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August 8, 1995

BSK JOB NO. 04-40-0027

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

Subject: Workplan
Aquifer Pump Test
Tien's Unocal Station
20405 Redwood Road
Castro Valley, California

Dear Mr. Nahas:

BSK & Associates, Inc. (BSK) is pleased to present this Workplan for construction of a groundwater extraction well and performance of an aquifer pump test at the Unocal Station located at 20405 Redwood Road in Castro Valley, California.

The purpose of aquifer pump test is to provide an estimate of aquifer parameters which may effect options for corrective action associated with the reported release of petroleum hydrocarbons. The data collected in the aquifer pump test will be utilized in the preparation of a Corrective Action Plan.

Respectfully submitted,
BSK & Associates

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

Richard E. Johnson, C.E.G.
Manager, Environmental Services

MBC/REJ:
(REPORTS\ENV\04400027.WRK)

TABLE OF CONTENTS

FIGURES

APPENDICES

Workplan - Aquifer Pump Test
Tien's Unocal Station
20405 Redwood Road
Castro Valley, California

1.0 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, summarized in our report (P89134) of February 5, 1990, indicate that a release of petroleum hydrocarbon had occurred. The groundwater monitoring well locations are shown on Figure 2, Site Plan.

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

Additional characterization of the lateral extent of petroleum hydrocarbons in soil was summarized in the seventh quarterly monitoring report (BSK Report P92057.3, dated May 29, 1992). The report indicated that petroleum hydrocarbons in groundwater extend south of the site between Wells MW-5 and MW-6, but attenuate to the north of MW-7. Wells MW-5, MW-6 and MW-7 were installed during this investigation.

As summarized in our *Special Sampling Report* of December 23, 1992, results of laboratory analyses by EPA Method 8010/8020 indicate that constituents registering under analyses by EPA Method 8015 for Total Petroleum Hydrocarbons as Gasoline (TPH-G) at MW-7 are likely the result of a perchloroethene release, possibly emanating from the 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.

1.1 Review of Subsurface Conditions

Subsurface soil conditions at the site, as revealed in exploratory borings and monitoring well borings, consist primarily of silty and sandy clays. In the vicinity of the underground fuel storage tanks and dispenser islands, four to five feet of black organic-rich silty clay fill are found immediately below the ground surface. The fill is, in turn, underlain by up to sixteen feet of sandy clay and silty clay material, grading to a clayey sand with depth. In general,

the western portion of the unit is typically coarser grain (e.g., sandy clay) than the eastern portion of the unit (e.g., silty clay). The clayey sand is underlain by a light brown silty clay extending from a depth of between 17 and 24 feet, continuing to the final depth explored. It is apparent from the boring logs that this lowermost clay layer slopes to the northeast.

South of the service station, (in the vicinity of wells MW-5 through MW-7), subsurface conditions comprised 10 to 20 feet of silty clay, the upper 10 feet of which appears to be fill materials. The silty clay is underlain by up to 5 feet of clayey silt and silty sand which, in turn, is underlain by a silty/sandy clay. The clay unit is very stiff to hard and contains thin lenses of fine sand and silt. At approximately 25 feet below grade, clayey sand was encountered. The sand unit contains lenses of fine sand, silt, and clay.

Groundwater at the site enters borings at depths of between 13 and 23 feet. The deeper water levels occur in the more clay-rich soil along the east and west boundaries of the site while the more shallow water is encountered the clayey and silty sands in the south-central portion of the site. Hydrostatic pressure results in a piezometric surface 10 to 12 feet below ground surface in all of the wells.

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.

2.0 PURPOSE AND SCOPE

The purpose of the aquifer pump test is to evaluate aquifer characteristics and provide data to aid in the development of a corrective action plan. The scope of work includes installation of a groundwater extraction well, development of the well, performing a step-drawdown aquifer test, performing a 48-hour constant pumping rate aquifer test, and evaluation of the data. The results of the aquifer testing will be incorporated in a Feasibility Study and Corrective Action Plan.

3.0 METHODOLOGY

BSK & Associates has prepared this Work Plan for installation of a groundwater extraction well and aquifer pump testing. Appendix A includes Standard Operating Procedures (SOPs) for drilling, soil sampling, monitoring well construction, monitoring well development, monitoring well sampling, decontamination, and sample handling. The SOPs are a detailed description of methodologies for routine tasks. A summary of tasks to be completed under this Workplan follows:

3.1 Permitting

Prior to commencement of groundwater extraction well installation activities, drilling permits will be obtained from the Zone 7 Water Agency. Discharge permits will be obtained from the local enforcing agency if necessary.

3.2 Underground Utilities

Underground Service Alert (USA) will be notified 48 hours before any subsurface work will begin.

3.3 Site Safety Plan

Work for the installation of the groundwater extraction well and aquifer testing will be performed under the guidelines presented in the Health and Safety Plan (Appendix B to this Workplan).

3.4 Groundwater Extraction Well Construction

The groundwater extraction well will be constructed under the supervision of a BSK & Associates engineer or geologist. Refer to Figure 2, Site Map for the location of the groundwater extraction well.

The bore hole for the groundwater extraction well will be drilled to approximately 30 feet below the ground surface using a truck-mounted B-53 Mobile Drill rotary rig, utilizing 8-inch hollow stem auger. Drill cuttings will be placed into 55-gallon DOT 17 E/H drums and labeled. Soil samples will be collected at 5-foot intervals with a California Modified split-barrel sampler. Materials encountered in the boring will be classified in accordance with the Unified Soil Classification System by a engineer or geologist under the supervision of a Licensed Civil Engineer or Geologist.

Augers and drill rods will be cleaned with a high-pressure, high-temperature cleaner before, between and after drilling the bore hole. 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.

Well construction materials will consist of 4-inch diameter schedule 40 PVC casing and screen with flush threaded joints. The screened interval will consist of 20 feet of factory slotted 0.02 inch PVC pipe. Prior to installation, the PVC casing and screen will be washed with a high-pressure, high-temperature cleaner. The annular space around the slotted interval will be back-filled with #2/12 silica sand. The sand will be placed through the hollow stem auger to a level two feet above the slotted interval. A one foot layer of 1/4-inch bentonite pellets will be placed above the sand pack and hydrated with potable water. Neat cement will

be placed above the bentonite pellet seal. The well-head will be secured in a traffic rated vault with locked well-head access.

The well will be developed by surging, bailing and pumping until the water reaches a degree of clarity. Development will take place a minimum of 24 hours after placement of the annular seal. Development effluent will be contained on-site in 55-gallon DOT 17 E/H drums and labeled.

Subsequent to installation of the new monitoring well the relative position and the elevation of the well will be determined relative to the existing wells at the Site.

3.5 Chemical Testing

Two soil samples collected during drilling activities, one groundwater sample collected subsequent to well development, and one groundwater sample obtained during the step-drawdown test will be submitted to BSK Analytical Laboratories for chemical analysis. The samples will be tested for Total Petroleum Hydrocarbons as Gasoline by EPA Method 8015M, and for Benzene, Toluene, Ethylbenzene, and Xylenes by EPA Method 8020.

3.6 Step-Drawdown Aquifer Test

The step-drawdown aquifer test will be performed by pumping the groundwater extraction well at three different pumping rates, or steps. Drawdown will be measured in the well at various time intervals during each pumping stage, as well as during well recovery on cessation of pumping. Pumping will be performed using a variable flow submersible pump equipped with a check valve to prevent back-flow. The groundwater produced during pumping will be stored in DOT E/H drums until results of laboratory analyses area available and disposal options can be evaluated.

Each step will be maintained for at least 45 minutes. The drawdown measurements for each step will be made at the following time intervals:

Sounding Interval	Pumping Interval - Each Step
Every 0.5 minutes	From 0 - 5 minutes
Every 1.0 minutes	From 5 - 15 minutes
Every 5.0 minutes	From 15 - 40 minutes
Every 10.0 minutes	From 40 - 60 minutes

Anticipated pumping rates are 2 gallons per minute (gpm), 4 gpm, and 8 gpm, however, pumping rates will be adjusted in the field to accomodate field conditions.

Following completion of the step drawdown test well recovery measurement will be until the groundwater level reaches a static level (less than 0.01 ft. of change in a 20 minute interval). The maximum time of the recovery measurements will be 100 minutes.

3.7 Constant Rate Pump Test

The data collected from the step drawdown test will be used to determine the appropriate pumping rate for the constant rate pump test. The groundwater extraction well will be pumped at a constant rate for 48 hours and the depth-to-groundwater measurements (drawdown) will be taken at the existing groundwater monitoring wells (MW-2 through MW-7). The depth-to-groundwater measurements will be made relative to the top-of-casing using a well sounder with an accuracy of 0.01 foot. The drawdown measurements will be made at the following time intervals:

Sounding Interval	Pump Test Interval	Wells
Initial	Prior to start of test	All Wells
Every 0.5 minute	From 0 - 3 minutes	Ex-1, MW-2, MW-3 & MW-4
Every 1.0 minute	From 3 - 6 minutes	Ex-1, MW-2, MW-3 & MW-4
Every 2.0 minutes	From 6 - 10 minutes	Ex-1, MW-2, MW-3 & MW-4
Every 10.0 minutes	From 10 - 100 minutes	Ex-1, MW-2, MW-3 & MW-4
Every 100.0 minutes	From 100 - 500 minutes	All Wells
Every 1000.0 minutes	From 200 - 2880 minutes	All Wells

The flow rate of water discharged from the well will be measured by use of a flow meter. Flow rate measurements will taken every 5 minutes during the early portion of the test, then at least every 4 hours during the remainder of the test. The pumping rate will be maintained at a constant rate (variable to within 10% of the desired pumping rate).

Following the termination of the constant rate drawdown test, drawdown recovery measurements will be made for a period of at least 100 minutes.

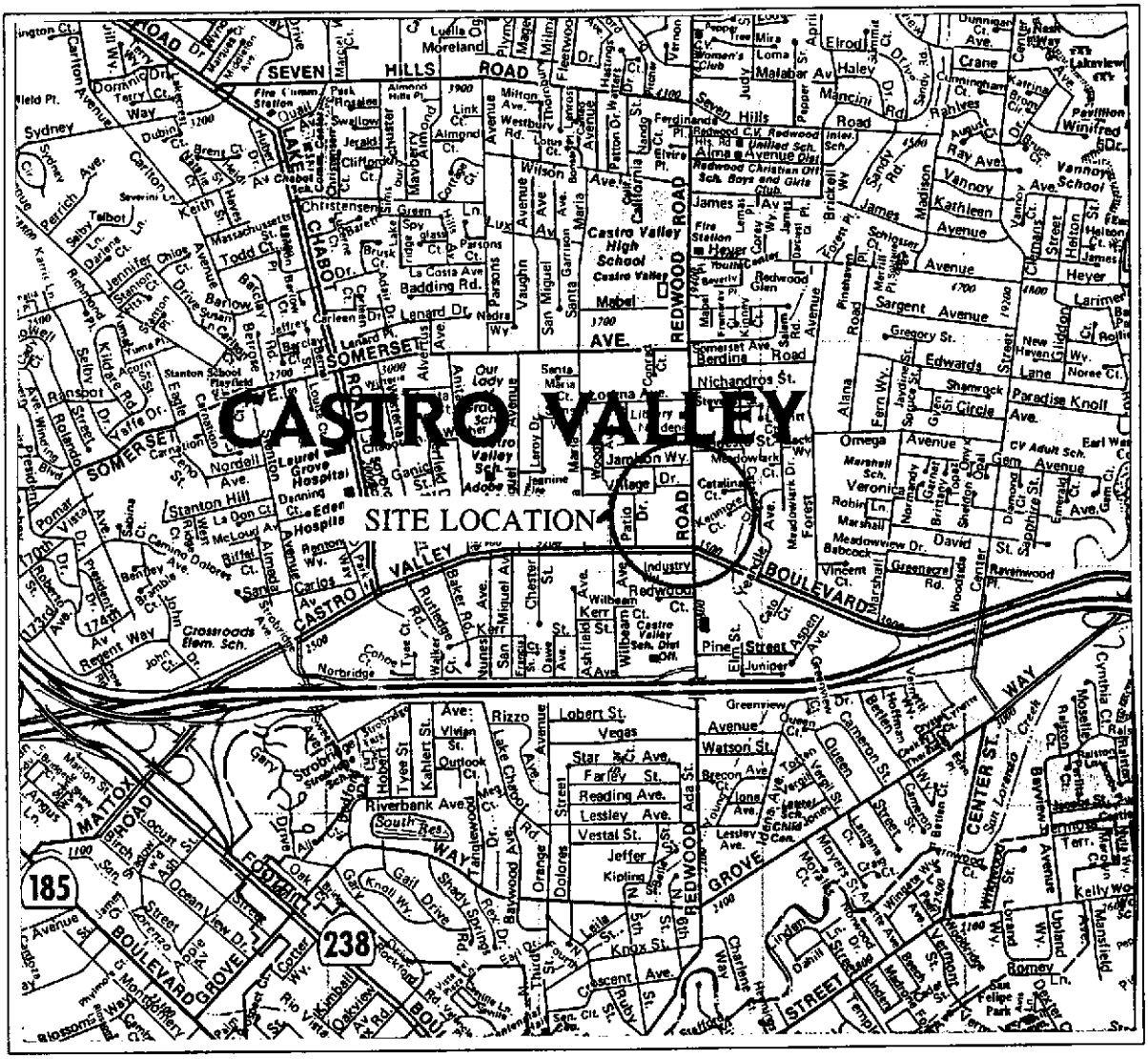
4.0 GROUNDWATER EFFLUENT MANAGEMENT

The groundwater produced from the extraction well during the step drawdown test will be placed in a holding tank pending results of chemical analysis. One sample of effluent water will be obtained from the effluent flowing into the holding tank to ascertain the disposal options. Effluent tests, consisting of analyses for TPH-G, and BTEX, will be conducted on a 24-hour turnaround basis.

Effluent for the 48-hour test will be discharged to the existing sewer system under permit. If sewer discharge is disallowed, effluent will be stored in a large capacity tank until an alternate treatment and disposal destination can be secured for the R.T. Nahas Company. Results of testing during the four hour step-drawdown test will be used to obtain a sewer discharge permit or identify an alternate waste handling plan, as appropriate.

5.0 REPORTING

Following completion of the aquifer test a summary report will be prepared presenting the data collected and estimates of aquifer parameters. The information will be incorporated into a feasibility study report which will address the effectiveness of remedial alternatives.

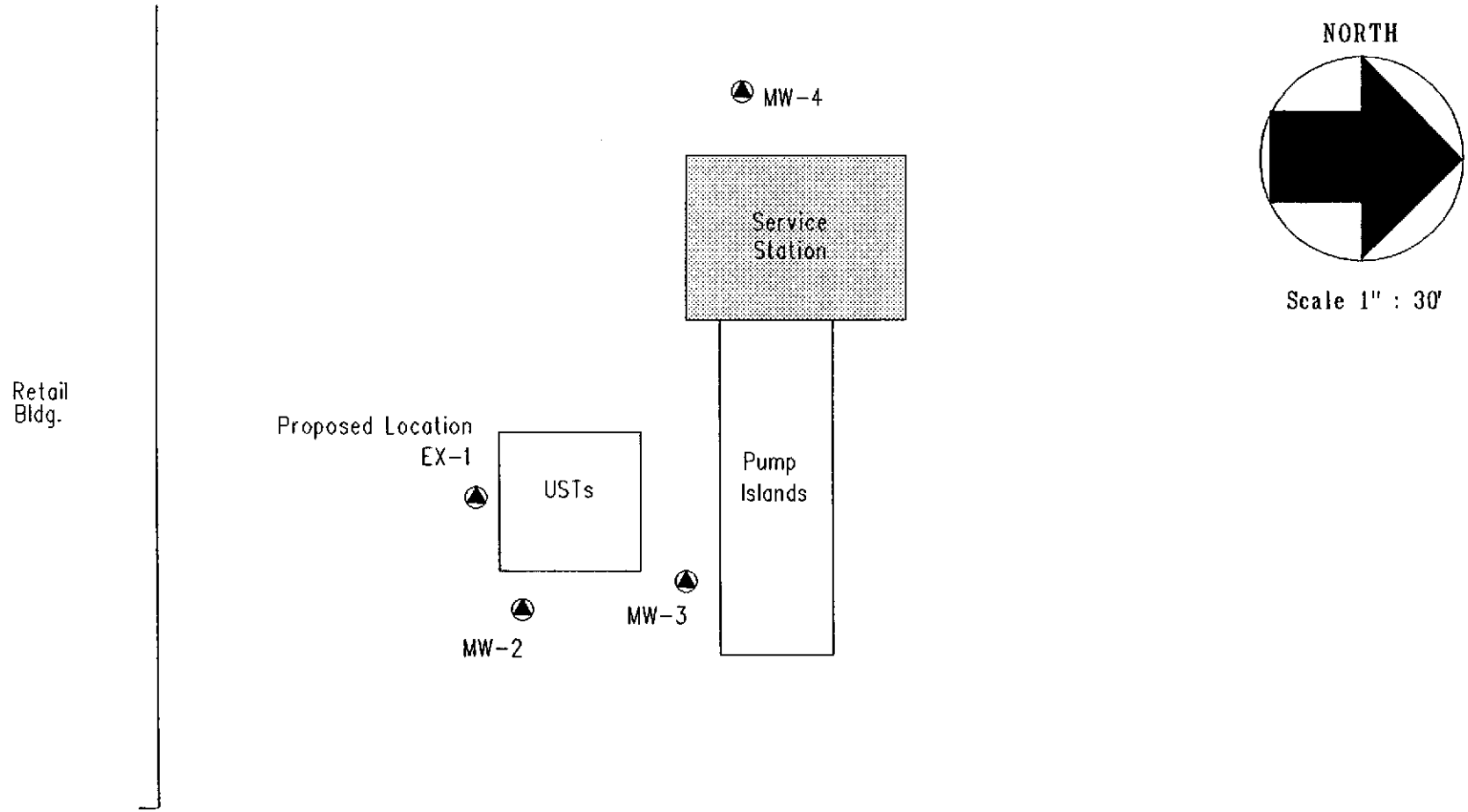


NORTH

VICINITY MAP

Tien's UNOCAL Station
20405 Redwood Road
Castro Valley, California

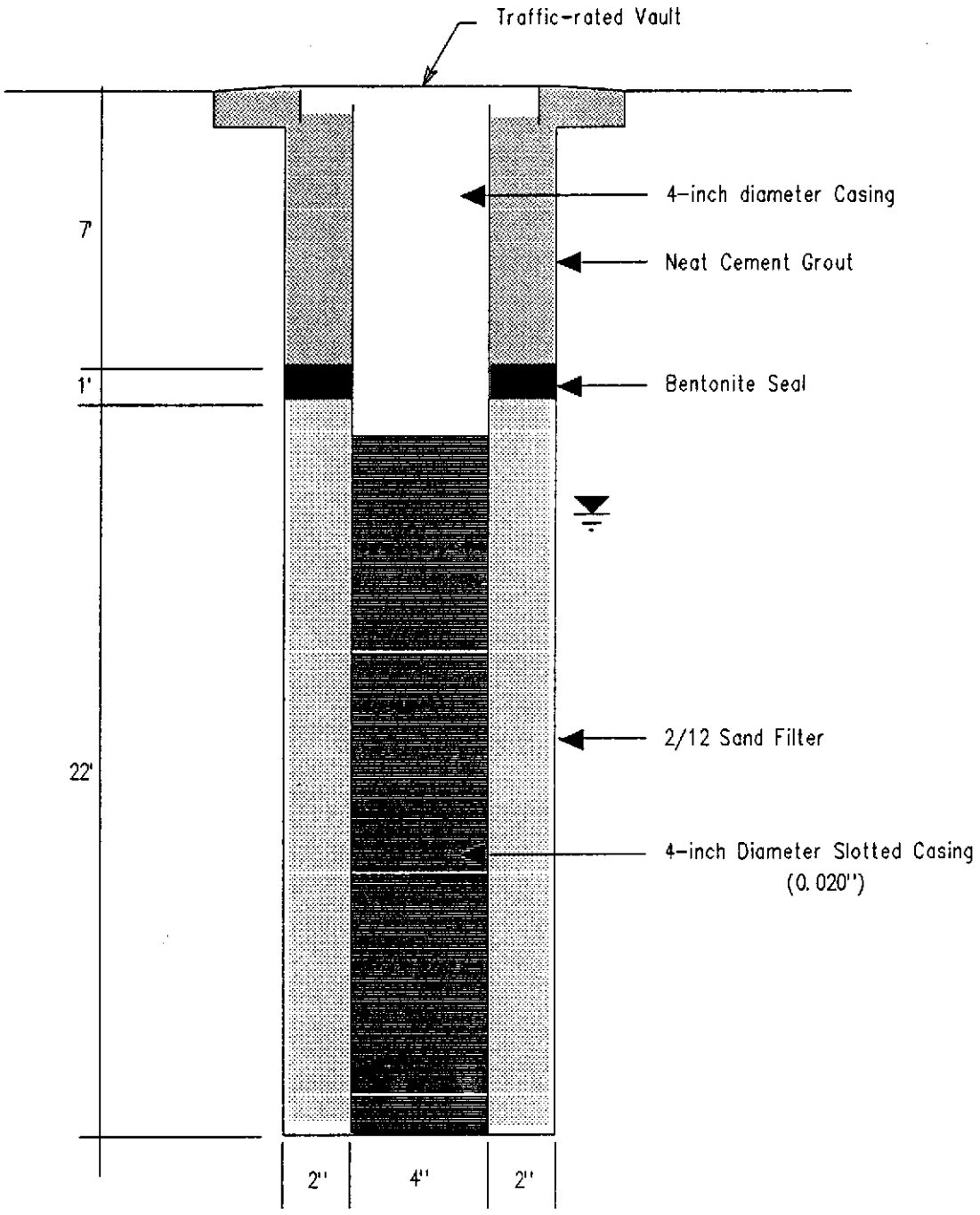
BSK No. 04-40-0027
FIGURE 2



SITE PLAN

Tien's UNOCAL Station
20405 Redwood Road
Castro Valley, California

BSK No. 04-40-0027
Figure 3



EXTRACTION WELL DETAIL

Tien's UNOCAL Station
20405 Redwood Road
Castro Valley, California

APPENDIX A

Standard Operating Procedures

BSK & Associates

SOP 1 - DRILLING AND SOIL SAMPLING

Prior to drilling, well construction permits will be obtained from the Zone 7 Water District. An engineer or geologist (under the supervision of a California-Licensed Engineer or Geologist) will be present during drilling and/or sampling to collect, or assist in the collection of relatively undisturbed samples of the subsurface materials, maintain logs of borings, and make observations of the site conditions. Drilling will be performed by a truck-mounted drill rig utilizing a hollow-stem auger method. Prior to drilling each boring, augers and sampling equipment will be decontaminated. Procedures for decontamination are presented in *Equipment Decontamination.*

Sample Locations and Depths

Soil sampling will be attempted in the borings at five-foot intervals, commencing at an approximate depth of five feet below the existing grade. Soil samples will be subjectively evaluated for the presence of petroleum hydrocarbons. Subjective analyses will include observation of color changes, odor and field screening using a Photo-ionization Detector.

Soil Sampling Apparatus and Sample Shipment

Soil samples will be collected with a California split-barrel sampler, lined with brass or stainless steel tubes. The sampler will be driven or pushed below the open bottom of the hollow-stem auger. Relatively undisturbed samples will be retained for chemical analysis. Sample tubes collected in the split-barrel sampler will be retained (assuming 100% recovery), logged and/or chemically analyzed. If utilizing hand-auger equipment, brass or stainless steel tubes will be contained in a drive-sampler, and driven with a slide hammer. Subsequent to collection, the ends of the sample tubes will be covered with Teflon film or aluminum foil and sealed with a plastic cap.

Soil samples will be stored on-site in an ice chest and kept cool with "Blue-ice". The temperature inside of the cooler will be maintained at 4 degrees Celsius, plus or minus 2 degrees. Samples will be shipped under appropriate Chain-of-Custody (COC) protocol to the California Licensed Analytical Laboratory for chemical analyses. Chain-of-Custody protocols are further described in *Sample Chain-of-Custody.*

Soil Cutting Storage

Auger cuttings will be stored in DOT approved drums at an on-site location specified by the property owner. Results of chemical analyses will be used to assist the owner in appropriate disposal of the cuttings.

SOP 2 - GROUNDWATER MONITORING/EXTRACTION WELL CONSTRUCTION

Drilling and well completion will be observed by a geologist or engineer under the supervision of Licensed Engineer or Geologist.

Well Location and Depth

Monitoring/extraction well location, depth and screened interval are presented in Figures 2 and 3.

Well Materials and Specifications

Wells will be constructed with Schedule 40, four-inch (inside diameter), poly vinyl chloride (PVC) casing. Flush-joint well casing will be utilized, and no chemical cements or solvents will be used in the construction of the wells. The top of the well casing will be covered with a locking watertight plug, and a threaded PVC plug will be installed at the bottom of each well.

The screened interval of the well will consist of Schedule 40, machine-slotted PVC well screen, with 0.020-inch slots. The well screen will extend from approximately 2 feet above the observed groundwater level to the maximum depth of the well boring (18 feet below the groundwater surface). The annular space of the well will be packed with a No. 2/12 silica sand to approximately two feet above the perforations. A one foot thick bentonite seal will be placed above the sand and hydrated with potable water to provide a filter media between the well pack and surface seal. The remaining annulus will be backfilled with neat cement grout to within approximately one foot of the existing grade. Well casing, sand, and bentonite will be placed through the center of the hollow-stem auger. Grout backfill will be allowed to free-fall from the top of the well-boring.

A water and dust-resistant steel utility box with either PVC or galvanized steel skirting will be placed over the well casing. The top of the well casing will be surveyed relative to existing wells.

Well Development

The well will be developed using bailers, surge blocks, and pumps to remove sediments from the well pack and casing. At the conclusion of development, water levels will again be measured.

Groundwater-Elevation Measurements

Groundwater levels will be measured in each of the onsite monitoring wells prior to each sampling event, prior to aquifer pump testing, and during the course of the pump test. Groundwater levels will also be measured prior to purging and subsequent to sampling.

The groundwater level in wells will be measured using a Solinst, electronic depth sounding device, or equivalent water-level indicator. The depth-to-water measurement provided by the depth sounding device will be referenced to a previously surveyed reference point on the well head. The resulting groundwater surface elevation will be recorded. Depth and elevation measurements will be reported on sampling-logs and pump test-logs to the nearest 0.01 foot.

Instrumentation introduced into the well for the purpose of measuring water levels or depths of wells will be decontaminated prior to, and subsequent to, introduction to each well. Decontamination procedures are outlined in *Equipment Decontamination.*

Groundwater Sampling

A groundwater sample will be collected from the monitoring/extraction well. The well will be purged prior to sampling to remove water from the well casing and formation surrounding the well screen which may have undergone chemical/physical alteration through exposure to the atmosphere. Equipment used for purging will be thoroughly decontaminated prior to use and between wells. The well will be purged of at least four well volumes (well volume based on inside diameter of casing), or until measurements of pH, temperature, and specific electric conductivity (EC) have stabilized (pH constant within 0.1, temperature, constant within 1° Celsius, and EC within 10% of previous measurement). Specific conductance and pH meters will be calibrated at least once each day they are used. Purged monitoring-well water will be stored in 55-gallon drums.

Groundwater-Sampling Apparatus

After completion of purging, a groundwater sample will be drawn from the monitoring/extraction well using a clean Teflon bailer lowered partially through the groundwater surface, or with a submersible electric pump. Discharge rate during sampling will approximate 0.3 gallons per minute. Clean latex or nitrile gloves will be worn during the sampling process.

SOP 3 - SAMPLE PACKAGING AND TRANSPORTATION

Groundwater samples, including duplicates and travel blanks, will be preserved and containerized in accordance with specifications established below.

SUMMARY OF SAMPLE MANAGEMENT REQUIREMENTS

ANALYSES	HOLD TIME	CONTAINER	PRESERVE	MIN AMT
Reserved				
Reserved				
BTEX/TPH-Gas	14 days	2-40 ml VOC	HCl, pH<2, 4°C	40 ml (no air space), 10g
TPH-Diesel	14 days	2-250 ml	H_2SO_4	1/2 liter, 50g

Groundwater samples collected for TPH-G and BTEX will be collected in volatile-organics-analysis (VOA or VOC) vials, avoiding any unnecessary agitation of the samples. The groundwater sample will be allowed to fill each vial until overflowing. The septum cap will be replaced and the vial inverted and inspected to ascertain that the vial contains no headspace or trapped air bubbles. Samples will be carefully handled and packaged to protect sample integrity. Soil and groundwater samples will be cushioned with bubble wrap or styrofoam and placed in an insulated cooler for transportation. The cooler will be packed with "Blue-Ice" or "water-ice" to maintain a temperature of approximately 4° C. If delivered to the laboratory by commercial transport, the shipping container will be sealed with a tamper-indicative Custody Seal.

Sample Labeling

Each sample will be identified by a sample label. Each label will include, at a minimum, the following information:

- -- Sample Number
- -- Project Number
- -- Sampling Date
- -- Sampling Time
- -- Name of Sampling Personnel

Sample labels will be completed with waterproof ink.

Sample Chain-of-Custody

Soil and groundwater samples obtained for chemical analyses will be accompanied to the analytical laboratory by a Chain-of-Custody form. Chain-of-Custody forms will be initiated at the time of sampling. Duplicate Chain-of-Custody forms will be placed in the project file.

Chain-of-Custody documentation will include the following information:

- Name of Sampler
- Sample I.D. numbers
- Time of sample acquisition
- Requested analyses
- Remarks as warranted
- Signatures, times and dates of custody transfer

Sampling personnel will be responsible for the protection and custody of the samples until they are relinquished. When sample custody is transferred, the respective individuals relinquishing and receiving the samples will sign, date, and record the time on the Chain-of-Custody form. If the sample is relinquished to a common-carrier for shipping, the name of the carrier will be listed on the Chain-of-Custody form.

SOP 4 - FIELD LOGS/DOCUMENTATION

During drilling, well installation, and aquifer pump testing, site and equipment conditions, variances from the specified sampling procedures, field observations, instrumentation readings, and measurements will be thoroughly documented by the sampling personnel. Soils encountered during drilling will be visually classified according to ASTM Test Designation D2488. Penetration blow counts for driven samples, and PID readings will be recorded on the drilling logs.

During groundwater sampling, site and equipment conditions, purge rates and volumes, sampling procedures, field observations, instrumentation readings, and measurements will be documented. Groundwater sampling records will be completed for each well sampled. Sampling records will be accompanied by a daily field report. The information to be included on well development and groundwater sampling records is as follows:

- -- Name of personnel performing sampling
- -- Weather conditions
- -- Total depth of well, casing diameter, and well volume
- -- Equipment calibration procedures and frequencies
- -- Starting groundwater level
- -- Time log of groundwater removal
- -- Depth from which sample is collected
- -- Physical properties of groundwater (general clarity, temp., pH, EC, etc.)
- -- Total well volumes removed
- -- Flow rate of sample and purge pumps
- -- Time of sample acquisition
- -- Decontamination procedures
- -- Sample containers (number and type)
- -- Analyses to be performed
- -- Description of field blanks, travel blanks, etc.
- -- Final depth to water
- -- Problems and resolutions

SOP 5 - EQUIPMENT DECONTAMINATION

Prior to drilling each monitoring-well boring, augers will be steam cleaned. Steam cleaning will be conducted over plastic and rinsate waters will be retained and transferred to a 55-gallon drum for storage.

Between soil-sampling attempts, soil samplers will be disassembled and washed in a solution of low-phosphate laboratory-grade detergent, rinsed with clean water, and reassembled with clean sample liners to minimize the potential of spreading possible contaminants among samples.

Prior to groundwater sampling at each well location, well points, casing, Hydropunch samplers, purge pumps and associated hose will be decontaminated by washing with a low-phosphate detergent, followed by rinses with tap water. Flushing the pumps and hoses with hot water and steam will be considered adequate decontamination.

Instrumentation used to measure depth to water and total depth of wells, will be decontaminated by washing with a non-phosphate detergent and rinsing with tap water. Instrumentation used to measure pH, temperature, and specific conductance will be rinsed with de-ionized water after each measurement.

Decontamination procedures and use of decontaminated equipment will be documented in the field notes or logbook.

APPENDIX B

Health & Safety Plan

BSK & Associates

HEALTH AND SAFETY PLAN

1.0 ORGANIZATIONAL STRUCTURE

1.1 Client Supervisor - Randy Nahas

1.2 Contractor's Project Manager -_____

The Project Manager (PM) for the Contractor 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 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 will 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	
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 will result in cessation of work.

The worker breathing zone shall be monitored during field activities which will 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 1/2-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 will 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 by personel shall be 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 will 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 will 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 or well installation activities are anticipated 1/2-hour after sunset and 1/2-hour before sunrise. Sufficient lighting will be provided during the 48-hour pump test.

12.0 CONFINED SPACE ENTRY

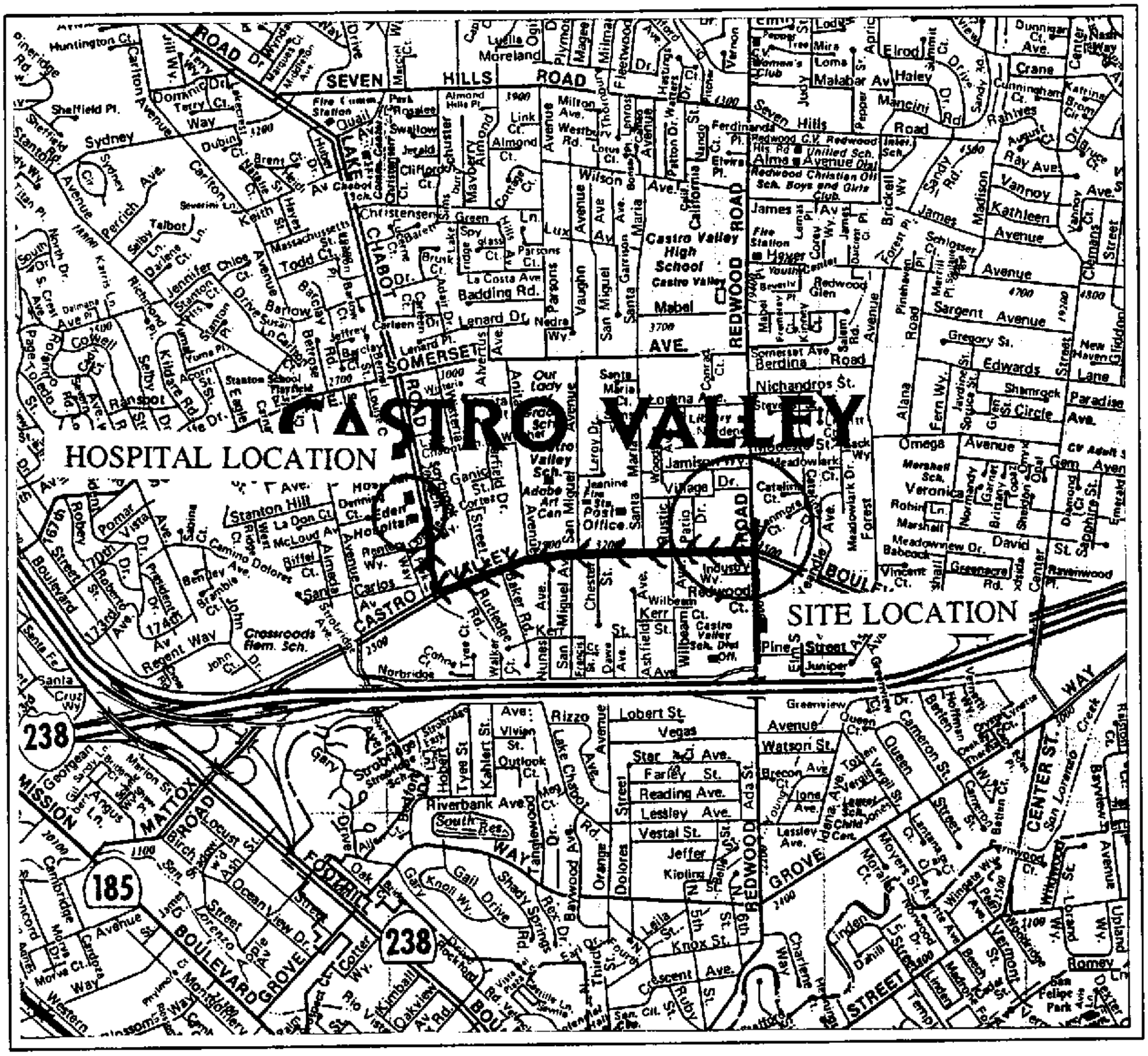
Confined space entry is not anticipated.

13.0 SITE EXCAVATION

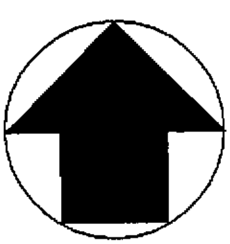
Excavations and bore-holes shall be securely covered to prevent accidental entry, or deliberate entry without tools. The excavations are anticipated to be less than 5 feet depth, therefore shoring will not be required. Prior to conducting any digging or boring operations, Underground Service Alert (USA) shall be notified at least 48 hours before subsurface activities begin.

BSK No. 04-40-0027

Figure B-1



NORTH



HOSPITAL ROUTE MAP

Tien's UNOCAL Station

20405 Redwood Road

Castro Valley, California