	<10		
	6/18/1998	GW	87.91	8.89		79.02	50	<0.5	<1	<1	<1	<10		
	3/9/1999	GW	87.91	10.20		77.71	15,000	<5	<5	<5	<5	23,000		
	9/28/1999	GW	87.91	11.81		76.10	36,000	<5	12	7	26	35,000		
	10/14/1999	GW	87.91	10.27		77.64								100
	3/27/2000	GW	87.91	9.98		77.93	1,300	<0.5	<0.5	0.51	<0.5	5,800		
	9/28/2000	GW	87.91	11.40		76.51	1,600	1.8	1.7	0.54	2.2	15,000		
	3/8/2001	GW	87.91	11.16		76.75	20,000	<0.5	<0.5	<0.5	<0.5	29,100		
	9/21/2001	GW	87.91	11.65		76.26	5,000	<0.5	<0.5	<0.5	<1.5	6,110		
	2/28/2002	GW	87.91	9.86		78.05	3,200	35.1	<0.5	<0.5	<1	4,620		
	9/6/2002	GW	87.91	12.32		75.59	1,900	<10	<10	<10	<10	15,000		
	2/19/2003	GW	87.91	11.63		76.28	45,000	<250	<250	<250	<250	32,000		
	7/14/2003	GW	87.91	12.07		75.84	9,300	<500	<500	<500	<500	24,000	<20,000	
	1/14/2004	GW	87.91	11.45		76.46	<50,000	<500	<500	<500	<500	21,000	<20,000	
	4/23/2004	GW	87.91	11.45		76.46	5,100	<250	<250	<250	<250	22,000	11,000	
	7/1/2004	GW	87.91	12.32		75.59	<5,000	<50	<50	<50	<50	5,200	2,900	
	10/28/2004	GW	87.91	13.02		74.89	8,500	<50	<50	<50	<50	6,800	6,700	
	1/10/2005	GW	87.91	14.38		73.53	<25,000	<250	<250	<250	<250	7,100	<10,000	
	4/13/2005	GW	87.91	14.03		73.88	<5,000	<50	<50	<50	<50	5,300	5,300	
	7/11/2005	GW	87.91	11.25		76.66	<5,000	<50	<50	<50	<50	5,300	9,000	
	10/17/2005	GW	87.91	12.48		75.43	<5,000	<50	<50	<50	<50	2,500	5,200	
	1/17/2006	GW	87.91	10.70		77.21	<5,000	<50	<50	<50	<50	2,200	8,400	
	7/26/2006	GW	87.91	10.47		77.44	2,700	<50	<50	<50	<50	2,900	4,500	
	10/31/2006	GW	87.91	12.02		75.89	2,300	<25	<25	<25	<25	2,300	9,300	
	1/8/2007	GW	87.91	11.68		76.23	1,500	<12	<12	<12	<12	1,700	7,700	
	4/10/2007	GW	87.91	11.45		76.46	1,300	<50	<50	<50	<50	1,500	6,400	
	7/10/2007	GW	87.91	11.97		75.94	2,300	<25	<25	<25	<25	2,600	8,700	120
	10/24/2007	GW	87.91	12.91		75.00	2,800	<25	<25	<25	<25	2,800	9,500	
	1/22/2008	GW	87.91	12.00		75.91	<2,500	<25	<25	<25	<25	1,400	6,000	
	4/15/2008	GW	87.91	11.77		76.14	73	<2.5	<2.5	<2.5	<2.5	2,400	6,800	
	7/8/2008	GW	87.91	12.65		75.26	93	<50	<50	<50	<50	2,800	7,600	
	11/19/2008	GW	87.91	13.98		73.93	130	<50	<50	<50	<50	1,900	7,100	
	2/10/2009	GW	87.91	13.64		74.27	<50	<50	<50	<50	<50	940	2,700	
	5/7/2009	GW	87.91	12.00		75.91	350	<20	<20	<20	<20	1,900	3,900	
	9/3/2009	GW	87.91	13.68		74.23	890	<40	<40	<40	<40	1,300	7,500	
	10/29/2009	GW	87.91	13.88		74.03	530	<0.50	<0.50	<0.50	<1.0	690	3,900	
	2/26/2010	GW	87.91	11.65		76.26	1,100	<10	<10	<10	<20	1,100	4,100	
	8/16/2010	GW	87.91	12.82		75.09	1,000	<10	<10	<10	<20	1,100	4,800	
	11/12/2010		87.91	12.98		74.93								
	2/3/2011	GW	87.91	12.38		75.53	<1000	<10	<10	<10	<20	860	3,200	
	6/23/2011		87.91	11.37		76.54								
	8/22/2011	GW	87.91	12.29		75.62	<250	<2.5	<2.5	<2.5	<5.0	170	3,100	
	2/20/2012	GW	87.91	13.09		74.82	<250	<2.5	<2.5	<2.5	<5.0	300	2,600	
MW-3	11/4/1989	GW	87.02	15.4		71.62	<500	<0.3	<0.3	<0.3	<0.3			
	4/3/1990	GW	87.02	13.9		73.12	<100	<0.5	<0.5	<0.5	<0.5			
	7/30/1990	GW	87.02	13.77		73.25	<50	<0.5	<0.5	<0.5	<0.5			
	11/20/1990	GW	87.02	14.67		72.35	<50	0.3	0.8	0.4	1.5			
	3/1/1991	GW	87.02	15.22		71.80	<100	0.4	<0.3	<0.3	<0.3			
	8/19/1991	GW	87.02	13.15		73.87	<30	<0.3	<0.3	<0.3	<0.3			

Table 2: Historical Groundwater Results
Former BP Service Station No. 11102
100 MacArthur Blvd, Oakland, CA
Local Case # RO456

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA	TPHd
							µg/L							
	11/13/1991	GW	87.02	15.66		71.36	<30	<0.3	<0.3	<0.3	<0.3			
	2/24/1992	GW	87.02	15.01		72.01	<50	0.65	1.4	0.66	4.4			
	5/19/1992	GW	87.02	15.52		71.50	<50	<0.5	<0.5	<0.5	<0.5			
	7/22/1992	GW	87.02	15.63		71.39	<50	<0.5	<0.5	<0.5	<0.5			<50
	11/11/1992	GW	87.02	14.13		72.89	<50	<0.5	0.7	<0.5	1.3			
	6/7/1993	GW	87.02	12.13		74.89	<50	<0.5	<0.5	<0.5	<0.5			
	12/2/1993	GW	87.02	13.29		73.73	<50	<0.5	<0.5	<0.5	<0.5			
	6/22/1994	GW	87.02	12.78		74.24	<50	<0.5	<0.5	<0.5	<0.5			
	1/10/1995	GW	87.02	12.01		75.01	<50	<0.5	<0.5	<0.5	<1			
	6/21/1995	GW	87.02	11.57		75.45	<50	<0.5	<0.5	<0.5	<1			
	12/27/1995	GW	87.02	13.47		73.55	<50	<0.5	<0.5	<0.5	<1	5.7		
	6/13/1996	GW	87.02	11.22		75.80	60	<0.5	<0.5	<0.5	<0.5	<10		
	12/4/1996	GW	87.02	13.28		73.74	<50	<0.5	<1	<1	<1	<10		
	6/10/1997	GW	87.02	10.22		76.80	<50	<0.5	<1	<1	<1	<10		
	12/12/1997	GW	87.02	12.61		74.41	<50	<0.5	<1	<1	<1	<10		
	6/18/1998	GW	87.02	9.07		77.95	50	<0.5	<1	<1	<1	<10		
	3/27/2000	GW	87.02	13.77		73.25	<50	<0.5	<0.5	<0.5	<0.5	1.6		
	9/28/2000	GW	87.02	11.28		75.74	<50	<0.5	7.4	<0.5	1.3	2		
	3/8/2001	GW	87.02	11.75		75.27	<50	<0.5	<0.5	<0.5	<0.5	60.4		
	9/21/2001	GW	87.02	11.33		75.69	<50	<0.5	<0.5	<0.5	<1.5	8.18		
	2/28/2002	GW	87.02	10.86		76.16	<50	<0.5	<0.5	<0.5	<1	25.5		
	9/6/2002	GW	87.02	12.73		74.29	<50	1.2	<0.5	<0.5	1	16		
	2/19/2003	GW	87.02	11.72		75.30	<500	<5	<5	<5	<5	110		
	7/14/2003	GW	87.02	13.76		73.26	<50	<0.5	<0.5	<0.5	0.67	28	<20	
	1/14/2004	GW	87.02	14.83		72.19	550	<5	<5	<5	<5	380	<200	
	4/23/2004	GW	87.02	13.17		73.85	<200	<25	<25	<25	<25	560	<1,000	
	7/1/2004	GW	87.02	15.19		71.83	<50	<0.5	<0.5	<0.5	0.5	48	<20	
	10/28/2004	GW	87.02	15.50		71.52	<500	<5	<5	<5	<5	290	<200	
	1/10/2005	GW	87.02	15.00		72.02	<50	<0.5	<0.5	<0.5	<0.5	18	<20	
	4/13/2005	GW	87.02	14.34		72.68	<50	<0.5	<0.5	<0.5	<0.5	9	<20	
	7/11/2005	GW	87.02	10.82		76.20	130	<1	<1	<1	<1	120	<40	
	10/17/2005	GW	87.02	11.84		75.18	<250	<2.5	<2.5	<2.5	<2.5	260	<100	
	1/17/2006	GW	87.02	11.59		75.43	800	<5	<5	<5	<5	980	200	
	4/21/2006	GW	87.02	10.00		77.02	<500	<5	<5	<5	<5	48	<200	
	7/17/2006	GW	87.02	10.80		76.22	910	<5	<5	<5	<5	1,400	<200	
	7/26/2006	GW	87.02	9.67		77.35	810	<10	<10	<10	<10	1,300	<400	
	10/31/2006	GW	87.02	10.85		76.17	1,600	<10	<10	<10	<10	2,300	<400	
	1/8/2007	GW	87.02	12.73		74.29	520	<5	<5	<5	<5	760	<200	
	4/10/2007	GW	87.02	11.93		75.09	630	<5	<5	<5	<5	750	<200	
	7/10/2007	GW	87.02	11.30		75.72	1,800	<5	<5	<5	<5	2,400	<200	66
	10/24/2007	GW	87.02	13.77		73.25	2,000	<25	<25	<25	<25	3,500	<1,000	
	1/22/2008	GW	87.02	12.92		74.10	1,600	<12	<12	<12	<12	2,800	<500	
	4/15/2008	GW	87.02	15.25		71.77	<50	<2.5	<2.5	<2.5	<2.5	960	<50	
	7/8/2008	GW	87.02	12.27		74.75	<50	<50	<50	<50	<50	2,200	<1,000	
	11/19/2008	GW	87.02	15.27		71.75	<50	<50	<50	<50	<50	2,700	<1,000	
	2/10/2009	GW	87.02	13.61		73.41	<50	<50	<50	<50	<50	1,800	<1,000	
	5/7/2009	GW	87.02	11.75		75.27	140	<10	<10	<10	<10	780	<200	
	9/3/2009	GW	87.02	13.47		73.55	1,100	<10	<10	<10	<10	2,400	<200	
	10/29/2009	GW	87.02	13.04		73.98	1,000	<10	<10	<10	<20	1,500	110	
	2/26/2010	GW	87.02	12.44		74.58	1,500	<10	<10	<10	<20	1,500	<80	
	8/16/2010	GW	87.02	11.43		75.59	1,900	<0.50	<0.50	<0.50	<1.0	2,400	20	
	11/12/2010		87.02	12.05		74.97								
	2/3/2011	GW	87.02	12.31		74.71	<1000	<10	<10	<10	<20	1,500	150	
	6/23/2011		87.02	11.08		75.94								
	8/22/2011	GW	87.02	11.54		75.48	<1000	<10	<10	<10	<20	2,600	<80	
	2/20/2012	GW	87.02	12.81		74.21	<1000	<10	<10	<10	<20	1,700	110	
MW-4	11/12/2010	GW	78.06				<50	<0.50	<0.50	<0.50	<1.0	95	6.9	
	2/3/2011	GW	78.06	12.09		65.97	<50	<0.50	<0.50	<0.50	<1.0	110	12	
	6/23/2011	GW	78.06	11.33		66.73	<50	<0.50	<0.50	<0.50	<1.0	36	<4.0	
	8/22/2011	GW	78.06	12.09		65.97	<50	<0.50	<0.50	<0.50	<1.0	3.7	<4.0	
	2/20/2012	GW	78.06	12.61		65.45	<50	<0.50	<0.50	<0.50	<1.0	12	<4.0	
QC-2	11/11/1992						<50	<0.5	<0.5	<0.5	<0.5			
	6/7/1993						<50	<0.5	<0.5	<0.5	<0.5			
	12/2/1993						<50	<0.5	<0.5	<0.5	<0.5			
	6/22/1994						<50	<0.5	<0.5	<0.5	<0.5			
	1/10/1995						<50	<0.5	<0.5	<0.5	<1			
	6/21/1995						<50	<0.5	<0.5	<0.5	<1			
	12/27/1995						<50	<0.5	<0.5	<0.5	<1	<5		
	6/13/1996						<50	<0.5	<0.5	<0.5	<0.5	<10		

Notes:
P = well purged prior to sampling
NP = well not purged prior to sampling
TOC = Top of Casing

Table 2: Historical Groundwater Results
Former BP Service Station No. 11102
100 MacArthur Blvd, Oakland, CA
Local Case # RO456

Location	Sample Date	Notes	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	TBA	TPHd
							µg/L							

DTW = Depth to Water
ft = feet
TPHg = Total Petroleum Hydrocarbons as Gasoline
MTBE = Methyl tert-butyl ether
TPHd = Total Petroleum Hydrocarbons as Diesel
µg/L = micrograms per liter
- = not analyzed
< = analyte not detected, result is less than value provided

Table 3: Historical Groundwater Flow Directions and Gradients
Former BP Service Station No. 11102
100 MacArthur Blvd, Oakland, CA
Local Case #RO456

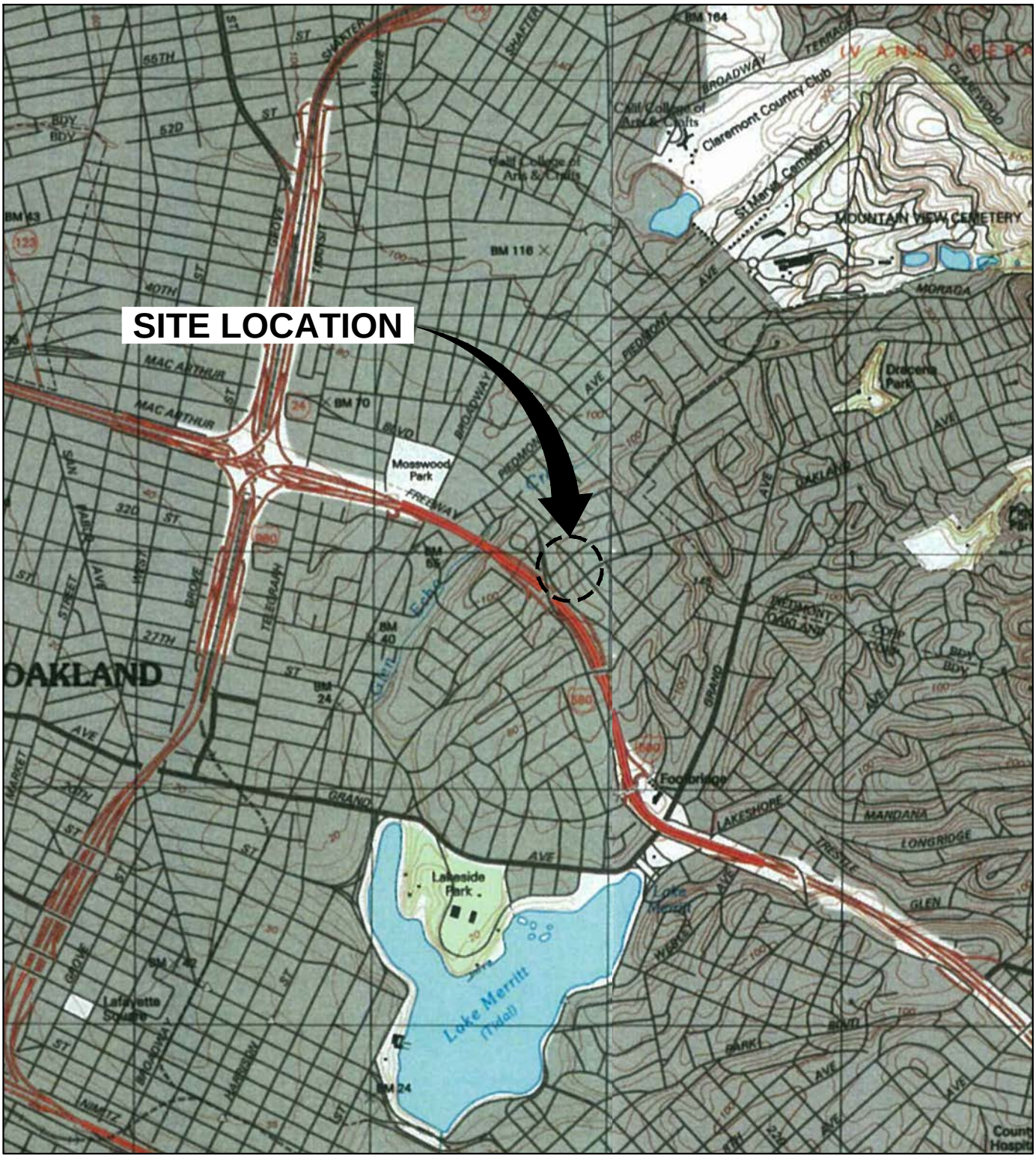
Date Sampled	Approximate Flow Direction	Approximate Hydraulic Gradient (ft/ft)
11/11/1989	Southwest	0.04
4/3/1990	Southwest	0.07
7/30/1990	Southwest	0.07
11/20/1990	Southwest	0.09
8/19/1991	South	0.06
11/13/1991	South	0.06
2/24/1992	Southwest	0.06
5/19/1992	Southwest	0.06
7/22/1992	West-Southwest	0.07
8/14/1992	West-Southwest	0.07
11/11/1992	Southwest	0.06
6/7/1993	Southwest	0.07
12/2/1993	Southwest	0.05
6/22/1994	Southwest	0.05
1/10/1995	Southwest	0.05
6/21/1995	West-Southwest	0.06
12/27/1995	West-Southwest	0.06
6/13/1996	West-Southwest	0.06
12/4/1996	West-Southwest	0.05
6/10/1997	West-Southwest	0.05
12/12/1997	West-Southwest	0.05
6/18/1998	West-Southwest	0.05
3/9/1999	West-Southwest	0.07
9/28/1999	West-Southwest	0.07
3/27/2000	West-Southwest	0.08
9/28/2000	North-Northwest	0.03
3/8/2001	North-Northwest	0.04
9/21/2001	West	0.03
2/28/2002	North-Northwest	0.04
2/19/2003	West	0.04
7/14/2003	West	0.06
1/14/2004	West-Northwest	0.08
4/23/2004	West	0.05
7/1/2004	West	0.08
10/28/2004	West-Northwest	0.07
1/10/2005	West-Southwest	0.07
4/13/2005	West-Southwest	0.08
7/11/2005	West-Southwest	0.06
10/17/2005	Southwest	0.05
1/17/2006	West	0.04
7/26/2006	Southwest	0.05
10/31/2006	Southwest	0.04
1/8/2007	West	0.06
4/10/2007	West	0.05
7/10/2007	Southwest	0.04
10/24/2007	West-Southwest	0.06
1/22/2008	West	0.05
4/15/2008	West-Southwest	0.09
7/8/2008	West-Southwest	0.05
11/19/2008	West	0.06
2/10/2009	West	0.04
5/7/2009	West	0.05
9/3/2009	West	0.05
10/29/2009	West	0.04
2/26/2010	West	0.05
8/16/2010	West-Southwest	0.05
2/3/2011	West-Southwest	0.04
6/23/2011	West-Southwest	0.05
8/22/2011	West-Southwest	0.05
2/20/2012	West-Southwest	0.05

Table 4: Most Recent Maximum Concentration of Contaminants Detected in Soil and Groundwater
Former BP Service Station No. 11102
100 MacArthur Blvd, Oakland, CA
Local Case #RO456

Analyte	Soil [1]							Groundwater					
	Most Recent Concentration Observed (mg/kg)	Sample Depth (feet bgs)	Sample Date	Maximum Concentration Observed (mg/kg)	Sample Depth (feet bgs)	Sample Date	Commercial ESL (mg/kg)	Most Recent Concentration Observed (µg/L)	Sample Date	Maximum Concentration Observed (µg/L)	Sample Date	Commercial ESL for the Protection of the Vapor Intrusion Pathway (µg/L)	State of California Maximum Contaminant Level (µg/L)
TPHg	<0.3 (MW-4)	6.5	10/6/2010	**1,300 (SB-7)**	2.0	7/14/2005	450	**1,900 (MW-3)**	8/16/2010	**45,000 (MW-2)**	2/19/2003	29	NA
Benzene	<0.0050 (MW-4)	6.5	10/6/2010	0.08 (MW-2)	10.0	10/25/1989	0.27	1.6 (MW-1)	5/7/2009	440 (MW-1)	5/19/1992	1,800	1
Toluene	<0.0050 (MW-4)	6.5	10/6/2010	0.006 (MW-3)	5.0	10/26/1989	210	1.0 (MW-1)	4/21/2006	110 (MW-1)	2/19/2003	530,000	150
Ethylbenzene	<0.0050 (MW-4)	6.5	10/6/2010	3.0 (SB-7)	2.0	7/14/2005	5	0.83 (MW-1)	1/22/2008	250 (MW-1)	5/19/1992	170,000	300
Xylenes	<0.01 (MW-4)	6.5	10/6/2010	3.9 (SB-7)	5.0	7/14/2005	100	0.89 (MW-1)	9/3/2009	1,100 (MW-1)	3/9/1999	160,000	1750
MTBE	<0.0050 (MW-4)	6.5	10/6/2010	0.37 (SB-4)	9.5	7/14/2005	65	1,700 (MW-3)	2/20/2012	49,000 (MW-1)	3/9/1999	80,000	13
TPHd	**2,100 (TD-1)**	0.5	11/22/1994	**2,100 (TD-1)**	0.5	11/22/1994	450	160 (MW-1)	7/10/2007	2900 (MW-1)	6/18/1998	NA	NA

[1] Soil results are reported from the vadose zone, which does not exceed 10 feet bgs
[2] ESL Table K-2 - Direct Exposure Soil Screening Levels Commercial/Industrial Exposure
[3] ESL Table E-1 - Groundwater Screening Levels for Evaluation of Potential Vapor Intrusion Concerns
Bold = exceedances of commercial ESL
TPHg = Total Petroleum Hydrocarbons as Gasoline
MTBE = methyl tert-butyl ether
TPHd = Total Petroleum Hydrocarbons as Diesel
mg/kg = milligrams per kilogram
µg/L = micrograms per liter
bgs = below ground surface
ND = non-detect, below laboratory detection limits
GRO Commercial ESL values are listed as TPH (gasolines) in Table A of *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*
DRO Commercial ESL values are listed as TPH (middle distillates) in Table A of Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater
NA = not available

Figures



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

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.

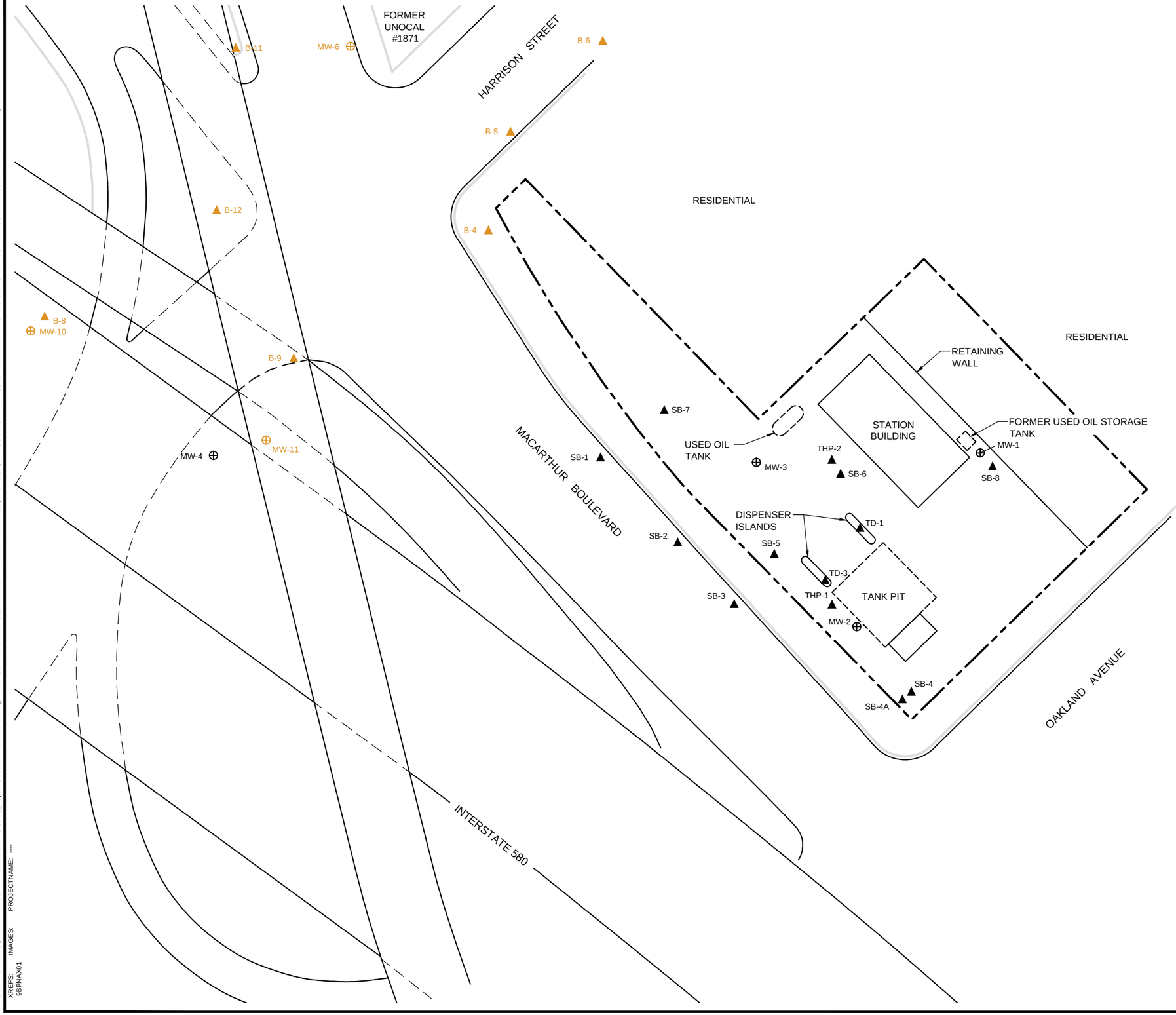
FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD:--- PIC: S.GLENN PM: H.PHILLIPS TM: C.MEYER LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Emeryville\ACT\GP09BPNA\C111\B0000\Closure_Report\GP09BPNAC11-B-01.dwg LAYOUT: 1 SAVED: 3/8/2012 2:31 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS-EMV.CTB PLOTTED: 3/8/2012 2:32 PM BY: BEARDSLEY, DANIEL
XREFS: IMAGES: PROJECTNAME: ----
oakland west.jpg
oakland east.jpg



LEGEND:

- PROPERTY BOUNDARY
- BP MONITORING WELL LOCATION
- BP SOIL BORING LOCATION
- UNOCAL MONITORING WELL LOCATION
- UNOCAL SOIL BORING LOCATION

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'
2. ALL LOCATIONS ARE APPROXIMATE.
3. THE NEW MONITORING WELL WAS INSTALLED ON 10/06/2010 AND DEVELOPED AND SAMPLED ON 10/12/2010.

0 40' 80'

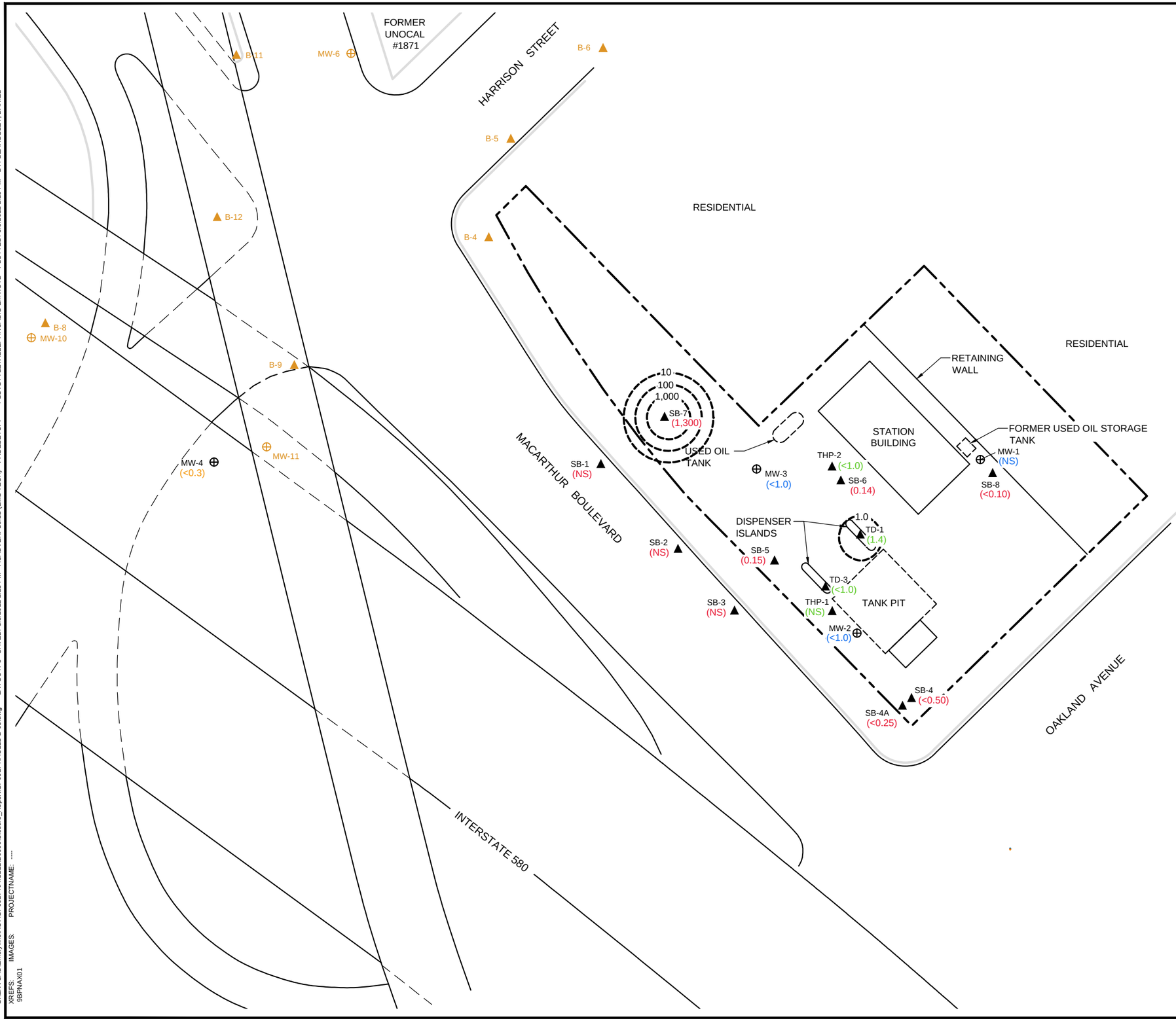
GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

SITE MAP WITH SOIL BORING AND MONITORING WELL LOCATIONS

ARCADIS

FIGURE
2



LEGEND:

- PROPERTY BOUNDARY
- ⊕ BP MONITORING WELL LOCATION
- ▲ BP SOIL BORING LOCATION
- ⊕ UNOCAL MONITORING WELL LOCATION
- ▲ UNOCAL SOIL BORING LOCATION
- 100 TPHg ISOCONCENTRATION CONTOUR (mg/Kg) (DASHED WHERE INFERRED)
- (<1.0) TPHg CONCENTRATION IN mg/Kg in 1989
- (<1.0) TPHg CONCENTRATION IN mg/Kg in 1994
- (<1.0) TPHg CONCENTRATION IN mg/Kg in 2005
- (<1.0) TPHg CONCENTRATION IN mg/Kg in 2010
- TPHg TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- (mg/Kg) MILLIGRAMS PER KILOGRAM
- (NS) NOT SAMPLED AT THE SPECIFIC INTERVAL

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'
2. ALL LOCATIONS ARE APPROXIMATE.

0 40' 80'

GRAPHIC SCALE

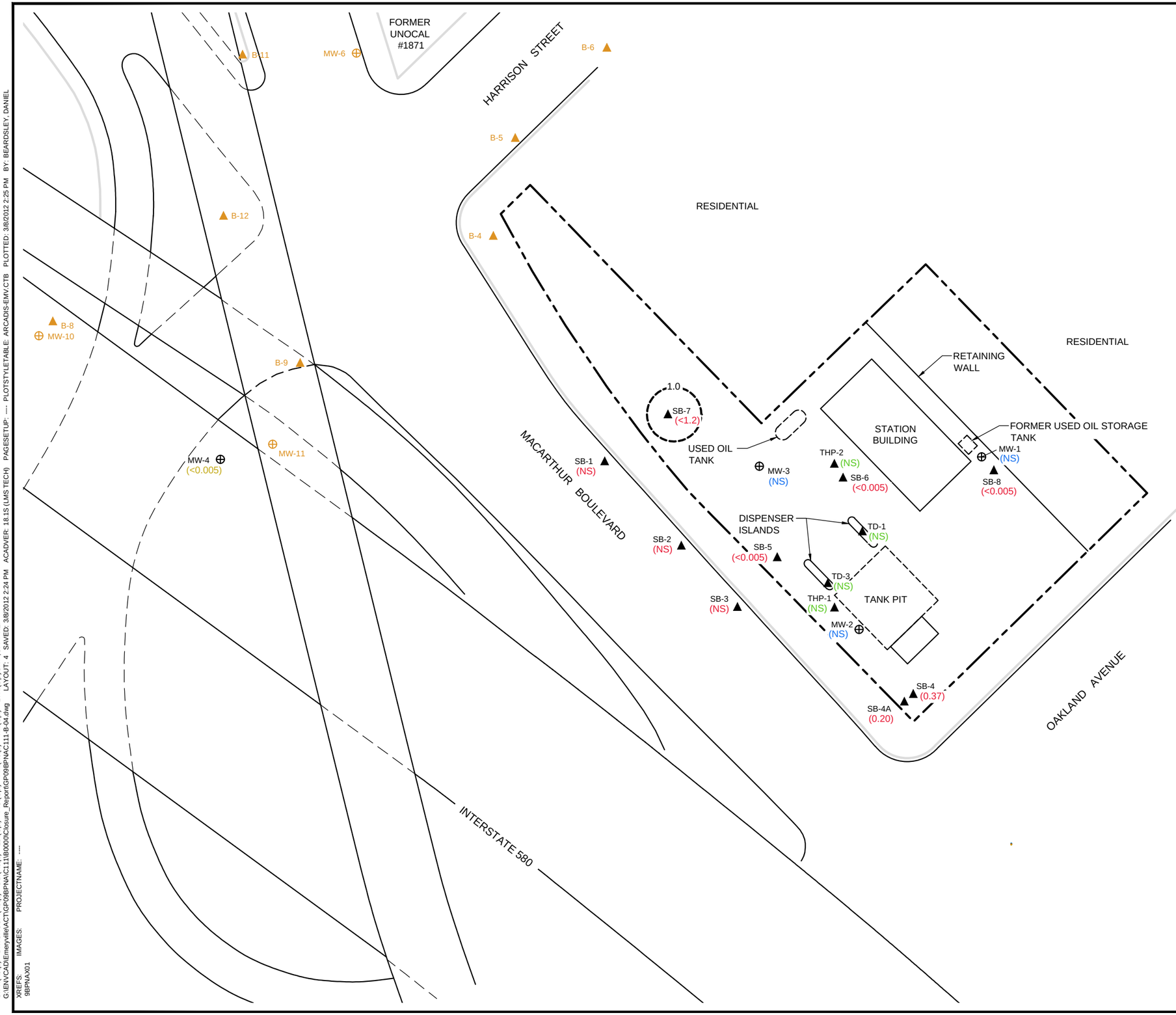
FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

HISTORICAL LATERAL EXTENT OF TPHg SOIL IMPACTS

ARCADIS

FIGURE
3

CTY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(On|Off=*;OFF=*REF*
G:\ENVCAD\Emeryville\ACT\GP09BPNA\C111\B0000\Closure_Report\GP09BPNAC111-B-03.dwg LAYOUT: 3 SAVED: 3/8/2012 2:25 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS-EMV.CTB PLOTTED: 3/8/2012 2:25 PM BY: BEARDSLEY, DANIEL
XREFS: PROJECTNAME: ----
IMAGES:
9BPNAX01



LEGEND:

- PROPERTY BOUNDARY
- ⊕ BP MONITORING WELL LOCATION
- ▲ BP SOIL BORING LOCATION
- ⊕ UNOCAL MONITORING WELL LOCATION
- ▲ UNOCAL SOIL BORING LOCATION
- 100 TPHg ISOCONCENTRATION CONTOUR (mg/Kg) (DASHED WHERE INFERRED)
- (<1.0) MTBE CONCENTRATION IN mg/Kg in 1989
- (<1.0) MTBE CONCENTRATION IN mg/Kg in 1994
- (<1.0) MTBE CONCENTRATION IN mg/Kg in 2005
- (<1.0) MTBE CONCENTRATION IN mg/Kg in 2010
- MTBE METHYL TERTIARY-BUTYL ETHER
- (mg/Kg) MILLIGRAMS PER KILOGRAM
- (NS) NOT SAMPLED AT THE SPECIFIC INTERVAL

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'
2. ALL LOCATIONS ARE APPROXIMATE.

0 40' 80'

GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

HISTORICAL LATERAL EXTENT OF MTBE SOIL IMPACTS

ARCADIS

FIGURE
4

CTY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Emeryville\ACT\GP09BPNA\C111\B0000\Closure_Report\GP09BPNAC111-B-04.dwg LAYOUT: 4 SAVED: 3/8/2012 2:24 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS-EMV.CTB PLOTTED: 3/8/2012 2:25 PM BY: BEARDSLEY, DANIEL
XREFS: PROJECTNAME: ----
IMAGES:
9BPNAX01

FORMER UNOCAL #1871

HARRISON STREET

B-11 MW-6 B-6 B-5 B-12 B-4 B-8 MW-10 B-9 MW-11 MW-4 A

RESIDENTIAL

RESIDENTIAL

RETAINING WALL

B SB-7

USED OIL TANK MW-3 THP-2 SB-6 STATION BUILDING FORMER USED OIL STORAGE TANK MW-1 SB-8 A'

SB-1

MACARTHUR BOULEVARD

DISPENSER ISLANDS TD-1 TD-3 THP-1 TANK PIT MW-2

SB-2 SB-5 SB-3 SB-4 SB-4A B'

OAKLAND AVENUE

INTERSTATE 580

LEGEND:

- PROPERTY BOUNDARY
- BP MONITORING WELL LOCATION
- BP SOIL BORING LOCATION
- UNOCAL MONITORING WELL LOCATION
- UNOCAL SOIL BORING LOCATION
- A — A' CROSS SECTION LOCATION

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'
2. ALL LOCATIONS ARE APPROXIMATE.

0 40' 80'

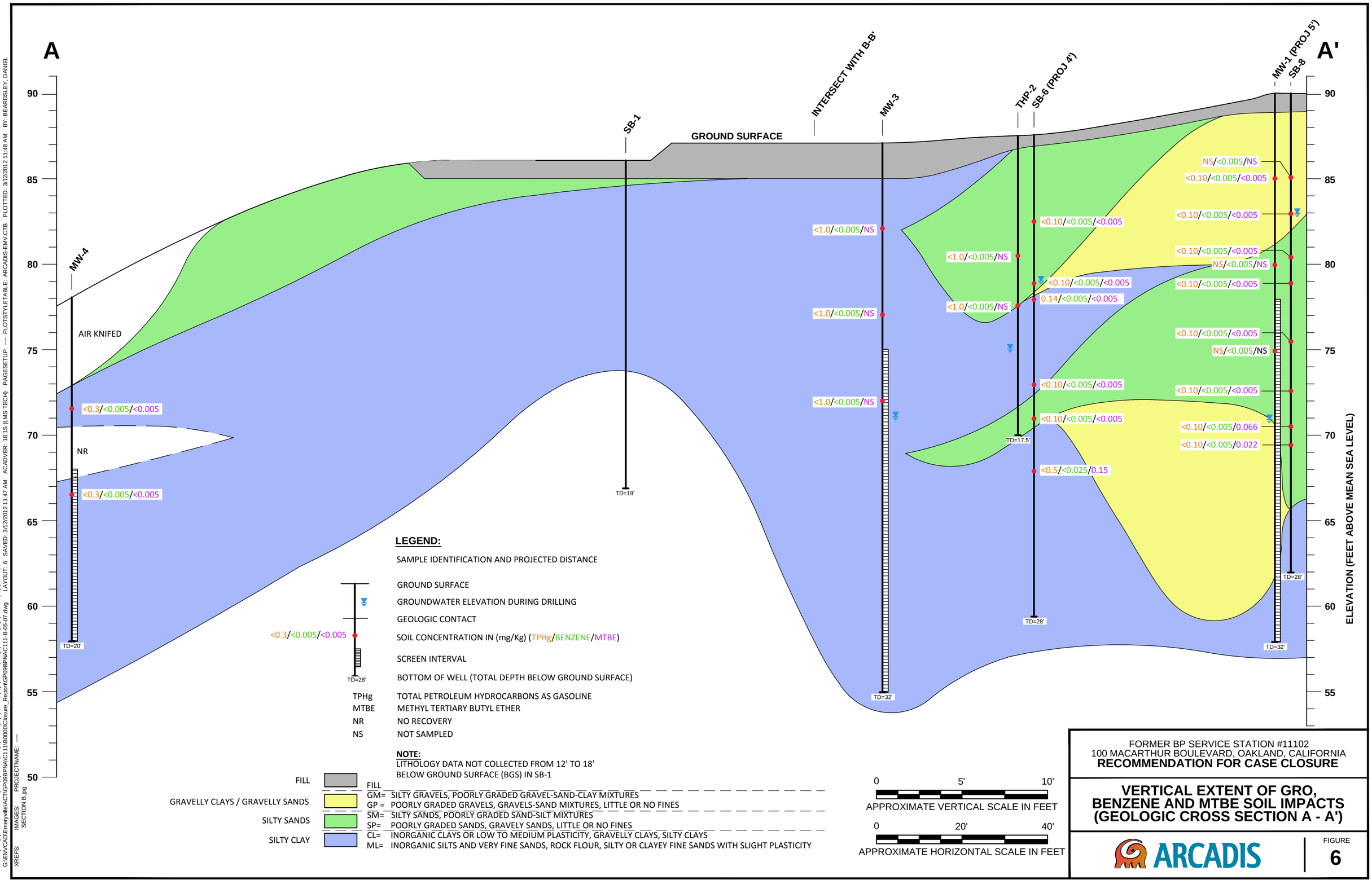
GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

SITE PLAN WITH CROSS SECTION LOCATION

ARCADIS

FIGURE
5

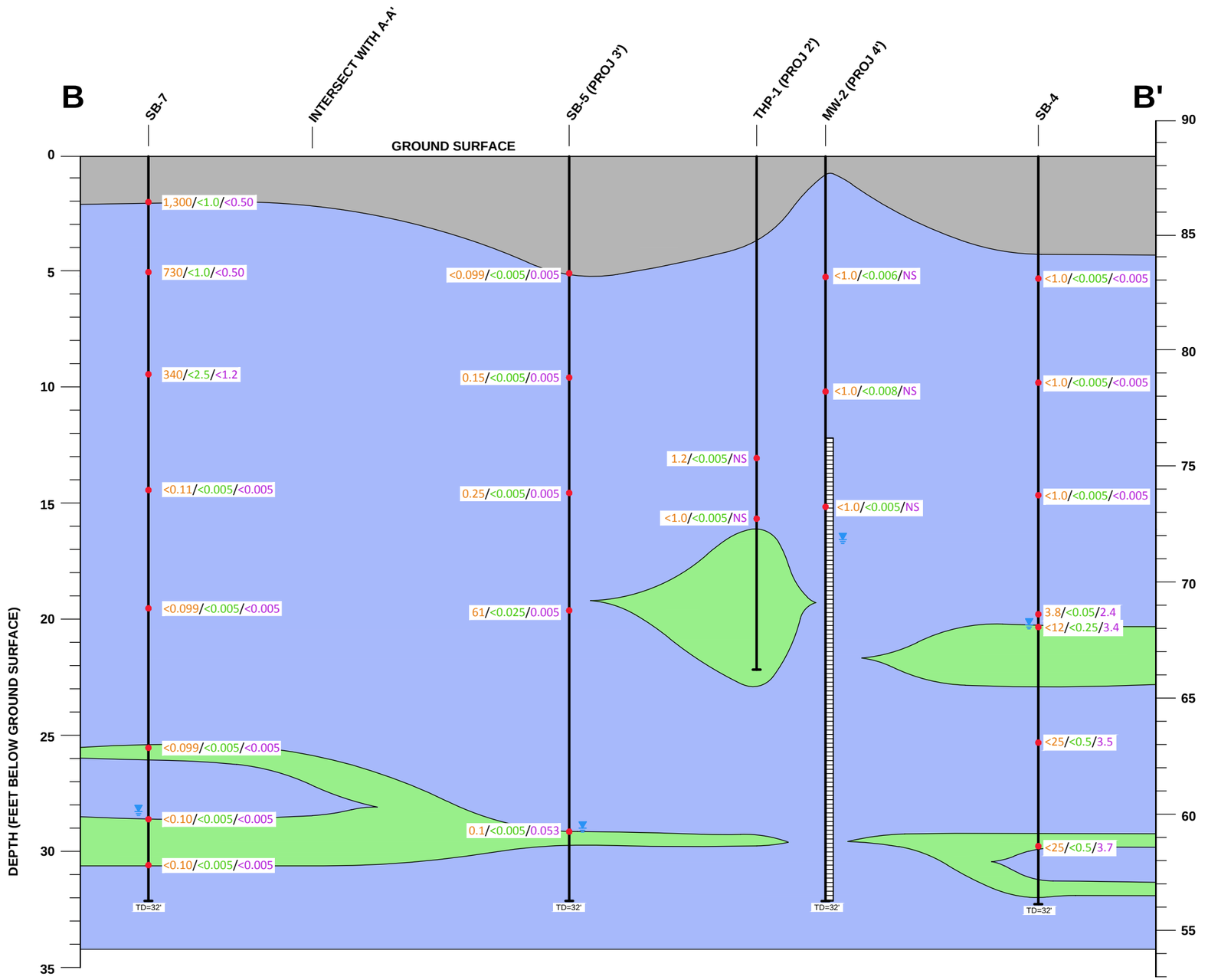


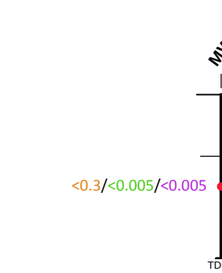
FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

VERTICAL EXTENT OF GRO, BENZENE AND MTBE SOIL IMPACTS (GEOLOGIC CROSS SECTION A - A')

ARCADIS

FIGURE
6





LEGEND:

SAMPLE IDENTIFICATION AND PROJECTED DISTANCE

GROUND SURFACE

GROUNDWATER ELEVATION DURING DRILLING

GEOLOGIC CONTACT

SOIL CONCENTRATION IN (mg/Kg) (TPHg/BENZENE/MTBE)

SCREEN INTERVAL

BOTTOM OF WELL (TOTAL DEPTH BELOW GROUND SURFACE)

TPHg	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
MTBE	METHYL TERTIARY BUTYL ETHER
NS	NOT SAMPLED

FILL	FILL
GRAVELLY CLAYS / GRAVELLY SANDS	GM= SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES GP = POORLY GRADED GRAVELS, GRAVELS-SAND MIXTURES, LITTLE OR NO FINES
SILTY SANDS	SM= SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES SP= POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SILTY CLAY	CL= INORGANIC CLAYS OR LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SILTY CLAYS ML= INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS WITH SLIGHT PLASTICITY

0 5' 10'
APPROXIMATE VERTICAL SCALE IN FEET

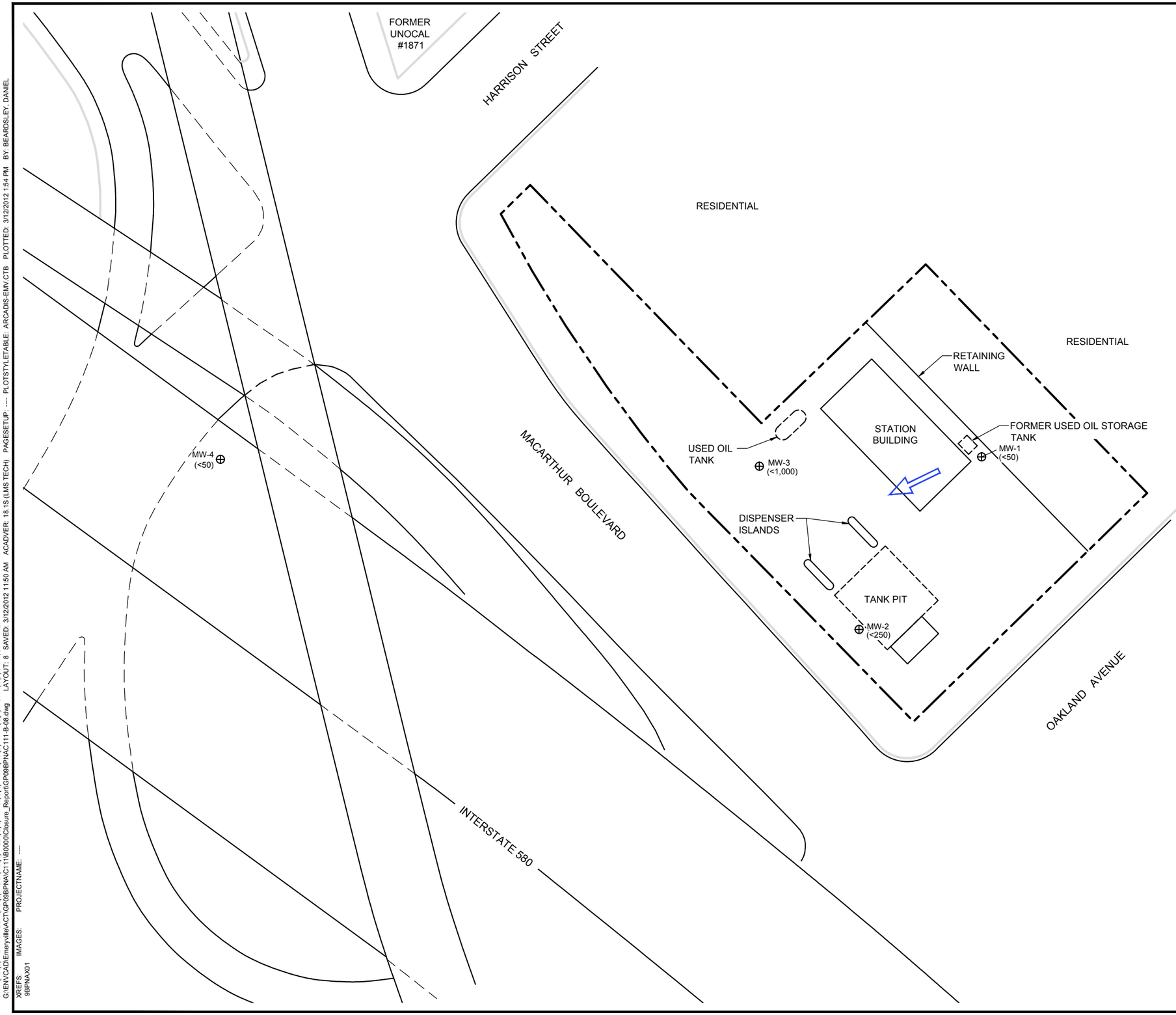
0 20' 40'
APPROXIMATE HORIZONTAL SCALE IN FEET

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

VERTICAL EXTENT OF GRO, BENZENE AND MTBE SOIL IMPACTS (GEOLOGIC CROSS SECTION B- B')

ARCADIS

FIGURE
7



LEGEND:

- PROPERTY BOUNDARY
- ⊕ BP MONITORING WELL LOCATION
- (<50) TPHg CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'

0 40' 80'

GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

EXTENT OF TPHg GROUNDWATER IMPACTS (FEBRUARY 2012)

ARCADIS

FIGURE
8

CTTY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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9BPNAX01
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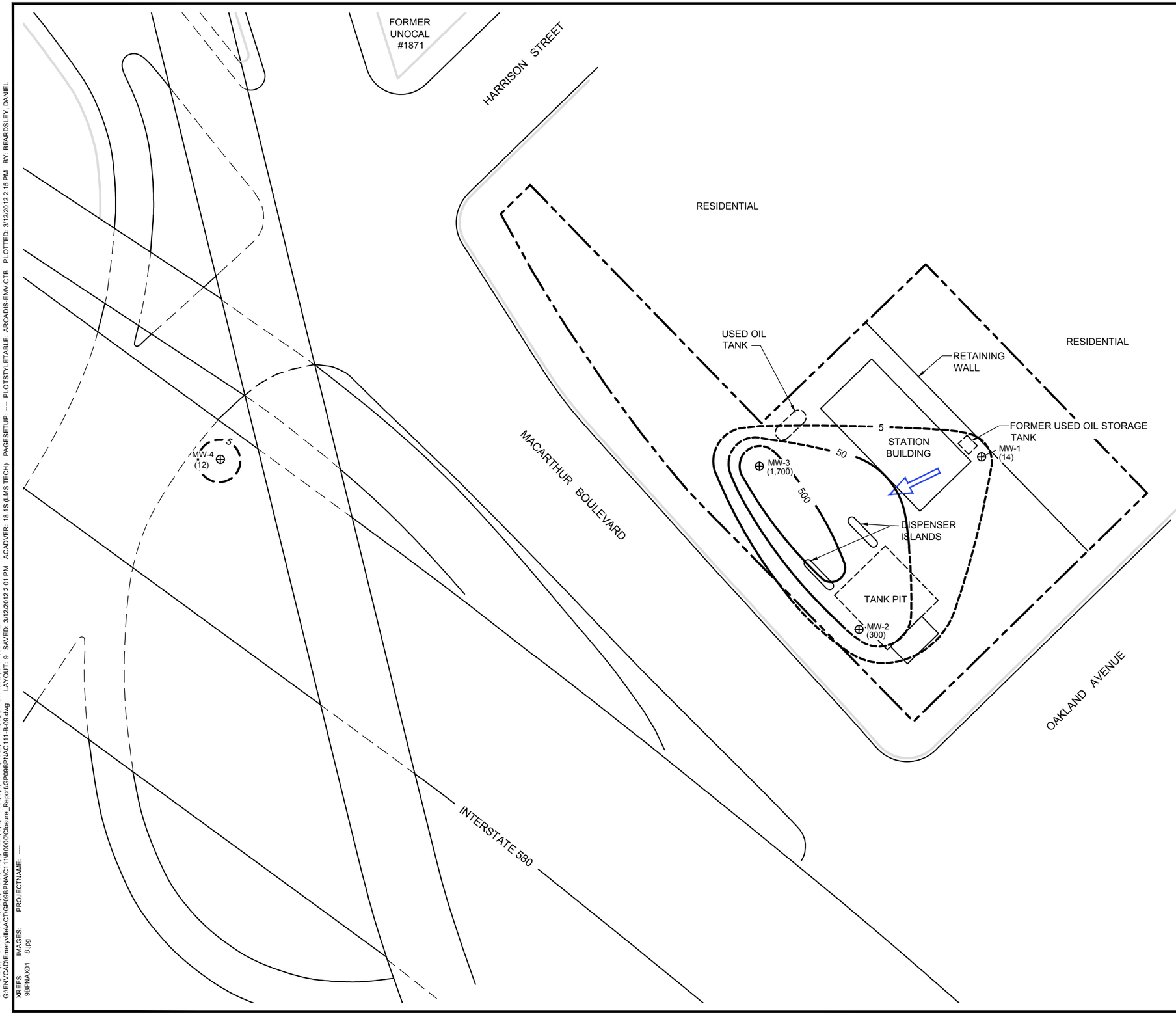

LEGEND:

- PROPERTY BOUNDARY
- ⊕ BP MONITORING WELL LOCATION
- (14) MTBE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- MTBE METHYL TERTIARY BUTYL ETHER
- 10 MTBE ISOCONCENTRATION CONTOUR (µg/L) (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'

0 40' 80'

GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

EXTENT OF MTBE GROUNDWATER IMPACTS (FEBRUARY 2012)

ARCADIS

FIGURE
9

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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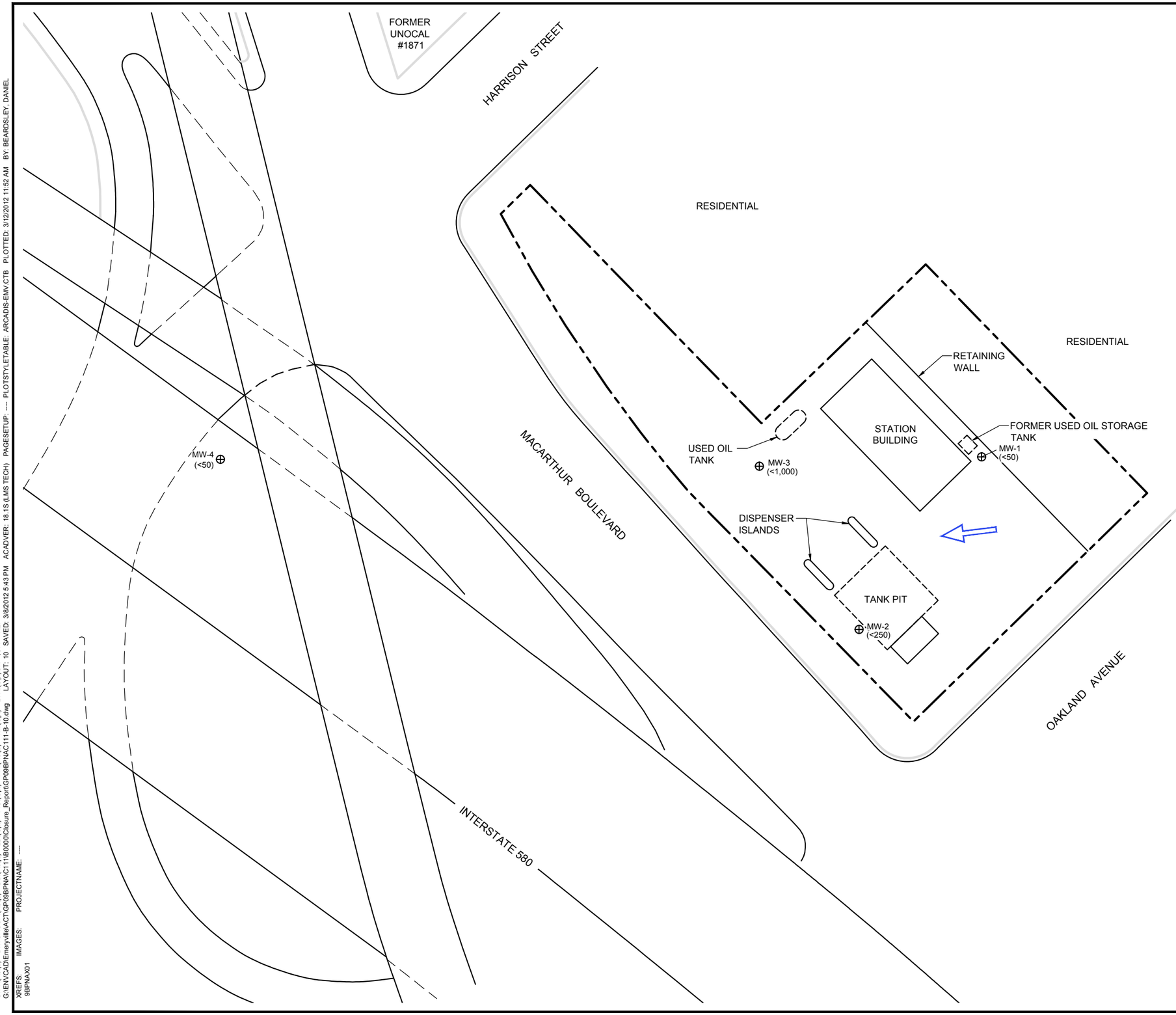

LEGEND:

- PROPERTY BOUNDARY
- ⊕ BP MONITORING WELL LOCATION
- (<50) TPHg CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'

0 40' 80'

GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

EXTENT OF TPHg GROUNDWATER IMPACTS (AUGUST 2011)

ARCADIS

FIGURE
10

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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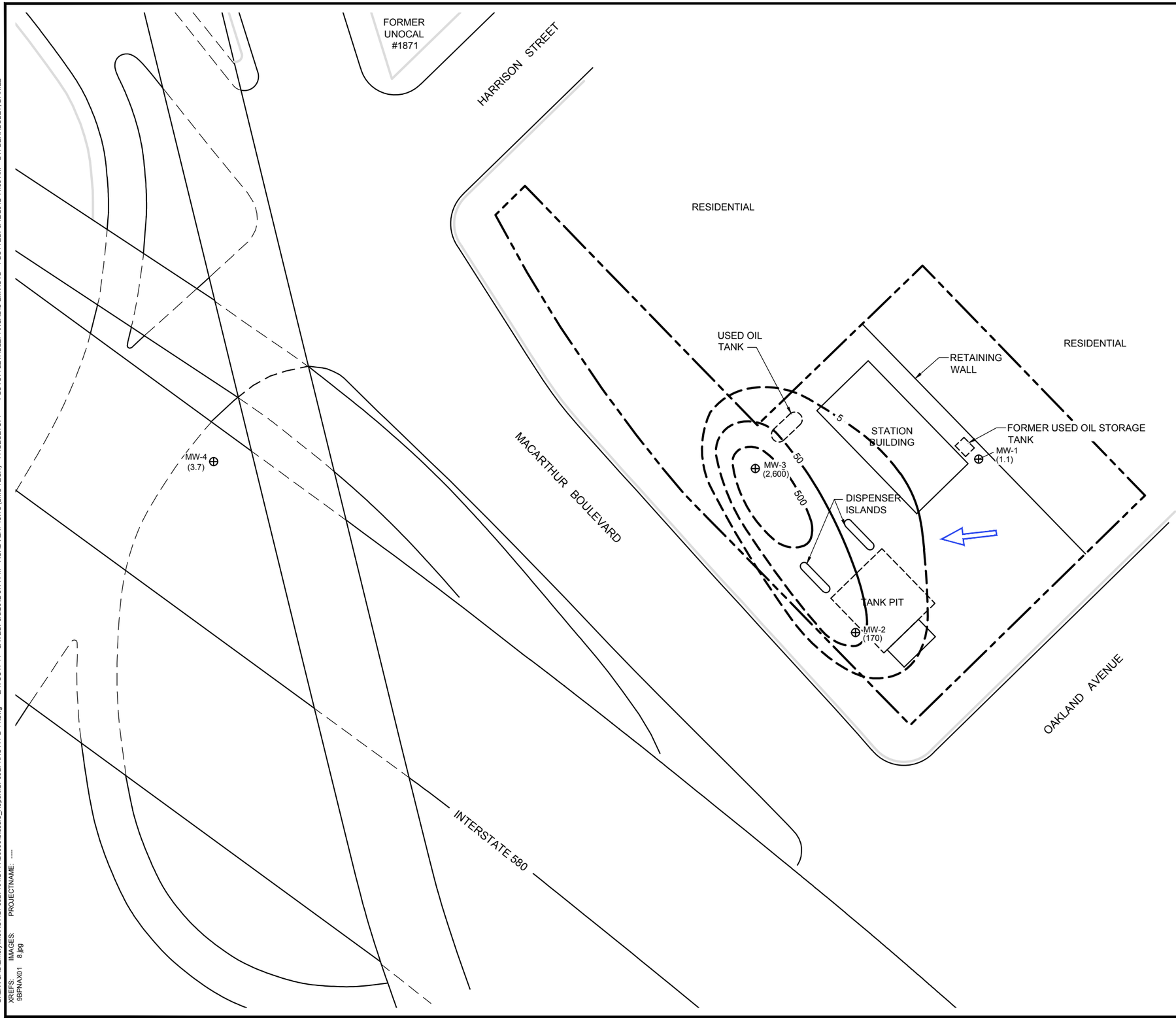

LEGEND:

- PROPERTY BOUNDARY
- ⊕ BP MONITORING WELL LOCATION
- (1.1) MTBE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- MTBE METHYL TERTIARY-BUTYL ETHER
- 10 MTBE ISOCONCENTRATION CONTOUR (µg/L) (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'

0 40' 80'

GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

EXTENT OF MTBE GROUNDWATER IMPACTS (AUGUST 2011)

ARCADIS

FIGURE
11

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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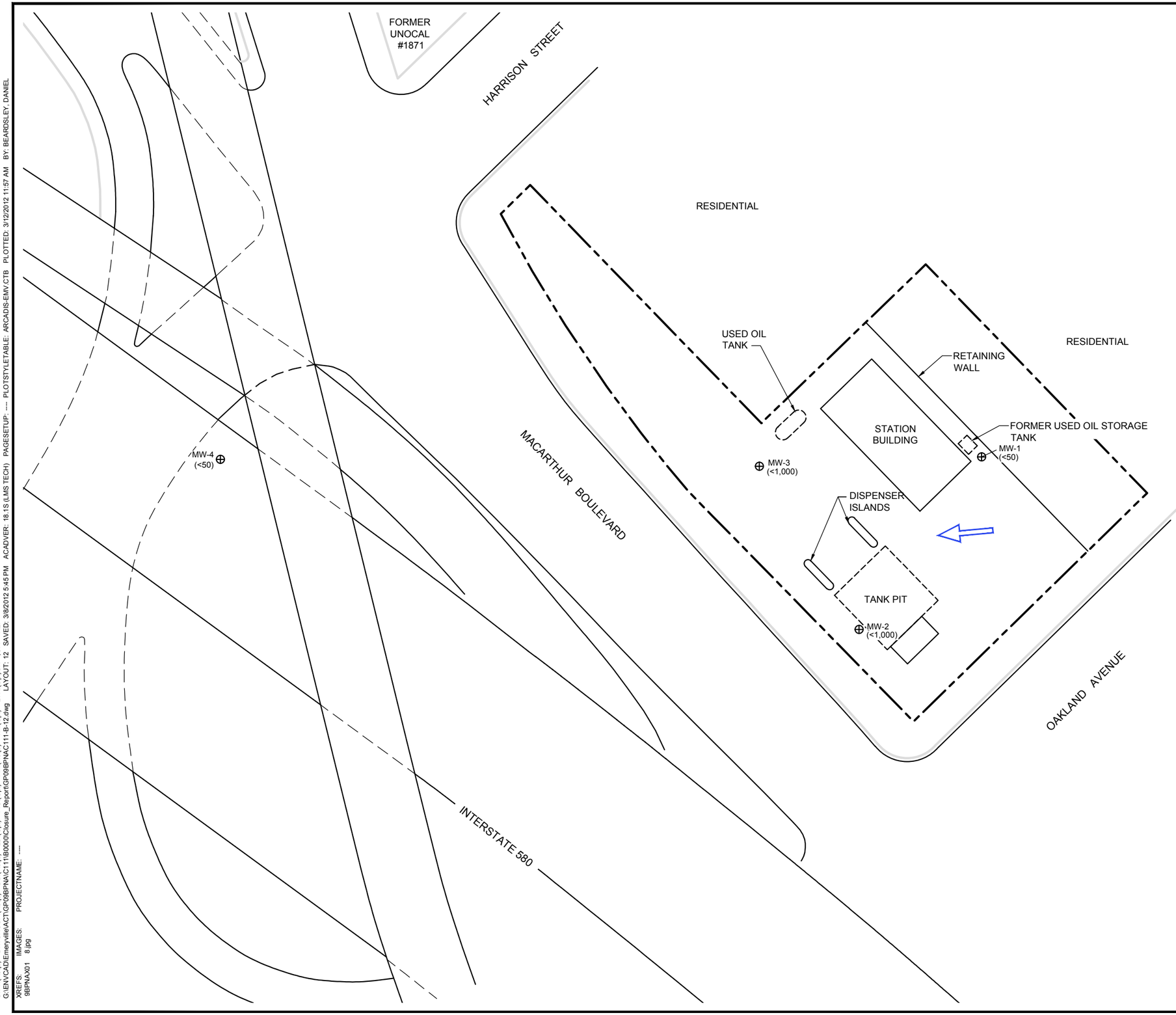

LEGEND:

- PROPERTY BOUNDARY
- ⊕ BP MONITORING WELL LOCATION
- (<50) TPHg CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'

0 40' 80'

GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

EXTENT OF TPHg GROUNDWATER IMPACTS (FEBRUARY 2011)

ARCADIS

FIGURE
12

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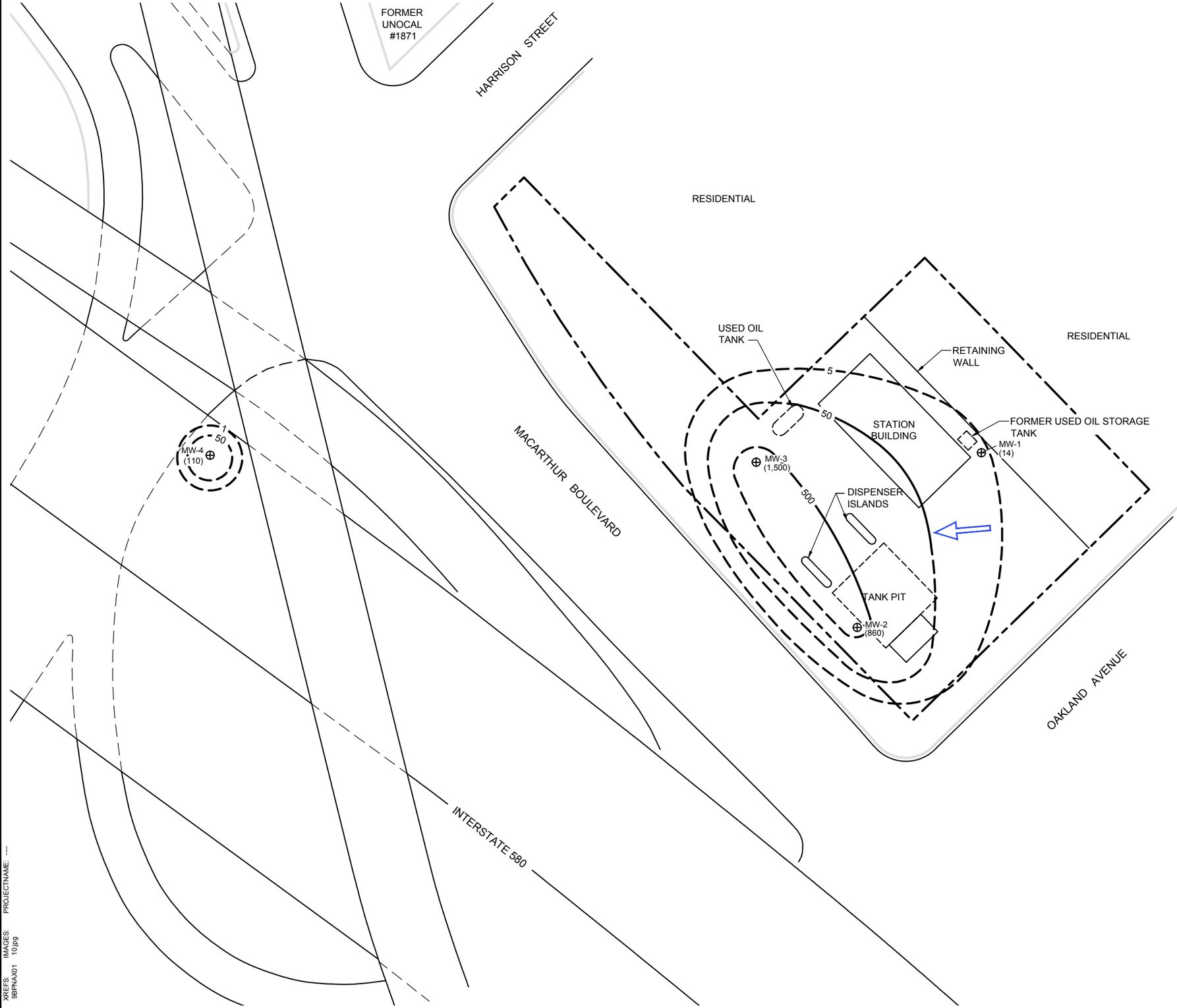

LEGEND:

- PROPERTY BOUNDARY
- ⊕ BP MONITORING WELL LOCATION
- (14) MTBE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- MTBE METHYL TERTIARY-BUTYL ETHER
- 10 MTBE ISOCONCENTRATION CONTOUR (µg/L) (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'

0 40' 80'

GRAPHIC SCALE

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

EXTENT OF MTBE GROUNDWATER IMPACTS (FEBRUARY 2011)

ARCADIS

FIGURE
13

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(OptION=*;OFF=*REF*
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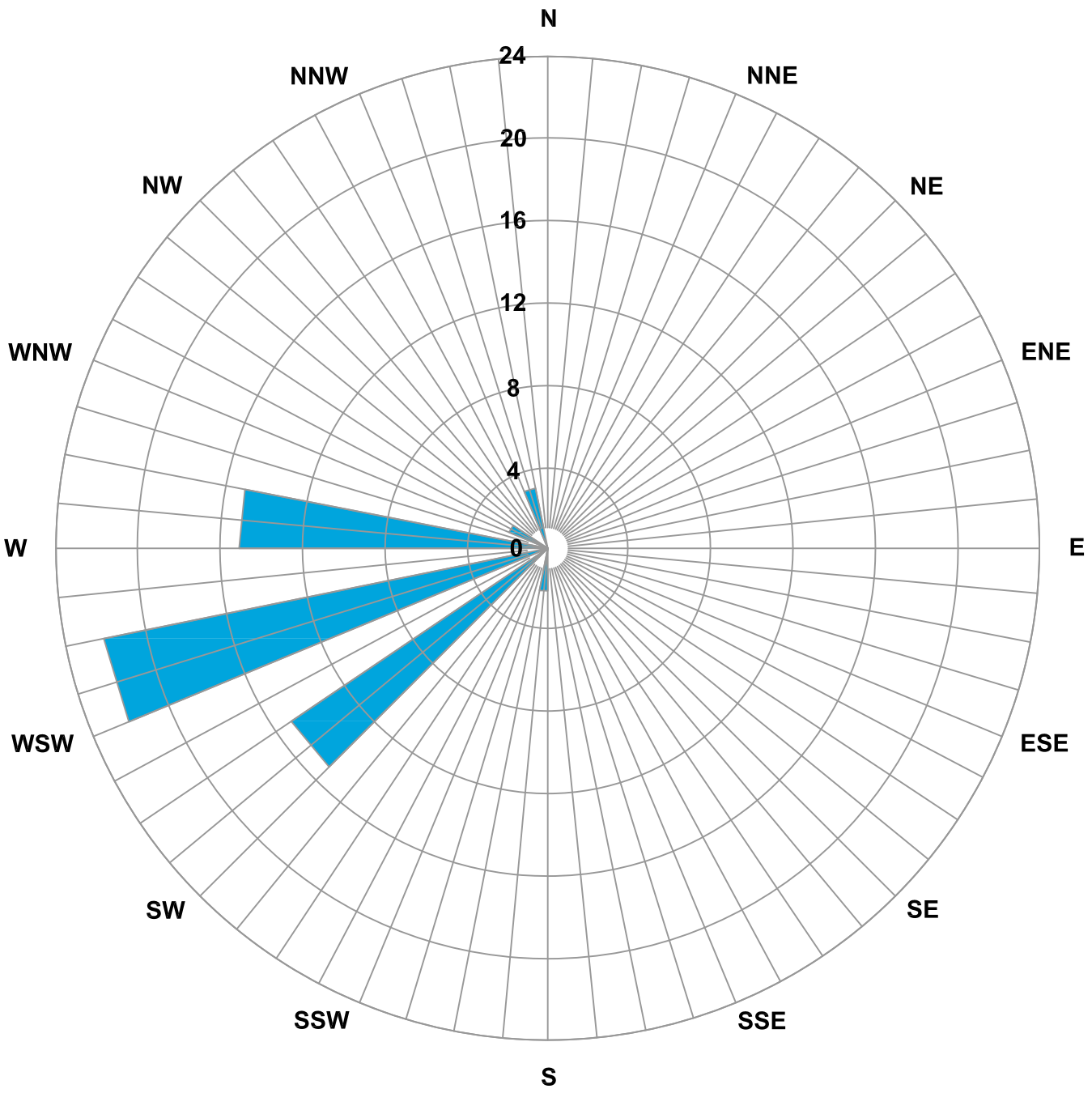


LEGEND

CONCENTRIC CIRCLES REPRESENT 59 MONITORING EVENTS CONDUCTED BETWEEN THE NOVEMBER, 1989 THROUGH FEBRUARY, 2012

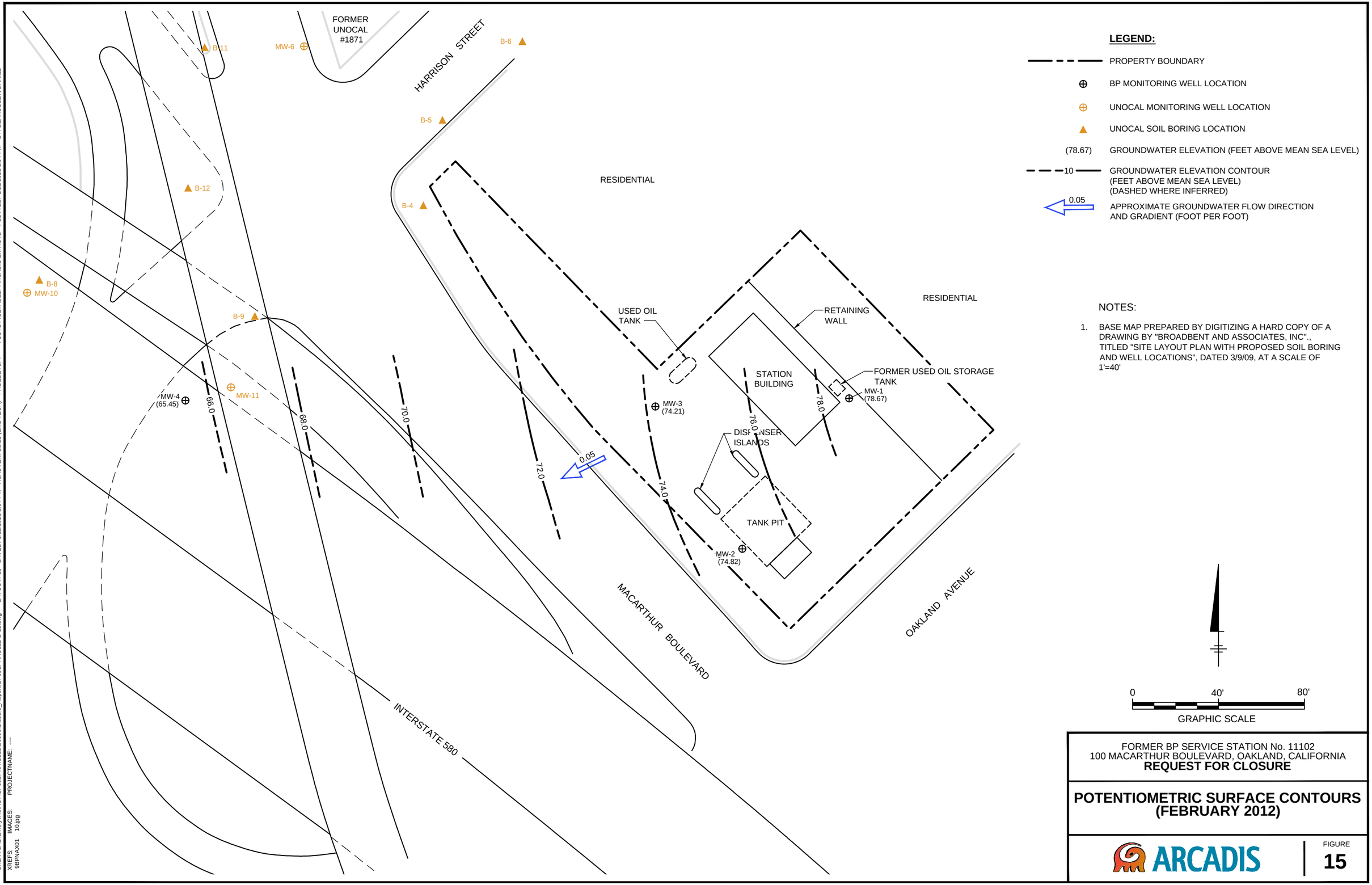
GROUNDWATER FLOW DIRECTION

FORMER BP SERVICE STATION #11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

GROUNDWATER FLOW DIRECTION ROSE DIAGRAM

ARCADIS

FIGURE
14



LEGEND:

- PROPERTY BOUNDARY
- BP MONITORING WELL LOCATION
- UNOCAL MONITORING WELL LOCATION
- UNOCAL SOIL BORING LOCATION
- (78.67) GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 10 GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL) (DASHED WHERE INFERRED)
- 0.05 APPROXIMATE GROUNDWATER FLOW DIRECTION AND GRADIENT (FOOT PER FOOT)

NOTES:

1. BASE MAP PREPARED BY DIGITIZING A HARD COPY OF A DRAWING BY "BROADBENT AND ASSOCIATES, INC"., TITLED "SITE LAYOUT PLAN WITH PROPOSED SOIL BORING AND WELL LOCATIONS", DATED 3/9/09, AT A SCALE OF 1'=40'

0 40' 80'

GRAPHIC SCALE

FORMER BP SERVICE STATION No. 11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
REQUEST FOR CLOSURE

POTENTIOMETRIC SURFACE CONTOURS (FEBRUARY 2012)

ARCADIS

FIGURE
15

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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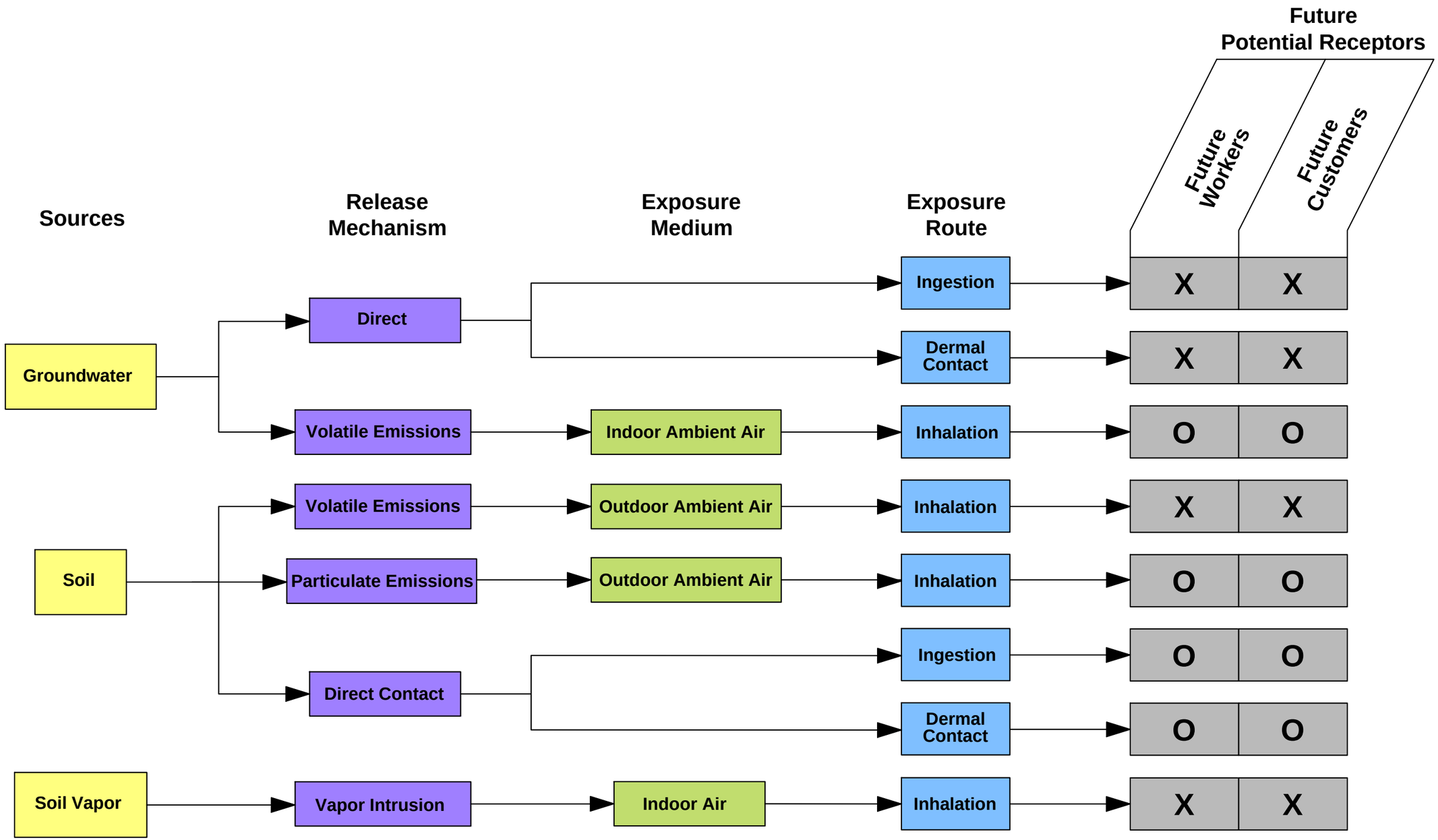


EXPLANATION

X INCOMPLETE PATHWAY

O COMPLETE PATHWAY

FORMER BP SERVICE STATION No. 11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
RECOMMENDATION FOR CASE CLOSURE

POTENTIAL EXPOSURE PATH FLOW CHART

ARCADIS

FIGURE **16**

ARCADIS

Appendix A

Boring Logs

ALTON GEOSCIENCE
BORING LOG

PROJECT: 30-063 BORING DATE: 10-26-89

LOCATION: 100 MacArthur Boulevard, Oakland GEOLOGIST: M. Hopwood

TYPE: 10" HSA BORING NO.: MW-1

DRILLING COMPANY: Bay Area Exploration

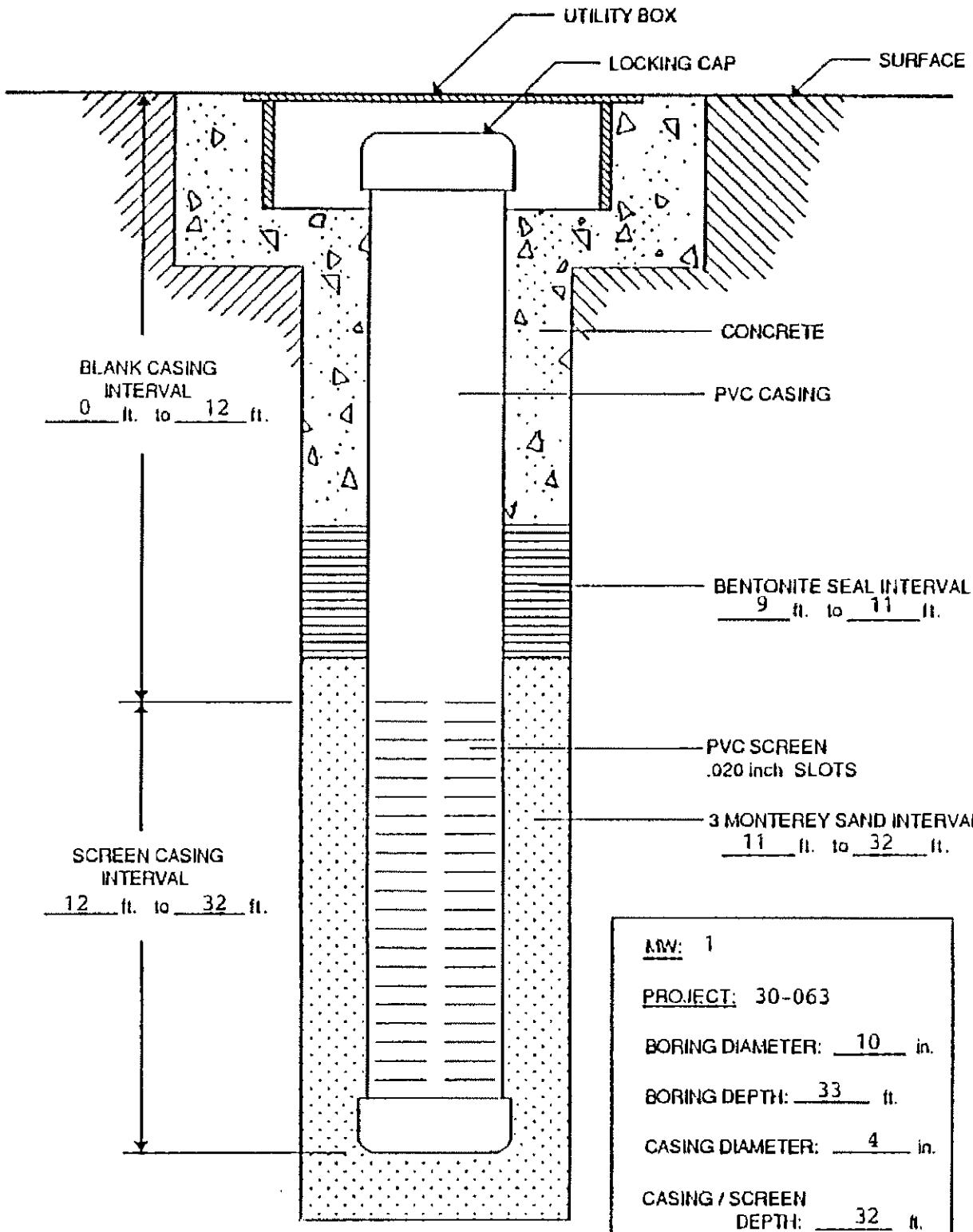
DEPTH (FEET)	I	BLOW CTS	MATERIAL ENCOUNTERED	USCS
			Asphalt Over Road Base Loose, dry, tan to orange, gravelly SAND.	GP
5		5,14,16	Loose, damp, tan to orange, gravelly SAND; wood fragments. CGI = ND.	GP
10		6,10,13	Loose, damp, tan to light brown, clayey SAND; poorly sorted. CGI = ND.	SC
15		8,8,25	Loose, very moist, tan to light brown, clayey SAND; some iron staining.	SC
▽ 20		9,9,12	Loose, saturated, tan to brown, gravelly SAND, with clay. CGI = ND.	GC
25				
30			Medium stiff, moist, tan CLAY.	CL
			Total Depth = 32 Feet	
35				
40				

TPH = Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
▽ = Ground Water Piezometric Surface
ND = Not Detected
CGI = Combustible Gas Indicator

++ = Sample Analyzed for Hydrocarbon Concentration
I = Sampling Interval
ppm = Parts per Million
LEL = Lower Explosive Limit

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylene
Total Depth = 32 Feet

MONITORING WELL CONSTRUCTION DETAIL



MW: 1

PROJECT: 30-063

BORING DIAMETER: 10 in.

BORING DEPTH: 33 ft.

CASING DIAMETER: 4 in.

CASING / SCREEN DEPTH: 32 ft.

NOTE: DRAWING IS NOT TO SCALE

ALTON GEOSCIENCE
1170 BURNETT AVE., STE S
CONCORD, CA 94520

ALTON GEOSCIENCE
BORING LOG

PROJECT: 30-063 BORING DATE: 10-25-89

LOCATION: 100 MacArthur Boulevard, Oakland GEOLOGIST: M. Hopwood

TYPE: 10" HSA BORING NO.: MW-2

DRILLING COMPANY: Bay Area Exploration

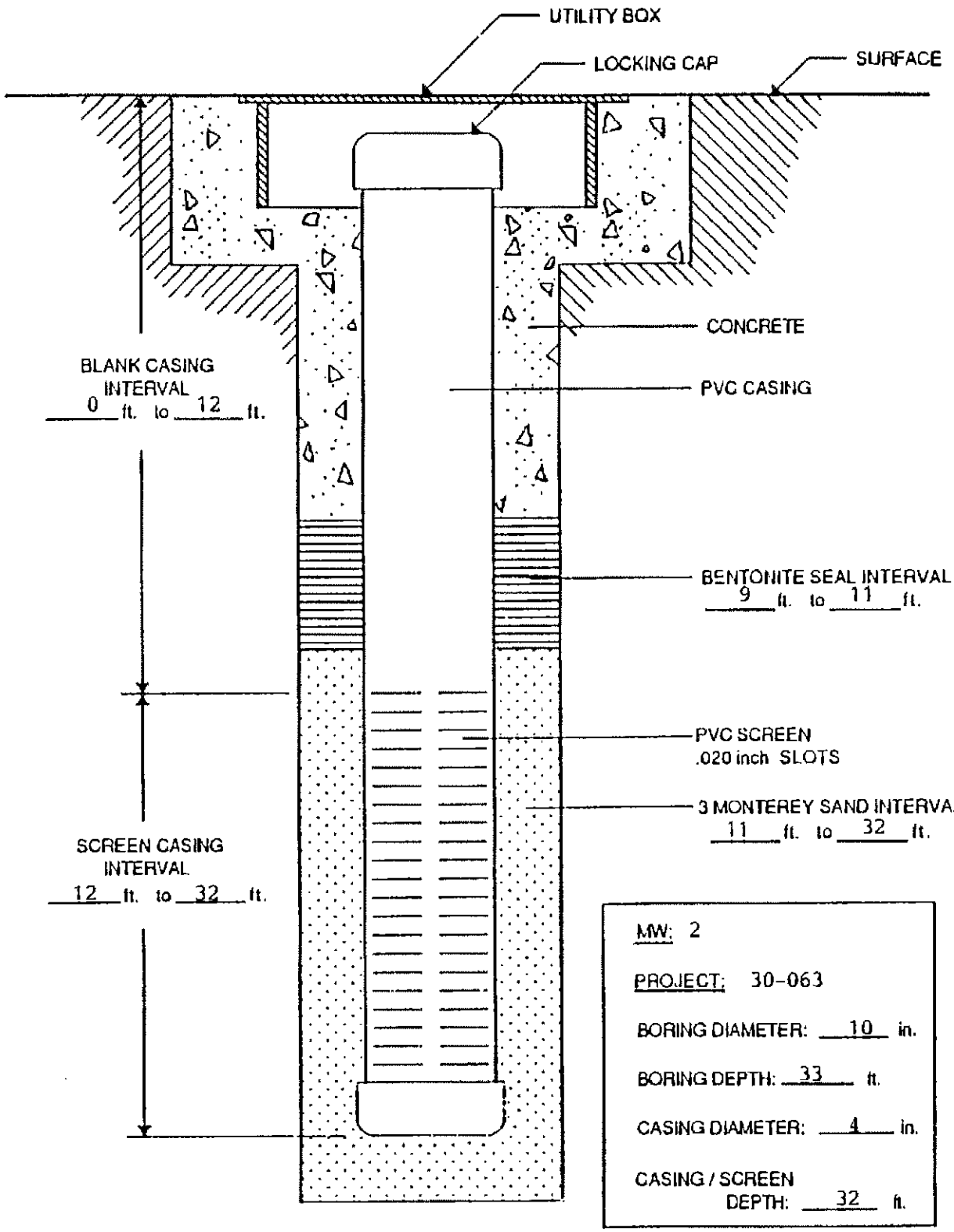
DEPTH (FEET)	I	BLOW CTS	MATERIAL ENCOUNTERED	USCS
0			Asphalt Over Road Base Very loose, damp, dark brown, silty CLAY.	CL
5		3,4,7	Loose, damp, greenish gray, silty CLAY with some coarse sand; very slight odor. CGI = 75 ppm.	
10		2,4,6	Medium stiff, damp, tan, sandy SILTY/CLAY. CGI = ND.	CL
15 ▽		5,7,12	Moderately stiff, damp, tan, clayey SILT.	ML
20				
25			Stiff, damp, gray, silty CLAY; iron stains; calcite stringers.	CL
30				
35			Total Depth - 32 Feet	
40				

TPH = Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
▽ = Ground Water Piezometric Surface
ND = Not Detected
CGI = Combustible Gas Indicator

++ = Sample Analyzed for Hydrocarbon Concentration
I = Sampling Interval
ppm = Parts per Million
LEL = Lower Explosive Limit

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylene
Total Depth = 32 Feet

MONITORING WELL CONSTRUCTION DETAIL



MW: 2

PROJECT: 30-063

BORING DIAMETER: 10 in.

BORING DEPTH: 33 ft.

CASING DIAMETER: 4 in.

CASING / SCREEN DEPTH: 32 ft.

NOTE: DRAWING IS NOT TO SCALE

ALTON GEOSCIENCE
16510 ASTON ST.
IRVINE, CA 92714

ALTON GEOSCIENCE
BORING LOG

PROJECT: 30-063 BORING DATE: 10-26-89

LOCATION: 100 MacArthur Boulevard, Oakland GEOLOGIST: M. Hopwood

TYPE: 10" HSA BORING NO.: MW-3

DRILLING COMPANY: Bay Area Explored

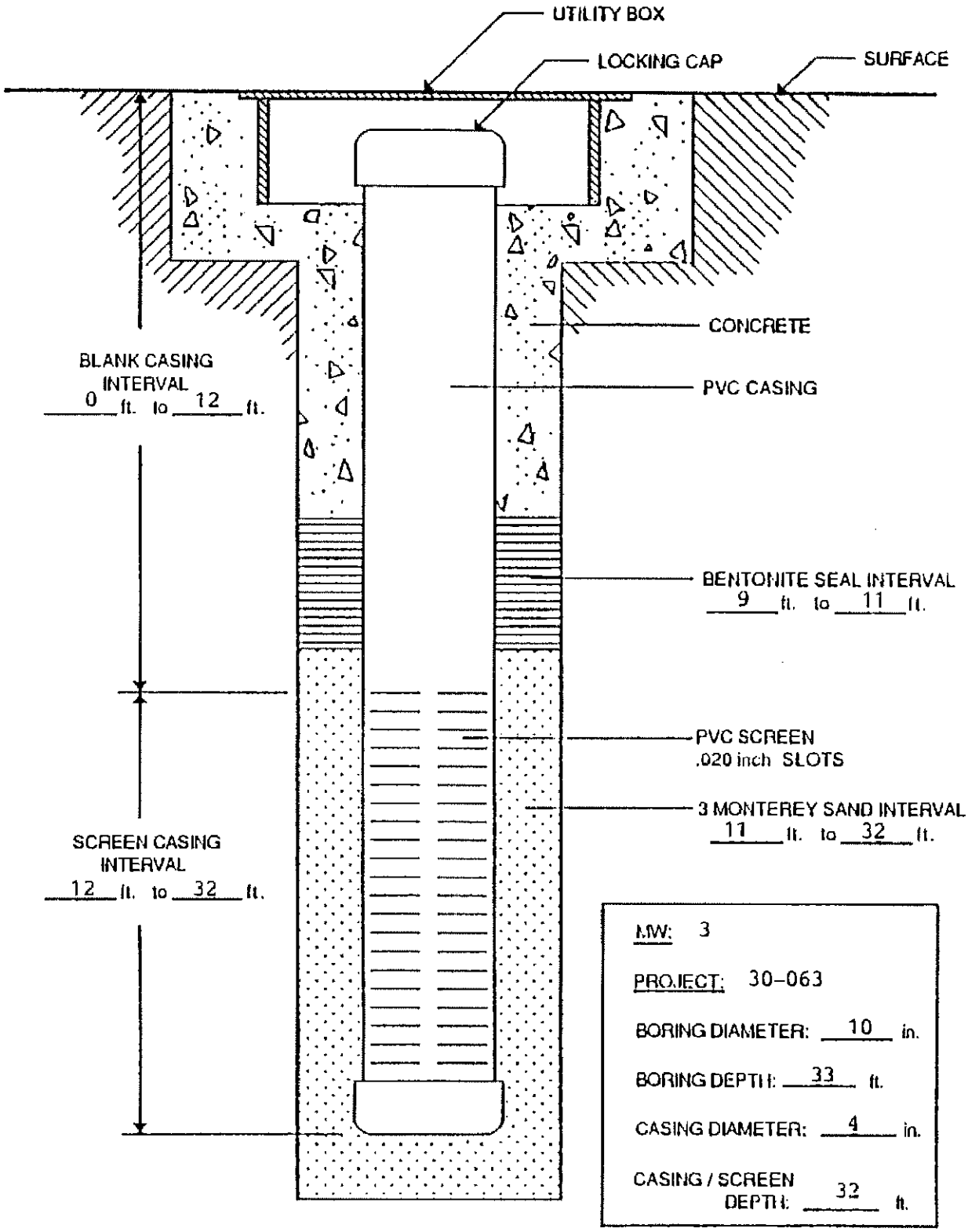
DEPTH (FEET)	I	BLOW CTS	MATERIAL ENCOUNTERED	USCS
0			Asphalt Over Road Base Loose, dry, tan to orange, gravelly SAND.	GP
5		7,11,14	Moderately stiff, damp, tan to gray/green, silty CLAY, with gravel; some iron staining.	CL
10		3,5,6		
			Moderately soft, damp, brown, silty CLAY.	CL
15 ▽		6,8,13		
			Moderately loose, damp, tan to brown, sandy CLAY.	CL
20				
			Soft, moist, tan CLAY.	CL
25			Becomes silty.	
30				
			Total Depth - 32 Feet	
35				
40				

TPH = Total Petroleum Hydrocarbons
TRPH = Total Recoverable Petroleum Hydrocarbons
▽ = Ground Water Piezometric Surface
ND = Not Detected
CGI = Combustible Gas Indicator

++ = Sample Analyzed for Hydrocarbon Concentration
I = Sampling Interval
ppm = Parts per Million
LEL = Lower Explosive Limit

B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylene
Total Depth = 32 Feet

MONITORING WELL CONSTRUCTION DETAIL



MW: 3

PROJECT: 30-063

BORING DIAMETER: 10 in.

BORING DEPTH: 33 ft.

CASING DIAMETER: 4 in.

CASING / SCREEN DEPTH: 32 ft.

ALTON GEOSCIENCE
1170 BURNETT AVE., STE S
CONCORD, CA 94520

NOTE: DRAWING IS NOT TO SCALE

Date Start/Finish: 10/6/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Air Knife / Hollow Stem Auger
Bit Size: 8-inch
Auger Size: 8-inch
Rig Type: 7730 DT
Sampling Method:
Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 20 ft
Surface Elevation: NA

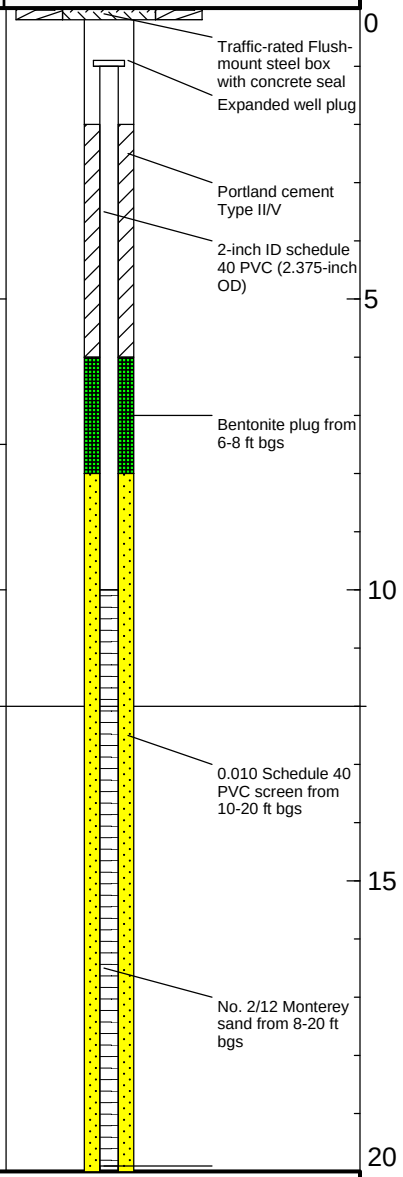
Description By: K. Lim
Reviewed By: Hollis Phillips, PG

Well/Boring ID: MW-4

Client: British Petroleum

Location: Former BP Service Station #11102
100 MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0		AK						Air Knife to 5 ft bgs
5	1	HSA	1.5					SILTY CLAY (CL), very dark gray (7.5YR 3/1), trace fine gravel, medium plasticity, soft, moist
	2	HSA	1					No Recovery
	3	HSA	0					
10	4	HSA	1					SILTY CLAY (CL), brown (7.5YR 4/3), trace fine gravel, medium plasticity, firm, moist
	5	HSA	1.5					SILTY CLAY (CL), yellowish brown (10YR 5/4), trace fine gravel, medium plasticity, firm, moist
	6	HSA	1.5					
15	7	HSA	1.5					
	8	HSA	1.5					
	9		1.5					
	10	HSA	1.5					
20	11	HSA	1					



ARCADIS
Infrastructure, environment, buildings

Remarks: AK = air knife; bgs = below ground surface; ft = feet; HSA = hollow stem auger; ID = inner diameter; in = inch; NA = not applicable; PG = professional geologist; PHC = petroleum hydrocarbon odor; PID = photoionization detector; ppm = parts per million; PVC = poly vinyl chloride; SAA = same as above

Air knife to 5 ft bgs; hollow stem auger from 5 ft to 20 ft bgs.

Analtyical samples were collected at 6.5 and 11.5 feet.

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: SB-1

Total Depth: 19 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Former BP Service Station #11102	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Boulevard, Oakland, CA	**Driller:** Paul Rogers
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** MARL M10T
PG: Barbara Jakub	**Drilling Method:** Airknife, Hand Auger (HA), and Hydropunch (HP)
Geologist: Jeremy Quick	**Sampling Method:**
Job Number: 38487349.0A022	**Date(s) Drilled:** October 7, 2005

BORING INFORMATION	
Groundwater Depth: Groundwater Not Encountered	**Boring Location:** MacArthur Blvd., approx. 175 ft north of Oakland Ave.
Air Knife or Hand Auger Depth: 12 ft bgs (HA)	**Boring Diameter:** 3.25 " (HA), 2.75 " (HP)
Coordinates: X NA Y NA	**Boring Type:** Exploratory HP Boring

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CONCRETE					Boring grouted with neat Portland Cement. Top 3-6" finished to grade with cement.
		SAND: (FILL) Black (2.5Y 2.5/1), loose, moist, 10% silt, 90% sand.	SP				
2		CLAYEY SILT: Black (2.5Y 2.5/1), very soft to soft, damp to moist, 25% clay, 70% silt, 5% sand, medium to high plasticity.	ML				
4		@ 4.5 ft bgs: Color change to grayish brown (2.5Y 5/2). Decreased clay (20%), increased silt (75%).					
6		GRAVELLY SILT: Grayish brown (2.5Y 5/2), loose, soft, damp, 15% clay, 50% silt, 5% sand, 30% gravel. @ 5.5-6.5 ft bgs: ~5-25 mm subangular chert clasts throughout. @ 6.5-7 ft bgs: ~2 inch subrounded pebble. @ 7-8 ft bgs: Color change to light olive brown (2.5Y 5/3). Increased silt (60%), decreased gravel (20%).	ML				Top 12 feet of boring logged from hand auger cuttings.
8		SILT: Light olive brown (2.5Y 5/3) to light yellowish brown (2.5Y 6/3), soft to medium stiff, damp, 10% clay, 80-85% silt (decreasing with depth), 5-10% sand (increasing with depth), low to no plasticity.	ML				
10		@ 11.8-12 ft bgs: Color change to grayish brown (2.5Y 5/2). No sand. Medium stiff to stiff.					

URS

LOG OF BORING

Borehole ID: SB-1

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
12		HydroPunch driven and exposed from 12 to 14 ft bgs. After 1 hour, no water was available for sampling.					
14		HydroPunch driven and exposed from 14 to 16 ft bgs. After 1 hour, no water was available for sampling.					
16		HydroPunch driven and exposed from 17 to 19 ft bgs. After 1 hour, no water was available for sampling.					
18							Bottom of Boring = 19 ft bgs

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: SB-2

Total Depth: 19 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Former BP Service Station #11102	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Boulevard, Oakland, CA	**Driller:** Paul Rogers
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** MARL M10T
PG: Barbara Jakub	**Drilling Method:** Airknife, Hand Auger (HA), and Hydropunch (HP)
Geologist: Barbara Jakub / Jeremy Quick	**Sampling Method:**
Job Number: 38487349.0A022	**Date(s) Drilled:** October 7, 2005
BORING INFORMATION	
Groundwater Depth: Groundwater Not Encountered	**Boring Location:** MacArthur Blvd., approx. 125 ft north of Oakland Ave.
Air Knife or Hand Auger Depth: 8 ft bgs (HA)	**Boring Diameter:** 3.25 " (HA), 2.75 " (HP)
Coordinates: X NA Y NA	**Boring Type:** Exploratory HP Boring

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CONCRETE					Boring grouted with neat Portland Cement. Top 3-6" finished to grade with cement.
2		GRAVELLY SILT: Fill material.	ML				
		CLAYEY SILT: Black (2.5Y 2.5/1), soft, dry to moist.	ML				
4		@ 3 ft bgs: 15% clay, 83% silt, 2% sand, and 3% angular gravel.		4.6			
6		@ 6 ft bgs: Color change to dark gray (2.5Y 4/1). Minor subrounded gravel.					Top 8 feet of boring logged from hand auger cuttings.
		@ 6.5 ft bgs: Oxidation staining is apparent.		14.0			
8		@ 7-8 ft bgs: Color change to grayish brown (2.5Y 5/2). Increased clay (20%), decreased silt (80%), no sand or gravel. Dry to damp, medium stiff to stiff, medium plasticity.		0			
10							

URS

LOG OF BORING

Borehole ID: SB-2

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
12		HydroPunch driven and exposed from 12 to 14 ft bgs. After 1 hour, no water was available for sampling.					
14		HydroPunch driven and exposed from 14 to 16 ft bgs. After 1 hour, no water was available for sampling.					
16		HydroPunch driven and exposed from 17 to 19 ft bgs. After 1 hour, no water was available for sampling.					
18							Bottom of Boring = 19 ft bgs

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: SB-3

Total Depth: 19 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Former BP Service Station #11102	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Boulevard, Oakland, CA	**Driller:** Paul Rogers
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** MARL M10T
PG: Barbara Jakub	**Drilling Method:** Air Knife, Hand Auger (HA), and Hydropunch (HP)
Geologist: Barbara Jakub / Jeremy Quick	**Sampling Method:**
Job Number: 38487349.0A022	**Date(s) Drilled:** October 7, 2005
BORING INFORMATION	
Groundwater Depth: Groundwater Not Encountered	**Boring Location:** MacArthur Blvd., approx. 100 ft north of Oakland Ave.
Air Knife or Hand Auger Depth: 12 ft bgs (HA)	**Boring Diameter:** 3.25 " (HA), 2.75 " (HP)
Coordinates: X NA Y NA	**Boring Type:** Exploratory HP Boring

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CONCRETE					Boring grouted with neat Portland Cement. Top 3-6" finished to grade with cement.
2		GRAVELLY SILT: Fill material. Very dark grayish brown (10YR 3/2), damp, 2% clay, 48% silt, 25% sand, 25% angular gravel, low to medium plasticity.	GM				
4		CLAYEY SILT: Very dark grayish brown (10YR 3/2), medium stiff, dry to moist, 20% clay, 78% silt, 2% fine sand, medium plasticity. @ 4 ft bgs: Color change to dark yellowish brown (10YR 4/4) with strong brown (7.5YR 5/8) and black (10YR 2/1) mottling.	ML				
6		SANDY SILT: Yellowish brown (10YR 4/3) with grayish brown (10YR 5/2) mottling, medium stiff, moist to wet, 3% clay, 82% silt, 15% sand, non-plastic.	ML				
8		CLAYEY SILT: Dark grayish brown (2.5Y 4/2) with dark yellowish brown (10YR 4/6) mottling, medium stiff, dry, 15% clay, 83% silt, 2% fine sand, low to medium plasticity, minor hydrocarbon odor. @ 6.5-8.5 ft bgs: Strong hydrocarbon odor.	ML				Top 12 feet of boring logged from hand auger cuttings.
10		SILTY SAND: Brown (10YR 4/3) with grayish brown (2.5Y 5/2) and strong brown (7.5YR 5/8) mottling, medium dense, dry, 15% clay, 25% silt, 45% sand, 15% gravel (angular quartz), low plasticity, hydrocarbon odor.	SM				
		CLAYEY SILT: Brown (10YR 4/3) with grayish brown (2.5Y 5/2) mottling, medium dense, dry, 15% clay, 85% silt, low plasticity, hydrocarbon odor.	ML				

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LOG OF BORING

Borehole ID : SB-3

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
12		SILT: Grayish brown (10YR 5/2) to light yellowish brown (2.5Y 6/3), stiff, dry to moist, 3% clay, 97% silt, minor hydrocarbon odor.	ML				
		HydroPunch driven and exposed from 12 to 14 ft bgs. After 1 hour, no water was available for sampling.					
14		HydroPunch driven and exposed from 14 to 16 ft bgs. After 1 hour, no water was available for sampling.					
16		HydroPunch driven and exposed from 17 to 19 ft bgs. After 1 hour, no water was available for sampling.					
18							Bottom of Boring = 19 ft bgs

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1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: SB-4

Total Depth: 32 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: BP #11102 Soil and Water Investigation	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Blvd, Oakland, CA	**Driller:** Jesse Pattison
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** Marl M2.5 DP
RG: John McCain	**Drilling Method:** Direct Push
Geologist: John McCain	**Sampling Method:** Continuous Macro-Core with acetate sleeve.
Job Number: 38487349.0A034	**Date(s) Drilled:** 07/14/05

BORING INFORMATION

Groundwater Depth: 20 ft bgs	**Boring Location:** SE corner of site
Air Knife or Hand Auger Depth: 5.0 feet bgs/Hand Auger	**Boring Diameter:** 2-inch
Coordinates: X Y	**Boring Type:** Exploratory

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		AC/Baserock: AC cover (6") with baserock (3") beneath	FILL				
2		SILTY SANDY CLAY w/ GRAVEL: FILL, black (10YR 2/1), 75% clay, 15% sand, 5% silt, 5% gravel, fine to coarse sands, trace angular gravel and brick fragments to 2" diameter, soft, moist, med. plasticity, no petroleum odor			Borehole grouted to grade with neat Portland cement		
4		SILTY SANDY CLAY: dark brown (10YR 3/3), 75% clay, 15% sand, 5% silt, 5% gravel, fine to coarse sands, trace sub-angular gravel to 0.5" diameter, soft, moist, med. plasticity, no petroleum odor	CL				
6		@ 6' - same as above, no gravel, no petroleum odor		0	SB-4 (6-6.5')		
8							
10		@ 10' - Silty Sandy Clay continues, reddish-brown, (5YR 5/4), 70% clay, 10% silt, 10% sand, 5% gravel, fine to coarse sands, trace sub-rounded gravels to 0.25", moist, med. stiff, no petroleum odor		0.2	SB-4 (9.5-10')		
12							
14							
16		@ 15' - Silty Sandy Clay continues, dark reddish gray (2.5YR 4/2), 80% clay, 10% silt, 10% sand, no gravels, fine sands, moist, med. stiff, no petroleum odor		0.2	SB-4 (14.5-15')		
18							
20		SILTY SAND: brown (7.5YR 5/3), 90% sand, 10% silt, fine sands, loose, wet, no petroleum odor	SM	1.9 9.6	SB-4 (19.5-20') SB-4 (20-20.5')		▽
22		SILTY SANDY CLAY: brown (7.5YR 5/3), 70% clay, 15% silt, 15% sand, fine sands, med. stiff, moist to wet, no petroleum odor, med. plasticity	CL				
24							

URS

LOG OF BORING

Borehole ID: SB-4

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
26		@ 25' - Silty Sandy Clay (CL) continues, light brown (7.5YR 6/3), 70% clay, 15% silt, 15% sand, med. stiff, moist to wet, no petroleum odor @ 26' - Silty Sandy Clay continues, color change to gray (Gley 1 5/10Y) at 26', no petroleum odor		0.5	SB-4 (25-25.5')		
28							
30		SILTY SAND: brown (7.5YR 5/3), 90%sand, 10%silt, fine sands, loose, wet, no petroleum odor	SM	0.5	SB-4 (29-29.5')		
		SILTY SANDY CLAY: gray (Gley 1 5/10Y), 70% clay, 15% silt, 15% sand, fine sands, stiff, moist, no petroleum odor, med. plasticity	CL				
32		SILTY SAND: brown (7.5YR 5/3), 90% sand, 10% silt, fine sands, loose, wet, no petroleum odor	SM				
		SILTY SANDY CLAY: gray (Gley 1 5/10Y), 70% clay, 15% silt, 15% sand, fine sands, stiff, moist, no petroleum odor, med. plasticity	CL				
34		lost sample at 31.5-32' when cutting acetate liner; no sample Bottom of Boring= 32' bgs Depth discrete groundwater samples were attempted within a boring 1 foot laterally from this location and were not successful.					
36							

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Oakland, California 94612

LOG OF BORING

Borehole ID: SB-4A

Total Depth: 36 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Former BP #11102	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Boulevard, Oakland, CA	**Driller:** Paul Rogers
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** MARL M10T
PG: Barbara Jakub	**Drilling Method:** Airknife and Direct Push Technology (DP)
Geologist: Jeremy Quick	**Sampling Method:** Soil: Acetate by MacroCore; Groundwater: 3 VOAs
Job Number: 38487349.0A022	**Date(s) Drilled:** October 7, 2005

BORING INFORMATION	
Groundwater Depth: 24.5 ft bgs	**Boring Location:** Southwest corner, on-site near former boring SB-4.
Air Knife or Hand Auger Depth: 5.2 ft bgs (HA)	**Boring Diameter:** 2.75 "
Coordinates: X NA Y NA	**Boring Type:** Exploratory

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		ASPHALT					
		CLAYEY SILTY SAND: Yellowish brown (10YR 5/4), medium dense to dense, damp, 10% clay, 30% silt, 60% fine sand, medium plasticity. Notable oxidation staining.	SM				Boring grouted with neat Portland Cement. Top 3-6" finished to grade with cement.
2		CLAYEY SANDY SILT: Dark brown (10YR 3/3), soft to medium stiff, damp, 5% clay, 70% silt, 25% sand, medium plasticity.	ML				Airknife could not penetrate, hand auger used instead.
		SANDY CLAYEY SILT: Grayish brown (10YR 5/2), very soft to soft, damp, 15% clay, 80% silt, 5% sand, minor ~2 mm angular white chert gravel, medium to high plasticity.	ML				
4		@ 4-5.2 ft bgs: Notable oxidation staining.					Top 5.2 feet of boring logged from hand auger cuttings.
		@ 5.2-6 ft bgs: Color change to gray (10YR 5/1), medium stiff, medium plasticity. Notable oxidation staining.					
6		@ 6-9 ft bgs: Color change to brown (10YR 5/3), low to medium plasticity. Weathered granite clasts throughout. Notable oxidation staining.		3.1	SB-4A -6' 09:55		
8							
		SAND: Greenish gray (GLEY 1 5/5GY) with dark grayish brown (10YR 4/2) mottling, loose to medium dense, moist, 2% clay, 8% silt, 90% course sand, non-plastic, hydrocarbon odor. Increasing fines with depth.	SM				
10				8.0	SB-4A -10' 10:13		
		SANDY SILT: Brown (10YR 5/3), damp, 3% clay, 47% silt, 30% sand, 20% gravel, low plasticity.	ML				

URS

LOG OF BORING

Borehole ID : SB-4A

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
12							
		No recovery from 12 to ~15.8 ft bgs. Could not remove acetate liner from Macrocore sampler.					
14							
16		CLAYEY SILT: Pale brown (10YR 6/3), medium stiff to stiff, damp, 5% clay, 95% silt, low plasticity. Logged from sampler shoe.	ML	9.1			
		SAND: Dark yellowish brown (10YR 4/4) with dark grayish brown (10YR 4/2) mottling and very dark gray (10YR 3/1) patches, damp, loose to medium dense, 2% clay, 8% silt, 80% sand, 10% ~2-3 mm gravel, slight hydrocarbon odor. Notable oxidation staining.	SP				
		@ 16.2-17 ft bgs: Grayish brown (10YR 5/2) with gray (10YR 5/1) patches.	ML				
18		CLAYEY SILT: Gray (10YR 5/1) to dark grayish brown (10YR 4/2), medium stiff, damp, 15% clay, 80% silt, 5% sand, trace gravel (likely scrape material), low to medium plasticity, slight hydrocarbon odor.		7.6			
20		@ 20-22 ft bgs: Color change to yellowish brown (10YR 5/4). Soft to medium stiff. Hydrocarbon odor.		21.5	SB-4A -20' 10:23		
22		@ 22-23 ft bgs: Increasing fines, no sand. Hydrocarbon odor.		28.7			
		SILTY GRAVELLY SAND: Light olive brown (2.5Y 5/4), loose to medium dense, damp, 1% (minor) clay, 19% silt, 60% sand, 20% gravel, non-plastic.	SP				
24		CLAYEY SILT: Light olive brown (2.5Y 5/3), soft to medium stiff, damp, 10% clay, 90% silt, low to medium plasticity, slight hydrocarbon odor.	ML		SB-4A 12:05	▽	
				3.2	SB-4A -25' 10:44		Boring was initially dry. Groundwater elevation measured after water was allowed to accumulate in the open boring for more than one hour.
26							
		@ 27.5-30 ft bgs: Color change to grayish brown (2.5Y 5/2) with dark gray (2.5Y 4/1) mottling to 28 ft bgs. Stiff to very stiff, low plasticity.					
28				0.9			

URS

LOG OF BORING

Borehole ID: SB-4A

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
30		@ 30-36 ft bgs: Color change to dark grayish brown (10YR 4/2). Stiff to very stiff.		5.2	SB-4A -30' 10:49		
32							
34		@ 35-36 ft bgs: Light gray (10YR 7/1) mottling. Very stiff.		0.8	SB-4A -35' 10:58		
36							Bottom of Boring = 36 ft bgs

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: SB-5

Total Depth: 32 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: BP #11102 Soil and Water Investigation	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Blvd, Oakland, CA	**Driller:** Jesse Pattison
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** Marl M2.5 DP
RG: John McCain	**Drilling Method:** Direct Push
Geologist: John McCain	**Sampling Method:** Continuous Macro-Core with acetate sleeve.
Job Number: 38487349.0A034	**Date(s) Drilled:** 07/14/05

BORING INFORMATION

Groundwater Depth: 29 ft bgs	**Boring Location:** Southwest of dispenser islands
Air Knife or Hand Auger Depth: 5.0 feet bgs/Hand Auger	**Boring Diameter:** 2-inch
Coordinates: X Y	**Boring Type:** Exploratory

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		AC/Baserock: AC cover (6") with baserock (2") beneath	FILL				
2		SANDY CLAY: FILL, black (Gley 1 2.5/N), 80% clay, 15% sand, 5% gravel, fine to coarse sands, trace angular gravels to 0.25" diameter, soft, moist, low plasticity, no petroleum odor @ 2' - Sandy Clay FILL continues, greenish gray (Gley 1 5/5GY), 85% clay, 15% sand, soft, moist, low plasticity, no petroleum odor			Borehole grouted to grade with neat Portland cement		
4		@ 5' - same as above, gray (Gley 2 4/5BG), angular gravels and concrete fragments to 3" diameter, soft, moist, slight petroleum odor					
6		SILTY SANDY CLAY: brown (7.5YR 5/4), 75% clay, 10% sand, 10% silt, 5% gravel, fine sands, trace sub-rounded gravels to 0.25", med. stiff, moist, med. plasticity, no petroleum odor	CL	0.0	SB-5 (5-5.5')		
8							
10		@ 10' - Silty Sandy Clay continues, brown (7.5YR 5/4), 75% clay, 10%silt, 10% sand, 5% gravel, trace angular gravel to 0.25" diameter, med. stiff, moist, med. plasticity, no petroleum odor		0.1	SB-5 (9.5-10')		
12							
14							
16		@ 15' - Silty Sandy Clay continues, brown (7.5YR 5/3), 75% clay, 10%silt, 10% sand, 5% gravel, trace angular gravel to 0.25" diameter, med. stiff, moist, med. plasticity, no petroleum odor		0.4	SB-5 (14.5-15')		
18							
20		@ 20' - Silty Sandy Clay continues, light olive brown (2.5YR 5/4), 80% clay, 10% silt, 10% sand, med. stiff, moist, med. plasticity, slight petroleum odor		40.9	SB-5 (19.5-20')		
22							
24							

URS

LOG OF BORING

Borehole ID: SB-5

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
26		@ 25' - Silty Sandy Clay (CL) continues, brown (7.5YR 5/3), 78% clay, 10%silt, 10% sand, 2% gravel, trace gravel to 0.25" diameter, med. stiff, moist, med. plasticity, no petroleum odor					
28							
30		SILTY SAND: brown (7.5YR 5/3), 85% sand, 10% silt, 5% clay, fine to coarse sands, loose, wet, no petroleum odor	SM	0.4	SB-5 (29-29.5')		⊠
		SILTY SANDY CLAY: brown (7.5YR 5/3), 85% clay, 10% silt, 5% sand, fine to coarse sands, stiff, moist, med. plasticity, no petroleum odor	CL				
32		Bottom of Boring= 32' bgs					
34		Depth discrete groundwater samples were attempted within a boring 1 foot laterally from this location and were not successful.					

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LOG OF BORING

Borehole ID: SB-6

Total Depth: 28 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: BP #11102 Soil and Water Investigation	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Blvd, Oakland, CA	**Driller:** Jesse Pattison
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** Marl M2.5 DP
RG: John McCain	**Drilling Method:** Direct Push
Geologist: John McCain	**Sampling Method:** Continuous Macro-Core with acetate sleeve.
Job Number: 38487349.0A034	**Date(s) Drilled:** 07/13/05

BORING INFORMATION

Groundwater Depth: 8.5 ft bgs	**Boring Location:** Between station building and dispensers
Air Knife or Hand Auger Depth: 5.0 feet bgs/Hand Auger	**Boring Diameter:** 2-inch
Coordinates: X Y	**Boring Type:** Exploratory

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		AC/Baserock: AC cover (3") with baserock (4") beneath	FILL				
2		SILTY SAND: FILL, red (2.5YR 5/6), 85% sand, 10% silt, 5% gravel, fine sands, trace angular gravels to 0.25" diameter, loose, moist, no petroleum odor			Borehole grouted to grade with neat Portland cement		
4							
6				0	SB-6 (5-6.5')		
8		@ 7' - Silty Sand continues, same color as above, angular gravels to 0.5" diameter, loose, moist, no petroleum odor @ 8.5' - Silty Sand continues, red (2.5YR 5/6), loose, wet at 8.5', petroleum odor		289	SB-6 (8.5-9')		▽
10		SILTY SANDY CLAY: dark greyish brown (10YR 4/2), 75% clay, 15% sand, 15% silt, 5%, fine sands, med. stiff, moist, no petroleum odor	CL	0.9	SB-6 (9.5-10')		
12							
14							
16		SILTY CLAYEY SAND: brown (10YR 5/3), 75% sand, 10% silt, 10% clay, 5% gravels, fine to coarse sands, angular gravels to 0.25", loose, wet, no petroleum odor	SM	0.4	SB-6 (14.5-15')		
18		SILTY SANDY CLAY: dark yellowish brown (10YR 4/4), 80% clay, 10% silt, 10% sand, fine to coarse sands, med. stiff, moist, no petroleum odor, med. plasticity	CL	0.6	SB-6 (16.5-17')		
20		@ 20' - Silty Sandy Clay continues, yellowish brown (10YR 5/4), trace angular gravel to 0.25" diameter, med. stiff, moist, no odor		0.0	SB-6 (19.5-20')		
22		no recovery from 20 - 24' push, soil in shoe @ 24'- Silty Sandy Clay continues, yellowish brown (10YR 5/4), fine to coarse sands, med. stiff, med. plasticity, slight petroleum odor					
24							

URS

LOG OF BORING

Borehole ID: SB-6

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
26		Silty Sandy Clay (CL) continues, grayish brown (10YR 5/2), fine sands, stiff, med. plasticity, no petroleum odor		0.0	SB-6 (27.5-28')		
28		Bottom of Boring= 28' bgs Depth discrete groundwater samples were attempted within a boring 1 foot laterally from this location and were not successful.					
30							
32							

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: SB-7

Total Depth: 32 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: BP #11102 Soil and Water Investigation	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Blvd, Oakland, CA	**Driller:** Jesse Pattison
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** Merl M2.5 DP
RG: John McCain	**Drilling Method:** Direct Push
Geologist: John McCain	**Sampling Method:** Continuous Macro-Core with acetate sleeve.
Job Number: 38487349.0A034	**Date(s) Drilled:** 07/14/05

BORING INFORMATION	
Groundwater Depth: 28.5 ft bgs	**Boring Location:** Southwest of used oil UST
Air Knife or Hand Auger Depth: 5.0 feet bgs/Hand Auger	**Boring Diameter:** 2-inch
Coordinates: X Y	**Boring Type:** Exploratory

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		AC/Baserock: AC cover (4") with baserock (2") beneath	FILL				
		SILTY CLAYEY SAND: FILL, very dark gray brown (Gley 1 3/10Y), 80% sand, 7.5% silt, 7.5% clay, 5% gravel, fine sands, trace angular gravels to 0.25" diameter, loose, moist to wet, petroleum odor					
2		SILTY SANDY CLAY: FILL, dark gray brown (Gley 1 3/10Y), 70% clay, 15% sand, 10% silt, 5% gravels, fine sands, soft, moist to wet, med. plasticity, petroleum odor		688	SB-7 (2-2.5')		
4							
				429	SB-7 (5-5.5')		
6							
8		SILTY SANDY CLAY: light olive brown (2.5Y 5/3), 85% clay, 10% silt, 5% sand, fine sands, stiff, moist, med. plasticity, no petroleum odor	CL				
10		@ 10' - Sandy Silty Clay continues, 80% clay, 10% silt, 10% sand, same color as above, stiff, moist, med. plasticity, no petroleum odor		7.5	SB-7 (9.5-10')		
12							
14							
		SANDY CLAYEY SILT: olive brown (2.5Y 4/3), 80% silt, 10% clay, 10% sand, fine sands, stiff, moist, low plasticity, no petroleum odor	ML	1.6	SB-7 (14.5-15')		
16							
					SB-7 (18.5-17')		
18							
20		@ 20' - Sandy Clayey Silt continues, light olive brown (2.5Y 5/4), 80% silt, 10% clay, 10% sand, very stiff, moist, low plasticity, no petroleum odor		0.5	SB-7 (19.5-20')		
22							
24							

URS

LOG OF BORING

Borehole ID: SB-7

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
26		@ 24.5' - Sandy Clayey Silt continues, light olive brown (2.5Y 5/4), 80% silt, 10% clay, 10% sand, very stiff, moist, low plasticity, no petroleum odor					
		SILTY SAND: brown (2.5Y 4/3), 90% sand, 10% silt, fine sands, loose, moist to wet, no petroleum odor	SM	4.2	SB-7 (25.5-26')		
28		SILTY SANDY CLAY: olive brown (2.5Y 4/3), 80% clay, 10% silt, 10% sand, fine sands, med. stiff, moist, med. plasticity, no petroleum odor	CL				
		SILTY SAND: brown (2.5Y 5/4), 90% sand, 10% silt, fine sands, loose, wet, no petroleum odor	SM	0.1	SB-7 (28.5-29')		▽
30		SILTY SANDY CLAY: brown (2.5Y 4/3), 80% clay, 10% silt, 10% sand, fine sands, med. stiff, moist, med. plasticity, no petroleum odor	CL	0.1	SB-7 (30.5-31')		
32		Bottom of Boring= 32' bgs Depth discrete groundwater samples were attempted within a boring 1 foot laterally from this location and were not successful.			Borehole grouted to grade with neat Portland cement		
34							

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: SB-8

Total Depth: 28 ft bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: BP #11102 Soil and Water Investigation	**Drilling Company:** Gregg Drilling & Testing
Site Location: 100 MacArthur Blvd, Oakland, CA	**Driller:** Jesse Pattison
Project Manager: Lynelle Onishi	**Type of Drilling Rig:** Marl M2.5 DP
RG: John McCain	**Drilling Method:** Direct Push
Geologist: John McCain	**Sampling Method:** Continuous Macro-Core with acetate sleeve.
Job Number: 38487349.0A034	**Date(s) Drilled:** 07/13/05

BORING INFORMATION

Groundwater Depth: 7 ft bgs	**Boring Location:** East of MW-1
Air Knife or Hand Auger Depth: 5.0 feet bgs/Hand Auger	**Boring Diameter:** 2-inch
Coordinates: X Y	**Boring Type:** Exploratory

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		AC/Baserock: AC cover (4") with baserock (2") beneath	FILL				
2		SILTY GRAVELY SAND: FILL, olive (5YR 4/4), 80% sand, 5% silt, 5% clay, 10% gravel, fine to coarse sands, trace sub-angular gravels to 0.25" diameter, loose, moist, no petroleum odor					
4							
6				0.4	SB-8 (5-5.5')		
		@ 7' - Silty Sand seam (3" thick) with gravels, 80% sand, 10% silt, 10% gravels, reddish brown (2.5YR 5/4), angular gravels to 0.25", loose, wet, no petroleum odor		0.0	SB-8 (7-7.5')		
8		SILTY CLAYEY SAND: brown (2.5YR 4/4), 75% sand, 10% silt, 10% clay, 5% gravels, fine sands, dense, moist, no petroleum odor	SM				
10				24.1	SB-8 (9.5-10')		
		@ 11' - Silty Sand seam (3" thick) with gravels, 80% sand, 10% silt, 10% gravels, brown (2.5YR 5/4), angular gravels to 0.25", loose, wet, no petroleum odor		0.0	SB-8 (11-11.5')		
12							
14				0.1	SB-8 (14.5-15')		
16							
18		@ 17.5' - Silty Clayey Sand seam (6" thick), 80% sand, 10% silt, 10% clay, reddish brown (2.5YR 5/4), loose, wet, no petroleum odor		0.0	SB-8 (17.5-18')		
20				0.0	SB-8 (19.5-20')		
				0.0	SB-8 (20.5-21')		
22							
24							

URS

LOG OF BORING

Borehole ID: SB-8

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
26		SILTY CLAY: reddish brown (5YR 5/3), 85% clay, 10% silt, 5% sand, trace fine sands, stiff, moist, med. plasticity, no petroleum odor	CL		Borehole grouted to grade with neat Portland cement		
28		Bottom of Boring= 28' bgs Depth discrete groundwater samples were attempted within a boring 1 foot laterally from this location and were not successful.					
30							
32							

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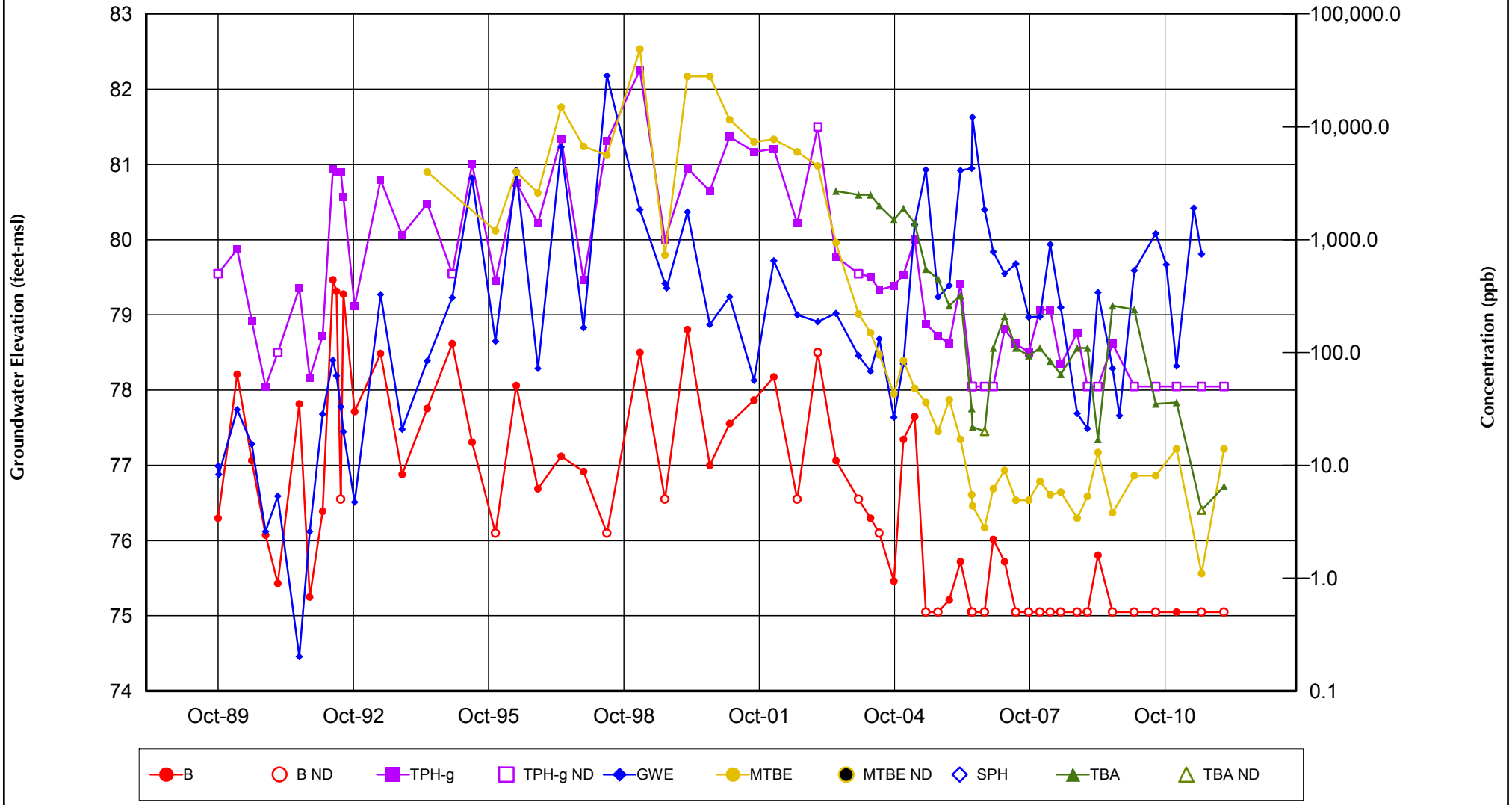
Appendix B

Concentration versus Time Graphs for TPHg, Benzene and MTBE

CA-11102

MW-1 Hydrograph



Notes:

1. No analytical samples were collected if SPH (separate phase hydrocarbons) was present in the well during the sampling event.
2. Non-detected analytical results are graphed at the laboratory reporting limit.
3. For additional information about data for a given sampling event (such as no data plotted), refer to the historical analytical table.

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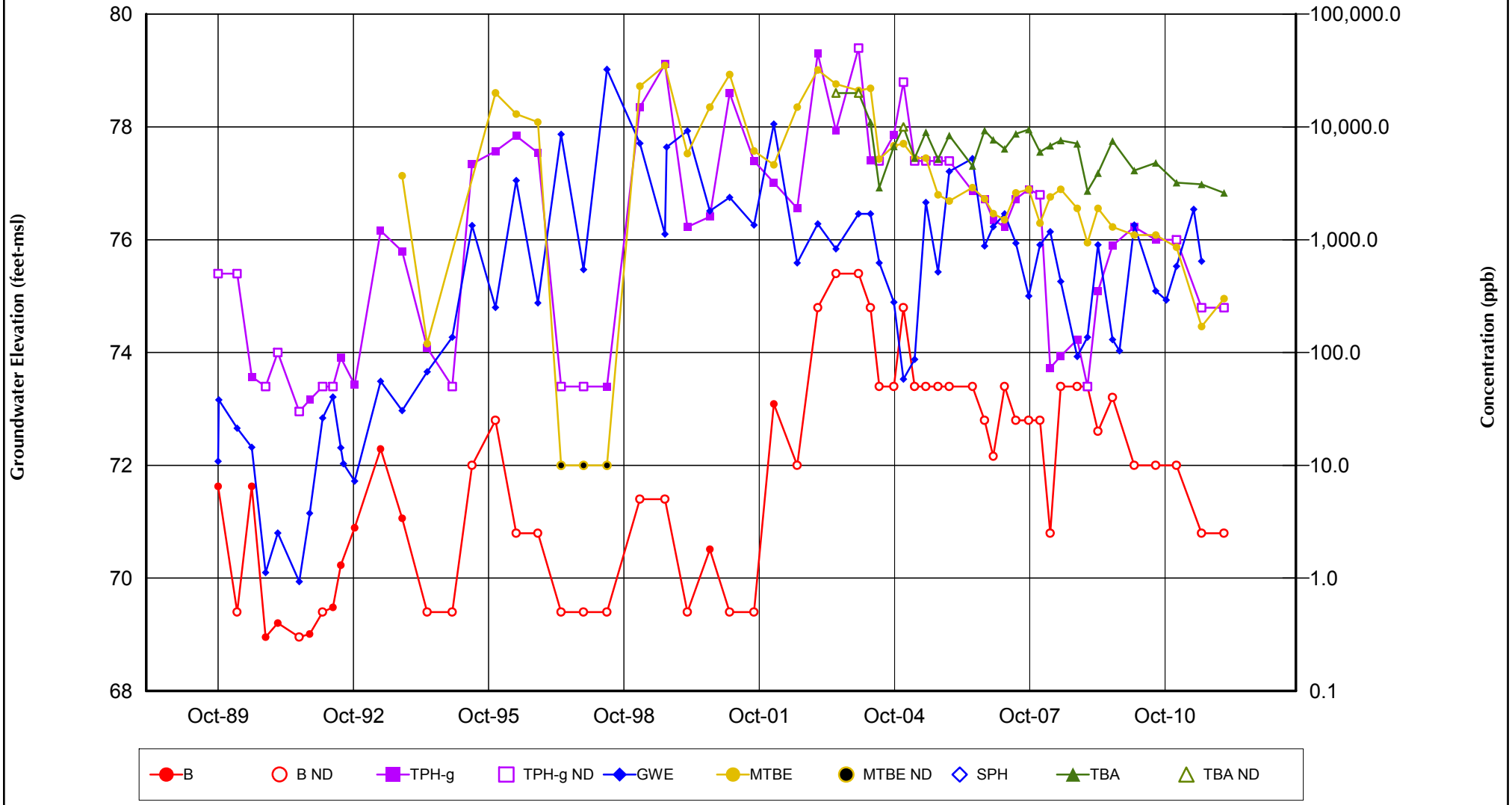
MW-2 Hydrograph



Notes:

1. No analytical samples were collected if SPH (separate phase hydrocarbons) was present in the well during the sampling event.
2. Non-detected analytical results are graphed at the laboratory reporting limit.
3. For additional information about data for a given sampling event (such as no data plotted), refer to the historical analytical table.

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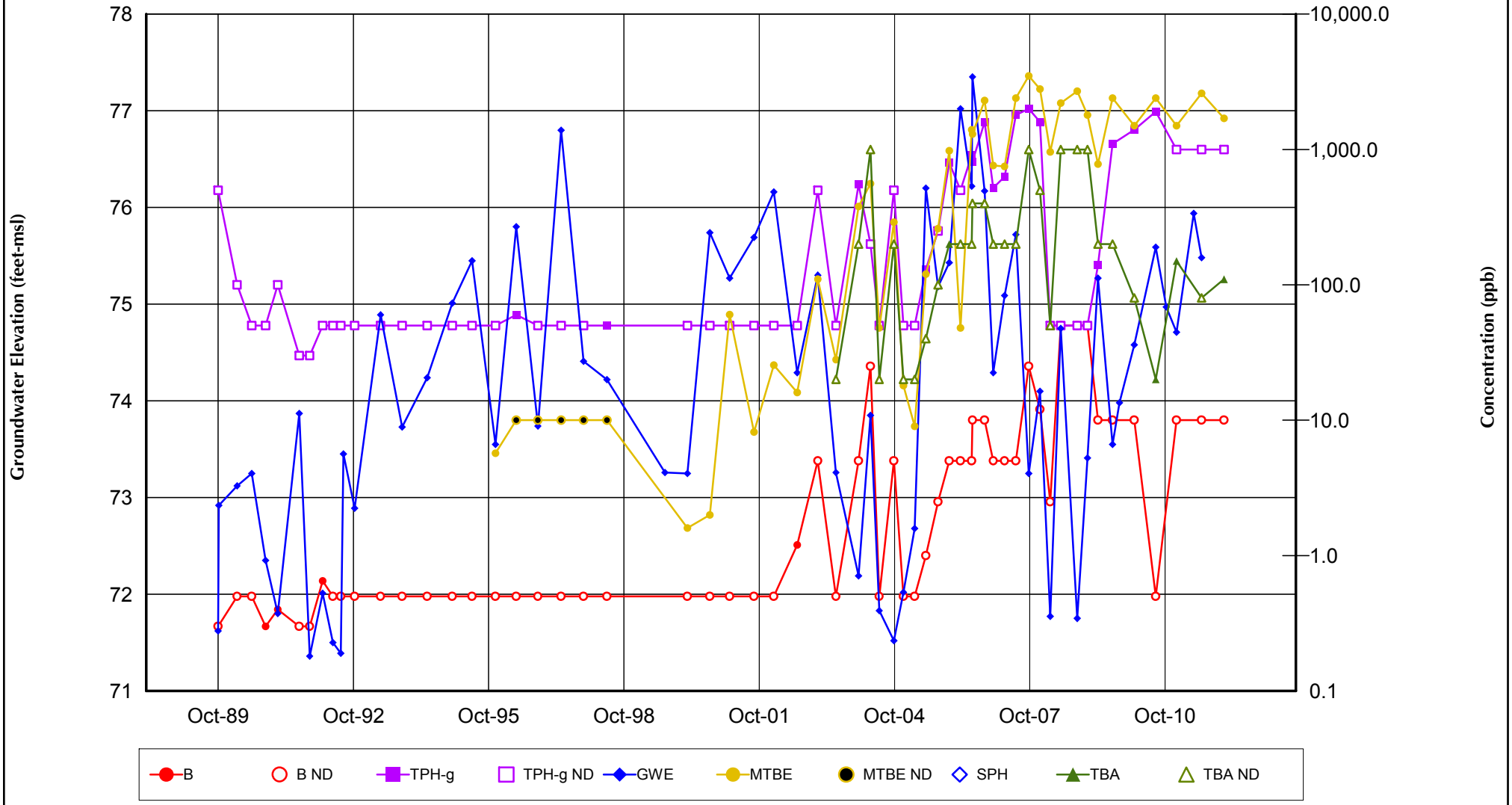
CA-11102

MW-3 Hydrograph



Notes:

1. No analytical samples were collected if SPH (separate phase hydrocarbons) was present in the well during the sampling event.
2. Non-detected analytical results are graphed at the laboratory reporting limit.
3. For additional information about data for a given sampling event (such as no data plotted), refer to the historical analytical table.

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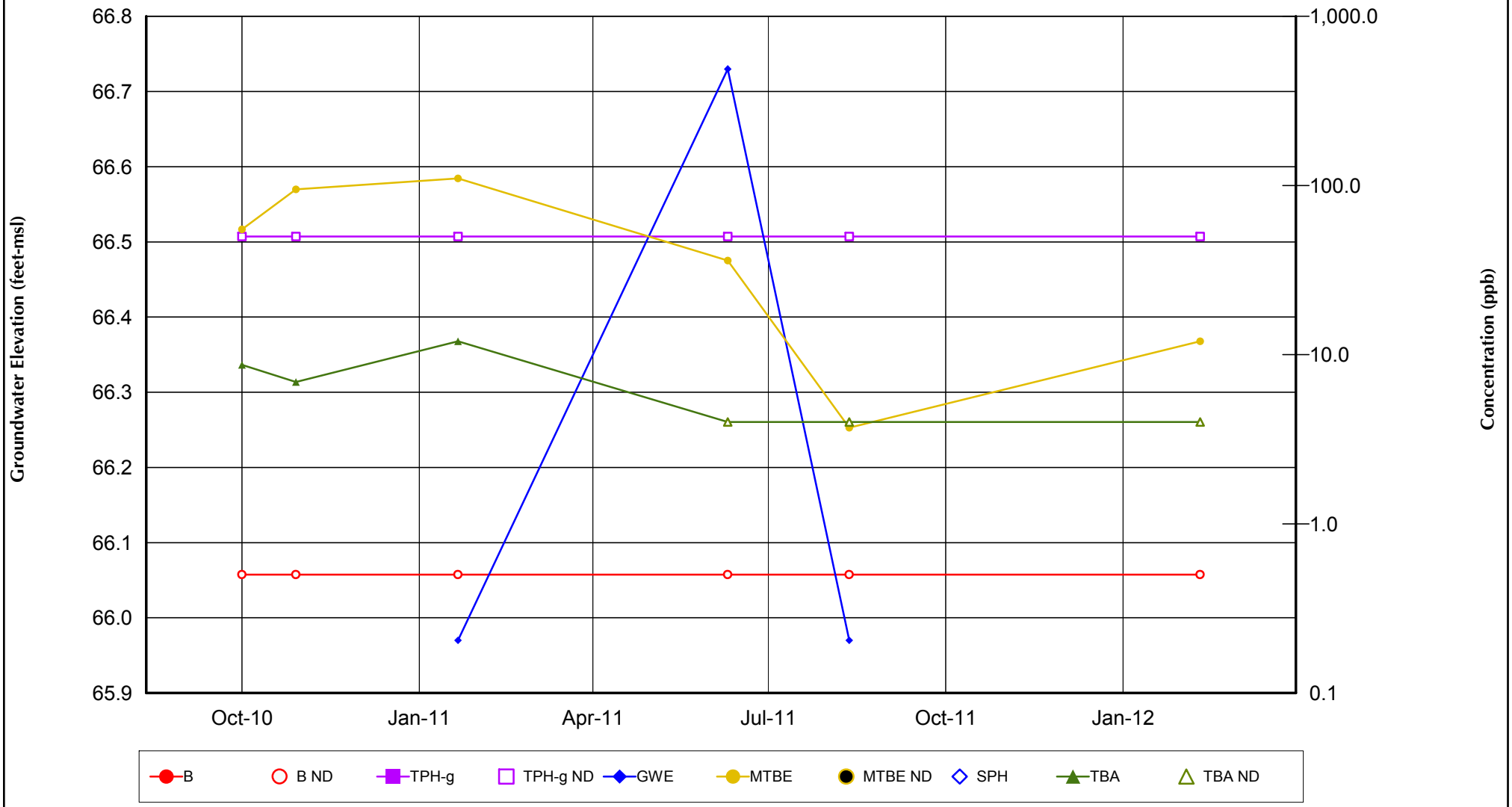
CA-11102

MW-4 Hydrograph



Notes:

1. No analytical samples were collected if SPH (separate phase hydrocarbons) was present in the well during the sampling event.
2. Non-detected analytical results are graphed at the laboratory reporting limit.
3. For additional information about data for a given sampling event (such as no data plotted), refer to the historical analytical table.

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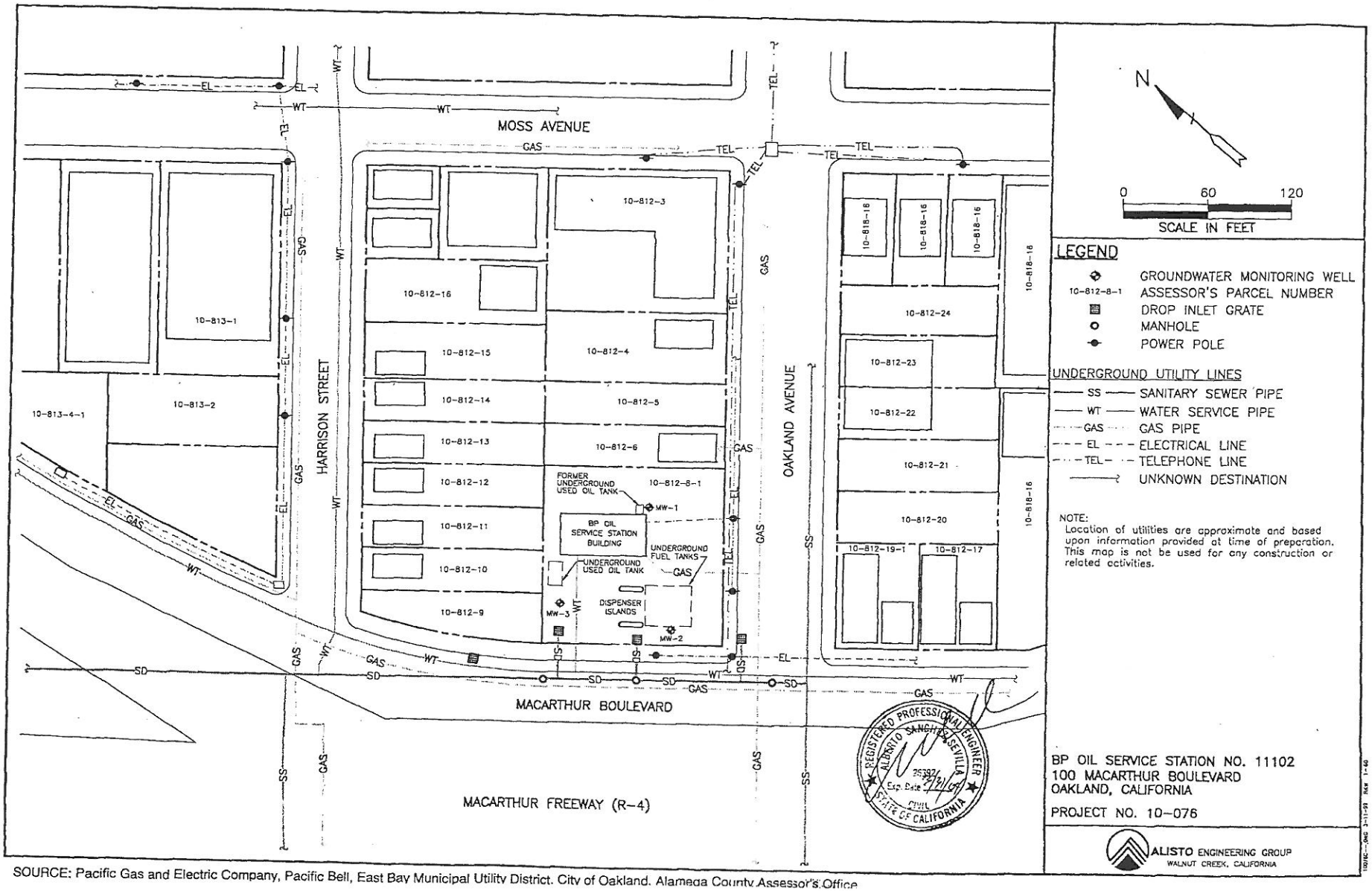
Appendix C

Historical Underground Utility Figure



SOURCE: Pacific Gas and Electric Company, Pacific Bell, East Bay Municipal Utility District, City of Oakland, Alameda County Assessor's Office

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Appendix D

Alameda County Environmental Health Case Closure Summary

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

I. AGENCY INFORMATION Date: March 12, 2012

Agency Name: Alameda County Environmental Health	Address: 1131 Harbor Bay Parkway
City/State/Zip: Alameda, CA 94502-6577	Phone: 510.668.4411
Responsible Staff Person: Paresh Khatri	Title: Groundwater Resources Engineer

II. CASE INFORMATION

Site Facility Name: Former BP Service Station #11102		
Site Facility Address: 100 MacArthur Boulevard, Oakland, CA		
RB Case No.: 01-0985	Local Case No.: RO0000456	LOP Case No.: RO0000456
URF Filing Date:	Global ID No.: T0600100908	APN: 010-0812-008-01

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
Unknown	12,000	Regular Unleaded Gasoline	In Place	1990-Present
Unknown	10,000	Unleaded Plus Gasoline	In Place	1990-Present
Unknown	6,000	Super Unleaded Gasoline	In Place	1990-Present
Unknown	1,000	Waste Oil	In Place	1988-Present
Unknown	6,000	Gasoline	Removed	1990
Unknown	6,000	Gasoline	Removed	1990
Unknown	8,000	Gasoline	Removed	1990
Unknown	550	Waste Oil	Removed	1988

Conflicting information exists regarding the previous USTs at the site. According to Mobile, one 6,000-gallon, one 8,000-gallon and one 10,000-gallon USTs were installed at the site in 1983 (Mobile, 1987). Additionally, Mobile also documents that one 12,000-gallon, one 10,000-gallon and one 6,000-gallon USTs were installed in 1982 (Mobile, 1986 and undated).The waste oil tank removed in 1988 is documented as being a 280-gallon capacity by Mobile (Mobile, 1989). The same waste oil UST is described as being 550-gallong capacity by KEI (KEI, 1988). The information provided above is based up on the records from the Alameda County Environmental Health Department.

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and Type of Release: Exact release source is unknown; upon excavation in 1988 the Waste Oil UST was observed having a hole in the tank and petroleum product was observed "dripping" from the west sidewall of the excavation (ACDEH, 1988).		
Site characterization complete? Yes	Date Approved By Oversight Agency: TBD	
Monitoring wells installed? Yes	Number: 4	Proper screened interval? yes
Highest GW Depth Below Ground Surface: 17.97 feet (below top of casing)	Lowest Depth: 8.02 feet (below top of casing)	Flow Direction: predominately west/southwest
Most Sensitive Current Use: Municipal wells		

Summary of Production Wells in Vicinity: Production wells are not present in site vicinity (1/4 mile)	
Are drinking water wells affected? No	Aquifer Name: NA
Is surface water affected? No	Nearest SW Name: Glen Echo Creek
Off-Site Beneficial Use Impacts (Addresses/Locations): None	
Reports on file? Yes with ACEH	Where are reports filed? ACEH & SFBRWQCB

TREATMENT AND DISPOSAL OF AFFECTED MATERIAL

Material	Amount (Include Units)	Action (Treatment or Disposal w/Destination)	Date
Tank	One 8,000-gallon UST Two 6,000-gallon UST One 550-gallon UST	8,000-gallon Gasoline UST and 6,000-Gasolie USTs removed in 1990; 550-gallon Waste Oil USTs removed in 1988. Limited documentation from UST removals exist	Gasoline USTs-1990 Waste Oil UST-1988
Piping	Unknown	--	--
Free Product	None	--	--
Soil	15 Cubic Yards	Soil removed in September 1988 during Waste Oil UST removal	September 19, 1988
Groundwater	Unknown	--	--

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

Contaminant	Soil (ppm)[1]		Water (ppb)	
	Before	After[2]	Before	After[2]
TPHg	1,300 mg/kg (SB-7@ 2.0', 7/4/2005)	<0.3 mg/kg (MW-4@ 6.5', 10/6/2010)	45,000 • g/L MW-2, 2/19/2003	1,900 • g/L MW-3, 8/16/2010
TPHd	2,100 mg/kg (TD-1@ 0.5', 11/22/1994)	2,100 mg/kg (TD-1@ 0.5', 11/22/1994)	2,900 • g/L MW-1, 6/18/1998	160 • g/L MW-1, 7/10/2007
Total Oil and Grease	24 mg/kg (WO @ 9', 9/19/1988)	<1.0 mg/kg (THP-2 @ 10', 11/22/1994)	14,000 • g/L MW-1, 3/1/1991	<5.0 • g/L MW-1, 6/18/1998
Benzene	0.08 mg/kg (MW-2@ 10', 10/25/1989)	<0.005 mg/kg (MW-4@ 6.5', 10/6/2010)	440 • g/L MW-1, 5/19/1992	1.6 • g/L MW-1, 5/7/2009
Toluene	0.006 mg/kg (MW-3@ 5', 10/26/1989)	<0.005 mg/kg (MW-4@ 6.5', 10/6/2010)	110 • g/L MW-1, 2/19/2003	1.0 • g/L MW-1, 4/21/2006
Ethylbenzene	3.0 mg/kg (SB-7@ 2.0', 7/14/2005)	<0.005 mg/kg (MW-4@ 6.5', 10/6/2010)	250 • g/L MW-1, 5/19/1992	0.83 • g/L MW-1, 1/22/2008
Xylenes	3.9 mg/kg (SB-7@ 5', 7/14/2005)	<0.01 mg/kg (MW-4@ 6.5', 10/6/2010)	1,100 • g/L MW-1, 3/9/1999	0.89 • g/L MW-1, 9/3/2009
MTBE	0.37 mg/kg (SB-4@ 9.5', 7/14/2005)	<0.005 mg/kg (MW-4@ 6.5', 10/6/2010)	49,000 • g/L[3] MW-1, 3/9/1999	2,600 • g/L[4] MW-3, 8/22/2011
Lead	Not analyzed	Not analyzed	Not analyzed	Not analyzed

[1] Soil results are from samples collected at depths of 10 feet bgs or shallower.
[2] After results are represented by the maximum concentration.
[3] Other fuel oxygenates (groundwater [µg/L] before cleanup): TBA 11,000 µg/L (MW-2), DIPE <0.50 µg/L, ETBE <0.5 µg/L, TAME 420 µg/L (MW-2), 1.2-DCA 2.8 µg/L (MW-2), ethanol 120 µg/L (MW-1)
[4] Other fuel oxygenates (groundwater [µg/L] after cleanup): TBA 2,600 µg/L (MW-2), DIPE <0.50 µg/L, ETBE <0.50 µg/L, TAME 3.9 µg/L (MW-2), 1.2-DCA 2.8 µg/L (MW-2), ethanol 120 µg/L (MW-1)

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 the release presents a significant risk to human health based upon current land use and conditions.		
Site Management Requirements: City of Oakland Building Department will be notified if excavation or development of the site be proposed that impacted soil or groundwater may be encountered, 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? It would depend on when the land use changes (site could be fully naturally attenuated at that time) and what the proposed land use change was.		
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:

Low levels of residual soil and groundwater contamination remain onsite (refer Tables 1 and 2 below); however, these concentrations do not pose a significant risk because the entire site is capped and the groundwater plume is contained on the site.

Conclusion:

ARCADIS requests approval for case closure and no further action at this site based on the following:

- Free product has never been observed in any of the monitoring wells or excavated areas on-site.
- Sources of petroleum hydrocarbons at the site have been adequately addressed. The absence of high concentrations of site COCs observed in soil samples suggests that secondary sources (residual hydrocarbons in soil) were identified and removed.
- Current groundwater concentrations are orders of magnitude below historical maximums, are continuing to decrease with time, or are not detected above the detection limit, indicating that natural attenuation processes are occurring at the Site.
- The Site has been adequately characterized.
- The low-level plume is decreasing in size and is generally confined to the site boundaries.
- Concentrations of BTEX in groundwater are all below the reporting limits.
- Concentrations of TPHg in groundwater are all below reporting limits.
- All the wells that contain MTBE concentrations in groundwater indicate a decreasing trend.
- All the wells that contain TBA concentrations in groundwater indicate a decreasing trend.
- Current site conditions suggest that soil concentrations of TPHg are limited to the western portion of the site in the vicinity of SB-7 (**Figure 7**).
- Current site conditions suggest that soil concentrations of MTBE are limited to the western portion of the site in the vicinity of SB-7 (**Figure 7**).
- No sensitive receptors are 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.

VI. LOCAL AGENCY REPRESENTATIVE DATA

Prepared by: Paresh Khatri	Title: Hazardous Materials Specialist
Signature:	Date:
Approved by:	Title:
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: **TBD**	
All Monitoring Wells Decommissioned: **TBD**	Number Decommissioned: **TBD**	Number Retained: **TBD**
Reason Wells Retained: **TBD**		
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 A of the Case Closure Summary Report.

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

Environmental Impacts in Groundwater

BP 11102

100 MacArthur Blvd, Oakland, California

Table 1. Comparison of Most Current 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)	TPH-DRO (mg/kg)
Current Maximum Residual Soil Concentrations at Site[1,3]	**<0.3 mg/kg (MW-4@ 6.5', 10/6/2010)**	**<0.005 mg/kg (MW-4@ 6.5', 10/6/2010)**	**<0.005 mg/kg (MW-4@ 6.5', 10/6/2010)**	**<0.005 mg/kg (MW-4@ 6.5', 10/6/2010)**	**<0.01 mg/kg (MW-4@ 6.5', 10/6/2010)**	**<0.005 mg/kg (MW-4@ 6.5', 10/6/2010)**	**2,100 mg/kg (TD-1@ 0.5', 11/22/1994)**
RWQCB, Region 2 ESLs[1]	**83[2]**	**0.044[2]**	**2.9[2]**	**3.3[2]**	**2.3[2]**	**0.023[2]**	**83[2]**

Notes:

[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*, Water Board, 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).

[3] Depth to water ranges between 8.02 feet and 17.97 feet below top of casing; therefore, all soil results are from sample depths of 10 feet or shallower.

Environmental Impacts in Groundwater
BP 11102
100 MacArthur Blvd, Oakland, California

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

	TPH-GRO (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)	TPH-DRO (µg/L)
Maximum Residual Groundwater Concentrations at Site	**<1,000 (all active monitoring wells)**	**<0.50 (all active monitoring wells)**	**<0.50 (all active monitoring wells)**	**<0.50 (all active monitoring wells)**	**<1.0 (all active monitoring wells)**	**1,700 (MW-3, 2/20/2012)**	**--**
RWQCB, Region 2 ESLs[1]	**100[2]**	**1.0[2]**	**40[2]**	**30[2]**	**20[2]**	**5.0[2]**	**100[2]**

Notes:
[1] Regional Water Quality Control Board, San Francisco Bay Region (Water Board) Environmental Screening Levels (ESLs) *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Water Board, 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).