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

KEI-P90-1003.P1
November 27, 1990

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

Attention: Mr. Rick Sisk

RE: **Work Plan/Proposal**
Unocal Service Station #7004
15599 Hesperian Boulevard
San Leandro, California

INTRODUCTION

1. Background:

Kaprealian Engineering, Inc's. (KEI) initial field work was conducted on October 12, 1990, when three underground fuel storage tanks were removed from the site. The tanks consisted of one 12,000 gallon super unleaded gasoline tank, and two 12,000 gallon regular unleaded fuel storage tanks. The tanks were made of steel and no apparent holes or cracks were observed in the tanks.

Nine soil samples, labeled A1, A2, A3, B1, B2, B3, C1, C2 and C3, were collected from beneath the fuel tanks at depths of approximately 14 to 15 feet below grade. Sample locations are as shown on the attached Site Plan, Figure 2.

In an attempt to remove as much of the contaminated soil as possible, KEI returned to the site on October 19, 1990, to observe additional soil excavation in the fuel tank pit. Soil was excavated from a depth below grade of 15 feet to a depth of 19 feet. Water was encountered in the fuel tank pit at a depth of approximately 18.5 feet, thus prohibiting the collection of any additional soil samples from the bottom of the fuel tank pit. Soil samples, labeled SW1 through SW4, were collected from the sidewalls of the fuel tank pit approximately six inches above the observed water table at lateral distances of 2, 4, 17 and 4 feet, respectively, from the original tank pit sidewalls. Sample point locations are as shown on the attached Site Plan, Figure 2.

KEI returned to the site on October 22, 1990, in order to complete the fuel tank pit sidewall sampling. One soil sample, labeled SW5, was collected from the south sidewall at

a depth of about 18 feet below grade. Due to obvious contamination observed in the area of sample point SW5, one additional soil sample, labeled SW5(20), was collected at a depth of 18 feet at a lateral distance of 20 feet from the original tank pit south sidewall.

After soil sampling was completed, the entire fuel tank pit was excavated 4 feet laterally and to a depth of approximately 19 feet. Following soil excavation, approximately 5,000 gallons of ground water were pumped from the fuel tank pit. On October 24, 1990, one water sample, labeled W1, was collected from the fuel tank pit.

KEI returned to the site on October 31, 1990, in order to collect soil samples from the product pipe trenches. Four samples, labeled P1 through P4, were collected from the pipe trenches at depths ranging from 2.5 to 3 feet below grade. After additional excavation in the area of sample point P2, one soil sample, labeled P2(7.5), was collected at a depth of 7.5 feet below grade. After the soil sampling was completed, pipe trenches were excavated to the depth of the sample points.

After reviewing the laboratory analyses and in an attempt to remove as much of the contaminated soil as possible, KEI returned to the site on November 2, 1990, to observe additional soil excavation in the area of sample points P1 and P3. Additional soil samples, labeled P1(8) and P3(5.5), were collected at depths of 8 and 5.5 feet, respectively. Sample point locations are shown on the attached Site Plan, Figure 2.

All samples were analyzed by Sequoia Analytical Laboratory in Concord, California. All soil and water samples 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.

Analytical results of the soil samples, collected from beneath the fuel tanks, indicated levels of TPH as gasoline ranging from 180 ppm to 1,900 ppm, and benzene ranging from 0.64 ppm to 9.7 ppm. Samples collected from the fuel tank pit sidewalls showed levels of TPH as gasoline ranging from non-detectable to 4.5 ppm, except for sample SW5, which showed 998 ppm of TPH as gasoline. However, the additional sample SW5(20), collected at a depth of 18 feet and a lateral distance of 16 feet from sample SW5, indicated 30 ppm of TPH as gasoline.

Analyses of soil samples, P1 through P4, collected from the pipe trenches, indicated levels of TPH as gasoline at 1,400 ppm, 3,900 ppm, 100 ppm and 19 ppm, respectively. However, after additional excavation, the levels of TPH as gasoline in samples P1(8), P2(7.5) and P3(5.5), collected beneath the samples P1, P2 and P3, respectively, were detected at 5.7 ppm, 20 ppm and 9.8 ppm, respectively. Results of the soil analyses are summarized in Table 1.

Analytical results of the water sample (W1), collected from the fuel tank pit, indicated 4,300 ppb of TPH as gasoline and 40 ppb of benzene. The results of the water analyses are summarized in Table 2.

Based on this information, KEI proposed additional investigation including installation of three monitoring wells in KEI's report (KEI-J90-1003.R1) dated November 26, 1990.

2. Site Description:

The subject site is presently used as a gasoline station. The site is situated on gently sloping southwest trending topography and is located approximately 700 to 800 feet northeast of San Lorenzo Creek, and 2.1 miles northeast of the present shoreline of San Francisco Bay. A Location Map and two Site Plans are attached to this report.

3. Regional Geology:

Based on review of regional geologic maps (U.S. Geological Survey Professional Paper 943 "Flatland Deposits - Their Geology and Engineering Properties and their Importance to Comprehensive Planning", by E.J. Helley and other, 1979), the subject site is underlain by Holocene Coarse-grained Alluvium (Qhac). The coarse-grained alluvium is described as typically consisting of unconsolidated, moderately sorted, permeable sand and silt with a thickness ranging from less than 10 feet to as much as 50 feet.

The subsurface soil materials exposed in the excavation appeared to consist primarily of clayey silt interbedded with fine-grained sand to the maximum depth explored (19 feet). Ground water was observed at 18.5 feet below grade.

PROPOSED FIELD WORK

PHASE II - DEFINING THE EXTENT OF SUBSURFACE CONTAMINATION

1. **KEI proposes to install three two-inch diameter monitoring wells, designated as MW1, MW2 and MW3 on the attached Site Plan, Figure 1, using hollow stem auger equipment.** Permits will be obtained from the Alameda County Health Department and Flood Control District, and/or the City of San Leandro as necessary prior to beginning work.

   The wells will be drilled approximately 10 to 15 feet into the saturated zone of the first encountered ground water unless a 5 foot thick clay aquitard is encountered first, at which time drilling will be terminated.

2. Soil samples will be collected at a maximum spacing of 5 foot intervals, significant changes in lithology, at obvious areas of contamination, and at/or within the soil/ground water interface beginning at a depth of about 4 to 5 feet below grade. Sampling for laboratory analyses and lithologic logging purposes will continue until the first water table is encountered. Sampling for lithologic logging purposes only will continue below the water table at the total depth drilled. Classification of soil will be done using the Unified Soils Classification System (USCS) by KEI's field engineer or geologist. Samples will be collected in a California modified split-spoon sampler with two-inch diameter brass liners. The sampler will be advanced ahead of the drilling augers at designated depths by dropping a 140 pound hammer 30 inches. Blow counts will be recorded. Samples will be removed from the sampler and retained in brass liners. The liners will be sealed with aluminum foil, plastic caps and tape. They will be labeled and stored on ice for delivery to a state certified laboratory.

3. Finalized Boring Logs will be prepared from field logs and submitted to the Alameda County Department of Health and to the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region.

4. Ground water is anticipated at approximately 18.5 feet below grade based on the ground water level found in the fuel tank pit.

5. Well Construction:

   Casing Type: Schedule 40 PVC, flush threaded joints, 0.01 inch factory slot, two-inch diameter. Screen to run from

total depth of the well to approximately 5 feet above the depth of the first encountered ground water. Monterey sand (#2/16) will fill the annular space from total depth to 2 feet above the perforated casing interval. A 2-foot thick bentonite seal will be placed in the annular space on top of the sand pack. Neat cement will be placed on top of the bentonite seal to the surface.

Well casings will be secured with a waterproof cap and a padlock. A round, watertight, flush-mounted well cover will be concreted in place over the top of each casing.

6. Water levels will be measured with an electronic sounder. The wells will be developed using a surface pump approximately one week after well completion. Wells will be pumped until expelled water is clear and free of turbidity. Effluent generated during well development will be contained in barrels and hauled from the site by a licensed hazardous materials hauler.

   Casing elevations will be surveyed by a licensed land surveyor to Mean Sea Level and to a vertical accuracy of 0.01 feet.

7. Ground Water Sampling:

   The wells will be purged with a bailer of approximately four casing volumes prior to sampling, and at least 72 hours after development. After recovery, samples will be collected using a clean Teflon bailer and promptly decanted into 40 ml VOA vials and/or one liter amber bottles, as appropriate. Vials and/or bottles will be sealed with Teflon-lined screw caps, labeled and stored on ice for delivery to a state certified laboratory. The sampling bailer will be cleaned with soap and a clean water rinse between uses.

   Wells will be checked for free product and sheen (using an interface probe and/or paste tape) prior to development and sampling.

   Properly executed Chain of Custody documentation will accompany all samples.

8. Laboratory Analyses:

Water and selected soil samples will be analyzed by Sequoia Analytical Laboratory in either Concord or Redwood City, California, a state certified laboratory, for TPH as gasoline using EPA analytical method 5030 in conjunction with modified 8015, and BTX&E using EPA method 8020 as recommended by the RWQCB and as specified in the Tri-regional guidelines.

Analytical results will be presented in tabular form, showing sample depths, results and detection limits.

The analytical results will be used to delineate the vertical and lateral extent of the contaminants in soil and ground water.

9. Hydrology:

Ground water flow direction will be determined from the survey data and water table depths from both the new and existing wells. The flow direction will be shown on the Site Plan.

10. Conclusions:

Conclusions and results of Phase I will be described in a technical report.

The technical report will be submitted to the City of San Leandro, and to the RWQCB.

PHASE III

Once the zero line is established through the completion of Phase II, a final remedial plan will be developed.

Interpretations of the subsurface stratigraphy will be used in consideration of various remedial options such as soil venting and/or air stripping.

PHASE IV

Implementation of the remediation plan.

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.

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.

Approved by:

Don R Braun

REGISTERED GEOLOGIST
DON R. BRAUN
No. 1310
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Don R. Braun
Certified Engineering Geologist

License No. 1310
Exp. Date 6/30/92

\jad

Attachments: Tables 1 & 2
Location Map
Site Plans - Figures 1 & 2
Well Completion Diagram

KEI-J90-1003.P1
November 27, 1990

TABLE 1

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on October 12, 19, 22 & 31, and
November 2, 1990)

Sample	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
A1	14.5	350	2.0	3.6	47	7.7
A2	14.5	480	2.4	7.3	49	7.4
A3	14.0	570	0.97	5.6	50	8.3
B1	15.0	180	0.64	0.84	11	3.0
B2	15.0	1,900	9.7	120	250	33
B3	15.0	990	6.3	52	120	16
C1	15.0	270	0.64	3.7	22	5.4
C2	15.0	1,200	4.9	41	150	24
C3	15.0	590	4.6	23	80	9.4
SW1	18.0	3.7	0.21	0.024	0.42	0.14
SW2	18.0	4.5	0.46	0.024	0.46	0.26
SW3	18.0	4.1	0.024	0.0080	0.088	0.058
SW4	18.0	ND	0.0090	ND	0.0070	ND
SW5	18.0	998	0.58	ND	21	19
SW5(20)	18.0	30	0.054	0.047	0.054	0.46
P1	2.5	1,400	0.22	3.3	72	8.9
P1(8)	8.0	5.7	0.0078	0.0054	0.18	0.033
P2	3.0	3,900	1.1	23	280	41
P2(7.5)	7.5	20	ND	0.11	1.3	0.12
P3	2.5	100	0.057	0.63	12	0.97
P3(5.5)	5.5	9.8	0.015	0.15	1.3	0.13
P4	2.5	19	ND	0.10	0.13	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.

KEI-J90-1003.P1
November 27, 1990

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

(Collected on October 24, 1990)

Sample #	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
W1	4,300	40	1.9	520	0.54
Detection Limits	30.0	0.3	0.3	0.3	0.3

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

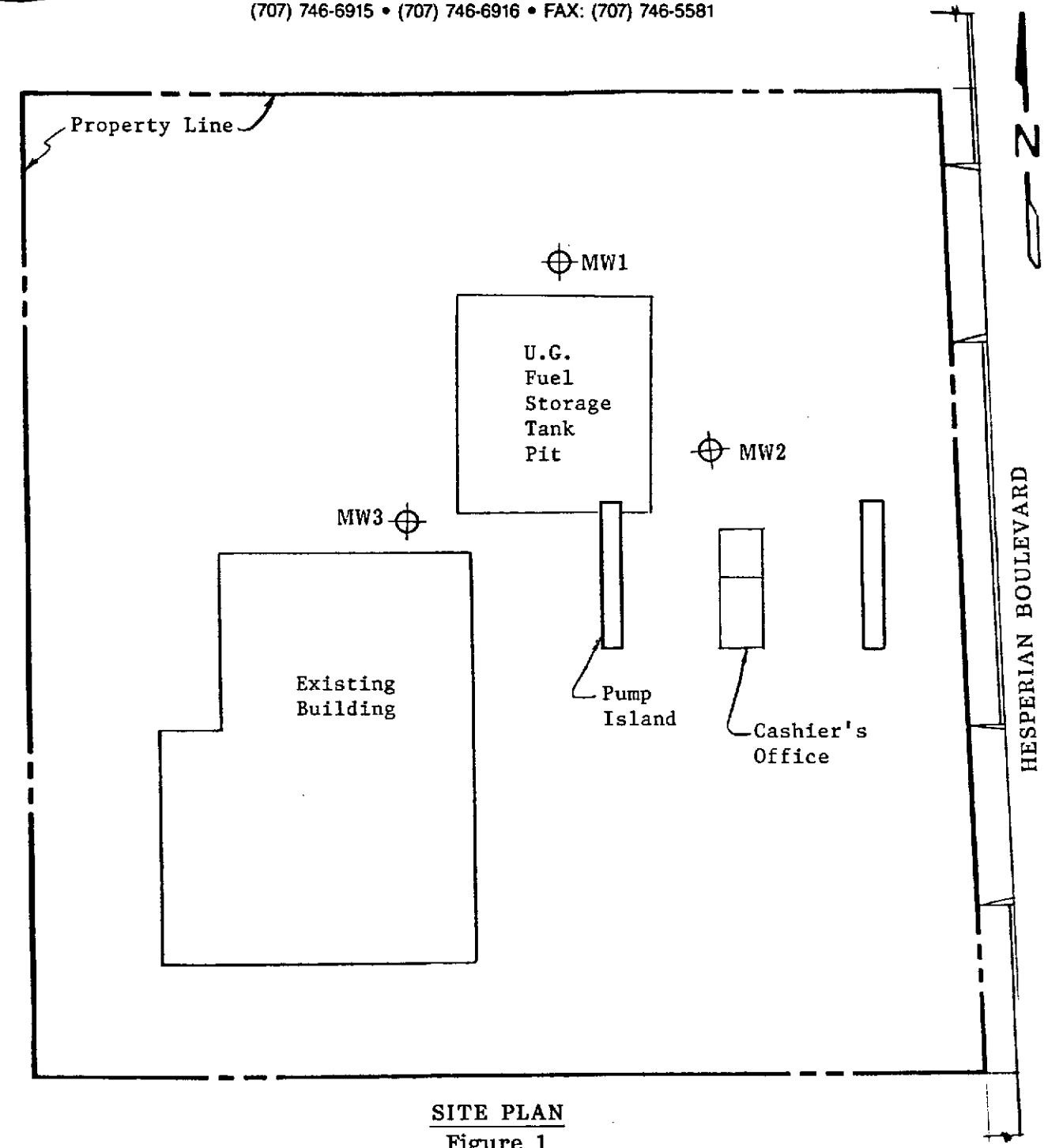
KAPREALIAN ENGINEERING, INC.
Consulting Engineers
P.O. BOX 996 • BENICIA, CA 94510
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581

LOCATION MAP

Base from U.S.G.S. 7.5 min. Hayward and San Leandro Quadrangles (photorevised 1980)

Unocal S/S #7004
15599 Hesperian Boulevard
San Leandro, 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 1

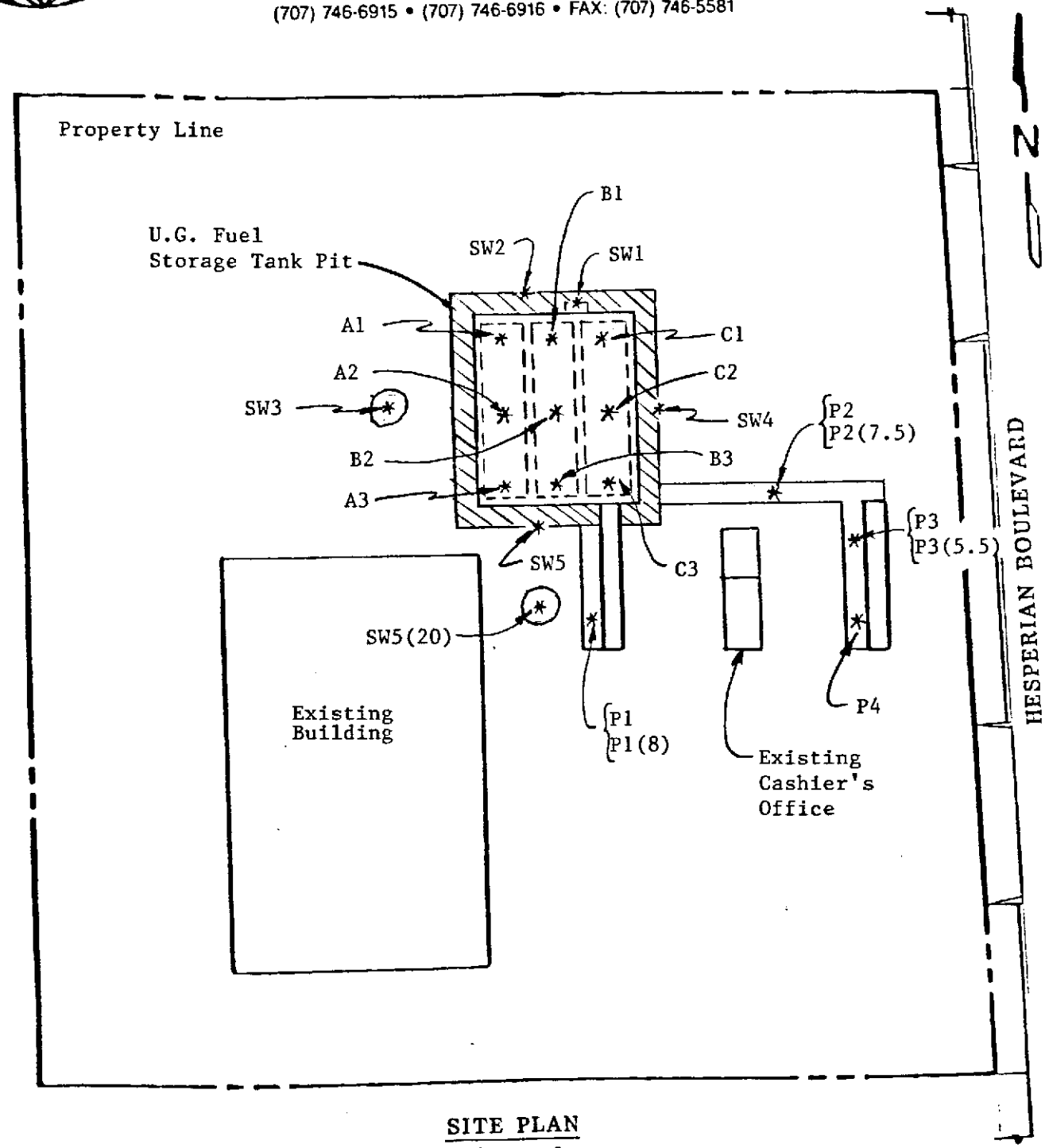
LEGEND

⊕ Monitoring well

0 30 60
Approx. scale feet

Unocal S/S #7004
15599 Hesperian Blvd.
San Leandro, 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

0 30 60
Approx. scale feet

LEGEND

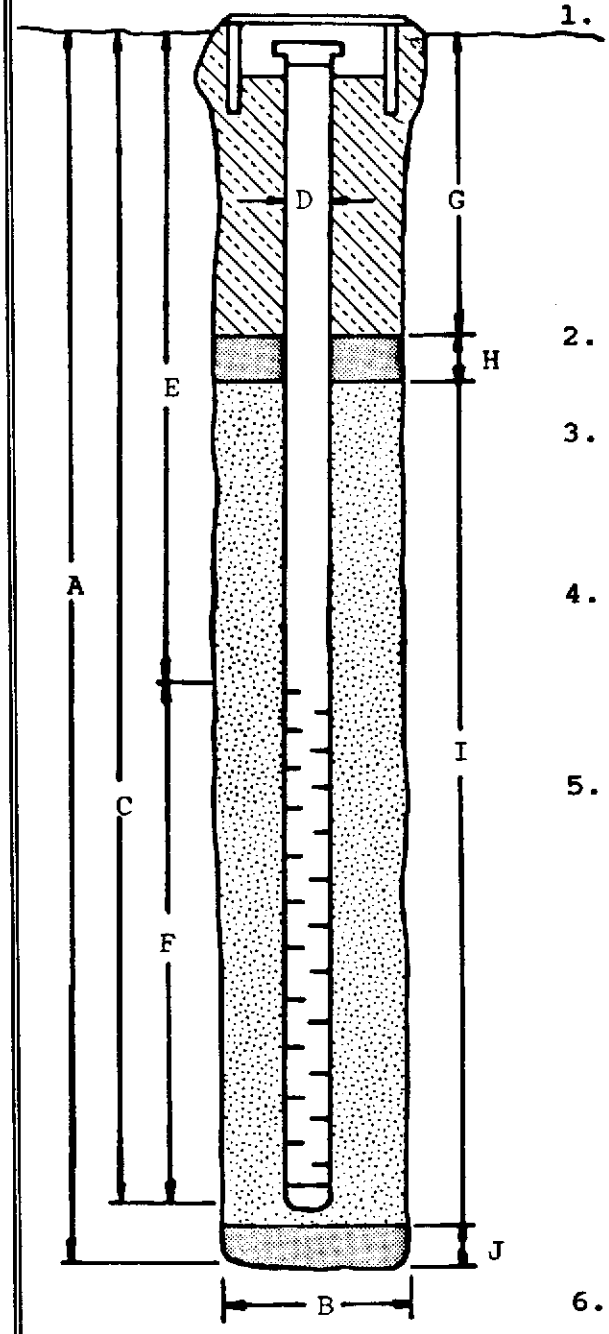
* Sample Point Location

▨ Area of Additional Excavation

Unocal S/S #7004
15599 Hesperian Boulevard
San Leandro, CA

WELL COMPLETION DIAGRAM
(SCHEMATIC)

Flush-mounted Well Cover



WELL DETAILS*

1. Well will be terminated 10 to 15 feet into first ground water unless a five foot thick aquitard is encountered below the water table, in which case the aquitard will be backfilled with bentonite pellets and the well terminated at the top of this aquitard [A].
2. Boring diameter [B] is 9 inches for 2 inch wells and 12 inches for 4 inch wells.
3. Perforated interval [F] will extend from bottom of casing to five feet above first ground water table (unless water <5 feet deep).
4. Schedule 40, PVC casing, 2 inch in diameter [D], will be used [C]. Screen is 0.020 or 0.010 inch factory machined slots, depending on filter pack grain size.
5. Filter pack will be placed from bottom of casing to two feet above perforated interval [I]. (Bottom seal [J] is not installed unless required.) Two feet of bentonite [H] will be placed above the filter pack. Concrete grout [G] will be placed from top of bentonite seal to the surface (unless modified due to shallow water). Blank casing [E] will extend from the top of the perforated casing to the top of the hole.
6. The well will be installed with a waterproof cap, padlock and a flush-mounted well cover.

* See text for additional information.