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December 24, 2012

Mr. Keith Nowell
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

RE: Conceptual Site Model and Request for Low-Threat Closure
2445 Castro Valley Boulevard Castro Valley, California
ACEH CASE No. RO#0002968

Dear Mr. Nowell,

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

If you have any questions or need additional information, please contact me at (925) 790-6270.

Sincerely,

Roya Kambin
Union Oil of California – Project Manager

Attachment
Conceptual Site Model and Request for Low-Threat Closure

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

Chevron Environmental Management Company

Conceptual Site Model and Request for Low-Threat Closure

76 Service Station
No. 3072
2445 Castro Valley Boulevard
Castro Valley, California
ACEH CASE No. RO#0002968

December 24, 2012

ARCADIS

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Conceptual Site Model and Request for Low-Threat Closure

76 Service Station
No. 3072
2445 Castro Valley Boulevard
Castro Valley, California
ACEH CASE No. RO#0002968

Prepared for:
Chevron Environmental Management Company

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Our Ref.:
B0047335.2012

Date:
December 24, 2012

ARCADIS

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Appendices

Acronyms and Abbreviations

ACDEH	Alameda County Department of Environmental Health
ARCADIS	ARCADIS U.S., Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
COPC	constituent of potential concern
CPT	cone penetrometer test
CSM	conceptual site model
CSM and Closure Report	Conceptual Site Model and Request for Low-Threat Closure Report
Delta	Delta Consultants
EBMUD	East Bay Municipal Utility District
G-R	Gettler-Ryan, Inc.
KEI	Kaprealian Engineering Inc.
Low-Threat Closure Policy	Low-Threat Underground Storage Tank Case Closure Policy
LRL	laboratory reporting limit
MCL	California Department of Public Health's Maximum Contaminant Level
mg/kg	milligrams per kilogram
MTBE	methyl tertiary-butyl ether
RWQCB	California Regional Water Quality Control Board
SCS	Site Closure Summary
SFRWQCB	San Francisco Regional Water Quality Control Board
site	76 Service Station No. 3072 located at 2445 Castro Valley Boulevard in Castro Valley, California
SWRCB	State Water Resources Control Board

TBA	tertiary-butyl ether
TPH-d	total petroleum hydrocarbons as diesel
TPH-g	total petroleum hydrocarbons as gasoline
TPPH	total purgeable petroleum hydrocarbons
µg/L	micrograms per liter
UST	underground storage tank
WQO	water quality objective

1. Introduction

ARCADIS U.S., Inc. (ARCADIS) has prepared this Conceptual Site Model and Request for Low-Threat Closure Report (CSM and Closure Report) as an addendum to the Site Closure Summary (SCS) for 76 Service Station No. 3072 located at 2445 Castro Valley Boulevard in Castro Valley, California (site; Figure 1) submitted on November 4, 2010. This CSM and Closure Report presents an evaluation of site conditions for low-threat closure under the State Water Resources Control Board's (SWRCB's) resolution 2012-0016, adopted on May 1, 2012, and effective on August 17, 2012, otherwise known as the Low-Threat Underground Storage Tank Case Closure Policy (Low-Threat Closure Policy; SWRCB 2012b). A completed Low-Threat Closure Checklist is included as Appendix A.

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

This CSM and Closure Report include the following sections, in addition to this introductory section:

- Section 2 – A detailed site description.
- Section 3 – A conceptual site model (CSM).
- Section 4 – A detailed evaluation of current site conditions compared against closure criteria set forth in the newly adopted Low-Threat Closure Policy.
- Section 5 – Recommendations and conclusions.
- Section 6 – References.

2. Site Description

The site is an operating 76-branded service station located at 2445 Castro Valley Boulevard, on the southern corner of the intersection of Castro Valley Boulevard and Strobridge Avenue (Figure 1). The site is bordered by the intersection of Castro Valley

Boulevard and Strobridge Avenue and beyond that commercial property to the north; residential and commercial property to the south; Castro Valley Boulevard, Foothill Boulevard, and grassy areas and a parking lot to the east; and Strobridge Avenue and commercial property to the east of the site.

Aboveground facilities at the site include a station building, an auto service building, and three fuel dispenser islands. Belowground facilities at the site include two 12,000-gallon and one 10,000-gallon gasoline underground storage tank (UST) located near the northern corner of the site. One 550-gallon waste-oil UST is also located at the site, south of the station building. A site plan is presented on Figure 2.

3. Conceptual Site Model

The following sections summarize the CSM, including a summary of site geology and hydrogeology, previous work, distribution of fuel hydrocarbons and oxygenates in the subsurface, and an evaluation of risks to human health and the environment.

3.1 Site Geology and Hydrogeology

The site is located in the East Bay Plain Sub-basin of the Santa Clara Valley Groundwater Basin, which is bounded to the west by San Francisco Bay. The East Bay Plain Sub-basin is an elongated, northwest trending flat alluvial plain encompassing approximately 115 square miles. The East Bay Plain is bounded on the west by San Francisco Bay, by San Pablo Bay to the north, and by the Hayward Fault to the east. The site area is underlain by Holocene-age alluvial deposits consisting of unconsolidated, poorly graded, permeable fine sands, silts, and clays with a few thin beds of coarse sand (California Department of Water Resources 2004).

Previous subsurface investigations at the site indicate that site soil conditions predominantly consist of clay, silty clay, sandy clay, and clayey gravel to approximately 20 feet below ground surface (bgs). Bedrock was encountered at depths ranging from approximately 7 to 50 feet bgs, the maximum depth explored (Delta Consultants [Delta] 2010). Copies of available boring logs are provided in Appendix B.

Groundwater elevations at monitoring wells at the site have historically ranged from approximately 11.69 to 23.02 feet bgs. Historical groundwater data indicates a groundwater flow direction predominantly to the southwest. Current groundwater data is not available as site monitoring wells were destroyed in 1993. Historical water levels are included in Appendix E.

3.2 Summary of Previous Work

This section summarizes previous work, including site assessment and release history, and site remediation activities. Available boring log and monitoring well construction diagrams are included as Appendix B. Historical soil data are included in Appendix C, historical soil sampling locations are included in Appendix D, and historical groundwater analytical results are included in Appendix E.

3.2.1 Site Assessment and Release History

In November 1989, three 10,000-gallon gasoline USTs, one 55-gallon waste-oil UST, and associated product piping were removed and replaced. During removal activities, two small holes were observed in one of the tanks. Approximately 1,800 cubic yards of impacted soil was over-excavated and removed from the site from November through February 1989 (Kaprealian Engineering Inc. [KEI] 1990a).

When the USTs were removed, six soil samples were collected from beneath the gasoline USTs (A1, A2, B1, B2, C1, and C2) and one soil sample was collected from beneath the waste-oil UST (WO1). The samples from beneath the gasoline USTs were collected at 13.5 feet bgs, and the sample from beneath the waste-oil UST was collected at 10.5 feet bgs. Total petroleum hydrocarbons as gasoline (TPH-g) were detected in five of the six soil samples collected at concentrations ranging from 1.9 (milligrams per kilogram [mg/kg]) at B-1 to 11 mg/kg at B-2. Total petroleum hydrocarbons as diesel (TPH-d) and benzene, toluene, ethylbenzene, and total xylenes (BTEX, collectively) were not detected above their respective laboratory reporting limits (LRLs) in any of the soil samples collected. The soil sample collected from the waste-oil UST only detected TPH-g at a concentration of 5.9 mg/kg. All other analytes were not detected above their respective LRL in the soil sample collected from WO-1 (KEI 1990a).

In addition, six soil samples were collected from the sidewalls of the UST excavation pit (SW-1 through SW-6) at depths ranging from 9.5 to 10.5 feet bgs. TPH-d was only detected in SW-4 at a concentration of 24 mg/kg. TPH-g and BTEX were only detected in the soil samples collected from SW-1 and SW-4 through SW-6. The maximum concentrations of TPH-g and BTEX were detected in SW-4 at concentrations of 160, 0.33, 6.4, 30, and 9.4 mg/kg, respectively. In addition, a grab groundwater sample (W-1) was collected from the UST excavation area. The grab groundwater sample contained concentrations of TPH-d (11,000 micrograms per liter [µg/L]), TPH-g (26,000 µg/L), benzene (670 µg/L), toluene (1,100 µg/L), ethylbenzene (120 µg/L), and total xylenes (9,100 µg/L) (KEI 1990a).

In January 1990, three onsite monitoring wells were installed (MW-1 through MW-3) to depths of 22 to 30 feet bgs in order to establish groundwater flow direction. Twelve soil samples were collected during monitoring well installation activities at depths ranging from 5 to 20 feet bgs. TPH-g, benzene, and ethylbenzene were only detected in the soil sample collected from MW-1 at a depth of 5 feet bgs at concentration of 2.8, 0.051, and 0.11 mg/kg, respectively. All other samples did not have concentrations of TPH-g and BTEX that were detected above their LRL. In addition, groundwater samples were collected from these monitoring wells in March 1990. TPH-g, benzene, ethylbenzene, and total xylenes were detected in the sample collected from MW-1 at concentrations of 32, 4.2, 0.36, and 1.1 µg/L, respectively. All other groundwater samples did not detect TPH-g and BTEX above their respective LRLs (KEI 1990b).

In February 1990, three soil samples were collected from the product piping trenches at depths ranging from 2.5 to 4 feet bgs (P-1 through P-3). TPH-g was detected in all three soil samples collected at concentrations ranging from 6.0 mg/kg (P-2) to 87 mg/kg (P-1). Benzene was detected in all three soil samples collected at concentrations ranging from 0.23 mg/kg (P-2) to 0.047 mg/kg (P-3). Toluene was detected in two of the soil samples collected at concentrations ranging from 0.11 mg/kg (P-3) to 0.17 mg/kg (P-1). Ethylbenzene was detected in all three soil samples collected at concentrations ranging from 0.11 mg/kg (P-2) to 2.3 mg/kg (P-1). Total xylenes were detected in all three soil samples collected at concentrations ranging from 0.33 mg/kg (P-2) to 10 mg/kg (P-1) (KEI 1990b).

In March 1990, three sidewall samples (SW-B, SW-C, and SW-D) were collected from the waste-oil UST excavation area at depths ranging from 8 to 9 feet bgs. TPH-g and BTEX were detected in the soil sample collected from SW-B at concentrations of 37, 0.10, 0.10, 0.25, and 0.74 mg/kg. TPH-d was not detected in any of the soil samples collected, and TPH-g and BTEX were not detected above their respective LRL in soil samples collected from SW-C and SW-D (KEI 1990b).

In April 1990, eight soil borings were advanced at depths ranging from 10.5 to 15 feet bgs (EB-1 through EB-8). Nineteen soil samples were collecting during soil boring advancement activities. TPH-g was detected in five of the soil samples collected, with concentrations ranging from 1.7 mg/kg (EB-4 at 14 feet bgs) to 5.0 mg/kg (EB-6 at 5 feet bgs). Benzene was detected in every soil sample collected at concentrations ranging from 0.0053 mg/kg (EB-2 at 5 feet bgs) to 0.066 mg/kg (EB-6 at 5 feet bgs). Toluene was detected in every soil sample collected at concentrations ranging from 0.015 mg/kg (EB-5 at 5 feet bgs) to 0.43 mg/kg (EB-4 at 14 feet bgs). Ethylbenzene was detected in 10 of the soil samples collected at concentrations ranging from 0.0050 mg/kg (EB-2 at 10 feet bgs and EB-8 at 10 feet bgs) to 0.032 mg/kg (EB-6 at 5 feet

bgs). Total xylenes were detected in 13 of the soil samples collected at concentrations ranging from 0.011 mg/kg (EB-1 at 5 feet bgs) to 0.24 mg/kg (EB-6 at 13 feet bgs) (KEI 1990b). On April 25, 1990, a groundwater sample was collected from EB-6 and TPH-g and BTEX was detected at 5,900, 840, 34, 100, and 73 µg/L (KEI 1990b).

In August 1990, two monitoring wells (MW-4 and MW-5) were installed to depths of 23.5 and 24 feet bgs. Three soil samples were collected during monitoring well installation activities. TPH-g and BTEX were not detected above LRLs in any of the soil samples collected. Groundwater samples were collected from monitoring wells MW-4 and MW-5 in August 1990. Benzene was only detected in the groundwater sample collected from MW-4 at a concentration of 0.34 µg/L. TPH-g, toluene, ethylbenzene, and total xylenes were not detected above the LRL in either groundwater sample collected (KEI 1990b).

In a letter dated April 15, 1993 from the California Regional Water Quality Control Board (RWQCB), the RWQCB corroborated the closure requested by the Alameda County Environmental Health Services (ACEHS). As a result, monitoring wells MW-1 through MW-5 were destroyed in June 1993 (Delta 2010).

In June 2001, one of the hydraulic hoists from inside the station building was removed. During its removal, one soil sample was collected from the excavation area at 8.5 feet bgs. Total petroleum hydrocarbons as hydraulic fluid was detected at a concentration of 1,200 mg/kg, and total oil and grease was detected at a concentration of 210 mg/kg. BTEX was not detected above LRLs in the soil sample collected. Approximately, 1 cubic yard of excavated soil was removed during hoist removal activities (Gettler-Ryan, Inc. [G-R] 2001).

In January 2005, six soil borings were advanced to depths ranging from 18 to 50 feet bgs (SB-1 through SB-6). A total of 10 soil samples and four grab groundwater samples were collected during these site investigation activities. TPH-d was detected in two of the soil samples collected at concentrations ranging from 2.1 mg/kg (SB-5 at 23 feet bgs) to 25 mg/kg (SB-4 at 8 feet bgs). total purgeable petroleum hydrocarbons (TPPH) was detected in two of the soil samples collected at concentrations of 470 mg/kg (SB-4 at 8 feet bgs) and 480 mg/kg (SB-1 at 8 feet bgs). Ethylbenzene was detected in two of the soil samples collected at concentrations of 0.043 mg/kg (SB-2 at 12 feet bgs) and 1.1 mg/kg (SB-1 at 8 feet bgs). Total xylenes were detected in three of the soil samples collected at concentrations ranging from 0.011 mg/kg (SB-2 at 24 feet bgs) to 1.1 mg/kg (SB-1 at 8 feet bgs). Methyl tertiary-butyl ether (MTBE) was detected in two of the soil samples collected at concentrations of 0.074 mg/kg (SB-1 at 25.5 feet bgs) and 0.11 mg/kg (SB-3 at 18 feet bgs). Tertiary-butyl alcohol (TBA) was detected in

two of the soil samples collected at concentrations of 0.013 mg/kg (SB-1 at 25.5 feet bgs) and 0.014 mg/kg (SB-2 at 12 feet bgs). Benzene, toluene, and other fuel oxygenates were not detected above their respective LRL in any of the soil samples collected (TRC 2005).

The grab groundwater samples collected during this 2005 investigation contained a single detection of ethylbenzene (0.77 µg/L from SB-1) and total xylenes (1.2 µg/L from SB-2). MTBE was detected in three of the four groundwater samples collected at concentrations ranging from 0.68 µg/L (SB-2) to 87 µg/L (SB-1). All other groundwater samples did not detect TPH-d, TPPH, benzene, toluene, TBA, or other fuel oxygenates above their respective LRL (TRC 2005).

A sensitive receptor survey was conducted in 2006 in order to identify public and municipal water wells within a 0.5-mile radius of the site. Three water supply wells are located within a 0.5-mile radius of the site. Two of the wells are listed as domestic wells and are approximately 1,584 feet and 1,980 feet north (upgradient) of the site. The third well is listed as a Cooling System Return and is approximately 1,980 feet north (upgradient) of the site. In addition to the well survey, the nearest surface-water bodies were identified. An unidentified creek is located approximately 1,425 feet east (upgradient) of the site, and South Reservoir is located approximately 1,950 feet southeast (crossgradient) of the site. While sensitive receptors were identified, because each of the receptors were greater than 1,000 feet from the site, it is unlikely that these potential receptors are impacted from the site's hydrocarbon plume (TRC 2006).

In order to further characterize the extent of impacted media in the shallow water-bearing zone, cone penetrometer tests (CPTs) were advanced at four locations onsite (CPT-1, CPT-2, CPT-4, and CPT-5). Four grab groundwater samples were collected during CPT activities. Grab groundwater samples from CPT-2 and CPT-5 were collected from the shallow water-bearing zone (approximately 22 to 36 feet bgs), and grab groundwater samples from CPT-1 and CPT-4 were collected from the deeper water-bearing zone (approximately 51 to 55 feet bgs). TPH-d was detected in all four grab groundwater samples collected, at concentrations ranging from 280 µg/L (CPT-2) to 800 µg/L (CPT-4). MTBE was detected in three of the groundwater samples collected at concentrations ranging from 5.2 µg/L (CPT-5) to 10 µg/L (CPT-4). TBA was only detected in one groundwater sample collected (54 µg/L from CPT-2). TPPH, BTEX, and other fuel oxygenates were not detected above their respective LRL in any of the grab groundwater samples collected (TRC 2007).

3.2.2 Remediation History

As discussed in Section 3.2.1 of this CSM and Closure Report, approximately 1,800 cubic yards of impacted soil was over-excavated and removed from the site from November through February 1989 during site upgrade activities (KEI 1990a).

3.3 Current and Historical Distribution of Residual Hydrocarbons and Oxygenates

Fuel hydrocarbon and oxygenate impacts to site soil and groundwater appear to have resulted from an undocumented release from the first- and/or second-generation service station facilities. The current distribution of residual petroleum hydrocarbons and fuel oxygenates in soil, groundwater, and soil gas are described in the following sections.

3.3.1 Soil

A total of 72 soil samples have been collected at the site at depths ranging from 2.5 to 50 feet bgs to characterize concentrations of fuel hydrocarbons and oxygenates in site soils (Appendix C). Soil sample locations are presented on Appendix D. Note that soil samples collected below approximately 10 feet bgs may represent saturated soil conditions and, therefore, may not accurately represent vadose zone soil conditions due to potential interactions with groundwater. Generally, the highest concentrations of COPCs in soil were found near the UST area on the northern portion of the site at depths of approximately 10 feet bgs. The majority of soil samples at the site were collected prior to the site closure in 1993 by the California Regional Water Quality Control Board (RWQCB) and the Alameda County Department of Environmental Health (ACDEH).

Maximum concentrations of fuel hydrocarbons and oxygenates from 0 to 5 feet bgs are summarized below:

TPH-g was detected at a maximum concentration of 87 mg/kg in the soil sample collected from P-1 at 4 feet bgs. Benzene was detected at a maximum concentration of 0.47 mg/kg in the soil sample collected from P-3 at 3 feet bgs. Toluene, ethylbenzene, and total xylenes were detected at a maximum concentration of 0.17, 2.3, and 10 mg/kg, respectively, in the soil sample collected from P-1 at 4 feet bgs. TPH-d and MTBE were not detected in any of the soil samples collected from 0 to 5 feet bgs.

Maximum concentrations of fuel hydrocarbons and oxygenates in soils from 5 to 10 feet bgs are summarized below:

TPH-g and BTEX were detected at a maximum concentration of 1,700 mg/kg, 16 mg/kg, 33 mg/kg, 26 mg/kg, and 110 mg/kg, respectively, in the soil sample collected from SW-7 at 9 feet bgs. TPH-d was detected at a maximum concentration of 25 mg/kg in the soil sample collected from SB-4 at 8 feet bgs. MTBE was not detected in any of the soil samples collected from 5 to 10 feet bgs.

Maximum concentrations of fuel hydrocarbons and oxygenates in soil samples greater than 10 feet bgs are summarized below:

TPH-g, ethylbenzene, and total xylenes were detected at a maximum concentration of 1,900 mg/kg, 28 mg/kg, and 120 mg/kg, respectively, in the soil sample collected from SW-1 (17) at 11 feet bgs. Benzene and toluene were detected at a maximum concentration of 17 mg/kg and 29 mg/kg, respectively, in the soil sample collected from SW-2 (17) at 11 feet bgs. TPH-d was detected at a maximum concentration of 2.1 mg/kg in the soil sample collected from SB-5 at 23 feet bgs. MTBE was detected at a maximum concentration of 0.11 mg/kg in the soil sample collected from SB-3 at 18 feet bgs. COPC concentrations located in the saturated zone may not be representative of vadose zone impacts and are likely affected by dissolved-phase concentrations.

3.3.2 Non-Aqueous Phase Liquid

There is no evidence of non-aqueous phase liquid (NAPL) at the site. In addition, ARCADIS reviewed available site boring logs and found no reference to petroleum hydrocarbon impacts.

3.3.3 Groundwater

COPCs in site groundwater were monitored quarterly from 1990 to 1993, then the site received closure and the wells decommissioned. The monitoring well network consisted of five wells (MW-1 through MW-5). Monitoring wells were sampled quarterly. The historical monitoring well groundwater analytical results are available in Appendix E.

Since then, grab groundwater samples were collected during site investigation activities in 2005 and 2007. Analytical data from these grab groundwater samples are available in Appendix E.

Dissolved-phase concentrations in grab groundwater samples collected in 2005 and 2007 indicate the following:

- ***TPH-d.*** TPH-d concentrations at the site ranged from less than the LRL (50 µg/L) to 800 µg/L in the grab groundwater sample collected from CPT-4. The historical maximum concentration for TPH-d was 800 µg/L in the grab groundwater sample collected from CPT-4 on May 2, 2007.

- ***TPH-g.*** TPH-g concentrations at the site were not detected above their LRLs in grab groundwater samples collected in 2005 and 2007. The historical maximum concentration for TPH-g was 5,900 µg/L in the grab groundwater sample collected from EB6 on April 15, 1990.

- ***Benzene.*** Benzene concentrations at the site were not detected above their LRLs in grab groundwater samples collected in 2005 and 2007. The historical maximum concentration for benzene was 840 µg/L in the grab groundwater sample collected from EB6 on April 15, 1990.

- ***Ethylbenzene.*** Ethylbenzene concentrations at the site ranged from less than the LRL of 0.50 µg/L to 0.77 µg/L in the grab groundwater sample collected from SB-1. The historical maximum concentration for ethylbenzene was 100 µg/L in the grab groundwater sample collected from EB6 on April 15, 1990.

- ***Toluene.*** Toluene concentrations at the site were not detected above their LRLs in grab groundwater samples collected in 2005 and 2007. The historical maximum concentration for toluene was 34 µg/L in the grab groundwater sample collected from EB6 on April 15, 1990.

- ***Total xylenes:*** Total xylenes concentrations at the site ranged from less than the LRL of 1.0 µg/L to 1.2 µg/L in the grab groundwater sample collected from SB-2. The historical maximum concentration for total xylenes was 73 µg/L in the grab groundwater sample collected from EB6 on April 15, 1990.

- ***MTBE.*** MTBE concentrations at the site ranged from less than the LRL of 0.50 µg/L to 87 µg/L in the grab groundwater sample collected from SB-1. The historical maximum concentration for MTBE was 87 µg/L in the grab groundwater sample collected from SB-1 on January 25, 2005.

Isoconcentration maps of the primary COPCs (TPH-d and MTBE) detected during the 2007 grab groundwater sampling event are included on Figures 3 through 6. TPH-g

and BTEX were not included as primary COPCs because their concentrations in groundwater were below the water quality objectives (WQOs) during most groundwater sampling events.

3.3.4 Soil Gas

No soil gas activities have been performed at this site.

3.4 Assessment of Impacts of Residual COPCs on Public Health and the Environment

Based on the assessment of data presented in this CSM and Closure Report, the residual concentrations of COPCs in site environmental media are unlikely to pose adverse effects to human health and the environment. This section summarizes sensitive receptors observed near the site, as well as the results of a water supply well survey, and an evaluation of potential exposure pathways.

3.4.1 Sensitive Receptors and Water Supply Well Survey

A sensitive receptor survey was conducted in 2006 in order to identify public and municipal water wells within a 0.5-mile radius of the site. Three water supply wells are located within a 0.5-mile radius of the site. Two of the wells are listed as domestic wells and are approximately 1,584 feet and 1,980 feet north of the site. The third well is listed as a Cooling System Return and is approximately 1,980 feet north of the site. In addition to the well survey, the nearest surface-water bodies were identified. An unidentified creek is located approximately 1,425 feet east of the site, and South Reservoir is located approximately 1,950 feet southeast of the site. While sensitive receptors were identified, because each of the receptors was greater than 1,000 feet from the site, it is unlikely that these potential receptors are impacted from the site's hydrocarbon plume (TRC 2006).

A 2008 well survey obtained from the SWRCB GeoTracker website for a site located at 2492 Castro Valley Boulevard (closed in February 2011), approximately 300 feet to the northeast of the site, identified one domestic well which is approximately 1,400 feet to the east-southeast of the site (ETIC, 2009).

The site is located in the East Bay Plain Sub-basin of the Santa Clara Valley Groundwater Basin and is located within the service area of the East Bay Municipal Utility District (EBMUD) public water system. Ninety percent of water within the EBMUD public water system, which includes drinking water at the site, is supplied by the Mokelumne Watershed. Local runoff stored in reservoirs supplements that supply,

and water from the Sacramento River is available, when needed, during dry years (EBMUD 2011).

Based on a review of the GeoTracker Groundwater Ambient Monitoring and Assessment database, the closest water supply well is located more than 4 miles southwest of the site.

3.4.2 Potential Transport and Release Mechanisms and Receptors

This section discusses the potential transport and release mechanisms and receptors at the site. Because the site had been granted closure in 1993 from the RWQCB and the ACDEH, analytical data after 1993 was used in the determination of the following release mechanisms and receptors.

3.4.2.1 Volatilization

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

In general, exposure to petroleum vapors migrating from soil or groundwater to indoor air may pose unacceptable human health risks. However, in many petroleum release cases, potential human exposures to vapors are mitigated by bioattenuation processes as vapors migrate toward the ground surface. However, to support risk-based decision making for the site, it is assumed that COPCs in groundwater may volatilize into commercial buildings.

3.4.3 Leaching to Groundwater

The release of petroleum hydrocarbons from former USTs, dispenser islands, and associated piping also can leach from soil to groundwater. This release mechanism is likely responsible for the majority of historical groundwater impacts. However, this release mechanism may have been mitigated through weathering and natural attenuation.

3.4.4 Direct Contact with Groundwater

As described in Section 3.4.1, groundwater at the site is currently not used as a potable source and is not expected to be used as a drinking water source in the future (EBMUD 2011). Drinking water is municipally supplied to the site. Therefore, potential direct contact exposures to COPCs in groundwater, such as tap water ingestion, dermal contact with tap water, and inhalation of volatile organic compounds released from tap water, are not expected to occur for current and future onsite and offsite receptors.

In the future, onsite construction workers may be directly exposed to groundwater while performing routine utility activities in subsurface trenches. Typically, utility trenches are located at a depth of no greater than 8 feet bgs. Historically, based on data collected from monitoring wells at the site from 1990 to 1993, the depth to groundwater has been measured at a minimum of approximately 6.50 feet below top of casing. Typically, at construction/excavation sites when groundwater is exposed, dewatering occurs, or workers are not required to work in standing water. Thus, it is unlikely that future onsite utility workers will be directly exposed to COPCs in groundwater, as they will dewater trenches or excavations if standing water is observed or they will not work in standing water.

3.4.5 Direct Contact with Soil

Given that the site is completely covered with buildings, concrete, asphalt paving, and perimeter landscaping, it is anticipated that current and future on and offsite commercial workers will not be exposed to constituents in soil via direct contact exposure pathways (i.e., incidental ingestion, dermal contact, and inhalation of particulates). Based on historical site soil data, most COPCs were not detected in samples collected within the top 5 feet of soil. Therefore, direct contact with shallow soil exposure pathways are not expected to be complete for current and future onsite workers. However, potential receptors, including future onsite construction/utility trench workers, may be directly exposed to COPCs in subsurface soil via incidental ingestion, dermal contact, and inhalation of vapor and dust particles in trench air.

Constituents adhered onto dust particles may migrate from exposed subsurface soil by wind erosion to outdoor air and be inhaled by potential on and offsite receptors. This transport mechanism is unlikely given that redevelopment of the site is not planned; the site is covered with a building, landscaping, concrete, or asphalt pavement; and soil is not exposed at the surface.

3.4.6 Potential Ecological Receptors

The nearest surface-water bodies are an unidentified creek located approximately 1,425 feet east of the site and South Reservoir located approximately 1,950 feet southeast of the site. The site is devoid of ecological habitat and surface water; therefore, it is anticipated that ecological receptors are absent from the site. It is expected that the site will remain a gasoline service station in the future. Given these features at the site, potential exposure pathways for current ecological receptors are incomplete.

Because the site is devoid of ecological habitat and surface water is absent, it is reasonable to assume that ecological receptors are absent from the site and will not be present in the future. In addition, no surface water is located near the site. Based on this information, potential exposure pathways for future ecological receptors are incomplete.

3.5 Summary of Potential Exposure Pathways

Potential receptors were identified based on current and future land use(s) at the site. As discussed previously, current and reasonably anticipated future land use at the site is commercial. Potential current and future human receptors at the site include current and future commercial workers and current and future onsite utility and construction trench workers. In addition, offsite commercial workers and residents could be exposed to COPCs volatilizing from groundwater and migrating into offsite buildings. The sources, release mechanisms, exposure media, and exposure pathways for these receptors are shown on Figure 7.

Based on the information presented in the previous sections, the following potential exposure pathways may be complete for the site:

Current and Future Onsite Commercial Workers

- Inhalation of vapors migrating from the subsurface and into buildings.

Current and Future Offsite Commercial Workers and Residents

- Inhalation of vapors migrating from the subsurface into buildings.

Current and Future Onsite Utility and Construction Trench Workers

- Inhalation (outdoor air) of vapors.
- Inhalation (outdoor air) of dust particles.
- Incidental ingestion and dermal contact of surface and subsurface soil.
- Incidental ingestion, dermal contact, and inhalation with groundwater.

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

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

4.1 Evaluation of Low-Threat Closure: General Criteria

4.1.1 Criteria a - The unauthorized release is located within the service area of a public water system

As discussed in Section 3.4.1, the site lies within the East Bay Plain Sub-basin and is located within the service area of the EBMUD public water system. Ninety percent of water within the EBMUD public water system, which includes drinking water at the site, is supplied by the Mokelumne Watershed. Local runoff stored in reservoirs supplements that supply, and water from the Sacramento River is available when needed during dry years (EBMUD 2011).

4.1.2 Criteria b - The unauthorized release consists only of petroleum

In 1989, a release of petroleum hydrocarbons was identified during station upgrade activities. The site was granted closure in 1993 from the RWQCB and the ACDEH. In 2001, additional site characterization activities were carried out as part of the hoist removal in the station building and the site was re-opened. No other releases (petroleum or non-petroleum) have been reported. COPCs at the site include TPH-d, TPH-g, BTEX, and fuel oxygenates, including MTBE.

4.1.3 Criteria c - The unauthorized ("primary") release from the UST system has been stopped

In 1989, a release of petroleum hydrocarbons was identified during station upgrade activities. The site was granted closure in 1993 from the RWQCB and the ACDEH. In 2001, additional site characterization activities were carried out as part of the hoist removal in the station building and the site was re-opened. The unauthorized released ceased with the removal of this infrastructure.

4.1.4 Criteria d - Free product has been removed to the maximum extent practicable

As described in Section 3.3.2, free product has not been observed in monitoring wells onsite. ARCADIS reviewed site boring logs and found no reference to petroleum hydrocarbon impact.

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

A CSM that includes a comprehensive site assessment and remediation history, regional and site-specific geology and hydrogeology, review of the soil and groundwater conditions at the site, and evaluation of human health exposure from site-related COPCs is presented in Sections 3.1 through 3.5 of this CSM and Closure Report.

4.1.6 Criteria f - Secondary source has been removed to the extent practicable

Secondary source removal has been addressed through soil excavation. Approximately 1,800 cubic yards of impacted soil was over-excavated and removed from the site from November through February 1989 (KEI 1990a). In addition, in 2001 during hoist removal activities, approximately 1 cubic yard of soil was removed from the site (G-R 2001).

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

MTBE was analyzed in soil samples collected in 2005 (Appendix C) and in grab groundwater samples collected during site investigation activities in 2005 and 2007 (Appendix E).

During the 2005 site assessment, MTBE was detected in two soil samples collected at a maximum concentration of 0.11 mg/kg (SB-3 at a depth of 18 feet bgs). In 2005,

MTBE was detected in three of the four grab groundwater samples collected at a maximum concentration of 87 µg/L (SB-1). In 2007, MTBE was detected in three of four grab groundwater samples collected with a maximum concentration of 10 µg/L (CPT-4).

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

No nuisance exists at the site, as defined by Water Code Section 13050. Site conditions and the treatment and disposal of site wastes are not injurious to health, indecent or offensive to the senses, and do not obstruct free use of property or interfere with the comfortable enjoyment of life or property. Site conditions and the treatment and disposal of site wastes do not affect an entire community or neighborhood or any considerable number of persons. Site impacts are restricted to the subsurface, and are present in a limited area that does not adversely affect the community at large.

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

4.2.1 Groundwater

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

WQOs used in this analysis are presented in Table A.

Table A. Summary of WQOs

COPC	WQO	Source
TPH-d	210 µg/L	SFRWQCB
TPH-g	210 µg/L	SFRWQCB
Benzene	1 µg/L	MCL
MTBE	13 µg/L	MCL
TBA	18,000 µg/L	SFRWQCB

Notes:
MCL = California Department of Public Health's Maximum Contaminant Level
SFRWQCB = San Francisco Regional Water Quality Control Board

The WQO for benzene is the established MCL (California Department of Public Health 2011). An MCL has not been established for TPH-d, TPH-g, or TBA. The environmental screening level established by SFRWQCB for groundwater that is not a current or potential drinking water resource (Table F-1b; SFRWQCB 2008) was utilized as the TPH-d and TPH-g WQO for this evaluation of groundwater plume stability.

4.2.1.1 Plume Stability

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

1) "Routinely observed non-detect values for groundwater parameters in down-gradient wells."

2) "Stable or decreasing concentration levels in down-gradient wells."

Monitoring wells at the site were decommissioned in 1993 when the site was granted closure from the RWQCB and the ACDEH. Since then, grab groundwater samples have been collected in 2005 and 2007. The grab groundwater samples collected were analyzed for TPH-d, TPPH, BTEX, MTBE, TBA, and other fuel oxygenates. The 2005 grab groundwater samples did not contain any COPCs that were detected above WQOs, with the exception of MTBE (87 µg/L from SB-1) located east-adjacent to the northwestern dispenser island. The 2007 grab groundwater samples detected one concentration of TBA (54 µg/L from CPT-2) above its WQO. CPT-1 is also located west-adjacent to the northwestern dispenser island near SB-1. TPH-d was also detected above its WQO in all four of the grab groundwater samples collected, with concentrations ranging from 280 µg/L (CPT-5, which is near the waste-oil UST) to 800 µg/L (CPT-4, which is east-adjacent to the southeastern dispenser island). Each of the grab groundwater locations that detected COPCs above their respective WQO are adjacent to site features that may have had an undocumented release (e.g., dispenser islands, USTs).

However, should a release be occurring during the grab groundwater sample collection in 2005 and 2007, it would be expected that the concentrations of TPH-d and other petroleum hydrocarbons would be much higher than detected. In addition, grab groundwater samples typically result in greater concentrations that are actually present due to the disturbance of soil, and may not be representative of actual groundwater concentrations at the site. Given that the groundwater samples collected are not at levels that would indicate an active release, the samples were collected near key site features and that the concentrations reported from the grab groundwater samples are

likely greater than actual concentrations in groundwater beneath the site, the plume is likely stable and not increasing or migrating offsite.

4.2.1.2 Additional Groundwater-Specific Criteria

As described in the Low-Threat Closure Policy, a site can meet the groundwater Media-Specific Criteria through one of five main classes. ARCADIS is of the opinion this site falls into Class 2 as described in detail below.

Class 2

2a. The contaminant plume that exceeds WQOs is less than 250 feet in length

For the determination of the classification of groundwater impacts, the length of the plume exceeding WQOs for each of the current site COPCs was measured from the most recent isoconcentration maps included as Figures 3 through 6.

- The TPH-d plume, exceeding 210 µg/L in the shallow groundwater zone, is estimated to be approximately 154 feet long.
- The TPH-d plume, exceeding 210 µg/L in the deep groundwater zone, is estimated to be approximately 190 feet long.

- MTBE concentrations did not exceed the WQO of 13 µg/L in either the shallow or deep groundwater zones.

2b. There is no free product

- There is no free product currently present in site monitoring wells, as detailed in General Criteria (d) and Section 3.3.2.

2c. The nearest existing water supply well or surface-water body is greater than 1,000 feet from the defined plume boundary

- As described in Section 3.4.1, no water supply wells were identified within 1,000 feet from the defined plume boundary at site.

- The nearest surface-water bodies are an unidentified creek located approximately 1,425 feet east of the site and South Reservoir located approximately 1,950 feet southeast of the site (Section 3.4.1).

2d. The dissolved concentration of benzene is less than 3,000 µg/L, and the dissolved concentration of MTBE is less than 1,000 µg/L

During the grab groundwater monitoring events in 2005 and 2007, benzene was not detected above 3,000 µg/L. In fact, benzene was not detected above its LRL during these events in any of the grab groundwater samples collected. MTBE was detected at a maximum concentration of 87 µg/L (SB-1 in 2005). Thus, concentrations of benzene and MTBE fall far below the 3,000 and 1,000 µg/L criteria, respectively.

4.2.2 Petroleum Vapor Intrusion to Indoor Air

As described in the Low-Threat Closure Policy, satisfaction of the Media-Specific Criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities where there are no site-specific characteristics that would pose an unacceptable health risk. The site is an active commercial petroleum fueling facility with no unacceptable risk characteristics and there are no plans for redevelopment; therefore, the site is exempt from this media-specific criterion.

As described in the Low-Threat Closure Policy, satisfaction of the Media-Specific Criteria for petroleum vapor intrusion to indoor air is not required for sites where there are: 1) no existing buildings currently occupied or that may be occupied in the future and 2) no buildings for human occupancy expected to be constructed in the future above the plume. The TPH-d plume exceeding 210 µg/L may extend offsite. However, the plume only extends to beneath roads and/or parking lots, adjacent to the site, and not beneath buildings or other structures. Therefore, the offsite portions of the plume are subject to the stated exception to this media-specific criterion.

4.2.3 Direct Contact and Outdoor Air Exposure

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

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

2) A site-specific risk assessment shows that COPCs present in soil will not adversely affect human health.

3) Exposure to COPCs is mitigated through engineering controls.

This site meets the first criteria as summarized below:

- Because the site is completely covered with a building and pavement, there is little or no potential for direct human contact with site soils or for offsite wind dispersion of soils. Therefore, direct contact exposure pathways (i.e., ingestion, dermal contact, and inhalation of particulates) with soils are considered incomplete or insignificant and are expected to remain the same in the future.

- Historical soil data are included in Appendix C. Benzene and ethylbenzene concentrations were evaluated using concentrations for commercial/industrial exposure because the site is not anticipated to be developed for residential use.

Soil samples collected in 1989 beneath the former waste-oil UST indicated low concentrations of TPH-g, likely related to the fuel USTs and/or associated piping. At the time the waste oil UST was removed, naphthalene and polyaromatic hydrocarbons (PAHs) were not analyzed in soil samples collected nor were they required to be analyzed. Soil excavation activities that were performed following the removal of the waste oil UST in November through February 1989 appeared to have largely removed potentially impacted soil. Therefore, should waste oil impacted soil have existed at the Site, it was likely removed during the waste oil UST excavation. Since there is no data that suggests a release occurred from the waste oil UST, the absence of this data does not pose a data gap.

Table B. Comparison of Maximum Concentrations of Benzene and Ethylbenzene in Soil against the No Significant Risk Values

Chemical	Commercial/Industrial				Utility Worker	
	0 to 5 feet bgs mg/kg		Volatilization to outdoor air (5 to 10 feet bgs) mg/kg		0 to 10 feet bgs mg/kg	
	Low-Threat Closure Policy Table 1	Site Maximum	Low-Threat Closure Policy Table 1	Site Maximum	Low-Threat Closure Policy Table 1	Site Maximum
Benzene	8.2	0.066	12	11	14	11
Ethylbenzene	89	2.3	134	26	314	26

As shown in Table B above, the historical maximum benzene and ethylbenzene concentrations are below the Low-Threat Closure Policy Table 1 values for Commercial/Industrial direct contact and volatilization to outdoor air and Utility Worker direct contact in soil samples collected from 0 to 10 feet bgs (Table 1, SWRCB 2012b).

However, there is one exception. The concentration of benzene in the soil sample collected from SW-7 at 9 feet bgs was 16 mg/kg, which was collected in December 1989. SW-7 was collected in the northern corner of the site, under a paved portion of the site. In addition, because the site is an active service station, it is unlikely that this elevated concentration of benzene will affect outdoor air concentrations. While utility workers may be exposed to soil at these depths, the soil sample from SW-7 is over 20 years old. It is likely that natural degradation of petroleum hydrocarbons would indicate that current concentrations of benzene in this area are likely significantly lower. This sample may be located in the saturated zone and may not be representative of vadose zone impacts and are likely affected by dissolved-phase concentrations. Furthermore, the locations where the elevated benzene concentration was observed were in a location with little or no potential for direct human contact with soil or for offsite wind dispersion of soil.

5. Conclusions and Recommendations

Site conditions meet all the General and Media-Specific Criteria established in the UST Low-Threat Closure Policy, and therefore, pose a low-threat to human health, safety, and the environment, and satisfy the case-closure requirements of Health and Safety Code Section 25296.10. Case closure is consistent with Resolution 92-49, which requires that cleanup goals be met within a reasonable timeframe. ARCADIS respectfully requests that the ACDEH grant low-threat site closure, as site conditions meet all General and Media-Specific Criteria established in the Low-Threat Closure Policy (SWRCB 2012b).

6. References

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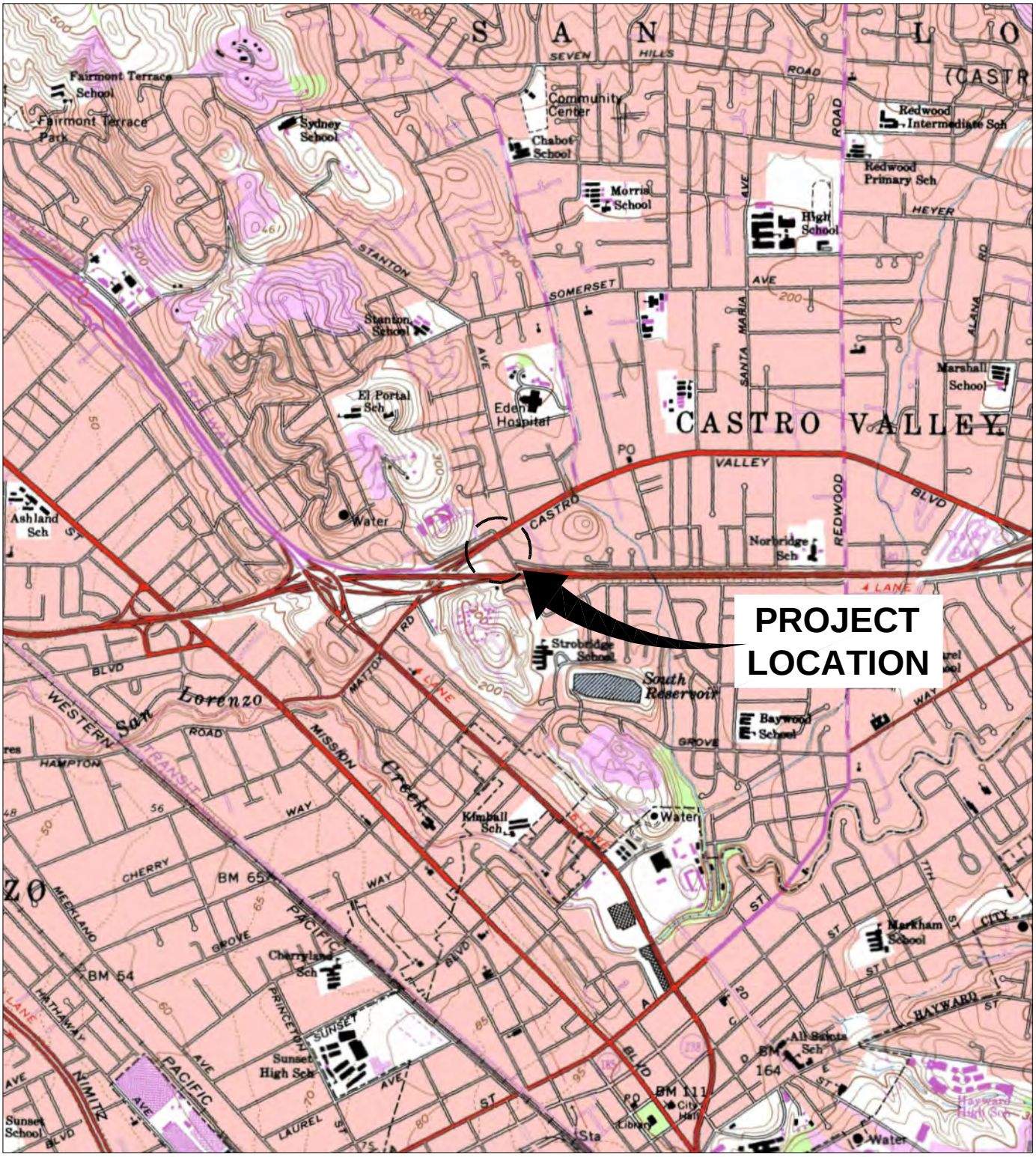
Figures



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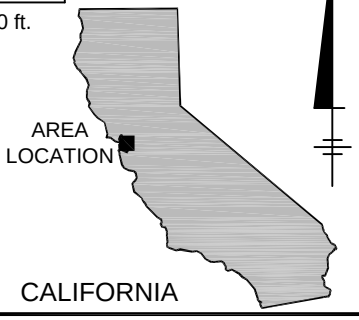

UNION OIL
STATION NO. 3072
2445 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

SITE LOCATION MAP

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FIGURE
1

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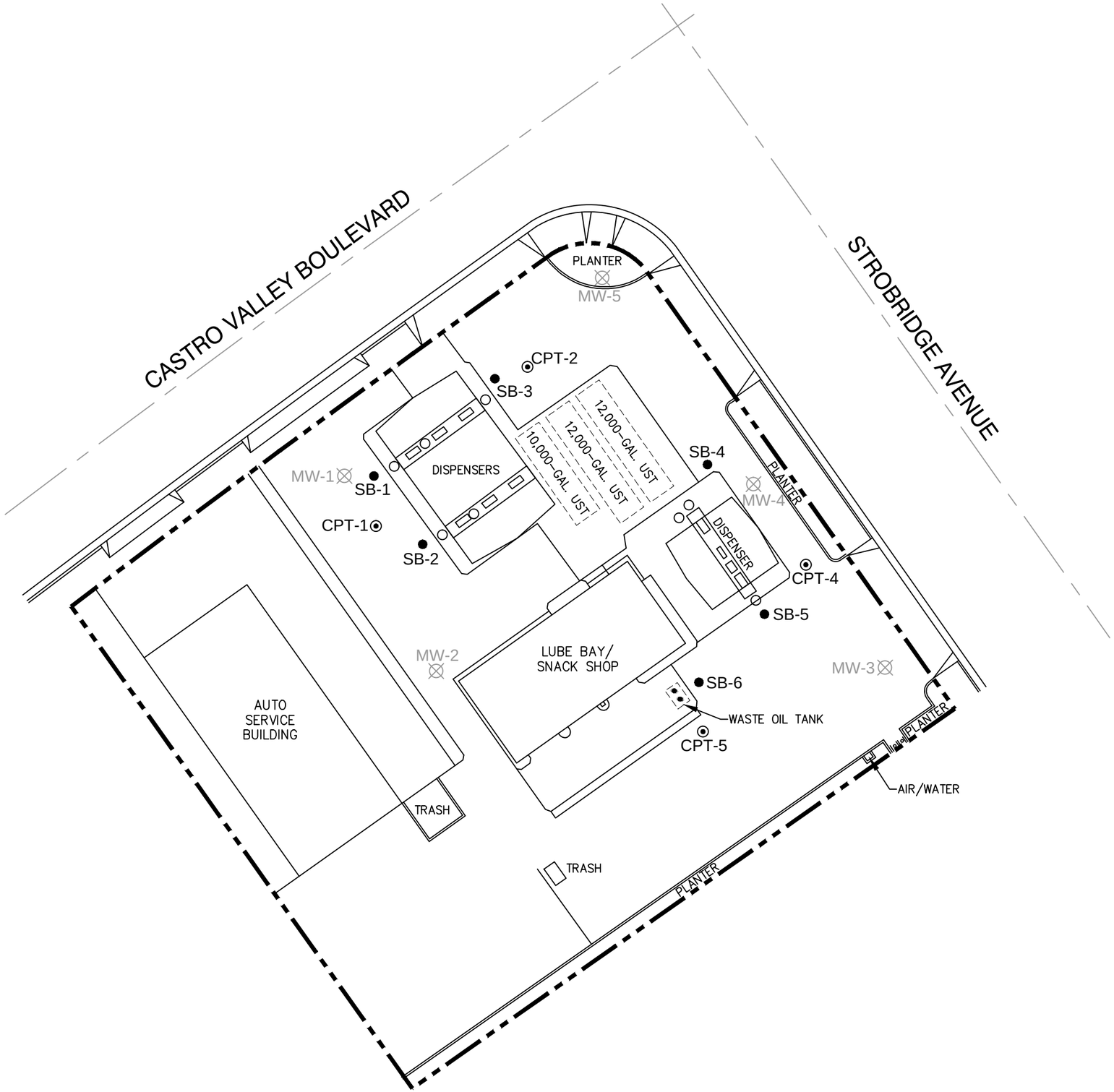

LEGEND

- PROPERTY BOUNDARY
- MW-1 ⊗ DESTROYED MONITORING WELL
- SB-1 ● SOIL BORING
- CPT-1 ⊙ CPT BORING

NOTES:

1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 01/14/09, AT A SCALE OF 1"=30'.
2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.

0 30' 60'

GRAPHIC SCALE

UNION OIL
STATION NO. 3072
2445 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

SITE PLAN

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FIGURE
2

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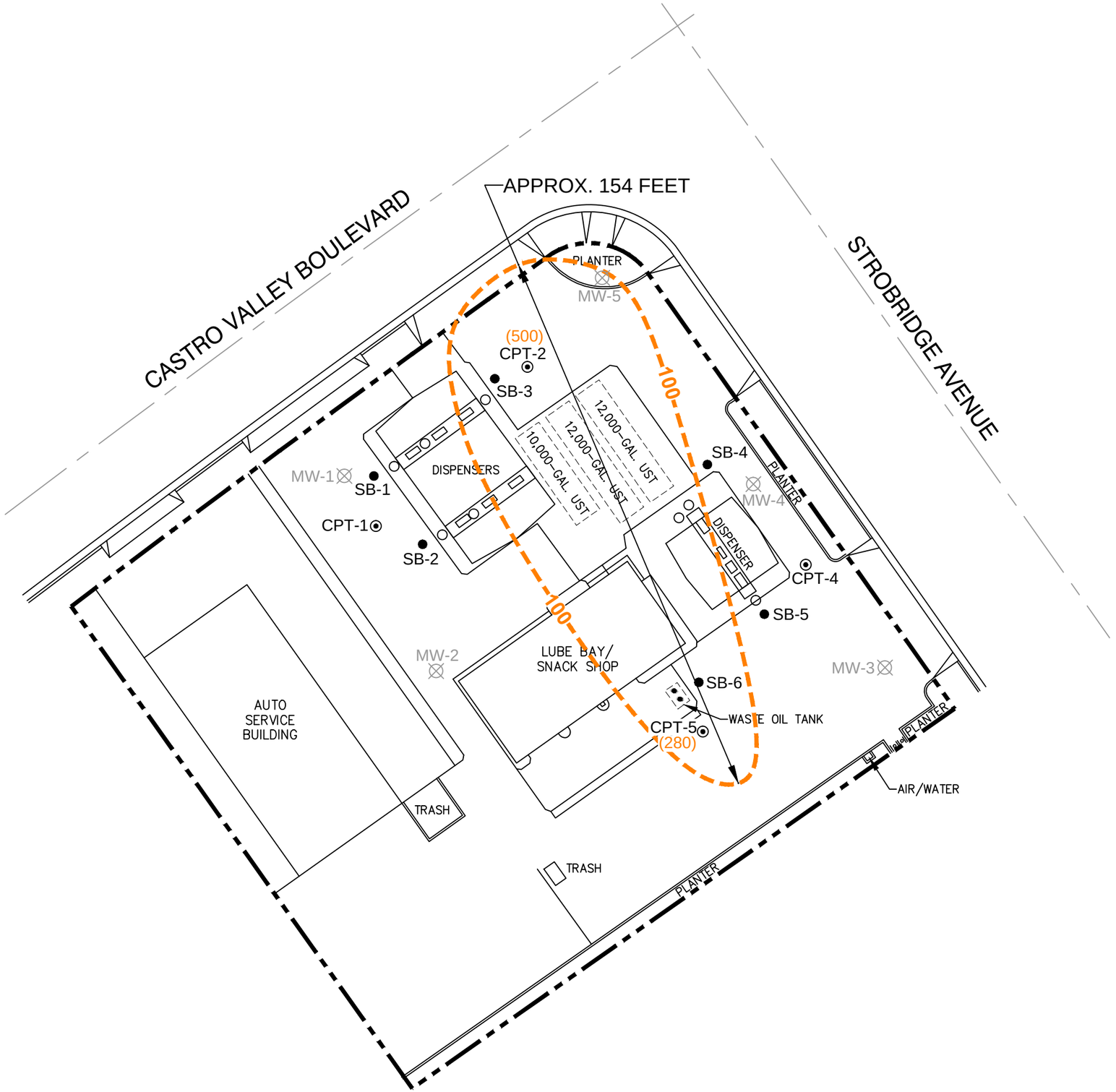

LEGEND

- PROPERTY BOUNDARY
- MW-1 ⊗ DESTROYED MONITORING WELL
- SB-1 ● SOIL BORING
- CPT-1 ⊙ CPT BORING
- 100 TOTAL PETROLEUM HYDROCARBONS AS DIESEL (TPH-d) ESL ISOCONCENTRATION CONTOURS, DASHED WHERE INFERRED
- (280) TPH-d CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- ESL ENVIRONMENTAL SCREENING LEVEL WHERE GROUNDWATER IS A CURRENT OR POTENTIAL SOURCE OF DRINKING WATER, TABLE F-1a, FINAL GROUNDWATER SCREENING LEVEL, SAN FRANCISCO REGIONAL WATER QUALITY CONTROL BOARD, MAY 2008

NOTES:

1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 01/14/09, AT A SCALE OF 1"=30'.
2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
3. GROUNDWATER SAMPLES COLLECTED AS GRAB GROUNDWATER IN MAY 2007.

0 30' 60'

GRAPHIC SCALE

UNION OIL
STATION NO. 3072
2445 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

TPH-d ISOCONCENTRATION MAP SHALLOW GROUNDWATER ZONE MAY 2007

ARCADIS

FIGURE 3

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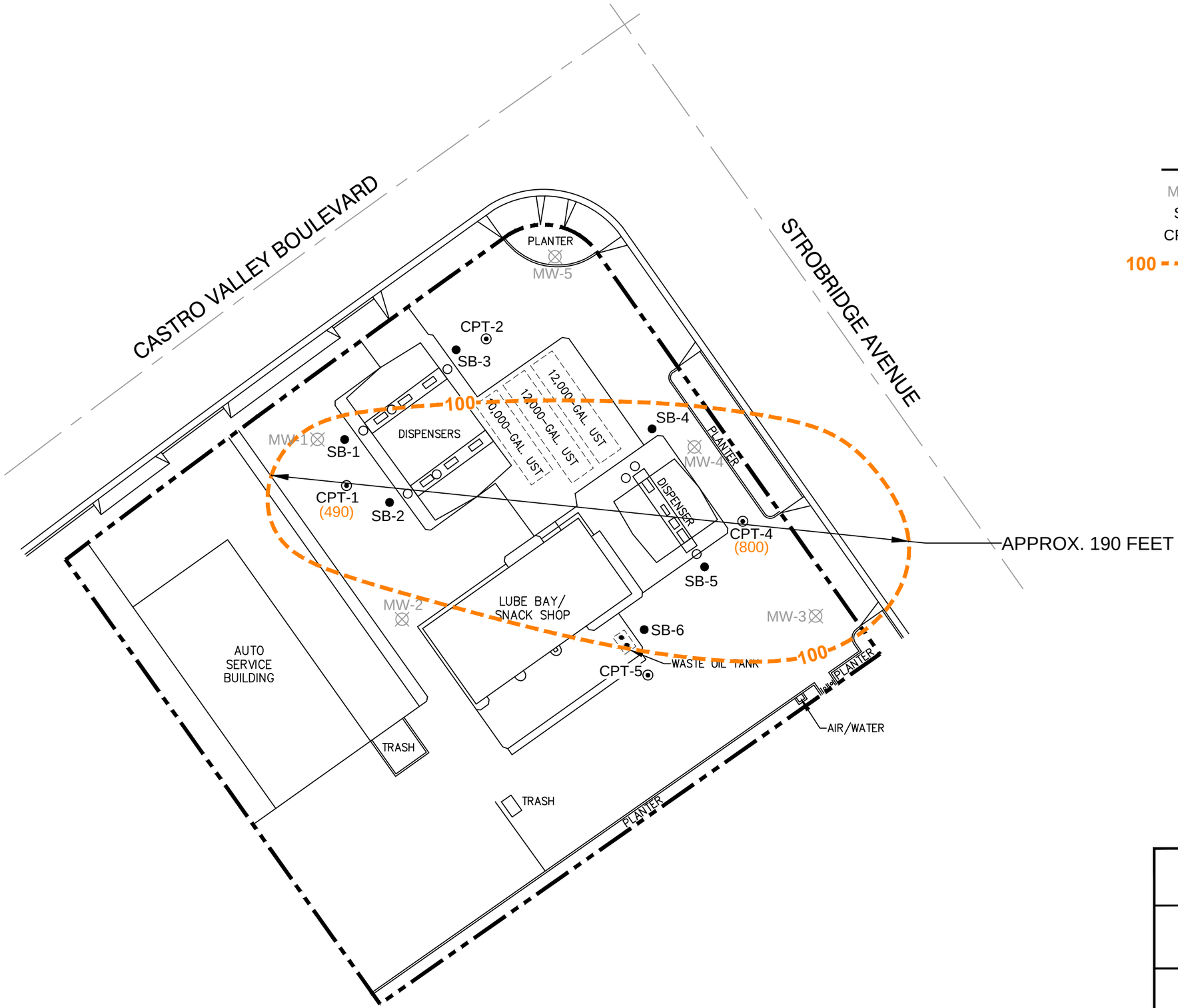

LEGEND

- PROPERTY BOUNDARY
- MW-1 ⊗ DESTROYED MONITORING WELL
- SB-1 ● SOIL BORING
- CPT-1 ⊙ CPT BORING
- 100 TOTAL PETROLEUM HYDROCARBONS AS DIESEL (TPH-d) ESL ISOCONCENTRATION CONTOURS, DASHED WHERE INFERRED
- (490) TPH-d CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- ESL ENVIRONMENTAL SCREENING LEVEL WHERE GROUNDWATER IS A CURRENT OR POTENTIAL SOURCE OF DRINKING WATER, TABLE F-1a, FINAL GROUNDWATER SCREENING LEVEL, SAN FRANCISCO REGIONAL WATER QUALITY CONTROL BOARD, MAY 2008

NOTES:

1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 01/14/09, AT A SCALE OF 1"=30'.
2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
3. GROUNDWATER SAMPLES COLLECTED AS GRAB GROUNDWATER IN MAY 2007.

0 30' 60'

GRAPHIC SCALE

UNION OIL
STATION NO. 3072
2445 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

TPH-d ISOCONCENTRATION MAP
DEEP GROUNDWATER ZONE
MAY 2007

ARCADIS

FIGURE
4

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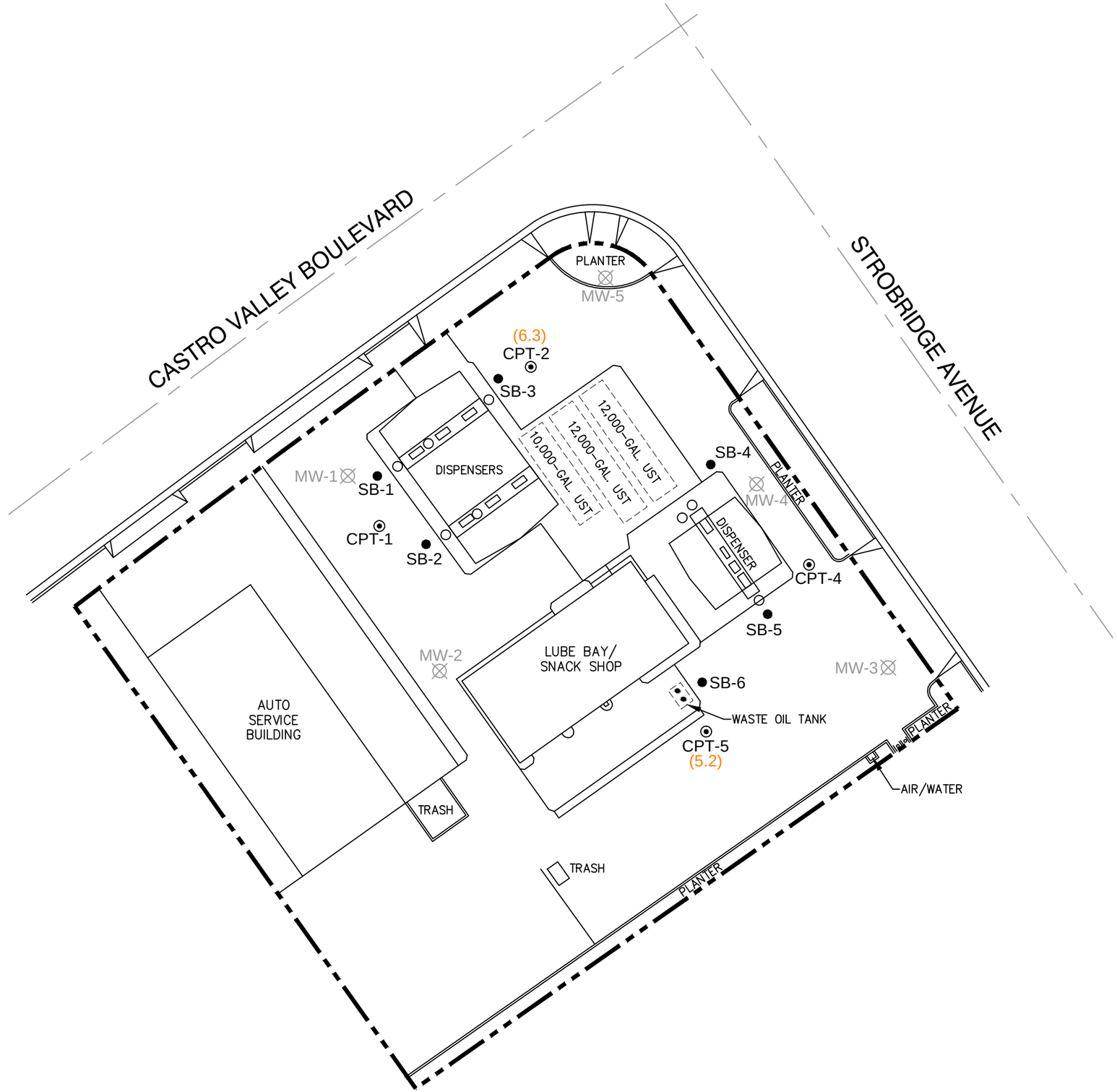


LEGEND

- PROPERTY BOUNDARY
- MW-1 ⊗ DESTROYED MONITORING WELL
- SB-1 ● SOIL BORING
- CPT-1 ⊙ CPT BORING
- (5.2) MTBE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- MTBE METHYL TERTIARY BUTYL ETHER

NOTES:

1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 01/14/09, AT A SCALE OF 1"=30'.
2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
3. GROUNDWATER SAMPLES COLLECTED AS GRAB GROUNDWATER IN MAY 2007.

0 30' 60'

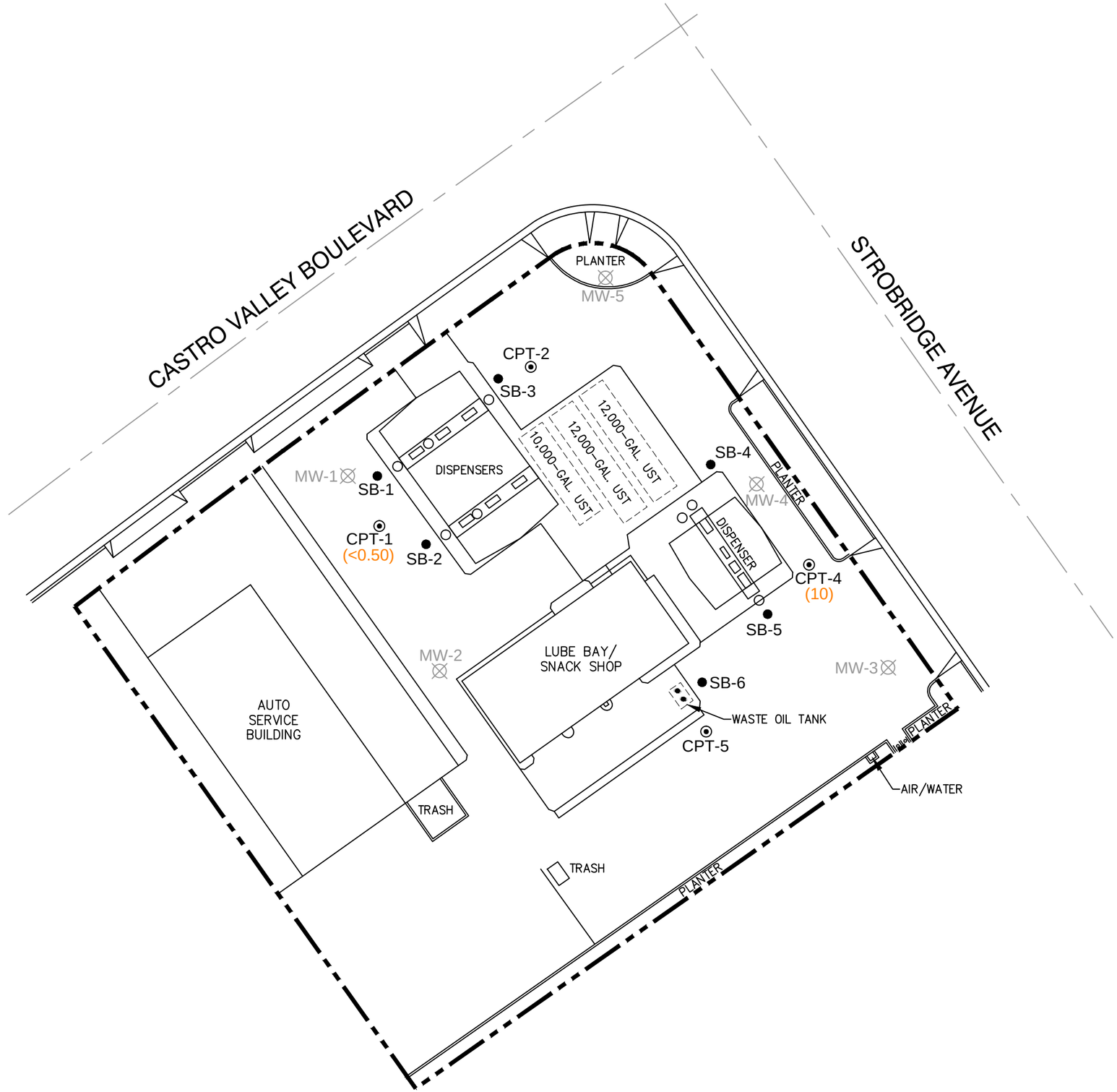
GRAPHIC SCALE

UNION OIL
STATION NO. 3072
2445 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

MTBE ISOCONCENTRATION MAP SHALLOW GROUNDWATER ZONE MAY 2007

ARCADIS

FIGURE 5



LEGEND

- PROPERTY BOUNDARY
- MW-1 ⊗ DESTROYED MONITORING WELL
- SB-1 ● SOIL BORING
- CPT-1 ⊙ CPT BORING
- (10) MTBE CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
- (<0.50) NOT DETECTED ABOVE ITS LABORATORY REPORTING LIMIT
- MTBE METHYL TERTIARY BUTYL ETHER

NOTES:

1. BASE MAP DIGITIZED FROM A FIGURE PDF PROVIDED BY DELTA, DATED 01/14/09, AT A SCALE OF 1"=30'.
2. ALL SITE FEATURES AND LOCATIONS ARE APPROXIMATE.
3. GROUNDWATER SAMPLES COLLECTED AS GRAB GROUNDWATER IN MAY 2007.

0 30' 60'

GRAPHIC SCALE

UNION OIL
STATION NO. 3072
2445 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

MTBE ISOCONCENTRATION MAP DEEP GROUNDWATER ZONE MAY 2007

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FIGURE 6

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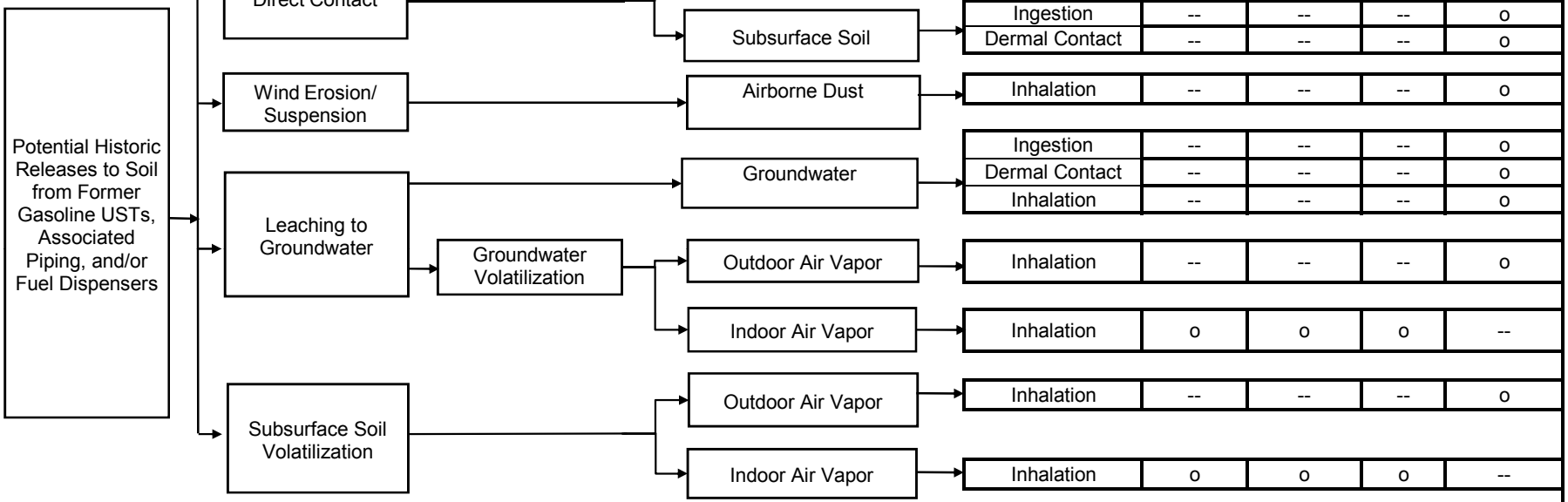

EXPOSURE ROUTE(S)	POTENTIAL RECEPTORS: Current and Future Onsite Commercial Workers	Current and Future Offsite Commercial Workers	Current and Future Offsite Residential Use	Current and Future On and Offsite Construction (Utility) Workers
Ingestion	--	--	--	o
Dermal Contact	--	--	--	o
Ingestion	--	--	--	o
Dermal Contact	--	--	--	o
Inhalation	--	--	--	o
Ingestion	--	--	--	o
Dermal Contact	--	--	--	o
Inhalation	--	--	--	o
Inhalation	--	--	--	o
Inhalation	o	o	o	--
Inhalation	--	--	--	o
Inhalation	o	o	o	--

Notes:

- ● = Potentially complete exposure pathway
- o = Potentially complete but insignificant exposure pathway
- -- = Incomplete exposure pathway or not applicable

76 Service Station No. 3072

2445 Castro Valley Boulevard, Castro Valley, California

CONCEPTUAL SITE MODEL AND REQUEST FOR LOW-THREAT CLOSURE

CONCEPTUAL SITE MODEL
HUMAN EXPOSURE PATHWAYS

ARCADIS

FIGURE
7

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Appendix A

Low-Threat Closure Checklist

Site Name:
Site Address:

Site meets the criteria of the Low-Threat Underground Storage Tank (UST) Case Closure Policy as described below.[1]

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

[1] Refer to the Low-Threat Underground Storage Tank Case Closure Policy for closure criteria for low-threat petroleum UST sites.

Site Name:
Site Address:

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

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Appendix B

Boring Logs/Well Construction Diagrams

BORING LOG

Project No. KEI-P89-1106	**Boring & Casing Diameter** 9" 2"	**Logged By** D.L.
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 1/18/90
Boring No. MW1	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement Clay, sand, and gravel: fill
			CH	Clay, high plasticity, stiff, moist, black.
5/7/14		5		Color change at 5 feet to dark gray 10-15% sand.
16/33/43			N/A	Shale bedrock, weathered, locally hard, fractured, slightly moist, olive brown, clayey inside fractures.
22/46/ 50-5"		10		
	▼			Shale bedrock at 13 feet, as above, wet.
		15		
		20		Color change at 20 feet to very dark gray.

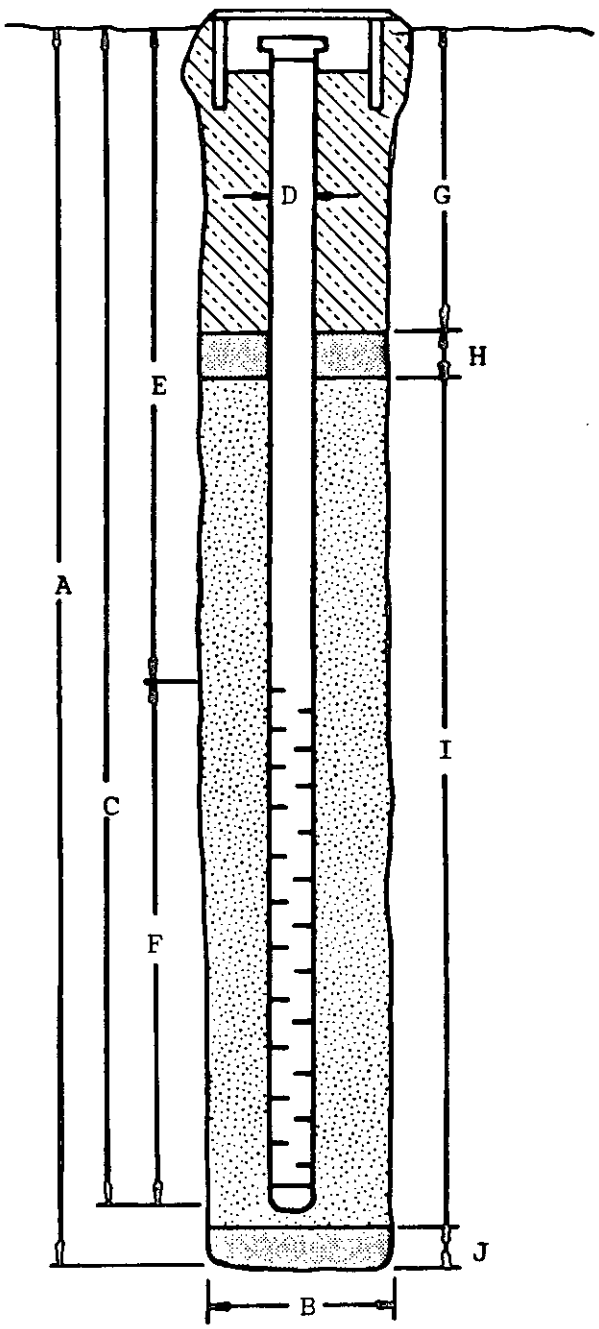
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - Castro Valley BORING/WELL NO. MW1

PROJECT NUMBER: KEI-P89-1106

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 25.5'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 25.5'

Material: Schedule 40 PVC

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

E. Depth to Perforations: 8'

F. Perforated Length: 17.5'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 4'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 19.5'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

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

BORING LOG

Project No. KEI-P89-1106	**Boring & Casing Diameter** 9" 2"	**Logged By** D.L.
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 1/18/90
Boring No. MW2	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement
				Silty clay, high plasticity, stiff, moist, very dark gray, locally gravelly, gravel to 1/2".
6/8/10		5	CH	Clay, high plasticity , with silt, 10-15% sand, stiff, moist, dark greenish gray, locally cemented, with gravel below 6 feet.
16/25/26			GC	Clayey gravel with sand, dense, moist, dark greenish gray, mottled with olive brown below 7.5 feet.
4/7/13		10	CH	Sandy clay, moderate to high plasticity, 10-15% gravel, stiff, firable, moist, yellowish brown.
				Very stiff at 12 feet, ocasional gravel, gravel is olive brown shale.
8/11/15				
7/13/22				
13/20/28		15		
10/19/21			GC	Clayey gravel with sand, dense, moist, yellowish brown, gravel is shale, dark brown within clay.
13/19/23				
50-2"	▼	20		At 20 feet, varied gravel, some serpentine. No recovery at 20.5 feet

BORING LOG

Project No. KEI-P89-1106	Boring & Casing Diameter 9" 2"	Logged By D.L.
Project Name Unocal Castro Valley	Well Head Elevation N/A	Date Drilled 1/18/90
Boring No. MW2	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
36/48/ 50-5"			SW-SC	Clayey sand with gravel, 15% clay, gravel as above, hard, wet, olive brown.
			N/A	Shale bedrock, very hard, fractured, dark yellowish brown to dark brown.
22/50-5"		25		Shale bedrock, well weathered to clay, locally hard, very dark gray.
50-3"		30		No recovery, shale bedrock, as above, near refusal.
		35		
		40		TOTAL DEPTH: 30'

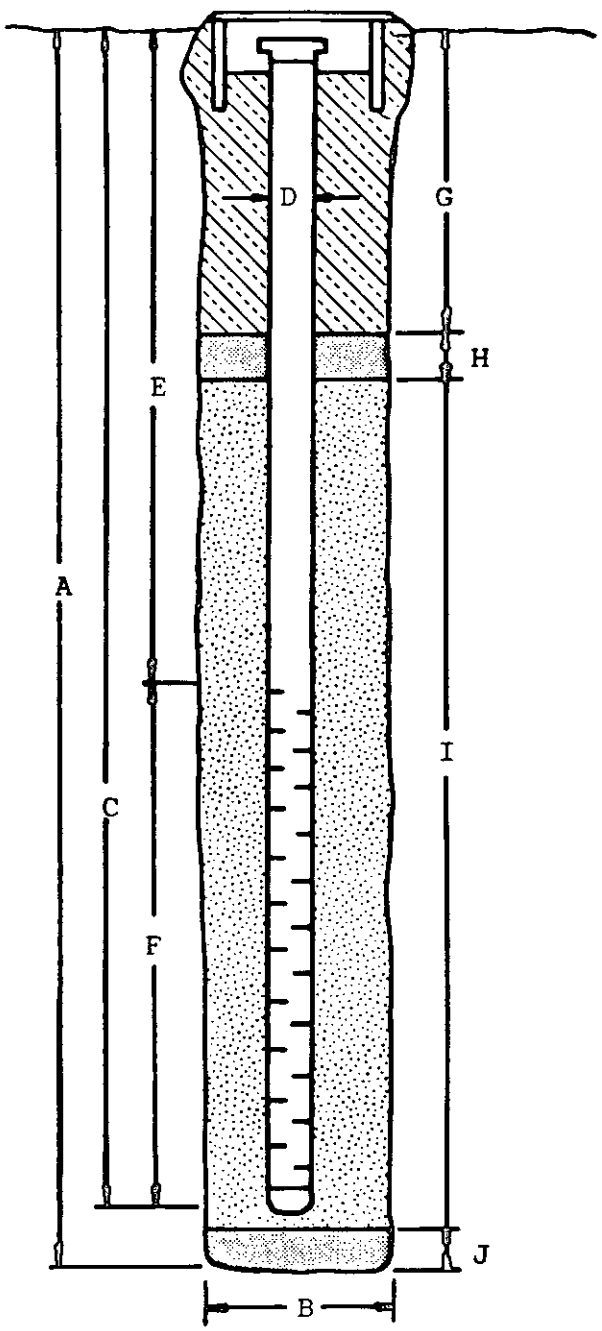
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - Castro Valley BORING/WELL NO. MW2

PROJECT NUMBER: KEI-P89-1106

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 30'

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'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 26'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

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

BORING LOG

Project No. KEI-P89-1106	**Boring & Casing Diameter** 9" 2"	**Logged By** D.L.
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 1/19/90
Boring No. MW3	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement Sand and gravel: fill
				Silty clay, high plasticity, stiff, moist, very dark grayish brown, 5-10% sand.
10/17/22		5	CH	Gravelly clay, high plasticity, 5-10% silt, very stiff, moist, light olive brown.
20/21/24			GC	Clayey gravel with sand, very dense, moist to wet, olive brown, gravel is almost entirely shale.
23/28/33	▼	10		
18/30/23		15		Clayey gravel with sand, as above, ocasionally grading to gravelly clay, very stiff, moist, olive brown.
		20		

BORING LOG

Project No. KEI-P89-1106	Boring & Casing Diameter 9" 2"	Logged By D.L.
Project Name Unocal Castro Valley	Well Head Elevation N/A	Date Drilled 1/19/90
Boring No. MW3	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
				Clayey gravel with sand, as above, ocasionally grading to gravelly clay, as above.
		25		
		30		
		35		
		40		TOTAL DEPTH: 22'

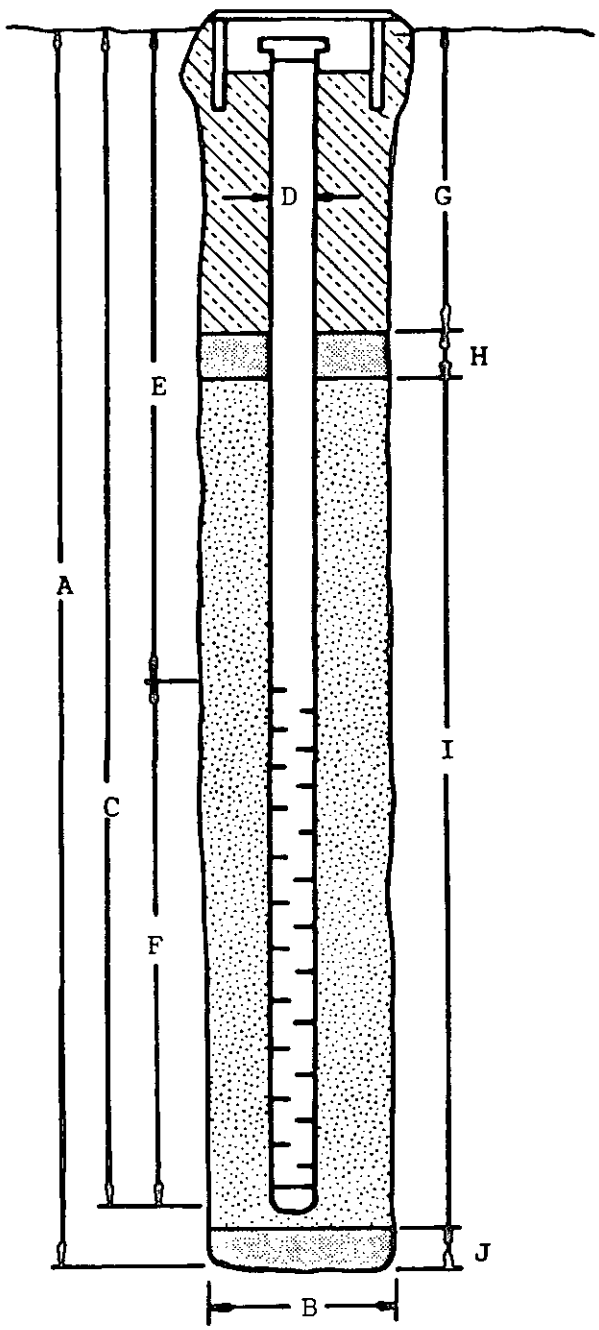
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal - Castro Valley BORING/WELL NO. MW3

PROJECT NUMBER: KEI-P89-1106

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 22'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 22'

Material: Schedule 40 PVC

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

E. Depth to Perforations: 5'

F. Perforated Length: 17'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Concrete

H. Seal: 18'

Seal Material: Bentonite

I. Gravel Pack:

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

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

BORING LOG

Project No. KEI-P89-1106	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W. DRB
Project Name Unocal-Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 8/13/90
Boring No. MW4	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt concrete over clayey sand and gravel base
			CH	Clay, trace to 5% coarse-grained sand trace of gravel to 1/2 inch dia. moist, hard, dark gray, 5% orangish brown banding
6/11/24		5	CL/CH	Clay, trace to 5% sand, trace to 10% caliche, light dive gray to greenish gray, moist, hard
				Bedrock
50	▼	10	N/A	Shale, moderately hard, fractured, very weathered, decomposed and clayey, wet below 10', olive brown
		15		Shale, moist, clayey, moderately hard, medium gray to olive gray
22/50-5"		20		

BORING LOG

Project No.	Boring & Casing Diameter	Logged By
KEI-P89-1106	9" 2"	W.W.
Project Name Unocal-Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 8/13/90
Boring No. MW4	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
17/28/37		25 30 35 40	N/A	Clayey shale bedrock as above, moderately hard, moist, gray

TOTAL DEPTH DRILLED: 22'
TOTAL DEPTH SAMPLED: 23.5'

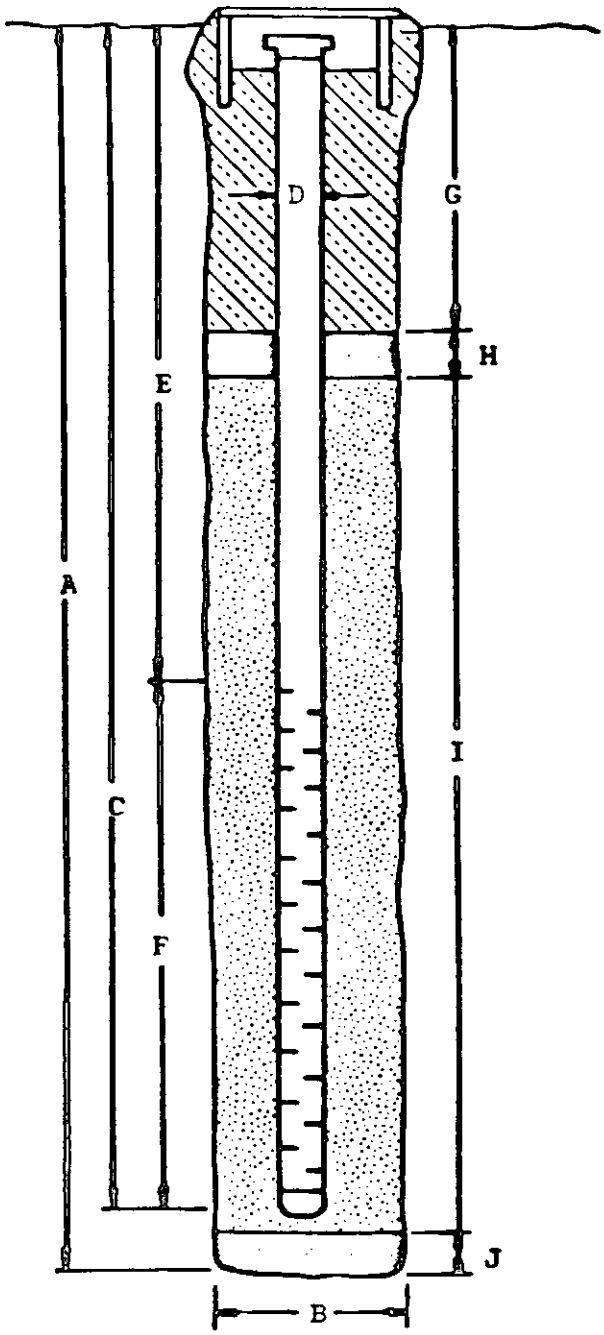
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal Castro Valley BORING/WELL NO. MW4

PROJECT NUMBER: KEI-P89-1106

WELL PERMIT NO.:

Flush-mounted Well Cover



A. Total Depth: 23.5'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 21'

Material: Schedule 40 PVC

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

E. Depth to Perforations: 6'

F. Perforated Length: 15'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 4'

Seal Material: Concrete

H. Seal: 18'

Seal Material: Bentonite

I. Gravel Pack: 17'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

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

BORING LOG

Project No. KEI-P89-1106	**Boring & Casing Diameter** 9" 2"	**Logged By** W.W. DRB
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 8/13/90
Boring No. MW5	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		A.C. Pavement over clayey sand and and gravel base
				Clay with gravel, gravel angular to 1 1/8 dia., trace sand and caliche, moist, firm, greenish gray.
			CL/ CH	Clay, trace sand, moist, firm, very dark gray.
7/14/15		5		Clay, trace fine sand, moist, very stiff, light olive gray to greenish gray trace to 10% caliche with nodules to 1/2 dia.
				Bedrock
50				Clayey shale, trace caliche(?), moist, olive gray, orangish brown, trace greenish gray (clay) highly weather-ed, decomposed
		10		
16/24/30			N/A	
				Clayey shale, trace organic matter, moist, olive gray to olive brown with trace of orange-brown, moderately hard, less weathered than above
36/40/45				
	▼			
35/50		15		
				Clayey shale, slightly weathered and decomposed, saturated, moderately hard, olive gray
40/50-5"		20		

BORING LOG

Project No.	Boring & Casing Diameter	Logged By
KEI-P89-1106	9" 2"	W.W.
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 8/13/90
Boring No. MW5	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS		Description
15/28/32			N/A		Shale, as above, very moist less weathered than above, clay in fract-fractures, moderately hard, gray.
		25			
		30			
		35			
		40			TOTAL DEPTH: 24'

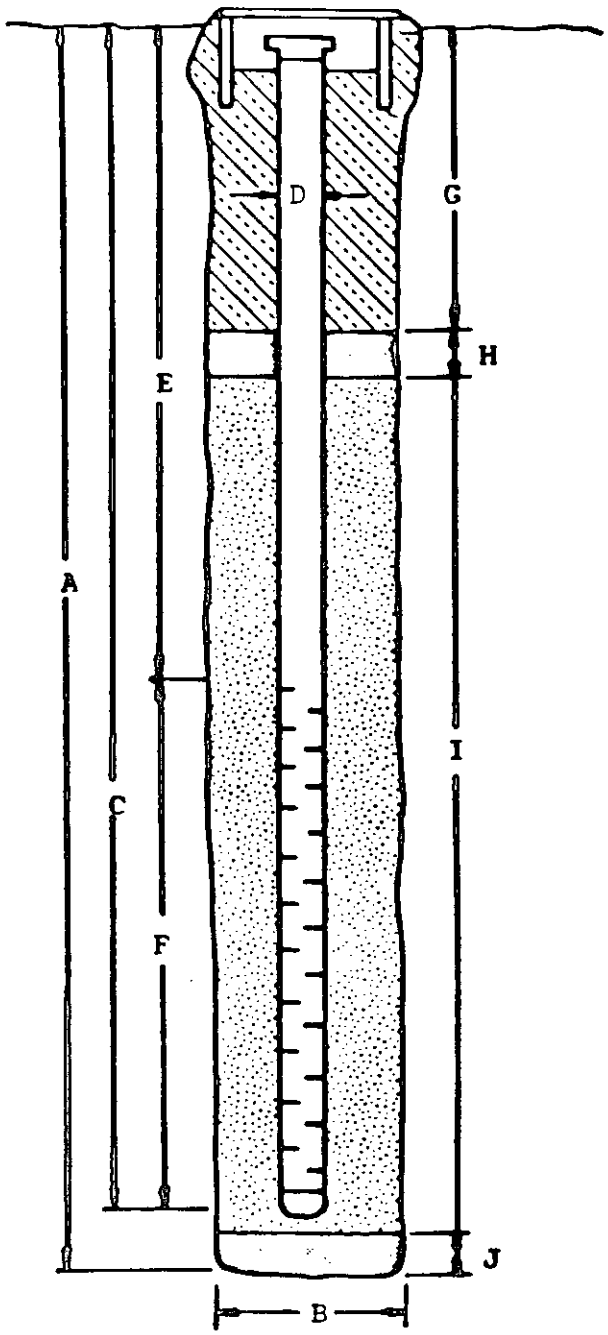
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal-Castro Valley 2445 C.V. Blvd. BORING/WELL NO. MW5

PROJECT NUMBER: KEI-P89-1106

WELL PERMIT NO.: _____

Flush-mounted Well Cover



A. Total Depth: 24'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 23.5'

Material: Schedule 40 PVC

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

E. Depth to Perforations: 8.5'

F. Perforated Length: 15'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 6.5'

Seal Material: Concrete

H. Seal: 1'

Seal Material: Bentonite

I. Gravel Pack: 16.5'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

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

BORING LOG

Project No. KEI-P89-1106	**Boring Diameter** 8"	**Logged By** D.L.
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 4/25/90
Boring No. EB1	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		A. C. Pavement over fill consisting of clay, sand, and gravel, moist.
				Fill is very moist at 3.5 feet.
14/24/37		5	CL/ CH	Gravelly clay, gravel consisting of shale fragments to 1-1/2" diameter, hard, moist, dark greenish gray and olive, cementation.
				BEDROCK
19/24/34		10	N/A	Shale, moderately hard, fractured, very weathered, decomposed and clayey moist, olive.
27/45/50-4"				Shale, as above, less weathered, becoming harder with depth.
	▼			Wet at 14 feet.
27/36/50-2 1/2"		15		
		20		TOTAL DEPTH DRILLED: 13.5' TOTAL DEPTH SAMPLED: 15'

BORING LOG

Project No.	Boring Diameter	Logged By
KEI-P89-1106	8"	D.L. DRB
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 4/25/90
Boring No. EB2	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		A. C. Pavement underlain by fill consisting of clay, sand and gravel.
			CL/ CH	Gravelly clay, very stiff, moist, very dark gray, gravel consists entirely of shale fragments.
21/42/50		5		BEDROCK
			N/A	Shale, hard, slightly moist, fractured decomposed and clayey in fractures, dark yellowish brown.
16/32/29	▼	10		Shale, as above, moist to wet, less weathered than above.
19/27/39				
		15		
		20		TOTAL DEPTH DRILLED: 12' TOTAL DEPTH SAMPLED: 13.5'

BORING LOG

Project No.	Boring Diameter	Logged By
KEI-P89-1106	8"	D.L. DRB
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 4/25/90
Boring No. EB3	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		A. C. Pavement underlain by fill consisting of clay, sand and gravel.
			CL/ CH	Clay, 10-15% silt, 5% sand and gravel to 1/8" diameter, stiff, moist, very dark gray.
5/26/30		5	GC	Clayey gravel with sand, very dense, moist, olive brown, gravel is mostly angular shale frements, trace serpentine?.
			CL/ CH	Clay, 5-10% sand, very stiff, moist, black.
15/21/32	▼	10	GC	Clayey gravel with sand, very dense, very moist to wet, yellowish brown.
		15		
		20		

TOTAL DEPTH DRILLED: 9'
TOTAL DEPTH SAMPLED: 10.5'

BORING LOG

Project No.	Boring Diameter	Logged By
KEI-P89-1106	8"	D.L. DRB
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 4/24/90
Boring No. EB4	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		
	NOT			A. C. Pavement underlain by fill consisting of clay, sand and gravel.
	ENCOUNTERED DURING DRILLING		CL/CH	Clay, with sand, very stiff, moist, very dark grayish brown to black.
15/23/46		5	GC	Clayey gravel with sand, very dense, moist, olive brown, gravel is entirely shale, maybe bedrock weathered to soil.
				BEDROCK
49/50-3"				Shale, hard, slightly moist, fractured weathered with clay-lined fractures, olive.
50-5 3/4"		10		
				Color change at 12 feet to olive gray, hardness increasing with depth.
25/41/50-5 1/2"				
50-2"				Difficult drilling at 14 feet.
		15		
		20		

TOTAL DEPTH DRILLED: 14'
TOTAL DEPTH SAMPLED: 14.5'

BORING LOG

Project No.	Boring Diameter	Logged By
KEI-P89-1106	8"	D.L.
Project Name Unocal Castro Valley	**Well Head Elevation** N/A	**Date Drilled** 4/25/90
Boring No. EB5	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		A. C. Pavement
			GP/ SP	Gravel and sand fill, 5-10% fines, road and utility trench backfill.
		5		
10/10/11				
10/9/8				
7/6/8				
				Base of Fill Materials
12/33/50	▽	10	N/A	BEDROCK Shale, moderately hard, moist, fractured, decomposed with clay-lined fractures, olive to olive gray.
		15		
		20		

TOTAL DEPTH DRILLED: 9.5'
TOTAL DEPTH SAMPLED: 11'

BORING LOG

Project No. KEI-P89-1106	Boring Diameter 8"	Logged By D.L.
Project Name Unocal Castro Valley	Well Head Elevation N/A	Date Drilled 4/24/90
Boring No. EB6	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		A. C. Pavement underlain by fill consisting of sand and gravel.
7/11/15		5	CL/ CH	Clay, 5-10% sand, 5-10% gravel to 3/4" diameter, very stiff, moist, black.
21/33/45		10	N/A	BEDROCK Shale, hard, slightly moist to moist, fractured, weathered with clay-lined fractures, olive brown.
45/50-4"	▼			Shale, as above, less weathered than above, hardness increasing with depth
50-3 1/4"		15		
		20		TOTAL DEPTH DRILLED: 14' TOTAL DEPTH SAMPLED: 14.5'

BORING LOG

Project No. KEI-P89-1106	Boring Diameter 8"	Logged By D.L. DRB
Project Name Unocal Castro Valley	Well Head Elevation N/A	Date Drilled 4/24/90
Boring No. EB7	Drilling Method Hollow-stem Auger	Drilling Company EGI

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		A. C. Pavement underlain by sand and gravel baserock.
6/12/21		5	CL/ CH	Clay, 5-10% sand and gravel to 3/8" diameter, very stiff, moist, black, lensed with greenish gray partially cemented layers below 5 feet, cemented layers have blocky texture (caliche?).
				BEDROCK
5/50		10	N/A	Shale, hard, slightly moist to moist, fractured, weathered with clay-lined fractures, olive brown.
30/49/50-5"				
50-5 1/2"				
50-5"	▼			
		15		
		20		TOTAL DEPTH DRILLED: 13.5' TOTAL DEPTH SAMPLED: 14'

BORING LOG

Project No. KEI-P89-1106	Boring Diameter 8"	Logged By D.L. DRB
Project Name Unocal Castro Valley	Well Head Elevation N/A	Date Drilled
Boring No. EB8	Drilling Method Hollow-stem Auger	Drilling Company EGI

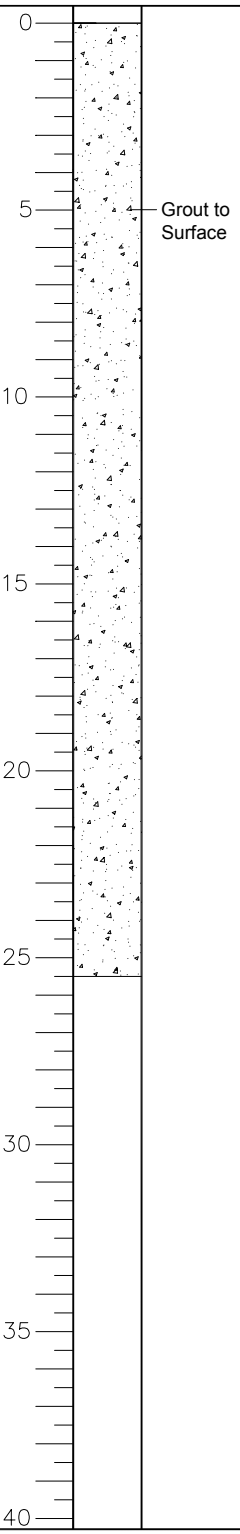
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		A. C. Pavement underlain by sand and gravel baserock.
11/13/20		5	CL/ CH	Clay, 10-20% sand and gravel to 3/8" diameter, very stiff, moist, black. At 5 feet, black and greenish gray, with locally strong cementation, blocky texture, greenish gray below 6 feet. Color change at approximately 8.5 feet to black.
				BEDROCK
11/25/40	▼	10	N/A	Shale, moderately hard, moist, very weathered, fractured, clay-lined fractures, olive to olive brown.
30/41/47				
		15		
		20		TOTAL DEPTH DRILLED: 12' TOTAL DEPTH SAMPLED: 13.5'

PROJECT NO.: 42-0187-01	DATE DRILLED: 1/24/05	NORTHING: NOT SURVEYED
LOCATION: 76 Station #3072	LOGGED BY: R. Dunn	EASTING: NOT SURVEYED
2445 Castro Valley Blvd.	APPROVED BY: K. Woodburne, RG	GROUND SURFACE ELEVATION: NOT SURVEYED
Castro Valley, California	DRILLING CO.: Woodward Drilling	

DRILLING METHOD: 2-inch Diameter Direct-Push
SAMPLER TYPE: 4-foot Continuous-Core Barrel
TOTAL DEPTH: 25.5 feet
DEPTH TO WATER: 23.5 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Vacuum clearance to 5'.		
34.0		3.0/3.0		5	SAND (SP): Gray (10YR 6/1), 10% fines, 90% fine- to medium-grained sand, dense, dry, hydrocarbon odor.	SP	
5.0		4.0/4.0		10	- @ 8': color change to grayish brown (10YR 5/2), slight odor.		
1.0		3.0/3.0			- @ 12': color change to brown (10YR 4/3), no odor.		
1.2		2.0/2.0		15			
					No recovery.		
1.5		3.0/3.0		20	SAND (SP): same as above.		
					- @ 21.5': color change to dark gray (10YR 4/1).		
1.4		2.5/2.5		25	- @ 24': color change to grayish brown (10YR 5/2), wet.	SP ▽	
				30			
				35			
				40			

BORING BACKFILL DETAIL



TRC

LOG OF EXPLORATORY BORING

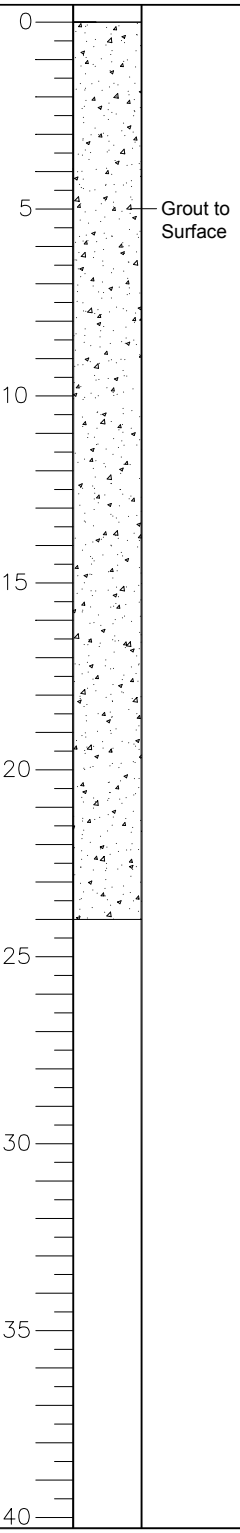
SB-1
PAGE 1 OF 1

PROJECT NO.: 42-0187-01	DATE DRILLED: 1/24/05	NORTHING: NOT SURVEYED
LOCATION: 76 Station #3072	LOGGED BY: R. Dunn	EASTING: NOT SURVEYED
2445 Castro Valley Blvd.	APPROVED BY: K. Woodburne, RG	GROUND SURFACE ELEVATION: NOT SURVEYED
Castro Valley, California	DRILLING CO.: Woodward Drilling	

DRILLING METHOD: 2-inch Diameter Direct-Push
SAMPLER TYPE: 4-foot Continuous-Core Barrel
TOTAL DEPTH: 24.0 feet
DEPTH TO WATER: 23.0 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Vacuum clearance to 5'.		
0.6		3.0/3.0		5	SAND (SP): Brown (10YR 4/3), 10% fines, 90% fine-grained sand, loose, dry.	SP	
7.1		4.0/4.0		10			
2.8		3.0/3.0					
2.1		1.0/1.0		15	- @ 15': fine- to medium-grained sand.		
2.0		1.5/1.5					
1.9		2.0/2.0			- @ 17.5': color change to dark grayish brown (10YR 4/2), dense.		
2.1		1.5/1.5		20			
1.6		3.0/3.0			SILTY CLAY (CL): Gray (10YR 5/1), 95% fines, 5% fine-grained sand, medium plasticity, soft, wet.	CL	
				25			
				30			
				35			
				40			

BORING BACKFILL DETAIL



TRC

LOG OF EXPLORATORY BORING

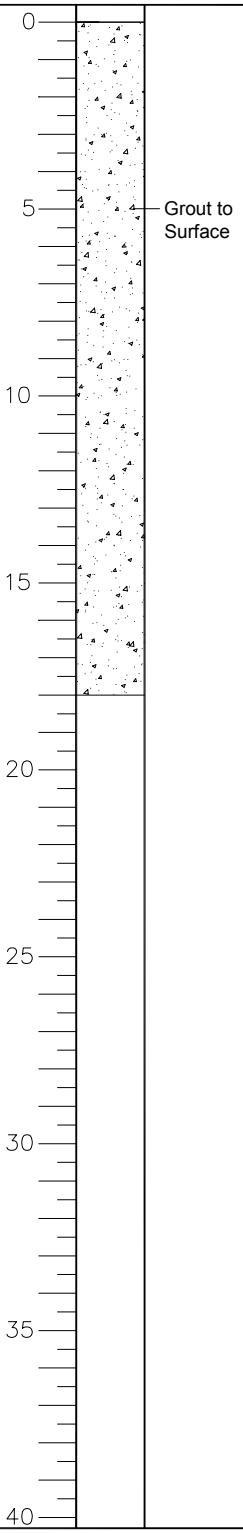
SB-2
PAGE 1 OF 1

PROJECT NO.: 42-0187-01	DATE DRILLED: 1/25/05	NORTHING: NOT SURVEYED
LOCATION: 76 Station #3072	LOGGED BY: R. Dunn	EASTING: NOT SURVEYED
2445 Castro Valley Blvd.	APPROVED BY: K. Woodburne, RG	GROUND SURFACE ELEVATION: NOT SURVEYED
Castro Valley, California	DRILLING CO.: Woodward Drilling	

DRILLING METHOD: 2-inch Diameter Direct-Push
SAMPLER TYPE: 4-foot Continuous-Core Barrel
TOTAL DEPTH: 18.0 feet
DEPTH TO WATER: 15.0 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Vacuum clearance to 5'.		
		0.0/ 3.0		5	No recovery.		
		0.0/ 4.0		10			
		1.0/ 3.5		15	PEA GRAVEL: wet.		
1.4		2.5/ 2.5			SAND (GW): Brown (10YR 4/3), 5% fines, 95% fine- to medium-grained sand, loose, wet.	GW	
				20			
				25			
				30			
				35			
				40			

BORING BACKFILL DETAIL



TRC

LOG OF EXPLORATORY BORING

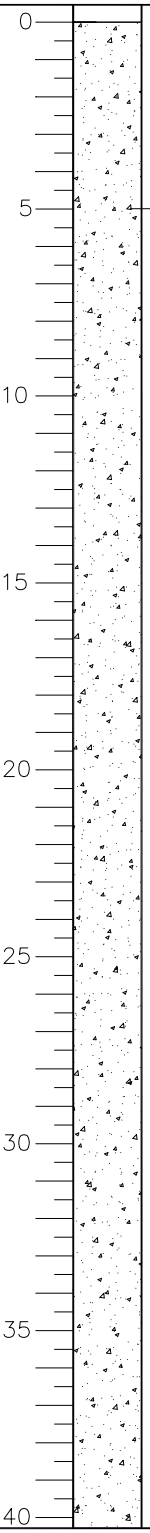
SB-3
PAGE 1 OF 1

PROJECT NO.: 42-0187-01	DATE DRILLED: 1/25/05	NORTHING: NOT SURVEYED
LOCATION: 76 Station #3072	LOGGED BY: R. Dunn	EASTING: NOT SURVEYED
2445 Castro Valley Blvd.	APPROVED BY: K. Woodburne, RG	GROUND SURFACE ELEVATION: NOT SURVEYED
Castro Valley, California	DRILLING CO.: Woodward Drilling	

DRILLING METHOD: 2-inch Diameter Direct-Push
SAMPLER TYPE: 4-foot Continuous-Core Barrel
TOTAL DEPTH: 50.0 feet
DEPTH TO WATER: 49.0 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Vacuum clearance to 5'.		
44.0		3.0/ 3.0		5	SILTY CLAY (CL): Greenish gray (GLEY 1 5/10Y), 90% fines, 10% fine-grained sand, medium plastic, soft, moist, hydrocarbon odor.		
1.3		4.0/ 4.0		10	- @ 8.5': stiff.	CL	
1.7		2.0/ 4.0		15	SAND (SP): Grayish brown (10YR 5/2), 10% fines, 90% fine-grained sand, dense, no odor. - @ 13': color change to brown (10YR 5/3). - @ 13.5': color change to very dark gray (10YR 3/1).		
2.0		3.0/ 3.0			- @ 18': color change to dark grayish brown (10YR 4/2).	SP	
0.9		1.0/ 1.0		20			
1.5		3.0/ 3.0					
2.0		1.0/ 1.0		25	Difficult drilling conditions; augers used; no samples collected.		
				30			
				35			
				40			

BORING BACKFILL DETAIL



TRC

LOG OF EXPLORATORY BORING

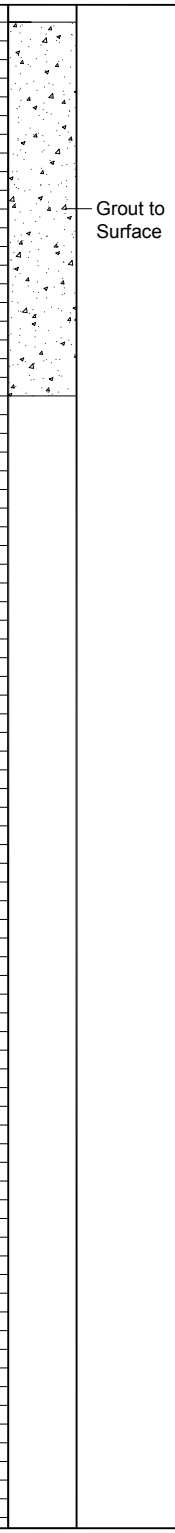
SB-4

PROJECT NO.: 42-0187-01	DATE DRILLED: 1/25/05	NORTHING: NOT SURVEYED
LOCATION: 76 Station #3072	LOGGED BY: R. Dunn	EASTING: NOT SURVEYED
2445 Castro Valley Blvd.	APPROVED BY: K. Woodburne, RG	GROUND SURFACE ELEVATION: NOT SURVEYED
Castro Valley, California	DRILLING CO.: Woodward Drilling	

DRILLING METHOD: 2-inch Diameter Direct-Push
SAMPLER TYPE: 4-foot Continuous-Core Barrel
TOTAL DEPTH: 50.0 feet
DEPTH TO WATER: 49.0 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				40	Difficult drilling conditions.		
				45			
1.2		1.0/ 1.0		50	SAND (SP): Gray (10YR 5/1), 10% fines, 90% very fine-grained sand, loose, wet.	SP	
				55			
				60			
				65			
				70			
				75			
				80			

BORING BACKFILL DETAIL



TRC

LOG OF EXPLORATORY BORING

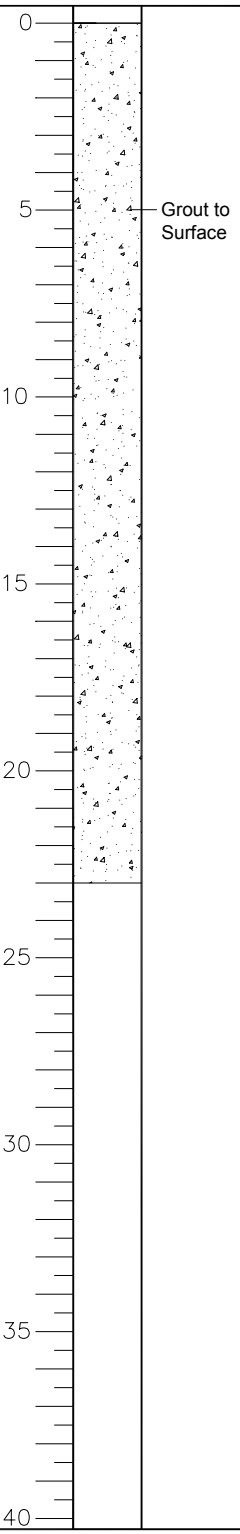
SB-4

PROJECT NO.: 42-0187-01	DATE DRILLED: 1/31/05	NORTHING: NOT SURVEYED
LOCATION: 76 Station #3072	LOGGED BY: R. Dunn	EASTING: NOT SURVEYED
2445 Castro Valley Blvd.	APPROVED BY: K. Woodburne, RG	GROUND SURFACE ELEVATION: NOT SURVEYED
Castro Valley, California	DRILLING CO.: Woodward Drilling	

DRILLING METHOD: 2-inch Diameter Direct-Push
SAMPLER TYPE: 4-foot Continuous-Core Barrel
TOTAL DEPTH: 23.0 feet
DEPTH TO WATER: Not Encountered

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Vacuum clearance to 5'.		
0.2		3.0/ 3.0		5	SILT (ML): Light yellowish brown (10YR 6/4), 90% fines, 10% fine-grained sand, nonplastic, stiff, dry.	ML	
0.4		4.0/ 4.0		10	SAND (SP): Brown (10YR 5/3), 10% fines, 90% fine- to medium-grained sand, dense, dry.	SP	
1.2		4.0/ 4.0		15			
1.2		2.0/ 2.0			- @ 17.5': color change to gray (10YR 5/11), fine-grained sand, loose.		
1.8		2.0/ 2.0		20			
2.5		2.0/ 2.0					
2.0		1.0/ 1.0		25			
				30			
				35			
				40			

BORING BACKFILL DETAIL



TRC

LOG OF EXPLORATORY BORING

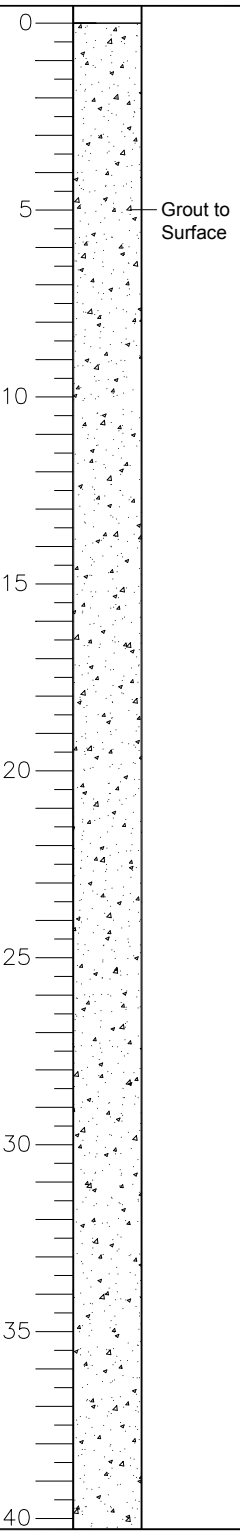
SB-5
PAGE 1 OF 1

PROJECT NO.: 42-0187-01	DATE DRILLED: 1/31/05	NORTHING: NOT SURVEYED
LOCATION: 76 Station #3072	LOGGED BY: R. Dunn	EASTING: NOT SURVEYED
2445 Castro Valley Blvd.	APPROVED BY: K. Woodburne, RG	GROUND SURFACE ELEVATION: NOT SURVEYED
Castro Valley, California	DRILLING CO.: Woodward Drilling	

DRILLING METHOD: 2-inch Diameter Direct-Push
SAMPLER TYPE: 4-foot Continuous-Core Barrel
TOTAL DEPTH: 50.0 feet
DEPTH TO WATER: 47.0 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Vacuum clearance to 5'.		
24.6		3.0/3.0		5	SILT (ML): Greenish gray (GLEY1 5/10Y), 90% fines, 10% fine- to medium-grained sand, low plasticity, soft, moist.	ML	
190.1		2.0/2.0					
60.1		2.0/2.0		10	SAND (SP): Pale brown (10YR 6/3), 15% fines, 85% fine-grained sand, dry.		
2.2		1.0/1.0			- @ 12.5': color change to yellowish brown (10YR 5/4).		
6.7		3.0/3.0		15	- @ 15.5': medium-grained sand, slight hydrocarbon odor.	SP	
7.1		3.0/3.0					
6.8		2.0/2.0		20	- @ 20': no odor.		
					Difficult drilling conditions; augers used; no samples collected.		
				25			
				30			
				35			
				40			

BORING BACKFILL DETAIL



TRC

LOG OF EXPLORATORY BORING

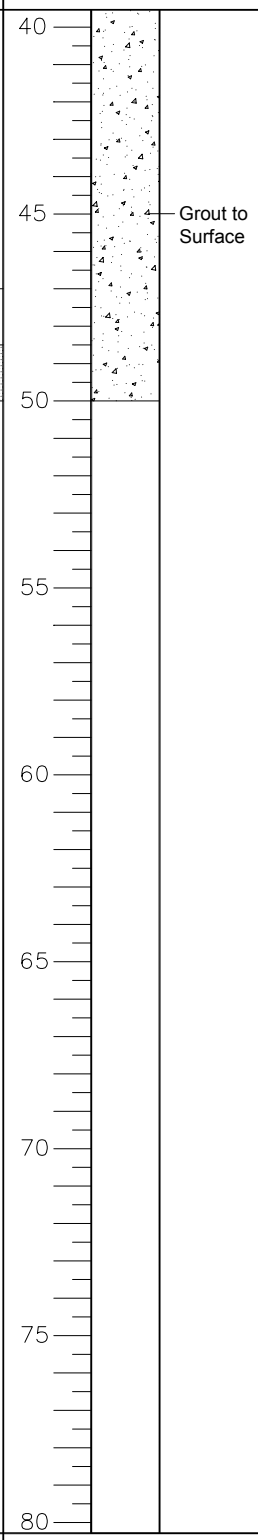
SB-6

PROJECT NO.: 42-0187-01	DATE DRILLED: 1/31/05	NORTHING: NOT SURVEYED
LOCATION: 76 Station #3072	LOGGED BY: R. Dunn	EASTING: NOT SURVEYED
2445 Castro Valley Blvd.	APPROVED BY: K. Woodburne, RG	GROUND SURFACE ELEVATION: NOT SURVEYED
Castro Valley, California	DRILLING CO.: Woodward Drilling	

DRILLING METHOD: 2-inch Diameter Direct-Push
SAMPLER TYPE: 4-foot Continuous-Core Barrel
TOTAL DEPTH: 50.0 feet
DEPTH TO WATER: 47.0 feet

PID/FID (ppm)	BLOWS PER 6 INCHES	RECOVERY	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				40	Difficult drilling conditions.		
		3.0/ 3.0		45	SANDY SILT (ML): Gray (10YR 5/1), 90% fines, 10% fine-grained sand, low plasticity, soft, wet.	ML	
				50	SAND (SP): Gray (10YR 6/1), 10% fines, 90% fine-grained sand, dense, dry.	SP	
				55			
				60			
				65			
				70			
				75			
				80			

BORING BACKFILL DETAIL



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LOG OF EXPLORATORY BORING

SB-6
PAGE 2 OF 2

ARCADIS

Appendix C

Historical Soil Results

KEI-J89-1106.R5
March 6, 1990

TABLE 1

SUMMARY OF LABORATORY ANALYSES
SOIL

(Samples collected on November 14 & 16, 1989)

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
A1	13.5	ND	2.4	ND	ND	ND	ND
A2	13.5	ND	ND	ND	ND	ND	ND
B1	13.5	--	1.9	ND	ND	ND	ND
B2	13.5	--	11	ND	ND	ND	ND
C1	13.5	--	1.5	ND	ND	ND	ND
C2	13.5	--	7.5	ND	ND	ND	ND
SW1	10.5	--	140	0.31	0.12	3.0	0.88
SW2	10.5	ND	ND	ND	ND	ND	ND
SW3	10.5	ND	ND	ND	ND	ND	ND
SW4	9.5	24	160	0.33	6.4	30	9.4
SW5	9.5	--	3.5	0.06	0.27	0.76	0.19
SW6	10	--	29	0.12	0.21	2.0	0.58
WO1(11)*	11	ND	5.9	ND	ND	ND	ND
Detection Limits		1.0	1.0	0.05	0.1	0.1	0.1

* TOG and all 8270 constituents were non-detectable. All 8010 constituents were non-detectable except 1,1-dichloroethene at 55 ppb. Metals concentrations were as follows: cadmium 2.5 ppm, chromium 39 ppm, lead 1.1 ppm, and zinc 45 ppm.

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-J89-1106.R5
March 6, 1990

TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

(Samples collected on December 22, 1989)

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
SW1(17)	11	ND	1,900	14	24	120	28
SW2(17)	11	ND	1,500	17	29	92	23
SW7	9	ND	1,700	16	33	110	26
SW8	9	ND	200	2.6	0.9	7.7	5.0
SW3(13)	9	ND	690	11	11	28	11
SW9	9	ND	3.0	0.2	0.1	0.1	ND
SW10	9	ND	500	4.0	5.9	22	6.9
SW4(11)	9	ND	410	2.7	3.9	19	3.8
Detection Limits		1.0	1.0	0.1	0.1	0.1	0.1

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-J89-1106.R9
September 28, 1990

TABLE 9

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on January 18, 1990)

Sample Number	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
MW1(5)	5.0	2.8	0.051	ND	ND	0.11
MW1(6.5)	6.5	ND	ND	ND	ND	ND
MW1(10.0)	10.0	ND	ND	ND	ND	ND
MW2(5)	5.0	ND	ND	ND	ND	ND
MW2(6.5)	6.5	ND	ND	ND	ND	ND
MW2(9.0)	9.0	ND	ND	ND	ND	ND
MW2(10)	10.0	ND	ND	ND	ND	ND
MW2(15)	15.0	ND	ND	ND	ND	ND
MW2(16.5)	16.5	ND	ND	ND	ND	ND
MW2(20)	20.0	ND	ND	ND	ND	ND
MW3(5)	5.0	ND	ND	ND	ND	ND
MW3(6.5)	6.5	ND	ND	ND	ND	ND
MW3(9)	9.0	ND	ND	ND	ND	ND
Detection Limits		1.0	0.05	0.1	0.1	0.1

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-J89-1106.R5
March 6, 1990

TABLE 4

SUMMARY OF LABORATORY ANALYSES

(Samples collected on February 14, 1990)

Sample	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
P1	4.0	87	0.33	0.17	10	2.3
P2	2.5	6.0	0.23	ND	0.33	0.11
P3	3.0	10	0.47	0.11	1.1	0.32
Detection Limits		1.0	0.05	0.1	0.1	0.1

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-J89-1106.R9
September 28, 1990

TABLE 8

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on March 9, 1990)

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
SWB*	8.0	<10	37	0.10	0.10	0.74	0.25
SWC*	9.0	ND	ND	ND	ND	ND	ND
SWD*	9.0	<10	ND	ND	ND	ND	ND
Detection Limits		1.0	1.0	0.05	0.1	0.1	0.1

* TOG and all EPA 8010 constituents were non-detectable.

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-J89-1106.R9
September 28, 1990

TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on April 24 and 25, 1990)

Sample Number	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
EB1(5)	ND	0.0063	0.042	0.011	ND
EB1(9.5)	4.9	0.0078	0.24	0.11	0.028
EB1(13.5)	ND	0.0087	0.048	ND	ND
EB2(5)	ND	0.0053	0.020	0.013	0.0068
EB2(10)	ND	0.0059	0.026	0.013	0.0050
EB3(5)	ND	0.0069	0.031	0.017	ND
EB3(9)	ND	0.0093	0.023	ND	ND
EB4(5)	ND	0.0091	0.034	ND	ND
EB4(10)	ND	0.0090	0.27	ND	ND
EB4(14)	1.7	0.0079	0.43	ND	ND
EB5(5)	ND	0.0095	0.015	ND	ND
EB6(5)	5.0	0.066	0.021	0.11	0.032
EB6(10)	ND	0.0086	0.060	0.014	0.0052
EB6(13)	ND	0.0080	0.16	0.24	0.0092
EB7(5)	3.0	0.040	0.056	0.073	0.034
EB7(9.5)	ND	0.0081	0.078	0.025	0.015
EB7(13.5)	ND	0.0054	0.085	0.012	ND
EB8(5)	2.7	0.023	0.067	0.078	0.013
EB8(10)	ND	0.0072	0.056	0.019	0.0050
Detection Limits	1.0	0.0050	0.0050	0.0050	0.0050

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-P89-1106.R9
September 28, 1990

TABLE 2

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on August 13, 1990)

Sample Number	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
MW4(5)	5	ND	ND	ND	ND	ND
MW5(9.5)	9.5	ND	ND	ND	ND	ND
MW5(13.5)	13.5	ND	ND	ND	ND	ND
Detection Limits		1.0	0.0050	0.0050	0.0050	0.0050

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

TABLE 1 - SOIL CHEMICAL ANALYTICAL DATA

Tosco (Unocal) Service Station No.3072
2445 Castro Valley Boulevard
Castro Valley, California

Sample No.	Sample Date	Sample Depth (Feet)	TPHhf (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Total Xylenes (ppm)	TOG (ppm)
H1(8.5)	6/7/01	8.5	1200[1]	NA	NA	NA	NA	210
Comp-1(A,B,C,D)[4]	6/7/01	-	74[2]	0.15[3]	0.035[3]	0.017[3]	0.029[4]	NA

EXPLANATION:

ppm = parts per million
NA= Not Analyzed

ANALYTICAL LABORATORY:

Sequoia Analytical Walnut Creek (ELAP #1271)
(see laboratory reports for detection limits)

ANALYTICAL METHODS:

TPHhf = Total Petroleum Hydrocarbons as hydraulic Fluid by DHS-LUFT
Benzene, Toluene, Ethylbenzene, and Total Xylenes by EPA Method 8020
TOG= Total Oil and Grease by EPA Method 5520E/F
[1] = Chromatogram Pattern: Unidentified Hydrocarbon >C16
[2]= Chromatogram Pattern: Hydraulic Oil C16-C40
[3] = Chromatogram Pattern: Gasoline C6-C12 + Unidentified Hydrocarbons >C10
[4]= Sample Comp-1(A,B,C,D) also contained: Mercury at 0.093 ppm, Barium at 160 ppm, Chromium at 30 ppm, Cobalt at 12 ppm, Copper at 32 ppm, Lead at 7.6 ppm, Nickel at 36 ppm, Vanadium at 51 and Zinc at 88 ppm. All other CAM 17 Metals were not detected.

Table 1

RESULTS OF LABORATORY ANALYSIS OF SOIL SAMPLES
76 Station # 3072
2445 Castro Valley Blvd, Castro Valley, California

Sample Number	Sample Date	Depth (fbg)	TPH-D (mg/kg)	TPPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total Xylenes (mg/kg)	TBA (mg/kg)	MTBE (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	1, 2-DCA (mg/kg)	EDB (mg/kg)	Ethanol (mg/kg)	Total Lead (mg/kg)	Oil & Grease (mg/kg)
			EPA 8015	EPA 8260B	EPA Method 8260B												Method 6010B	Method 1664A
SB-1 @ 8'	1/24/2005	8.0	--	**480**	<0.50	<0.50	**1.1**	**1.1**	<2.5	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<25	--	--
SB-1 @ 25.5'	1/24/2005	25.5	--	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	**0.013**	**0.074**	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.1	--	--
SB-2 @ 12'	1/24/2005	12.0	--	<1.0	<0.0050	<0.0050	**0.043**	**0.021**	**0.014**	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.1	--	--
SB-2 @ 24'	1/24/2005	24.0	--	<1.0	<0.0050	<0.0050	<0.0050	**0.011**	<0.010	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.1	--	--
SB-3 @ 18'	1/25/2005	18.0	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	**0.11**	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.1	--	--
SB-4 @ 8'	1/25/2005	8.0	**25**	**470**	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<1.0	<0.50	<0.50	<0.50	<0.50	<25	--	--
SB-4 @ 50'	1/25/2005	50.0	--	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.1	--	--
SB-5 @ 23'	1/31/2005	23.0	**2.1**	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.1	--	--
SB-6 @ 10'	1/31/2005	10.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**3.4**	**670**
SB-6 @ 50'	1/31/2005	50.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**4.7**	<50
Composite	1/25/2005	na	**5.0**	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.1	**7.5**	

Notes:

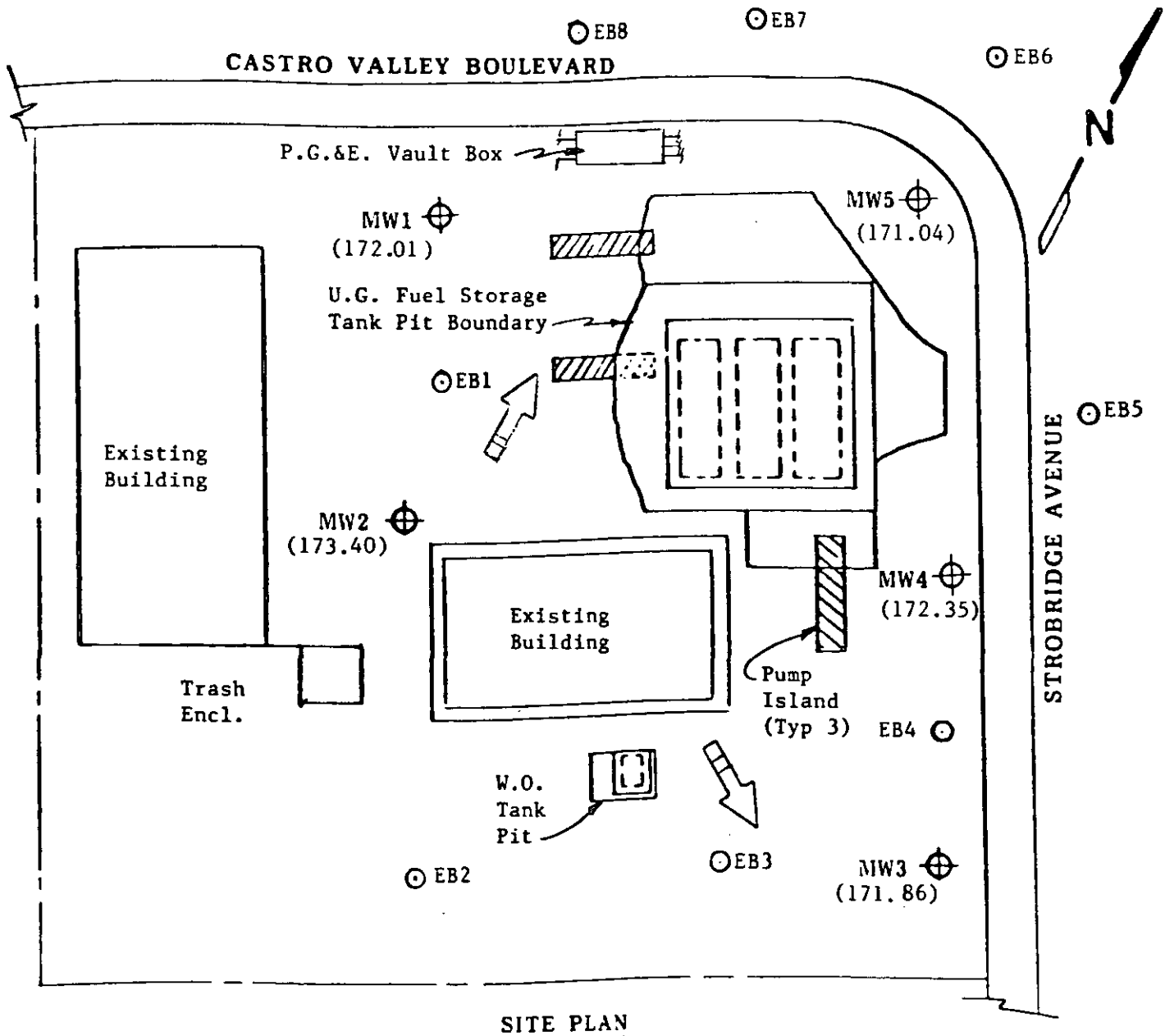
TPH-D = total petroleum hydrocarbon as diesel
TPPH = total purgeable petroleum hydrocarbons
TBA = tertiary butyl alcohol
MTBE = methyl tertiary butyl ether
DIPE = di-isopropyl ether
ETBE = ethyl tertiary butyl ether
TAME = tertiary amyl methyl ether
1,2 DCA = 1,2-dichloroethane
EDB = ethylene dibromide
fbg = feet below grade
mg/kg = milligrams per kilogram
-- = not analyzed, measured, or collected
na = not applicable

ARCADIS

Appendix D

Soil Sample Locations

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
PO. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



SITE PLAN

Figure 1

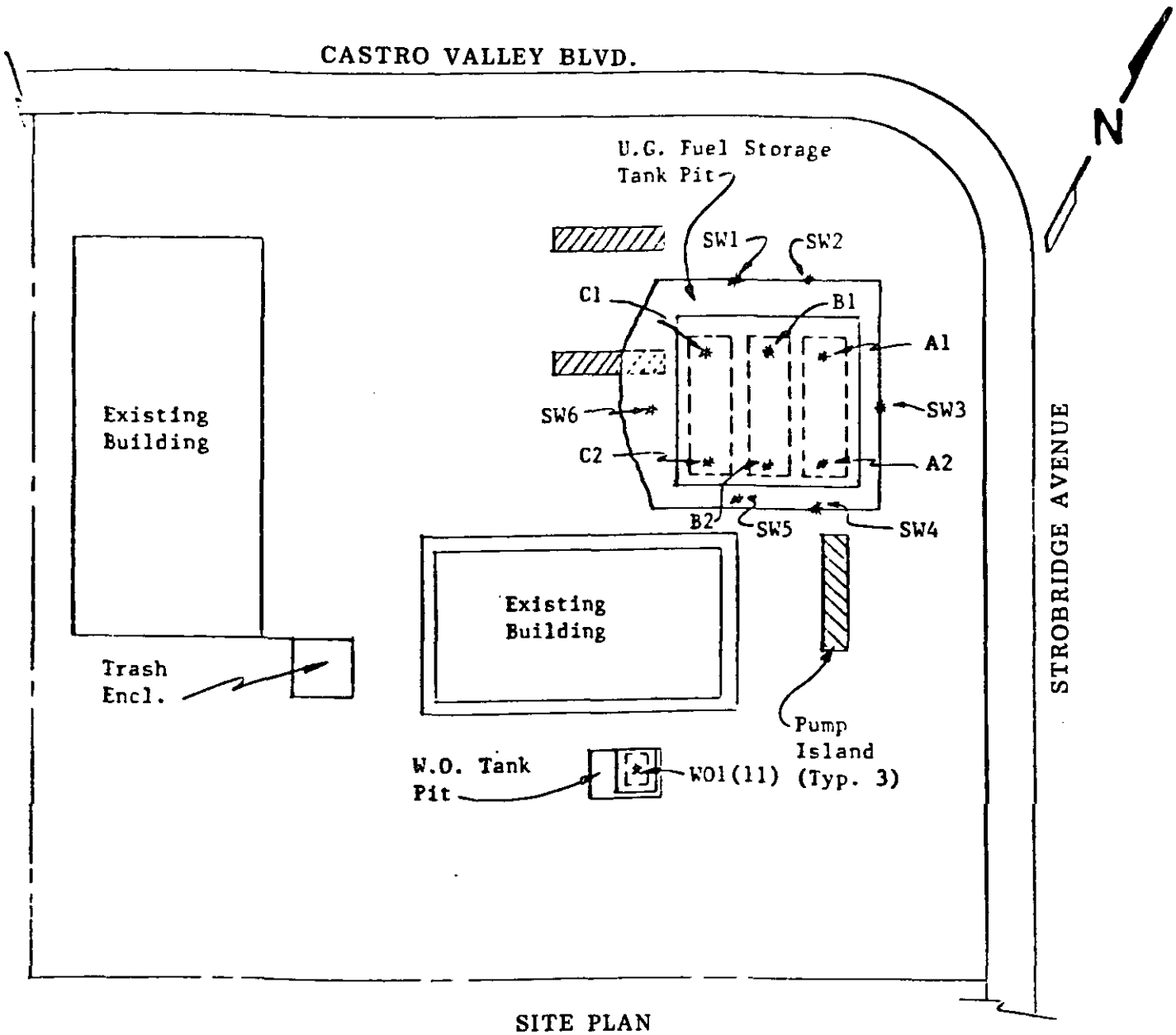
LEGEND

- Monitoring Well (Existing)
- Exploratory Boring
- Ground Water Flow Direction
- ( ) Ground Water Elevation in feet (above MSL) on 8/20/90

30 0 30
Approx. Scale feet

Unocal S/S #3072
2445 Castro Valley Blvd.
Castro Valley, CA

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
P.O. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



SITE PLAN
Figure 2

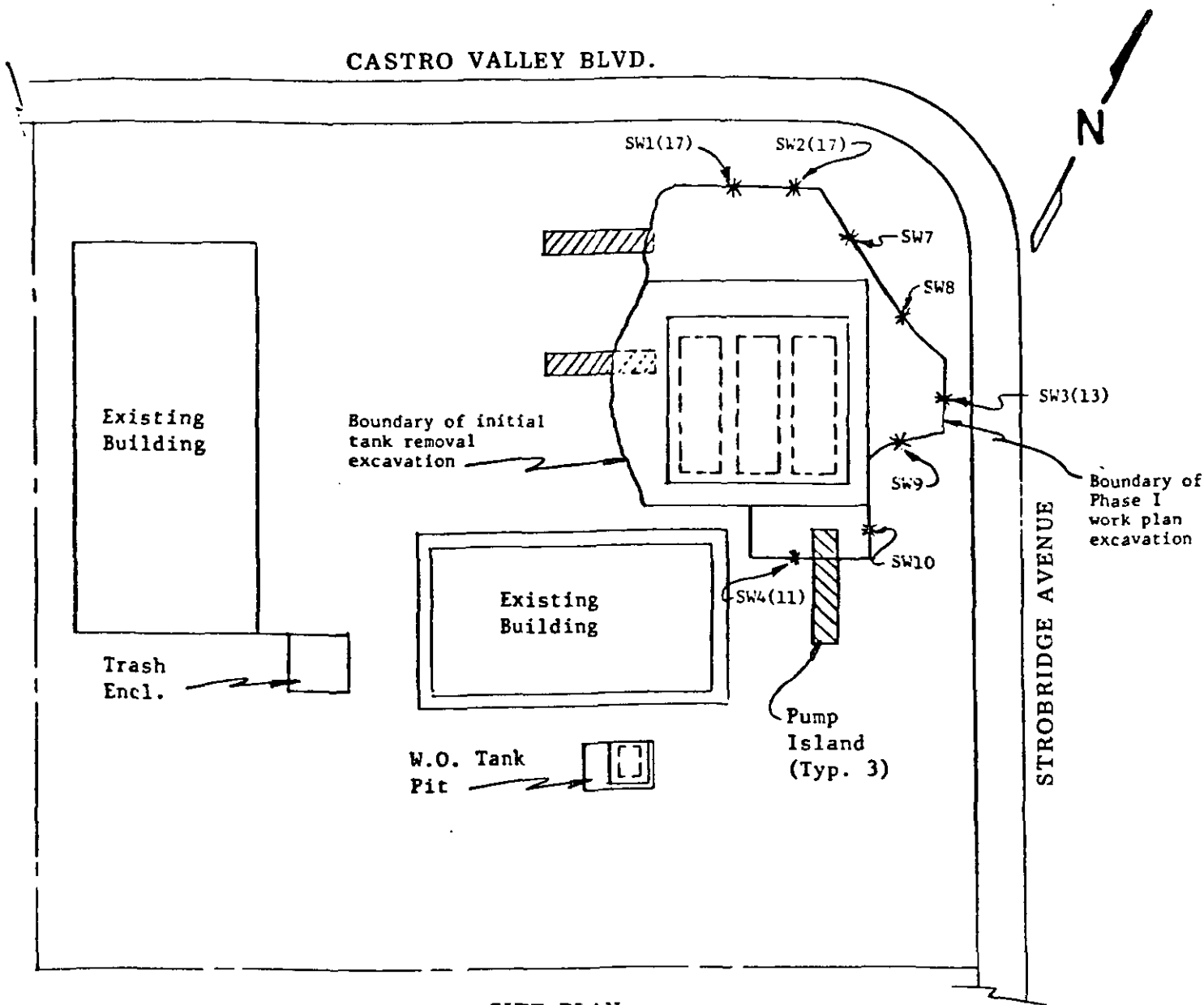
30 0 30
Approx. Scale feet

LEGEND

* Sample Point Location

Unocal S/S #3072
2445 Castro Valley Blvd.
Castro Valley, CA

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
PO. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



SITE PLAN
Figure 3

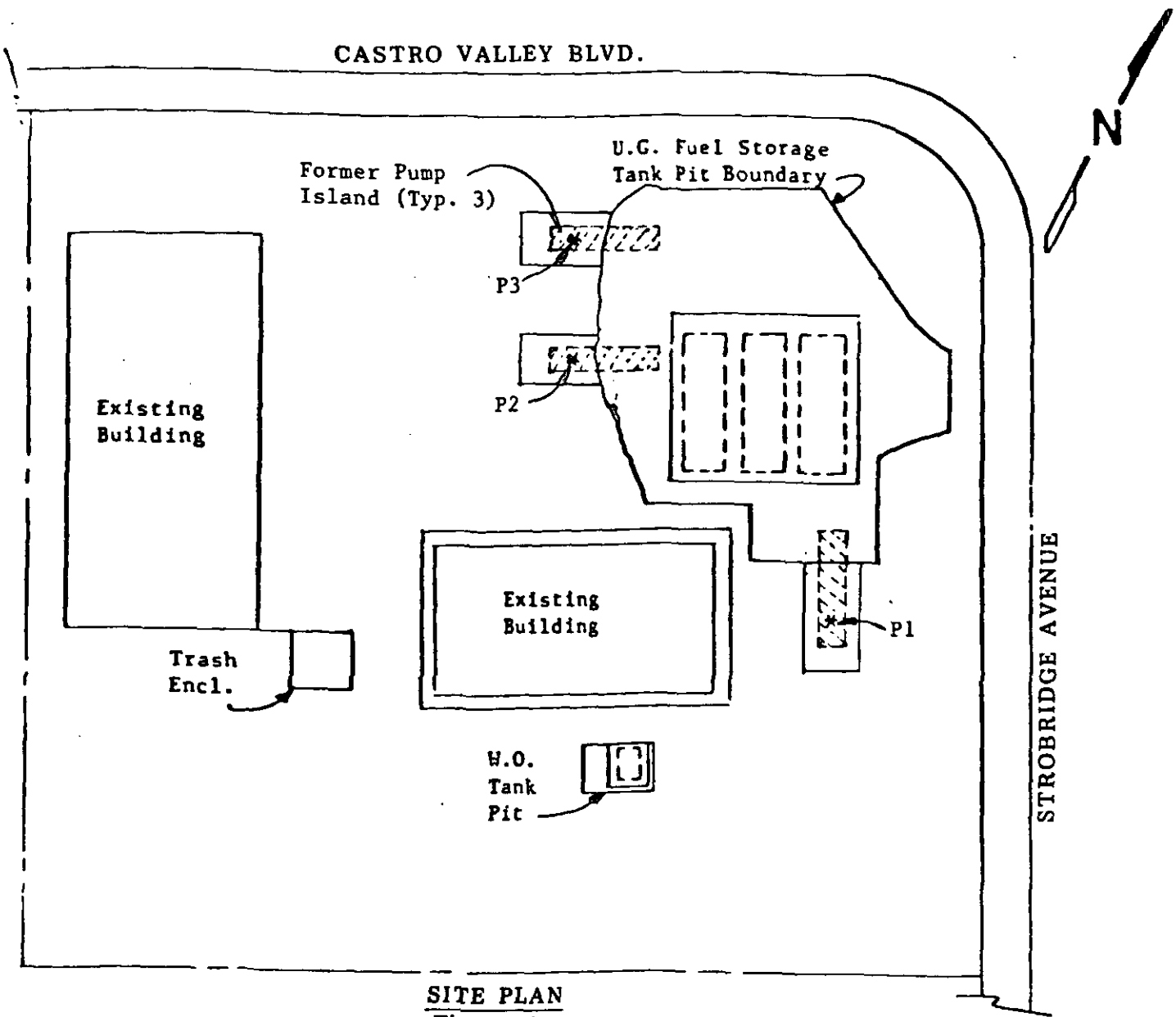
30 0 30
Approx. Scale Feet

LEGEND

* Sample Point Location

Unocal S/S #3072
2445 Castro Valley Blvd.
Castro Valley, CA

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
PO. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



SITE PLAN
Figure 4

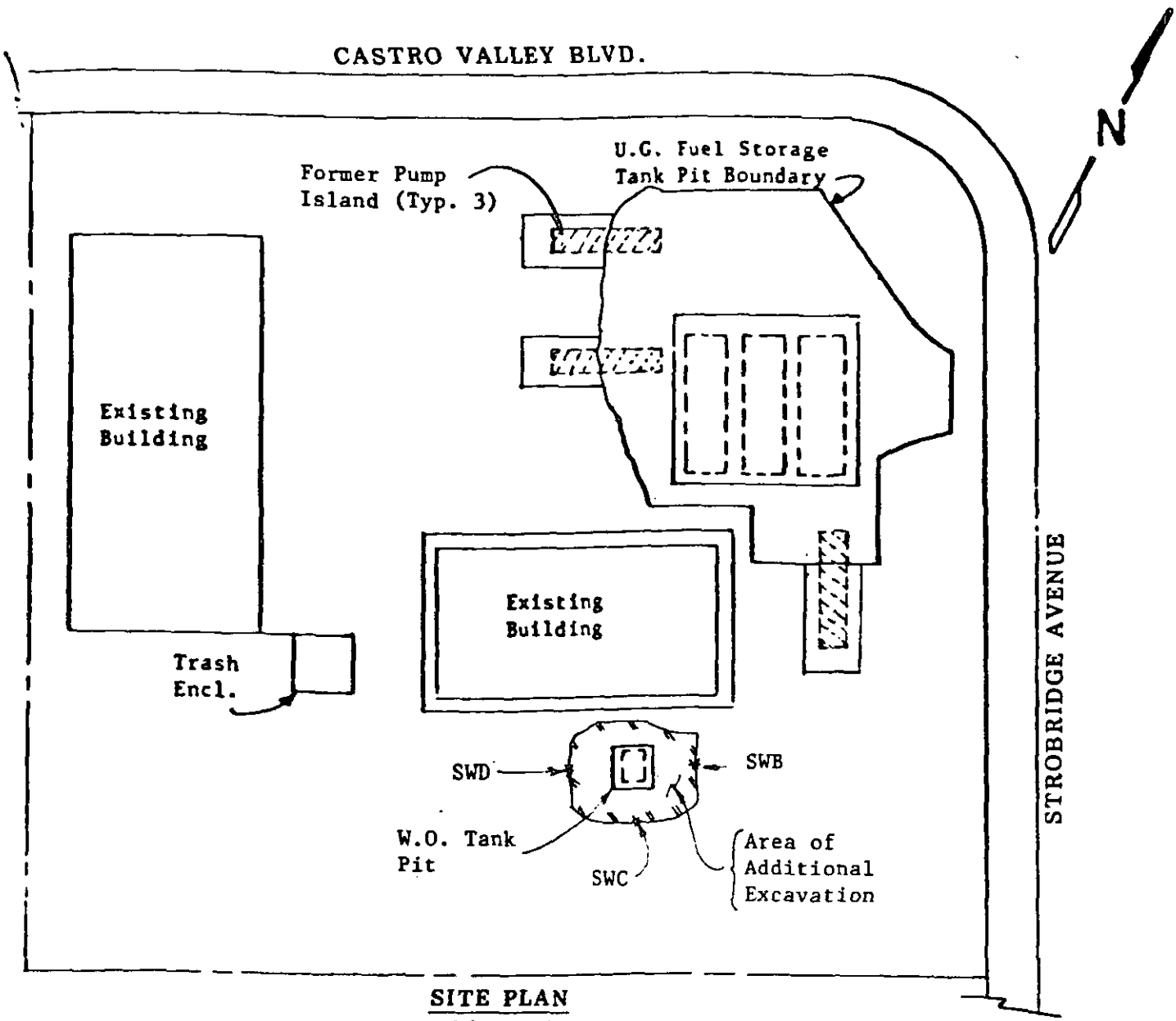
LEGEND

* Sample Point Location

30 0 30
Approx. Scale feet

Unocal S/S #3072
2445 Castro Valley Blvd.
Castro Valley, CA

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
PO. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



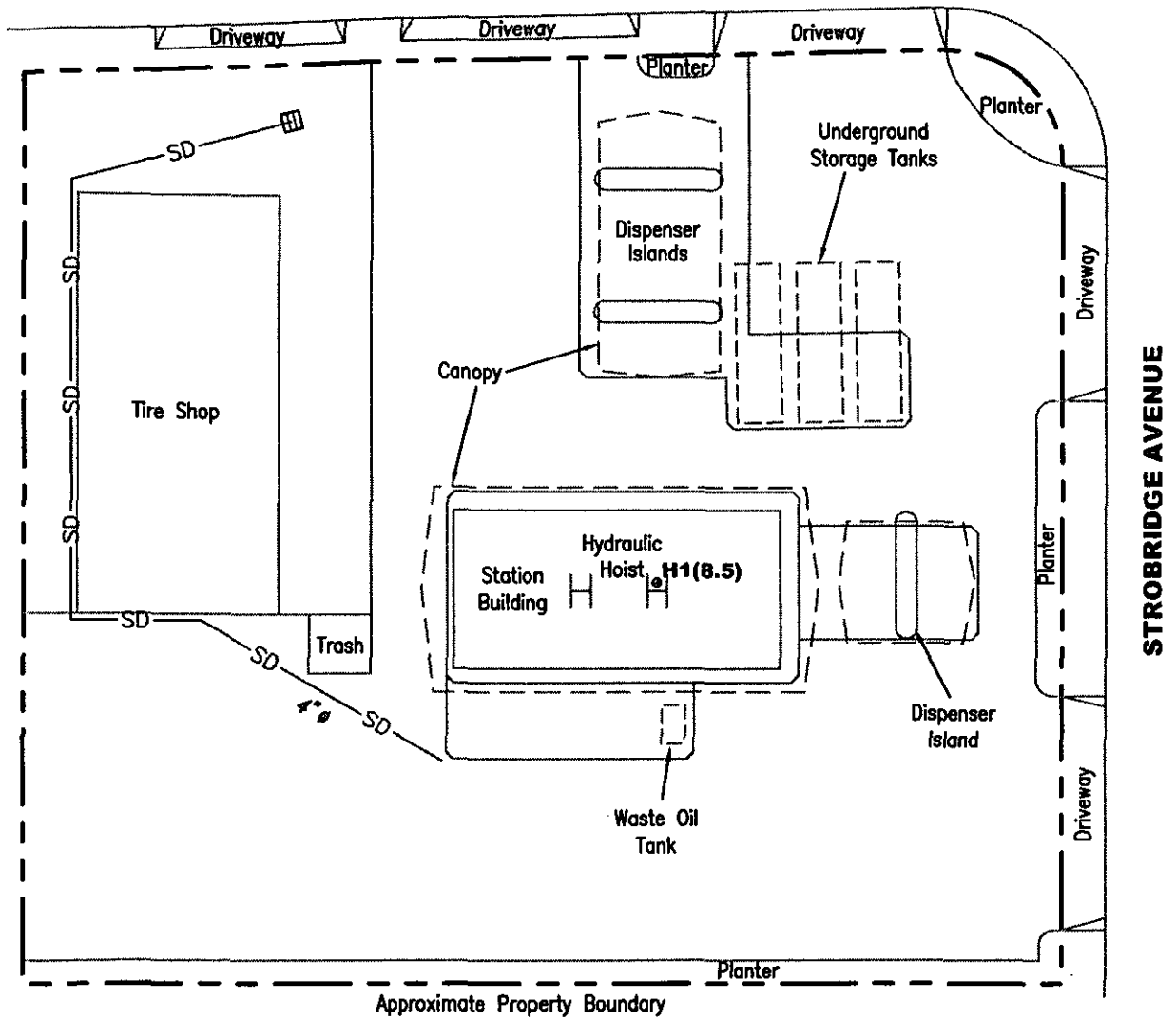
SITE PLAN
Figure 5

LEGEND

* Sample Point Location

30 0 30
Approx. Scale feet

Unocal S/S #3072
2445 Castro Valley Blvd.
Castro Valley, CA



EXPLANATION

- Soil sample location
- Storm drain

UNDERGROUND UTILITIES

—SD— Storm drain

N

0 30

Scale in Feet

Source: Figure modified from drawing provided by Unocal.

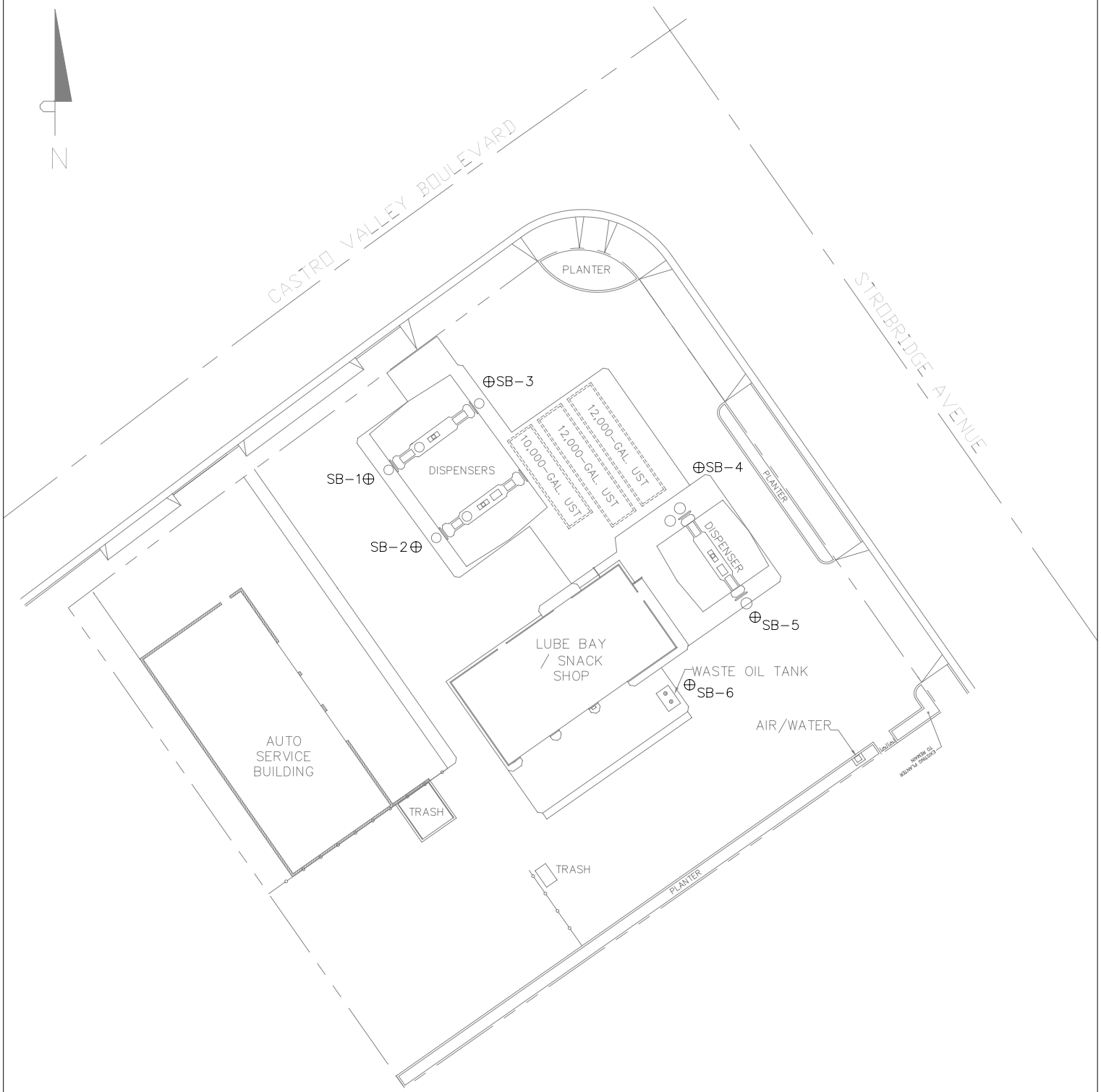
GETTLER - RYAN INC.
6747 Sierra Ct., Suite J
Dublin, CA 94568 (925) 551-7555

SITE PLAN
Tosco (76) Service Station No. 3072
2445 Castro Valley Boulevard
Castro Valley, California

FIGURE
1

PROJECT NUMBER	REVIEWED BY	DATE	REVISED DATE
140176		7/01	

FILE NAME: P:\ENVIRO\TOSCO\3072\A01-3072.DWG | Layout Tab: Hoist Rem 7-01



APPROXIMATE SCALE (FEET)

0 40 80

LEGEND

Property Boundary

Fence

SB-4 Soil Boring

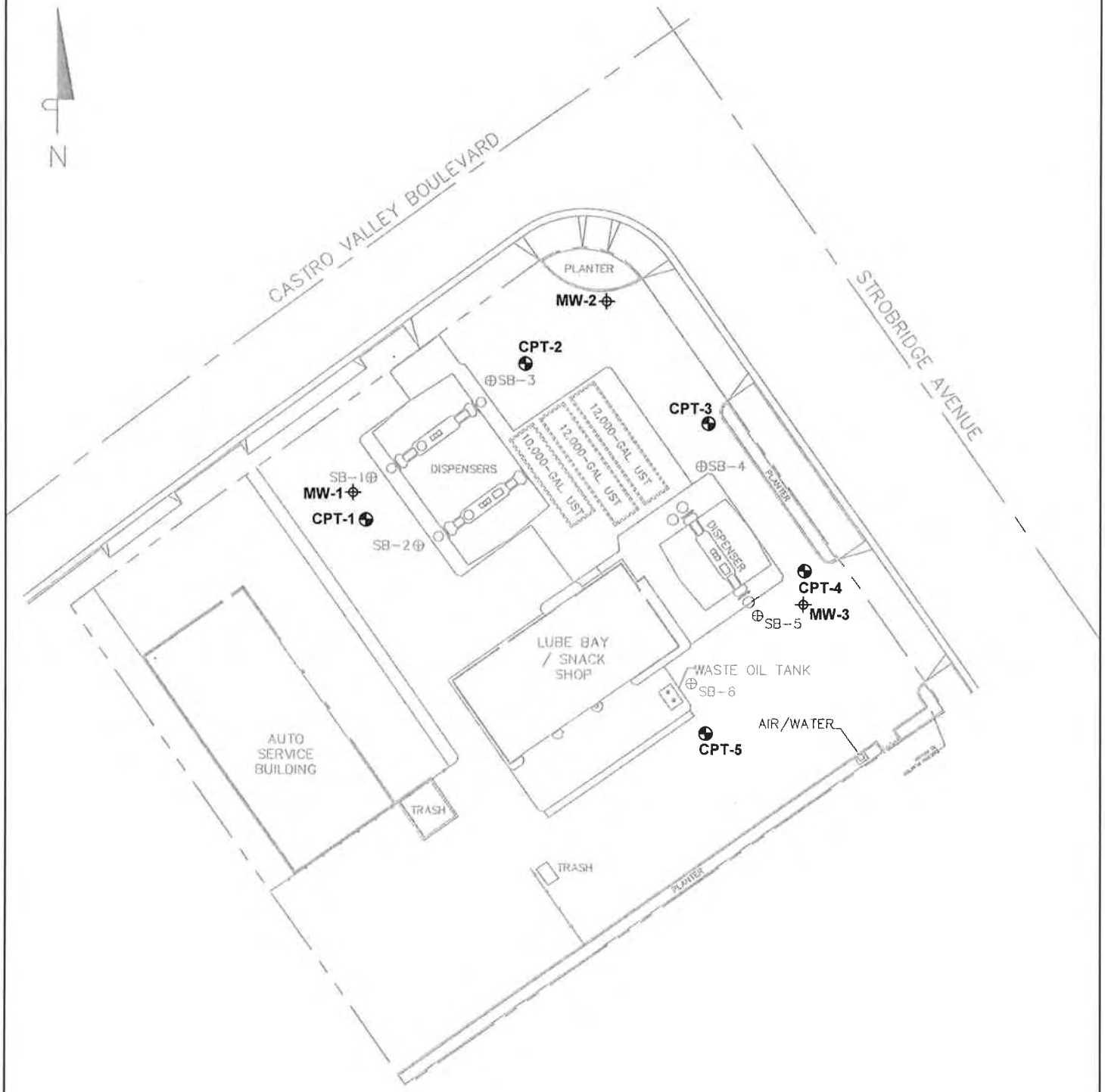
SOURCE: Client-provided site plan prepared by A&S Engineering, October 1997.

SITE PLAN

76 Service Station #3072
2445 Castro Valley Boulevard
Castro Valley, California

TRC

FIGURE 2



LEGEND

- Property Boundary
- Fence
- ⊕ SB-6 — Previous Soil Boring
- CPT-5 — CPT Hydropunch Location
- MW-3 — Proposed Monitoring Well Locations

APPROXIMATE SCALE (FEET)

0 40 80

SOURCE: Client-provided site plan prepared by A&S Engineering, October 1997.

SITE PLAN SHOWING CPT HYDROPUNCH & PROPOSED MONITORING WELL LOCATIONS

76 Service Station #3072
2445 Castro Valley Boulevard
Castro Valley, California

TRC

FIGURE 2

ARCADIS

Appendix E

Historical GW Analytical Results

KEI-J89-1106.R9
September 28, 1990

TABLE 10

SUMMARY OF LABORATORY ANALYSES
WATER

(Collected on April 25, 1990)

Sample Number	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
EB6	5,900	840	34	73	100
Detection Limits	30	0.3	0.3	0.3	0.3

Results in parts per billion (ppb), unless otherwise indicated.

NOTE: Water samples were collected during drilling. The results of the analyses may not be representative of formation water, they should be used for information only.

Table 2

RESULTS OF LABORATORY ANALYSIS OF GROUNDWATER SAMPLES
76 Station # 3072
2445 Castro Valley Blvd, Castro Valley, California

Sample Number	Sample Date	Depth (fbg)	TPH-D (µg/L)	TPPH (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	TBA (µg/L)	MTBE (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1, 2-DCA (µg/L)	EDB (µg/L)	Ethanol (µg/L)
			EPA 8015	EPA 8260B	EPA Method 8260B											
SB-1	1/24/2005	na	--	<50	<0.50	<0.50	**0.77**	<1.0	<5.0	**87**	<0.50	<0.50	<0.50	<0.50	<0.50	<50
SB-2	1/24/2005	na	--	<50	<0.50	<0.50	<0.50	**1.2**	<5.0	**0.68**	<0.50	<0.50	<0.50	<0.50	<0.50	<50
SB-3	1/25/2005	na	<50	<50	<0.50	<0.50	<0.50	<1.0	<5.0	**5.1**	<0.50	<0.50	<0.50	<0.50	<0.50	<50
SB-4	1/25/2005	na	--	<50	<0.50	<0.50	<0.50	<1.0	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<50

Notes:
TPH-D = total petroleum hydrocarbon as diesel
TPPH = total purgeable petroleum hydrocarbons
TBA = tertiary butyl alcohol
MTBE = methyl tertiary butyl ether
DIPE = di-isopropyl ether
ETBE = ethyl tertiary butyl ether
TAME = tertiary amyl methyl ether
1,2 DCA = 1,2-dichloroethane
EDB = ethylene dibromide
fbg = feet below grade
µg/L = micrograms per liter
-- = not analyzed, measured, or collected
na = not applicable

Table 1
GRAB GROUNDWATER ANALYTICAL RESULTS
76 Service Station #3072
2445 Castro Valley Boulevard, Castro Valley, CA

Sample ID	Date Sampled	Sample Depth (fbg)	TPH-d	TPPH	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TAME	TBA	DIPE	EDB	ETBE	1,2-DCA	Ethanol
			EPA 8015	EPA Method 8260B												
			Concentrations in micrograms per liter (µg/L)													
Shallow Water-Bearing Zone																
CPT-2	5/3/2007	36	**500**	<50	<0.50	<0.50	<0.50	<0.50	**6.3**	<0.50	**54**	<0.50	<0.50	<0.50	<0.50	<250
CPT-5	5/3/2007	22	**280**	<50	<0.50	<0.50	<0.50	<0.50	**5.2**	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<250
Deeper Water-Bearing Zone																
CPT-1	5/2/2007	55	**490**	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<250
CPT-4	5/2/2007	51	**800**	<50	<0.50	<0.50	<0.50	<0.50	**10**	<0.50	<10	<0.50	<0.50	<0.50	<0.50	<250

Notes:

TPH-d = total petroleum hydrocarbons as diesel (C12-C24)
TPPH = total purgable petroleum hydrocarbons (C6-C12)
MTBE = methyl teriary butyl ether
TAME = tertiary amyl methyl ether
TBA = tertiary butyl alcohol
DIPE = di-isopropyl ether
EDB = 1,2-dibromoethane
ETBE = ethyl tertiary butyl ether
1,2-DCA = 1,2-dichloroethane
fbg = feet below grade
-- = not analysed
N/A = not applicable

KEI-P89-1106.QR5
January 20, 1992

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
12/20/91	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND
	MW5	ND	ND	ND	ND	ND	ND
9/25/91	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND
	MW5	ND	ND	ND	ND	ND	ND
6/12/91	MW1	--	ND	0.66	ND	ND	ND
	MW2	--	ND	ND	0.46	0.44	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	0.48	ND
	MW5	--	ND	ND	ND	0.32	ND
3/11/91	MW1	--	ND	0.90	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	44	0.74	ND	0.15	3.2
	MW5	--	ND	ND	ND	ND	ND
12/12/90	MW1	--	34	1.6	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	0.73	ND	ND	ND
	MW5	--	ND	ND	ND	ND	ND
8/27/90	MW1	--	ND	3.2	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	1.1	0.50	0.89	0.54
	MW4	--	ND	0.34	ND	ND	ND
	MW5	--	ND	ND	ND	ND	ND
3/22/90	MW1	--	32	4.2	ND	1.1	0.36
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4*	--	ND	ND	ND	ND	ND
Detection Limits		50	30	0.30	0.30	0.30	0.30

KEI-P89-1106.QR5
January 20, 1992

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

-- Indicates analysis not performed.

ND = Non-detectable.

* Sample MW4 is a duplicate of sample MW2 (only on the date indicated).

Results in parts per billion (ppb), unless otherwise indicated.