

Recommendation for Case Closure

Former BP Service Station #11266
1541 Park Street
Alameda, California
ACEH Case #RO0000318

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Environmental Health

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ENVIRONMENT

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

Date:
February 24, 2011

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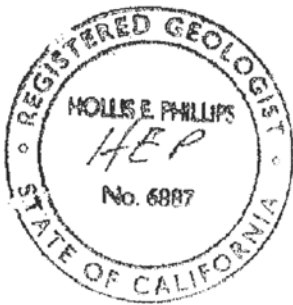
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GP09BPNA.C001



Atlantic Richfield Company

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Station No. 11266
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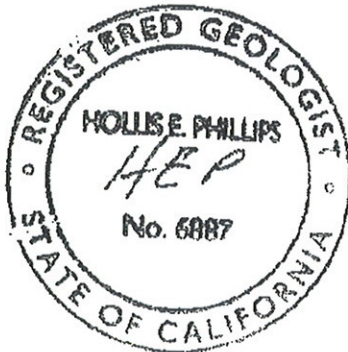
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Recommendation for Case Closure

Former Atlantic Richfield
Company Station No. 11266

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Acronyms/Abbreviations

ACEH	Alameda County Environmental Health
Alton	Alton Geoscience Inc.
Alisto	Alisto Engineering Group
ARCO	Atlantic Richfield Company
BAI	Broadbent Associates, Inc
Basin Plan	<i>San Francisco Bay Basin (Region 2) Water Quality Control Plan</i>
bgs	below ground surface
BP	British Petroleum
BTEX	benzene, toluene, ethylbenzene and xylene
btoc	below top of casing
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

EPA	Environmental Protection Agency
ESL	Environmental Screening Level
Gph	gallons per hour
GSI	GeoStrategies, Inc
GWET	Ground Water Extraction and Treatment
HETI	Hydro-Environmental Technologies, Inc.
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	separate-phase hydrocarbon
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
UST	underground storage tank
VOC	volatile organic compounds
VW	Vapor extraction Well
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. 11266 (Site) located at 1541 Park Street, in Alameda, California (**Figure 1**). Case closure is warranted for the site based on the following information:

- Petroleum hydrocarbon sources, including other potential secondary sources, have been removed as evidenced by current Site conditions.
- 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 and remains onsite.
- 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 history.
- 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

1.1 Site Background

The Site is located on the Southwest corner of the intersection of Lincoln Avenue and Park Street in Alameda, California (**Figure 1**). The station is currently an active 76-brand retail gasoline service station. Structures on the site include a service station building with three service bays and four pump islands with associated dispensers. The site is generally flat and surfaced in asphalt and concrete. Properties surrounding the site are primarily commercial and retail. On-site structures below ground surface consist of one 12,000 gallon and two 10,000 gallon double walled fiberglass gasoline underground storage tanks (USTs). A 1,000 gallon double-walled fiberglass UST is used to store waste motor oil on-site. The first documented installation of USTs onsite was in 1987 when older and undocumented USTs were removed (BAI, 2009).

There are currently five on site monitoring wells (MW-1 through MW-5) and one offsite monitoring well (MW-6) located in the Southern lane of Lincoln Avenue. One recovery well (RW-1) is located on the Northern portion of the site. A site map with soil boring and well locations is provided as **Figure 2**.

1.2 Site Geology and Hydrogeology

The site is located along the northeastern edge of the Central Sub-Area of the East Bay Plain of the San Francisco Basin (SFRWQCB, 1999). Alameda is isolated by a tidal canal and is underlain by Holocene and Pleistocene dune sands (Graymer, 2000) which are highly susceptible to salt water intrusion (SFRWQCB, 1999). Throughout most of the Alameda County portion of the East Bay Plain the general direction of groundwater flow is from east to west from the Hayward Fault to the San Francisco Bay. According to the East Bay Plain Groundwater Basin Beneficial Use Evaluation Report prepared by the SFRWQCB, water level measurements show that regional groundwater is flowing to the south in the shallow aquifer and is flowing to the north within the deeper aquifer of the Alameda Formation (SFRWQCB, 1999).

The site elevation is approximately 29 feet above mean sea level. Groundwater has been measured between 6.24 to 11.49 feet below ground surface (bgs) and fluctuates seasonally (BAI, 2009). Site groundwater flow direction was most recently calculated to the east at 0.02 ft/ft using data from the third quarter 2010 monitoring event. Soil

stratigraphy data derived from on-site borings generally indicates soils underlying the site consist of poorly graded fine- to medium-grained sands from the surface to the total depth explored (25 feet bgs). A distance of approximately 0.5 miles spans between the site and the Alameda tidal canal which is the closest body of surface water.

2. Previous Site Investigations

2.1 UST and Product Line Replacement Activities

On September 15, 1987, Kaprealian Engineering, Inc (KEI) oversaw the removal and replacement of three gasoline USTs and one used oil UST at the Site. Two gasoline USTs (6,000- and 8,000-gallons) were single-walled fiberglass, while the third gasoline UST and used oil UST (5,000- and 250-gallons, respectively) were of steel construction. KEI collected eight sidewall samples from the excavation for the gasoline USTs and one bottom sample from the used oil UST excavation. KEI reported that bottom samples were not collected from the excavation for the gasoline USTs due to the presence of ground water at approximately 12 feet bgs. In addition, one grab groundwater sample was collected from the gasoline UST excavation pit.

During UST removal activities, sidewall soil samples collected from the gasoline UST excavation at a depth of 11.5 feet bgs contained total petroleum hydrocarbons-gasoline (TPHg) at concentrations ranging from non-detect to 3,200 milligrams per kilogram (mg/kg) or parts per million (ppm), benzene at concentrations ranging from non-detect to 81 mg/kg, toluene at concentrations ranging from non-detect to 42 mg/kg, and total xylenes at concentrations ranging from non-detect to 450 mg/kg. Concentrations of TPHg, benzene, toluene, and total xylenes (BTEX) in the groundwater sample collected from beneath the former gasoline USTs were reported as 530,000 micrograms per liter (\bullet g/L) or parts per billion (ppb), 6,300 \bullet g/L, 66,000 \bullet g/L, and 200,000 \bullet g/L, respectively. One soil sample collected from beneath the used oil UST at a depth of 7.5 feet was non-detect for total petroleum hydrocarbons-diesel (TPHd) and volatile organic hydrocarbons (VOCs), but contained 150 mg/kg total oil and grease (TOG) (KEI, October 1987).

Hydro Environmental Technologies, Inc. (HETI) reported that in September 1990, KEI oversaw the renovation of product dispensers and associated underground piping at the Site. According to HETI, KEI did not produce a report or sample location map for these activities. However, as reported previously in an interview with HETI, Katherine Chesie with ACEH claimed several cubic yards of soil were removed and

stockpiled on Site. Furthermore it was reported that four soil samples (D1 through D4) taken from the trenches and stockpile were below laboratory detection limits (HETI, February 1992).

On December 6, 1999, Paradiso Mechanical removed and replaced the product dispensers and the associated underground piping at the Site. SECOR conducted soil sampling activities following excavation operations. SECOR reported that four soil samples, designated (PD-1 through PD-4) were collected from the excavation under the product dispensers. Soil sample PL-1 and PL-2 were collected from below the product piping excavations. The highest concentrations of hydrocarbons were observed in sample PD-3 at 2.0 mg/kg TPHg, 0.009 mg/kg Benzene, 0.051 mg/kg Toluene, 0.013 mg/kg Ethylbenzene, and 0.15 mg/kg Xylenes. The highest concentrations of lead were observed in sample PD-4 at 910 mg/kg total lead, 39 milligrams per liter (mg/l) lead by California Waste Extraction Test (WET), and 1.2 mg/l lead by Toxicity Characteristic Leaching Procedure (TCLP) (SECOR, January 2000).

2.2 Subsurface Investigations

On February 9, 1988, KEI oversaw the drilling of three on-site exploratory soil borings to a depth of 25 ft bgs and subsequent installation of two-inch diameter groundwater monitoring wells (MW-1 through MW-3). One soil sample was collected from each boring at approximately ten ft bgs. On February, 11 1998, the wells were developed, purged, and groundwater samples collected. The soil sample collected from MW-1 contained concentrations of TPHg at 2.4 mg/kg, benzene at 0.1 mg/kg, toluene at 0.2 mg/kg and total xylenes at 0.7 mg/kg. The groundwater sample collected from MW-1 contained concentrations of TPHg at 95,000 • g/L, benzene at 2,000 • g/L, toluene at 5,900 • g/L, ethylbenzene at 1,100 • g/L, and total xylenes at 10,000 • g/L. Soil and groundwater samples from borings/wells MW-2 and MW-3 contained no reportable concentrations of TPHg or BTEX above laboratory detection limits. In addition, the groundwater sample from MW-3 was also analyzed for TPHd, TOG, and VOCs; none of which were present above the method detection limits (MDL) (KEI, March 1988).

On March 22, 1989, KEI oversaw the drilling and installation of three additional two-inch diameter groundwater monitoring wells at the Site to a maximum depth of 25 feet bgs (MW-4 through MW-6). Two soil samples were collected from each boring at approximately five and ten ft bgs. The wells were developed and purged on March 28, 1989, and on March 29, 1989 groundwater samples were collected from wells

MW-1 through MW-6. Groundwater samples collected from well MW-1 contained reportable concentrations of TPHg at 25,000 • g/L, benzene at 930 • g/L, toluene at 2,600 • g/L, ethylbenzene at 24 • g/L, and total xylenes at 3,100 • g/L. Minor BTEX concentrations were reported in the groundwater sample from well MW-2. No hydrocarbons were detected above MDLs in the soil or groundwater samples collected from wells MW-3 through MW-6 (KEI, April 1989).

On November 15, 1989, EMCON oversaw Tracer Research Corporation advance three direct-push borings on- and off-site (B-1 through B-3). Grab groundwater samples were collected from open boreholes B-1 through B-3 and from wells MW-2 and MW-6. Samples were screened onsite by means of a gas chromatograph for TPHg and BTEX. Reportedly, an unknown non-fuel VOC was detected but not identified in samples from monitoring well MW-2 and MW-4. Analytical results for TPHg and benzene ranged from non-detectable concentrations to maximum concentrations of 15,000 • g/L (MW-1) and 280 (MW-1) (EMCON, March 1990).

Additionally in November 1989, EMCON performed aquifer testing at the Site. A step-drawdown test and a constant-discharge test were conducted in a two-inch diameter ground-water monitoring well (MW-5). Based on the results of the tests, EMCON estimated that the aquifer underlying the Site had an average specific capacity of approximately 330 gallons per day per foot (gpd/ft) and could sustain a yield of 0.5 gallons per minute (gpm). EMCON described these values as approximate due to well insufficiencies (high hydraulic head losses through the screen and sand pack) (EMCON, March 1990).

On April 13, 1992, HETI oversaw the installation of one, six-inch diameter recovery well (RW-1) on-site. The well placement was based on previous EMCON aquifer testing, which suggested a well placed at this location would provide an area of influence (capture zone) sufficient to capture a 40-ft diameter petroleum hydrocarbon plume when pumping at 0.5 gpm. In the HETI Remedial Action Plan dated February 28, 1992, the recovery well was proposed to be installed to a depth of 25 ft bgs, and screened from five to 25 ft bgs. HETI reported in their Quarterly Monitoring Report dated May 4, 1992 that RW-1 was installed to a depth of 30 feet bgs. An actual screen interval was not provided within the report. Soil samples were not collected during the installation of the recovery well, as reported by HETI.

On June 10 2009, Stratus oversaw RSI Drilling in the advancement of two soil borings (B-1 and B-2) to a maximum depth of 9.5 feet bgs. The soil borings were advanced in effort to confirm elevated concentrations from historical soil sample C-1. The historical

soil sample C-1 was collected during the initial UST removal and investigation in 1987 as a sidewall sample and reported the highest historical soil concentrations of TPHg and benzene at 3,200 mg/Kg and 81 mg/Kg respectively. Only B-2 was completed as planned as crews encountered pea gravel and a metal object in clearing B-1 and abandoned the boring due to the presence of pea gravel and its proximity to the dispenser islands, product lines and utility lines. Boring B-2 was advanced to a maximum depth of 9.5-feet bgs near the former waste oil tank excavation pit in the area of the historical sample location W.O.-1 (BAI, 2009). ACEH submitted a letter order in September of 2009 for additional subsurface investigation to assess soil conditions at historic sample location C-1.

On October 26, 2010 ARCADIS supervised WDC Exploration & Wells, Inc. in the advancement of one direct-push soil boring SB-02 (**Figure 2**) to assess the nature and extent of impacts to soil in the area of historic soil sample C-1, which contained elevated concentrations of petroleum hydrocarbons. A soil sample was collected from boring SB-02 at a depth of approximately 11.5 ft bgs and subsequent analysis reported all analytes below laboratory reporting limits with the exception of lead which reported a concentration of 2.0 mg/Kg (ARCADIS, 2010). Monitoring well construction details and historical boring logs are included in **Appendix A**.

2.3 Groundwater Investigation Methods

Soil and groundwater samples appear to have been collected appropriately for environmental investigation and data gathering purposes. Soil and groundwater samples were analyzed by a California-certified laboratory. Soil sampling equipment used at the site has included: hand augers, split-spoon samplers and metal liners. Anomalous inconsistencies were not reported from previous soil sampling events. Groundwater samples have been withdrawn from the site's monitoring wells using disposable polyethylene bailers. Emcon Associates, Status Environmental, Inc., Broadbent & Associates, Inc. and Blaine Tech Services, Inc. have completed groundwater sampling at the site since 1988 in accordance with applicable sampling guidelines. A copy of their sampling procedures is included in **Appendix B**.

3. Extent of Soil and Groundwater Impacts

3.1 Soil Conditions

Numerous soil samples have been collected on-site during well installations, product line and dispenser island renovations, and UST removals, as previously discussed.

The maximum concentrations detected for site specific contaminants of concern (COCs) in onsite soils are listed below:

- TPHg - 3,200 mg/kg
- benzene -81 mg/kg
- toluene -42 mg/kg, and
- total xylenes - 450 mg/kg

The above results were detected in sample C-1, collected during the September 15, 1987 UST removal and replacement activities at approximately 11.5 ft bgs along the east sidewall of the gasoline UST excavation pit.

- TOG - 150 mg/kg

The above result was detected in sample W.O.-1, collected during the 1987 UST removal activities, at approximately 7.5 ft bgs, below the removed waste oil UST.

- Ethylbenzene - 0.013 mg/k, and
- Total lead - 910 mg/kg

The above results were detected in sample PD-3 and PD-4, respectively; both collected during the December 6, 1999 product line and dispenser island renovation activities at approximately two ft bgs. PD-3 was collected below the northeastern dispenser and PD-4 was collected below the southeastern dispenser.

The 1987 UST complex removal/replacement activities appear to have adequately delineated the limits of petroleum hydrocarbons soil contamination above the groundwater table.

Potential source areas in the soil appear to have been isolated hotspots on the northeastern sidewall of the former UST pit, and under the western end of the northern pump dispenser island. The sample from MW-1 located near the northern end of the UST excavation contained 2.4 mg/kg of TPHg and minor concentrations of fuel constituents benzene (0.1 mg/kg), toluene (0.2 mg/kg) and total xylenes (0.7 mg/kg). The confirmation soil sample from SB-02 (located adjacent to MW-1) collected in 2010 contained no detected concentrations above laboratory reporting limits for any of the analytes listed above. The sample from MW-1 was collected at 10 feet bgs and SB-02 was collected at 11.5 feet bgs to in correlation with historical boring C-1.

Sample PD-3 located near the western end of the northern pump dispenser island contained 2.0 (mg/kg) of TPHg and minor concentrations of fuel constituents benzene (0.009 mg/kg), toluene (0.051 mg/kg), ethylbenzene (0.013 mg/kg) and total xylenes (0.15 mg/kg). None of the other five samples taken from beneath the product dispenser lines or islands during the 1999 upgrades contained any reportable concentrations with the exception of PL-2 which reported ethylbenzene at 0.008 mg/kg.

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 1988 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. ARCADIS collected a soil sample, which was saturated, at 11.5 feet bgs to correlate with the historic soil sample C-1, also collected at 11.5 feet bgs. The ARCADIS sample, SB-02, did not contain analytes above the MDL. However because the sample was saturated ARCADIS does not consider it a vadose zone sample.

The most recent soil samples taken from the vadose zone (10 feet bgs or shallower) were collected from soil boring B-2 at 5, 6.5, 8, and 9.5 feet bgs in June of 2009. Contaminants of concern were not detected above laboratory detection limits in any of the soil samples analyzed.

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

3.2 Groundwater

Groundwater monitoring of site monitoring wells began on October 10, 1988. The original groundwater monitoring schedule employed by KEI consisted of three monitoring events and one sampling event per quarter. The groundwater monitoring schedule was discontinued in October 2001 pending review of the case closure request. A one-time sampling event was performed on October 25, 2006 (BAI 2006). This one-time event was in response to well rehabilitation and redevelopment activities as requested by the ACEH in their July 7, 2006 letter. An additional one-time sampling event was conducted in June of 2009 in accompaniment of the soil investigation activities conducted by BAI.

Groundwater is currently monitored and sampled on a semi-annual basis during the first and third quarters. Groundwater samples are analyzed for TPHg, BTEX, tert-methyl-butyl ether (MTBE), ETBE, DIPE, TAME, TBA, EDB, 1,2-DCA and Ethanol by EPA method 8260B; and total lead by EPA method 200.7.

Currently the highest reported concentrations of COCs are from RW-1 with concentrations of TPHg at 900 µg/L and benzene at 5.0; and MW-2 with concentrations of MTBE at 6.0 µg/L. These concentrations are indicating decreasing trends (**Appendix C**). **Table 2** presents historical groundwater analytical data.

3.2.1 TPHg

Historically TPHg has been reported at concentrations greater than laboratory reporting limits in all site-related wells with the exception of MW-5. The highest concentrations were reported in MW-1 (95,000 • g/L; March 1988) and RW-1 (27,000 • g/L; February 1995), which are located northeast of the former USTs and dispenser islands, respectively. TPHg was last detected in MW-1 in the first quarter 2010 at an order of magnitude below the historical high at a concentration of 2,100 • g/L. TPHg was detected in RW-1 in the third quarter 2010 at two orders of magnitude below the historical high at a concentration of 900 • g/L.

Monitoring well MW-2 reported a historical high for TPHg in January of 1996 at a concentration of 3,400 • g/L. TPHg was last detected in MW-2 in the third quarter of 2006 at two orders of magnitude below the historical high at a concentration of 55 • g/L and has not been detected in groundwater samples since June of 2009.

Monitoring well MW-3 reported a historical high for TPHg in March of 1999 at 17,000 •g/L and it was last detected in the third quarter 2010 at three orders of magnitude below the historical high at a concentration of 79 •g/L.

Monitoring well MW-4 has only reported one detection of TPHg since its installation in 1989 in a sample collected in November 1989 at a concentration of 430 •g/L. All groundwater samples collected from MW-4 since November 1989 have contained no reportable detections for TPHg.

Monitoring well M-5 had never reported any concentrations of TPHg in groundwater samples since it was installed in 1989.

3.2.2 Benzene

Historically benzene has been reported at concentrations greater than laboratory reporting limits in all site-related wells with the exception of MW-5. The highest concentrations were reported in RW-1 (2,400 •g/L; February 1995) and MW-1 (2,000 •g/L; March 1988.) Benzene was last detected in RW-1 in the third quarter 2010 at three orders of magnitude below the historical high at a concentration of 5.0 •g/L. Benzene was last detected in MW-1 in the second quarter 2009 at two orders of magnitude below the historical high at a concentration of 5.1 •g/L and has not been reported above laboratory detection limits since.

Monitoring well MW-2 reported a historical high for benzene in October of 1994 at a concentration of 31 •g/L. Benzene was last detected in MW-2 in the third quarter of 2006 at two orders of magnitude below the historical high at a concentration of 0.57 •g/L and has not been detected in groundwater samples since June of 2009.

Monitoring well MW-3 reported a historical high for benzene in March of 1999 at 8.2 •g/L and was last detected in the first quarter 2001 at a concentration of 2.97 •g/L. Concentrations of benzene have not been detected in groundwater samples from MW-3 since August 2006.

Monitoring well MW-4 has only reported one detection of benzene since its installation in 1989 in a sample collected in November 1989 at a concentration of 6.2 •g/L. All groundwater samples collected from MW-4 since November 1989 have contained no reportable detections for benzene.

Monitoring wells MW-5 and MW-6 have never reported any concentrations of benzene in groundwater samples since their installation in 1989.

3.2.3 MTBE

Historically MTBE has been reported at concentrations greater than laboratory reporting limits in all site-related wells with the exception of MW-4 and MW-5. The highest concentrations were reported in MW-1 (68,412 • g/L; March 1994) and MW-2 (11,000 • g/L; January 1996), which are located northeast and east of the former USTs and dispenser islands, respectively. MTBE was last detected in MW-1 in the third quarter 2006 at four orders of magnitude below the historical high at a concentration of 1.2 • g/L and has been below laboratory detection limits since. MTBE was last detected in MW-2 in the third quarter 2010 at four orders of magnitude below the historical high at a concentration of 6.0 • g/L.

Monitoring well MW-3 reported a historical high for MTBE in March of 1999 at a concentration of 17,000 • g/L and was last detected in the third quarter 2006 at four orders of magnitude below the historical high at a concentration of 1.2 • g/L. Concentrations of MTBE have not been detected in groundwater samples from MW-3 since August 2006.

Monitoring wells MW-4 and MW-5 have never reported any concentrations of MTBE in groundwater samples since their installation in 1989.

Monitoring well MW-6 reported a historical high for MTBE in January of 1996 at a concentration of 2,400 • g/L and was last detected in the third quarter 1999 at two orders of magnitude below the historical high at a concentration of 20 • g/L. Concentrations of MTBE have not been detected in groundwater samples from MW-6 since September 1999.

Recovery well RW-1 reported a historical high for MTBE in December of 1993 at a concentration of 1,900 • g/L and was last detected in the first quarter 1996 at two orders of magnitude below the historical high at a concentration of 43 • g/L. Concentrations of MTBE have not been detected in groundwater samples from RW-1 since January 1996.

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

The DTW in monitoring wells has ranged from 6.24 feet below top of casing (btoc) (MW-5; March 1999) to 23.40 feet btoc (RW-1; September 1993). Historically the groundwater gradient has ranged from 0.0008 feet/foot to 0.03 feet/foot. The groundwater flow direction has been predominantly to the east/southeast.

Historical groundwater analytical results from monitoring events are presented in **Table 2** and concentrations of TPHg, benzene and MTBE from the most recent groundwater monitoring event are illustrated on **Figures 8** through **10**. Additionally, concentration trends for TPHg, benzene and MTBE in wells MW-1 through MW-6 and RW-1 are provided in Charts 1 through 7 included in **Appendix C**.

Historical groundwater flow directions and gradients are provided in **Table 3** and shown on **Figure 11**. A potentiometric surface map of groundwater elevations in July 2010 is provided on **Figure 12**.

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 surface-water body is the San Francisco Bay, located approximately 1.0 mile to the southwest of the site.

4.2 Sensitive Receptor Survey

The EMCON Phase II Site Assessment Report, (EMCON 1990) presented the locations and uses of 14 wells within a 2,000-ft radius of the Site. Reportedly, the

wells consisted of ten irrigation wells, two industrial/municipal wells, one domestic well, and one abandoned well. Four of the irrigations wells were reportedly positioned downgradient from the Site. EMCON concluded that the downgradient wells were beyond the delineated extent of the petroleum hydrocarbon plume (EMCON, March 1990).

The nearest natural drainage is Alameda Tidal Canal, located approximately 0.4 miles northwest of the Site. The Alameda Tidal Canal flows generally southeast at its closest proximity to the Site. The closest body of water is the San Francisco Bay to the southwest (upgradient) of the Site.

One school was identified within one quarter mile of the site; Alameda Christian School is located cross gradient to the site approximately 1,080 feet to the northwest. No hospitals are known to be located within a quarter mile of the Site.

ARCADIS used the Revised May 2008 *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (Water Board 2008) to obtain current ESLs and assess potential human health 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.

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 (2009) from the vadose zone (grade to 10 feet bgs) indicates that COCs were not detected above laboratory reporting limits. Prior to 209 soil samples were last collected in 1999 at which time the maximum detected concentrations was 2.4 mg/kg of TPHg collected at 2 feet bgs, which is below the ESL. A commercial worker would likely not have contact with soil located at 10 feet bgs or greater. Therefore, contact with on-site soil does not pose as a health risk to a commercial worker, including

inhalation of particulates. **Figure 13** illustrates the potential sources of exposure and the status of the corresponding pathways.

Groundwater ESLs were obtained from *Table E-1 – Groundwater Screening Levels for Evaluation of Potential Vapor Intrusion Concerns* (Water Board 2008). The inhalation of vapors migrating from the subsurface to indoor air is the only identified complete potential exposure pathway to groundwater. Shallow groundwater is not a current or anticipated future domestic supply source. However, for informational purposes, the groundwater concentrations are also compared to the drinking water standards, maximum contaminant levels (MCLs).

An ESL for TPHg in groundwater, considering the vapor intrusion pathway, is currently not available. The DTSC rescinded its total petroleum hydrocarbon risk assessment guidance document in April 2010. TPHg was reported at 900 µg/L during the latest sampling event. This sample was collected approximately 60 feet from the nearest structure in the downgradient direction. Per current DTSC direction, vapor intrusion potential was evaluated using groundwater BTEX data. The most recent analytical results from a sampling event conducted in July 2010 indicated that the BTEX compounds were significantly below their respective ELS for the protection of the indoor air pathway. Therefore, vapor intrusion does not appear to be a health concern at the Site. The ESLs and BTEX reported BTEX concentrations in groundwater are presented in Table 4.

Soil vapor samples have not been collected at the Site, so as discussed above, the groundwater data were used to evaluate the vapor intrusion potential. A station building is currently present at the site but upgradient from VOC-affected groundwater. Current concentrations show that all COCs are below their applicable ESLs for the protection of the indoor air pathway (**Table 4**). Therefore, though potentially complete, the potential exposure from groundwater through inhalation of volatile organics in indoor air is considered an insignificant pathway (exposure is below levels associated with health concern). **Figure 13** illustrates the potential sources of exposure and the status of the corresponding pathways.

As indicated in the *Bioattenuation of Petroleum Hydrocarbon Vapors in the Subsurface: Update on Recent Studies and Proposed Screening Criteria for the Vapor-Intrusion Pathway* (Davis 1999), there are no reported or published cases where vapor intrusion has occurred at low dissolved sources (<1,000 µg/L benzene; <10,000 µg/L TPH) when clean soil and oxygen are present between the source and the receptor. Regardless of soil type, the data indicate that 5 feet of any type of clean soil attenuates

vapors associated with dissolved concentrations of benzene and TPH. Shallow vadose zone soil samples have not exceeded ESLs at the site. The current station building is located approximately 70 feet cross-gradient of RW-1 which indicated the presence of benzene (5 µg/L) above the ESL (1 µg/L).

4.3 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 sampled for soil were below their respective commercial ESLs for general soil quality. Soil ESLs for the protection of the worker were not exceeded (**Table 4**). Therefore, the Site, under current or future commercial use, does not pose as a human health risk to the hypothetical on-site worker populations.

Currently no groundwater ESL for the protection of the vapor intrusion pathway is available. The most recent TPHg concentrations observed at well MW-1 reported a detection of 2,100 •g/L. Concentrations of TPHg in MW-1 have continued to decline over its history (**Appendix D**). The most recent TPHg concentrations observed at well RW-1 reported a detection of 900 •g/L. RW-1 has maintained a steadily declining trend over its history (**Appendix D**) which is expected to continue.

Additionally, the groundwater plume is stable and is not migrating off site as evidenced by the lack of concentrations in off-site well MW-6. Based on the analytical results, distance to receptors and human health-based screening, current site conditions are unlikely to pose a threat to human health or the environment.

5. Remedial Activities

On August 21, 1992, a GWET system installation was completed at the Site by HETI. The ground-water remediation system began operation on August 26, 1992. The GWET system operated from August 26, 1992 to October 1, 1994 as reported by Alisto, when the system was shut down due to mechanical difficulties. From the records available, no supporting documentation reporting the total gallons of ground

water treated, or the amount of petroleum hydrocarbons removed from the environment could be found.

The potential source of hydrocarbons includes the former UST complex and portions of the product piping east of the UST complex. The exact volume released from the UST complex and product piping are unknown.

The removal of the original UST complex in 1987 and associated piping in 1999 was conducted as a release intervention by KEI. The approximate amount of cubic yards of contaminated soil removed at the time of the UST complex removal is unknown.

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 decreasing concentrations of COCs in groundwater. Samples collected from MW-4 and MW-5 have generally indicated results below laboratory detection limits since their installation in March of 1989 with the exception of one anomalous detection in 1989 (**Table 2/ Appendix D**). The lack of significant concentrations seen in the down gradient well (MW-6) indicates that any residual groundwater impacts are not migrating off site. The extremely low level of soil contamination remaining on site does not appear to be impacting the groundwater.

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 removed. The absence of high concentrations observed in soil samples suggests that secondary sources (residual hydrocarbons in soil) were identified and removed.
- The three wells that contain TPHg concentrations in groundwater indicate decreasing concentration trends (**Appendix D**).
- The one well that contains MTBE concentrations in groundwater indicate a decreasing trend (**Appendix D**).
- The one well that contains benzene concentrations in groundwater indicate a decreasing trend (**Appendix D**).
- Current site conditions suggest that TPHg, is limited to the northern site boundary in the vicinity of MW-1 and RW-1, and MTBE and benzene are in the vicinity of RW-1 (**Figure 7**). The plume does not appear to be migrating, as evidenced by the results of groundwater samples collected from MW-6.
- 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

ARCADIS U.S., December 1, 2010, *Site Investigation Report, BP #11266, 1541 Park Street, Alameda, CA 94501, Local Case No. RO318*.

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ACEH, 8 April 2009. *Fuel Leak Case No. RO 0000318 and GeoTracker Global ID T0600100207, BP #11266, 1541 Park Street, Alameda, CA 94501.* Letter from Mr. Paresh Khatri (ACEH) to Mr. Paul Supple (Atlantic Richfield Company) approving work plan with technical comments.

Broadbent & Associates, Inc., December 15, 2008. *Work Plan for Soil & Water Investigation, Former BP Service Station No. 11266, 1541 Park Street, Alameda, CA, ACEH Case No. RO0000318.*

Broadbent & Associates, Inc., May 8, 2009. *Addendum Work Plan for Soil & Water Investigation, Former BP Service Station No. 11266, 1541 Park Street, Alameda, CA, ACEH Case No. RO0000318.*

Broadbent & Associates, Inc., October 25, 2006. *Third Quarter 2006 Ground-Water Monitoring Report, Former BP Service Station No. 11266, 1541 Park Street, Alameda, CA, ACEH Case No. RO0000318.*

California Regional Water Quality Control Board, San Francisco Bay Region, Groundwater Committee, June 1999. *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, Alameda County and Contra Costa Counties, CA.*

California Regional Water Quality Control Board, San Francisco Bay Region, May 2008. *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater.*

ARCADIS

Tables

Table 1: Historical Soil Results
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

Sample Location	Sample Depth (ft bgs)	Sample Date	TPHg		TPHd		Benzene		Toluene		Ethylbenzene		Xylene		MTBE		O & G		Lead	
Commercial ESLs (mg/Kg)¹			450		450		0.27		210		5.0		100		65		--		750	
A1*	11.5'	9/15/1987	<1.0	mg/Kg	--	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
A2*	11.5'	9/15/1987	<1.0	mg/Kg	--	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
B1*	11.5'	9/15/1987	<1.0	mg/Kg	--	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
B2*	11.5'	9/15/1987	340	mg/Kg	--	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	mg/Kg	8.6	mg/Kg	--	--	--	--	--	
C1*	11.5'	9/15/1987	3200	mg/Kg	--	mg/Kg	81	mg/Kg	42	mg/Kg	--	mg/Kg	450	mg/Kg	--	--	--	--	--	
C2*	11.5'	9/15/1987	490	mg/Kg	--	mg/Kg	2.6	mg/Kg	13	mg/Kg	--	mg/Kg	180	mg/Kg	--	--	--	--	--	
D1*	11.5'	9/15/1987	<1.0	mg/Kg	--	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
D2*	11.5'	9/15/1987	75	mg/Kg	--	mg/Kg	0.3	mg/Kg	6.1	mg/Kg	--	mg/Kg	40	mg/Kg	--	--	--	--	--	
W.0-1*	7.5'	9/15/1987	<1.0	mg/Kg	--	mg/Kg	--	mg/Kg	--	mg/Kg	--	mg/Kg	--	mg/Kg	--	--	--	--	--	
MW-1*	10'	2/9/1988	2.4	mg/Kg	--	mg/Kg	0.1	mg/Kg	0.2	mg/Kg	<0.1	mg/Kg	0.7	mg/Kg	--	--	--	--	--	
MW-2*	10'	2/9/1988	<1.0	mg/Kg	--	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
MW-3*	10'	2/9/1988	<1.0	mg/Kg	--	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
MW4	5'	3/22/1989	<0.1	mg/Kg	--	mg/Kg	<0.05	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
MW4	10'	3/22/1989	<0.1	mg/Kg	--	mg/Kg	<0.05	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
MW5	6'	3/22/1989	<0.1	mg/Kg	--	mg/Kg	<0.05	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
MW5	10'	3/22/1989	<0.1	mg/Kg	--	mg/Kg	<0.05	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
MW6	5'	3/22/1989	<0.1	mg/Kg	--	mg/Kg	<0.05	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
MW6	10'	3/22/1989	<0.1	mg/Kg	--	mg/Kg	<0.05	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	<0.1	mg/Kg	--	--	--	--	--	
D1	--	9/1/1990	ND	mg/Kg	--	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	--	--	--	--	--	
D2	--	9/1/1990	ND	mg/Kg	--	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	--	--	--	--	--	
D3	--	9/1/1990	ND	mg/Kg	--	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	--	--	--	--	--	
D4	--	9/1/1990	ND	mg/Kg	--	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	--	--	--	--	--	
Composite A	--	9/1/1990	ND	mg/Kg	--	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	ND	mg/Kg	--	--	--	--	--	
PD-1	2.0	12/6/1999	<0.1	mg/Kg	--	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.10	mg/Kg	<0.05	mg/Kg	--	--	<5.0	mg/Kg
PD-2	2.0	12/6/1999	<0.1	mg/Kg	--	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.10	mg/Kg	<0.05	mg/Kg	--	--	6.0	mg/Kg
PD-3	2.0	12/6/1999	2.0	mg/Kg	--	mg/Kg	0.009	mg/Kg	0.051	mg/Kg	0.013	mg/Kg	0.15	mg/Kg	<0.05	mg/Kg	--	--	140	mg/Kg
PD-4	2.0	12/6/1999	<0.1	mg/Kg	--	mg/Kg	<0.005	mg/Kg	0.15	mg/Kg	<0.005	mg/Kg	0.09	mg/Kg	<0.05	mg/Kg	--	--	910	mg/Kg
PL-1	2.0	12/6/1999	<0.1	mg/Kg	--	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	<0.10	mg/Kg	<0.05	mg/Kg	--	--	10	mg/Kg
PL-2	2.0	12/6/1999	<0.1	mg/Kg	--	mg/Kg	<0.005	mg/Kg	<0.005	mg/Kg	0.008	mg/Kg	<0.10	mg/Kg	<0.05	mg/Kg	--	--	10	mg/Kg
B-2-5'	5.0	6/10/2009	<0.50	mg/Kg	--	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	--	--	47.9	mg/Kg
B-2-6.5'	6.5	6/10/2009	<0.50	mg/Kg	--	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	--	--	15.8	mg/Kg
B-2-8'	8.0	6/10/2009	<0.50	mg/Kg	--	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	--	--	96.6	mg/Kg
B-2-9.5'	9.5	6/10/2009	<0.50	mg/Kg	--	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	<0.001	mg/Kg	--	--	17.2	mg/Kg
SB-02	11.5	10/26/2010	<0.240	mg/Kg	--	mg/Kg	<0.004	mg/Kg	<0.004	mg/Kg	<0.004	mg/Kg	<0.009	mg/Kg	0.004	mg/Kg	--	--	2.0	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
 mg/L = milligrams per liter
 ppm = parts per million
 MTBE = Methyl tert-butyl ether
 - = not analyzed
 ND< = analyte not detected, result is less than value provided
 1 = Soil ESLs values are listed from Table K-2
 * = Total Petroleum Hydrocarbon Analysis with no Speciation
Bold = Exceeds ESL

Table 2: Historical Groundwater Results
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

Location	Sample Date	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	Lead	DO
MW-1	2/17/1988	19.19	-	0	-	95000	2000	5900	1100	10000	-	-	-
MW-1	10/12/1988	19.19	10.58	0	8.61	14000	180	120	110	750	-	-	-
MW-1	12/28/1988	19.19	9.83	0	9.36	2800	40	7.1	2.3	110	-	-	-
MW-1	3/29/1989	19.19	-	0	-	25000	930	2600	24	3100	-	-	-
MW-1	11/28/1989	19.19	-	0	-	15000	280	880	340	1200	-	-	-
MW-1	2/13/1991	19.19	9.46	0	9.73	25000	680	2700	1100	3200	-	-	-
MW-1	5/10/1991	19.19	9.07	0	10.12	20000	400	1300	540	1600	-	-	-
MW-1	8/1/1991	19.19	9.76	0	9.43	11000	240	1100	500	1300	-	-	-
MW-1	1/8/1992	19.19	9.36	0	9.83	10000	260	1100	570	2000	-	-	-
MW-1	3/30/1992	19.19	8.15	0	11.04	5800	290	570	500	1100	-	-	-
MW-1	7/2/1992	19.19	9.38	0	9.81	2500	170	60	310	300	-	-	-
MW-1	7/22/1992	19.19	9.62	0	9.57	-	-	-	-	-	-	-	-
MW-1	10/2/1992	19.19	9.98	0	9.21	4000	86	190	270	350	-	-	-
MW-1	12/14/1992	19.19	9.90	0	9.29	6800	75	540	200	670	-	-	-
MW-1	3/24/1993	19.19	8.52	0	10.67	6400	150	310	370	710	1400	-	-
MW-1	6/17/1993	19.19	9.37	0	9.82	3800	110	160	310	480	220	-	-
MW-1	9/29/1993	19.19	10.80	0	8.39	1100	22	16	54	110	320	-	-
MW-1	12/28/1993	19.19	9.27	0	9.92	1800	26	110	77	300	220	-	-
MW-1	3/29/1994	19.19	8.77	0	10.42	22000	990	560	970	2000	68412	-	3.1
MW-1	7/7/1994	19.19	9.18	0	10.01	18000	67	32	250	140	30000	-	-
MW-1	10/18/1994	19.19	9.85	0	9.34	270	1.9	0.6	ND<0.5	3.2	-	-	3.6
MW-1	2/1/1995	19.19	7.04	0	12.15	5400	260	350	1100	980	-	-	6.5
MW-1	4/12/1995	19.19	7.74	0	11.45	13000	260	620	960	2600	-	-	5.0
MW-1	9/13/1995	19.19	9.58	0	9.61	5800	110	110	510	830	4300	-	5.2
MW-1	1/11/1996	19.19	8.95	0	10.24	5400	91	130	510	1000	1700	-	5.2
MW-1	4/18/1996	19.19	8.40	0	10.79	12000	190	420	1100	1560	2100	-	4.5
MW-1	6/28/1996	19.19	9.08	0	10.11	11000	100	130	670	1180	4600	-	-
MW-1	11/5/1996	19.19	9.81	0	9.38	8800	55	28	520	430	5700	-	5.5
MW-1	1/17/1997	19.19	7.81	0	11.38	12000	180	160	1200	1650	3200	-	8
MW-1	5/1/1997	19.19	9.13	0	10.06	8600	160	49	950	850	3200	-	7.0
MW-1	7/9/1997	19.19	9.55	0	9.64	10000	93	27	720	476	4500	-	6.3
MW-1	10/16/1997	19.19	9.77	0	9.42	2100	71	14	420	194	500	-	6.8
MW-1	1/8/1998	19.19	8.36	0	10.83	2500	33	21	180	183	1200	-	6.1
MW-1	4/17/1998	19.19	7.48	0	11.71	14000	140	410	730	1980	2400	-	3.7
MW-1	9/11/1998	19.19	9.30	0	9.89	7700	65	38	580	880	1700	-	5.6
MW-1	3/9/1999	19.19	6.80	0	12.39	6300	93	99	510	790	780	-	-
MW-1	9/23/1999	19.19	8.31	0	10.88	8500	93	88	910	1900	640	-	-
MW-1	3/27/2000	19.19	6.82	0	12.37	2100	35	6.2	240	120	160	-	-
MW-1	9/27/2000	19.19	8.58	0	10.61	810	13	0.62	43	12	46	-	-
MW-1	3/21/2001	19.19	7.47	0	11.72	1500	28.2	1.68	107	90.5	15.2	-	-
MW-1	9/18/2001	19.19	8.95	0	10.24	990	24	9.57	44.6	62.6	31.2	-	-

Table 2: Historical Groundwater Results
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

Location	Sample Date	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	Lead	DO
MW-1	8/24/2006	19.19	7.75	0	11.44	1900	6.4	1.9	48	41	1.2	ND<100	-
MW-1	6/30/2009	28.62	8.85	0	19.77	11000	5.1	29	310	1200	ND<0.50	54.2	2.98
MW-1	3/18/2010	28.62	7.37	0	21.25	2100	ND<5.0	5.6	24	170	ND<5.0	25	0.82
MW-1	7/12/2010	28.62	8.29	0	20.33	-	-	-	-	-	-	-	-
MW-2	2/17/1988	19.32	-	0	-	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-2	10/12/1988	19.32	11.00	0	8.32	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-2	12/28/1988	19.32	10.38	0	8.94	ND<50	ND<0.5	ND<0.5	ND<0.5	0.6	-	-	-
MW-2	3/29/1989	19.32	-	0	-	ND<50	1.1	0.78	ND<0.5	1.7	-	-	-
MW-2	11/28/1989	19.32	-	0	-	170	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-2	2/13/1991	19.32	10.01	0	9.31	150	1.4	ND<0.5	ND<0.5	0.9	-	-	-
MW-2	5/10/1991	19.32	9.74	0	9.58	160	5.4	ND<0.5	0.5	0.8	-	-	-
MW-2	8/1/1991	19.32	10.27	0	9.05	110	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-2	1/8/1992	19.32	10.05	0	9.27	ND<50	1.4	ND<0.5	ND<0.5	1.1	-	-	-
MW-2	3/30/1992	19.32	9.03	0	10.29	91	0.7	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-2	7/2/1992	19.32	9.96	0	9.36	150	3.1	0.6	0.6	1.1	-	-	-
MW-2	7/22/1992	19.32	10.12	0	9.20	-	-	-	-	-	-	-	-
MW-2	10/2/1992	19.32	10.42	0	8.90	56	ND<0.5	0.8	0.8	1.2	-	-	-
MW-2	12/14/1992	19.32	10.77	0	8.55	210	1.5	ND<0.5	0.9	2.7	-	-	-
MW-2	3/24/1993	19.32	9.33	0	9.99	94	0.8	ND<0.5	ND<0.5	0.9	-	-	-
MW-2	6/17/1993	19.32	9.91	0	9.41	ND<50	ND<0.5	ND<0.5	ND<0.5	0.7	23	-	-
MW-2	9/29/1993	19.32	11.39	0	7.93	68	ND<0.5	0.9	0.7	1.9	59	-	-
MW-2	12/28/1993	19.32	9.75	0	9.57	260	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1300	-	-
MW-2	3/29/1994	19.32	9.39	0	9.93	150	ND<0.5	ND<0.5	ND<0.5	ND<0.5	1622	-	4.9
MW-2	7/7/1994	19.32	9.68	0	9.64	1100	0.6	1.7	0.6	3.2	2000	-	-
MW-2	10/18/1994	19.32	10.22	0	9.10	290	31	0.8	ND<0.5	5.1	-	-	3.3
MW-2	2/1/1995	19.32	8.03	0	11.29	100	ND<0.5	ND<0.5	ND<0.5	ND<1	-	-	6
MW-2	4/12/1995	19.32	8.71	0	10.61	1200	ND<1.0	ND<1.0	ND<1.0	ND<2.0	-	-	8.3
MW-2	9/13/1995	19.32	10.19	0	9.13	480	ND<2.5	NO<2.5	ND<2.5	ND<5.0	2300	-	7.8
MW-2	1/11/1996	19.32	9.59	0	9.73	3400	ND<25	ND<25	ND<25	ND<50	11000	-	5.4
MW-2	4/18/1996	19.32	9.04	0	10.28	130	ND<0.5	ND<1	ND<1.0	ND<1	170	-	5.5
MW-2	6/28/1996	19.32	9.72	0	9.60	300	ND<0.5	ND<1	ND<1.0	ND<1	430	-	4.9
MW-2	11/5/1996	19.32	10.43	0	8.89	710	ND<2.5	ND<5.0	ND<5.0	ND<5.0	960	-	5.3
MW-2	1/17/1997	19.32	8.80	0	10.52	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	24	-	5.3
MW-2	5/1/1997	19.32	10.06	0	9.26	80	ND<0.5	ND<1.0	ND<1.0	ND<1.0	100	-	5.2
MW-2	7/9/1997	19.32	10.50	0	8.82	150	ND<0.5	ND<1.0	ND<1.0	ND<1.0	170	-	4.3
MW-2	10/16/1997	19.32	10.18	0	9.14	ND<50	ND<1.0	ND<1.0	ND<1.0	ND<1.0	260	-	5
MW-2	1/8/1998	19.32	9.04	0	10.28	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	18	-	4.4
MW-2	4/17/1998	19.32	8.56	0	10.76	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<10	-	3.9
MW-2	9/11/1998	19.32	9.79	0	9.53	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<10	-	6.1
MW-2	3/9/1999	19.32	7.93	0	11.39	200	ND<1.0	ND<1.0	ND<1.0	ND<1.0	190	-	-
MW-2	9/23/1999	19.32	8.52	0	10.80	<250	ND<5.0	ND<5.0	ND<5.0	ND<5.0	84	-	-

Table 2: Historical Groundwater Results
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

Location	Sample Date	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	Lead	DO
						µg/L							
MW-3	4/17/1998	19.99	9.62	0	10.37	-	-	-	-	-	-	-	-
MW-3	9/11/1998	19.99	10.83	0	9.16	-	-	-	-	-	-	-	-
MW-3	3/9/1999	19.99	9.00	0	10.99	17000	8.2	ND<1.0	ND<1.0	5.9	17000	-	-
MW-3	9/23/1999	19.99	9.20	0	10.79	-	-	-	-	-	-	-	-
MW-3	3/27/2000	19.99	9.10	0	10.89	1200	4.5	1.2	3.0	3.1	2800	-	-
MW-3	9/27/2000	19.99	9.96	0	10.03	-	-	-	-	-	-	-	-
MW-3	3/21/2001	19.99	9.46	0	10.53	610	2.97	ND<2.5	8.66	7.85	572	-	-
MW-3	9/18/2001	19.99	10.13	0	9.86	-	-	-	-	-	-	-	-
MW-3	8/24/2006	19.99	9.61	0	10.38	96	ND<0.5	0.52	ND<0.5	ND<0.5	1.2	ND<100	-
MW-3	6/30/2009	29.43	10.03	0	19.40	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<5.0	2.40
MW-3	3/18/2010	29.43	8.82	0	20.61	100	ND<0.5	ND<0.5	ND<0.5	ND<1.0	ND<0.5	ND<5.0	0.78
MW-3	7/12/2010	29.43	9.24	0	20.19	79	ND<0.5	ND<0.5	ND<0.5	ND<1.0	ND<0.5	ND<5.0	-
MW-4	3/29/1989	20.17	-	0	-	ND	ND	ND	ND	ND	-	-	-
MW-4	11/28/1989	20.17	-	0	-	430	6.2	0.6	12	3	-	-	-
MW-4	2/13/1991	20.17	-	0	-	ND	ND	ND	ND	ND	-	-	-
MW-4	5/10/1991	20.17	9.67	0	10.50	ND<54	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	8/1/1991	20.17	10.42	0	9.75	ND<54	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	1/8/1992	20.17	10.05	0	10.12	ND	ND	ND	ND	ND	-	-	-
MW-4	3/30/1992	20.17	8.73	0	11.44	ND	ND	ND	ND	ND	-	-	-
MW-4	7/2/1992	20.17	10.04	0	10.13	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	7/22/1992	20.17	10.26	0	9.91	-	-	-	-	-	-	-	-
MW-4	10/2/1992	20.17	10.63	0	9.54	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	12/14/1992	20.17	10.02	0	10.15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	3/24/1993	20.17	9.08	0	11.09	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	6/17/1993	20.17	10.03	0	10.14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	9/29/1993	20.17	10.96	0	9.21	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	12/28/1993	20.17	9.33	0	10.84	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	3/29/1994	20.17	9.42	0	10.75	-	-	-	-	-	-	-	-
MW-4	7/7/1994	20.17	9.82	0	10.35	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-4	10/18/1994	20.17	10.36	0	9.81	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	3.1
MW-4	2/1/1995	20.17	7.50	0	12.67	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.0	-	-	9.3
MW-4	4/12/1995	20.17	8.21	0	11.96	--	-	-	-	-	-	-	-
MW-4	9/13/1995	20.17	10.2	0	9.97	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<5.0	-	4.3
MW-4	1/11/1996	20.17	9.57	0	10.60	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<5.0	-	5.1
MW-4	4/18/1996	20.17	9.03	0	11.14	-	-	-	-	-	-	-	-
MW-4	6/28/1996	20.17	8.73	0	11.44	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<10	-	4.6
MW-4	11/5/1996	20.17	9.47	0	10.70	-	-	-	-	-	-	-	-
MW-4	1/17/1997	20.17	8.79	0	11.38	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<10	-	5.4
MW-4	5/1/1997	20.17	10.08	0	10.09	-	-	-	-	-	-	-	-
MW-4	7/9/1997	20.17	10.52	0	9.65	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<10	-	4.1

Table 2: Historical Groundwater Results
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

Location	Sample Date	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	Lead	DO
						µg/L							
MW-4	10/16/1997	20.17	10.85	0	9.32	-	-	-	-	-	-	-	-
MW-4	1/8/1998	20.17	9.60	0	10.57	-	-	-	-	-	-	-	-
MW-4	4/17/1998	20.17	9.11	0	11.06	-	-	-	-	-	-	-	-
MW-4	9/11/1998	20.17	10.32	0	9.85	-	-	-	-	-	-	-	-
MW-4	3/9/1999	20.17	7.30	0	12.87	ND<50	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	-	0
MW-4	9/23/1999	20.17	7.86	0	12.31	-	-	-	-	-	-	-	-
MW-4	3/27/2000	20.17	7.57	0	12.60	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-
MW-4	9/27/2000	20.17	9.59	0	10.58	-	---	-	-	-	-	-	-
MW-4	3/21/2001	20.17	8.14	0	12.03	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	-	-
MW-4	9/18/2001	20.17	9.74	0	10.43	-	-	-	-	-	-	-	-
MW-4	8/24/2006	20.17	8.98	0	11.19	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<100	-
MW-4	6/30/2009	29.61	9.47	0	20.14	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	35.7	3.53
MW-4	3/18/2010	29.61	7.85	0	21.76	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<0.50	ND<5.0	1.3
MW-4	7/12/2010	29.61	8.96	0	20.65	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<0.50	ND<5.0	-
MW-5	3/29/1989	19.41	-	0	-	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	11/28/1989	19.41	-	0	-	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	2/13/1991	19.41	-	0	-	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	5/10/1991	19.41	9.03	0	10.38	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	8/1/1991	19.41	9.70	0	9.71	ND<54	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	1/8/1992	19.41	9.23	0	10.18	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	3/30/1992	19.41	7.85	0	11.56	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	7/2/1992	19.41	9.27	0	10.14	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	7/22/1992	19.41	9.55	0	9.86	-	-	-	-	-	-	-	-
MW-5	10/2/1992	19.41	9.97	0	9.44	ND<50	ND<50	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	12/14/1992	19.41	9.14	0	10.27	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	3/24/1993	19.41	8.17	0	11.24	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	6/17/1993	19.41	8.29	0	11.12	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	9/29/1993	19.41	10.31	0	9.10	ND<50	ND<0.5	ND<0.5	ND<0.5	0.6	-	-	-
MW-5	12/28/1993	19.41	8.91	0	10.50	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	3/29/1994	19.41	8.50	0	10.91	-	-	-	-	-	-	-	-
MW-5	7/7/1994	19.41	8.99	0	10.42	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-5	10/18/1994	19.41	9.61	0	9.80	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	3.5
MW-5	2/1/1995	19.41	6.55	0	12.86	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.0	-	-	7.6
MW-5	4/12/1995	19.41	7.27	0	12.14	-	-	-	-	-	-	-	-
MW-5	9/13/1995	19.41	9.49	0	9.92	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<5.0	-	4.9
MW-5	1/11/1996	19.41	8.82	0	10.59	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<5.0	-	4.9
MW-5	4/18/1996	19.41	8.30	0	11.11	-	-	-	-	-	-	-	-
MW-5	6/28/1996	19.41	8.96	0	10.45	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<10	-	4.2
MW-5	11/5/1996	19.41	9.69	0	9.72	-	-	-	-	-	-	-	-
MW-5	1/17/1997	19.41	9.02	0	10.39	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<10	-	5.2
MW-5	5/1/1997	19.41	10.29	0	9.12	-	--	-	-	-	-	-	-

Table 2: Historical Groundwater Results
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

Location	Sample Date	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	Lead	DO
						µg/L							
MW-5	7/9/1997	19.41	10.71	0	8.70	ND<50	ND<0.5	ND<1.0	ND<1.0	ND<1.0	ND<10	-	4.2
MW-5	10/16/1997	19.41	11.03	0	8.38	-	-	-	-	-	-	-	-
MW-5	1/8/1998	19.41	10.00	0	9.41	-	-	-	-	-	-	-	-
MW-5	4/17/1998	19.41	8.73	0	10.68	-	-	-	-	-	-	-	-
MW-5	9/11/1998	19.41	9.91	0	9.50	-	-	-	-	-	-	-	-
MW-5	3/9/1999	19.41	6.24	0	13.17	ND<50	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	-	-
MW-5	9/23/1999	19.41	6.74	0	12.67	-	-	-	-	-	-	-	-
MW-5	3/27/2000	19.41	6.64	0	12.77	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-
MW-5	9/27/2000	19.41	8.76	0	10.65	-	-	-	-	-	-	-	-
MW-5	3/21/2001	19.30	7.15	0	12.15	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.5	ND<0.5	-	-
MW-5	9/18/2001	19.30	8.85	0	10.45	-	-	-	-	-	-	-	-
MW-5	8/24/2006	19.41	8.12	0	11.29	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<100	-
MW-5	6/30/2009	28.72	8.61	0	20.11	-	-	-	-	-	-	-	-
MW-5	3/18/2010	28.72	6.84	0	21.88	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.0	ND<0.5	ND<5.0	1.3
MW-5	7/12/2010	28.72	8.13	0	20.59	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<1.0	ND<0.5	ND<5.0	1.77
MW-6	3/29/1989	19.4	-	0	-	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	11/28/1989	19.4	-	0	-	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	2/13/1991	19.4	-	0	-	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	5/10/1991	19.4	9.80	0	9.60	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	8/1/1991	19.4	10.29	0	9.11	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	1/8/1992	19.4	10.02	0	9.38	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	3/30/1992	19.4	8.86	0	10.54	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	7/2/1992	19.4	9.94	0	9.46	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	7/22/1992	19.4	10.1	0	9.30	-	-	-	-	-	-	-	-
MW-6	10/12/1992	19.4	10.48	0	8.92	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	12/14/1992	19.4	10.76	0	8.64	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	3/24/1993	19.4	9.19	0	10.21	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	6/17/1993	19.4	9.91	0	9.49	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	9/29/1993	19.4	11.49	0	7.91	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	12/28/1993	19.4	9.88	0	9.52	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	3/29/1994	19.4	9.36	0	10.04	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	66.3	-	-
MW-6	7/7/1994	19.4	9.75	0	9.65	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	38	-	-
MW-6	10/18/1994	19.4	10.3	0	9.10	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	-	-	-
MW-6	2/1/1995	19.4	7.92	0	11.48	ND<50	ND<0.5	0.9	ND<0.5	1.1	-	-	-
MW-6	4/12/1995	19.4	8.41	0	10.99	220	ND<0.5	ND<0.5	ND<0.50	ND<1.0	-	-	-
MW-6	9/13/1995	19.4	10.05	0	9.35	180	ND<1.0	ND<1.0	ND<1.0	ND<2.0	770	-	-
MW-6	1/11/1996	19.4	9.52	0	9.88	670	ND<2.5	ND<2.5	ND<2.5	ND<5.0	2400	-	-
MW-6	4/18/1996	19.4	9.03	0	10.37	560	ND<0.5	ND<1.0	ND<1.0	ND<1.0	860	-	-
MW-6	6/28/1996	19.4	8.76	0	10.64	620	ND<0.5	ND<1.0	ND<1.0	ND<1.0	540	-	-
MW-6	11/5/1996	19.4	9.48	0	9.92	810	ND<5.0	ND<10	ND<10	ND<10	970	-	-
MW-6	1/17/1997	19.4	8.58	0	10.82	830	ND<0.5	ND<1.0	ND<1.0	ND<1.0	960	-	-

Table 2: Historical Groundwater Results
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

Location	Sample Date	TOC Elevation (ft)	DTW (ft btoc)	Product Thickness (ft)	Water Level Elevation (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	Lead	DO
RW-1	9/23/1999	19.27	7.63	0	11.64	-	-	-	-	-	-	-	-
RW-1	3/27/2000	19.27	7.04	0	12.23	-	-	-	-	-	-	-	-
RW-1	9/27/2000	19.27	8.55	0	10.72	-	-	-	-	-	-	-	-
RW-1	3/21/2001	19.27	7.48	0	11.79	-	-	-	-	-	-	-	-
RW-1	9/18/2001	19.27	9.13	0	10.14	-	-	-	-	-	-	-	-
RW-1	8/24/2006	-	-	0	-	-	-	-	-	-	-	-	-
RW-1	6/30/2009	28.63	10.16	0	18.47	290	ND<0.50	15	9.6	51	ND<0.5	5.47	3.34
RW-1	3/18/2010	28.63	7.64	0	20.99	1000	3.9	82	59	280	ND<2.5	14	1.17
RW-1	7/12/2010	28.63	9.26	0	19.37	900	5.0	27	48	220	ND<5.0	5.0	1.05

Notes:

P = well purged prior to sampling

NP = well not purged prior to sampling

TOC = Top of Casing

BTOC = Below Top of Casing

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

mg/L = milligrams per liter

- = not analyzed

ND< = analyte not detected, result is below laboratory reporting limit

Table 3: Historical Groundwater Flow Directions and Gradients
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

Date Sampled	Approximate Flow Direction	Approximate Hydraulic Gradient (ft/ft)
10/12/1988	East	NA
12/28/1988	East	NA
2/13/1991	East	0.009
5/10/1991	East	0.01
8/1/1991	East	0.008
1/8/1992	East	0.01
3/30/1992	East	0.01
7/2/1992	East	0.009
10/2/1992	East	0.006
12/14/1992	East	0.02
3/24/1993	East	0.01
6/17/1993	Southeast	0.02
9/29/1993	Southeast	0.003
12/28/1993	Northeast	0.02
3/29/1994	Southeast	0.01
7/7/1994	Southeast	0.007
10/18/1994	East	0.008
2/1/1995	Southeast	0.02
4/12/1995	Southeast	0.02
9/13/1995	Southeast	0.008
1/11/1996	East	0.01
4/18/1996	East	0.01
6/28/1996	East	0.03
11/5/1996	Northeast	0.02
1/17/1997	Northeast	0.03
5/1/1997	Northeast	0.03
7/9/1997	Northeast	0.03
10/16/1997	Northwest	0.03
4/17/1998	South	0.01
9/11/1998	South	0.009
3/9/1999	Southeast	0.02
9/23/1999	Southeast	0.02
3/27/2000	South	0.02
9/27/2000	South	0.008
3/21/2001	Southeast	0.01
9/18/2001	Southeast	0.01
8/24/2006	South	0.01
6/30/2009	East	0.01
3/18/2010	Southeast	0.01
7/12/2010	South	0.02
Notes:		
NA	Not Available	

Table 4: Most Recent and Maximum Concentration of Contaminants Detected in Soil and Groundwater
Former BP Service Station No. 11266
1541 Park Street, Alameda, CA
Local Case #RO318

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 ² (mg/kg)	Most Recent Concentration Observed (µg/L)	Sample Date	Maximum Concentration Observed (µg/L)	Sample Date	Commerical ESL for the Protection of the Vapor Intrusion Pathway ³ (µg/L)	State of California Maximum Contaminant Level (µg/L)
TPHg	<0.50 (B-2)	9.5	6/10/2009	2.4 (MW-1)	10	2/9/1988	450	900 (RW-1)	7/12/2010	95,000 (MW-1)	3/4/1988	--	NA
Benzene	<0.001 (B-2)	9.5	6/10/2009	0.1 (MW-1)	10	2/9/1988	0.27	5.0 (RW-1)	7/12/2010	2,400 (RW-1)	2/1/1995	1,800	1.0
Toluene	<0.001 (B-2)	9.5	6/10/2009	0.15 (PD-4)	2.0	12/6/1999	210	27 (RW-1)	7/12/2010	6,100 (RW-1)	2/1/1995	530,000	150
Ethylbenzene	<0.001 (B-2)	9.5	6/10/2009	0.013 (PD-3)	2.0	12/6/1999	5.0	48 (RW-1)	7/12/2010	1,800 (RW-1)	2/1/1995	170,000	300
Xylenes	<0.001 (B-2)	9.5	6/10/2009	0.7 (MW-1)	10	2/9/1999	100	220 (RW-1)	7/12/2010	10,000 (MW-1)	3/4/1988	160,000	1750
MTBE	<0.001 (B-2)	9.5	6/10/2009	<0.001 (B-2)	9.5	6/10/2009	650	6.0 (RW-1)	7/12/2010	68,412 (MW-1)	3/29/1994	80,000	13
TPHd	--	--	--	--	--	--	450	1,000 (MW-1)	8/24/2006	1,000 (MW-1)	8/24/2006	-	NA
Lead	96.6 (B-2)	8.0	6/10/2009	910 (PD-4)	2.0	12/6/1999	750	5.0 (RW-1)	7/12/2010	54.2 (MW-1)	6/30/2009	-	15

¹ Soil results are reported from the vadose zone, which does not exceed 10 feet bgs

² Soil ESLs are from Table K-2 of Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater

³ Groundwater ESLs are from Table E-1 of Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater

⁴ Groundwater MCLs are from Title 22 of the California Code of Regulations

Bold = exceedances of commercial ESL

TPHg = Total Petroleum Hydrocarbons as Gasoline

TPHd = Total Petroleum Hydrocarbons as Diesel

MTBE = methyl tert-butyl ether

mg/kg = milligrams per kilogram

µg/L = micrograms per liter

bgs = below ground surface

TPHg Commerical ESL values are listed as TPH (gasolines) in Table A of *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*

TPHd Commerical ESL values are listed as TPH (middle distillates) in Table A of *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*

ND = non-detect, below laboratory detection limits

NA = Not Available

ARCADIS

Figures

CITY: PATALUMA, CA DIV/GROUP: ENV. DB: J. HARRIS LD... PIC: S. GLENN PM: H. PHILLIPS TM: J. AMMERMAN LVR: 0/0/0/0/0 OFF+REF+G-ENV/CA/Petaluma/ACT/GP/98BPNA/C001/000001/541 Park Street-Alameda/Soil and GW Inv/WP/GP/98BPNA/C001/B01.dwg LAYOUT: 1/19/2010 8:07 AM ACADVER: 18.05 (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 11/29/2010 2:33 PM BY: HARRIS, JESSICA XREFS: IMAGES: PROJECTNAME: NASA 3000.bmp



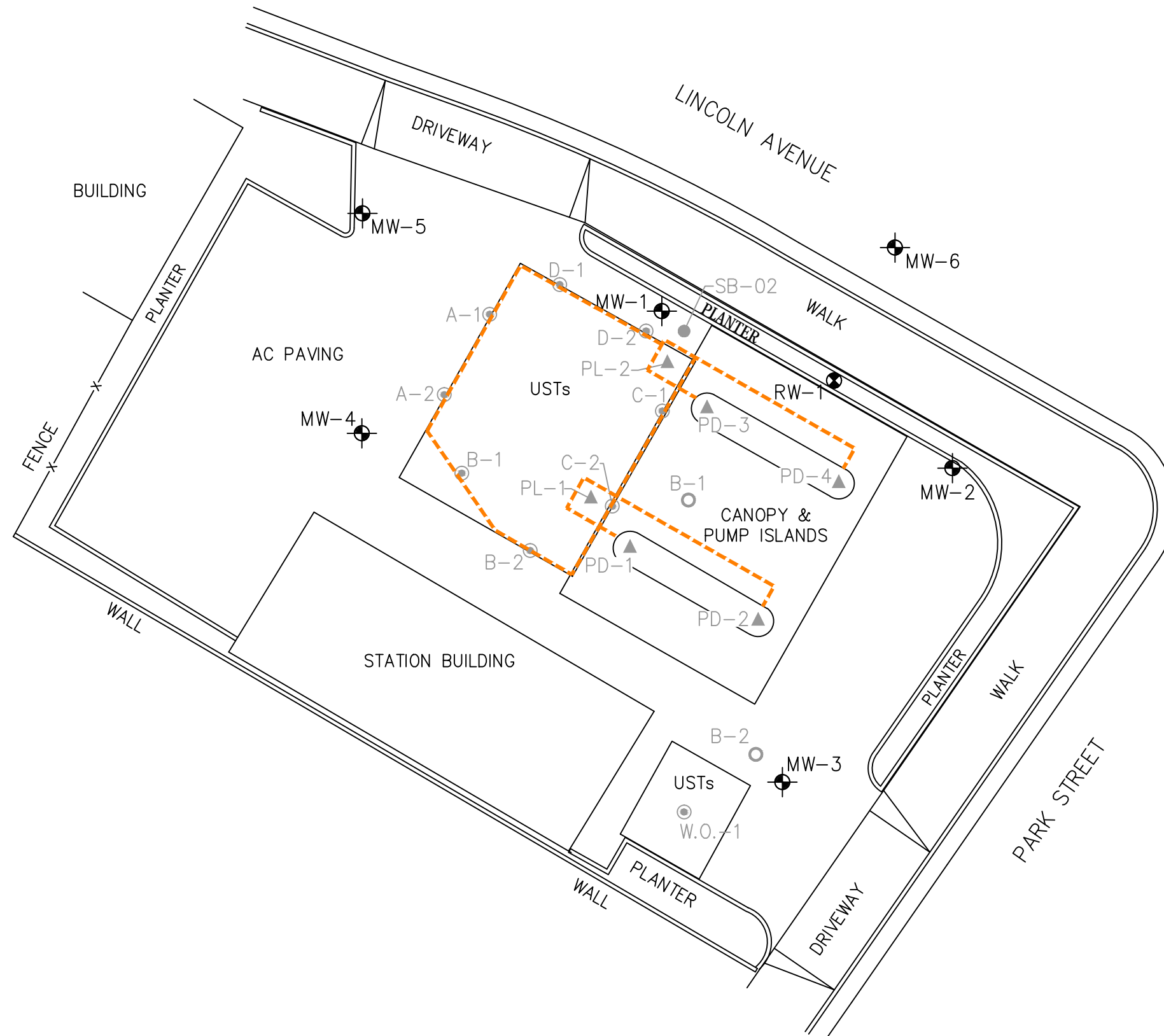
SITE LOCATION

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., OAKLAND WEST, CA., 1993, AND SAN LEANDRO, 1993, REVISED 1996.



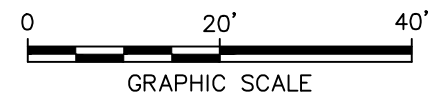
FORMER BP SERVICE STATION #11266 1541 PARK STREET ALAMEDA, CALIFORNIA	
SITE LOCATION MAP	
	FIGURE 1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD: ... PIC: ... PM: L.A. SMITH TM: C. MEYER LYR: (OP)ON=, OFF=REF
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 HARRIS, JESSICA XREFS: IMAGES: GP09BPNA\001-X01 PROJECTNAME: ...



LEGEND

- ⊕ MONITORING WELL
- ⊗ RECOVERY WELL
- ⊙ SOIL BORING BY KAPREALIAN ENGINEERING, INC.; 1987
- ▲ SOIL SAMPLE LOCATION BY SECOR; 1999
- SOIL BORING BY BROADBENT & ASSOCIATES, INC.; 2009
- SOIL BORING LOCATION BY ARCADIS; 2010
- - - HISTORICAL EXCAVATION LIMIT

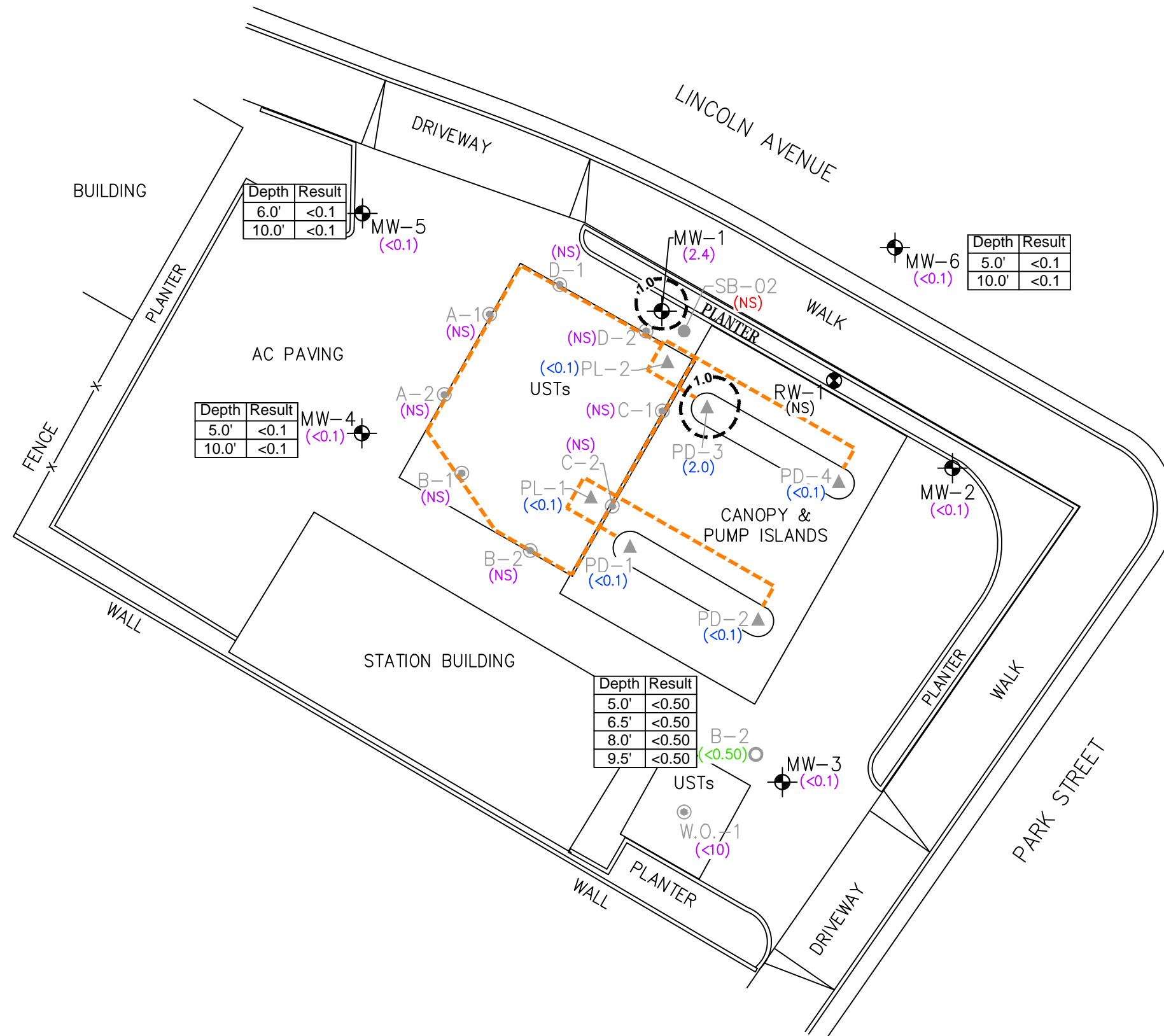


FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

**SITE PLAN WITH
 HISTORICAL EXCAVATION LIMITS
 AND SOIL SAMPLE LOCATIONS**



NOTE:
 BASEMAP PROVIDED BY BROADBENT & ASSOCIATES, INC., PROJECT
 REFERENCE NO. 06-88-658, DATED SEPTEMBER 30, 2009, AT A
 SCALE OF 1"=30'.

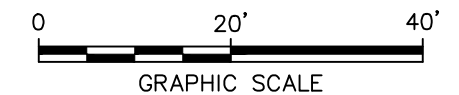


LEGEND

- MONITORING WELL
- RECOVERY WELL
- SOIL BORING BY KAPREALIAN ENGINEERING, INC.; 1987
- SOIL SAMPLE LOCATION BY SECOR; 1999
- SOIL BORING BY BROADBENT & ASSOCIATES, INC.; 2009
- SOIL BORING LOCATION BY ARCADIS; 2010
- HISTORICAL EXCAVATION LIMIT
- (2.4) TPHg CONCENTRATION IN (mg/kg) IN 1988
- (2.0) TPHg CONCENTRATION IN (mg/kg) IN 1999
- (<0.50) TPHg CONCENTRATION IN (mg/kg) IN 2009
- (NS) TPHg CONCENTRATION IN (mg/kg) IN 2010
- (NS) NOT SAMPLED AT THE SPECIFIED INTERVAL
- 1.0 TPHg ISOCONCENTRATION CONTOUR (mg/kg) (DASHED WHERE INFERRED)
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- mg/kg MILLIGRAMS PER KILOGRAM
- FT BGS FEET BELOW GROUND SURFACE

Depth	Result
5.0'	<0.1
10.0'	<0.1

TPHg CONCENTRATION IN mg/kg
SAMPLE DEPTH IN FT BGS



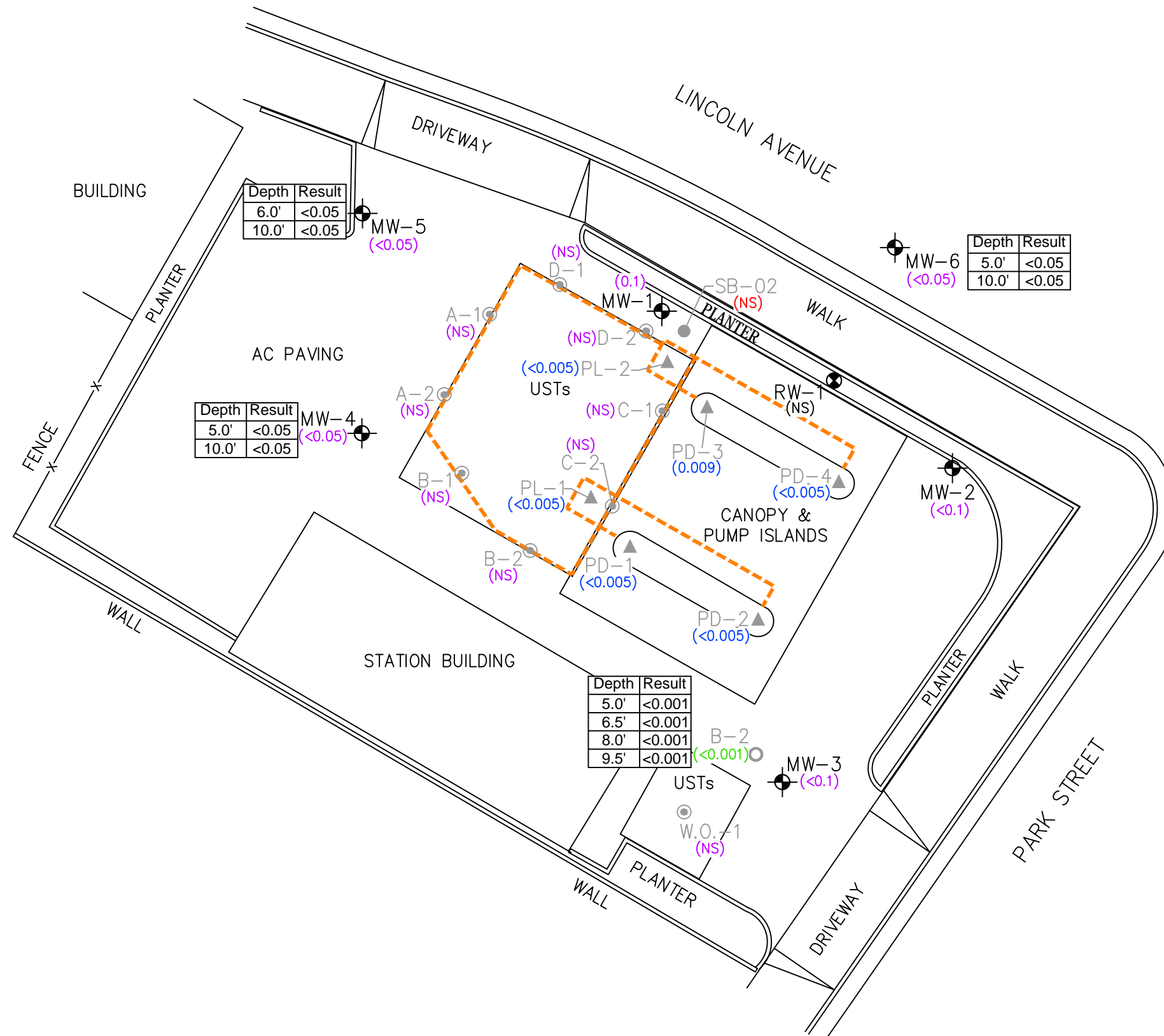
FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

**HISTORICAL TPHg
 SOIL SAMPLE RESULTS**



NOTES:

- BASEMAP PROVIDED BY BROADBENT & ASSOCIATES, INC., PROJECT REFERENCE NO. 06-88-658, DATED SEPTEMBER 30, 2009, AT A SCALE OF 1"=30'.
- SOIL CONCENTRATION IS BASED UPON THE HIGHEST DETECTION FROM THE BORING WITHIN THE VADOSE ZONE (0-10 FT BGS).

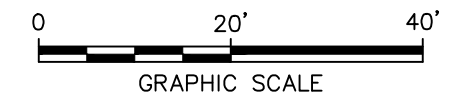


LEGEND

- MONITORING WELL
- ⊗ RECOVERY WELL
- ⊙ SOIL BORING BY KAPREALIAN ENGINEERING, INC.; 1987
- SOIL BORING BY BROADBENT & ASSOCIATES, INC.; 2009
- SOIL BORING LOCATION BY ARCADIS; 2010
- ▲ SOIL SAMPLE LOCATION BY SECOR; 1999
- - - HISTORICAL EXCAVATION LIMIT
- (<0.05) BENZENE CONCENTRATION IN (mg/kg) IN 1988
- (0.009) BENZENE CONCENTRATION IN (mg/kg) IN 1999
- (<0.001) BENZENE CONCENTRATION IN (mg/kg) IN 2009
- (NS) BENZENE CONCENTRATION IN (mg/kg) IN 2010
- (NS) NOT SAMPLED AT THE SPECIFIED INTERVAL
- mg/kg MILLIGRAMS PER KILOGRAM
- FT BGS FEET BELOW GROUND SURFACE

Depth	Result
5.0'	<0.05
10.0'	<0.05

BENZENE CONCENTRATION IN mg/kg
SAMPLE DEPTH IN FT BGS



FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

**HISTORICAL BENZENE
 SOIL SAMPLE RESULTS**

FIGURE
4

- NOTES:
- BASEMAP PROVIDED BY BROADBENT & ASSOCIATES, INC., PROJECT REFERENCE NO. 06-88-658, DATED SEPTEMBER 30, 2009, AT A SCALE OF 1"=30'.
 - SOIL CONCENTRATION IS BASED UPON THE HIGHEST DETECTION FROM THE BORING WITHIN THE VADOSE ZONE (0-10 FT BGS).

Depth	Result
6.0'	<0.05
10.0'	<0.05

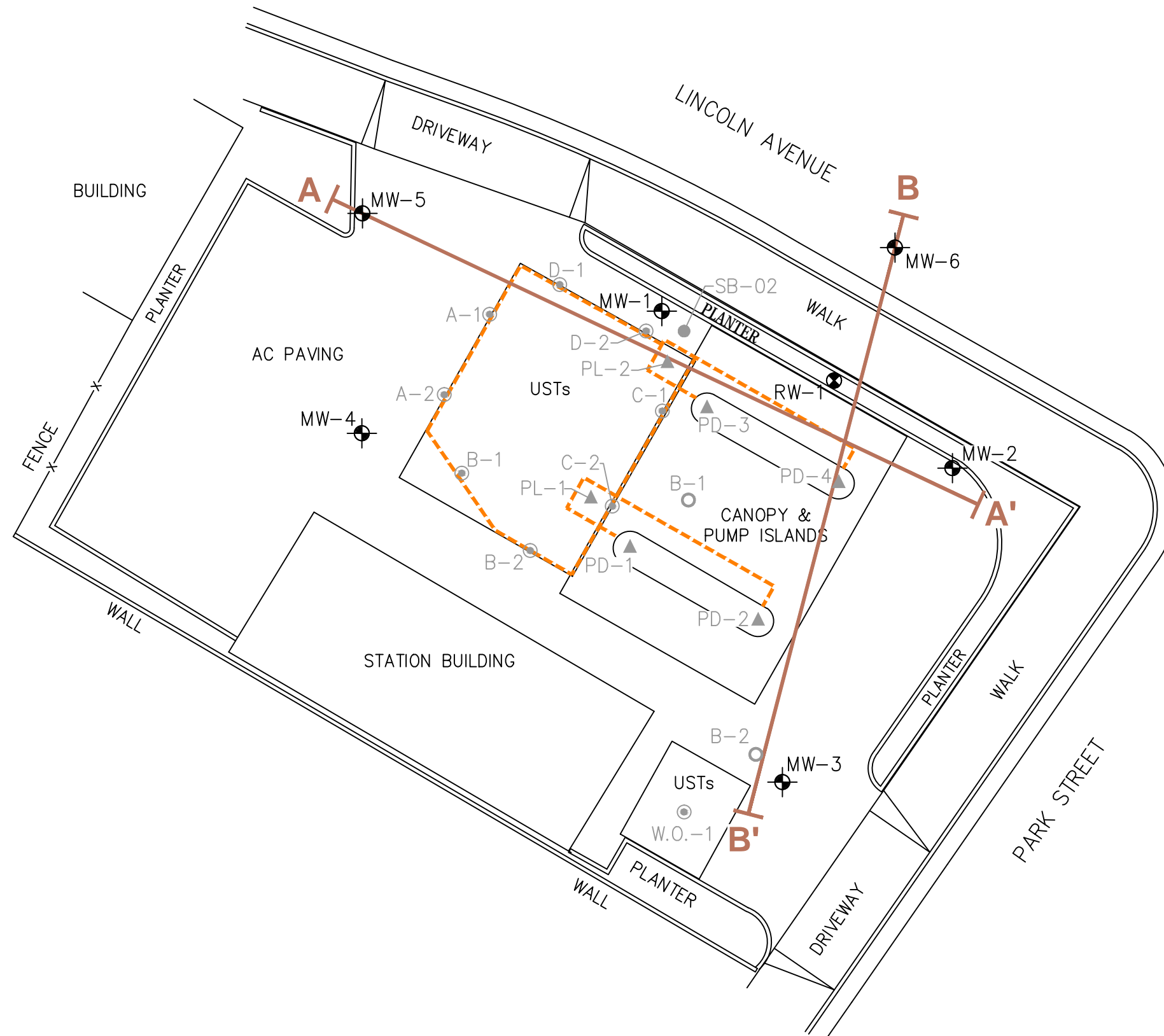
Depth	Result
5.0'	<0.05
10.0'	<0.05

Depth	Result
5.0'	<0.05
10.0'	<0.05

Depth	Result
5.0'	<0.001
6.5'	<0.001
8.0'	<0.001
9.5'	<0.001

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD: ... PIC: ... PM: L.A. SMITH TM: C. MEYER L.Y: (OP)ON-OFF=REF
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XREFS: IMAGES: GP09BPNA\001-X01 PROJECTNAME: ...



LEGEND

- MONITORING WELL
- RECOVERY WELL
- SOIL BORING BY KAPREALIAN ENGINEERING, INC.; 1987
- SOIL SAMPLE LOCATION BY SECOR; 1999
- SOIL BORING BY BROADBENT & ASSOCIATES, INC.; 2009
- SOIL BORING LOCATION BY ARCADIS; 2010
- HISTORICAL EXCAVATION LIMIT
- CROSS SECTION LOCATION



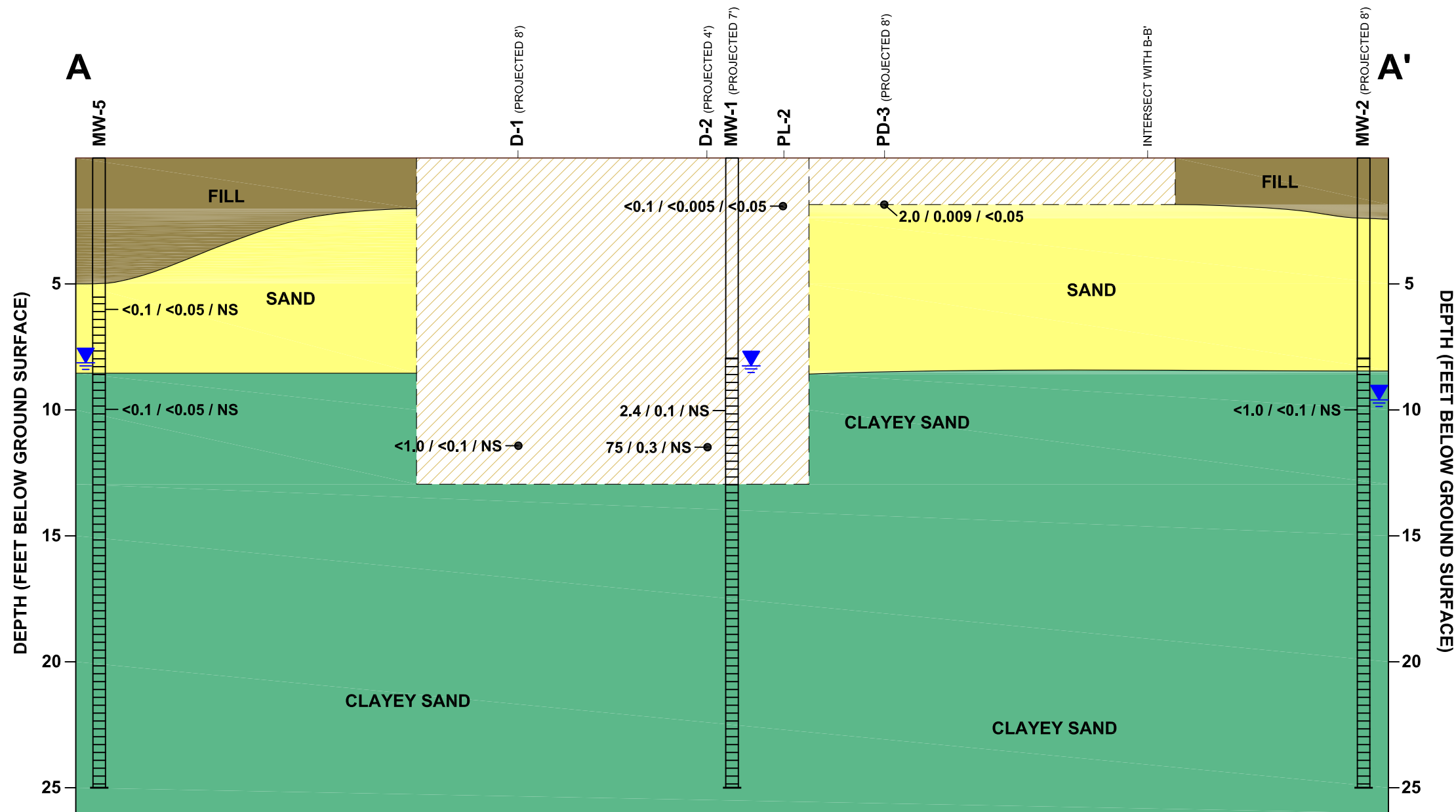
FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

**SITE PLAN WITH
 CROSS SECTION LOCATIONS**



FIGURE
5

NOTE:
 BASEMAP PROVIDED BY BROADBENT & ASSOCIATES, INC., PROJECT
 REFERENCE NO. 06-88-658, DATED SEPTEMBER 30, 2009, AT A
 SCALE OF 1"=30'.



LEGEND

TPHg / BENZENE / MTBE LABORATORY ANALYZED SOIL SAMPLE IN MILLIGRAMS PER KILOGRAM (mg/kg)

83 / 0.044 / 65 ENVIRONMENTAL SCREENING LEVEL (mg/kg) FOR TPHg/BENZENE/MTBE

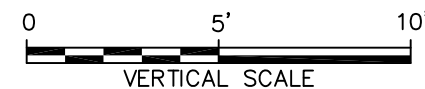
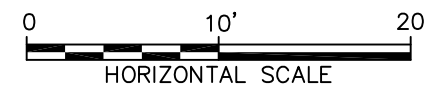
WATER LEVEL DURING JULY 2010

WELL SCREEN

TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

MTBE METHYL TERTIARY BUTYL ETHER

- FILL
- SAND
- CLAYEY SAND
- HISTORICAL EXCAVATION LIMITS

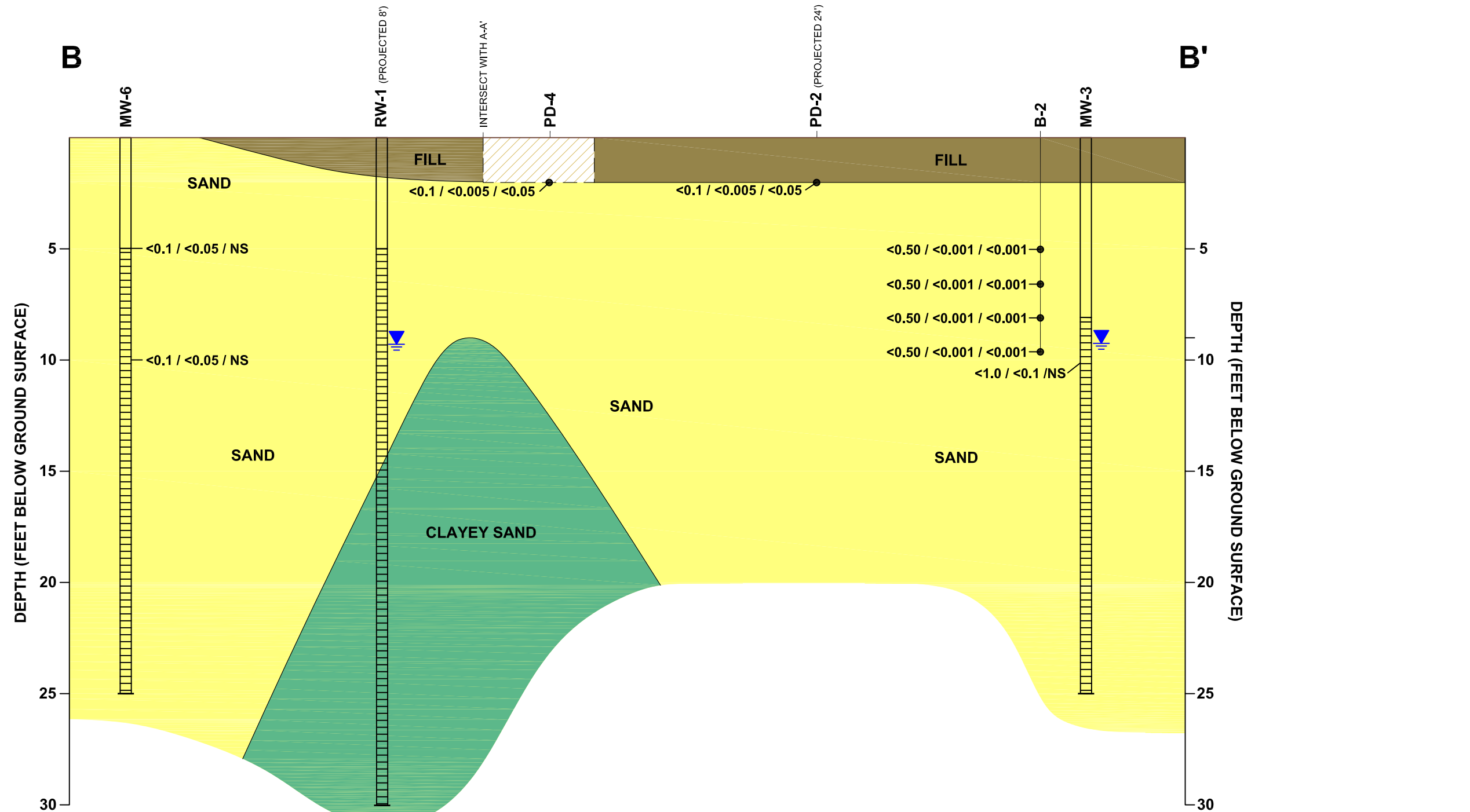


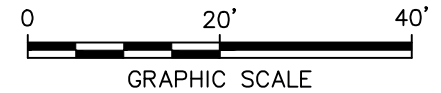
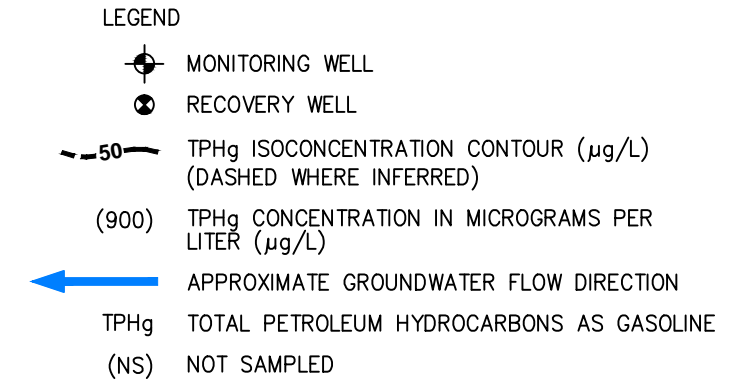
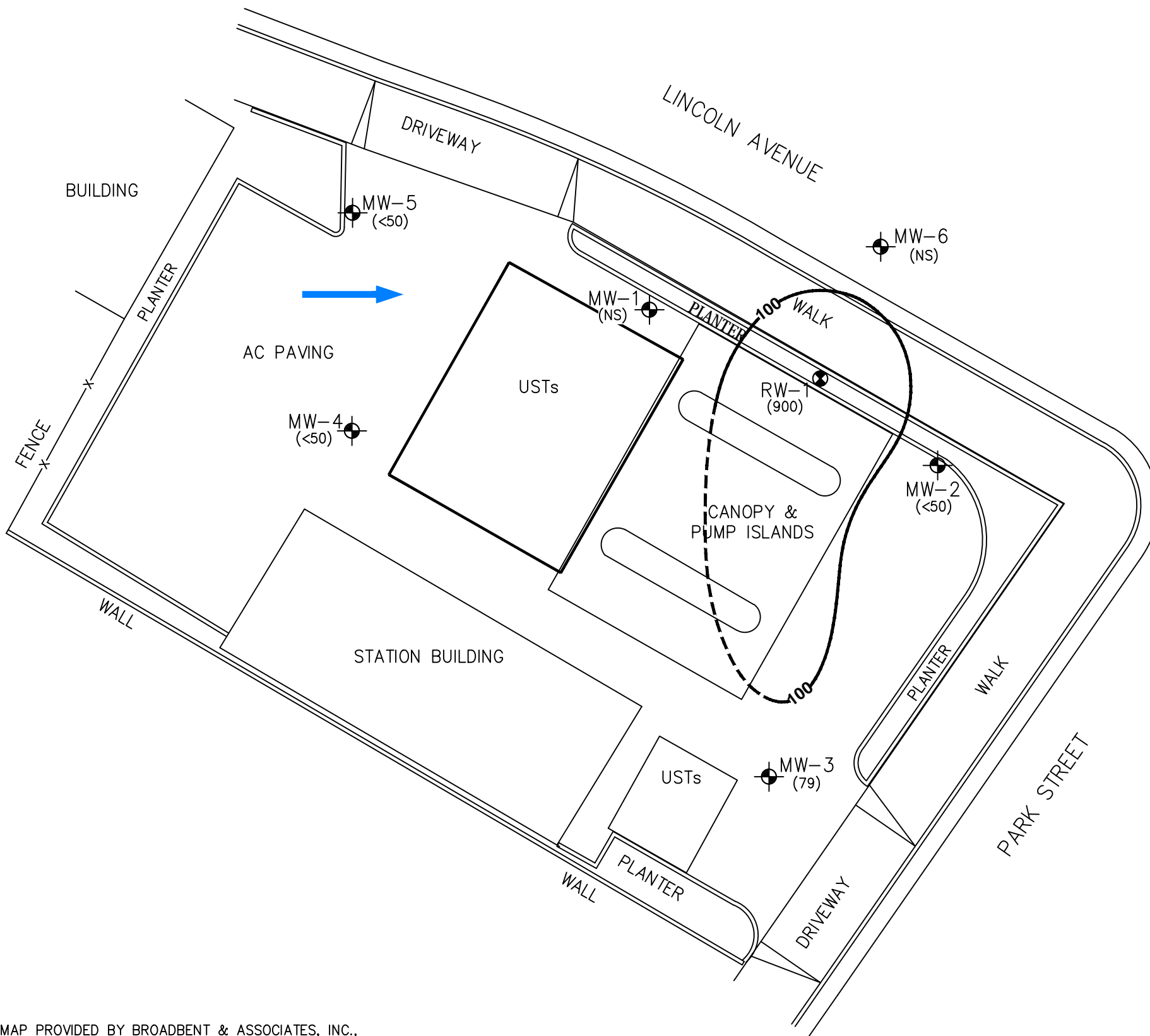
FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

**VERTICAL EXTENT OF TPHg, BENZENE, AND MTBE SOIL IMPACTS
 GEOLOGIC CROSS SECTION A-A'**

ARCADIS

FIGURE **6**

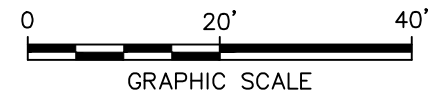
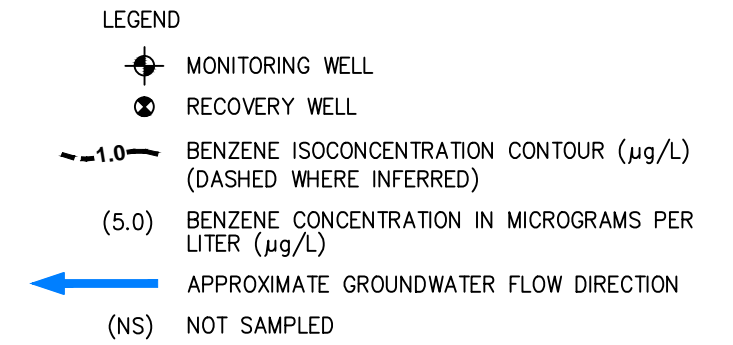
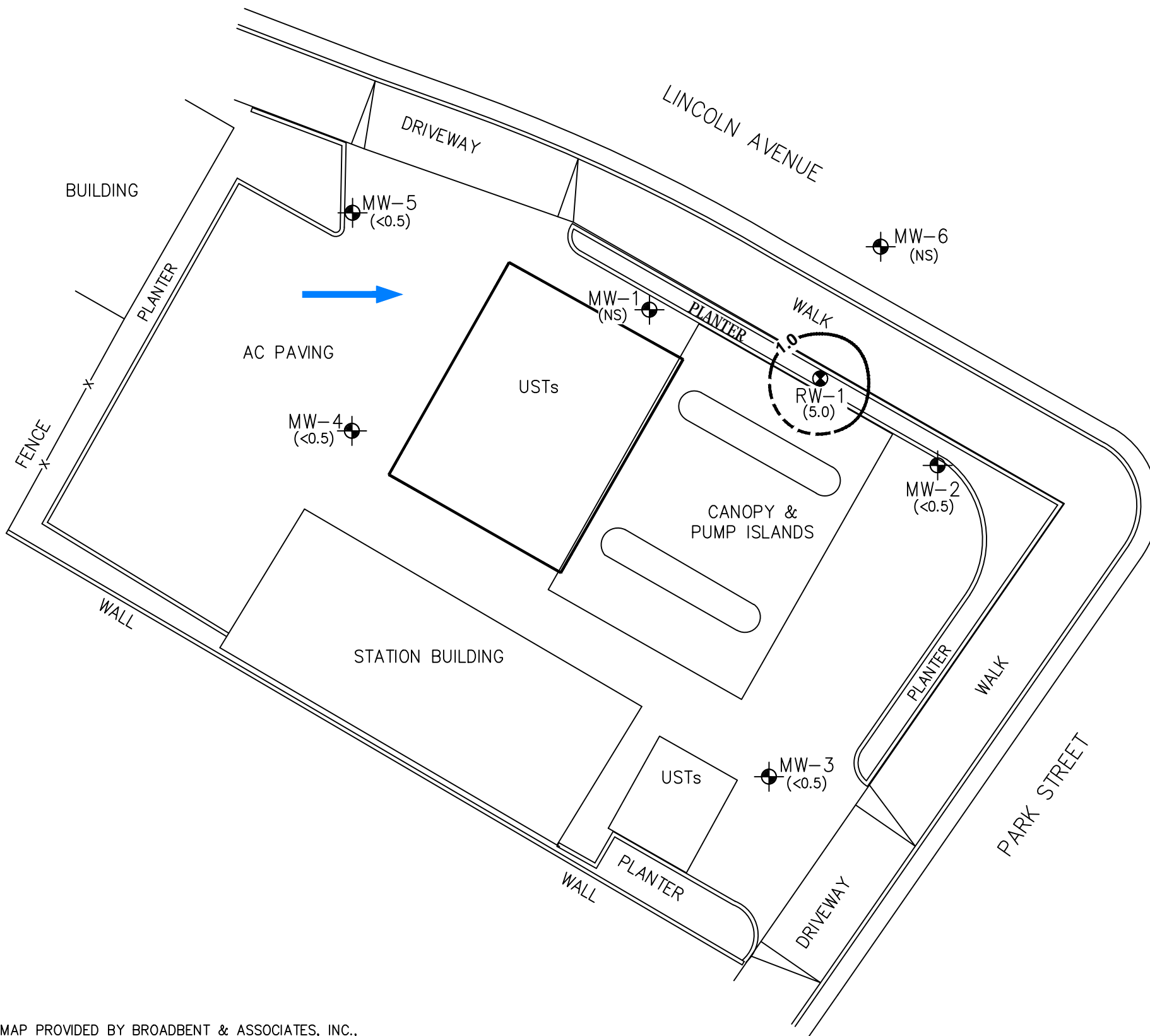




NOTES:

1. BASEMAP PROVIDED BY BROADBENT & ASSOCIATES, INC. PROJECT REFERENCE NO. 06-88-658, DATED SEPTEMBER 30, 2009, AT A SCALE OF 1"=30'.
2. CONCENTRATION IS BASED UPON THE HIGHEST DETECTION FROM THE BORING IN THE SPECIFIED INTERVAL.

FORMER BP SERVICE STATION #11266 1541 PARK STREET ALAMEDA, CALIFORNIA BP SITE 11266 CLOSURE	
EXTENT OF TPHg GROUNDWATER IMPACTS JULY 2010	
	FIGURE 8



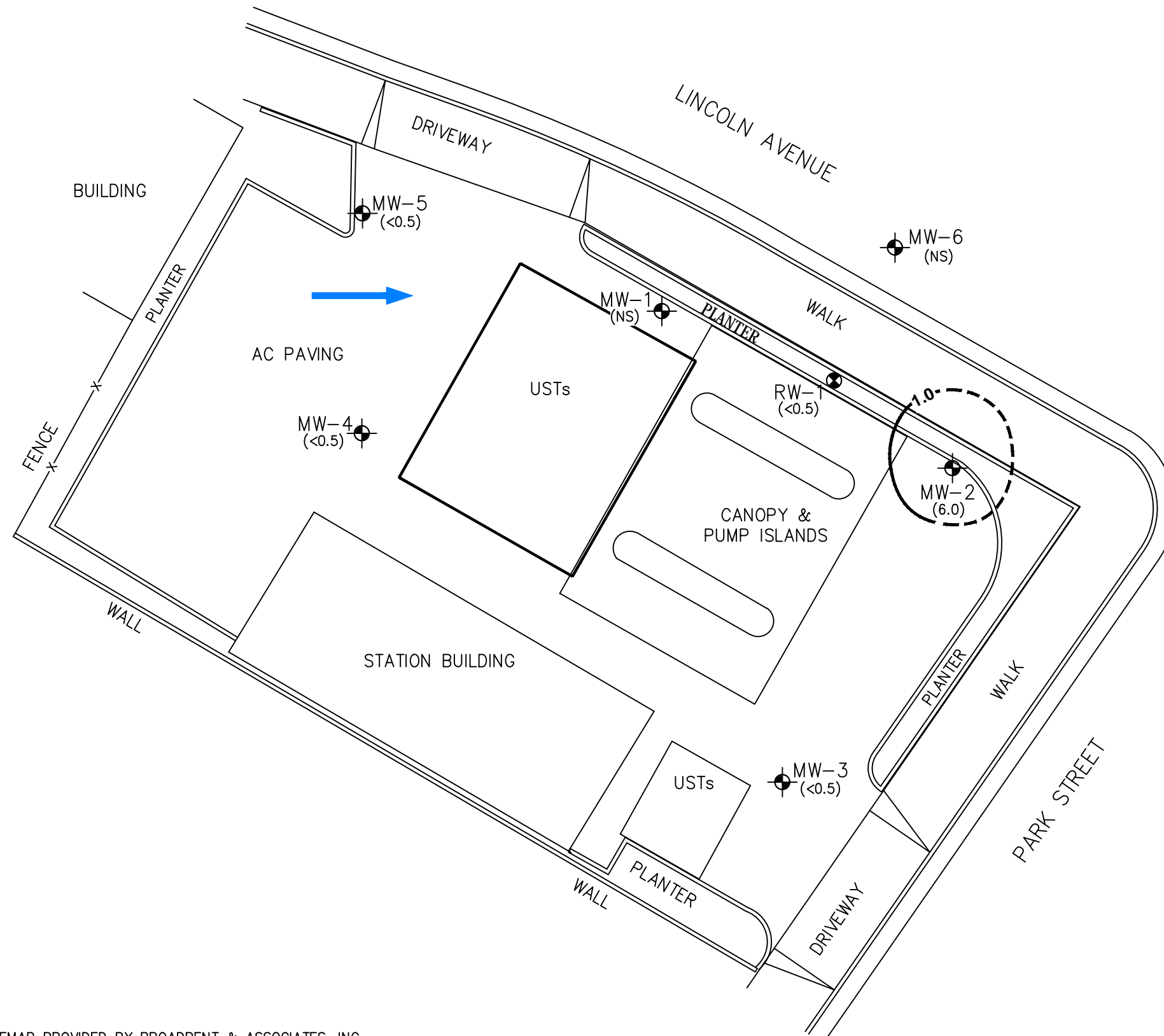
NOTES:

1. BASEMAP PROVIDED BY BROADBENT & ASSOCIATES, INC. PROJECT REFERENCE NO. 06-88-658, DATED SEPTEMBER 30, 2009, AT A SCALE OF 1"=30'.
2. CONCENTRATION IS BASED UPON THE HIGHEST DETECTION FROM THE BORING IN THE SPECIFIED INTERVAL.

FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

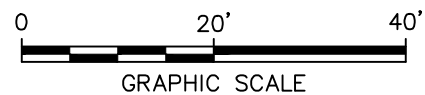
**EXTENT OF BENZENE
 GROUNDWATER IMPACTS
 JULY 2010**





LEGEND

- MONITORING WELL
- RECOVERY WELL
- MTBE ISOCONCENTRATION CONTOUR ($\mu\text{g/L}$) (DASHED WHERE INFERRED)
- (6.0) MTBE CONCENTRATION IN MICROGRAMS PER LITER ($\mu\text{g/L}$)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- MTBE METHYL TERTIARY BUTYL ETHER
- (NS) NOT SAMPLED



- NOTES:**
- BASEMAP PROVIDED BY BROADBENT & ASSOCIATES, INC. PROJECT REFERENCE NO. 06-88-658, DATED SEPTEMBER 30, 2009, AT A SCALE OF 1"=30'.
 - CONCENTRATION IS BASED UPON THE HIGHEST DETECTION FROM THE BORING IN THE SPECIFIED INTERVAL.

FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

**EXTENT OF MTBE
 GROUNDWATER IMPACTS
 JULY 2010**

ARCADIS

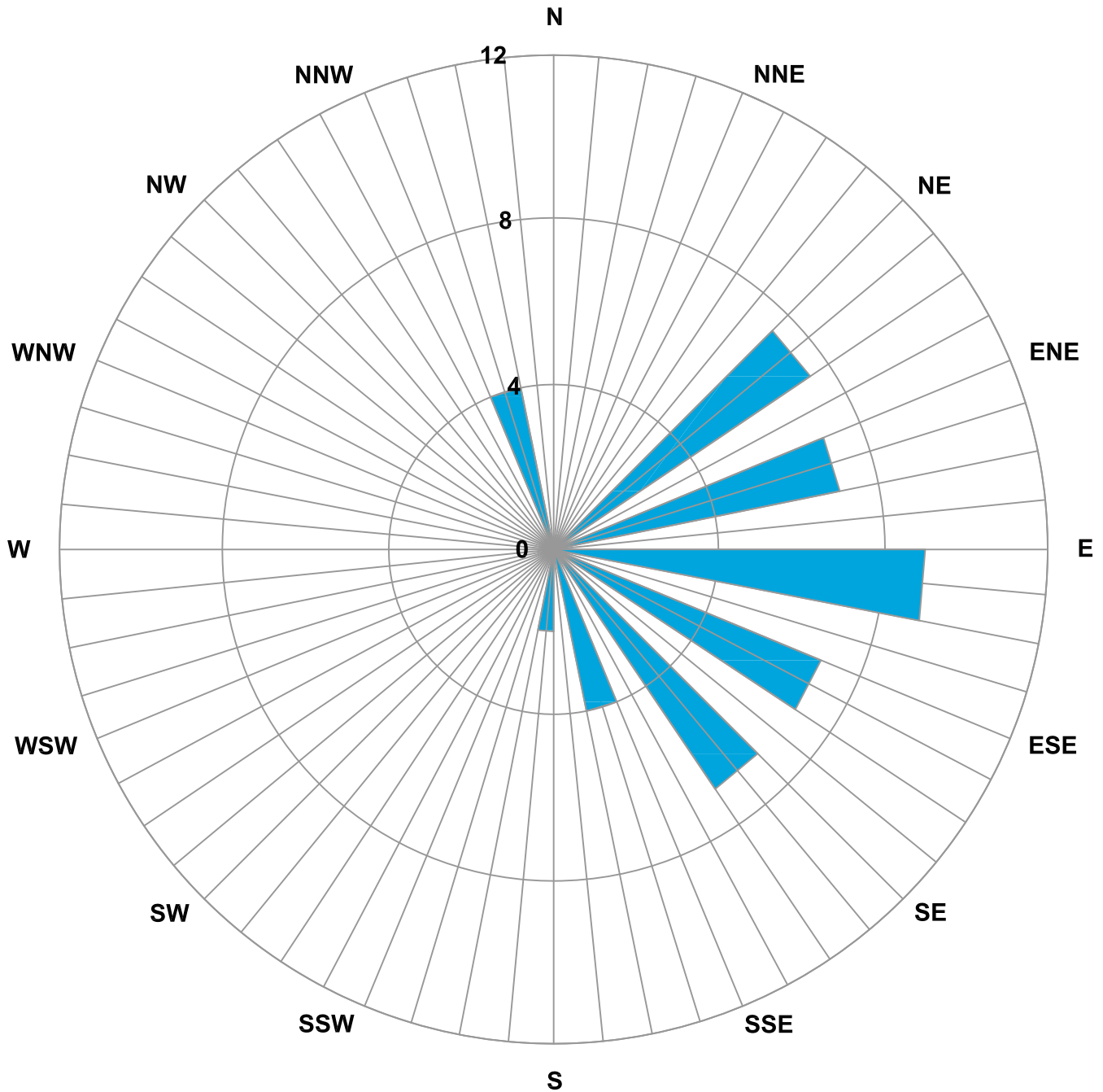
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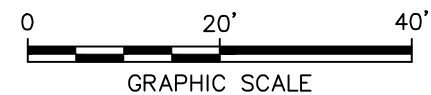
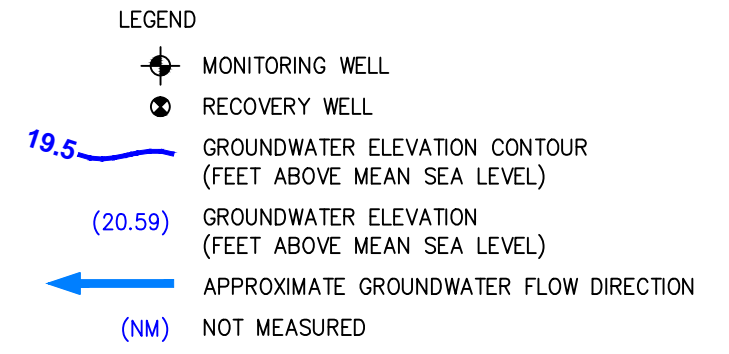
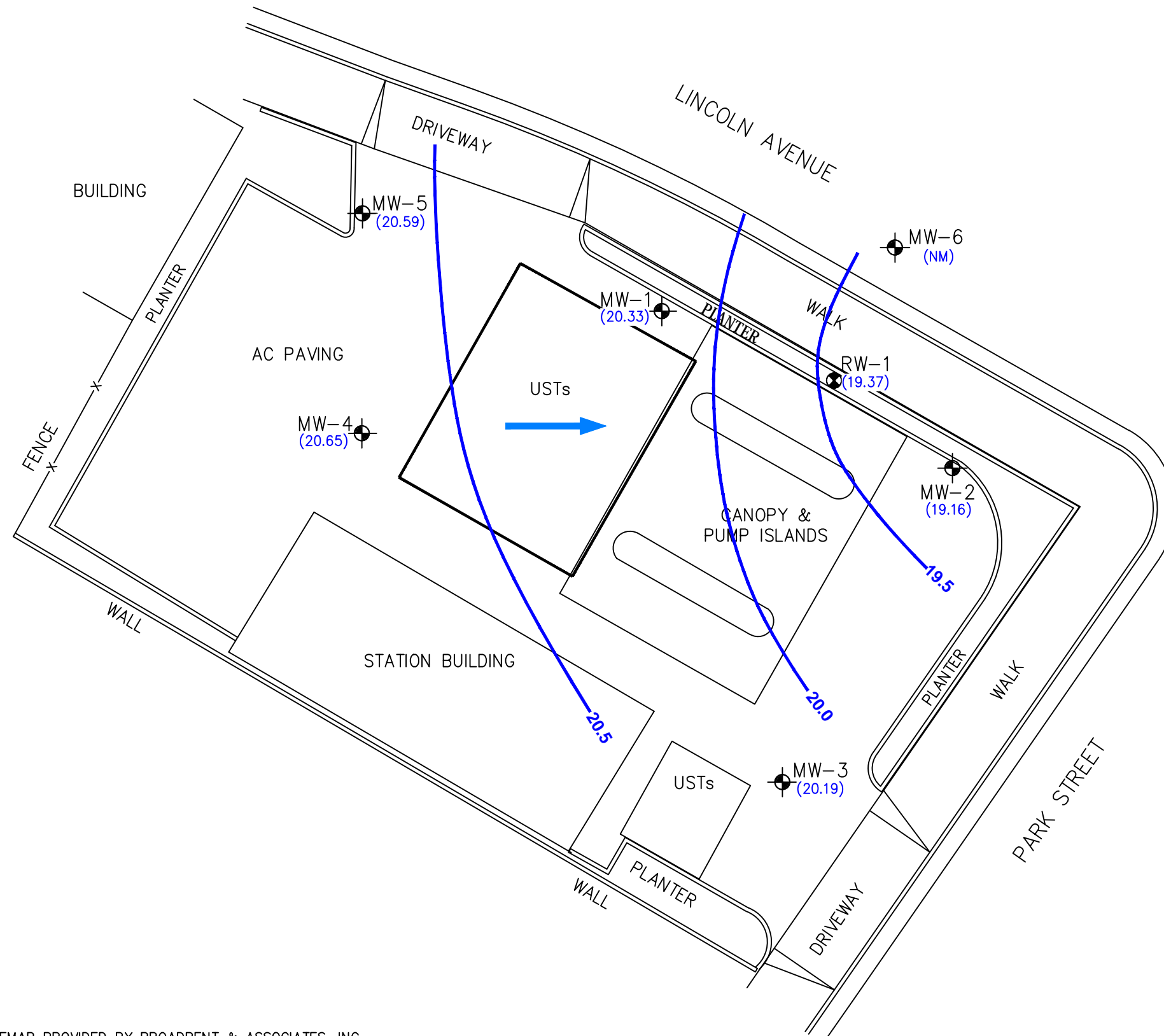
LEGEND

CONCENTRIC CIRCLES REPRESENT 40 MONITORING EVENTS CONDUCTED BETWEEN OCTOBER 1988 THROUGH JULY 2010.

 GROUNDWATER FLOW DIRECTION



FORMER BP SERVICE STATION #11266 1541 PARK STREET ALAMEDA, CALIFORNIA BP SITE 11266 CLOSURE	
HISTORIC GROUNDWATER FLOW DIRECTION ROSE DIAGRAM	
	FIGURE 11



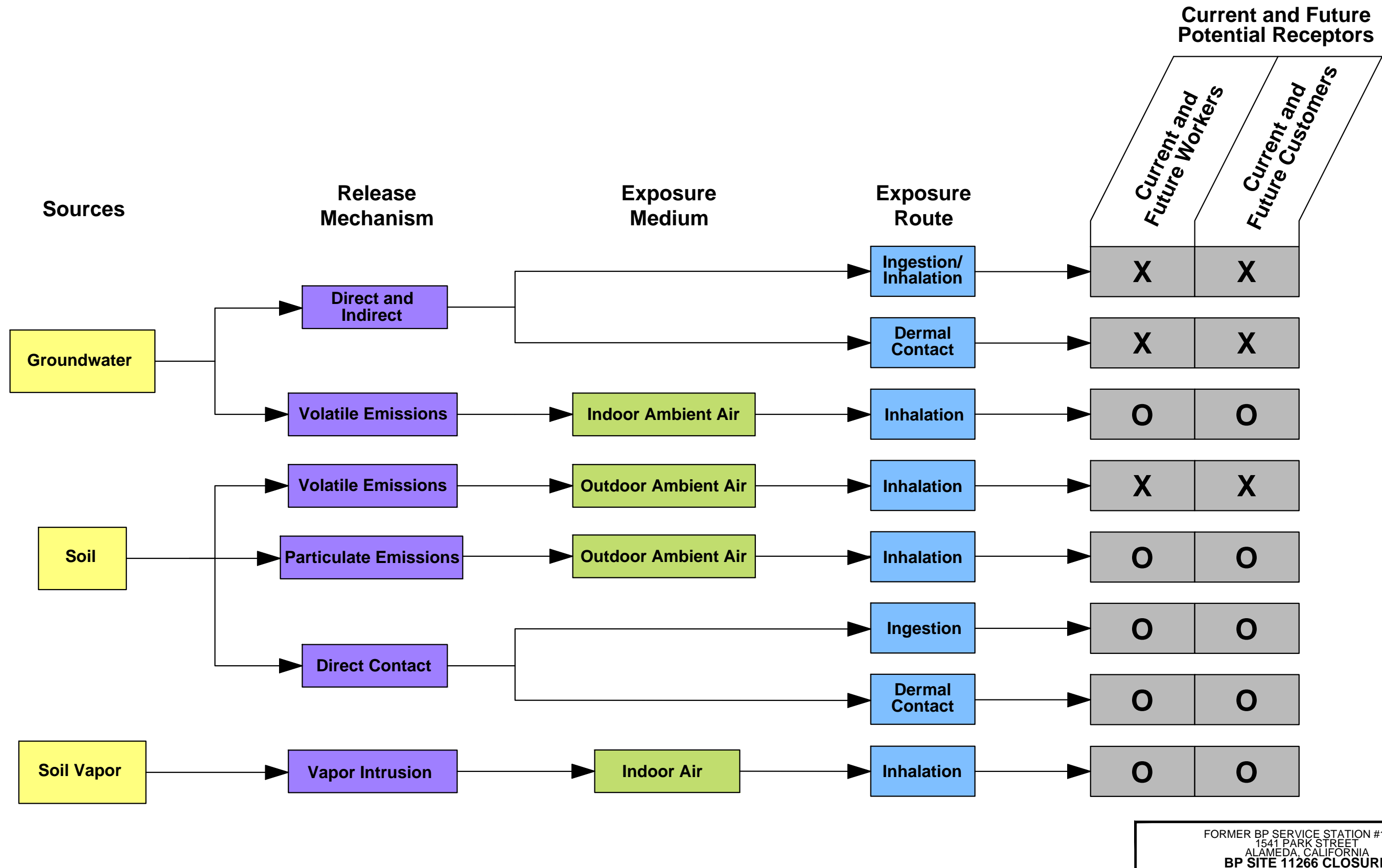
- NOTES:**
- BASEMAP PROVIDED BY BROADBENT & ASSOCIATES, INC. PROJECT REFERENCE NO. 06-88-658, DATED SEPTEMBER 30, 2009, AT A SCALE OF 1"=30'.
 - CONCENTRATION IS BASED UPON THE HIGHEST DETECTION FROM THE BORING IN THE SPECIFIED INTERVAL.

FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

**POTENTIOMETRIC SURFACE CONTOURS
 JULY 2010**

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FIGURE
12



EXPLANATION

- X INCOMPLETE PATHWAY
- O COMPLETE PATHWAY

FORMER BP SERVICE STATION #11266
 1541 PARK STREET
 ALAMEDA, CALIFORNIA
BP SITE 11266 CLOSURE

**POTENTIAL EXPOSURE PATH
 FLOW CHART**

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FIGURE
13

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Appendix A

Monitoring Well Construction Details
and Soil Boring Logs

Well Construction Details
Former BP Service Station 11266
1541 Park Street
Alameda, California

Soil Boring or Well ID	Installation Date	Boring Depth (feet bgs)	Well Diameter (inches)	Screen Top (feet bgs)	Well Bottom (feet bgs)	Screen Length (feet)	TOC Elevation (msl)	Latitude	Longitude
Groundwater Monitoring Wells									
MW-1	2/9/1988	25.0	2	8.0	25.0	17.0		37.7666142	-122.2412812
MW-2	2/9/1988	25.0	2	8.0	25.0	17.0		37.7665461	-122.2411115
MW-3	2/9/1988	25.0	2	8.0	25.0	17.0		37.7664036	-122.2412079
MW-4	3/22/1989	25.0	2	5.0	25.0	20.0		37.7665568	-122.2414497
MW-5	3/22/1989	25.0	2	5.0	25.0	20.0		37.7666556	-122.2414517
MW-6	3/22/1989	25.0	2	5.0	25.0	20.0		37.7666447	-122.2411498
RW-1	4/13/1992	30.0	6	5.0	30.0	25.0		37.7665845	-122.2411828

Explanation:

bgs = below ground surface
msl = mean sea level
NA = not available
SVE = soil vapor extraction
TOC = top of casing
-- = not applicable

Exploratory Boring Log

Project No. KEI-P87-097A	Boring & Casing Diameter 8 in. 2 in csg.	Logged By JS
Project Name Mobil #10-EYD	Casing Elevation	Date Drilled 2-9-88
Boring No. MW-1	Hollow-stem Flight Auger	Depth to Groundwater 10.5 ft.

Penetration blows/ft	G. W. level	Depth (ft) Samples	Litho- graphy USCS	Description
		0	SP	ASPHALT & BASEROCK FILL
		5	SW	SAND: fine grained, very well sorted, little to no fines, dry
31	▼	10	SC	clayey sand at 8', low plasticity moderate odor in sample, dark greenish grey 5GY 4/1
		15		
		20		

Exploratory Boring Log

Project No. KEI-P87-097A	Boring & Casing Diameter	Logged By
Project Name Mobil #10-EYD	Casing Elevation	Date Drilled 2-9-88
Boring No. MW-1	Hollow-stem Flight Auger	Depth to Groundwater

Penetration blows/ft	G. W. level	Depth (ft) Samples	Litho- graphy USCS	Description
		20		SAND: as above
		25		TOTAL DEPTH 25 FEET
		30		
		35		
		40		

WELL DETAILS

PROJECT NAME: Mobil S/S #10-EYD 1541 Park Ave.
Alameda, CA

BORING/WELL NO. MW-1

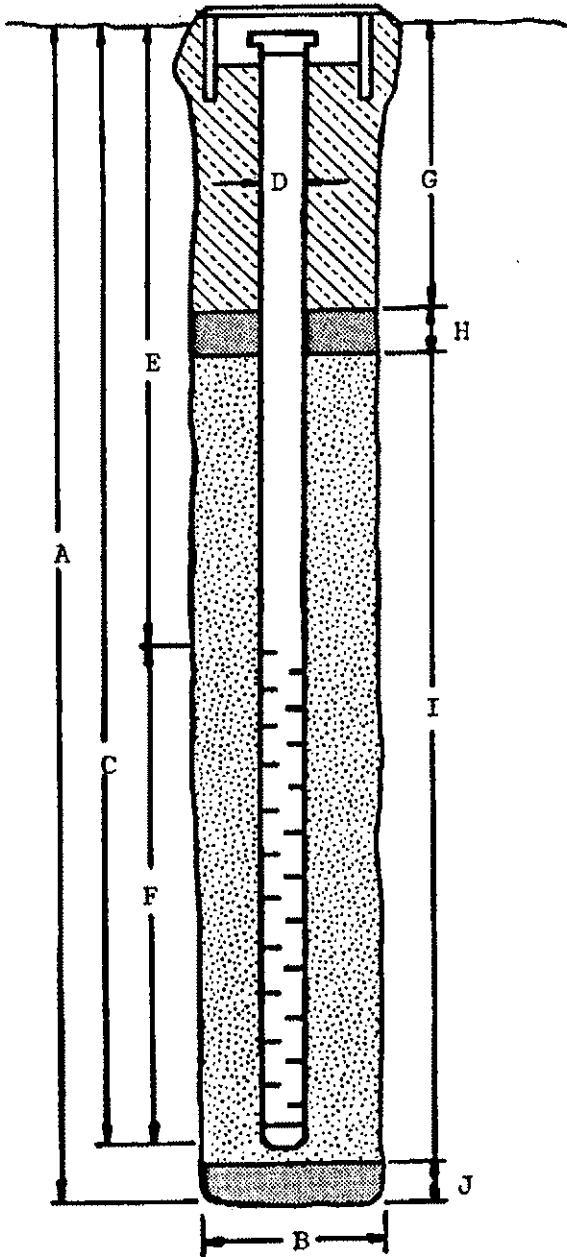
PROJECT NUMBER: KEI-P87-097A

CASING ELEVATION: _____

WELL PERMIT NO.: 88010

SURFACE ELEVATION: _____

G-5 Vault Box



- A. Total Depth: 25'
- B. Boring Diameter: 8"
 Drilling method: Hollow stem
- C. Casing Length: 25'
 Material: Schedule 40 PVC
- D. Casing Diameter: 2 in.
- E. Depth to Perforations: 8 ft.
- F. Perforated Length: 17 ft.
 Perforated Interval: 25 to 8 ft.
 Perforation Type: slot
 Perforation Size: 0.02 in.
- G. Surface Seal: 6 to 0 ft.
 Seal Material: concrete
- H. Seal: 7 to 6 ft.
 Seal Material: bentonite
- I. Gravel Pack: 25 to 7 ft.
 Pack Material: Monterey sand
 Size: No. 3
- J. Bottom Seal: none
 Seal Material: _____

Exploratory Boring Log

Project No. KEI-P87-097A	Boring & Casing Diameter 8 in. 2 in. csg.	Logged By JS
Project Name Mobil #10-EGY	Casing Elevation	Date Drilled 2-9-88
Boring No. MW-2	Hollow-stem Flight Auger	Depth to Groundwater 11 ft.

Penetration blows/ft	G. W. level	Depth (ft) Samples	Litho- graphy USCS	Description
		0	ASPHALT & BASEROCK FILL	
			SW	SAND: brown 10YR 4/3, fine grained, very well sorted, no fines, dry
		5		
39		10		poor sample recovery brown 10YR 5/7
		15		
		20		

Exploratory Boring Log

Project No. KEI-P87-097A		Boring & Casing Diameter		Logged By	
Project Name Mobil #10-EGY		Casing Elevation		Date Drilled 2-9-88	
Boring No. MW-2		Hollow-stem Flight Auger		Depth to Groundwater	
Penetration blows/ft	G. W. level	Depth (ft) Samples	Litho- graphy USCS	Description	
		20		SAND : as above	
		25			
		30		TOTAL DEPTH 25 FEET	
		35			
		40			

WELL DETAILS

PROJECT NAME: MOBIL S/S #10-EGY 1541 Park Ave
Alameda, CA

BORING/WELL NO. MW-2

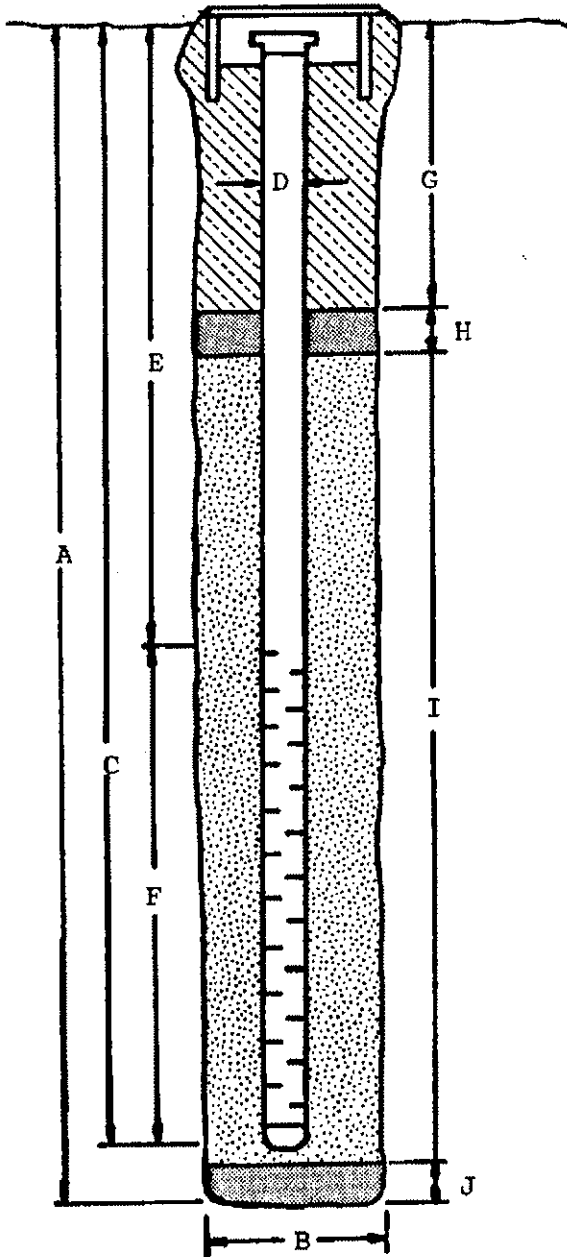
PROJECT NUMBER: KEI-P87-097A

CASING ELEVATION: _____

WELL PERMIT NO.: 88010

SURFACE ELEVATION: _____

G-5 Vault Box



- A. Total Depth: 25 ft.
- B. Boring Diameter: 8 in.
 Drilling method: Hollow stem
- C. Casing Length: 25 ft.
 Material: Schedule 40 PVC
- D. Casing Diameter: 2 in.
- E. Depth to Perforations: 8 ft.
- F. Perforated Length: 17 ft.
 Perforated Interval: 25 to 8 ft.
 Perforation Type: slot
 Perforation Size: 0.02 in.
- G. Surface Seal: 6 to 0 ft.
 Seal Material: concrete
- H. Seal: 7 to 6 ft.
 Seal Material: bentonite
- I. Gravel Pack: 25 to 7 ft.
 Pack Material: Monterey sand
 Size: No. 3
- J. Bottom Seal: none
 Seal Material: _____

Exploratory Boring Log

Project No. KEI-P87-097A	Boring & Casing Diameter 8 in. 2 in. csg.	Logged By JS
Project Name Mobil #10-EDG	Casing Elevation	Date Drilled 2-9-88
Boring No. MW-3	Hollow-stem Flight Auger	Depth to Groundwater 13.5

Penetration blows/ft	G. W. level	Depth (ft) Samples	Litho- graphy USCS	Description
		0		ASPHALT & BASEROCK FILL
			SW	SAND: dark reddish brown 5YR 3/3, fine grained, very well sorted, no fines, dry
45	▼	10		no odor
		15		
		20		

Exploratory Boring Log

Project No. KEI-P87-097A	Boring & Casing Diameter 8 in. 2 in. csg.	Logged By JS
Project Name Mobil #10-EGY	Casing Elevation	Date Drilled 2-9-88
Boring No. MW-3	Hollow-stem Flight Auger	Depth to Groundwater

Penetration blows/ft	G. W. level	Depth (ft) Samples	Litho- graphy USCS	Description
		20		SAND : as above
		25		TOTAL DEPTH 25 FEET
		30		
		35		
		40		

WELL DETAILS

PROJECT NAME: Mobil S/S #10-EGY

BORING/WELL NO. MW-

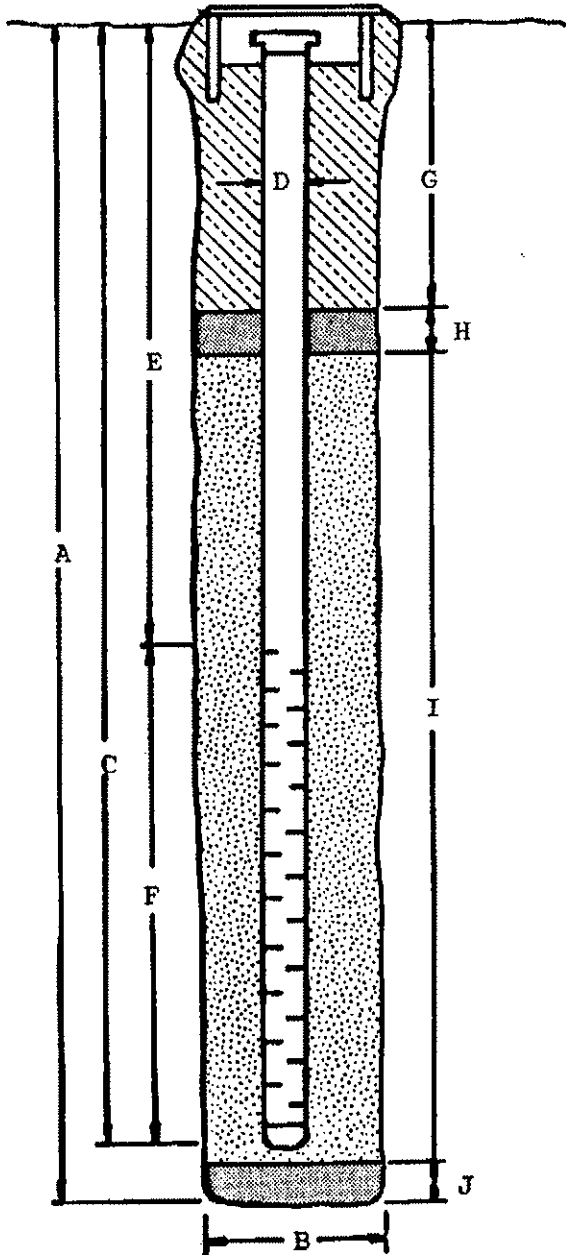
PROJECT NUMBER: KEI-P87-097A

CASING ELEVATION: _____

WELL PERMIT NO.: 88010

SURFACE ELEVATION: _____

G-5 Vault Box



- A. Total Depth: 25 feet
- B. Boring Diameter: 8 in.
Drilling method: Hollow stem
- C. Casing Length: 25 ft.
Material: Schedule 40 PVC
- D. Casing Diameter: 2 in.
- E. Depth to Perforations: 10 ft.
- F. Perforated Length: 15 ft.
Perforated Interval: 25 to 10 ft.
Perforation Type: slot
Perforation Size: 0.02 in.
- G: Surface Seal: 7 to 0 ft.
Seal Material: concrete
- H. Seal: 8 to 7 ft.
Seal Material: bentonite
- I. Gravel Pack: 25 to 8 ft.
Pack Material: Monterey sand
Size: No. 3
- J. Bottom Seal: none
Seal Material: _____

Key To Boring Logs

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
		GRAVEL WITH FINES	GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
			GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
		SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW
	SP			Poorly graded sands or gravelly sands, little or no fines.
	SANDS WITH FINES		SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
	FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50%		ML
CL				Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
OL				Organic silts and organic silty clays of low plasticity.
SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	
		CH	Inorganic clays of high plasticity, fat clays.	
		DH	Organic clays of medium to high plasticity, organic silts.	
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

DEFINITION OF TERMS

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS			COBBLES	BOULDERS
200	40	10	4	3/4"	3"	12"		
SILTS AND CLAYS	SAND			GRAVEL				
	FINE	MEDIUM	COARSE	FINE	COARSE			

GRAIN SIZES

SANDS AND GRAVELS	BLOWS/FOOT [†]
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

SILTS AND CLAYS	STRENGTH [‡]	BLOWS/FOOT [†]
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

RELATIVE DENSITY

[†] Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).


[‡] Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

UNIFIED SOIL CLASSIFICATION SYSTEM

(ASTM D-2487)

Soil Color derived from the MUNSELL Soil Color Charts

B O R I N G L O G

Project No. KEI-P87-0907		Boring & Casing Diameter 9" 2"		Logged By Gary Johnson	
Project Name Mobil - Alameda		Well Head Elevation N/A		Date Drilled 3/22/89	
Boring No. MW-4		Drilling Method Hollow-stem Auger		Drilling Company EGI	
Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description	
3/3/3		0	SP	Medium to fine grained sand, brown, well sorted	
12/18/20		5			
12/18/20		10			
		15		As above to total depth	
		20			
		25			
		30			
TOTAL DEPTH 25'					

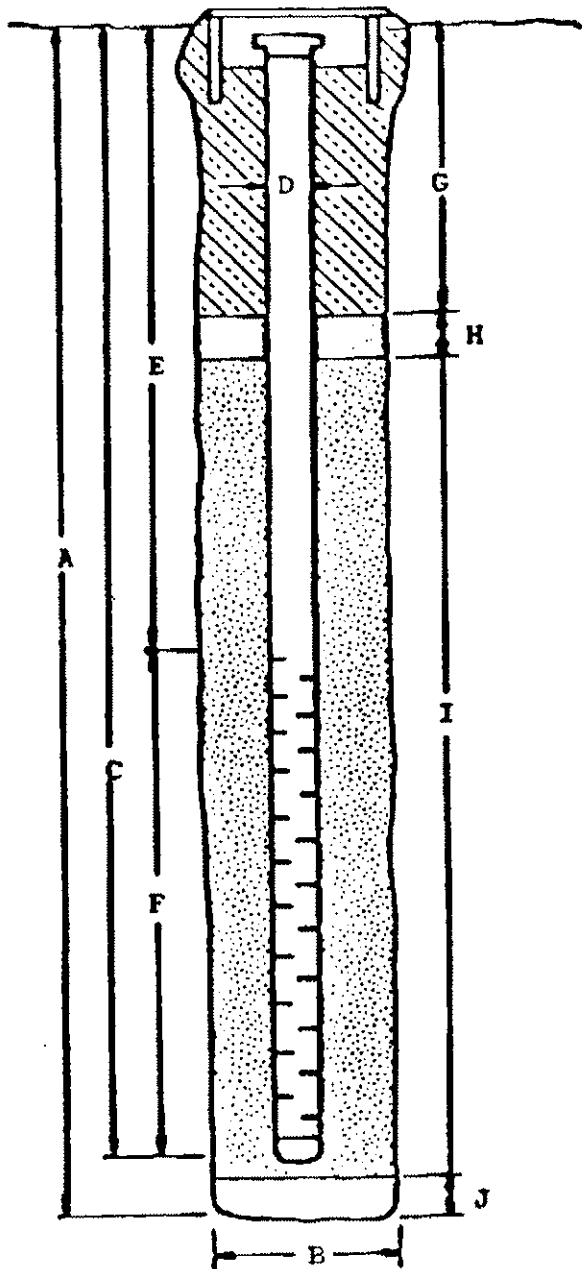
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Mobil - Alameda BORING/WELL NO. MW-4

PROJECT NUMBER: KEI-P87-0907

WELL PERMIT NO.: 89124

Flush-mounted Well Cover



A. Total Depth: 25'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 25'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 20'

Perforated Interval: 5'-25'
Machined

Perforation Type: Slot

Perforation Size: 0.020"

G. Surface Seal: 0'-3'

Seal Material: Concrete

H. Seal: 1'

Seal Material: Bentonite

I. Gravel Pack: 4'-25'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

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

B O R I N G L O G

Project No. KEI-P87-0907		Boring & Casing Diameter 9" 2"		Logged By Gary Johnson	
Project Name Mobil - Alameda		Well Head Elevation N/A		Date Drilled 3/22/89	
Boring No. MW-5		Drilling Method Hollow-stem Auger		Drilling Company EGI	
Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description	
6/10/12		0		0'-5' fill large chunks of concrete	
		5			
12/14/16	▼ =	10	SP	Medium to fine sand, brown, well sorted As above to total depth	
		15			
		20			
		25			
		30			
TOTAL DEPTH 25'					

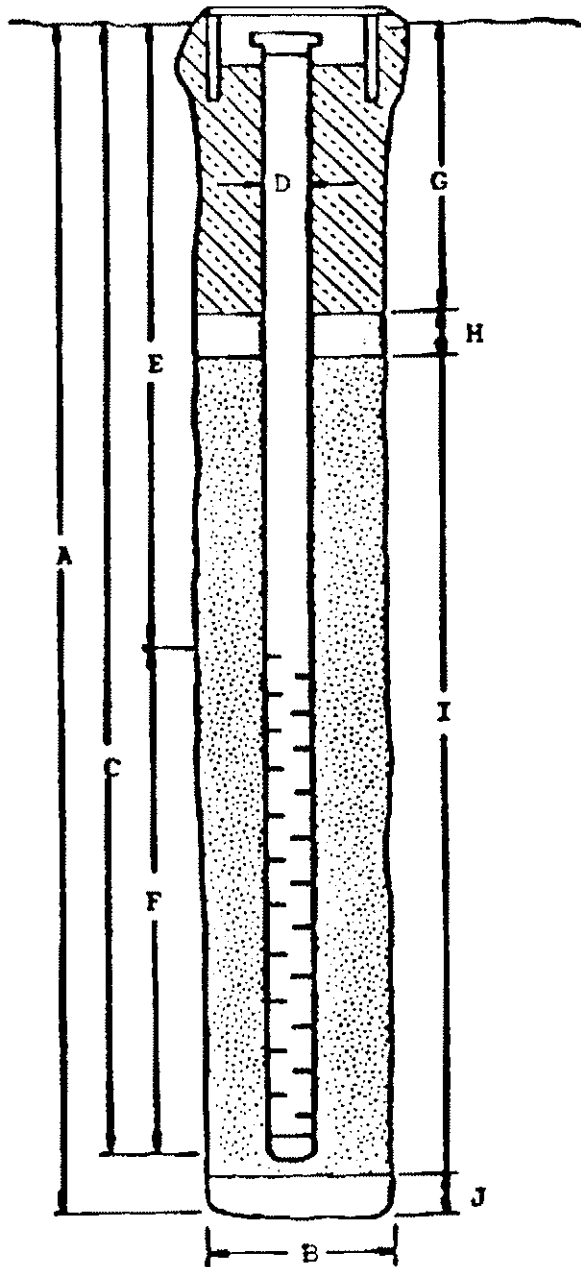
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Mobil - Alameda BORING/WELL NO. MW-5

PROJECT NUMBER: KEI-P87-0907

WELL PERMIT NO.: 89124

Flush-mounted Well Cover



A. Total Depth: 25'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem
Auger

C. Casing Length: 25'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 20'

Perforated Interval: 5'-25'
Machined

Perforation Type: Slot

Perforation Size: 0.020"

G. Surface Seal: 0'-3'

Seal Material: Concrete

H. Seal: 1'

Seal Material: Bentonite

I. Gravel Pack: 4'-25'

Pack Material: RMC Lonestar
Sand


Size: #3

J. Bottom Seal: None

Seal Material: N/A

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

B O R I N G L O G

Project No. KEI-P87-0907		Boring & Casing Diameter 9" 2"		Logged By Gary Johnson	
Project Name Mobil - Alameda		Well Head Elevation N/A		Date Drilled 3/22/89	
Boring No. MW-6		Drilling Method Hollow-stem Auger		Drilling Company EGI	
Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description	
4/6/7		0	SP	Fine to medium grained sand, brown, well sorted	
6/9/12		5			
6/9/12		10			
		15		As above to total depth	
		20			
		25			
		30			
TOTAL DEPTH 25'					

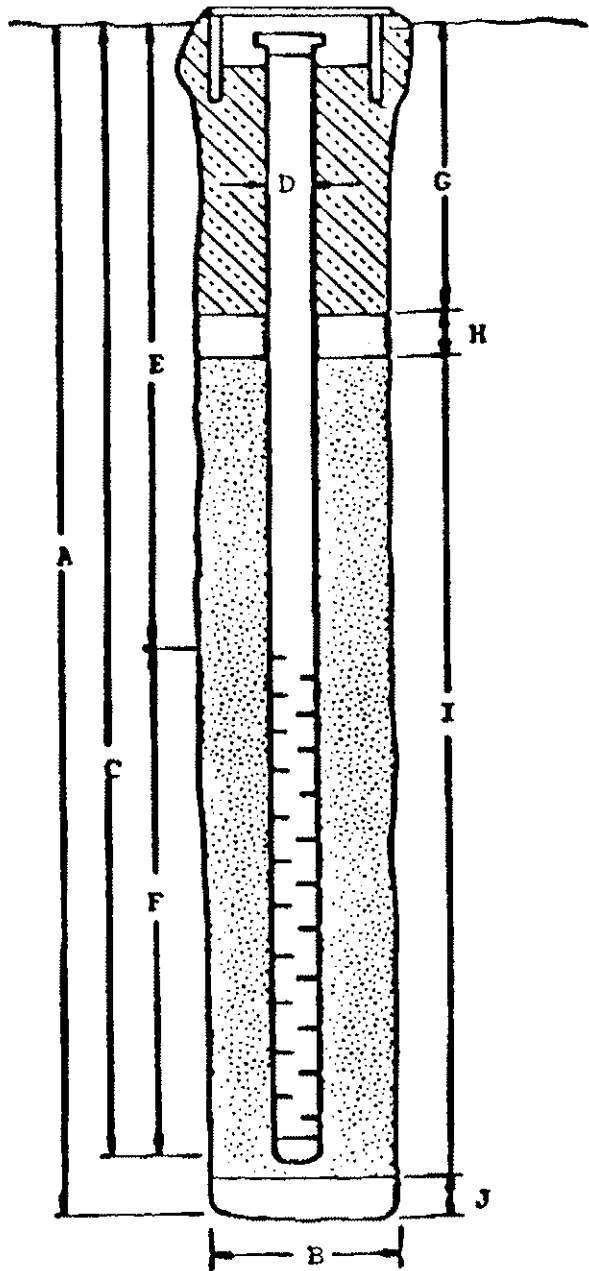
W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Mobil - Alameda BORING/WELL NO. MW-6

PROJECT NUMBER: KEI-P87-0907

WELL PERMIT NO.: EX-89-0032

Flush-mounted Well Cover



A. Total Depth: 25'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 25'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 20'

Perforated Interval: 5'-25'
Machined
Perforation Type: Slot

Perforation Size: 0.020"

G. Surface Seal: 0'-3'

Seal Material: Concrete

H. Seal: 1'

Seal Material: Bentonite

I. Gravel Pack: 4'-25'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

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



KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P. O. BOX 913

BENICIA, CA 94510

(415) 676-9100 (707) 746-6915

MAJOR DIVISIONS	SYMBOLS	TYPICAL SOIL DESCRIPTIONS
<u>GRAVELS</u> (More than ½ of coarse fraction > No. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
	GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
<u>SANDS</u> (More than ½ of coarse fraction < No. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
	SP	Poorly graded sands or gravelly sands, little or no fines
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
<u>SILTS & CLAYS</u> <u>LL < 50</u>	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
<u>SILTS & CLAYS</u> <u>LL > 50</u>	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS	Pt	Peat and other highly organic soils

CLASSIFICATION CHART
(Unified Soil Classification System)



KAPREALIAN ENGINEERING, INC.

Consulting Engineers

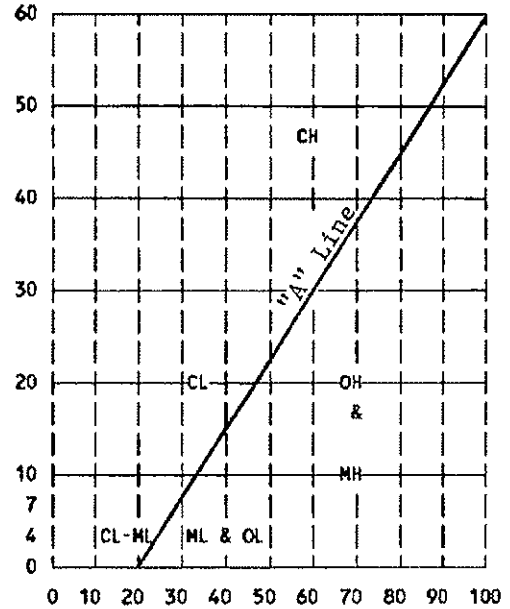
P. O. BOX 913

BENICIA, CA 94510

(415) 676-9100 (707) 746-6915

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
Coarse	3" to 3/4"	76.2 to 19.1
Fine	3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.074
Coarse	No. 4 to No. 10	4.76 to 2.00
Medium	No. 10 to No. 40	2.00 to 0.420
Fine	No. 40 to No. 200	0.420 to 0.074
SILT & CLAY	Below No. 200	Below 0.074

GRAIN SIZE CHART



LIQUID LIMIT PLASTICITY CHART

SANDS AND GRAVELS	BLOWS/FOOT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	BLOWS/FOOT*
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

CONSISTENCY

*Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon.

UNIFIED SOIL CLASSIFICATION SYSTEM

- Soil sample, not retained Soil sample, not recovered
 Soil sample, retained for analysis

METHOD OF SOIL CLASSIFICATION

ARCADIS

Appendix B

Groundwater Sampling Protocols

FIELD PROCEDURES FOR GROUNDWATER SAMPLING

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

Groundwater and Liquid-Phase Petroleum Hydrocarbon Depth Assessment

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

Subjective Analysis of Groundwater

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

Monitoring Well Sampling

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

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

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

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

Groundwater Sample Labeling and Preservation

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

Sample Identification and Chain-of-Custody Procedures

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

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

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

Equipment Cleaning

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

Appendix C

Concentration versus Time Graphs
for TPHg, Benzene and MTBE

CHART 1: MW-1 Concentration Trends

TPHg Benzene MTBE Water Elevation

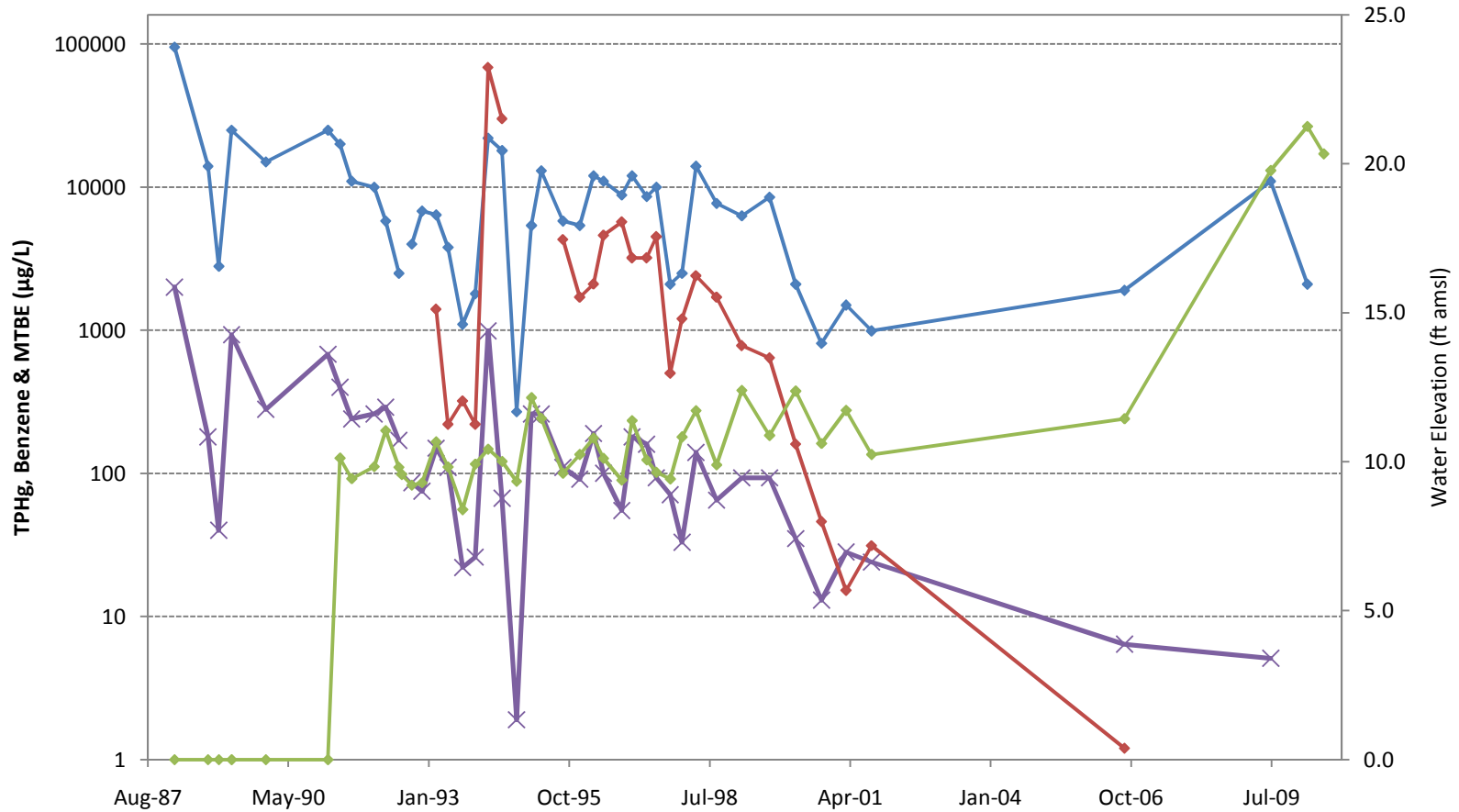


CHART 2: MW-2 Concentration Trends

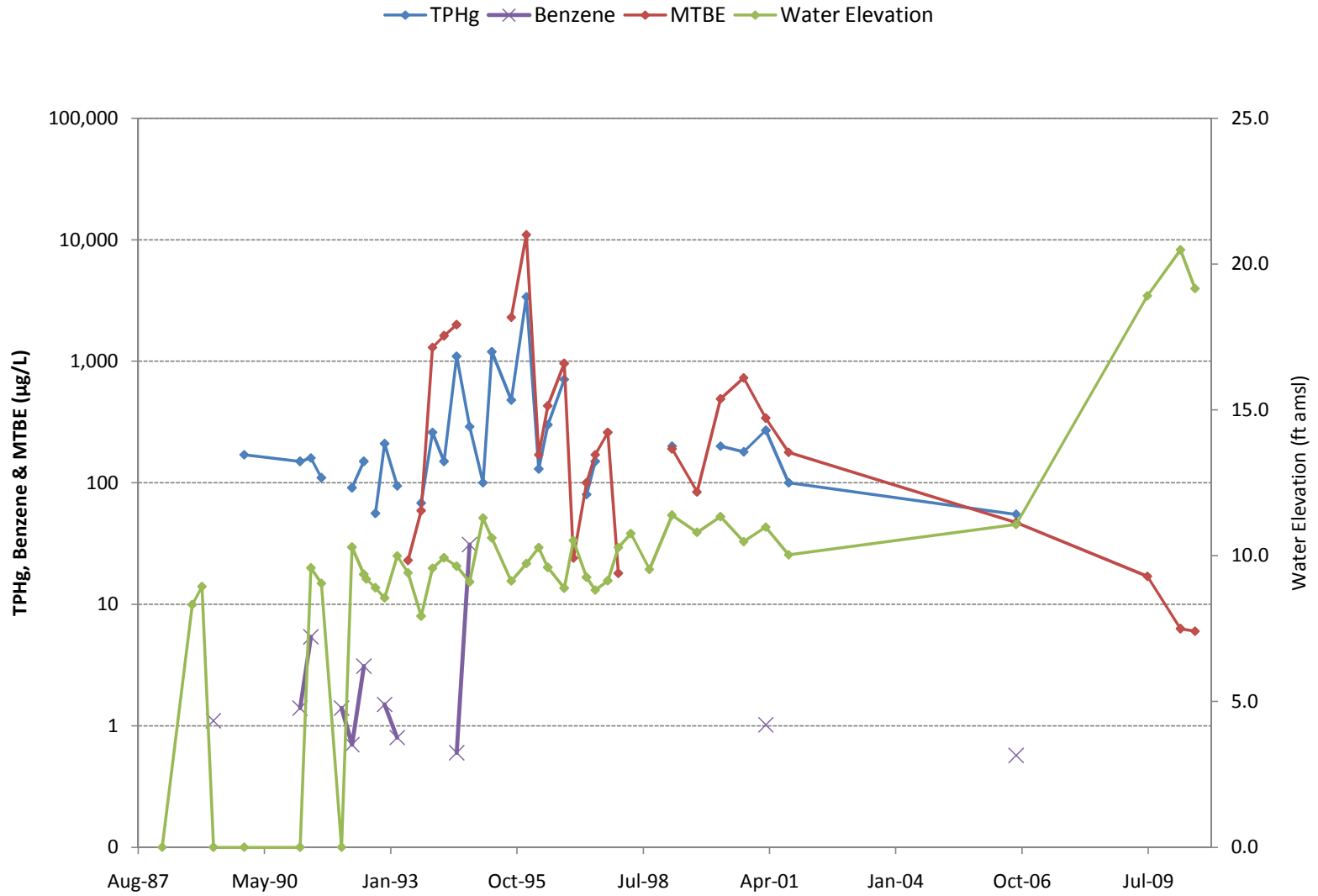


CHART 3: MW-3 Concentration Trends

—◆— TPHg —×— Benzene —◆— MTBE —◆— Water Elevation

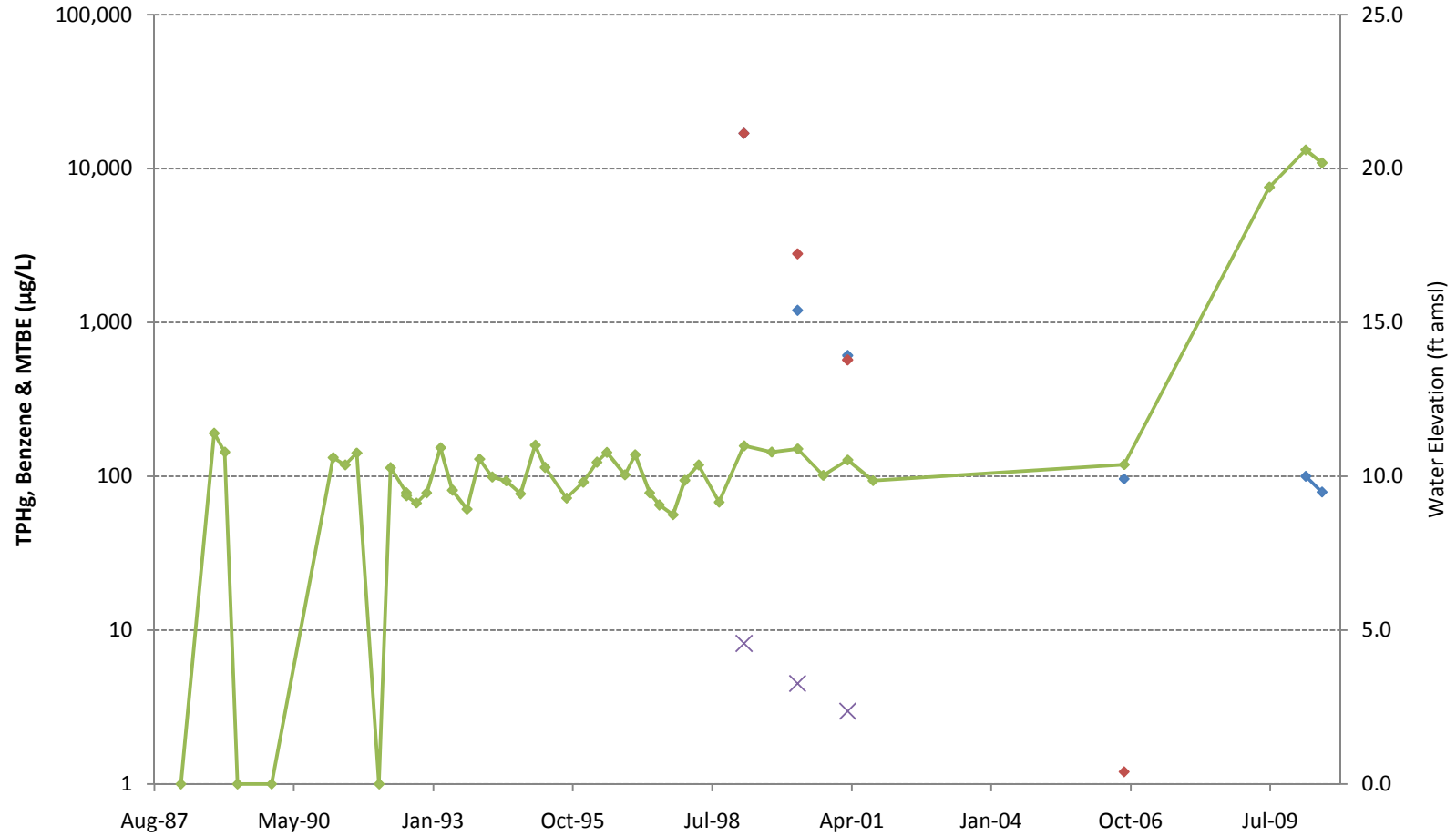


CHART 4: MW-4 Concentration Trends

—◆— TPHg —×— Benzene —◆— MTBE —◆— Water Elevation

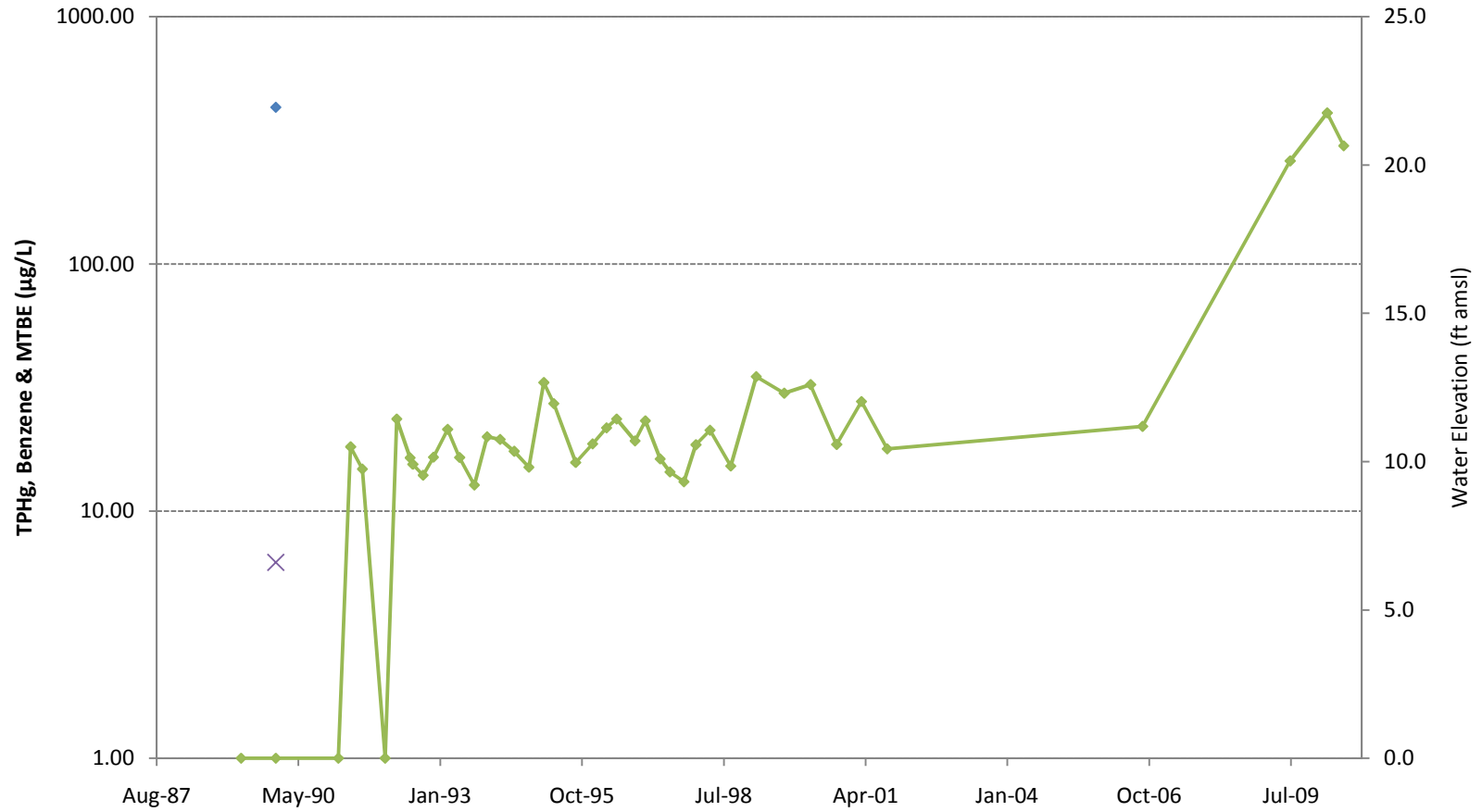


CHART 5: MW-5 Concentration Trends

TPHg Benzene MTBE Water Elevation



CHART 6: MW-6 Concentration Trends

TPHg MTBE Benzene Water Elevation

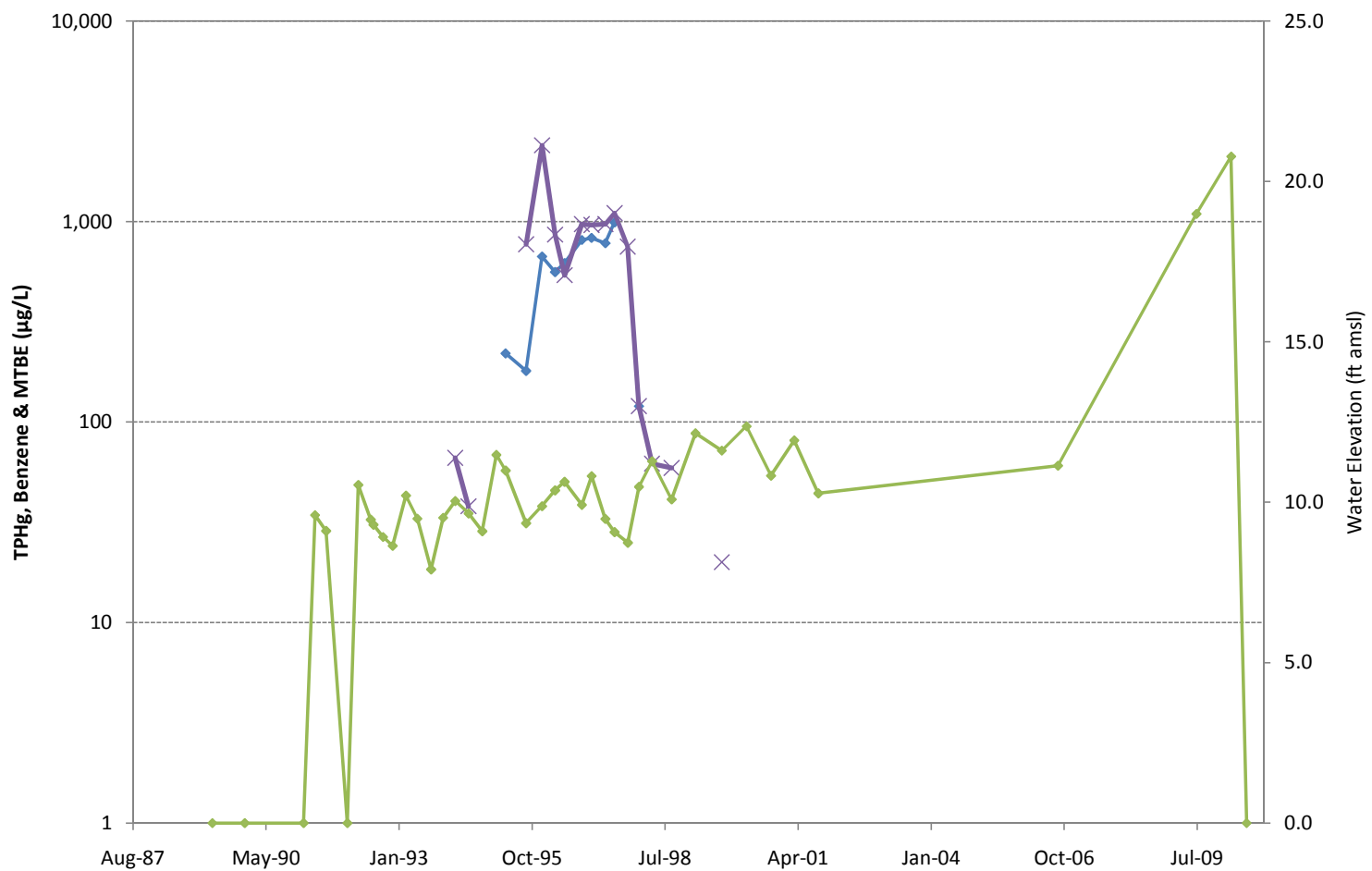
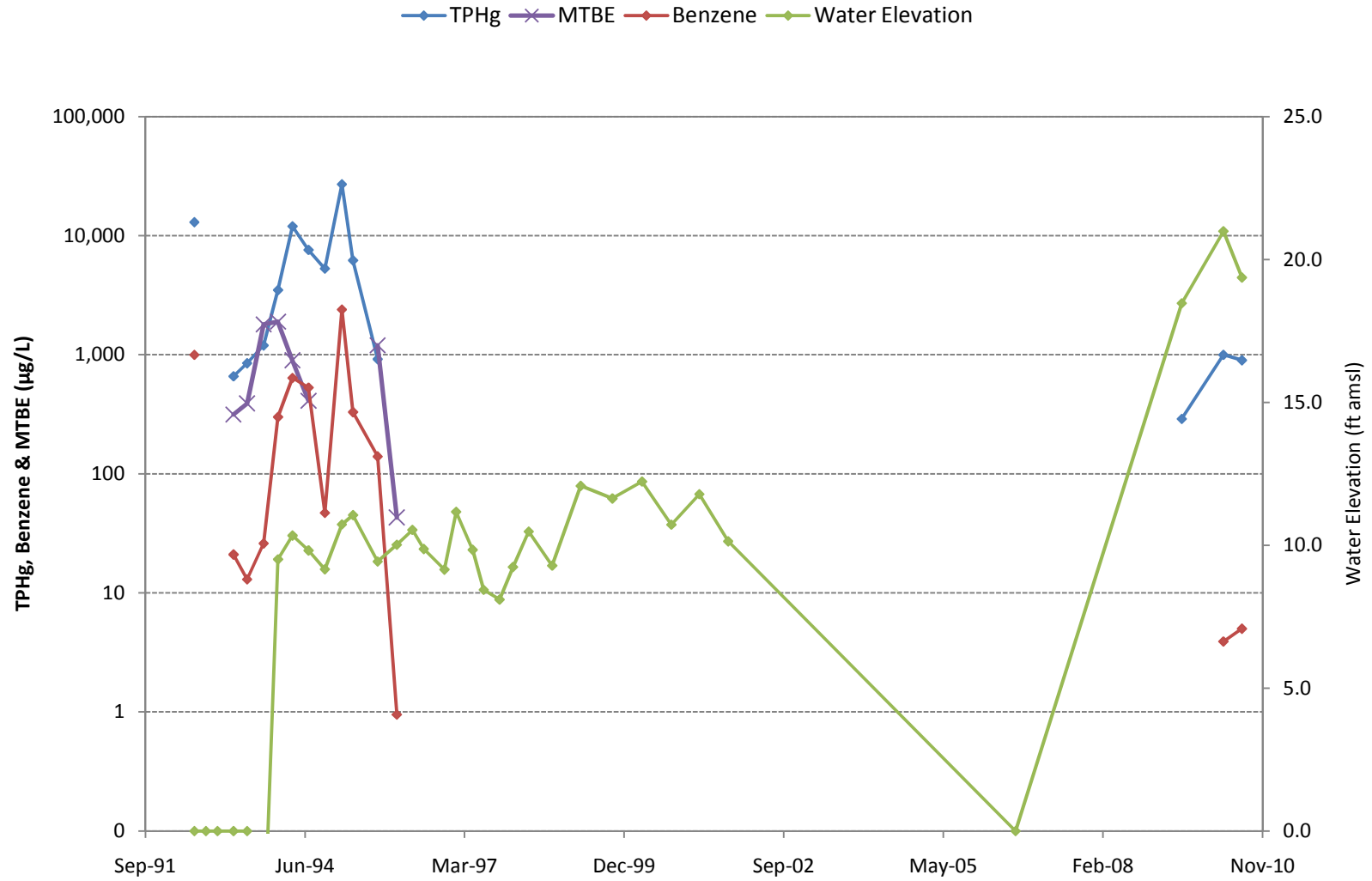


CHART 7: RW-1 Concentration Trends



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Appendix D

Alameda County Environmental
Health Case Closure Summary

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Alameda County Environmental Health

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

I. AGENCY INFORMATION

Date: February 23, 2011

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 #11266		
Site Facility Address: 1541 Park Street, Alameda, CA		
RB Case No.: 01-0221	Local Case No.: RO0000318	LOP Case No.: RO0000318
URF Filing Date:	Global ID No.: T0600100207	APN: 71-202-6
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	Gasoline	In Place	1987-Present
Unknown	10,000	Gasoline	In Place	1987-Present
Unknown	10,000	Gasoline	In Place	1987-Present
Unknown	1,000	Waste Oil	In Place	1987-Present
Unknown	8,000	Gasoline	Removed	September 1987
Unknown	6,000	Gasoline	Removed	September 1987
Unknown	5,000	Gasoline	Removed	September 1987
Unknown	250	Waste Oil	Removed	September 1987
Piping			Removed	December 1999
Piping			Removed	September 1990

III. RELEASE AND SITE CHARACTERIZATION INFORMATION

Cause and Type of Release: Exact release source is unknown; upon excavation in 1987 the USTs were described as being in good condition.	
Site characterization complete? Yes	Date Approved By Oversight Agency: TBD

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Monitoring wells installed? Yes	Number: 7	Proper screened interval? yes
Highest GW Depth Below Ground Surface: 6.24 feet (below top of casing)	Lowest Depth: 11.49 feet (below top of casing)	Flow Direction: predominately east
Most Sensitive Current Use: municipal and domestic water supply		

Summary of Production Wells in Vicinity: Production wells are not present in site vicinity (1,320 feet)	
Are drinking water wells affected? No	Aquifer Name: NA
Is surface water affected? No	Nearest SW Name: Alameda Tidal Canal
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 one 6,000-gallon UST one 5,000-gallon UST one 250-gallon UST	8,000-gallon Gasoline USTs removed in 1987; 6,000-gallon Gasoline USTs removed in 1987; 5,000-gallon UST removed in 1987, 250-gallon Waste Oil UST removed in 1987. Waste manifests not included in UST removal report	September 1987
Piping	Unknown	First generation of product lines removed in September 1990; second generation of product lines removed in December 1999; waste manifests not included in removal report	Initial Piping removed on September, 1990; Secondary replacement in December 1999
Free Product	None	--	--
Soil	Unknown	Soil removed in September 1987 during UST removal. Soil removed during product line removal in September 1990. No waste manifest included in UST removal report. No report issued for product line removal/replacement.	September 1987/September 1990
Groundwater	Unknown	Groundwater pumped out during aquifer testing at the site. No documentation of volume of water removed in report.	November 1989

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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	2.4 mg/kg (MW-1@ 10', 2/9/1988)	<0.50 mg/kg (B-2@ 9.5', 6/10/2009)	95,000 • g/L MW-1, 3/4/1988	900 • g/L RW-1, 7/12/2010
TPHd	Not sampled	Not sampled	1,000 • g/L MW-1, 8/24/2006	1,000 • g/L MW-1, 8/24/2006
Total Oil and Grease	Not sampled	Not sampled	Not sampled	Not sampled
Benzene	0.1 mg/kg (MW-1@ 10', 2/9/1988)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	2,400 • g/L RW-1, 2/1/1995	5.0 • g/L RW-1, 7/12/2010
Toluene	0.15 mg/kg (PD-4@ 2', 12/6/1999)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	6,100 • g/L RW-1, 2/1/1995	27 • g/L RW-1, 7/12/2010
Ethylbenzene	0.013 mg/kg (PD-3@ 2', 12/6/1999)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	1,800 • g/L RW-1, 2/1/1995	48 • g/L RW-1, 7/12/2010
Xylenes	0.7 mg/kg (MW-1@ 10', 2/9/1999)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	10,000 • g/L MW-1, 3/4/1988	220 • g/L RW-1, 7/12/2010
MTBE	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	68,412 • g/L ³ MW-1, 3/29/1994	6.0 • g/L ⁴ RW-1, 7/12/2010
Lead	910 mg/kg (PD-4@ 2', 12/6/1999)	96.6 mg/kg (B-2@ 8', 6/10/2009)	54.2 • g/L MW-1, 6/30/2009	5.0 • g/L RW-1, 7/12/2010

¹ Soil results are from samples collected at depths of 10 feet bgs or shallower.
² After results are represented by the maximum concentration on site.
³ Other fuel oxygenates (groundwater [µg/L] before cleanup): TBA 10 µg/L (MW-1), DIPE <10 µg/L (MW-6), ETBE <10 µg/L (MW-6), TAME 2.2 µg/L (MW-2), 1.2-DCA <10 µg/L (MW-6), EDB <10 µg/L (MW-6), ethanol <1,000 µg/L (MW-6)
⁴ Other fuel oxygenates (groundwater [µg/L] after cleanup): TBA <40 µg/L (MW-1), DIPE <0.50 µg/L (MW-6), ETBE <0.50 µg/L (MW-6), TAME <0.50 µg/L (MW-2), 1.2-DCA <0.50 µg/L (MW-6), EDB <0.50 µg/L (MW-6), ethanol <100 µg/L (MW-6)

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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 would present 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? NA		
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.

<p>Considerations and/or Variances:</p> <p>Low levels of residual groundwater contamination remain onsite (refer Tables 1 and 2 below); however, these concentrations do not pose a significant risk because soil vapor is not a threat and the entire site is capped.</p> <p>Conclusion:</p> <p>ARCADIS requests approval for case closure and no further action at this site based on the following:</p> <ul style="list-style-type: none"> • Sources of petroleum hydrocarbons at the site have been removed. The absence of high concentrations observed in soil samples suggests that secondary sources (residual hydrocarbons in soil) were identified and removed. • The three wells that contain TPHg concentrations in groundwater indicate decreasing concentration trends. • The one well that contains MTBE concentrations in groundwater indicates a decreasing trend. • The one well that contains benzene concentrations in groundwater indicates a decreasing trend. • Current site conditions suggest that TPHg, is limited to the northern site boundary in the vicinity of MW-1 and RW-1, and MTBE and benzene are in the vicinity of RW-1. The plume does not appear to be migrating, as evidenced by the results of groundwater samples collected from MW-6. • The site has been adequately characterized. • No sensitive receptors are likely to be impacted, including surface-water bodies, municipal wells and drinking water sources.

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- 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 6002
 6235 Seminary Avenue, 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}	<0.50 mg/kg (B-2@ 9.5', 6/10/2009)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	<0.001 mg/kg (B-2@ 9.5', 6/10/2009)	--
RWQCB, Region 2 ESLs¹	83²	0.044²	2.9²	3.3²	2.3²	0.023²	83²

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 6.24 feet and 11.49 feet below top of casing; therefore, all soil results are from sample depths of 10 feet or shallower.

Environmental Impacts in Groundwater
 BP 6002
 6235 Seminary Avenue, 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) (µg/L)	TPH-DRO (µg/L)
Maximum Residual Groundwater Concentrations at Site	900 MW-1, 7/12/2010	5.0 RW-1, 7/12/2010	27 RW-1, 7/12/2010	48 RW-1, 7/12/2010	220 RW-1, 7/12/2010	6.0 RW-1, 7/12/2010	--
RWQCB, Region 2 ESLs¹	100²	1.0²	40²	30²	20²	5.0²	100²

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).