



KAPREALIAN ENGINEERING, INC.
Consulting Engineers

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Alameda County
Environmental Health

KEI-J89-1106.R8
June 11, 1990

Unocal Corporation
2000 Crow Canyon Place, Suite #400
P.O. Box 5155
San Ramon, CA 94583

Attention: Mr. Ron Bock

RE: Continuing Subsurface Investigation at
Unocal Service Station #3072
2445 Castro Valley Boulevard
Castro Valley, California

Dear Mr. Bock:

This report presents the results of our subsurface investigation for the referenced site in accordance with Kaprealian Engineering, Inc's. (KEI) proposal KEI-P89-1106.P2 dated January 8, 1990. The purpose of the investigation was to determine if the subsurface soil and ground water (if encountered) has been impacted at the site. The following work performed by KEI was initiated for the purpose of divestment.

Coordination with regulatory agencies.

Logging and Preparation of Boring Logs for eight exploratory borings.

Soil sampling.

Ground water sampling.

Laboratory analyses.

Data analyses, interpretation and report preparation.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a gasoline station. A Location Map and Site Plans are attached to this report.

KEI's work at the site began on November 14, 1989, when KEI collected soil samples following the removal of three fuel storage tanks and one waste oil tank at the referenced site. The soil samples (A1, A2, B1, B2, C1 and C2) under the fuel storage tanks were collected at a depth of 13.5 feet. The soil sample (W01)

under the waste oil tank was collected at a depth of 10.5 feet. All soil samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California. The samples under the fuel storage tanks were analyzed for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes and ethylbenzene (BTX&E). In addition, the two samples from under the diesel tank were analyzed for TPH as diesel. Analytical results showed TPH as gasoline ranging from non-detectable to 11 ppm, with non-detectable BTX&E concentrations in each case. TPH as diesel concentrations were non-detectable for the two diesel tank bottom samples. The soil sample from under the waste oil tank was analyzed for TPH as gasoline, BTX&E, TPH as diesel, total oil and grease (TOG), EPA method 8010, and EPA method 8270 compounds, and the metals cadmium, chromium, lead and zinc. Laboratory analyses showed TPH as gasoline at 5.9 ppm, metals ranging from non-detectable to 45 ppm, 55 ppb of 1,1-dichloroethene, and non-detectable levels of all other constituents analyzed. Analytical results are summarized in Table 2, and sample point locations are shown on the attached Site Plan, Figure 2.

On November 16, 1989, KEI collected six sidewall soil samples, designated as SW1 through SW6, and a water sample, designated as W1, from the fuel tank pit. The tank pit water level was measured to be 11.5 feet below the ground surface. The sidewall soil samples were collected approximately 6 to 12-inches above the tank pit water level. All samples were analyzed for TPH as gasoline and BTX&E. Three of the six sidewall soil samples (labeled SW2, SW3 and SW4) and the water sample were also analyzed for TPH as diesel. Laboratory analyses of the soil samples showed TPH as gasoline ranging from non-detectable to 29 ppm for four of the six samples, with samples SW1 and SW4 showing 140 and 160 ppm, respectively. TPH as diesel levels were non-detectable for two of the sidewall samples with sample SW4 showing 24 ppm. Analyses of the water sample showed 11,000 ppb TPH as diesel, 26,000 ppb TPH as gasoline, and 670 ppb benzene. Analytical results of the soil samples are summarized in Table 2, and sample point locations are shown on the attached Site Plan, Figure 2.

On November 28, 1989, KEI returned to the site to meet with the representative of the Alameda County Health Care Services (ACHCS) to clarify ACHCS guidelines as applied to the subject site for fuel tank pit excavation and sampling. In response to the meeting, KEI submitted a Phase I work plan (KEI-P89-1106.P1) dated November 30, 1989, to define the extent of contamination in the vicinity of the tank pit. The work plan was approved by the ACHCS in a letter dated December 8, 1989.

On December 22, 1989, KEI returned to the site after further excavation to collect additional sidewall soil samples from the fuel tank pit. Soil was excavated from the north, east and south sides of the pit. Sidewall soil samples, designated as SW1(17), SW2(17), SW7, SW8, SW9, SW10, SW11 and SW3(13), were collected at depths of approximately 9 or 11 feet, and analyzed on-site by Mobile Chem Labs, Inc., of Lafayette, California, a state-certified mobile laboratory. After excavation, TPH as gasoline was detected at concentrations of 1,500 and 1,900 ppm on the northerly wall of the pit, at concentrations ranging from 3.0 to 1,700 ppm on the easterly wall, and at 410 ppm on the southerly wall. Analytical results are summarized in Table 3, and sample point locations are shown on the attached Site Plan, Figure 3.

Based on the analytical results, KEI recommended the installation of nine exploratory borings to further define the extent of the soil contamination.

On January 18 and 19, 1990, three two-inch diameter monitoring wells (designated as MW1, MW2 and MW3 on the attached Site Plan) were installed at the site. The monitoring wells were drilled and completed to total depths ranging from 22 to 30 feet. Ground water was encountered at depths ranging from 9 to 20.5 feet beneath the surface during drilling. The wells were developed on January 22 and 23, 1990. Analytical results of the soil samples, collected from the borings for monitoring wells (MW1, MW2 and MW3), indicated non-detectable levels of TPH as gasoline and BTX&E in all soil samples, except for sample MW1(5), which showed 2.8 ppm of TPH as gasoline, 0.051 ppm of benzene, and 0.11 ppm of ethylbenzene. Analytical results of the ground water samples collected from monitoring wells MW2 and MW3 indicated non-detectable levels of TPH as gasoline and BTX&E. In well MW1, TPH as gasoline and benzene were detected at 32 and 4.2 ppb, respectively. Analytical results of the soil samples are summarized in Table 6, and water samples in Table 7.

On February 14, 1990, three soil samples, labeled P1, P2 and P3, were collected from the product pipe trenches at depths ranging from 2.5 to 4.0 feet. Analytical results indicate levels of TPH as gasoline ranging from 6.0 to 87 ppm. Results of the soil analyses are summarized in Table 4. Soil sample locations are shown on the attached Site Plan, Figure 4.

KEI returned to the site on March 9, 1990, when three sidewall soil samples, labeled SWB, SWC and SWD, were collected from the sidewalls of the waste oil tank at depths of 8 to 9 feet. The waste oil tank pit had been excavated to a depth of 11 to 12 feet. Analytical results of the soil samples (SWB, SWC and SWD), collected from sidewalls of the waste oil tank pit, indicate non-

detectable levels of TOG and all EPA 8010 constituents for each of the three samples. Laboratory analyses indicate non-detectable levels of TPH as gasoline and BTX&E for samples SWC and SWD, while SWB showed 37 ppm TPH as gasoline with 0.10 ppm benzene. TPH as diesel levels were non-detectable for sample SWC, with both SWB and SWD less than 10 ppm. Results of the soil samples are summarized in Table 5. Soil sample point locations are shown on the attached Site Plan, Figure 5.

FIELD ACTIVITIES

On April 24 and 25, 1990, eight exploratory borings (designated as EB1 through EB8 on the attached Site Plan, Figure 1) were drilled at the site. Subsurface materials penetrated and the depths at which soil samples were collected are shown in the attached Boring Logs.

The eight borings were drilled and/or sampled to depths of 10-1/2 to 15 feet below grade. Ground water was encountered at depths of approximately 10 to 14 feet beneath the surface in each boring except EB4 where ground water was not encountered. Soil and bedrock samples were collected at a maximum spacing of 5 foot intervals, changes in lithology, obvious areas of contamination and at the soil-bedrock/water table interface beginning at a depth of 5 feet in each of the borings. Undisturbed soil samples were collected by driving a California-modified split-spoon sampler ahead of the drilling augers. The clean, two-inch diameter brass tubes holding the samples were sealed with aluminum foil, plastic caps and tape, and stored in a cooled ice chest for delivery to a state certified laboratory. Drilling was generally stopped about one to two feet after intersecting the first water table, except for EB4, which was terminated at a depth of 14.5 feet and ground water was not encountered. A water sample was collected from boring EB5 only, using a clean acrylic bailer. The water sample was placed in VOA vials, with Teflon-lined screw caps, and labeled and stored in a cooler on ice for delivery to the laboratory. All borings were backfilled to the surface with neat cement.

ANALYTICAL RESULTS

Samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California, and were accompanied by properly executed Chain of Custody documentation. Soil samples from all borings and the water sample from EB5 were analyzed for total petroleum hydrocarbons (TPH) as gasoline using EPA method 5030 in conjunction with modified 8015, and benzene, toluene, xylenes and ethylbenzene (BTX&E) using EPA method 8020. The results of soil analyses are summarized in Table 1, and the results of the water analyses are

summarized in Table 8. Copies of the laboratory analyses and Chain of Custody documentation are attached to this report.

Analytical results of the soil samples, collected from the eight exploratory borings (EB1 through EB8), indicate non-detectable levels of TPH as gasoline in all samples, except EB1(9.5), EB4(14), EB6(5), EB7(5) and EB8(5), in which levels ranged from 1.7 to 5.0 ppm. Benzene was detected in all soil samples and the levels ranged from 0.0053 to 0.023 ppm.

The water sample analysis collected from boring EB5 immediately after drilling indicates a level of TPH as gasoline at 5,900 ppb with a level of benzene at 840 ppb. However, the results of the analyses may not be representative of formation water, and therefore they should be used for information purposes only.

HYDROLOGY AND GEOLOGY

The water table stabilized in the existing monitoring wells at depths ranging from 7.35 to 9.00 feet below the surface as measured on March 22, 1990. The ground water flow direction appeared to be to the northeast on March 22, 1990, (based on water level data collected from the three monitoring wells). Ground water flow direction is shown on the attached Site Plan, Figure 1.

Based on review of regional geologic maps (U.S. Geological Survey Open-File Report 80-540 "Preliminary Geologic Map of the Hayward Quadrangle, Alameda and Contra Costa Counties, California" by T.W. Dibblee, Jr., 1980), the subject site is underlain by Quaternary-age alluvium. Mapped bedrock outcrops adjacent to the site include the marine Panoche Formation (Kpc), which is described as a conglomerate generally composed of granite, diorite, quartzite and black chert cobbles in a sandstone matrix and the Knoxville Formation (JKk), which is described as consisting of dark micaceous shale with minor thin sandstone.

Also, the site is situated approximately 3,000 feet northeast of the mapped trace of the active Hayward Fault; 1,900 feet southwest of the concealed mapped trace of the East Chabot Fault; and 1,800 feet northeast of the mapped trace (northern terminous?) of the West Chabot Fault.

As exposed in the underground tank pit excavation, the earth materials at the subject site consist of artificial fill materials at the surface which are typically 1 to 2 feet thick, and locally vary up to a maximum of about 9 feet at the east wall of the pit excavation. These fill materials are in turn underlain by dark gray silty clay soil materials, which are about 2.5 feet

thick. The soil materials are underlain by greenish-brown to yellowish brown highly weathered to slightly weathered shale, which varies from soft to moderately hard with abundant fractures (both clay healed and relatively open).

The results of the drilling activities at the site indicate that bedrock materials underlying the site are composed of brown and gray shale, which is slightly to highly weathered. The depth to the bedrock materials appears to vary considerably from about 5 to 6 feet below grade in the vicinity of well MW1 and boring EB2, to about 21-1/2 feet in the vicinity of well MW2, to greater than 22 feet in the vicinity of well MW3 (maximum depth explored). However, bedrock commonly underlies that site at a depth of about 10 feet as encountered in the majority of the borings at the site and exposures in the old tank pit excavation.

RECOMMENDATIONS

Based on the analytical results, KEI recommends the installation of two additional monitoring wells to further define the extent of ground water contamination. In addition, KEI recommends the implementation of monthly monitoring and quarterly sampling of the existing monitoring wells. KEI's proposal for this work is attached for your review and consideration.

DISTRIBUTION

A copy of this report should be sent to Alameda County Health Care Services, and to the Regional Water Quality Control Board, San Francisco Bay Region.

LIMITATIONS

Soil deposits and rock formations may vary in thickness, lithology, saturation, strength and other properties across any site. In addition, environmental changes, either naturally-occurring or artificially-induced, may cause changes in the extent and concentration of any contaminants. Our studies assume that the field and laboratory data are reasonably representative of the site as a whole, and assume that subsurface conditions are reasonably conducive to interpolation and extrapolation.

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The results of this study are based on the data obtained from the field and laboratory analyses obtained from a state certified laboratory. We have analyzed this data using what we believe to be currently applicable engineering techniques and principles in the Northern California region. We make no warranty, either expressed or implied, regarding the above, including laboratory analyses, except that our services have been performed in accordance with generally accepted professional principles and practices existing for such work.

Should you have any questions regarding this report, please feel free to call me at (707) 746-6915.

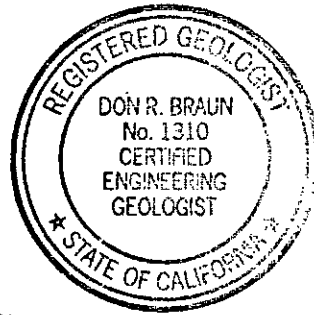
Sincerely,

Kaprealian Engineering, Inc.



Don R. Braun
Certified Engineering Geologist

License No. 1310
Exp. Date 6/30/90



Mardo Kaprealian
President

jad

Attachments: Tables 1 through 8
Location Map
Site Plans - Figures 1 through 5
Boring Logs
Laboratory Results
Chain of Custody documentation
Proposal

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TABLE 1

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on April 24 and 25, 1990)

<u>Sample Number</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
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.

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TABLE 2

SUMMARY OF LABORATORY ANALYSES
 SOIL

(Collected on November 14 & 16, 1989)

<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
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.

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TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on December 22, 1989)

<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl- benzene</u>
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.

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TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on February 14, 1990)

<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
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.

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TABLE 5

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on March 9, 1990)

<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl- benzene</u>
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 levels and concentrations of all EPA 8010 constituents were non-detectable.

ND = Non-detectable.

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

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TABLE 6

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on January 18, 1990)

<u>Sample Number</u>	<u>Depth (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
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.

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TABLE 7

SUMMARY OF LABORATORY ANALYSES
WATER

(Samples collected on March 22, 1990)

<u>Sample Number</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
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	30	0.3	0.3	0.3	0.3

ND = Non-detectable.

*Sample MW4 is a duplicate of sample MW2.

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

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TABLE 8

SUMMARY OF LABORATORY ANALYSES
WATER

(Collected on April 25, 1990)

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

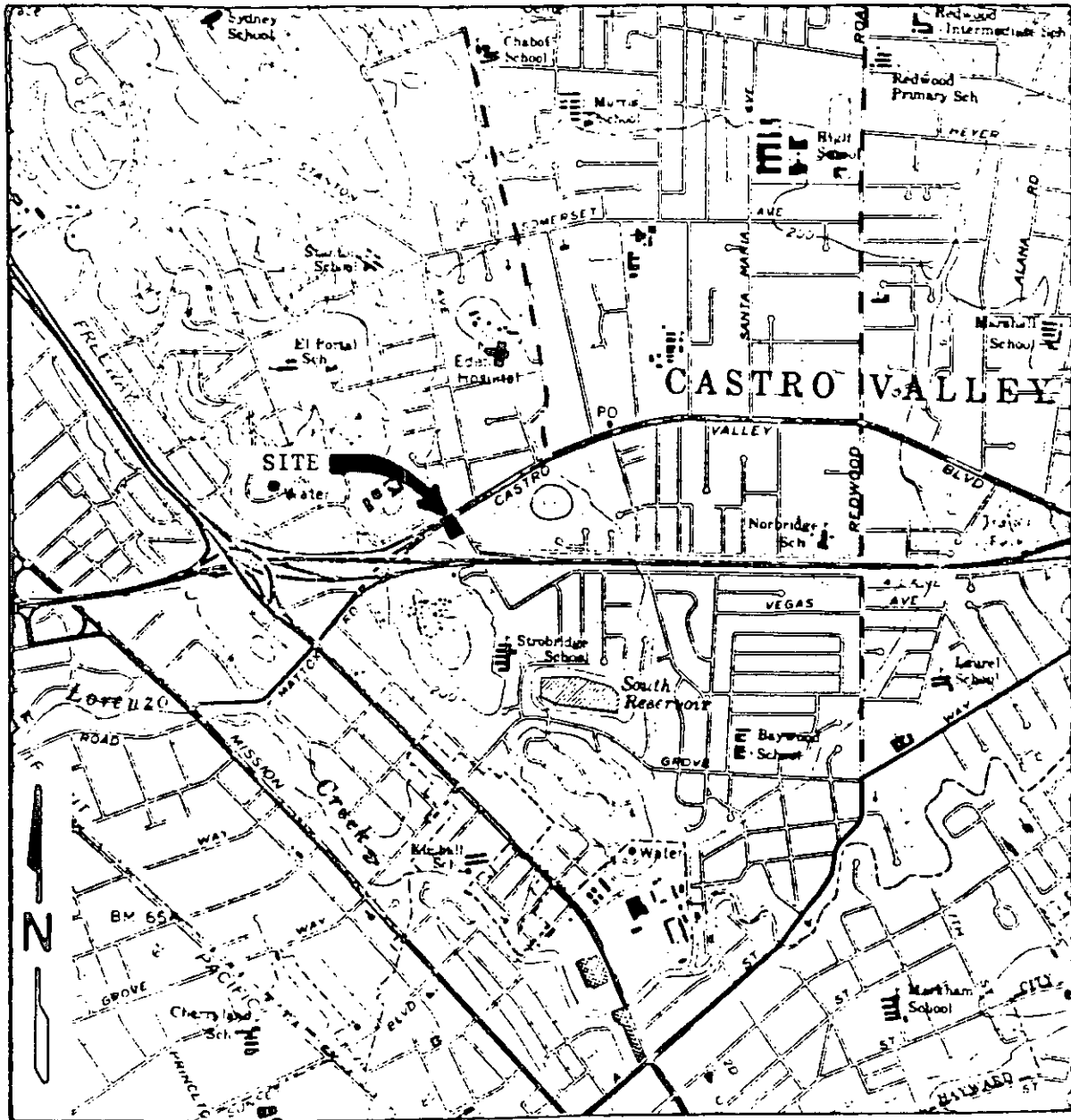
Results in parts per billion (ppb), unless otherwise indicated.

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.



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LOCATION MAP

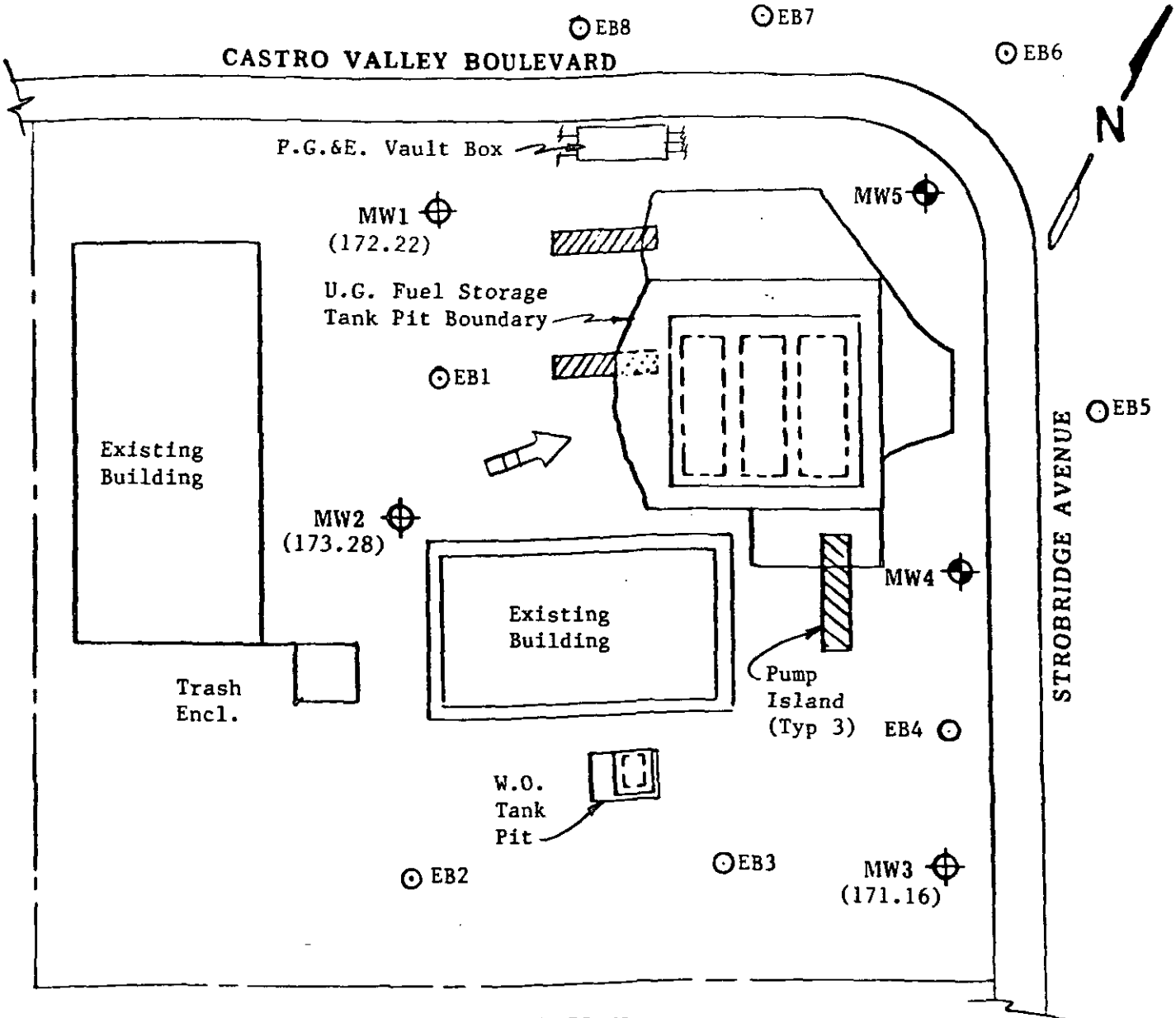
Unocal Service Station #3072
2445 Castro Valley Blvd.
Castro Valley, California



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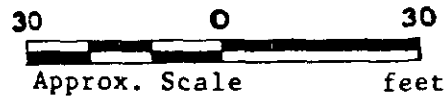
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SITE PLAN
Figure 1

LEGEND

- Monitoring Well (Proposed)
- Monitoring Well (Existing)
- Exploratory Boring
- Ground Water Flow Direction
- () Ground Water Elevation in feet (MSL) on 3/22/90.

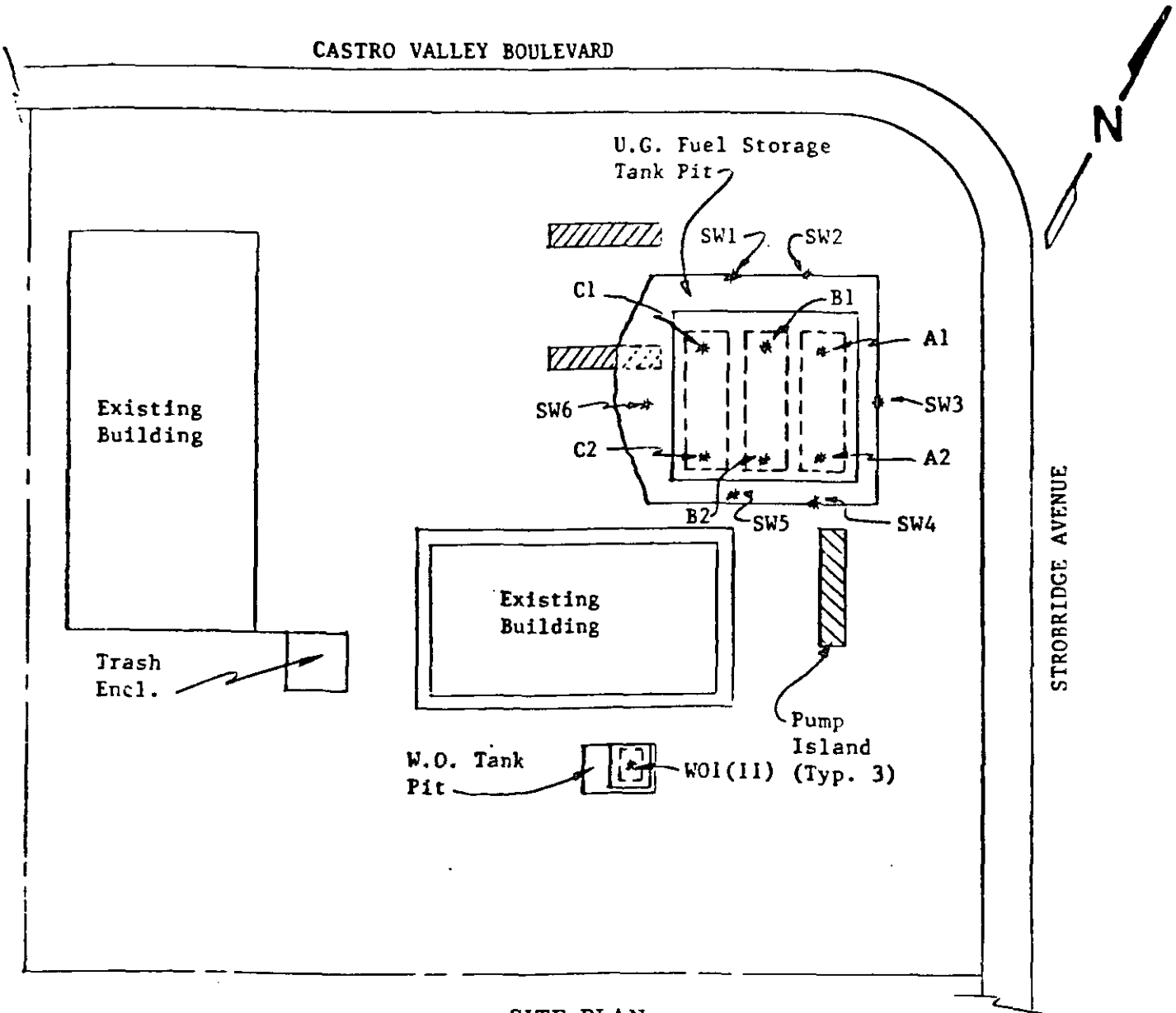


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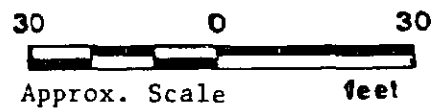


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SITE PLAN
Figure 2



LEGEND

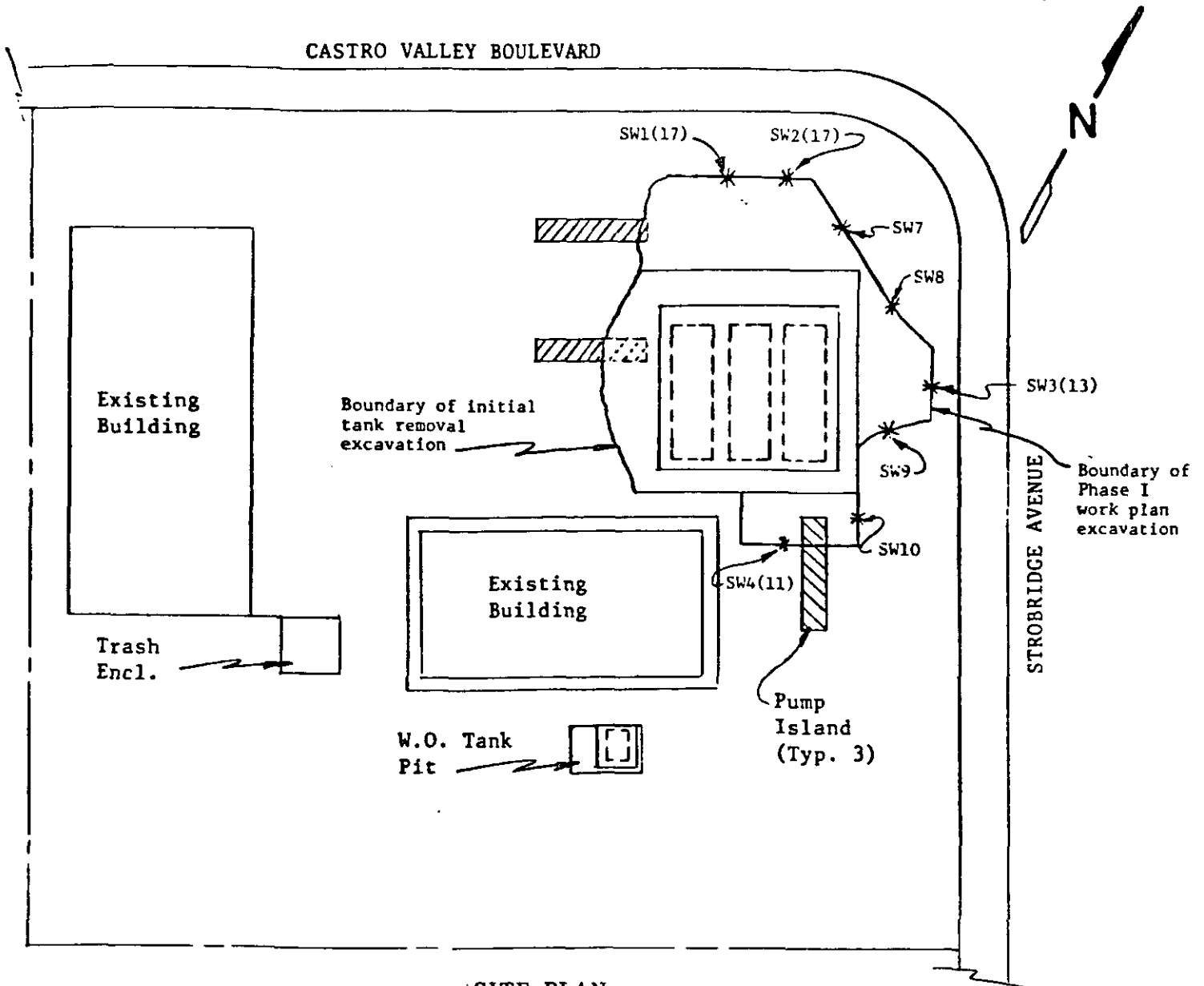
* Sample Point Location

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

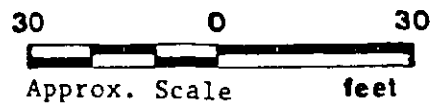


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SITE PLAN
Figure 3



LEGEND

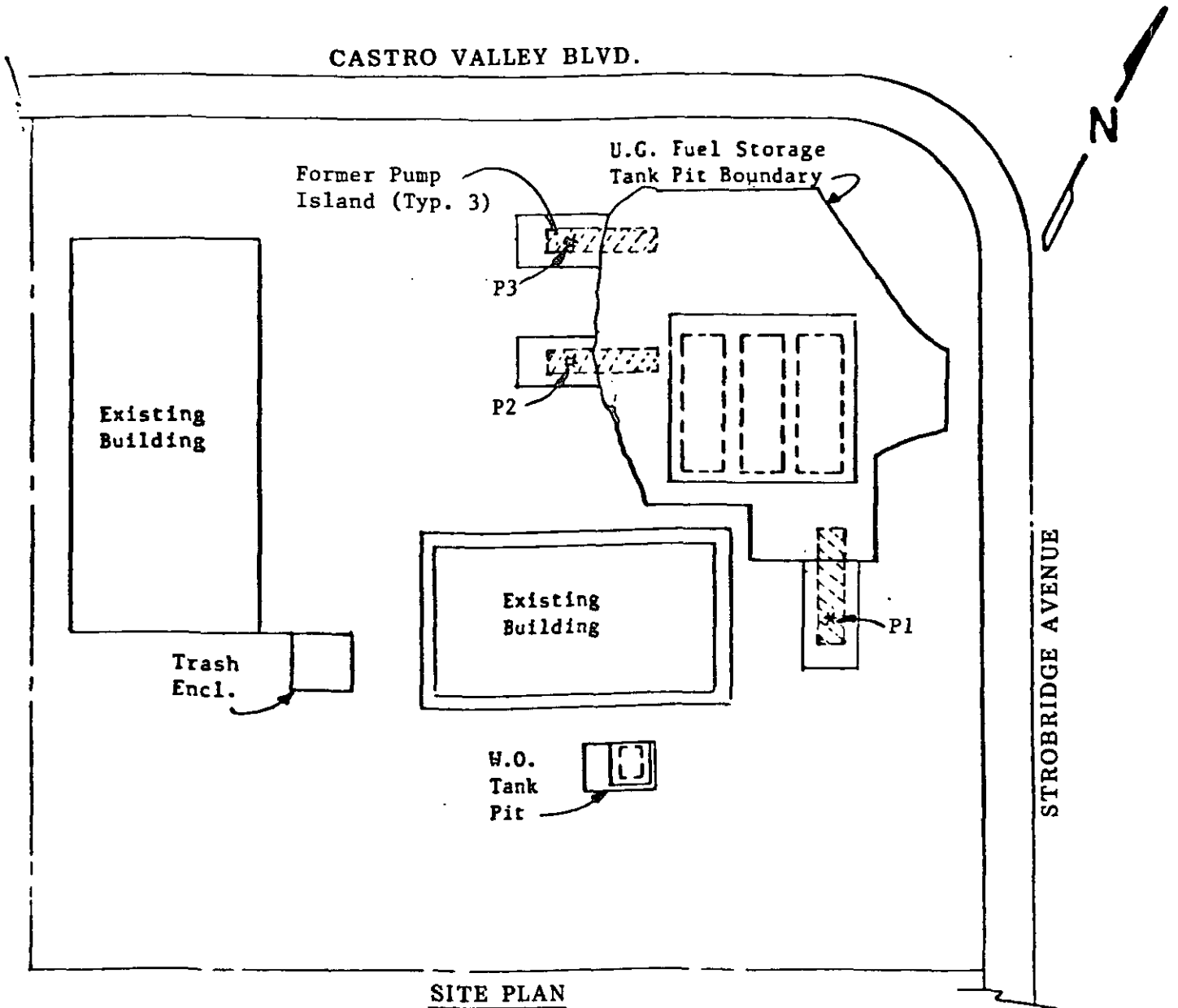
* Sample Point Location

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Castro Valley, CA



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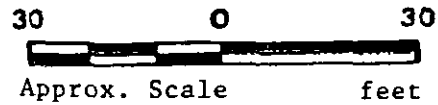
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SITE PLAN
Figure 4

LEGEND

* Sample Point Location



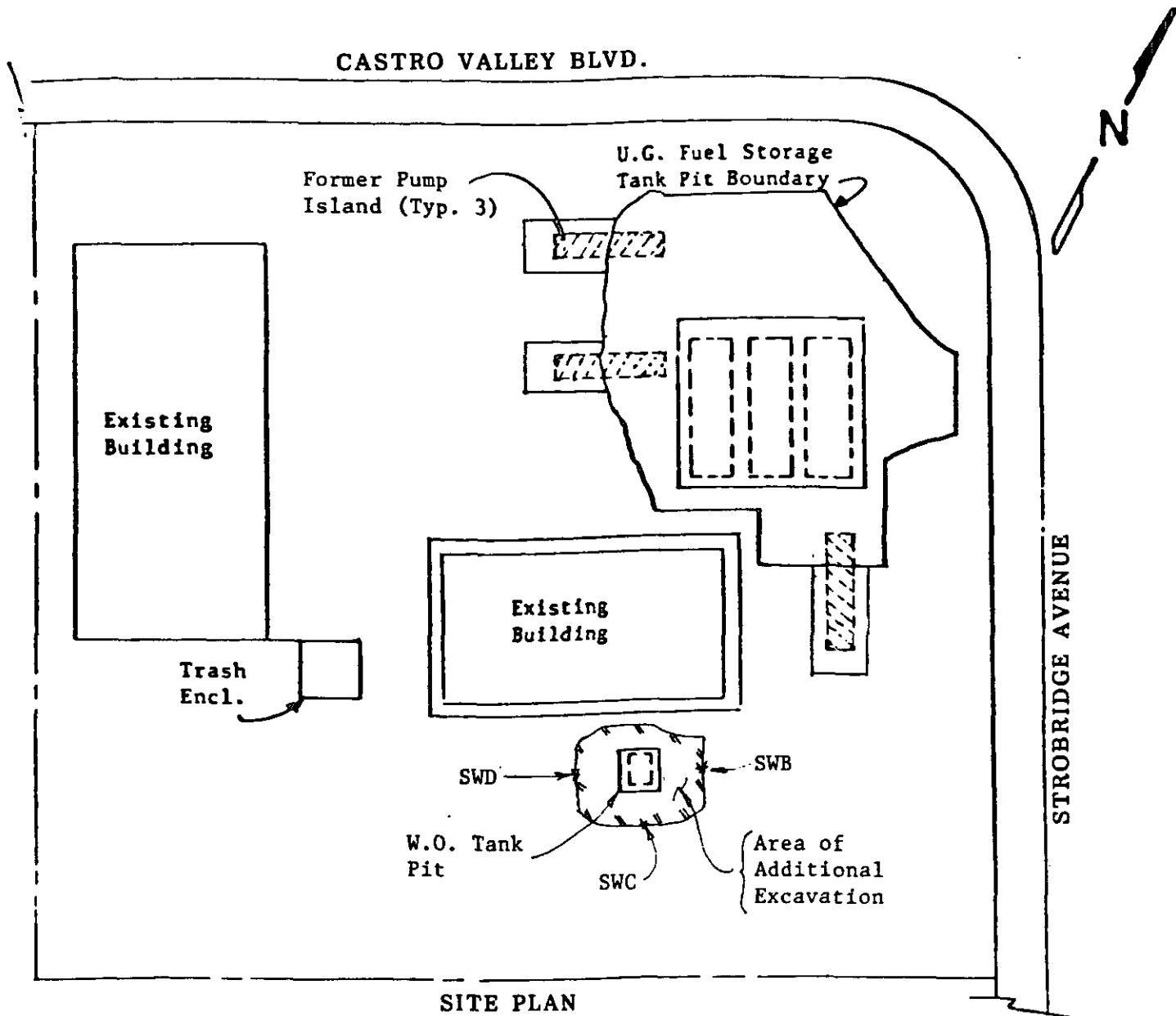
Unocal Service Station # 3072
2445 Castro Valley Blvd.
Castro Valley, California



KAPREALIAN ENGINEERING, INC.

Consulting Engineers

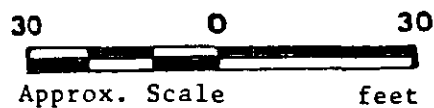
PO. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



SITE PLAN
Figure 5

LEGEND

* Sample Point Location



Unocal Service Station # 3072
2445 Castro Valley Blvd.
Castro Valley, California

BORING LOG

Project No. KEI-P89-1106		Boring Diameter 8"		Logged By D.L. <i>DRB</i>	
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.	
27/36/50-2 1/2"	▼	15		Wet at 14 feet.	
		20		<p style="text-align: right;">TOTAL DEPTH DRILLED: 13.5'</p> <p style="text-align: right;">TOTAL DEPTH SAMPLED: 15'</p>	

BORING LOG

Project No. KEI-P89-1106		Boring Diameter 8"		Logged By D.L. <i>DLB</i>	
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	N/A		
				BEDROCK	
				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. KEI-P89-1106	Boring Diameter 8"	Logged By D.L. <i>DRB</i>
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.
		5	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 fragments, trace serpentine?.
		10	CL/ CH	Clay, 5-10% sand, very stiff, moist, black.
	▼	10	GC	Clayey gravel with sand, very dense, very moist to wet, yellowish brown.
15/21/32		15		
		20		
				TOTAL DEPTH DRILLED: 9' TOTAL DEPTH SAMPLED: 10.5'

BORING LOG

Project No. KEI-P89-1106		Boring Diameter 8"		Logged By D.L. <i>DRB</i>	
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	
	N O T	0		A. C. Pavement underlain by fill consisting of clay, sand and gravel.	
	E N C O U N T E R E D		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 en- tirely shale, maybe bedrock weathered to soil.	
	D U R I N G			—BEDROCK—	
49/50-3" 50-5 3/4"		10		Shale, hard, slightly moist, fractured weathered with clay-lined fractures, olive.	
25/41/50-5 1/2"	D R I L L I N G			Color change at 12 feet to olive gray, hardness increasing with depth.	
50-2"		15		Difficult drilling at 14 feet.	
		20			
				TOTAL DEPTH DRILLED: 14' TOTAL DEPTH SAMPLED: 14.5'	

BORING LOG

Project No. KEI-P89-1106	Boring Diameter 8"	Logged By D.L. <i>DLB</i>
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
		5	GP/ SP	Gravel and sand fill, 5-10% fines, road and utility trench backfill.
10/10/11				
10/9/8				
7/6/8				
12/33/50		10	N/A	Base of Fill Materials
				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. <i>DLB</i>	
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	
45/50-4"	▼			Shale, hard, slightly moist to moist, fractured, weathered with clay-lined fractures, olive brown.	
50-3 1/4"		15		Shale, as above, less weathered than above, hardness increasing with depth	
		20		TOTAL DEPTH DRILLED: 14' TOTAL DEPTH SAMPLED: 14.5'	

BORING LOG

Project No. KEI-P89-1106		Boring Diameter 8"		Logged By D.L. <i>DRB</i>	
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?).	
5/50		10	N/A		
30/49/50-5"				BEDROCK	
50-5 1/2"				Shale, hard, slightly moist to moist, fractured, weathered with clay-lined fractures, olive brown.	
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. <i>DRB</i>
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.
11/25/40		10	N/A	— BEDROCK — 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'



SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Kaprealian Engineering, Inc.	Client Project ID: Unocal, Castro Valley, 2445 C V Blvd.	Sampled: Apr 24-25, 1990
P.O. Box 996	Matrix Descript: Soil	Received: Apr 26, 1990
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: May 7, 1990
Attention: Mardo Kaprealian, P.E.	First Sample #: 004-3689	Reported: May 9, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
004-3689	EB1 (5)	N.D.	0.0063	0.042	N.D.	0.011
004-3690	EB1 (9.5)	4.9	0.0078	0.24	0.028	0.11
004-3691	EB1 (13.5)	N.D.	0.0087	0.048	N.D.	N.D.
004-3692	EB2 (5)	N.D.	0.0053	0.020	0.0068	0.013
004-3693	EB2 (10)	N.D.	0.0059	0.026	0.0050	0.013
004-3694	EB3 (5)	N.D.	0.0069	0.031	N.D.	0.017
004-3695	EB3 (9)	N.D.	0.0093	0.023	N.D.	N.D.
004-3696	EB4 (5)	N.D.	0.0091	0.034	N.D.	N.D.
004-3697	EB4 (10)	N.D.	0.0090	0.27	N.D.	N.D.
004-3698	EB4 (14)	1.7	0.0079	0.43	N.D.	N.D.

Detection Limits:	1.0	0.0050	0.0050	0.0050	0.0050
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Belinda C. Vega
Belinda C. Vega
Project Manager



SEQUOIA ANALYTICAL

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(415) 364-9600 • FAX (415) 364-9233

Kaprealian Engineering, Inc.	Client Project ID: Unocal, Castro Valley, 2445 C V Blvd.	Sampled: Apr 24-25, 1990
P.O. Box 996	Matrix Descript: Soil	Received: Apr 26, 1990
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: May 7, 1990
Attention: Mardo Kaprealian, P.E.	First Sample #: 004-3699	Reported: May 9, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
004-3699	EB5 (5)	N.D.	0.0095	0.015	N.D.	N.D.
004-3701	EB6 (5)	5.0	0.066	0.021	0.032	0.11
004-3702	EB6 (10)	N.D.	0.0086	0.060	0.0052	0.014
004-3703	EB6 (13)	N.D.	0.0080	0.16	0.0092	0.24
004-3704	EB7 (5)	3.0	0.040	0.056	0.034	0.073
004-3705	EB7 (9.5)	N.D.	0.0081	0.078	0.015	0.025
004-3706	EB7 (13.5)	N.D.	0.0054	0.085	N.D.	0.012
004-3707	EB8 (5)	2.7	0.023	0.067	0.013	0.078
004-3708	EB8 (10)	N.D.	0.0072	0.056	0.0050	0.019

Detection Limits:	1.0	0.0050	0.0050	0.0050	0.0050
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Belinda C. Vega
Project Manager



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER 	SITE NAME & ADDRESS Unocal - Castro Valley 2445 Castro Valley Blvd.	ANALYSES REQUESTED <div style="display: flex; justify-content: space-around;"> <div style="border: 1px dashed black; padding: 5px;">TPH-G</div> <div style="border: 1px dashed black; padding: 5px;">BTEX</div> </div>	TURN AROUND TIME: <u>Regular</u>								
WITNESSING AGENCY 											
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	NO. OF CONT.	CORP	SAMPLING LOCATION	TPH-G	BTEX	REMARKS
EB1-(5)	4-25-90		✓		✓	1		See Sample I.D. #	✓	✓	0043689
EB1-(9.5)	4-25-90		✓		✓	1			✓	✓	690
EB1-(13.5)	4-25-90		✓		✓	1			✓	✓	691
EB2-(5)	4-25-90		✓		✓	1			✓	✓	692
EB2-(10)	4-25-90		✓		✓	1			✓	✓	693
EB3-(5)	4-25-90		✓		✓	1			✓	✓	694
EB3-(9)	4-25-90		✓		✓	1			✓	✓	695
EB4-(5)	4-24-90		✓		✓	1			✓	✓	696
EB4-10	4-24-90		✓		✓	1			✓	✓	697
Relinquished by: (Signature) 	Date/Time 4/26/90 9:50	Received by: (Signature) Tom McLean		The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? <u>Yes</u> 2. Will samples remain refrigerated until analyzed? <u>Yes</u> 3. Did any samples received for analysis have head space? <u>No</u> 4. Were samples in appropriate containers and properly packaged? <u>Yes</u>							
Relinquished by: (Signature) Tom McLean	Date/Time 4/29/90 12:45	Received by: (Signature)									
Relinquished by: (Signature)	Date/Time	Received by: (Signature)									
Relinquished by: (Signature)	Date/Time	Received by: (Signature)									
		 Signature		 Title		 Date 4/26					



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLE		SITE NAME & ADDRESS							ANALYSES REQUESTED				TURN AROUND TIME:
[Signature]		Unocal - Castro Valley 2445 Castro Valley Blvd.											Regular
WITNESSING AGENCY													REMARKS
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPH-G	BTXE			
EB4-(14)	4-24-90		✓		✓		1	See sample I.D. #	✓	✓	0043698		
EB5-(5)	4-25-90		✓		✓		1	↓	✓	✓	699		
EB5-(10)	4-25-90		✓		✓		1		✓	✓	700		
EB6-5	4-24-90		✓		✓		1		✓	✓	701		
EB6-(10)	4-24-90		✓		✓		1		✓	✓	702		
EB6-(13)	4-24-90		✓		✓		1		✓	✓	703		
EB7-(5)	4-24-90		✓		✓		1		✓	✓	704		
EB7-(9.5)	4-24-90		✓		✓		1		✓	✓	705		
EB7-(13.5)	4-24-90		✓		✓		1		✓	✓	706		

Relinquished by: (Signature) [Signature] (KEI)	Date/Time 4/24/90 ⁹⁵⁰	Received by: (Signature) Tom McLean	The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? <input checked="" type="checkbox"/> 2. Will samples remain refrigerated until analyzed? <input checked="" type="checkbox"/> 3. Did any samples received for analysis have head space? <u>NO</u> 4. Were samples in appropriate containers and properly packaged? <input checked="" type="checkbox"/>
Relinquished by: (Signature) Tom McLean	Date/Time 4/24/90 ¹²⁴⁵	Received by: (Signature) [Signature]	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	

Signature	Title	Date
[Signature]	[Signature]	4/26/90



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER <i>[Signature]</i>		SITE NAME & ADDRESS Unocal - Castro Valley 2445 Castro Valley Blvd.							ANALYSES REQUESTED		TURN AROUND TIME: Regular
WITNESSING AGENCY									TPH-G BTEX		REMARKS
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPH-G	BTEX	REMARKS
EB8-5	4/25/90		✓		✓		1	See ^{sample} boxing ID. #	✓	✓	0043 707
EB8-10	4/25/90		✓		✓		1	" " " "	✓	✓	0043 708

Relinquished by: (Signature) <i>[Signature]</i> (KET)	Date/Time 4/26/90 9:30	Received by: (Signature) Tim M. L...	The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? <input checked="" type="checkbox"/> 2. Will samples remain refrigerated until analyzed? <input checked="" type="checkbox"/> 3. Did any samples received for analysis have head space? <u>NO</u> 4. Were samples in appropriate containers and properly packaged? <input checked="" type="checkbox"/>
Relinquished by: (Signature) Tom M. L...	Date/Time 4/26/90	Received by: (Signature) <i>[Signature]</i>	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
		<i>[Signature]</i>	Signature
		<i>[Signature]</i>	Title
		4/26/90	Date



SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
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Kaprealian Engineering, Inc.	Client Project ID: Unocal, Castro Valley, 2445 Castro Valley Blvd	Sampled: Apr 25, 1990
P.O. Box 996	Sample Descript.: Water, EB5-W	Received: Apr 26, 1990
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: Apr 26, 1990
Attention: Mardo Kaprealian, P.E.	Lab Number: 004-3688 A-B	Reported: Apr 30, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Low to Medium Boiling Point Hydrocarbons	3,000	5,900
Benzene	30	840
Toluene	30	34
Ethyl Benzene	30	100
Xylenes	30	73

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard. Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL

Belinda C. Vega
Belinda C. Vega
Project Manager



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER <i>[Signature]</i>		SITE NAME & ADDRESS Unocal - Castro Valley 2445 Castro Valley Blvd.				ANALYSES REQUESTED		TURN AROUND TIME: Regular	
WITNESSING AGENCY						TPH-G BTEX			
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	CONT.	SAMPLING LOCATION	REMARKS
EB5-W	4-25-90		✓	✓			2		0043688 AB

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time 4/26/90 9:50	Received by: (Signature) Tom Mc Law	The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? <input checked="" type="checkbox"/> 2. Will samples remain refrigerated until analyzed? <input checked="" type="checkbox"/> 3. Did any samples received for analysis have head space? <u>NO</u> 4. Were samples in appropriate containers and properly packaged? <input checked="" type="checkbox"/>
Relinquished by: (Signature) Tom Mc Law	Date/Time 4/26/90 12:45	Received by: (Signature) <i>[Signature]</i>	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
			Signature: <i>[Signature]</i> Title: <i>[Signature]</i> Date: 4/26/90