R.T. NAHAS COMPANY *Since 1947*
REAL ESTATE DEVELOPERS AND INVESTORS

20630 PATIO DRIVE
CASTRO VALLEY, CALIFORNIA 94546
TELEPHONE (510) 538-9600
FAX (510) 881-7618

December 10, 1997

Mr. Scott Seery
Hazardous Materials Specialist
Alameda County Health Care Services
1131 Harbor Bay Parkway, Room 250
Oakland, CA 94502-6577

RE: Unocal 76 Service Station
Castro Valley, CA

Dear Scott:

Enclosed is a Workplan for the Supplemental Subsurface Characterization for the Unocal 76 Service Station on Redwood Road in Castro Valley, CA.

Sincerely,

Randy Nahas /s

Randall E. Nahas

REN/hrs
Enclosure

Workplan
Supplemental Subsurface Characterization
Unocal 76 Service Station
20405 Redwood Road
Castro Valley, California

BSK & ASSOCIATES
Geotechnical Consultants, Inc.

BSK JOB NO. 04-40-0163
December 9, 1997

BSK

BSK
1181 Quarry Lane, Building 300
Pleasanton, CA 94566
(510) 462-4000 • FAX (510) 462-6283

December 9, 1997

BSK JOB NO. 04-40-0163

Mr. Randall E. Nahas
R.T. Nahas Company
20630 Patio Drive
Castro Valley, California 94546

Subject: Workplan
Supplemental Subsurface Characterization
Unocal 76 Service Station
20405 Redwood Road
Castro Valley, California

Dear Mr. Nahas:

BSK & Associates, Inc. (BSK) is pleased to present this Workplan for supplemental subsurface characterization at the Unocal 76 Station located at 20405 Redwood Road in Castro Valley, California.

The purpose of the supplemental subsurface characterization, as stated in our proposal 04-40-0163, dated December 3, 1997, is to provide updated data with regards to concentrations of petroleum hydrocarbons in the soil and groundwater at the site. The scope of work and related sample point locations are based on a request from Mr. James deGeorgio of the California State Water Resources Control Board, Underground Storage Tank Cleanup Fund (USTCF).

Copies of this Workplan should be submitted to the following for review:

Scott Seery
Alameda County Department of Environmental Health
1181 Harbor Bay Parkway
Alameda, CA 94502

James deGeorgio
California State Water Resources Control Board
Underground Storage Tank Cleanup Fund
P.O. Box 944212
Sacramento, CA 94244-2120

BSK is pleased to continue to be of service to you during this project. If you have questions concerning the contents of the Workplan, please do not hesitate to contact us.

Respectfully submitted,
BSK & Associates

Martin B. Cline, R.G.
Geologist
R.G. No. 6244

Alex Y. Eskandari, P.E.
Manager, Professional Services Group
C.E. 38101

MBC/AYE:
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Distribution: R.T. Nahas Company (4 copies)

BSK

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Unocal 76 Service Station
20405 Redwood Road
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1.0 PURPOSE AND SCOPE

The purpose of the proposed supplemental subsurface characterization is to provide updated data with regards to concentrations of petroleum hydrocarbons in the soil and groundwater at the site. The scope of work includes drilling and sampling 7 borings, at locations requested by Mr. deGeorgio to depths of 15 to 20 feet, analytical testing of 28 soil and 7 groundwater samples and preparation of a supplemental subsurface characterization report.

2.0 INTRODUCTION

BSK & Associates has prepared this Work Plan for supplemental subsurface characterization. During site activities, BSK & Associates would be the prime drilling contractor (C-57 #490942).

2.1 Permits - Prior to commencement of exploration and sampling activities, drilling permits would be submitted to the County of Alameda Public Works Agency.

2.2 Underground Utilities - Underground Service Alert (USA) would be notified 48 hours before any subsurface work would begin.

Site Safety Plan - All work for the supplemental subsurface characterization will be performed under the guidelines presented in the Health and Safety Plan attached to this Work Plan.

3.0 BACKGROUND

BSK & Associates installed three groundwater monitoring wells (MW-2, MW-3 and MW-4) in December 1989 at the Unocal 76 Service Station located at 20405 Redwood Road, Castro Valley, California. The service station location is shown on Figure 1, Vicinity Map. The monitoring facilities were installed in order to comply with the California UST Monitoring requirements of Alternative 6, Subchapter 16, Title 23, California Code of Regulations. The results of well installations, soil sampling and chemical testing of the soil and water samples were summarized in our Report P89134, dated February 5, 1990. The groundwater monitoring well locations are shown on Figure 2, Site Plan.

BSK performed an assessment of the lateral extent of shallow soil contamination in April 1991 (see our Report P90165, dated April 1991). During the investigation, shallow soil contamination was observed to occur from the pump islands to the south property boundary, and within the east and west property boundaries.

The seventh quarterly monitoring report included the results of additional lateral contamination characterization in the off-site area to the south (BSK Report P92057.3, dated May 29, 1992). This report indicated the extension of a groundwater contaminant plume south of the site, between Wells MW-6 and MW-5, but north of MW-7. Wells MW-5, MW-6 and MW-7 were installed during this investigation.

In our Special Sampling Report of December 23, 1992, BSK determined that concentrations of Total Petroleum Hydrocarbons as Gasoline (TPHg) at MW-7 were related to Perchloroethene contamination, possibly emanating from a nearby dry cleaner.

In a letter dated April 13, 1995, Alameda County Health Care Services requested that a corrective action plan (CAP) be prepared for the Site. During the development and implementation of the CAP, the six groundwater monitoring wells located at the Site may be sampled on a semi-annual basis.

In late 1995, BSK prepared a feasibility study which reviewed soil remediation methods including soil-vapor extraction, in-situ bioventing, excavation and disposal and excavation and onsite treatment, and groundwater remediation methods including extraction and treatment, air sparging, and no action. During the feasibility study, an aquifer test was performed on well MW-101, which was installed south of the underground gasoline tanks in September 1995.

3.1 Review of Subsurface Conditions

The site subsurface soil conditions, as revealed in Borings MW-1A, MW-2, MW-3, and MW-4 of our previous investigation (P89134), consist primarily of silty and sandy clays. Four to five feet of black organic-rich silty clay fill are found immediately below the ground surface, followed by three to five feet of greenish-gray sandy/silty clay native material. In the western portion of the study area, the greenish clay is underlain by seven to eleven feet of yellow-brown sandy clay, grading to a clayey sand with depth. In the eastern portion of the tank area, the sandy clay and clayey sand are split by a six foot layer of silty clay. Light brown silty clay was encountered in each boring from 17 and 24 feet in depth, and continuing to the final depth explored. It is apparent from the boring logs that this lowermost clay layer slopes to the northeast.

In the areas of Wells MW-5 through MW-7, subsurface conditions comprised 10 to 20 feet of dark gray to yellow-gray silty clay, the upper 10 feet of which may be fill. The silty clay is underlain by 4 to 5 feet of orange-brown clayey silt to silty sand. This unit often contains fine, wet to saturated pores. At fifteen to twenty feet in depth, a silty to sandy grayish clay is encountered. This clay is very stiff to hard, often porous, and contains thin saturated lenses of fine sand and silt. At approximately 25 feet, clayey sand to sand was encountered. This unit is soft to firm and contains many fine lenses of sand, silt, and clay. The sand and silt are typically saturated.

Groundwater within the site has been encountered at both 13 to 15 feet and 19 to 23 feet. The lower water levels occur in clayey sands along the east and west boundaries of the site, and likely in its northern one-third. This water horizon is considered the first primary aquifer. A shallow "perched" water is found in clayey sand at 13 to 15 feet, occurring throughout the south-central portion of the

site. Hydrostatic pressure in both units results in a piezometric surface 10 to 12 feet below ground surface. The similar piezometric surface suggests that the "perched" water is connected to the underlying aquifer. Additional evidence for this connection is the lack of a confining layer below the upper clayey sand in several borings in the south-central portion of the site.

Groundwater flow direction at the site has been towards the southwest since December 1989. Gradient has varied at the site from 0.4% to 2.0%. Electrical conductivity is a relatively low 300 to 1,000 micromhos/cm, and pH has generally been slightly acidic. Seasonal precipitation appears to result in more southerly flow, a flatter gradient, and 1 to 2 feet higher water levels in early spring.

During soil boring investigations, soil contamination by petroleum hydrocarbons was observed olfactorily and by Photo-Ionization Detector (PID) in 13 borings in the project area. Hydrocarbons were detected at depths ranging from just below the asphalt pavement to 17 feet (the greatest depth of several borings in the area of greatest contamination). PID values reached 3,600 ppm total ionizable hydrocarbons in soil. The greatest concentrations were observed between 10 feet in depth and first encountered groundwater (where encountered). It was noted that contamination was not always accompanied by soil staining, and volatilization was rapid upon exposure to air.

Groundwater contamination has been encountered at the site in samples obtained quarterly from Wells MW-2 and MW-3, and in Well MW-7. Wells MW-2 and MW-3 are adjacent to, and up- and cross-gradient to what is believed to be the contaminant source area. Well MW-7 is down gradient from the source area; however, it appears that contamination encountered in Well MW-7 is not related to the Unocal contaminant plume.

4.0 DRILLING AND SAMPLING METHODOLOGY

A BSK & Associates engineer or geologist under the direct supervision of a Registered Civil Engineer or Geologist will be present during drilling and soil/groundwater sampling. Refer to Figure 2, Site Map for the location of the proposed soil borings. It should be noted that the locations of the soil borings are based upon a correspondence from Mr. James deGeorgio of the California State Water Resources Control Board, Underground Storage Tank Cleanup Fund (USTCF)

The borings, estimated to be 15 to 20 feet deep, will be drilled with a truck-mounted B-53 Mobile Drill rotary rig, utilizing 5-inch diameter solid flight auger. Drill cuttings will be stockpiled at the site and covered with visqueen. Materials encountered in the boring would be classified in accordance with the Unified Soil Classification System by a engineer or geologist under the direct supervision of a Registered Civil Engineer or Registered Geologist. Soil samples and drill cuttings will be field-screened for total volatile organic compounds using a photoionization detector (PID).

Soil samples will be collected starting at a depth of one foot below the ground surface and at 5-foot intervals until groundwater is encountered. The soil samples will be collected with a California Modified split-barrel sampler. Retained soil samples will be capped with Teflon® lined capes and labeled.

Groundwater grab samples will collected utilizing a hydropunch II® sampling device. The groundwater samples will be collected by driving the hydropunch 2 feet into the first groundwater bearing zone, then lowering a bailer inside the hydropunch device and withdrawing a groundwater sample. The groundwater sample will be transferred the appropriate sample bottle with preservatives added and labeled.

The retained soil and groundwater samples will be stored in a cooler with ice or blue ice until delivery to the analytical laboratory. Delivery of the samples to the analytical laboratory will be performed using chain-of-custody protocol.

Augers and drill rods would be cleaned with a high-pressure, high-temperature cleaner before, between and after drilling each boring. The equipment will be washed in a polyethylene-lined containment basin. The rinsate from the auger wash will be placed into 55-gallon DOT 17 E/H drums and labeled.

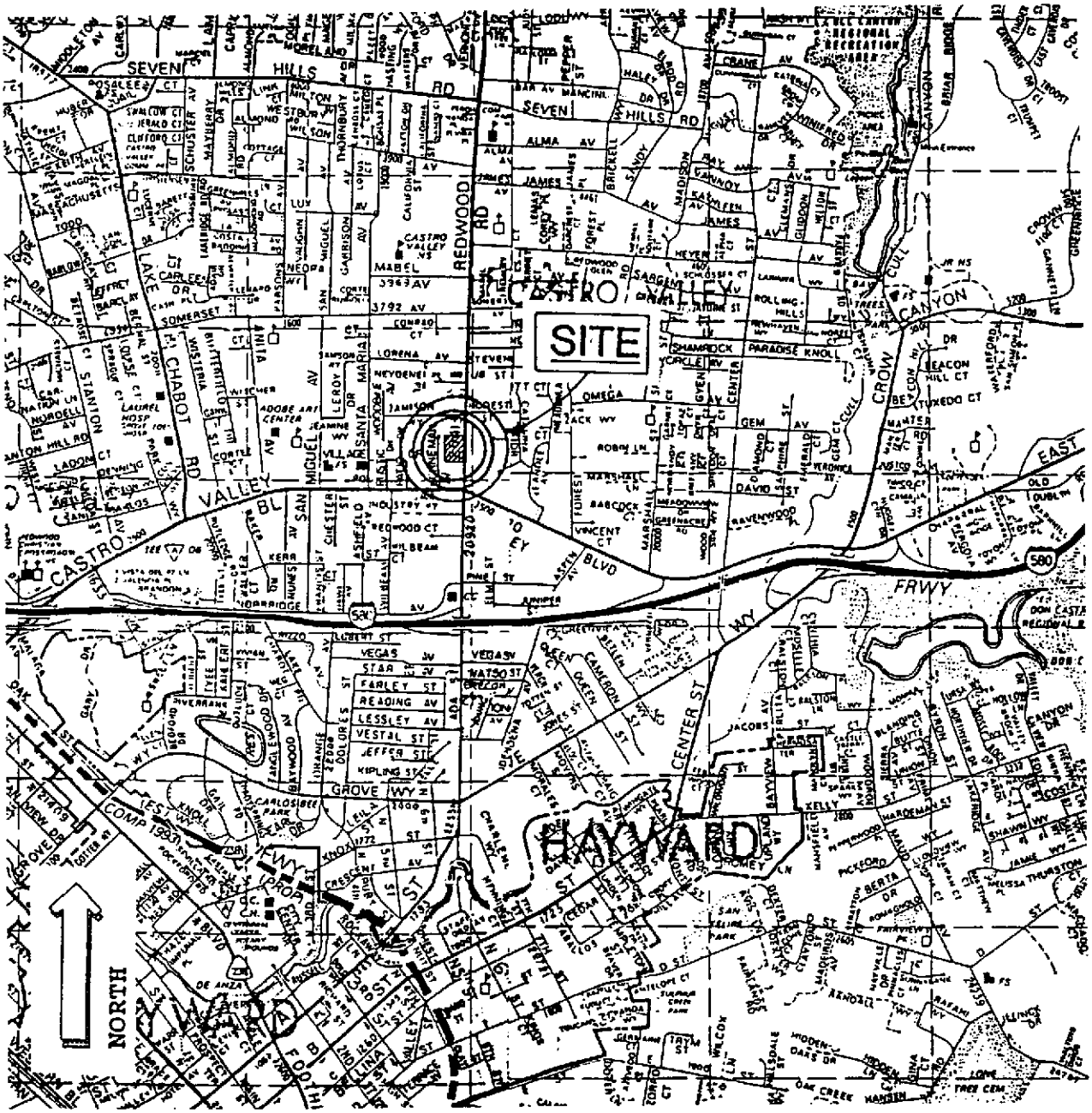
Subsequent to drilling the borings the boreholes will be backfilled with neat cement using the tremmie method.

5.0 ANALYTICAL TESTING

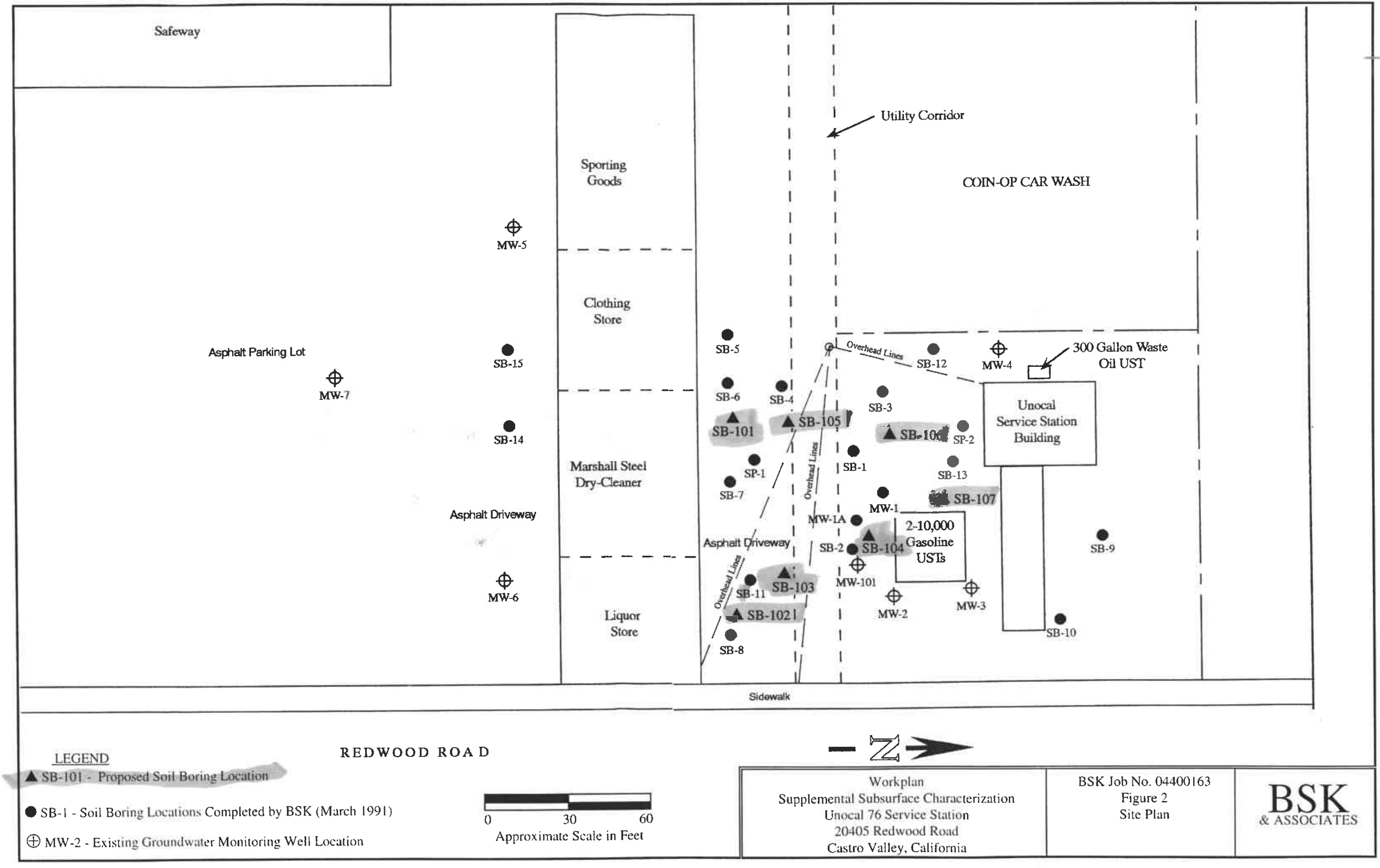
A total of 28 soil samples and 7 groundwater samples will be analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-g), Benzene, Toluene, Ethyl benzene, Xylenes (BTEX) and Methyl-t-Butyl Ether (MTBE) by EPA 8020M/8015M. Two soils samples with the highest concentrations of MTBE will be confirmed using EPA 8260. The samples will be analyzed by our State certified analytical laboratory.

6.0 REPORTING

Upon receiving the results of the analytical testing, a supplemental subsurface characterization report will be prepared. The report will contain, at a minimum, a description of field procedures, boring logs, site plan, tables summarizing the soil and groundwater sample analytical results, and copies of the laboratory analytical reports and chain-of-custody documentation for the soil and groundwater samples. Conclusions and recommendations for further action, if needed, will be included in the report.



Workplan Supplemental Subsurface Characterization Unocal 76 Service Station 20405 Redwood Road Castro Valley, California	BSK JOB No. 04400163 VICINITY MAP FIGURE 1	BSK & ASSOCIATES



Workplan
Supplemental Subsurface Characterization
Unocal 76 Service Station
20405 Redwood Road
Castro Valley, California

BSK Job No. 04400163
Figure 2
Site Plan

BSK & ASSOCIATES

APPENDIX A
HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

1.0 ORGANIZATIONAL STRUCTURE

1.1 Client Supervisor - Randy Nahas

1.2 Project Manager -Alex Y. Eskandari

The Project Manager (PM) has overall responsibility for safe conduct of field work, including full implementation of this operating procedure by project staff assisting with field work. The Contractor will comply with regulations, including OSHA 29 CFR 1910.134 (Respiratory Protection) and 29 CFR 1910.120 (Hazardous Waste Operations).

The PM shall assign a Site Safety Officer (SSO), who may be the Site Supervisor, to attend to day-to-day health and safety matters in the field. The SSO/Site Supervisor must be on-site whenever work by employees of the Contractor (BSK) is being performed at the site. The PM, SSO or the Contractor's employees are authorized to suspend work when, in their judgement, working conditions become too hazardous. The PM or SSO may remove from the site any employee whose conduct endangers the health and safety of the employee or of others.

In addition, the PM, SSO, or Site Supervisor has primary responsibility for:

- Assuring that personnel are aware of known site conditions, components of this plan, and are familiar with planned procedures for dealing with emergencies.
- Monitoring the safety performance of site personnel to ensure that required work practices are employed, and correcting work practices that may result in injury or potential exposure to hazardous substances.
- Preparing accident/incident reports.

The Contractor's Project Manager, Site Safety Officer and/or Site Supervisor shall have successfully completed the OSHA 40-hour safety training, plus requisite annual 8-hour recertification training.

2.0 SAFETY MEETINGS

Daily Tailgate Meetings - "Tailgate" safety meetings shall be held daily prior to work start-up to present and review health and safety concerns associated with the project.

3.0 EMERGENCY RESPONSE

Initial Response - All emergencies shall be reported by dialing 911 on a mobile phone to be maintained on site at all times. The nearest Hospital is Eden Medical Center located at 20103 lake Chabot Road, Castro Valley.

4.0 POTENTIAL CHEMICAL HAZARDS

Chemicals which have been detected at the site from previous investigations and present a potential hazard to personnel are listed in Table 1. The primary route of entry for the chemicals which have high vapor pressures would be inhalation.

TABLE 1

Compound Name	Vapor Pressure (mm Hg)	Threshold Limiting Value (ppm)	Time Weighted Average (ppm)	Short-Term Exposure Limits (ppm)	IDLH (ppm)	Other Hazards
Benzene	75	Ca	0.1	1.0	Ca	
Toluene	20	100	100	200	2000	
Ethylbenzene	10	100	100	125	2000	
Xylene	9	100	100	200	1000	
Methyl-t-Butyl Ether	249	40	40	NA	NA	
Gasoline	--	300	300	500	--	LEL=14,000
Portland Cement	NA	10*	10*	NA	NA	Caustic When Wet

LEL - Lower Explosion Limit
Ca - Carcinogen
NA - Not Available
* - mg/M^3

5.0 MONITORING

5.1 Photo Ionization Detector (PID) - A PID utilizing a 10.0 ev lamp can detect the following compounds of concern:

Benzene
Xylene
Toluene
Ehtylbenzene

The PID shall be calibrated daily to a 100 ppm iso-butylene standard, and zeroed in the field to ambient working conditions.

5.2 Combustible Gas and Oxygen Indicator (LEL-O_2) - A detector capable of detecting lower explosion limits from 0 to 100% and oxygen levels 0 to 25%. The LEL-O_2 meter shall be calibrated according to the manufacturers specifications prior to use.

5.3 Odors - Unusual odor or other chemical warning encountered during work activities would result in cessation of work.

The worker breathing zone shall be monitored during field activities which would cause a potential exposure to hazardous chemicals. Trenches and excavations shall be monitored for inhalation and explosion hazards.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

If the compounds described in Section 5.0 are encountered during the site activities, the most likely entry route for contaminants to workers is inhalation and skin contact.

6.1 Perceived Hazards

6.1.a. Inhalation - Dust, fumes, mist and vapors may be inhaled during remedial activities. Volatilized organic compounds may be expected at the site, and can be monitored by a PID or LEL-O_2 meter.

6.1.b. Skin Contact - Contact with the skin by splashing or sloshing of excavated effluent, possibly containing hazardous compounds, is a perceived hazard. Eye contact with fluids may also be anticipated.

6.2 Personal Protective Equipment

6.2.a. Protective Materials - The following protective materials are

recommended for gloves and boots at the site: Nitrile, Vinyl or PVC.

6.2.b. Uncoated Tyveks are recommended.

6.2.c. Eye Protection - To prevent contact with the eyes, encapsulating goggles shall be worn around fluids. Workers not handling fluids shall wear protective eyewear to guard against flying debris. Eyewear must conform to ANSI Standard Z87.1.

6.2.d. Respirator Selection - If required, respirators shall be full or ½-face, and shown to have been fit-tested to the user. Respirator cartridges available for use at the site shall be suitable for organic vapors, dust, mist and fumes.

6.3 Working PPE Levels - Workers within the work area control zones should be dressed in Level D Protective apparel, which includes, but is not limited to:

Boots
Safety Glasses/Goggles
Hard Hat
Gloves
Hearing Protection

For emergency measures, respirators with the appropriate cartridge and Tyveks shall also be available.

6.4 PPE Revision - Encounter with and identification of a hazardous compound or compounds would necessitate re-evaluation of PPE and safety procedures at the work site.

7.0 PHYSICAL HAZARDS

Physical hazards which can be expected at the project site include equipment failure, slip, trip and fall, flammable vapors and weather. Equipment used at the site shall be regularly and properly maintained, kept clean and stored in its proper location or position when not in immediate use. Equipment utilized in areas where flammable vapors may be present shall be properly bonded and/or grounded.

7.1 Weather - Inclement weather such as heat or rain can result in accident or injury.

7.1.a. Heat: - Appropriate measures shall be taken to monitor personnel for signs of heat stress.

7.1.b. Rain - During rain, extra caution shall be maintained for slip and overhead hazards, as well as containment of runoff from waste. If a thunderstorm occurs, work shall cease, any equipment with a mast shall be lowered, if safe to do so, and cover taken away from the work vehicle.

8.0 SITE CONTROL

Access to hazardous and potentially hazardous areas of spill sites must be controlled to reduce the probability of occurrence of physical injury and chemical exposure of field personnel, visitors and the public. A hazardous or potentially hazardous area includes areas where (1) field personnel are required to wear respirators, (2) borings are being drilled with powered augers, or (3) excavating operations with heavy equipment are being performed.

Entry to hazardous areas would be limited to individuals who must work in those areas, and those qualified to do so. Unofficial visitors must not be permitted to enter hazardous areas while work is in progress in those areas. Official visitors should be discouraged from entering hazardous areas, but may be allowed to enter only if they agree to abide by the provisions of this document, have the requisite OSHA certifications, follow orders issued by the Site Safety Officer, and are informed of the potential dangers that could be encountered in the areas.

8.1 Hot Zone - Drill or Excavation Operation Zone

8.1.a. Authorized Personnel - Authorized personnel shall be those persons directly involved in drilling, equipment operating, logging, monitoring and primary support activities.

8.1.b. Personal Protection - A minimum of Level D personnel protective equipment will be maintained, which includes a minimum of a hard-hat, work shoes, ear protection, and gloves.

8.1.c. Zone Limits - Hot zone limits extend to 15 feet from the excavation equipment or drill rig.

8.2 Warm Zone - Transitional area, decontamination area. Fully encircles Hot Zone.

8.2.a. Authorized Personnel - Persons authorized to enter this zone include secondary drilling/work support, decontamination personnel and supervisory personnel with requisite health and safety-training.

8.2.b. Personal Protection - Persons entering the Warm Zone shall

wear at a minimum a hard-hat. Persons working within the warm zone shall dress in Personal Protective Equipment (PPE) similar to that used in the Hot Zone at that time.

8.2.c. Zone Limits - Warm Zone limits extend 10 feet from vehicles and equipment in use at the site, other than the drill rig. The zone would extend to 25 feet from the drill rig.

8.3 Control Zone Delineation - Control zones shall be clearly delineated by barricades, traffic cones, barricade tape or other demarcation or as required.

9.0 DECONTAMINATION

Decontamination of employees and equipment shall occur before exit from site control zones. PPE and equipment that may be reused will be washed with detergent and water, and thoroughly rinsed with potable water. Articles to be changed daily, such as tyvek coveralls, inner gloves, foam ear inserts and respirator cartridges will be discarded to a plastic bag, tied, and placed in a DOT drum reserved for such purpose. Removal of PPE will be performed in a manner such that inner protective gloves will be the last item removed, and skin and clothing will not contact soiled gear. Wash and rinse bins and brushes will be supplied for decontamination. Decontamination will be performed in the Warm Control Zone. Rinsate and wash water will be contained, and stored in DOT-approved drums reserved for that use.

If used, respirators will be washed separately, stored and sealed for next use.

10.0 SPILL CONTAINMENT

Containment of leakage or spill from a storage container at the site will be exercised promptly, with materials designed for that purpose, such as dikes, booms, pads and plug material. If a container has leaked, it will be properly disposed, and the contents transferred to another suitable container.

11.0 ILLUMINATION

No drilling activities are anticipated ½-hour after sunset and ½-hour before sunrise.

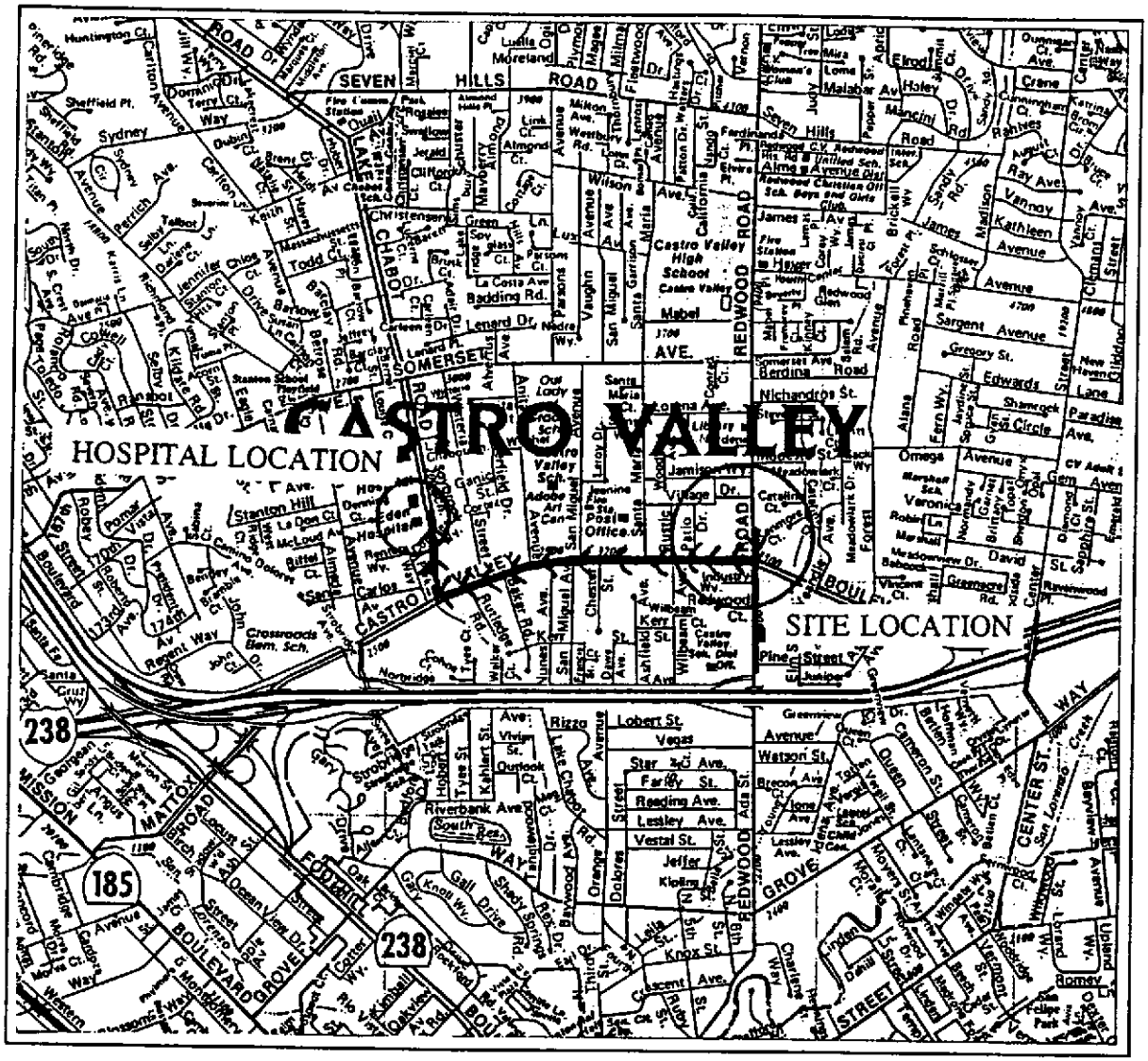
12.0 CONFINED SPACE ENTRY

Confined space entry is not anticipated.

13.0 SITE EXCAVATION

Excavations and bore-holes shall be securely covered to prevent accidental entry, or

deliberate entry without tools. Prior to conducting any digging or boring operations, Underground Service Alert (USA) shall be notified at least 48 hours before subsurface activities begin.



Workplan
Supplemental Subsurface Characterization
Unocal 76 Service Station
20405 Redwood Road
Castro Valley, California

BSK JOB No. 04400163
HOSPITAL ROUTE MAP
FIGURE A-1

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