Environmental
Science &
Engineering, Inc.
A CILCORP Company

April 28, 1994

Ms. Juliet Shin
Hazardous Materials Specialist
Alameda Health Care Services Agency
Department of Environmental Health
80 Swan Way, #200
Oakland, California 94621

SUBJECT: WORKPLAN FOR ADDITIONAL SITE ASSESSMENT
FORMER BILL CHUN'S SERVICE STATION
2301 SANTA CLARA AVENUE
ALAMEDA, ALAMEDA COUNTY, CALIFORNIA
ESE PROJECT #6-93-5112

Dear Ms. Shin:

Environmental Science & Engineering, Inc. (ESE) presents this subject workplan for additional investigation at the subject site for review and comment by the Alameda County Health Care Services Agency, Department of Environmental Health (Alameda County). The objective of the scope of work outlined herein is to delineate the horizontal extent of petroleum hydrocarbons in the subsurface in the approximate downgradient direction from the site. Tasks associated with these objectives are described below. All aspects of the work described in this workplan will be conducted under the direct oversight of a Registered California Geologist.

1.0 BACKGROUND

Investigation at the subject site (see Figure 1 - Location Map) was initiated on July 31, 1992 when three steel underground gasoline tanks (two 550-gallon and one 285-gallon) were removed from the site. The consultant of record (Parker Environmental Services) reported that the 285-gallon tank was observed to have a two-inch diameter hole at its base.

One soil sample was collected from beneath each tank and from beneath the former fuel island, and two soil samples were collected from the stockpile resulting from tank excavation. Analytical results for soil samples reported concentrations of Total Petroleum Hydrocarbons as Gasoline (TPH-G) ranging from 2.1 to 16,000 milligrams per kilogram (mg/kg) or parts per million (ppm). Concentrations of Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) were shown to range from 0.011 to 1,400 ppm.

In January 1993, ESE conducted a Preliminary Site Assessment (PSA) at the subject site. Three ground-water monitoring wells (MW-1, MW-2, and MW-3; Figure 2 - Site Map) were installed and soil and ground water samples were collected during those activities. Analytical results for soil samples collected from MW-1, MW-2, and MW-3 reported concentrations of TPH-G ranging from 640 ppm to 5,800 ppm. Reported concentrations of BTEX ranged from non-detectable to 1,200 ppm. Analytical results for ground water samples reported concentrations of TPH-G ranging from 8,500 micrograms per liter (ug/L) or parts per billion (ppb) to 110,000 ppb. Concentrations of BTEX were shown to range from non-detectable to 20,000 ppb. Samples from wells MW-1 and MW-2 reported 1,2-Dichloroethane (EDC) present at concentrations of 470 ppb and 550 ppb, respectively. Results of the investigation are summarized in ESE's March 31, 1993 "Report on Preliminary Site Assessment at the Former Bill Chun Texaco Service".

In September 1993, ESE conducted an additional investigation at the site. Four ground water monitoring wells (MW-4, MW-5, MW-6, and MW-7; Figure 2 - Site Map) were installed and soil and ground water samples were collected during those activities. Aquifer testing and analyses were also conducted during this investigation. Analytical results for soil samples collected from borings MW-4, MW-5, MW-6, and MW-7 reported concentrations of TPH-G ranging from non-detectable to 13,000 ppm and concentrations of BTEX ranging from non-detectable to 1,600 ppm. Analytical results for ground water samples reported concentrations ranging from 0.44 ppm to 140 ppm TPH-G and concentrations of BTEX ranging from 0.001 ppm to 46 ppm. Results of the investigation are summarized in ESE's October 1, 1993 "Report of Findings, Additional Site Assessment and Third Quarter 1993 Ground Water Monitoring."

ESE is currently under contract to perform quarterly monitoring for the site through the Second Quarter 1994. The results of Fourth Quarter 1993 ground water monitoring were presented in ESE's January 6, 1994 "Fourth Quarter 1993 Ground Water Monitoring" report. Those results documented that free phase petroleum hydrocarbons approximately 0.8 feet thick were present in well MW-5. ESE continues to monitor water levels and product thicknesses on a monthly basis.

First Quarter 1994 ground water monitoring results are preliminary; however, free product thicknesses up to 0.03 feet were observed in wells MW-5 and MW-7. Overall, concentrations of petroleum hydrocarbons in ground water did not change significantly relative to Fourth Quarter 1993 results.

2.0 SCOPE OF WORK

The proposed scope of work in the workplan will include the following activities:

- Pre-field activities, to include preparation of a project-specific health & safety plan (HASP) and obtaining appropriate permits;
- Recovery of free product in wells MW-5 and MW-7 via bailing or passive skimmer;
- Excavation of additional hydrocarbon impacted soil within the existing UST excavation at the site, and appropriate backfilling to grade;
- Drilling additional borings offsite and collection of "grab" ground water samples using Hydropunch® technology for the purpose of assessing the offsite extent and nature of petroleum hydrocarbon impacted soil and ground water;
- Short-term soil vapor extraction testing;
- Investigation of possible offsite sources of petroleum hydrocarbons in soil and ground water via agency file review, aerial photograph evaluation, and area reconnaissance; and,
- Preparation of a report of findings documenting this phase of site investigation.

Specific tasks are detailed below.

2.1 TASK 1 - PRE-FIELD ACTIVITIES

ESE will update the existing HASP to reflect the proposed activities and associated dates. The HASP will address potential physical and chemical hazards associated with the proposed work. The HASP plan will be reviewed and approved by ESE's Concord Office Health & Safety Officer prior to its implementation. All personnel who are to be present during any of the proposed activities will be required to review the plan and to acknowledge its receipt and review before being allowed within the work zone.

Prior to implementation of proposed field activities, appropriate applications for proposed offsite borings to the Alameda County Zone 7 Water Agency (Zone 7) will be prepared and submitted. As described below for Task 4, three offsite borings are to be drilled in City of Alameda right-of-way for the purpose of collecting "grab" ground water samples. Concurrent with application for well permits through Zone 7, ESE will obtain the appropriate excavation permits through the City of Alameda Central Permit Office.

In conjunction with permitting activities, appropriate notification to Underground Service Alert (USA) will be made regarding well locations. Additionally, representatives of the City of Alameda Public Works Department will be consulted to identify any City utilities in the vicinity of proposed drilling locations.

If required, a permit for onsite soil aeration will be obtained through the Bay Area Air Quality Management District (BAAQMD).

2.2 TASK 2 - PERFORM INTERIM REMOVAL OF FREE PRODUCT

ESE's Fourth Quarter 1993 and First Quarter 1994 ground water monitoring at the site revealed that existing wells MW-5 and MW-7 contain a thin layer of free product. For a period of two months, free product will be bailed from the two wells on a weekly basis. Alternatively, passive skimmers will be installed in the wells and evacuated weekly over the same period. The most cost-effective approach, based primarily on potential volumes of free product recovered, will be employed. Free product removed from the wells will be stored onsite in DOT rated 55-gallon drum(s), pending appropriate disposal.

At the end of the proposed period for interim free product removal, the merits of establishing long-term hydraulic control for free product removal will be evaluated. If appropriate, a remedial action plan addressing, at a minimum, continued passive removal of free product from any wells shown to contain free product will be prepared. Additional remedial activities will be proposed at that time, as appropriate.

2.3 TASK 3 - OVERSEE EXCAVATION OF ADDITIONAL IMPACTED SOIL

Based on soil sampling results associated with tank excavation reported by Parker Environmental Services and visual observations by ESE staff, soil impacted with petroleum hydrocarbons is present within the existing excavation. In Alameda County's October 7, 1993 letter to Mr. Wayne Chun regarding this site, the agency concurred with ESE's finding that additional soil should be removed. The limits of the existing excavation are shown in the attached Figure 2.

To the extent possible on this site (the existing fuel island/canopy/kiosk structure and the building located immediately northeast of the excavation preclude significant additional excavation), additional excavation of the existing tank pit to a depth just below ground water occurrence (approximately 10 feet below grade) will be performed. ESE estimates that only about 75 cubic yards of soil will be removed. Excavated soil will be stockpiled and aerated onsite pending determination of appropriate treatment and/or disposal technology. The same physical constraints limiting over-excavation also hinder confirmation sampling. Confirmation samples will be collected from sidewalls under the supervision of an Alameda

County representative, as appropriate. Floor samples will not be collected due to the anticipated occurrence of ground water in the base of the excavation. It is assumed that removal of the existing kiosk and canopy will not be necessary. Excavated soil will be stockpiled on and underneath plastic sheeting.

Because the extent to which excavated soil has been impacted by petroleum hydrocarbons is not currently known, it is not possible to accurately evaluate the degree to which excavated soil will require pretreatment (aeration) prior to disposal. Based on analytical results for soil samples, appropriate treatment/disposal options will be evaluated and presented in the report of findings to be prepared following this investigation.

The contractor selected to perform additional excavation will also coordinate appropriate backfilling and compaction of the existing tank pit. This pit has been a safety concern to the Alameda County and Alameda Fire Department, and will be backfilled as soon as possible.

2.4 TASK 4 - ADDITIONAL DRILLING/SAMPLING

ESE will direct the drilling of three additional soil borings (HP-1, HP-2, and HP-3; Figure 2) to an approximate depth of 10 feet below ground surface (bgs). The purpose of the borings will be to provide additional definition of petroleum hydrocarbons in soil, and to allow collection of "grab" ground water samples in the open boreholes (using Hydropunch® technology) at locations up-, down-, and crossgradient relative to the site.

Borings will be drilled in accordance with ESE Standard Operating Procedure (SOP) No. 1 for Soil Borings and Soil Sampling with Hollow-Stem Augers in Unconsolidated Formations (attached). Drilling services will be provided by a California-licensed C-57 drilling contractor.

Soil samples will be collected at approximate five-foot intervals in each boring while drilling to visually evaluate soil characteristics and to screen soil for organic vapors using a field photoionization detector (PID). Soil samples from the approximate five-foot depth and ground-water/unsaturated zone interface (9-10 feet bgs) will be submitted to a State-certified laboratory to be analyzed for TPH-G, Total Petroleum Hydrocarbons as Diesel (TPH-D) and BTEX using Environmental Protection Agency (EPA) method 8240/8260, and for chlorinated hydrocarbons using EPA Method 8010.

After drilling to a depth approximately equivalent to the anticipated occurrence of first ground water, "grab" ground water samples will be collected using the Hydropunch® technique. This procedure involves pushing a Hydropunch® sampler approximately 2.5 to 3 feet through and ahead of the hollow-stem augers once total boring depth has been reached (near the presumed vadose zone/saturated zone interface). The outer sheath of the sampler is then retracted to expose a Teflon screen to the subsurface, allowing ground

water to fill the sampler. After the sampler fills, ground water is extracted from the screen using a stainless steel or disposable Teflon bailer. Ground water samples collected from each boring will be preserved and submitted with soil samples to the laboratory and analyzed for TPH-G, TPH-D, BTEX, and chlorinated hydrocarbons using the methodology described above.

In ESE's October 1, 1993 report, it was indicated that an approximately one-foot thick zone of soil, at the approximate vadose/saturated zone interface 10 feet bgs, contains elevated concentrations of petroleum hydrocarbons throughout the site, and that excavation would likely not be an appropriate remedial approach. Subsequent to completion of soil and ground water sampling described above, a vadose zone well (SV-1) will be installed at the approximate location shown in Figure 2 for the purpose of determining if vapor extraction will be a viable remedial approach. This location optimizes site conditions for vent testing, because nearby wells MW-1, MW-2, MW-5, and MW-6 can be used for monitoring.

Well SV-1 will be constructed of two-inch diameter PVC to ten feet deep in an eight-inch diameter boring, and will be screened from five to ten feet below grade.Soil samples will be collected at the approximate five-foot depth and unsaturated zone/ground water interface in the well and submitted to the laboratory for analysis as described above.

2.5 TASK 5 - CONDUCT VAPOR EXTRACTION TESTING

SVE test objectives will be to:

- Estimate the rate of petroleum hydrocarbon extraction achievable;
- Estimate the zone of influence of vapor extraction; and,
- Observe changes in soil vapor concentrations during extraction testing at monitoring wells.

An approximately four-hour duration SVE test will be performed at well SV-1 (as the extraction well) using ESE's test trailer. The test equipment consists of a vacuum blower, moisture knockout drum, granular activated carbon (GAC), flowmeters and temperature, pressure and vacuum gages.

Prior to initiating vapor extraction, initial vacuum and vapor concentration measurements will be taken at selected monitoring wells (MW-1, MW-2, MW-5, and MW-6; Figure 2). This will be done to establish a baseline against which changes caused by vapor extraction can be evaluated. A vacuum will then be applied to the extraction well while measuring induced vacuums at the monitoring points.

Vapor samples will be collected from all monitoring wells at regular intervals using Tedlar bags and field tested for total hydrocarbons using a photo ionization detector (PID) calibrated in parts per million by volume (ppmv) as hexane. The PID readings will be taken to monitor vapor concentrations at the individual monitoring points. The extracted air flow rate will be measured at the extraction well using a variable area flowmeter (rotameter).

The extracted vapor will be treated using granular activated carbon prior to discharge in accordance with Bay Area Air Quality Management District guidelines. A total of three extracted vapor samples will be collected using Tedlar bags at regular intervals during the test and tested for total hydrocarbons using the PID. In addition, two air samples will be collected at the beginning and end of the test and analyzed in a certified laboratory by EPA Methods 8015/8020 for TPH-G and BTEX.

The SVE test will be performed by applying a vacuum to the unsaturated (vadose) zone through well SV-1 screened within the plume of soil contamination. At the same time, the effects of vapor extraction are monitored at vapor monitoring wells screened in the same zone and located at varying distances from the extraction well. The variables monitored include extracted air flow rate, extracted vapor concentration, induced vacuum at monitoring wells and concentration changes at monitoring wells. The pilot test data provide estimates of the zone of influence due to vapor extraction, extracted vapor composition and the rate of hydrocarbon extraction. This preliminary information is used to determine well placement, size vapor abatement equipment and estimate time for remediation for a full scale vapor extraction system design.

2.6 TASK 6 - PERFORM PHASE I ENVIRONMENTAL SITE ASSESSMENT

ESE has indicated in previous reports that petroleum hydrocarbons are present along the southwestern (upgradient) site margin (Figure 2) which may be sourced at a location separate from the site. Furthermore, it is the site owner's recollection that the facility located immediately northeast of the site, along Santa Clara Avenue (Figure 2) operates or operated an underground fuel tank in the past.

A limited Phase I environmental site assessment (ESA) will be performed to identify and assess characteristics of vicinity properties that may be of environmental concern to the site, particularly with respect to fuel leak sites. It is anticipated that the following activities will be completed for this ESA:

- Observation of adjacent properties and site vicinity. The observations will be completed from the vantage point of the public right-of way. Special emphasis will be placed on investigating surrounding land uses that are of greater environmental significance such as print shops, dry cleaners, and other sources for petroleum hydrocarbons and/or solvents. Specific operations or sites may be further researched with local regulatory agencies.

- Regulatory agency research through review of current database of listings of regulatory permits, registrations, enforcement actions, and contaminated sites. The most current listings of fuel leak or toxic release sites within 1/4-mile will be reviewed. Sites of concern listed within 1/4-mile of the site will be further researched, if possible at an appropriate local regulatory agency if incomplete or conflicting information is found.

- Vicinity parcel and utility maps will be obtained and reviewed through the Alameda County Assessors Office and City of Alameda Public Works Department.

Findings for the ESA will be incorporated with the report of findings described below.

2.7 TASK 7 - PREPARE A REPORT OF FINDINGS

Upon completion of field activities described and receipt of analytical results for soil, ground water, and vapor samples, a report of findings will be prepared and submitted to Alameda County, the Regional Board, and the Alameda Fire Department for review. The report will detail all activities and results associated with the investigation. Results will be summarized in both tabular and graphical form, and all raw data (laboratory reports, boring/well completion logs, field logs, etc.) will be incorporated as appendices to the report.

3.0 TENTATIVE PROGRESS AND REPORTING SCHEDULE

The referenced tasks will be performed in a timely manner subject to the tentative schedule presented below.

Task/Activity	Estimated Start Date	Estimated Compl. Date
1) Pre-Field Activities	05/23/94	06/03/94
2) Perform Interim Removal of Free Product	06/06/94	08/12/94
3) Oversee Excavation of Additional Impacted Soil	06/06/94	06/17/94
4) Additional Drilling/Sampling	06/06/94	06/10/94
5) Conduct Vapor Extraction Testing	06/20/94	06/24/94
6) Perform Phase I ESA	05/23/94	06/10/94
7) Prepare a Report of Findings	06/13/94	07/08/94

If you have any questions or require additional information regarding this workplan, please contact Mike Quillin at (510) 685-4053.

Sincerely,

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

Michael E. Quillin, R.G. 5315
Senior Hydrogeologist

Susan S. Wickham, R.G. 3851
Senior Geologist

Attachments: Figures (2)
ESE SOPs (3)

pc: Mr. Wayne Chun

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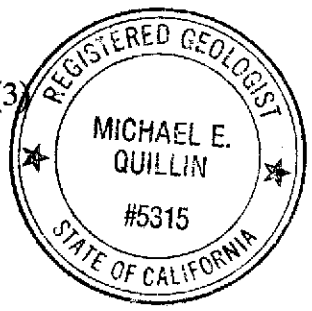
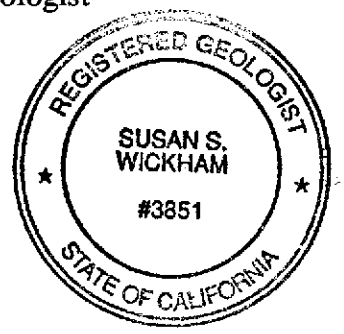
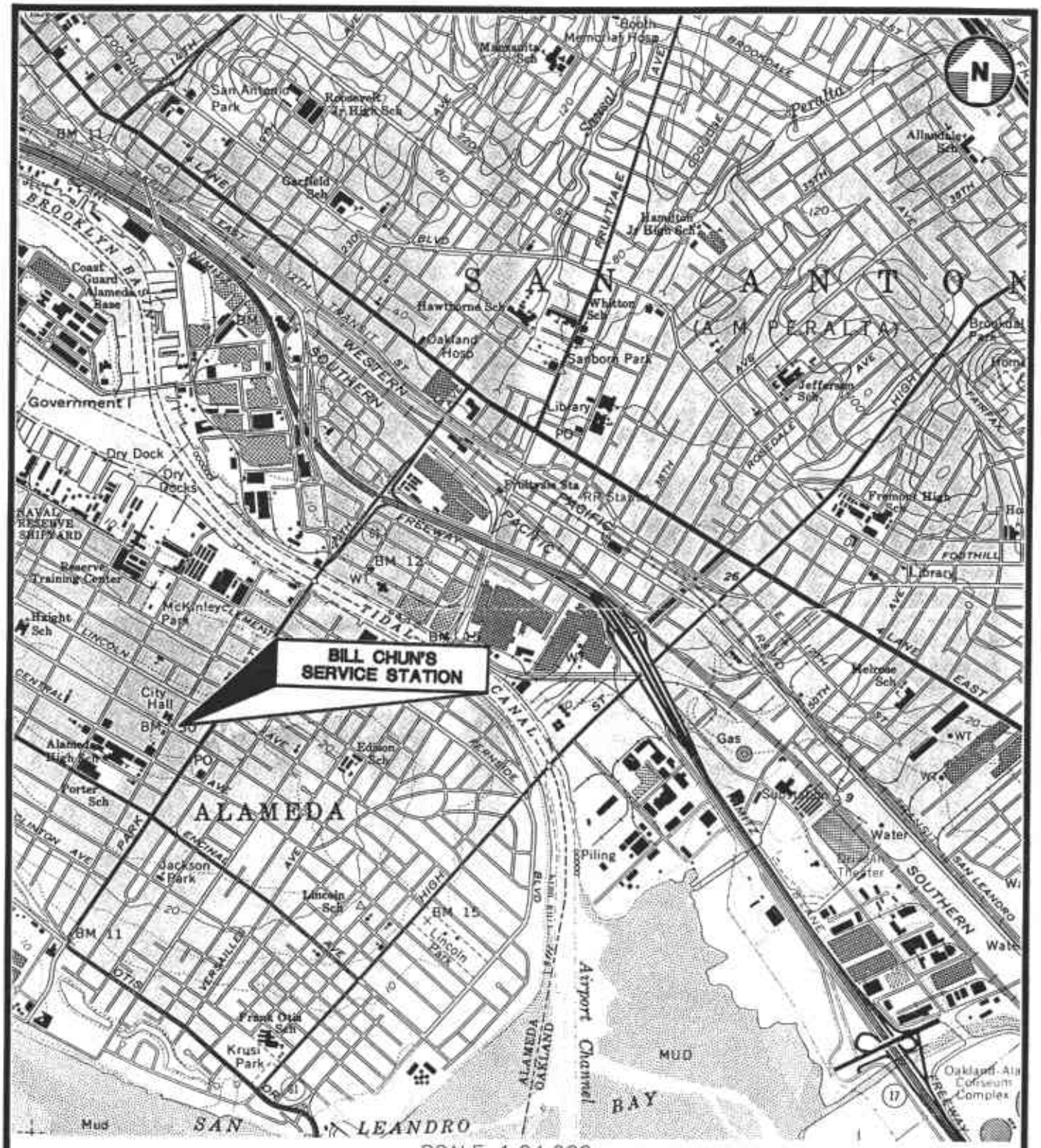
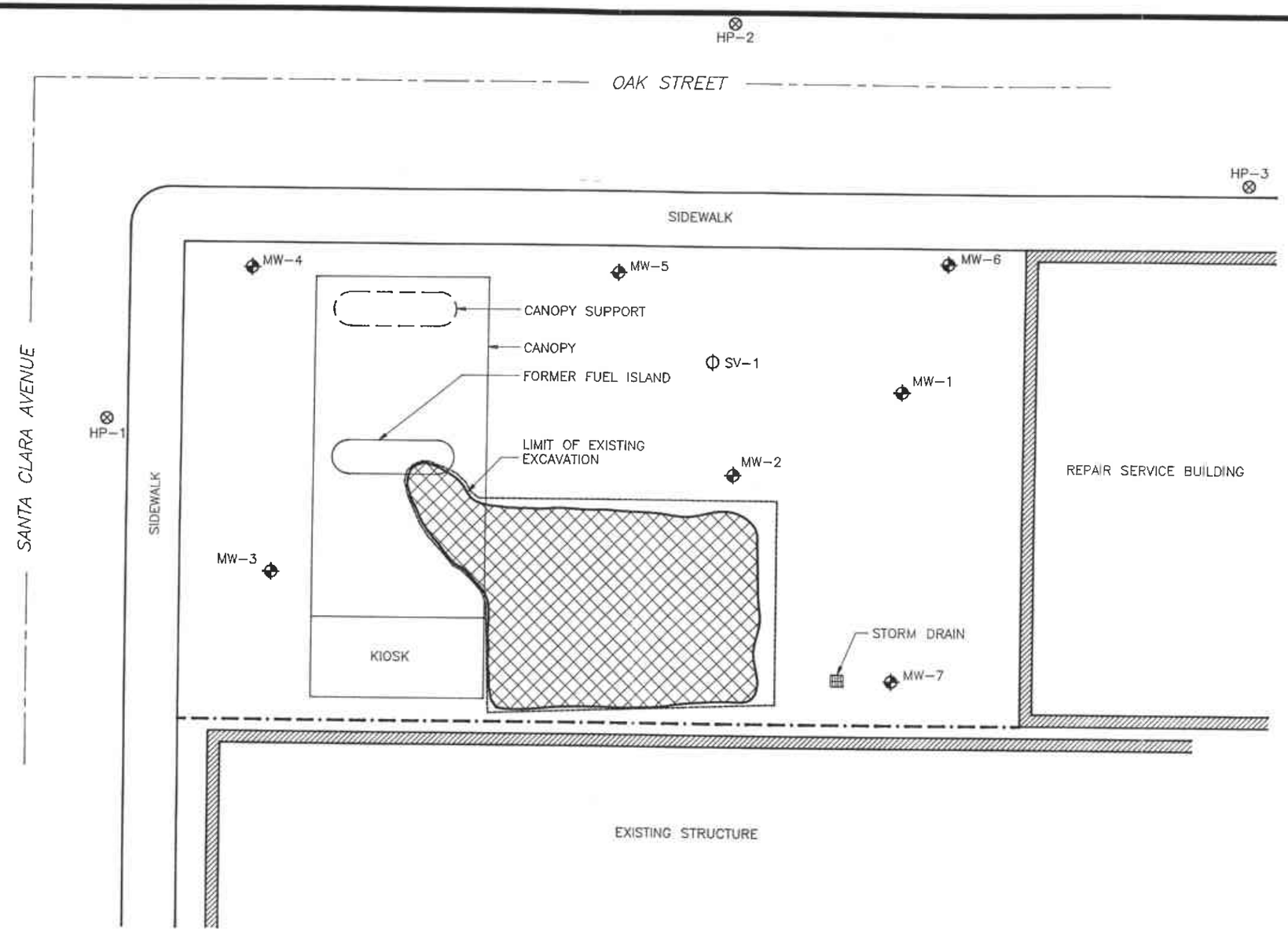






ADAPTED FROM U.S.G.S. OAKLAND EAST 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP, 1959, PHOTOREVISED 1980.

ESE A CELCORP Company — Environmental Science & Engineering, Inc.	DATE 8/93	LOCATION MAP	FIGURE NO. 1
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	REVISED	BILL CHUN'S SERVICE STATION 2301 SANTA CLARA AVENUE ALAMEDA, CALIFORNIA	PROJ. NO. 6-93-5112
	CAD FILE 51121001		



LEGEND

- EXISTING MONITORING WELL LOCATION
- PROPERTY BOUNDARY
- PROPOSED SOIL BORING/HYDROPUNCH®
- PROPOSED VADOSE ZONE WELL
- PROPOSED OVEREXCAVATION LIMITS

SCALE
0 10 FEET

ESE A CALCORP Company
Environmental Science & Engineering, Inc.
4090 NELSON AVENUE, SUITE J
CONCORD, CA 94520

DATE 12/93
REVISED 4/94 MEQ
CAD FILE 51121007

SITE MAP

BILL CHUN'S SERVICE STATION
2301 SANTA CLARA AVENUE
ALAMEDA, CALIFORNIA

FIGURE NO. 2
PROJ. NO. 6-93-5112

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE

STANDARD OPERATING PROCEDURE NO. 1
FOR SOIL BORINGS AND SOIL SAMPLING WITH HOLLOW-STEM AUGERS IN UNCONSOLIDATED FORMATIONS

Environmental Science & Engineering, Inc. (ESE) typically drills soil borings using a truck-mounted, continuous-flight, hollow-stem auger drill rig. The drill rig is owned and operated by a drilling company possessing a valid State of California C-57 license. The soil borings are conducted under the direct supervision and guidance of an experienced ESE geologist. The ESE geologist logs each borehole during drilling in accordance with the Unified Soil Classification System (USCS). Additionally, the ESE geologist observes and notes the soil color, relative density or stiffness, moisture content, odor (if obvious) and organic content (if present). The ESE geologist will record all observations on geologic boring logs.

Soil samples are collected during drilling at a minimum of five-foot intervals by driving an 18-inch long Modified California Split-spoon sampler (sampler), lined with new, thin-wall brass sleeves, through the center of and ahead of the hollow stem augers, thus collecting a relatively undisturbed soil sample core. The brass sleeves are typically 2-inches in diameter and 6-inches in length. The sampler is driven by dropping a 140-pound hammer 30-inches onto rods attached to the top of the sampler. Soil sample depth intervals and the number of hammer blows required to advance the sampler each six-inch interval are recorded by the ESE geologist on geologic boring logs. The ends of one brass sleeve are covered with Teflon sheeting, then covered with plastic end caps. The end caps are sealed to the brass sleeve using duct tape. Each sample is then labeled and placed on ice in a cooler for transport under chain of custody documentation to the designated analytical laboratory. A portion of the remaining soil in the sampler is placed in either a new Ziploc® bag or a clean Mason Jar® and set in direct sunlight to enhance the volatilization of any Volatile Organic Compounds (VOCs) present in the soil. After approximately 15-minutes that sample is screened for VOCs using a photoionization detector (PID). The PID measurements will be noted on the geologic boring logs. The PID provides qualitative data for use in selecting samples for laboratory analysis. Soil samples from the saturated zone (beneath the ground-water table) are collected as described above, are not screened with the PID, and are not submitted to the analytical laboratory. The samples from the saturated zone are used for descriptive purposes. Soil samples from the saturated zone may be retained as described above for physical analyses (grain size, permeability and porosity testing).

If the soil boring is not going to be completed as a well, then the boring is typically terminated upon penetrating the saturated soil horizon or until a predetermined interval of soil containing no evidence of contamination is penetrated. This predetermined interval is typically based upon site specific regulatory or client guidelines. The boring is then backfilled using either neat cement, neat cement and bentonite powder mixture (not exceeding 5% bentonite), bentonite pellets, or a sand and cement mixture (not exceeding a 2:1 ratio of sand to cement). However, if the boring is to be completed as a monitoring well, then the boring is continued until either a competent, low estimated-permeability, lower confining soil layer is found or 10 to 15-feet of the saturated soil horizon is penetrated, whichever occurs first. If a low estimated-permeability soil layer is found, the soil boring will be advanced approximately five-feet into that layer to evaluate its competence as a lower confining layer, prior to the termination of that boring.

All soil sampling equipment is cleaned between each sample collection event using an Alconox® detergent and tap water solution followed by a tap water rinse. Additionally, all drilling equipment and soil sampling equipment is cleaned between borings, using a high pressure steam cleaner, to prevent cross-contamination. All wash and rinse water is collected and contained onsite in Department of Transportation approved containers (typically 55-gallon drums) pending laboratory analysis and proper disposal/recycling.